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YIGO, GU
07/02/2002

THE UNITED STATES AIR FORCE

INSTALLATION RESTORATION PROGRAM

FINAL
RECORD OF DECISION
FOR
HARMON ANNEX OPERABLE UNIT

ANDERSEN AIR FORCE BASE, GUAM

July 2002

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13. ABSTRACT ***(Maximum 200 words)***

This Record of Decision presents the rationale behind a No Further Action decision for Installation Restoration Program (IRP) Site 18/Landfill 23, Site 19/Landfill 24, and Site 39/Harmon Substation located at Harmon Annex, Andersen Air Force Base, Guam. This Record of Decision summarizes the history, environmental background, extent of contamination, associated risks, implemented remedial alternatives, and the post-remedial status of the Harmon Annex Operable Unit.

14. SUBJECT TERMS

- *Andersen AFB*
- *Remedial Investigation*
- *No Further Action*
- *Human Health Risk Assessment*
- *Ecological Risk Assessment*

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BTVs	Background Threshold Values
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CSM	Conceptual Site Model
CRP	Community Relations Plan
CY	Cubic Yards
DAWR	Department of Aquatic and Wildlife Resources DSI Detailed Site Inventory
EA	EA Engineering, Science, and Technology, Inc.
EBS	Environmental Baseline Survey
EOD	Explosive Ordnance Disposal
˚F	degrees Fahrenheit
ft	feet
FFA	Federal Facility Agreement
GEPA	Guam Environmental Protection Agency
GovGuam	Government of Guam
GSA	General Services Administration
GWA	Guam Waterworks Authority
HSWA	Hazardous and Solid Waste Act of 1982
ICF	ICF Technology, Inc.
IRP	Installation Restoration Program
IT/OHM	IT Corporation
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MARBO	Marianas Bonins Command
MCL	Maximum Contaminant Level
mgd	million gallons per day
mg/kg	milligrams per kilogram
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NCS	U.S. Naval Communication Station
NFA	No Further Action
NFRAP	No Further Response Action Planned
NGL	Northern Guam Lens
OU	Operable Unit
OSWER	Office of Solid Waste and Emergency Response

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

P.L.	Public Law
PACAF	Pacific Air Force
PAH	polycyclic aromatic hydrocarbon
PCBs	poly chlorinated biphenyls
PRG	Preliminary Remediation Goal
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RGO	Remedial Goal Objective
RI	Remedial Investigation
RL	reporting limit
ROD	Record of Decision
RPM	Remedial Program Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOC	semivolatile organic compound
TEQ	Toxicity Equivalent Quotient
TPH	Total Petroleum Hydrocarbons
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USN	United States Navy
UXO	Unexploded Ordnance
VOC	volatile organic compound
WWII	World War II

1. DECLARATION

1.1 Site Name and Location

Andersen Air Force Base (AFB), Harmon Annex Operable Unit (OU), Guam, USA

1.2 Statement of Basis and Purpose

This Record of Decision (ROD) is a legal technical document prepared for the Harmon Annex OU comprised of three Installation Restoration Program (IRP) sites at Andersen AFB in Guam. The three IRP sites are Site 18 (Landfill 23), Site 19 (Landfill 24), and Site 39 (Harmon Substation), including the groundwater underlying the sites. The purpose of this ROD is to present the public with a consolidated source of information regarding the history, environmental background, extent of contamination, associated risks, implemented remedial alternatives, and the post-remedial status of the Harmon Annex OU.

According to Chapter IX of the Interim Final Guidance on Preparing Superfund Decision Documents (USEPA, 1989a), this ROD is a "unique" case where remedial alternatives have already been implemented and *No Further Action* is proposed for the three Harmon Annex sites. The United States Air Force (USAF), the United States Environmental Protection Agency (USEPA) Region IX, and the Guam Environmental Protection Agency (GEPA) concur with the *No Further Action* decision presented in this ROD. The *No Further Action* is warranted because previous removal actions have already mitigated the sites, and the Harmon Annex OU poses no current or future threat to human health or the environment (USEPA, 1989a). Subsequently, the standard ROD formats have been modified to present the *No Further Action* decision in accordance with the Administrative Record for the sites and in compliance with 40 Code of Federal Regulations (CFR), Part 300. The CFR included the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Hazardous and Solid Waste Act of 1982 (HSWA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plain of 1990 (NCP).

1.3 Description of the Selected Remedy: *No Further Action*

1.4 Declaration Statement

The *No Further Action* alternative was recommended for Sites 18, 19, and 39. Based on the *Final Remedial Investigation (RI) for Harmon Annex* OU (EA, 2000), there was no supporting evidence that Site 18, covering approximately 42.2 acres, was ever used as a landfill. Subsequently, Site 18 was classified as an Area of No Suspected Contamination.

Sites 19 and 39 were used in part as landfills. Sites 19 and 39 cover approximately 28.1 and 8.3 acres, respectively. Debris and Constituents of Concern (COCs) were identified at some areas of the sites. The USAF decided to establish conservative cleanup standards based on the USEPA Region IX, Residential Preliminary Remediation Goals (PRGs) due to the urgency in transferring Harmon Annex sites to the Government of Guam (GovGuam). Based on mutual agreement between the USAF, USEPA Region IX, and GEPA, soil removal and off-site land disposal was selected as a cleanup alternative for Sites 19 and 39. This removal action was protective of human health and the environment and complied with federal and territorial (Guam) requirements that were legally applicable or relevant and appropriate. The groundwater beneath Sites 18, 19, and 39 is approximately 320 feet below ground surface (bgs) with a westward flow towards the Philippine Sea. No COCs were detected in the groundwater under Harmon Annex above the Maximum Contaminant Levels (MCLs), or PRGs for tap water, with the exception of chloroform, chromium, and nickel. These compounds do not represent groundwater contamination because chloroform is associated with laboratory contamination and chromium and nickel are attributed to corrosion of the stainless steel piston pump and well screen.

After removing the sources of all COCs, Sites 19 and 39 are classified as a Category IV, No Further Response Action Planned (USAF, 1995). Furthermore, the removing of any contaminant source was cost effective in providing a permanent solution for these sites and precluding long-term monitoring requirements as well as future five-year reviews that are associated with some other remedial alternatives.

1.5 Signature and Supported Agency Acceptance of the Remedy

The following signature pages document that the USAF, USEPA Region IX, and GEPA supported acceptance of the remedy.

This signature page documents that the USAF supports acceptance of the remedy for the Harmon Annex OU.

________________________________ ___________________________

Eugene D. Santarelli
Lieutenant General,
U.S. Air Force Vice Commander,
Pacific Air Forces

Date

This signature page documents that the USEPA Region IX supports acceptance of the remedy for the Harmon Annex OU.

_______________________________________ ____________________________

Daniel A. Meer
Chief Federal Facilities Cleanup Branch
U.S. Environmental Protection Agency, Region IX

Date

This signature page documents that the GEPA supports acceptance of the remedy for the Harmon Annex OU.

____________________________________ __________________________

Jesus Salas
Administrator
Guam Environmental Protection Agency

Date

2. DECISION SUMMARY

This decision summary has been prepared for IRP Sites 18, 19, and 39 located at Harmon Annex. The purpose of this decision summary is to provide an overview of each site's description, environmental characteristics, history, public involvement, extent of contamination, associated human health and ecological risks, remedial alternatives, and rationale for implementing the remedy of choice in light of statutory requirements. A detailed RI report was completed for the above-referenced sites in November 2000 (EA, 2000).

2.1 Site Name, Location, and Description

Guam is the largest and southernmost island of the Mariana Islands in the western Pacific Ocean. Relative to Guam, Hawaii is 3,700 miles to the east and Japan is 1,560 miles to the north (Figure 2-1). Guam is approximately 30 miles long, varies in width from 4 to 12 miles, and has a total land area covering approximately 209 square miles.

Andersen AFB consists of multiple parcels of land located on the northern half of the island (Figure 2-2). The Main Base property includes the Main Base and Northwest Field and is about 8 miles wide, 2 to 4 miles long, and covers approximately 24.5 square miles. The Main Base is the center of active base operations and Northwest Field has been relatively inactive since the early 1950s. In addition to the Main Base and Northwest Field (which together cover 15,463 acres), Andersen AFB occupies other smaller areas to the south, including the Marianas Bonins Command (MARBO) Annex and the Harmon Annex (Figure 2-2). The MARBO Annex, covering 2,432 acres, lies about 4 miles south of the Main Base. The Harmon Annex, with 1,817 acres, is located approximately 4 miles south of Northwest Field.

The Harmon Annex is bordered by the U.S. Naval Communication Station (NCS) to the north, Marine Drive (Route 1) to the south, Route 3 to the east, and the coastal cliffline to the west (Figure 2-3). The Harmon Annex includes Site 18, Site 19, and Site 39, which are the focus of this ROD.

Site 18, with no buildings or structures, is located in an undeveloped area north of Harmon Village, approximately 300 feet north of Beach Road. In August 1992, a site reconnaissance was conducted that expanded the study boundary of Site 18 to cover approximately 42.2 acres, as shown in Figure 2-4. Site 19, with a total of 28.1 acres, is located just north of Harmon Village. Site 19 is comprised of Parcel A (9.4 acres), Parcel B (12.3 acres), and Parcel C (6.4 acres), which are separated by Beach Road, 10th Street, and 13th Street, respectively (Figure 2-5). With the exception of two concrete pads and one concrete slab at Landfill 24A, Site 19 includes no buildings or structures. Site 39 (8.3 acres) is located north of Marine Drive and adjacent to the Guam Power Authority Electrical Substation, across from the Micronesia Mall. Site 39 includes an oil/water separator, an electric vault, a cathodic converter, and a stormwater outfall as shown in Figure 2-6.

The Harmon Annex ranges in elevation from 220 feet to 320 feet mean sea level (msl) and Sites 18, 19, and 39 are approximately 310 feet, 280 feet, and 260 feet above msl, respectively. The

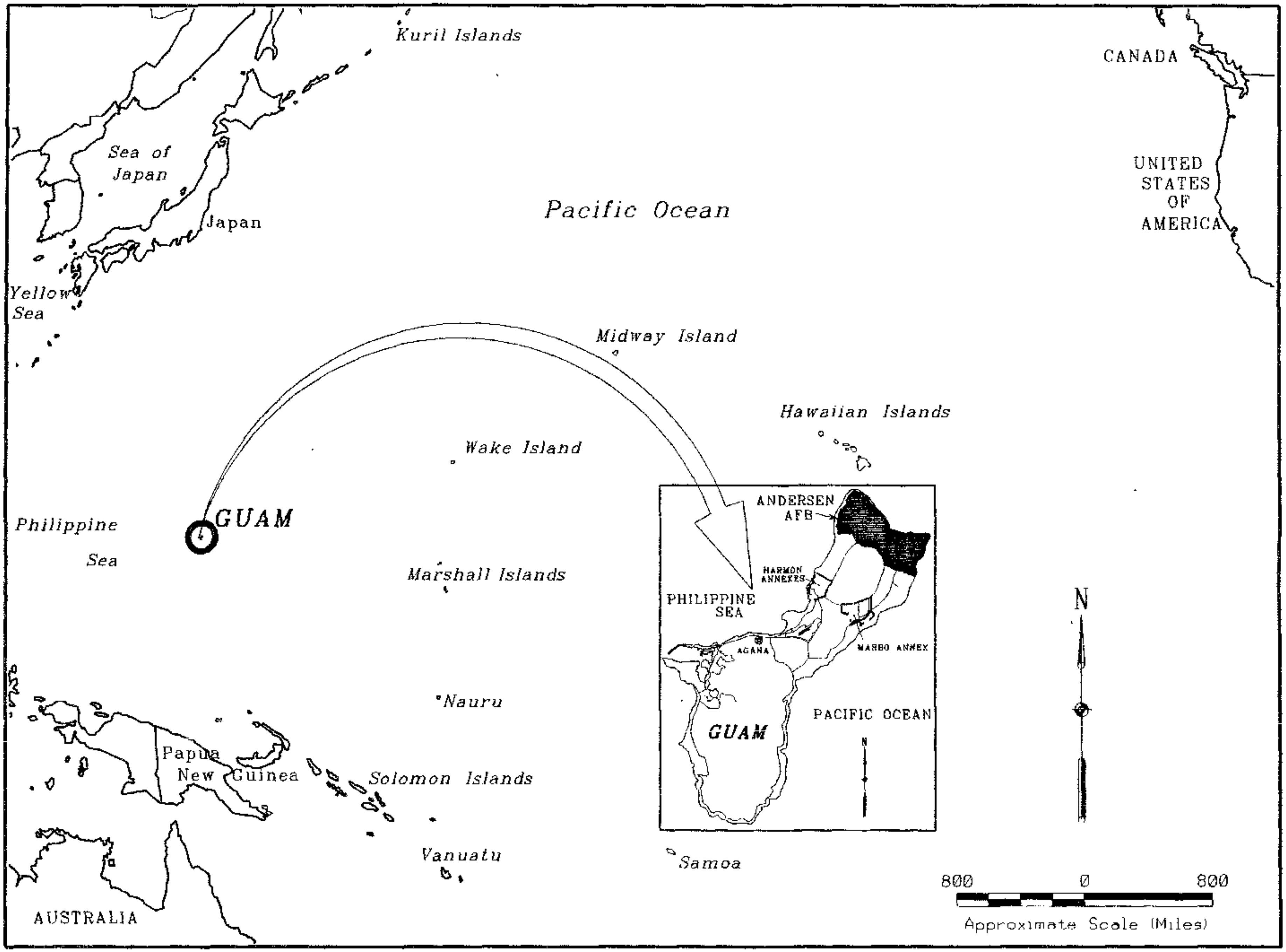

Figure 2-1. Location Map of Guam

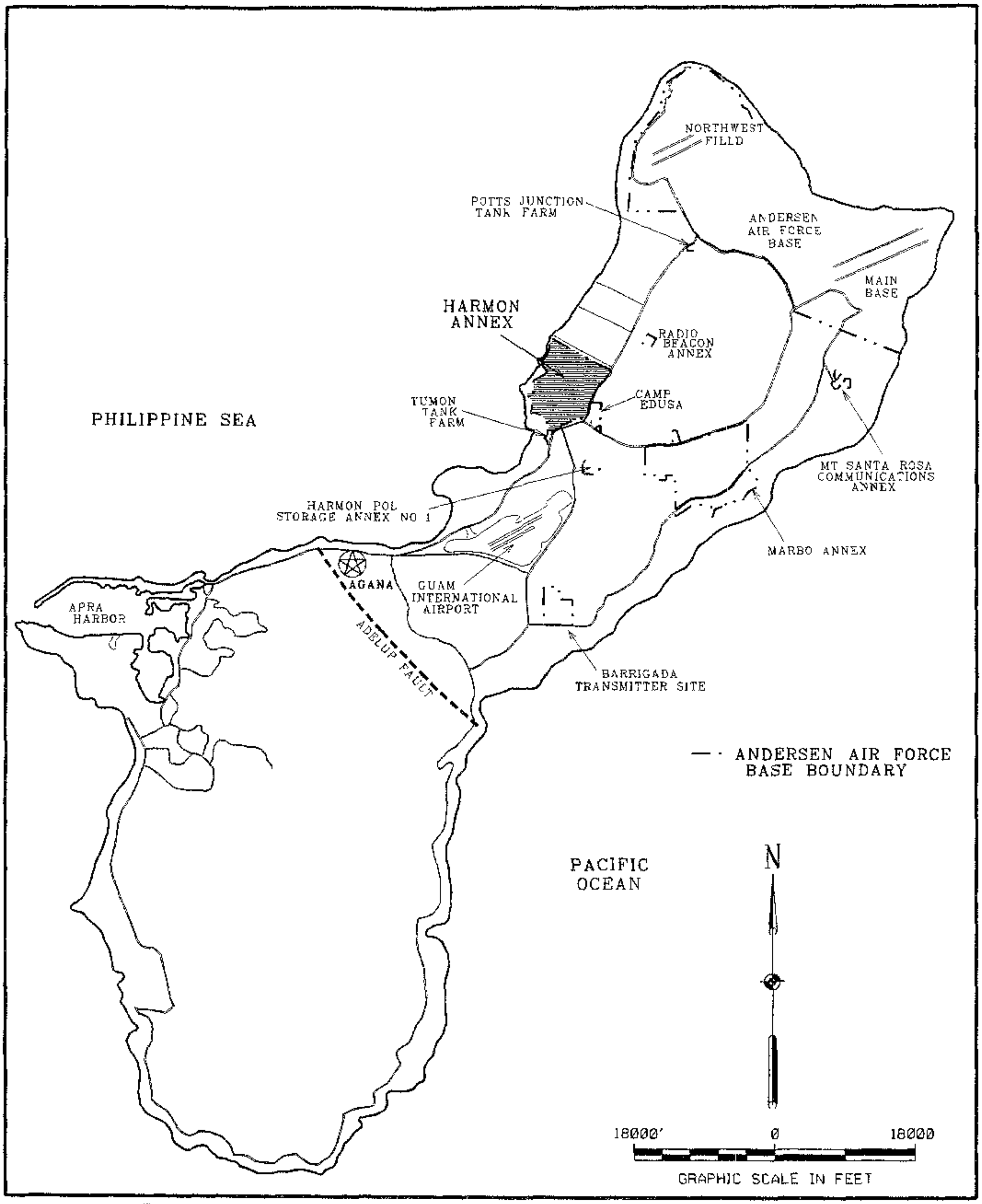

Figure 2-2 Location Map of Andersen Air Force Base on Guam

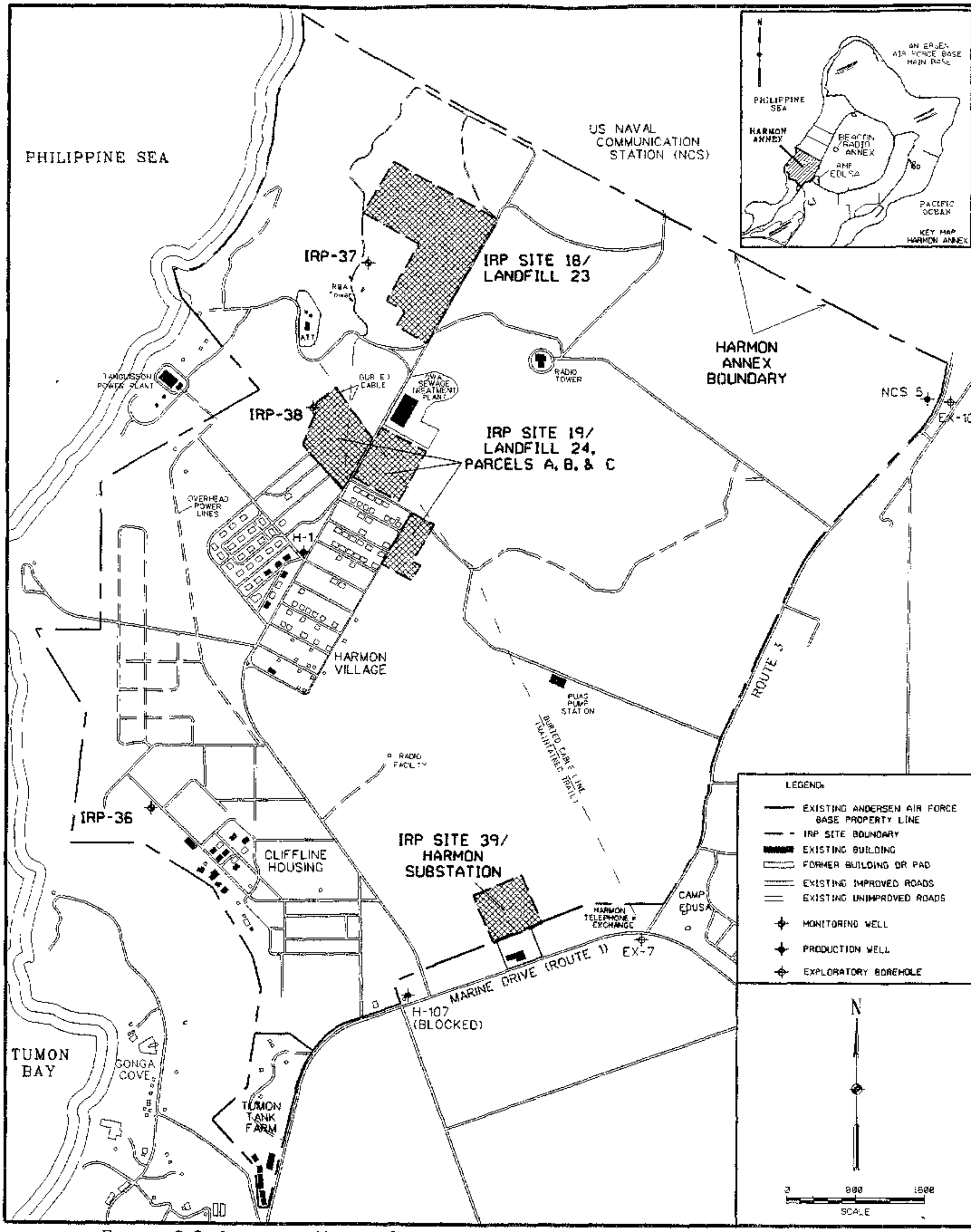

Figure 2-3 Location Map of Harmon Annex Including IRP Sites 18, 19, and 39 at Andersen AFB Guam

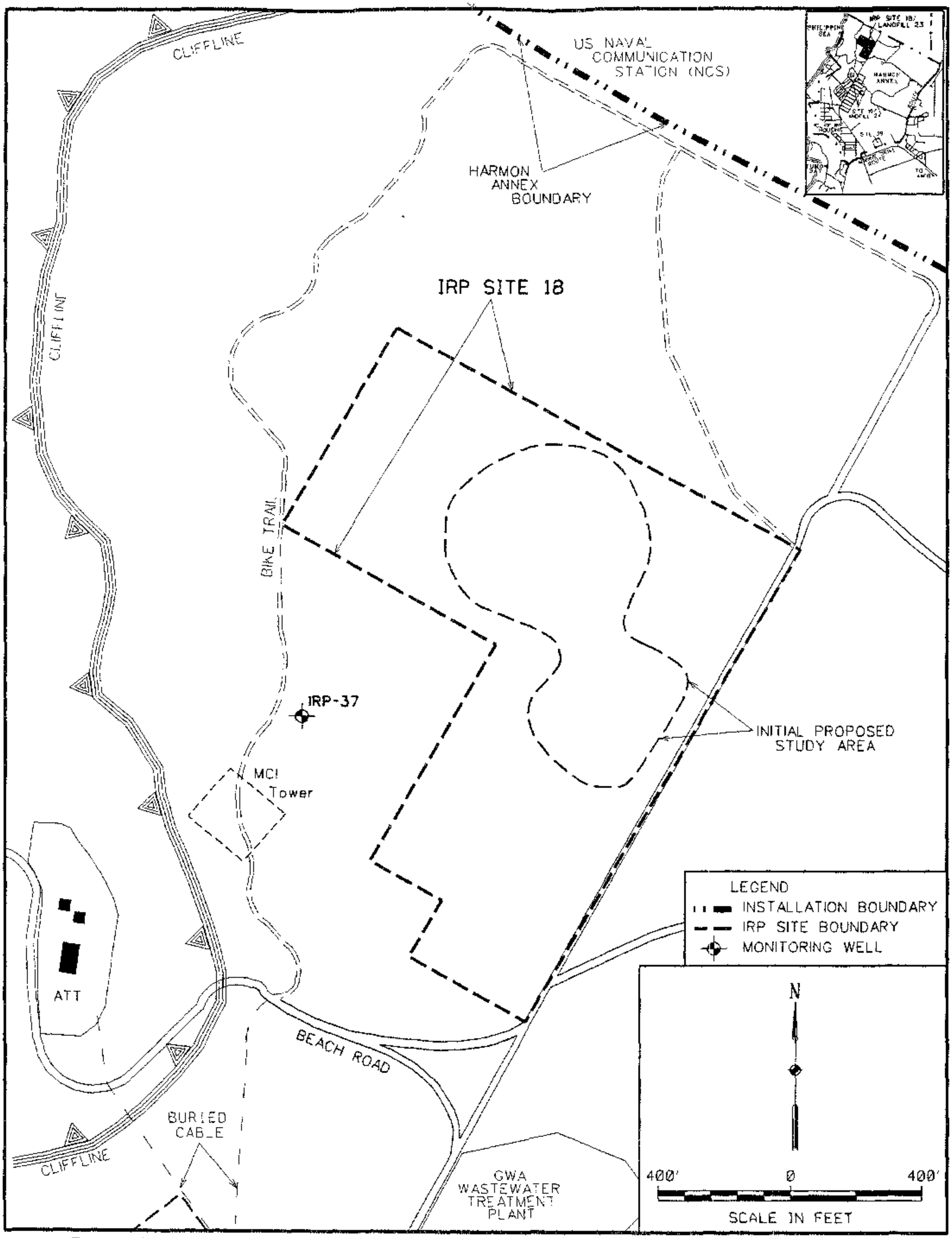

Figure 2-4. Location of IRP Site 18/Landfill 23 at Harmon Annex, Andersen AFB, Guam.

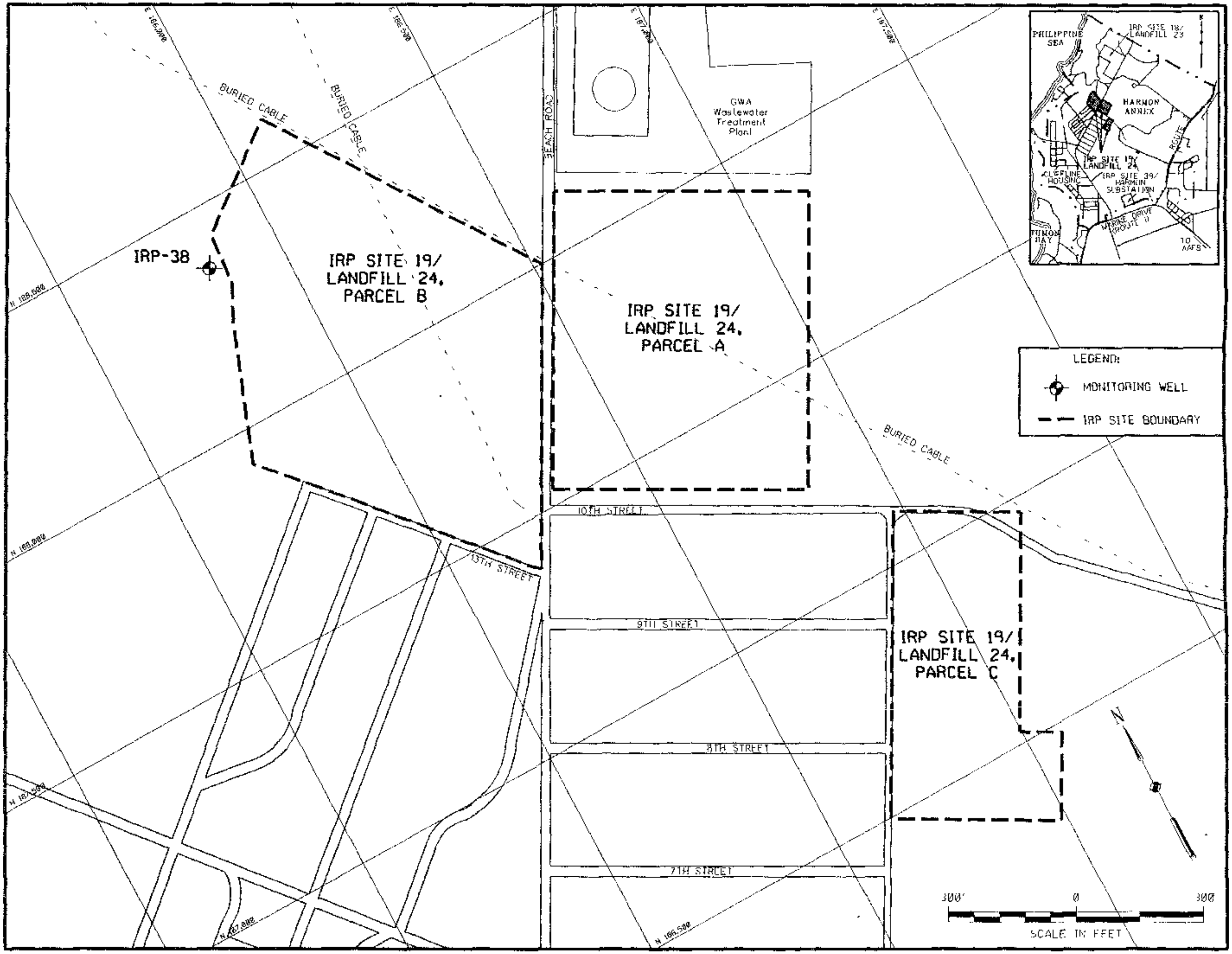

Figure 2-5. Location of IRP Site 19/Landfill 24, Parcels A, B, and C at Harmon Annex, Andersen AFB, Guam

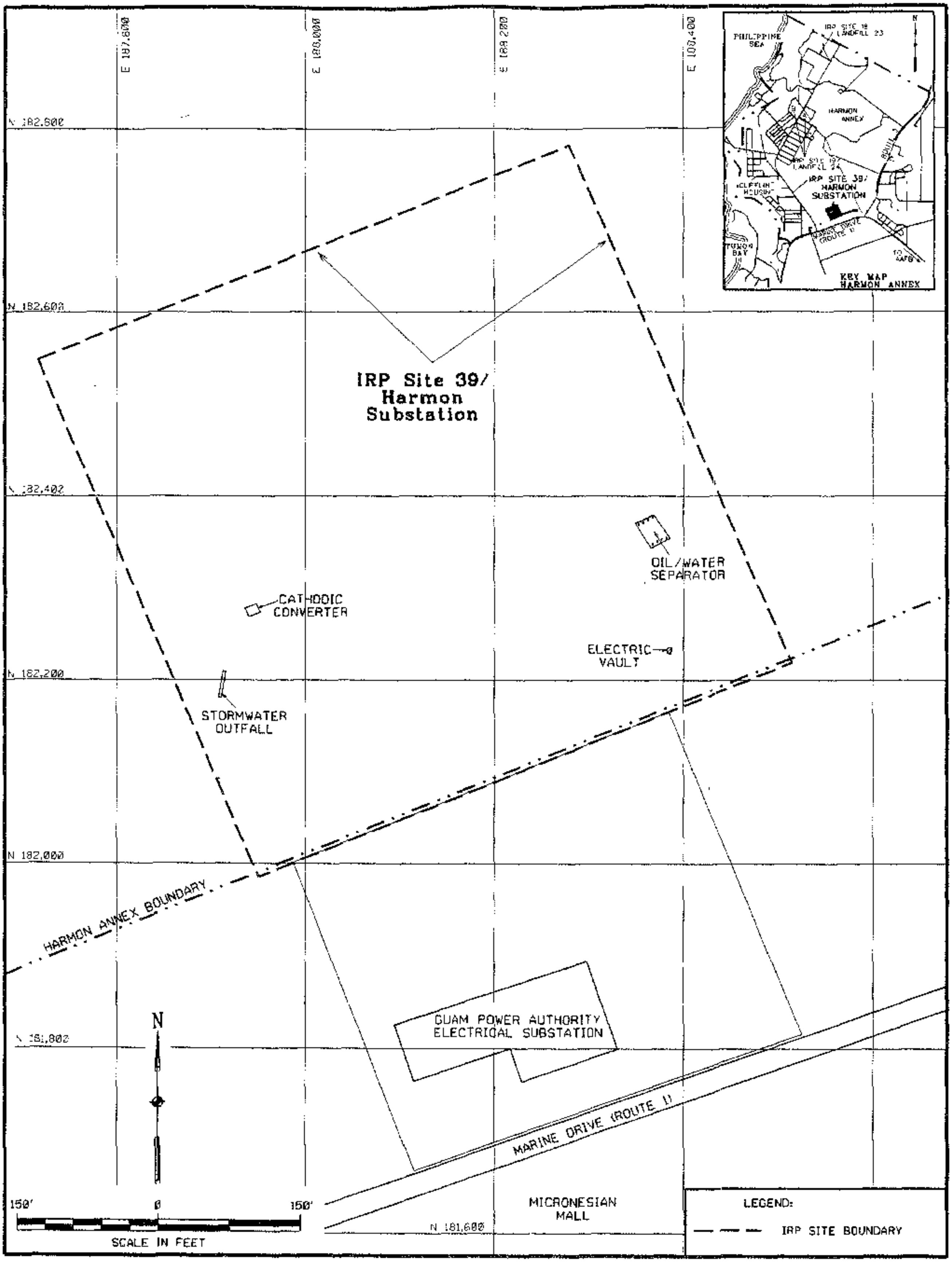

Figure 2-6. Location of IRP Site 39/Harmon Substation at Harmon Annex, Andersen AFB, Guam.

Harmon Annex resides in the region of the northern plateau, which consists of limestone reef deposits underlain by volcanic rocks. Groundwater resources are primarily found in the northern half of the island in porous limestone deposits of the Barrigada and Mariana Formations. Because fresh groundwater is lighter in weight as compared with seawater, groundwater floats on seawater as a lens-shaped body of freshwater in an approximate buoyant equilibrium. The groundwater-air interface at Harmon Annex is encountered at 2.66 feet to 4.29 feet above msl, approximately 320 feet bgs. The groundwater-seawater interface, however, is not well defined due to dynamic mixing of freshwater and seawater. This mixing zone (diffuse zone) is a layer of brackish water occurring at the bottom of a 106- to 171-foot-thick groundwater lens, depending on tidal changes, seasonal variation in precipitation, and withdrawals of freshwater by mechanical means (Mink, 1976).

Guam lies about 900 miles north of the equator, which creates a year-round warm climate. The mean annual temperature is approximately 81 degrees Fahrenheit (˚F) and temperatures range from the low 70s to the low 90s ˚F. There are two seasons on Guam, a wet season that extends from July to November, and a dry season that extends from December to June. The mean monthly temperatures range from 80 ˚F during January to about 83 ˚F in June (Ward et al., 1965). Humidity ranges between 65 to 80 percent in the late afternoon and 85 to 100 percent at night, with a monthly average of 66 percent. The trade winds are dominant from the east or northeast, with wind speed ranging between 4 and 12 miles per hour throughout the year. These winds are the strongest during the dry season, averaging 15 to 25 miles per hour. During the wet season, the trade winds are still dominant, but less frequent. The winds can blow from any direction with wind speeds generally less than 15 miles per hour. Storms may occur at any time during the year, but are most common during the wet season. The ambient air quality of Guam remains relatively clean at all times due to prevailing winds of clean air from the ocean.

Many natural habitat communities on Guam have been destabilized by the introduction of non-native species. Consequently, several of the native flora and fauna of Guam are considered threatened or endangered species (DAWR, 1994). However, no threatened or endangered species have been encountered in the vicinity of Sites 18, 19, and 39. A site-specific flora and fauna survey has been conducted for Sites 18, 19, and 39 and the results are as follows.

The flora at Site 18 includes approximately 40 percent Mixed Herbaceous and 60 percent Mixed Shrubs (Figure 2-7). Mixed Herbaceous habitat at the site included a mixture of grasses, vines, herbs, shrubs, and small trees to 10 feet tall. The dominant grass was Small foxtail (*Pennisetum pofystachiori*), and the vines were Balsalm Apple (*Momordica charantia*) and *Passiflora suberosa*. The Mixed Shrubs included a mixture of trees 3 to 30 feet tall. The dominant small trees in the Mixed Shrub habitat were Tangantangan (*Leucaena leucocephald*), Sumac (*Aidia cochinchinensis*), and Sea Hibiscus (*Hibiscus tiliaceus*).

The flora at Site 19 includes approximately 65 percent of Grassland and Tangantangan forest and 35 percent of Mixed Shrubs (Figure 2-8). Grassland and Tangantangan forest at Site 19 included a mixture of grasses, vines, herbs, shrubs, and small trees to 10 feet tall, which dominate the habitat. The dominant grass was Small foxtail (*Pennisetum polystachiori*); the dominant vine was Passiflora suberosa; the dominant herb was Dwarf Poinsettia (*Euphorbia cyathopord*); and

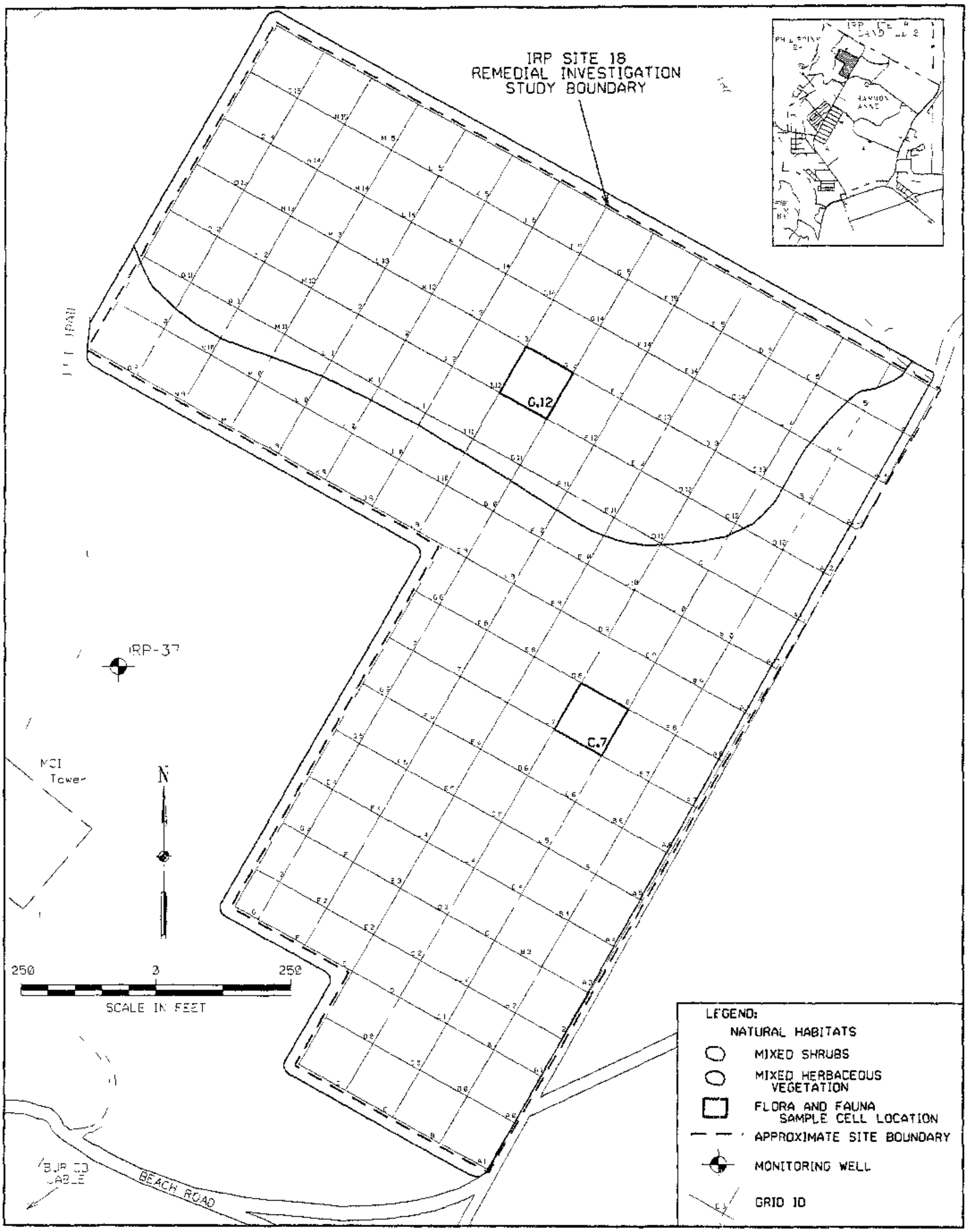

Figure 2-7 Natural Habitats of IRP Site 18, Andersen AFB, Guam.

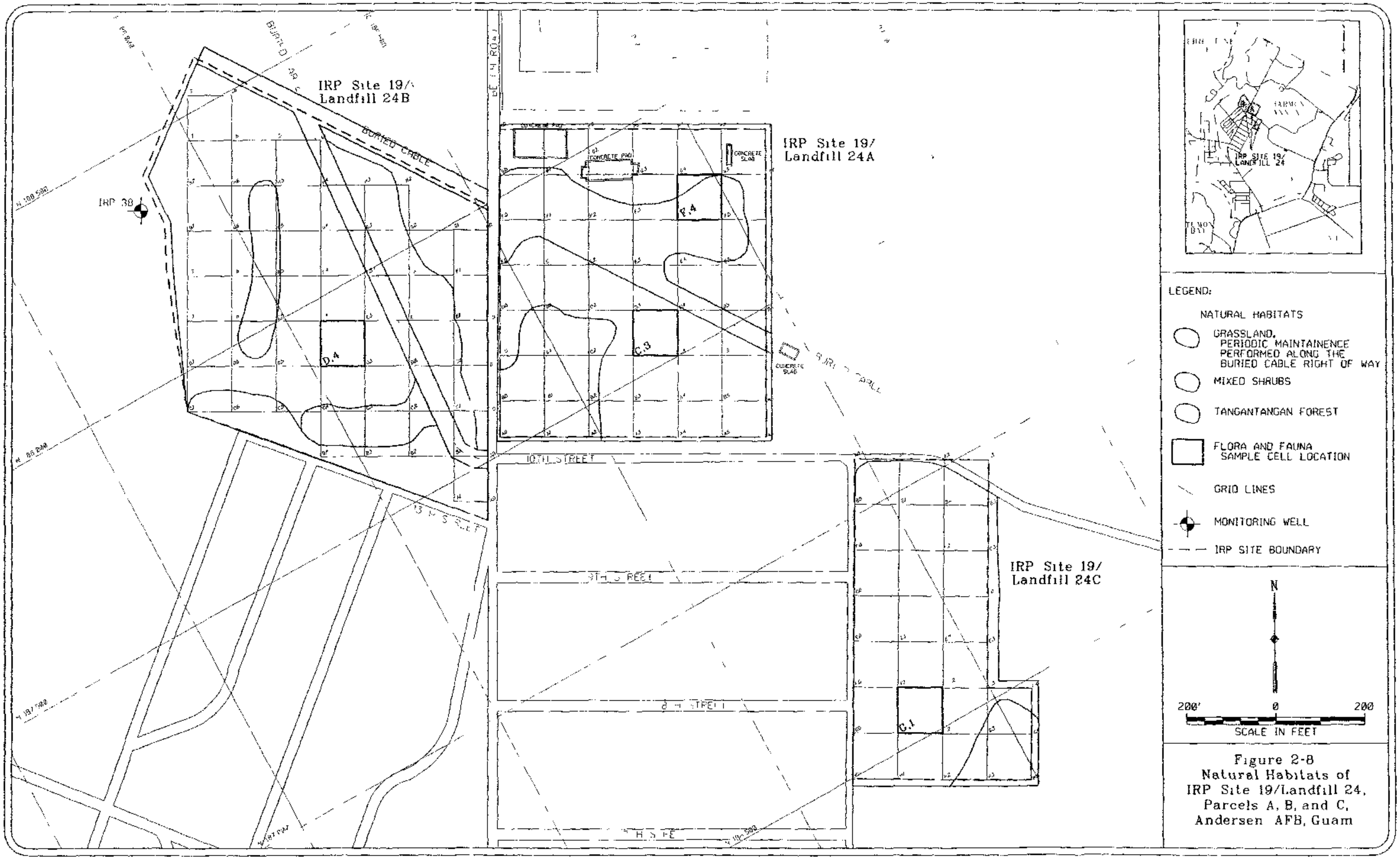

Figure 2-8
Natural Habitats of
IRP Site 19/Landfill 24,
Parcels A, B, and C,
Andersen AFB, Guam

the dominant small trees were Tangantangan (*Leucaena leucocephald*). The Mixed Shrubs included vines and herbs to 10 feet tall, which dominate the habitat (Figure 2-8). The dominant vine was Passiflora suberosa; the dominant herb was False Verbena (*Sida sp.)*; the trees were Tangantangan *(Leucaena leucocephald*) and Sea Hibiscus (*Hibiscus tiliacae*). Additionally, other vines, epiphytes, herbs, shrubs, and several small trees were present in small percentages at the site.

The flora at Site 39 includes approximately 35 percent of Grassland habitat and 65 percent of Mixed Shrubs habitat (Figure 2-9). Grassland habitat included a mixture of grasses, vines, herbs, and shrubs up to 3 feet tall. Small trees 3 to 10 feet tall dominate the habitat. The dominant grass was Small foxtail (*Pennisetum polystachion*) and Wildcane (*Saccharum spontaneum*), with a mixture of other vines, herbs, shrubs, and small trees. The Mixed Shrubs included vines and herbs up to 3 feet tall; trees 3 to 10 feet tall dominate this habitat. The dominant herb was False Verbena (*Sida sp.*) and the dominant trees were Sea Hibiscus (*Hibiscus tiliacae*), Tangantangan (*Leucaena leucocephald*), and False Elder (*Premna obtusifolid*). This habitat also had a number of large dead Ifit (*Intsia bijugd*) trees on the ground. Additional grasses, vines, herbs, shrubs, and trees were present at the site.

The fauna at Sites 18,19, and 39 are similar and include Feral deer (*Cervus mariannus*), Feral pigs (*Sus scrofd*), and Feral dogs (*Canis familiaris*), which migrate across and may inhabit the site. Some bird species observed transiting this habitat were the Black drongo (*Dicrurus macrocerus*) and Eurasian tree sparrow (*Passer montanus*).

The population of Guam was projected to be 167,000 by the year 2000, an increase of 26 percent from the total population in 1990 (Guam Annual Economic Review, 1999). Guam is also the most populated island in the Mariana Archipelago. A variety of different ethnic groups inhabit Guam including Chamorro (38 percent) and Filipino (23 percent). The total military population on Guam is approximately 13,000 or about 8 percent of the total population. The population of Andersen AFB is approximately 3,800 or about 3 percent of the total population of Guam. Guam's population is relatively young with a median age of about 25 years, as compared with 33 years for the U.S. mainland.

The Harmon Annex area is sparsely populated. Sites 18, 19, and 39 are isolated and unpopulated and are not proximal to residential areas. The nearest populated village is Dededo to the east. Dededo, with 24 percent of the total island population, is currently the largest populated village on Guam (Guam Department of Commerce, 1999).

A large proportion of Guam's population is employed by the public sector. The federal government employs about 8 percent of the total workforce on Guam and GovGuam employs about 21 percent of the total workforce. Employment in the private sector is dominated by Services (23 percent of the total workforce), Retail Trade (19 percent), and Construction (11 percent). Agriculture accounts for less than one percent of total employment (Guam Department of Commerce, 1999).

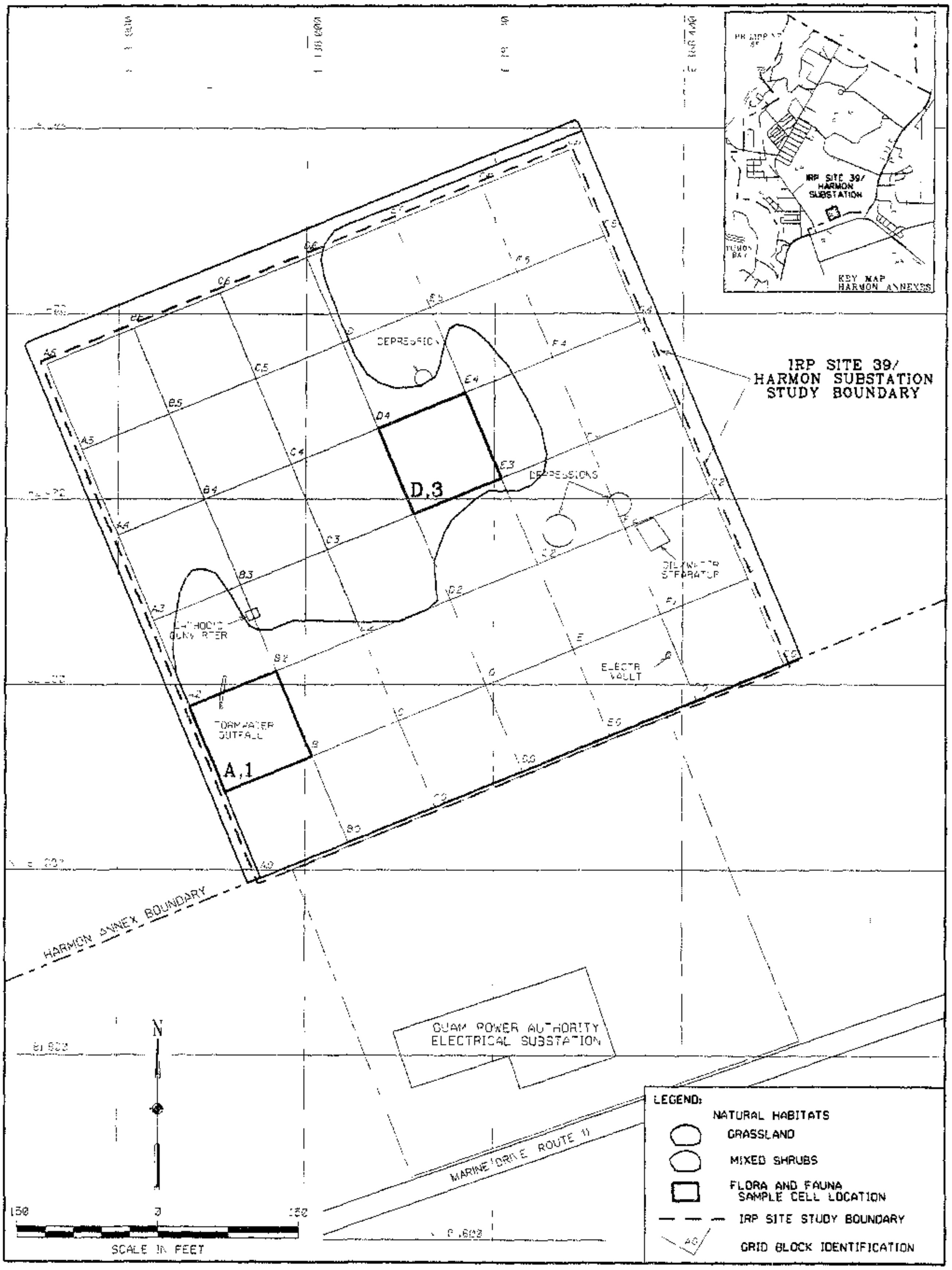

Figure 2-9 Natural Habitats of IRP Site 39/Harmon Substation, Andersen AFB, Guam

In 1990, GovGuam initiated a comprehensive study to evaluate Guam's water supply and demand. Subsequently, the water supply in Guam was reported at 40 million gallons per day (mgd) between 1985 and 1989, and the water demand is projected at 225 mgd for the year 2010 (Public Utility Agency of Guam, 1992).

Freshwater is drawn from the non-brackish portion of the groundwater lens, which is known as the Northern Guam Lens (NGL). The NGL is a dynamic system and is the major source of potable water in Guam. The groundwater flow direction in the NGL at Harmon Annex is generally toward the coastline. The important factors governing the amount of freshwater in the lens are the effects of mixing freshwater and seawater, the permeability of the limestone formations, and the rate of recharge (Ward et al., 1965).

Since the mid-1990s, Guam's dependency on groundwater as a drinking source has increased about 80 percent (GEPA, 1997). According to the Water and Environmental Research Institute of the Western Pacific, there are 172 production wells on Guam with an estimated average production rate of 37 mgd. Of these wells, Guam Waterworks Authority (GWA) maintains 109, Andersen AFB maintains 10, and the United States Navy (USN) maintains 13.

Only one production well, H-l, is operating in the Harmon Annex area. Well H-l supplies the nearby treatment plant and a few residences and small businesses with a production rate of 200 gallons per minute (GWA, 1999). Another production well, NCS-5, was operated by the USN, but is currently not in operation (Figure 2-3).

2.2 Site History and Enforcement Activities

The Harmon Annex was originally developed by the USAF in the mid-1940s and generally was used for housing and administration facilities. The major development of the Harmon Annex occurred on the southern portion near the cliffiine, Harmon Village, and the Harmon Cliffline Housing (Figure 2-3). Portions of Harmon Annex were used by the 1958th Communication Squadron for the USAF until 1976, and since then the site has not been used (EA, 1997). Other portions of the Harmon Annex were not developed by the USAF (ICF Technology, 1995).

During World War II (WWII), the USN controlled all property on Guam. In May 1960 under the terms of the Organic Act of 1950, Harmon Annex was formally transferred from the USN to the USAF.

In 1976, Harmon Annex was declared excess land to the USAF mission on Guam and in 1994, Harmon Annex was included in United States Public Law (P.L.) 103-339 for transfer to the GovGuam through the U.S. General Services Administration (GSA). The USAF requires an Environmental Baseline Survey (EBS) for all Air Force-owned property scheduled for real estate transactions. The EBS is generally divided into two phases. The Phase I EBS includes a comprehensive review of available records followed by site reconnaissance to identify areas of concern (AOCs) suspected of potential contamination. Subsequently, the Phase II EBS assesses the AOCs using sampling and analysis to determine the existence of potential contamination.

Between 1995 and 1997, Phase I and II EBS investigations were conducted at 15 AOCs at the Harmon Annex and seven sites required cleanup (EA, 1997). At these seven AOCs, surface and subsurface samples were collected from abandoned cesspools, open pits, oil/water separators, and waste piles. Based on laboratory analytical results, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, antimony, lead, and/or benzo(a) pyrene were detected in soil samples collected from these accumulation points at concentrations that exceeded the Residential PRGs (EA, 1997). Subsequently, in 1998, material from the cesspools, open pits, oil/water separators, contaminated waste piles, and suspected asbestos-containing material were removed from the seven AOCs and transferred to the Andersen AFB Landfill for disposal. The features were backfilled to grade with clean material. Confirmation soil sampling and analyses at the seven AOCs indicated that all impacted soils were removed such that the analytical results were below Residential PRGs (IT/OHM, 1999a).

Furthermore, due to the primary mission in national defense, the USAF has long been engaged in a wide variety of operations that involve the use, storage, and disposal of hazardous materials. On 14 October 1992, the USEPA Region IX formally listed Andersen AFB on the National Priorities List to investigate the abandoned sites, which may have been impacted by the use, storage, and disposal of hazardous materials. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number for Andersen AFB is GU6571999519.

Consequently, the USAF entered into a Federal Facility Agreement (FFA) with the USEPA Region IX and GEPA. The FFA, finalized on 30 March 1993, established a framework for performing detailed environmental investigations (such as the RI) at Andersen AFB. The FFA was based on applicable environmental laws including CERCLA, HSWA, SARA, and the NCP.

In 1986, the USAF used the United States Army's established IRP as a model to implement the FFA. Under the 14 August 1981 Executive Order 12316, the Department of Defense designed their own IRP to identify uncontrolled hazardous waste disposal sites. IRP remedial goals and objectives evolved over the years in a manner consistent with the transformation of environmental laws, such as the 1990 NCP established by CERCLA and SARA (ICF Technology, 1996a).

The mandates of SARA expanded the scope and requirements of CERCLA and provided specific directives to federal facilities regarding the investigation of waste disposal sites. Under SARA, technologies that involve the permanent removal or destruction of hazardous wastes or contaminants are preferable to actions that only contain or isolate the contaminant. SARA also provided greater interaction with public and state agencies and extended the role of the USEPA in the evaluation of the health risks associated with the contamination. Under SARA, an early determination of Applicable or Relevant and Appropriate Requirements (ARARs) is required, and potential remedial alternatives should be considered at the initial phase of an RI. In response to these changes, the IRP also was changed.

The early United States Army IRP was comprised of four phases:

- Phase I - Initial Assessment/Records Search. This phase identifies the past waste disposal sites that might be impacted by the presence of hazardous materials.

- Phase II - Confirmation/Quantification Study. Using field investigations, including sampling and analysis, this phase identifies the type and the extent of the contamination at a site.

- Phase III - Technology Base Development. This phase identifies the potential remedial alternatives to address the source of contamination at a site.

- Phase IV - Remedial Action. In this phase, the selected remedial alternatives for a site are implemented.

In 1988, the phased IRP approach was superseded by a method that approximates the RI guidelines used by the USEPA. The revised IRP format combined Phase II and Phase TV and more closely paralleled the RI process. This IRP modification provided the USAF the means to select appropriate remedial actions effectively.

IRP investigations at Andersen AFB were initiated in 1983 with a records search to identify the potential sites of concern. As the result of the records search, 20 sites were initially identified as IRP sites of concern, including Site 18 and Site 19. Site 39 was later added as an IRP site when debris was discovered during an excavation in 1989 (ICF Technology, 1996b). In August 1992, a site visit was also conducted at each site to evaluate any potential adverse environmental impacts from past waste disposal practices at Andersen AFB.

2.3 Highlights of Community Participation

In August 1992, to inform and involve the local community, Andersen AFB conducted 67 interviews with local government officials, residents, and concerned citizens to determine the level of community concern and interest in the environmental investigations. These community interviews provided the basis for the 1993 Community Relations Plan (CRP) (ICF Technology, 1993). The 1993 CRP described activities to keep the nearby communities informed of the progress of the environmental investigations at Andersen AFB sites and provide opportunities for input from residents regarding cleanup plans. In response to the USEPA request, Andersen AFB conducted 27 additional interviews in 1998, and updated the CRP (EA, 1998a).

The USAF has promoted community relations and encouraged public involvement in cleanup decisions through the Restoration Advisory Board (RAB), established in 1995. Currently, the RAB is comprised of community members, elected officials, USAF officials, and representatives from regulatory agencies. The RAB meets on a quarterly basis to discuss program progress and to advise the community on the status and plans for the various IRP sites.

In addition to RAB meetings, in 1993 Andersen AFB provided a brochure that was prepared to respond to community concerns and to inform the public about Andersen AFB's IRP investigations (ICF Technology, 1993). In February 1997, a fact sheet for the Harmon Annex was distributed to the community that explained the status of the IRP investigations and the status of P.L. 103-339 (EA, 1997). A complete summary of the history and status of community involvement for the IRP at Andersen AFB is presented in the December 2000 Final Management Action Plan (Andersen AFB, 2000).

Andersen AFB also made copies of the Harmon Annex OU reports available to the public in both the Administrative Record and the Information Repository at the following locations:

Installation Restoration Program
36 CES/CEVR, Unit 14007, Andersen AFB, Guam
APO AP 96543-4077
Telephone: (671) 366-5080
Contact: Mr. Gregg Ikehara, Installation Project Manager

Nieves M. Flores Memorial Library
254 Martyr Street,
Hagatna, Guam 96910
Telephone: (671) 475-4751, 4752, 4753, or 4754
Contact: Christine Scott-Smith

University of Guam
Federal Document Department, RFK Library, UOG Station
Mangilao, Guam 96923
Telephone: (671) 735-2321 Contact: Walfrid C. Benavente

A notice of the availability for the Harmon Annex OU reports was published in the Guam *Pacific Daily News*. A notice of this ROD's availability will also be published in the Guam *Pacific Daily News* after it is signed. A complete Administrative Record Index is presented in Appendix A.

In February 2001, the Proposed Plan for the Harmon Annex OU was released to the public for review and comments, with a public comment period from 06 February to 08 March 2001. A public meeting was held in the Hilton Guam Resort & Spa on 22 February 2001 where the Proposed Plan was presented and representatives from USEPA, GEPA, and Andersen AFB responded to public comments. The results of the public meeting and responses to public comments are presented in Section 3 of this ROD.

2.4 Scope and Role of the Operable Unit or Response Action

Andersen AFB elected to use an OU approach to manage the investigation and remediation of environmental conditions at Harmon Annex. According to the 1993 FFA, the OUs were formed to:

- Expedite the completion of environmental activities

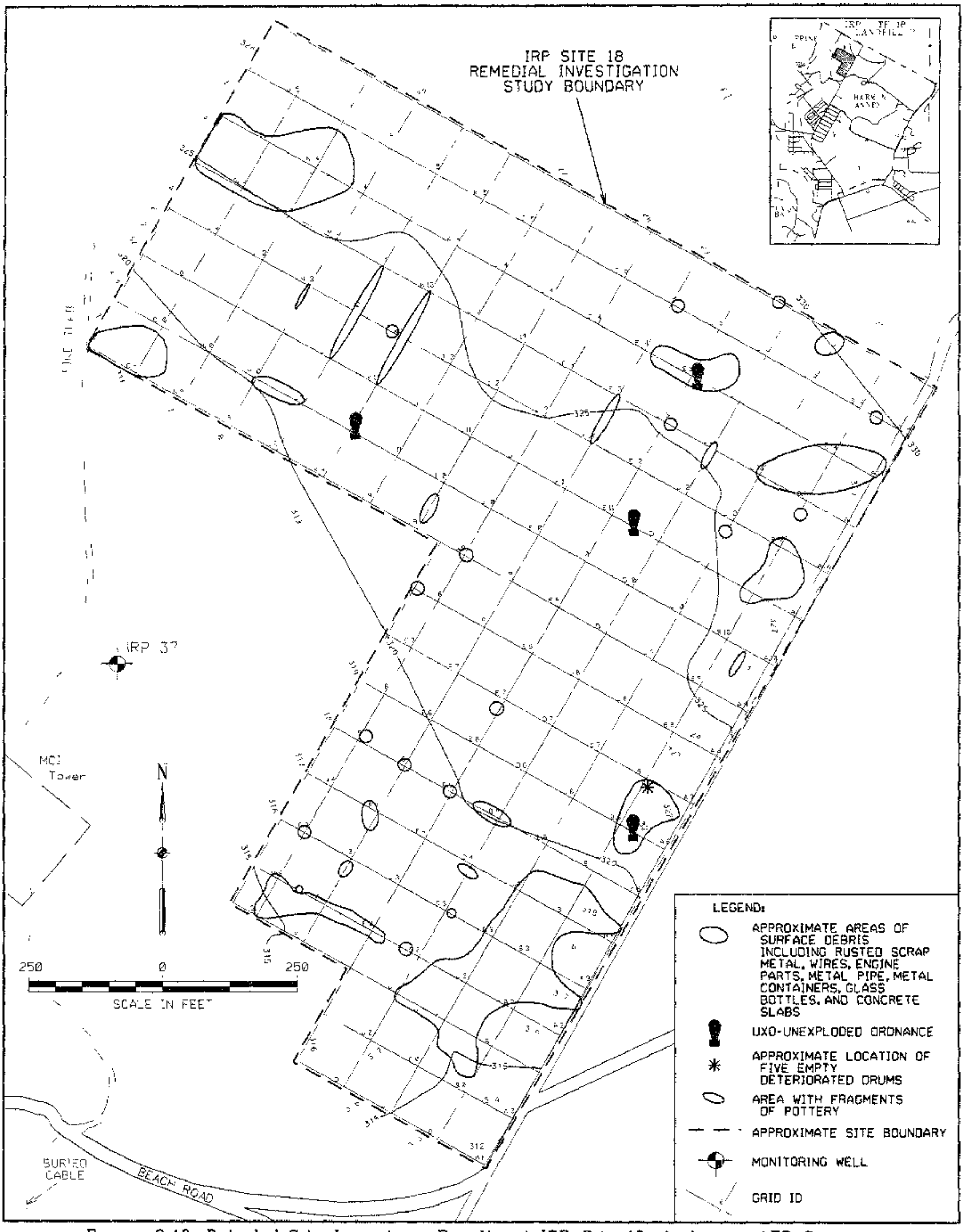

Figure 2-10 Detailed Site Inventory Results at IRP Site 18, Andersen AFB, Guam

- Evaluate sites with similar locations and potentially similar requirements as a group
- Complete remedial design investigations at sites where closure decisions have been previously reached with GovGuam
- Provide a screening mechanism for evaluating newly or tentatively identified sites for inclusion in the Remedial Investigation/Feasibility Study

All environmental investigations at Harmon Annex were performed under the Harmon Annex OU. Until 1996, the soils that were investigated at Harmon Annex were managed under the USAF designation of OU 5, and groundwater as OU 2. In order to concurrently address both soil and groundwater at Harmon Annex, OU 5 and OU 2 were combined into the Harmon Annex OU.

The Harmon Annex OU included three sites (IRP Sites 18, 19, and 39, including the groundwater underlying these sites). Presently, no remedial action is required at any of the three sites of Harmon Annex OU. There is no supporting evidence that Site 18 was ever used as a landfill and no contamination was found at the site. Based on mutual agreement between the USAF, USEPA Region IX, and GEPA, soil removal and off-site land disposal was selected as a cleanup alternative for Sites 19 and 39 to expedite the transfer of Harmon Annex to GovGuam. Subsequently, all sources of contamination were removed from Sites 19 and 39 to prevent current or future exposure to the contaminated soils and prevent potential contaminant migration into the groundwater.

2.5 Site Characteristics

In order to characterize each site, reconnaissance, detailed site inventories, geophysical surveys, soil gas surveys, exploratory test ditches and test pits, surface and subsurface soil sampling, groundwater sampling, drum/sump sampling, and topographical surveys were conducted at the Harmon Annex OU. Because the detailed results of the field investigations are already presented in the Final *RI for Harmon Annex OU* (EA, 2000), only a summary of fundamental site contaminant characteristics are presented in this ROD.

To evaluate risk associated with each contaminant, laboratory-detected analyte concentrations were compared to PRGs developed by the USEPA Region IX to establish screening criteria for potentially contaminated Residential and/or Industrial sites (USEPA, 1998). Because the future use of Harmon Annex sites is not known, both the Residential and Industrial PRGs are presented in this ROD, when applicable.

In general, the Residential PRGs are established conservatively at lower concentrations as compared with Industrial PRGs. Any analytical results, with the exception of metals, that exceeded the PRGs were further evaluated to assess the potential human health risk associated with each contaminant at a site. Some metal concentrations in Guam soils occur naturally at relatively high concentrations. Background threshold values (BTVs) were established for each metal based on cumulative probability plots of the entire surface soil data set (ICF Technology, 1996a). The data set for each metal was evaluated to distinguish background populations from contaminant populations. At the August 2001 Remedial Program Manager (RPM) meeting, USEPA and GEPA requested that BTVs for specific metals (particularly arsenic and manganese) be reviewed using the updated soil analytical database with a consideration for the effects of grain size. A review of the updated database revealed no change in BTV for arsenic (62 milligrams per kilograms [mg/kg]). However, the review resulted in an increase of the BTV for manganese from 3,150 mg/kg to 7,100 mg/kg (EA, 2001).

Subsequently, if any soil sample metal result exceeded the PRG, the result would then be compared with BTVs. The groundwater analytical data collected for the RI were compared with USEPA Safe Drinking Water Act MCLs (USEPA, 1996) and the USEPA Region IX Tap Water PRGs (USEPA, 1998).

2.5.1 Sites 18,19, and 39 Conceptual Model

Conceptual Site Models (CSMs) are useful in assessing the fate and transport of COPCs and evaluating potential exposure pathways relative to present and future receptors, hi order to expedite the property transfer of Harmon Annex sites to GovGuam, the USAF established conservative cleanup standards based on the stringent USEPA Region IX Residential PRGs rather than conducting human and ecological risk assessments. A CSM that is applicable to Sites 18, 19, and 39 is presented in Appendix C.

2.5.2 Site 18 Contaminant Characteristics

Site 18 is located in an undeveloped area of the Harmon Annex. Based on several record searches, site reconnaissance, geophysical survey, 21 test ditch excavations, and 1 passive and 14 active soil gas samples there was no supporting evidence that the site was ever used as a landfill (EA, 2000). No stressed vegetation, stained soil, or fill materials were identified at Site 18 that could be deemed as evidence of waste disposal activities.

The debris identified at the site during the Detailed Site Inventory (DSI) was non-hazardous in nature, such as empty deteriorated drums (Figure 2-10). Scattered Unexploded Ordnance (UXO) identified at the site were removed from the site and disposed of at the Main Base by Air Force Explosive Ordnance Disposal personnel. All UXO found at the site were WWII remnants and typical of UXO found elsewhere on Guam.

Four biased surface soil samples (including one duplicate sample) were collected at Site 18. All surface soil samples were collected from 2.0 to 4.0 inches (0.2 to 0.3 feet) bgs and were analyzed for semivolatile organic compounds (SVOCs) and metals (inorganics).

As presented in Table 2-1, aluminum and chromium were detected in two surface soil samples at concentrations that exceeded the Residential PRGs and BTVs (Figure 2-11). These metal concentrations were close to (within 10 percent) the concentrations of metals established for BTVs and most likely represent background conditions.

TABLE 2-1. SURFACE SOIL ANALYTICAL RESULTS FOR IRP SITE 18, ANDERSEN AFB, GUAM.

Analytical Method	Analyte	Units	BTV	Residential		Industrial		S18S001	S18S002	S18S002DUP	S18S004
			Screening Basis					20 Jan 1997 Sample Identification			
				1998 USEPA REGION IX PRGs				Sample Depth (feet)			
								0 2 - 0 3	0 2 0 3	0 2 - 0 3	0 2 0 3
SEMIVOLATILE ORGANIC COMPOUNDS											
SW8270	BENZOIC ACID	µg/kg	N/A	**100,000,000**	nc	**100,000,000**	nc	720 J	<2,400	<2,400	<2,300
SW8270	BIS (2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**32,000**	nc	**140,000**	nc	<570	350 J	<490	<480
INORGANICS											
SW6010	ALUMINUM	mg/kg	**173,500**	75,000	nc	100,000	nc	**190,000**	167,000	155,000	**200,000**
SW6010	ANTIMONY	mg/kg	**63**	30	nc	**750**	nc	11 4 BN	10 1 BN	8 2 BN	12 3 BN
SW6010	ARSENIC	mg/kg	**62**	0 38	ca	3	ca	31 E	26 2 E	19 E	30 3 E
SW6010	BARIUM	mg/kg	335	**5,200**	nc	**100,000**	nc	39 1	30 8	25 9	31 8
SW6010	BERYLLIUM	mg/kg	3 34	**150**	nc	**3400**	nc	4 1	3 6	3 2	4 1
SW6010	CADMIUM	mg/kg	6 5	**37**	nc	**930**	nc	6 5	5 0	4 7	3 9
SW6010	CALCIUM	mg/kg	N/A	N/A		N/A		25,000 *	38,300 *	55,000 *	7,150 *
SW6010	CHROMIUM	mg/kg	**1,080**	210	ca	450	ca	**1,090**	914	806	**1,210**
SW6010	COBALT	mg/kg	29	**3,300**	nc	**29,000**	nc	21 4	18 4	14 9	19 4
SW6010	COPPER	mg/kg	72 2	**2,800**	nc	**70,000**	nc	7 9 B	5 8 B	2 B	<0 84
SW6010	IRON	mg/kg	**116,495**	22,000	nc	100,000	nc	120,000	108,000	<575	125,000
SW6010	LEAD	mg/kg	166	**400**	nc	**1,000**	nc	83 7	77 6	66 5	72 2
SW6010	MAGNESIUM	mg/kg	N/A	N/A		N/A		1,430 E	1,380 E	1,250 E	1,050 E
SW6010	MANGANESE	mg/kg	**7100 (1)**	3,100	nc	**45,000**	nc	3,490	2,960	2,820	3,520
SW7471	MERCURY	mg/kg	0 28	**22**		**560**		0 35 B	0 34 B	0 34 B	0 29 B
SW6010	NICKEL	mg/kg	242 5	**1,500**	nc	**37,000**	nc	86 5	86 2	67 0	89 0
SW6010	POTASSIUM	mg/kg	N/A	N/A		N/A		96 6 B	123 B	120 B	39 6 B
SW6010	SODIUM	mg/kg	N/A	N/A		N/A		165 B	155	163	121 B
SW7841	THALLIUM	mg/kg	1 42	**6**	nc	**150**	nc	0 98 *	1 2 *	1 1 *	1 7 *
SW6010	VANADIUM	mg/kg	206	**520**	nc	**13,000**	nc	147 E	126 F	99 5 E	133 E
SW6010	ZINC	mg/kg	111	**22,000**	nc	**100,000**	nc	54 0	31 4	23 3	25 4

Notes

BTV = Background Threshold Values, PRG = Preliminary Remediation Goals, E = Reported value is estimated due to the presence of interference, N = Spiked sample recovery is not within control limits, * = Duplicate analysis is not within control limit, B = Value less than Contract Required Detection Limit, but greater than the Instrument Detection Limit, ca = Cancer PRG, nc = non-carcinogen, N/A = Not Applicable, mg/kg = milligrams per kilogram, µg/kg = micrograms per kilogram

(1) - Recalculated BTV concentration established in December 2001 (EA, 2001)

Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.

Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

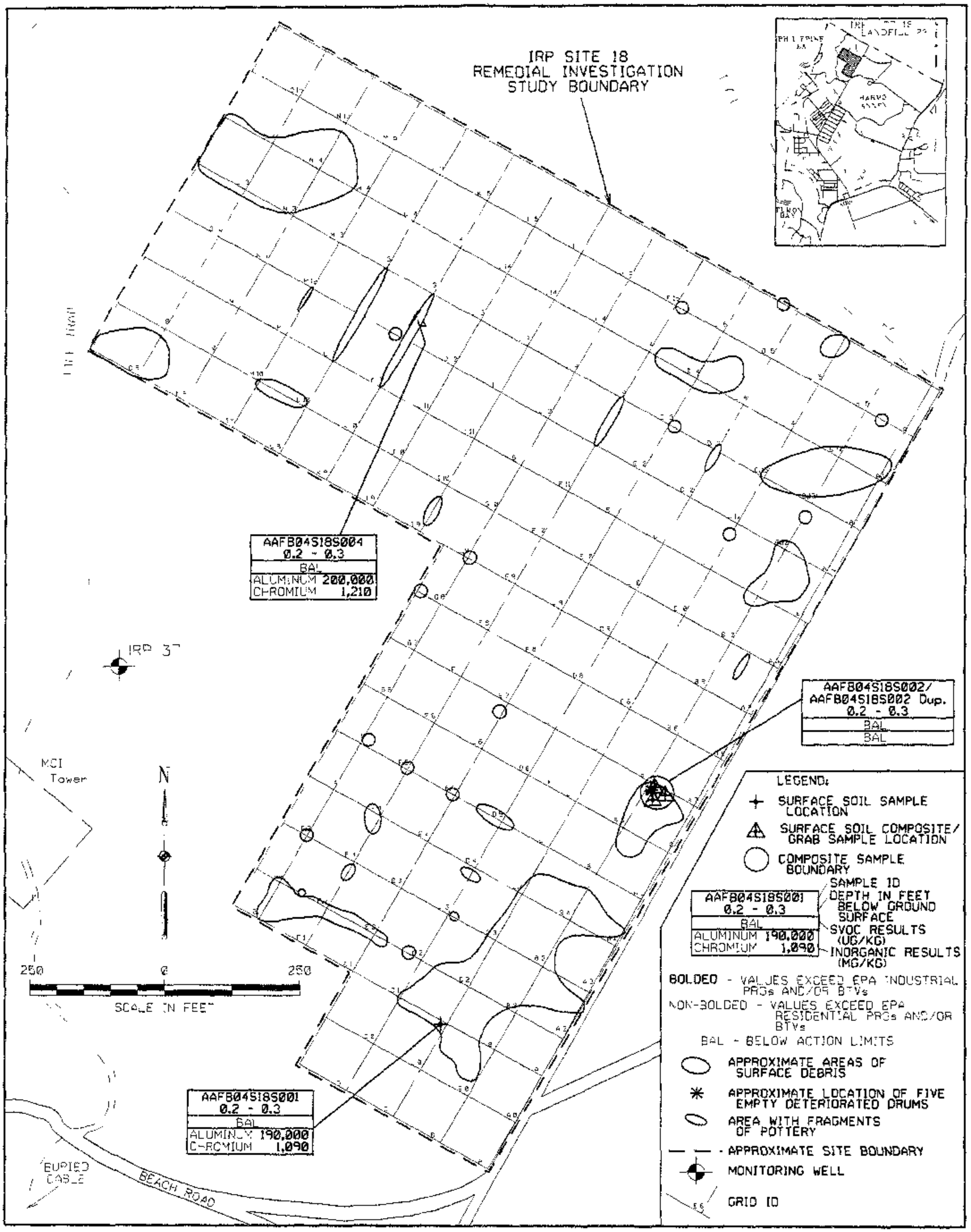

Figure 2-11 Soil Sample Locations and Results at IRP Site 18, Andersen AFB, Guam

Of the three groundwater monitoring wells at Harmon Annex, well IRP-37 is located near Site 18 (Figure 2-3). Monitoring well IRP-37 was installed during 1996 and has been sampled biannually using a dedicated pump. Based on groundwater monitoring results at IRP-37, groundwater beneath Site 18 is approximately 320 feet bgs and flows westward towards the Philippine Sea. Six groundwater sampling events have been conducted at IRP-37 between fall 1996 and spring 1999. These samples were analyzed for combinations of volatile organic compounds (VOCs), SVOCs, polycyclic aromatic hydrocarbon (PAHs), pesticides/ polychlorinated biphenyls (PCBs), and metals. As presented in Table 2-2, no organic or inorganic compounds were detected at concentrations above MCLs, or PRGs for tap water, with the exception of chloroform and nickel. These compounds were not believed to represent groundwater contamination because chloroform is associated with laboratory contamination and nickel is attributed to corrosion of the stainless steel piston pump and well screen.

2.5.3 Site 19 Contaminant Characteristics

Site 19 is located in an undeveloped area of the Harmon Annex. Based on the records search and site reconnaissance, there was supporting evidence that part of the site was used as a landfill. Debris was disposed in trenches that were later covered with soil.

The debris identified at the site during the DSI included glass bottles, metal banding, rusted sheet metal pieces, piping, wires, deteriorated fire extinguishers, metal containers, engine parts, cables, concrete slabs, steel cables, slag/ash, corrugated metal, suspected asbestos-containing materials, and municipal trash (Figure 2-12). Several 55-gallon drum remnants were identified at the site. With the exception of one drum containing asphalt-like material, the remaining drums were empty and deteriorated. The laboratory analytical results indicated that VOCs were detected in the sample collected from the drum containing asphalt-like materials. The drum was wrapped in plastic and was subsequently disposed of off-island.

A total of 17 surface soil samples (including two duplicates) were collected from Site 19 (Table 2-3 and Figure 2-13). All samples were analyzed for SVOCs and metals. Iron at Parcel B, and antimony, iron, and lead at Parcel C were detected at concentrations that exceeded the Residential PRGs and the BTVs. Most of the iron was detected at concentrations most likely representing background concentrations and therefore no remedial action was recommended in these areas (Figures 2-13 and 2-14). The location of elevated antimony and lead at Parcel C was identified as a "hot spot" and remedial action was recommended (EA, 2000).

A total of 17 subsurface soil samples (including two duplicate samples) were collected at Site 19 (Figure 2-14). For the most part, these samples were analyzed for VOCs, SVOCs, PAHs, metals, and dioxins (using USEPA Method SW8280). As presented in Tables 2-4 and 2-5, at Parcel A, in the fill area on the southwest corner of the site, benzo(a) pyrene, manganese, and dioxins were detected at concentrations above Residential PRGs (Figure 2-14). The initial dioxin subsurface soil samples collected from Site 19 during the RI were analyzed using USEPA Method SW8280. As the Method SW8280 reporting limits (RLs) for individual congeners were above their respective Residential PRGs the data set did not meet data quality objectives. Subsequently, one subsurface soil sample was collected from each of two locations (AAFB04S19S022 and

TABLE 2-2. GROUNDWATER ANALYTICAL RESULTS FOR MONITORING WELL IRP-37, NEAR IRP SITE 18, ANDERSEN AFB, GUAM.

Sample Identifier / Sampling Date			Screening Basis: 1998 USEPA Region IX PRGs Tap Water		MCL		IRP-37 26-Sep-96	IRP-37 01-Apr-97	IRP-37 17-Nov-97	IRP-37 31-Mar-98	IRP-37 02-Nov-98	IRP-37 11-Apr-99
Method	Analyte	Units										
VOLATILE ORGANIC COMPOUNDS												
8260	CARBON DISULFIDE	µg/L	1,040	nc	N/A		12 ‡	<1	<1	<1	<1	<1
8260	TRICHROLOETHENE (TCE)	µg/L			**5**	F	<1	<1	<1	<1	<1	0'7 J
8260	CHLOROFORM	µg/L	0 16	ca	**100**	P	**0.5 J†**	**0.5 J†**	<1	<1	<1	<1
INORGANICS												
6010	ALUMINUM	µg/L	36,500	nc	N/A		<25	76.6 B	109 B	111 B	157 B	65 B
6010	ANTIMONY	µg/L	15	nc	**6**	F	<2	<2	2 3 B	<1	3.6 B‡	<1
6010	CALCIUM	µg/L			N/A		66,700	71,100	68,100	66,200	71,500	67,600 E
6010	CHROMIUM, TOTAL	µg/L			**100**	F	18.4 B	44.8 B	40 2 BE	50.4	55.8	62 7
6010	IRON	µg/L	11,000	nc	N/A		<40	300	123	215	667	256 E
6010	LEAD	µg/L	4	nc	**15**	TT	<1	<1	1 7 B	1.1 BN	1.1 B‡	1 B‡
6010	MAGNESIUM	µg/L			N/A		4,530	5,500	5,000	4,520	5,400	5,010
6010	MANGANESE	µg/L	1,700	nc	N/A		<6	<6	<8	<8	56	<8
6010	NICKEL	µg/L	730	nc	**100**	F	<15	**112 B**	19 B	33.9 B	40.6	45.6
6010	POTASSIUM	µg/L			N/A		1,390 B	2,350 B	1,360 B	1,680 B	1,390	1,110
6010	SELENIUM	µg/L	180	nc	**50**	F	1.2 BN	<1	<2	<0.7	3.9 B	<2
6010	SODIUM	µg/L			N/A		28,500	33,700	33,200	27,300	30,800	29,100
6010	ZINC	µg/L	11,000	nc	N/A		<12	<12	<12	<12	17.5 B	<12
WATER QUALITY PARAMETERS												
325.2	CHLORIDE (AS CL)	mg/L	N/A	N/A	N/A		59.2	65 4	61.2	52.8	---	---
375.4	SULFATE (AS SO4)	mg/L	N/A	N/A	**500**	P	3.2	10.4	8.4	8.1	---	---
310.1	ALKALINITY, BICARBON/ATE	mg/L	N/A	N/A	N/A		185	180	169	175	---	---
310.1	ALKALINITY, CARBON/ATE	mg/L	N/A	N/A	N/A		0 8	<0.5	0.96	<0.4	---	---
310.1	ALKALINITY, TOTAL	mg/L	N/A	N/A	N/A		185	180	169	175	---	---
160.1	TOTAL DISSOLVED SOLIDS	mg/L	N/A	N/A	N/A		283	303	294	291	---	---

Notes:

PRG = Region IX USEPA Preliminary Remediation Goal
F = Final; TT = 1996 USUSEPA SDWA MCL
P = Proposed; N/A = Not Applicable
mg/L = milligrams per liter; µg/L = micrograms per liter
nc = non-carcinogen; ca = Cancer PRG
Bold = Concentrations equal of exceed the PRGs for tap water.
Bold & shaded = Concentrations equal or exceed the MCLs.

MCL = USEPA Safe Drinking Water Act Maximum Contaminant Levels
B = (Inorganics) Reported value is less than the Contract Required Detection Limit.
E = Reported value is estimated due to interference.
N = Spiked sample recovery is not within the control limits.
† = Common Lab Contaminant
‡ = Analyte detected in associated laboratory blank or field blank
J = Estimated value

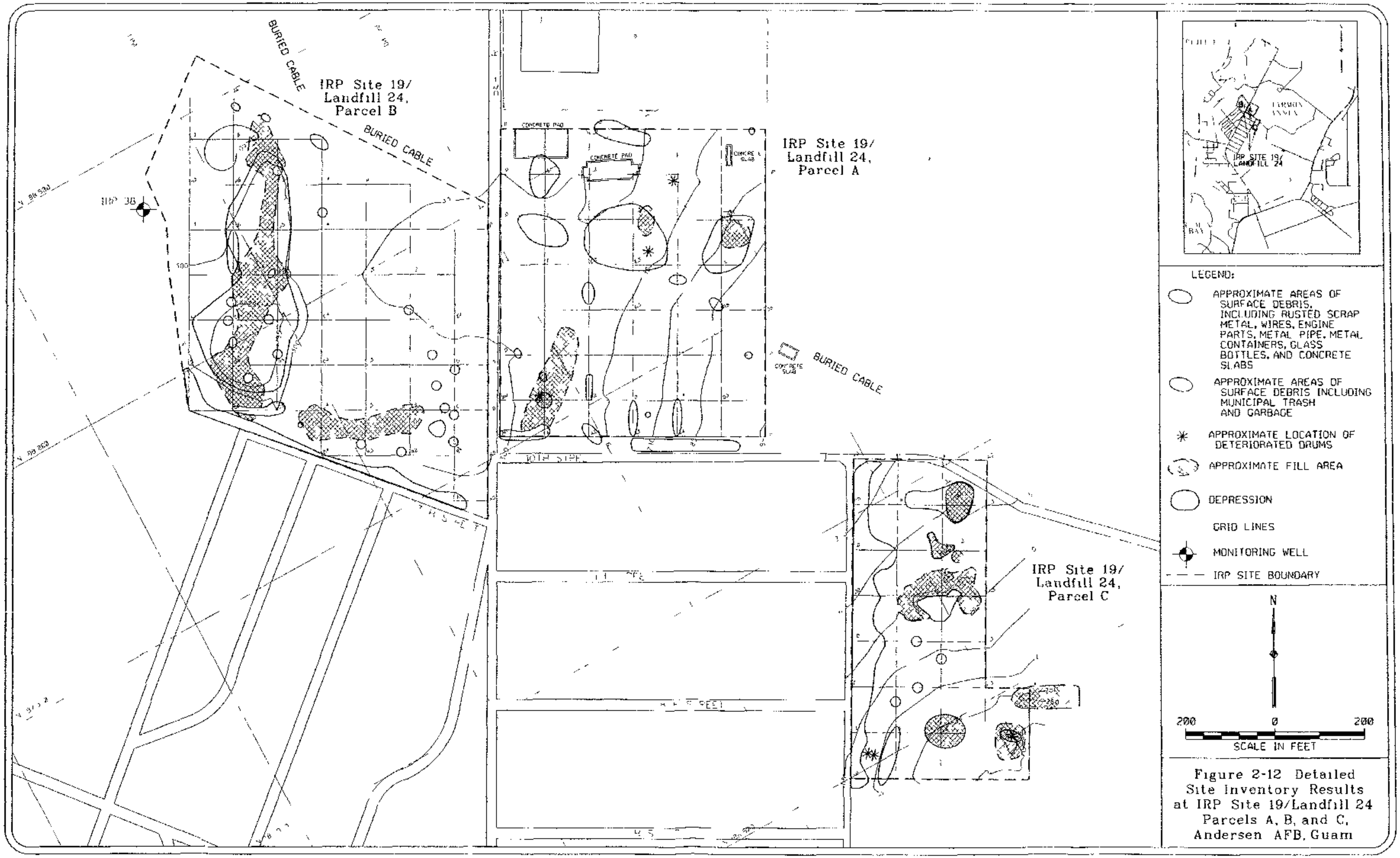

Figure 2-12 Detailed Site Inventory Results at IRP Site 19/Landfill 24 Parcels A, B, and C, Andersen AFB, Guam

TABLE 2-3. SURFACE SOIL ANALYTICAL RESULTS FOR IRP SITE 19, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Screening Basis 1998 USEPA Region IX PRGs Residential		Industrial		S19S001	S19S002	S19S003	S19S004	S19S005	S19S006	S19S007	S19S008	S19S009
	Sample Location (Parcel)							(A)	(A)	(A)	(A)	(A)	(A)	(B)	(B)	(B)
	Sample Depth (feet)							0 2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0 2 - 0.3	0 2 - 0.3
	Sample Date							20-Jan-97	20-Jan-97	20-Jan-97	20-Jan-97	20-Jan-97	20-Jan-97	21-Jan-97	21-Jan-97	21-Jan-97
SEMIVOLATILES																
SW8270	BENZO (b) FLUORANTHENE	µg/kg	NA	**560**		**3,590**		<460	160 J	<460	<500	<490	<550	<520	<490	<530
INORGANICS																
SW6010	ALUMINUM	mg/kg	**173,500**	74,900	nc	100,000	max	111,000	145,000	70,300	130,000	146,000	143,000	135,000	145,000	153,000
SW6010	ANTIMONY	mg/kg	**63**	30.0	nc	**749**	nc	7.8 BN	7.4 BN	4.8 BN	9.1 BN	10 BN	10 BN	9.6 BN	9.3 BN	9.2 BN
SW6010	ARSENIC	mg/kg	**62**	0.38	ca	2.99	ca	17.8 E	15.9 E	7.0	30.1 E	30.1 E	32.4 E	16.1 N*	24.8 N*	23.4 N*
SW6010	BARIUM	mg/kg	335	**5,150**	nc	**100,000**	max	26.1	31.5	16.2	25 4	27.5	29.2	25.2	26 5	30.1
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**3,400**	nc	2.2	2.9	1.3 B	2.5	2.9	3.0	2.5	2.8	3.0
SW6010	CADMIUM	mg/kg	6.5	**37.5**	nc	**934**	nc	2.8	6.1	2.2	4.2	4.2	4.2	3.5	3.8	4.0
SW6010	CALCIUM	mg/kg	N/A	N/A		N/A		123,000 *	10,800 *	235,000 *	106,000 *	87,900 *	32,400 *	33,700 *	70,300 *	38,500 *
SW6010	CHROMIUM	mg/kg	**1,080**	210	ca	450	ca	598.0	675.0	378.0	695.0	843.0	755.0	812	859	853
SW6010	COBALT	mg/kg	29	**3,250**	nc	**28,600**	nc	13.2	21.9	8.4	15.5	17.5	18 5	15.5	16 8	18 3
SW6010	COPPER	mg/kg	72.2	**2,780**	nc	**69,600**	nc	8.0	11.0	8.4	10.3	9.0	6.7 B	9 1	9.1	45.8
SW6010	IRON	mg/kg	**116,495**	22,500	nc	100,000	max	73,900	85,200	46,500	84,800	97,000	95,200	87,000	95,200	**122,000**
SW6010	LEAD	mg/kg	166	**400**	nc	**1,000**	nc	45.2	68.6	73.1	53.4	51.8	64 5	56.6 *	56.3 *	57.3 *
SW6010	MAGNESIUM	mg/kg	N/A	N/A		N/A		1580 E	1720 E	1900 E	1860 E	1490 E	1400 E	1,310	1,680 E	1,420 E
SW6010	MANGANESE	mg/kg	**7100 (1)**	3,120	nc	**45,300**	nc	1,900	3,210	1,270	2,150	2,530	2,510	2,830	2,900	3,030
SW7471	MERCURY	mg/kg	0.28	**22.5**	nc	**562**	nc	0.23 B	0.34 B	0.25 B	0.25 B	0.27 B	0.43 B	0 22 B	0.25 B	0.22 B
SW6010	NICKEL	mg/kg	242.5	**1,500**	nc	**37,500**	nc	52.4	135.0	36.2	71.2	83 7	75.6	64.3 N	79.8 N	83.4 N
SW6010	POTASSIUM	mg/kg	N/A	N/A		N/A		47 B	90.3 B	40.0 B	69.3 B	62.8	139 B	101	81.5 B	152 B
SW6010	SELENIUM	mg/kg	N/A	**375**	nc	**9,370**	nc	<1.3	<1.5	<1.3	<1.5	<1.4	<1.6	<1.5	<1.4	<1.5
SW6010	SILVER	mg/kg	14.9	**375**	nc	**9,370**	nc	<0.55	<0.61	<0.55	<0.57	<0.57	<0.66	<0.47	<0.43	<0 48
SW6010	SODIUM	mg/kg	N/A	N/A		N/A		160.0	148 B	161.0	147.0	147.0	152 B	162	157	158 B
SW7841	THALLIUM**	mg/kg	1.42	**6**	nc	**150**	nc	0.75 *	1.7 *	0.59 W*	1.1 *	1.1 *	1.2 *	1.2	1.3	1.2
SW6010	VANADIUM	mg/kg	206	**525**	nc	**13,100**	nc	81.1 E	99 3 E	57.5 E	105 E	124 E	111 E	88.4 N	102 N	94.7 N
SW6010	ZINC	mg/kg	111	**22,500**	nc	**100,000**	max	61.0	116.0	64.8	50.9	37.9	41 2	40.3	34.7	32 9
SW9012	CYANIDE	mg/kg	1.47	**1100**	nc	**14,000**	max	<0.50	<0.34	<0.30	<0 32	<0.29	<0.31	<0.35	<0.28	<0.34

Notes:

BTV = Background Threshold Value
PRG = Preliminary Remediation Goal
* = Duplicate analysis is not within control limits.
** = PRG for thallium acetate
B = Reported value is less than the Contract Required Detection Limit, but greater than the Instrument Detection Limit
N/A = Not Applicable
NS = Not Sampled
(1) - Recalculated BTV concentration established in December 2001 (EA, 2001)

nc = non-cancerous
ca = cancerous
max = ceiling limit
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram

E = Reported value is estimated due to the presence of interference.
J = Indicates an estimated value.
N = Spiked sample recovery is not within control limits
W = Postdigestion spike for Graphite Furnace Atomic Absorption analysis is out of control limits (86-115%) and sample absorbance is less than 50% of spike absorbance.
Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.
Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

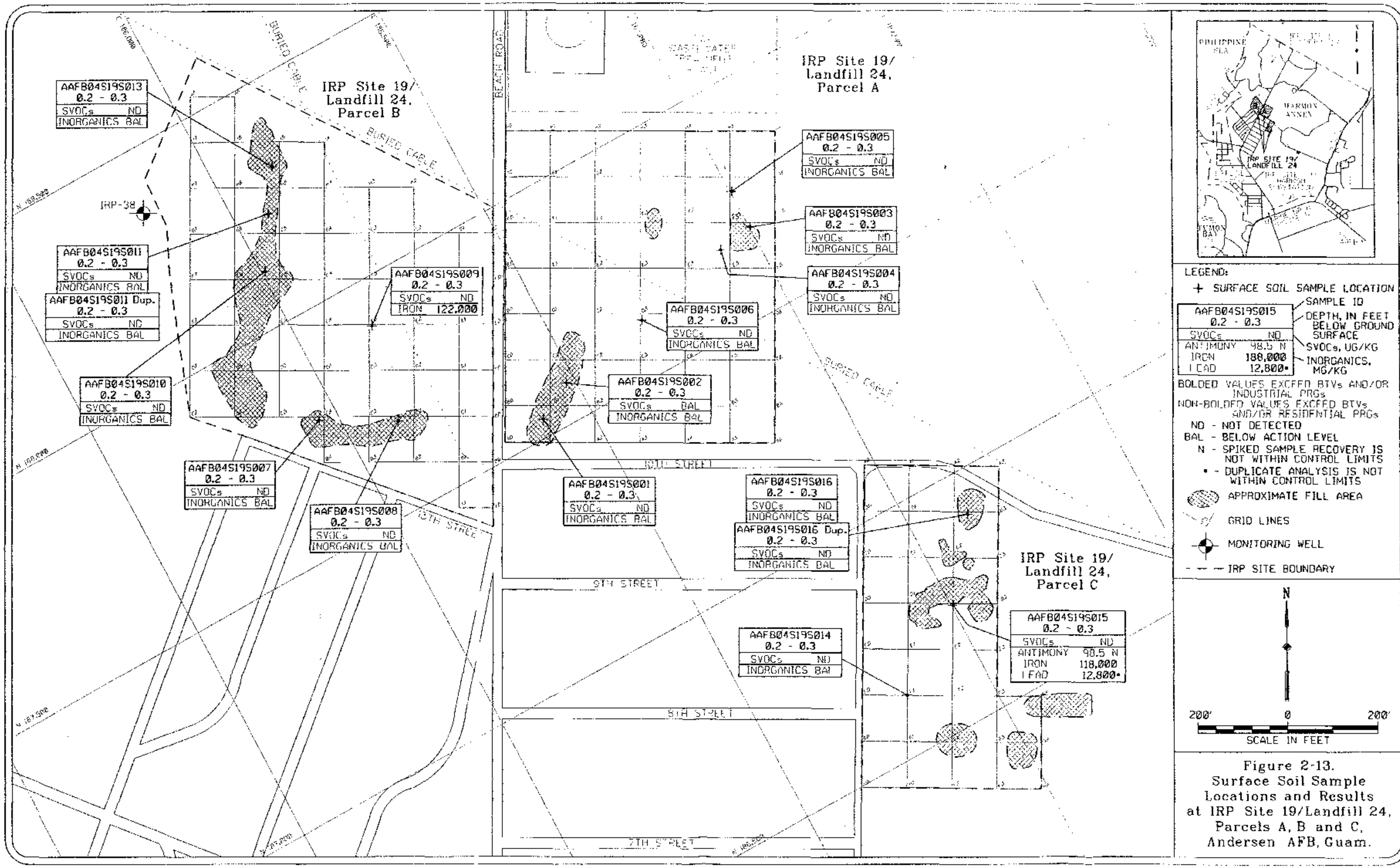

Figure 2-13. Surface Soil Sample Locations and Results at IRP Site 19/Landfill 24, Parcels A, B and C, Andersen AFB, Guam.

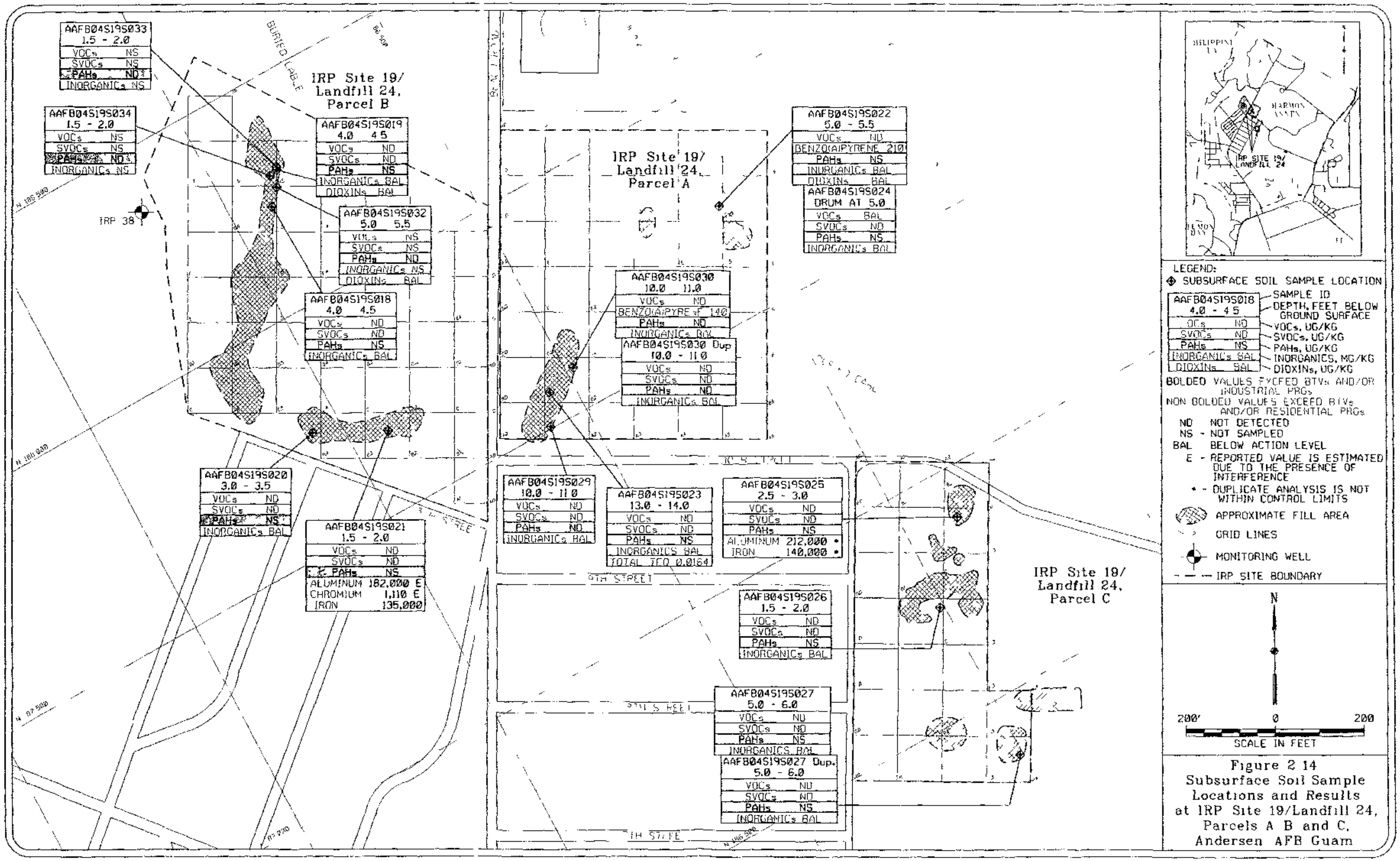

Figure 2 14
Subsurface Soil Sample Locations and Results at IRP Site 19/Landfill 24, Parcels A B and C, Andersen AFB Guam

TABLE 2-4. SUBSURFACE SOIL ANALYTICAL RESULTS FOR IRP SITE 19, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Screening Basis 1998 USEPA Region IX PRGs Residential	Screening Basis 1998 USEPA Region IX PRGs Industrial	S19S018	S19S019	S19S020	S19S021	S19S022	S19S023	S19S024	S19S025
	Sample Location (Parcel)					(B)	(B)	(B)	(B)	(A)	(A)	(A)	(C)
	Sample Depth (feet)					4 5	4 5	3	2	5 5	12	Drum @ 5 0	2 5
	Sample Date					23-Jan-97	23-Jan-97	23-Jan-97	23-Jan-97	27-Jan 97	27-Jan-97	28-Jan-97	29-Jan-97
VOLATILES													
SW8260	STYRENE	µg/kg	N/A	**1,700,000**	**1,700,000**	<6	<6	<7	<7	3 J	<6	<710	<7
SW8260	M&P XYLENES	µg/kg	N/A	**320,000**	**320,000**	<6	<6	<7	<7	<6	<6	2,700 JD	<7
SW8260	0-XYLENE	µg/kg	N/A	**280,000**	**280,000**	<6	<6	<7	<7	<6	<6	13,000 D	<7
SW8260	ISOPROPYLBENZENE	µg/kg	N/A	**120,000**	**490,000**	<6	<6	<7	<7	<6	<6	19,000 D	<7
SW8260	N-PROPYLBENZENE	µg/kg	N/A	N/A	N/A	<6	<6	<7	<7	<6	<6	41,000 D	<7
SW8260	1,3,5-TRIMETHYLBENZENE	µg/kg	N/A	N/A	N/A	<6	<6	<7	<7	<6	<6	220,000 D	<7
SW8260	1,2,4-TRIMETHYLBENZENE	µg/kg	N/A	N/A	N/A	<6	<6	<7	<7	<6	<6	230,000 D	<7
SW8260	SEC-BUTYLBENZENE	µg/kg	N/A	N/A	N/A	<6	<6	<7	<7	<6	<6	12,000 D	<7
SW8260	P-ISOPROPYLTOLUENE	µg/kg	N/A	N/A	N/A	<6	<6	<7	<7	<6	<6	9,300 D	<7
SEMIVOLATILES													
SW8270	PHENANTHRENE	µg/kg	N/A	N/A	N/A	<420	<380	<490	<2500	830	<410	<9400	<480
SW8270	FLUORANTHENE	µg/kg	N/A	**2,000,000**	**37,400,000**	<420	<380	<490	<2500	630 J	<410	<9400	<480
SW8270	PYRENE	µg/kg	N/A	**1,480,000**	**26,500,000**	<420	<380	<490	<2500	670 J	<410	<9400	<480
SW8270	BUTYLBENZYLPHTHALATE	µg/kg	N/A	**930,000**	**930,000**	<420	<380	<490	<2500	260 J	<410	<9400	<480
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	N/A	N/A	NS	NS	NS	NS	NS	NS	NS	NS
SW8270	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	**3,590**	<420	<380	<490	<2500	190 J	<410	<9400	<480
SW8270	BIS (2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**32,000**	**140,000**	560	<380	<490	<2500	<770	<410	<9400	<480
SW8270	CHRYSENE	µg/kg	N/A	**55,700**	**359,000**	<420	<380	<490	<2500	250 J	<410	<9400	<480
SW8270	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	**3,590**	<420	<380	<490	<2500	270 J	<410	<9400	<480
SW8270	BENZO[K]FLUORANTHENE	µg/kg	6100	**5,570**	**35,900**	<500	<500	<500	<500	<500	<500	<500	<500
SW8270	BENZO (A) PYRENE	µg/kg	N/A	**56**	**360**	<51	<47	<60	<300	**210**	<49	<1100	<58
PAHs													
SW8310	ANTHRACENE	µg/kg	N/A	14,000,000	**220,000,000**	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	FLUORANTHENE	µg/kg	N/A	2,000,000	**37,400,000**	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	PYRENE	µg/kg	N/A	1,480,000	**26,500,000**	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZ(A)ANTHRACENE	µg/kg	N/A	560	3,590	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	CHRYSENE	µg/kg	N/A	32,000	140,000	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZO (B) FLUORANTHENE	µg/kg	N/A	560	3,590	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZO (K) FLUORANTHENE	µg/kg	N/A	5,570	35,900	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZO (A) PYRENE	µg/kg	N/A	56	360	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	56	360	NS	NS	NS	NS	NS	NS	NS	NS
SW8310	INDENO (1,2,3-CD) PYRENE	µg/kg	N/A	560	3600	NS	NS	NS	NS	NS	NS	NS	NS
INORGANICS													
SW6010	ALUMINUM	mg/kg	**173,500**	74,900 nc	100,000 max	94,300 E	24,400 E	150,000 E	**182,000 E**	25,200 E	37,000 E	37,400 E	**212,000 ***
SW6010	ANTIMONY	mg/kg	**63**	30 0 nc	**749** nc	9 0 BEN	24 6 EN	10 4 BEN	12 2 BEN	3 1 BEN	14 8 BEN	3 4 BEN	12 1 BN
SW6010	ARSENIC	mg/kg	**62**	0 38 ca*	2 99 ca	7 6 N*	7 0 N*	9 0 BN*	11 9 N*	2 7 BN*	5 5 N*	7 0 N*	<5 7
SW6010	BARIUM	mg/kg	335	**5,150** nc	**100,000** max	17 6	12 2	26 3	34 7	10 8 B	21 1	14 0	14 9
SW6010	BERYLLIUM	mg/kg	3 34	**150** nc	**3,400** nc	1 9	0 4	2 9	3 8	0 41	0 65	0 75	4 5
SW6010	CADMIUM	mg/kg	6 5	**37.5** nc	**934** nc	2 6 E	1 1 E	2 7 E	4 0 E	0 81 E	17 0 E	1 1 E	4 0
SW6010	CALCIUM	mg/kg	N/A	N/A	N/A	149,000	309,000	101,000	8,690	309,000	291,000	207,000	3160 B

TABLE 2-4. SUBSURFACE SOIL ANALYTICAL RESULTS FOR IRP SITE 19, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Screening Basis 1998 USEPA Region IX PRGs Residential	Industrial	S19S026 (C) 1 5 29-Jan-97	S19S027 (C) 5 29 Jan-97	S19S028 duplicate sample of S19S027	S19S029 (A) 10 28 Oct 97	S19S030 (A) 10 28 Oct-97	S19S031 duplicate sample of S19S030	S19S032 (B) 5 29 Oct-97	S19S033 (B) 1 5 29 Oct 97	S19S034 (B) 1 5 29-Oct-97
VOLATILES														
SW8260	STYRENE	µg/kg	N/A	**1,700,000**	**1,700,000**	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	M&P XYLENES	µg/kg	N/A	**320,000**	**320,000**	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	0-XYLENE	µg/kg	N/A	**280,000**	**280,000**	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	ISOPROPYLBENZENE	µg/kg	N/A	**120,000**	**490,000**	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	N-PROPYLBENZENE	µg/kg	N/A	N/A	N/A	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	1,3,5-TRIMETHYLBENZENE	µg/kg	N/A	N/A	N/A	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	1,2,4-TRIMETHYLBENZENE	µg/kg	N/A	N/A	N/A	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	SEC-BUTYLBENZENE	µg/kg	N/A	N/A	N/A	<7	<7	<7	<8	<7	<7	NS	NS	NS
SW8260	P-ISOPROPYLTOLUENE	µg/kg	N/A	N/A	N/A	<7	<7	<7	<8	<7	<7	NS	NS	NS
SEMIVOLATILES														
SW8270	PHENANTHRENE	µg/kg	N/A	N/A	N/A	<450	<470	<470	<500	<460	<460	NS	NS	NS
SW8270	FLUORANTHENE	µg/kg	N/A	**2,000,000**	**37,400,000**	<450	<470	<470	<500	370 J	<460	NS	NS	NS
SW8270	PYRENE	µg/kg	N/A	**1,480,000**	**26,500,000**	<450	<470	<470	<500	400 J	<460	NS	NS	NS
SW8270	BUTYLBENZYLPHTHALATE	µg/kg	N/A	**930,000**	**930,000**	<450	<470	<470	<500	<460	<460	NS	NS	NS
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	N/A	N/A	NS	NS	NS	110 J	<460	<460	NS	NS	NS
SW8270	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	**3,590**	<450	<470	<470	<500	<460	<460	NS	NS	NS
SW8270	BIS (2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**32,000**	**140,000**	<450	<470	<470	190 J	<460	<460	NS	NS	NS
SW8270	CHRYSENE	µg/kg	N/A	**55,700**	**359,000**	<450	<470	<470	<500	350 J	<460	NS	NS	NS
SW8270	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	**3,590**	<450	<470	<470	<500	330 J	<460	NS	NS	NS
SW8270	BENZO[K]FLUORANTHENE	µg/kg	6100	**5,570**	**35,900**	<500	<500	<500	100 J	<460	<460	NS	NS	NS
SW8270	BENZO (A) PYRENE	µg/kg	N/A	**56**	**360**	<54	<57	<57	<61	**140**	<56	NS	NS	NS
PAHs														
SW8310	ANTHRACENE	µg/kg	N/A	14,000,000	**220,000,000**	NS	NS	NS	<76	<69	<69	<64	<65	<69
SW8310	FLUORANTHENE	µg/kg	N/A	2,000,000	**37,400,000**	NS	NS	NS	<110	<97	<97	<90	<91	<97
SW8310	PYRENE	µg/kg	N/A	1,480,000	26,500,000	NS	NS	NS	<140	<130	<130	<120	<120	<130
SW8310	BENZ(A)ANTHRACENE	µg/kg	N/A	560	**3,590**	NS	NS	NS	<30	<28	<28	<26	<26	<28
SW8310	CHRYSENE	µg/kg	N/A	32,000	**140,000**	NS	NS	NS	<76	<69	<69	<64	<65	<69
SW8310	BENZO (B) FLUORANTHENE	µg/kg	N/A	560	**3,590**	NS	NS	NS	<30	<28	<28	88	<26	<28
SW8310	BENZO (K) FLUORANTHENE	µg/kg	N/A	5,570	**35,900**	NS	NS	NS	<30	<28	<28	38	<26	<28
SW8310	BENZO (A) PYRENE	µg/kg	N/A	56	**360**	NS	NS	NS	<30	<28	<28	50	<26	<28
SW8310	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	56	**360**	NS	NS	NS	<30	<28	<28	28	<26	<28
SW8310	INDENO (1,2,3-CD) PYRENE	µg/kg	N/A	560	3600	NS	NS	NS	<30	<28	<28	42	<26	<28
INORGANICS														
SW6010	ALUMINUM	mg/kg	**173,500**	74,900 nc	100,000 max	105,000 *	144,000 *	88,800 *	54,800	120,000	121,000	NS	NS	NS
SW6010	ANTIMONY	mg/kg	**63**	30 0 nc	**749** nc	7 7 BN	9 1 BN	5 3 BN	16 1 BN	13 7 BN	14 2 BN	NS	NS	NS
SW6010	ARSENIC	mg/kg	**62**	0 38 ca*	2 99 ca	<5 3	<5 5	<5 5	6 1 N	13 5 N	18 1 N	NS	NS	NS
SW6010	BARIUM	mg/kg	335	**5,150** nc	**100,000** max	5 4 B	28 4	13 5	52 5	35 3	47 2	NS	NS	NS
SW6010	BERYLLIUM	mg/kg	3 34	**150** nc	**3,400** nc	1 8	2 5	1 5	0 97	2 2	2 2	NS	NS	NS
SW6010	CADMIUM	mg/kg	6 5	**37.5** nc	**934** nc	2 2	5 5	3 2	1 1	2 7	2 6	NS	NS	NS
SW6010	CALCIUM	mg/kg	N/A	N/A	N/A	195,000	48,100	188,000	180,000	119,000	97,300	NS	NS	NS

TABLE 2-5. SUBSURFACE SOIL DIOXIN RESULTS FOR IRP SITE 19, ANDERSEN AFB, GUAM.

	Sample Identifer					S19S019		S19S022		S19S023		S19S029		S19S030	
	Sample Location (Parcel)					(B)		(A)		(A)		(A)		(A)	
	Sample Depth (feet)					4.5		5.5		12		11		11	
	Sample Date		Screening Basis			1/23/97		1/27/97		1/27/97		10/28/97		10/28/97	
Method	Analyte	Units	WHO TEFs	1998 USEPA Region IX PRG Residental	1998 USEPA Region IX PRG Industrial	Conc./ MDL	TEQ * (detect) or (0.5 ND)	Conc / MDL	TEQ * (detect) or (0.5 ND)	Conc./ MDL	TEQ * (detect) or (0.5 ND)	Conc / MDL	TEQ * (detect) or (0.5 ND)	Conc./ MDL	TEQ * (detect) or (0.5 ND)
SW8280	2,3,7,8-TCDD	µg/kg	1	0.0038 ca	0.030 ca	<0.122	0 061	NA		<0.127	0 064	<0.2	0 100	<0.1	0.050
SW8280	1,2,3,7,8-PeCDD	µg/kg	1			<0.682	0.341	NA		<0 71	0 355	<0.9	0.450	<0.8	0.400
SW8280	1,2,3,4,7,8-HxCDD	µg/kg	0.1			<0.475	0 238	NA		<0.495	0.248	<0.6	0.300	<0.6	0.300
SW8280	1,2,3,6,7,8-HxCDD	µg/kg	0.1			<0.426	0.213	NA		<0.444	0 222	<0.5	0.250	<0.5	0.250
SW8280	1,2,3,7,8,9-HxCDD	µg/kg	0.1			<0.365	0.183	NA		<0.38	0 190	<0.5	0.250	<0.4	0.200
SW8280	1,2,3,4,5,7,8-HpCDD	µg/kg	0.01			2.42	0.024	NA		[1.1]	0.011	<0.90	0.450	<0.8	0.400
SW8280	1,2,3,4,6,7,8,9-OCDD	µg/kg	0.0001			6 88	0.0007	NA		4.77	0.0005	<1.1	0.550	<1.0	0.500
SW8280	TOTAL PCDD	µg/kg					1.060				1.089		2 350		2.100
SW8280	2,3,7,8-TCDF	µg/kg	0.1			<0.0974	0.049	NA		<0.101	0.051	<0.1	0.050	<0.1	0.050
SW8280	1,2,3,7,8-PeCDF	µg/kg	0.05			<0.499	0.250	NA		<0.52	0.260	<0.6	0.300	<0.6	0.300
SW8280	2,3,4,7,8-PeCDF	µg/kg	0.5			<0.475	0.238	NA		<0.495	0.248	<0.6	0.300	<0.6	0.300
SW8280	1,2,3,4,7,8-HxCDF	µg/kg	0.1			<0.608	0.304	NA		<0.634	0.317	<0.8	0.400	<0.7	0.350
SW8280	1,2,3,6,7,8-HxCDF	µg/kg	0.1			<0.572	0.286	NA		<0.596	0.298	<0.7	0.350	<0.7	0.350
SW8280	2,3,4,6,7,8-HxCDF	µg/kg	0.1			<0.438	0.219	NA		<0.457	0.229	<0.5	0.250	<0.5	0.250
SW8280	1,2,3,7,8,9-HxCDF	µg/kg	0.1			<0.268	0.134	NA		<0.279	0.140	<0.3	0.150	<0.3	0.150
SW8280	1,2,3,4,6,7,8-HpCDF	µg/kg	0.01			<0.438	0.219	NA		<0.457	0.229	<0.5	0.250	<0.5	0.250
SW8280	1,2,3,4,7,8,9-HpCDF	µg/kg	0.01			<0.389	0.195	NA		<0.406	0.203	<0.5	0.250	<0.5	0.250
SW8280	1,2,3,4,6,7,8,9-OCDF	µg/kg	0.0001			<0.73	0.365	NA		<0.761	0.381	<0.9	0.450	<0.8	0.400
SW8280	TOTAL PCDF	µg/kg					2.257				2.353		2.750		2.650
SW8280	TOTAL TEQ	µg/kg	1.0	**0.0038 ca**	**0.030 ca**		**3.32**				**3.44**		**5.10**		**4.75**
	Sample Identifer (Confirmation Sample (IT/OHM, 1999)					HAS19S413		HAS19S451		HAS19S450					
	Sample Location (Parcel)					(B)		(A)		(A)					
	Sample Depth (feet)					4.5		6		15					
	Sample Date					12/12/98		12/12/98		12/12/98					
SW8290	TOTAL TEQ	µg/kg	1.0	**0.0038 ca**	**0.030 ca**		0.0006		0.0016		**0.0164**		NS		NS

Notes:
PRG = Preliminary Remediation Goal
TEF = Toxicity Equivalent Factor
TEQ = Toxicity Equivalent Quotient - Sum of TEFs present,
TEQ* represents sum of (detects x TEF) + (detection limit x TEF for NDs)
Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.
Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

Please note that Method 8280 results may have a limited use due to insensitive detection limit as compared with Method 8290.
µg/kg = micrograms/kilogram (parts per billion)
WHO = World Health Organization
MDL = Method Detetction Limit
ND = Not Detected
ca = cancer PRG
NA = Not Analyzed
NS = Not Sampled

AAFB04S19S023) in Parcel A. These subsurface samples were analyzed for dioxins using Method SW8290. As presented in Table 2-5, Method SW8290 provided significantly lower RLs than Method SW8280. Sample AAFB04S10S023, as analyzed by Method SW8290, also included dioxins at concentrations above Residential PRGs. However, in accordance with an agreement between the USAF, GEPA, and the USEPA Region IX, the subsurface dioxin cleanup standard was established at 1.0 microgram per kilogram (µg/kg) and no cleanup was recommended for dioxins at Parcel A (IT/OHM, 1999b).

As presented in Tables 2-4 and 2-5, three subsurface soil samples and a duplicate soil sample were collected from between 10 and 14 feet bgs, in the southwest corner fill area of Parcel A (Figure 2-14). Benzo(a) pyrene (SVOCs by USEPA Method SW8270) was detected in a single sample (AAFB04S19S030 at 140 µg/kg) at a concentration that exceeded 1he Residential PRG (56 µg/kg), but less than the Industrial PRG (360 µg/kg). This result was considered suspect as benzo(a) pyrene was not detected in the same sample using the more accurate USEPA Method SW8310, and benzo(a) pyrene was not detected in the duplicate sample (AAFB04S19S031D) using either Method SW8270 or SW8310. Manganese was detected in a single sample (AAFB04S19S023 at 7,090 mg/kg) at a concentration that exceeded the Residential PRG (3,120 mg/kg). However, this manganese concentration is just below the revised BTV of 7,100 mg/kg (EA, 2001). Total dioxin (Toxicity Equivalent Quotient [TEQ] by USEPA Method SW8290) was detected in subsurface soil sample AAFB04S19S023 (0.0164 µg/kg) at concentrations exceeding the Residential PRG (0.0038 µg/kg), but less than the Industrial PRG (0.03 µg/kg). This TEQ concentration is considerably lower than the subsurface dioxin cleanup standard of 1.0 µg/kg established by the USAF, GEPA, and the Office of Solid Waste and Emergency Response (OSWER) directive (IT/OHM, 1999c), and no further action is required. Therefore, the area on the southwest corner of Parcel A was not recommended for remediation.

Also at Parcel A, in the vicinity of the nine drums on the northern portion of the parcel, benzo(a) pyrene was detected at a concentration exceeding the Residential PRG (Table 2-4 and Figure 2-14). The drums in the surrounding few feet of soil were marked in the field as a " hot spot" for cleanup (EA, 1998b). One sample was collected from the asphalt-like material in the drum near grid cells F5 and G5. A flame ionization detector reading of 600 parts per million from the drum was recorded in the field. Sample S19S024 was collected from soil/rags inside of the drum and analyzed for VOCs, SVOCs, and metals. As presented in Table 2-4 and Figure 2-14, no SVOCs or metals were detected in the sample collected from the drum content at concentrations that exceeded the Residential PRGs. However, VOCs (for which no Residential or Industrial PRGs are available) were detected in the sample collected from drum content. This drum was wrapped in plastic and was subsequently disposed of off-island.

At Parcel B, aluminum, chromium, and iron were detected in a subsurface soil sample collected in the southern portion of the parcel at concentrations slightly greater than BTVs (Table 2-4). These metal concentrations most likely represent background concentrations and therefore no remedial action was recommended in these areas (Figures 2-13 and 2-14). The subsurface fill area on the northern portion of Parcel B also included samples with dioxins at concentrations above the Residential PRG. As mentioned earlier, USEPA Method SW8280 was used for dioxin analysis during the initial subsurface soil sampling at Site 19. To compare the dioxin sample

TABLE 2-6. GROUNDWATER ANALYTICAL RESULTS FOR MONITORING WELL IRP-38, NEAR IRP SITE 19, ANDERSEN AFB, GUAM.

Sample Identifier / Sampling Date			Screening Basis: 1998 USEPA Region IX PRGs				IRP-38	IRP-38	IRP-38	IRP-38	IRP-38	IRP-38	IRP-38 Dup
							25-Sep-96	12-May-97	13-Oct-97	31-Mar-98	03-Nov-98	05-Apr-99	05-Apr-99
Method	Analyte	Units	Tap Water		MCLs								
VOLATILE ORGANIC COMPOUNDS													
8260	CARBON DISULFIDE	µg/L	1,040	nc	N/A		2 ‡	<1	<1	<1	<1	<1	<1
8260	METHYLENE CHLORIDE	µg/L	4.3	ca	N/A		<1	<1	<1	1 †	<1	<1	<1
INORGANICS													
6010	ALUMINUM	µg/L	36,500	nc	N/A		<25	83.7 B	130 B	79.7 B	249	90.7 B	92.7 B
6010	ANTIMONY	µg/L	15	nc	6	F	<2	<2	1 1 B	<1	1.2 B‡	1.5 B	4.6 B
6010	CALCIUM	µg/L			N/A		67,500	68,300	64,800 E	66,100	72,500	72,500 E	69,100 E
6010	CHROMIUM, TOTAL	µg/L			100	F	14.7 B	16 B	17.3 B	10.7 B	<4	**174**	**197**
6010	IRON	µg/L	11,000	nc	N/A		44.1 B	54.5	75.8	<52	124	719 E	723 E
6010	LEAD	µg/L	4	nc	15	TT	<1	<1 W	<1	<1 N	1.8 B‡	1.9 B‡	1.5 B‡
6010	MAGNESIUM	µg/L			N/A		4,410	4,290	3,650 E	3,440	4,220	3,960	3,680
6010	NICKEL	µg/L	730	nc	100	F	<15	<15	19.4 B	11.1 B	58 1	42.9	43.4
6010	POTASSIUM	µg/L			N/A		1,120 B	694 B	972 BE	1,050 B	887 B	801 B	842 B
6010	SILVER	µg/L	180	nc	N/A		<3	<4	3.4 B	1.2 B	<1	<1	<1
6010	SODIUM	µg/L			N/A		23,900	20,600	19,200 E	18,100	24,700	24,700	24,700
6010	ZINC	µg/L	11,000	nc	N/A		<12	<12	<12	<12	16.8 B	<12	<12
7740	SELENIUM	µg/L	180	nc	50	F	1.1 BN	<1	<0.7	0.82 BW	<2	22,300	21,400
WATER QUALITY PARAMETERS													
325.2	CHLORIDE (AS CL)	mg/L	N/A	N/A	N/A		44.6	39.9	36.2	35.1	---	---	---
375.4	SULFATE (AS SO4)	mg/L	N/A	N/A	500	P	3.3	5.6	5	5.6	---	---	---
310.1	ALKALINITY, BICARBONATE	mg/L	N/A	N/A	N/A		183	182	170	183	---	---	---
310.1	ALKALINITY, CARBONATE	mg/L	N/A	N/A	N/A		0.8	<0.5	0.46	<0.4	---	---	---
310.1	ALKALINITY, TOTAL	mg/L	N/A	N/A	N/A		183	182	170	183	---	---	---
160.1	TOTAL DISSOLVED SOLIDS	mg/L	N/A	N/A	N/A		288	268	212	219	---	---	---

Notes:
PRG = 1998 Region IX EPA Preliminary Remediation Goal
MCL = 1996 EPA SDWA Maximum Contaminant Level
F = Final; TT = EPA SDWA Action Level
P = Proposed; nc = non-carcinogen; N/A = Not Applicable
† = Common Lab Contaminant
mg/kg = milligrams per kilogram; µg/kg = micrograms per kilogram
B = (Inorganics) Reported value is less than the Contract Required Detection Limit
E = Reported value is estimated due to interference
N = Spiked sample recovery is not within the control limits
W = Postdigestion spike for Graphite FurN/Ace Atomic Absorption aN/Alysis is out of control limits (86-115%) and sample absorbance is less than 50% of spike absorbance.
Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.
‡ = Analyte detected in associated laboratory blank or field blank
Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

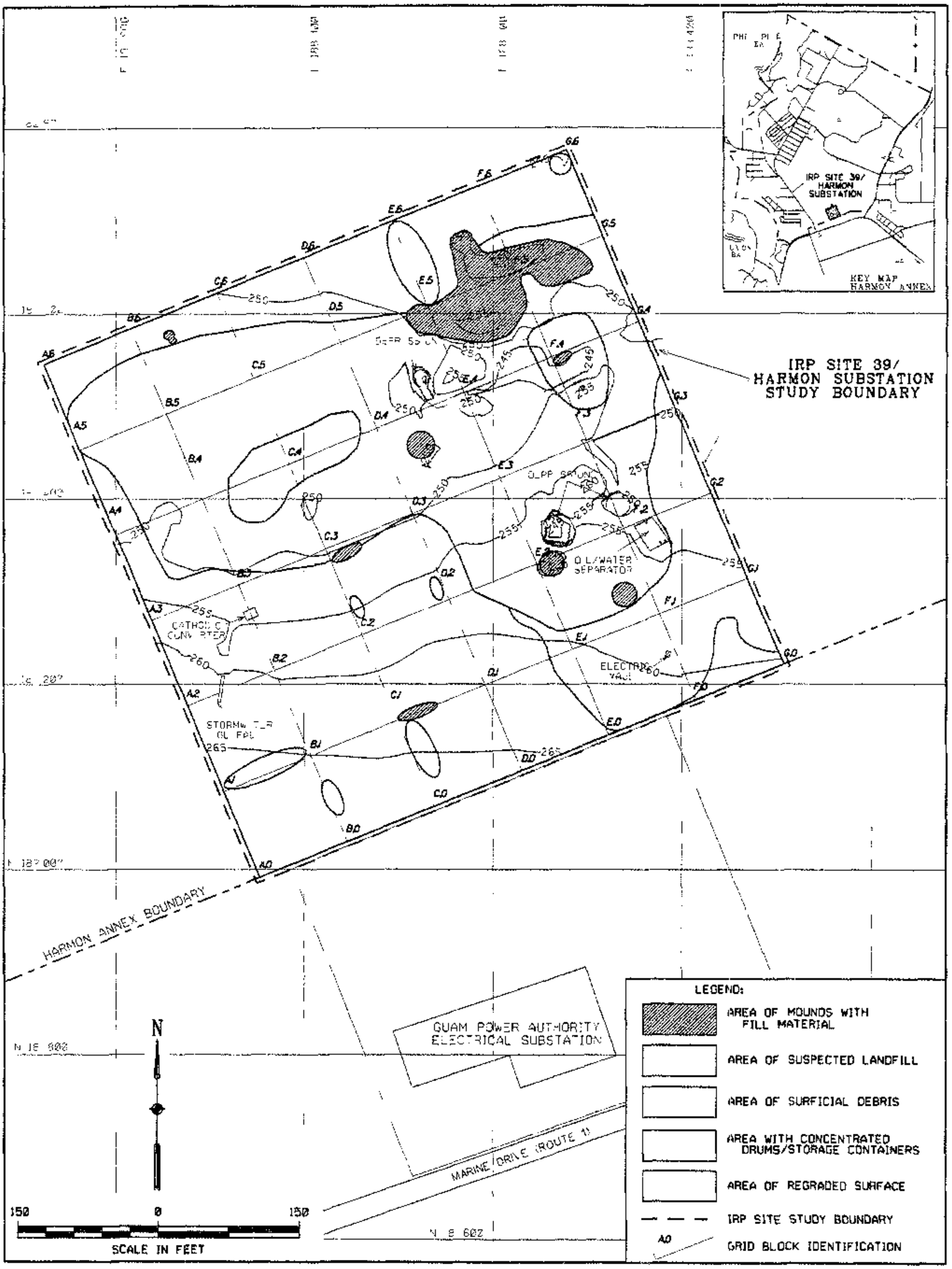

Figure 2-15 Detailed Site Inventory at IRP Site 39/Harmon Substation, Andersen AFB, Guam

A total of 15 surface soil samples (including two duplicate samples) were collected in areas of suspected contamination at Site 39 (Figure 2-16). The surface soil samples were collected during three rounds of sampling. During the first round of sampling in January 1997, surface soil samples were analyzed for SVOCs, metals, and dioxins (using USEPA Method SW8280). During the second round of sampling in October 1997, surface soil samples were analyzed for PAHs (USEPA Method SW8310) and dioxins (USEPA Method SW8280). In May 1998, additional surface soil samples were analyzed for dioxins using USEPA Method SW8290. Dioxin samples were collected in areas where burnt materials were found during test trench and test pit excavations.

A total of 19 subsurface soil samples (including two duplicate samples) were collected during two rounds of sampling (Figure 2-17) similar to surface soil sampling. During the first round of sampling in January and February 1997, subsurface soil samples were analyzed for VOCs, SVOCs, metals, Total Kjeldahl Nitrogen, total phosphorus, and Total Organic Carbon. Based on analytical laboratory results, detection limits for SVOCs and PAHs were elevated due to soil matrix interference. The USAF submitted a variance to include USEPA Method SW8310 for PAH analysis to improve soil detection limits. During the second round of sampling in October 1997, subsurface soil samples were analyzed for PAHs and dioxins using USEPA Method SW8280.

The surface and subsurface soil sample analytical results indicated that there were several impacted areas at Site 39 (Tables 2-7 and 2-8). Three surface soil samples (S39S034, S39S031, and S39S024) near grid cells E6, A6, and C2 were impacted by benzo(a) pyrene at concentrations exceeding the Residential PRGs. Duplicate subsurface sample S39S012dup was impacted by lead at a concentration exceeding the Residential PRG. However, lead was not detected in the associated sample (S39S012) at a concentration exceeding the Residential PRG. The tar/asphalt buried drum area near grid cells F3 and F4 was impacted with SVOCs and PAHs (S39S004, S39S004dup, S39S009, S39S015, and S39S029). Because the property is excess land that is scheduled for transfer to GovGuam, the USAF proposed remedial action for the PAH and SVOC hot spots. The remedial action included the area where the buried drums were observed and the area near grid cells C3 and C4 where buried containers of tar-like material were found. Additionally, no VOCs were detected in any of the subsurface samples collected at Site 39. Subsurface sample S39S017 located north of the stormwater outfall contained detectable PAHs. Even though those detectable PAH constituents were below action standards, the concentration of benzo(a) pyrene was near the Residential PRG.

The oil/water separator's sludge contained VOCs, SVOCs, pesticides, and metals at concentrations above Residential PRGs (Table 2-9). The oil/water separator's floating petroleum product contained an elevated concentration of Total Petroleum Hydrocarbons (TPH) and the liquid contained metals at concentrations above MCLs (Table 2-10). The Air Force recommended the removal of the oil/water separator and liquids (EA, 1998c).

Dioxin was detected in surface and subsurface soil samples collected at Site 39 at concentrations exceeding the Residential or Industrial PRGs (Tables 2-11 and 2-12). Although the majority of dioxin sample results were biased due to high laboratory detection limits associated with the

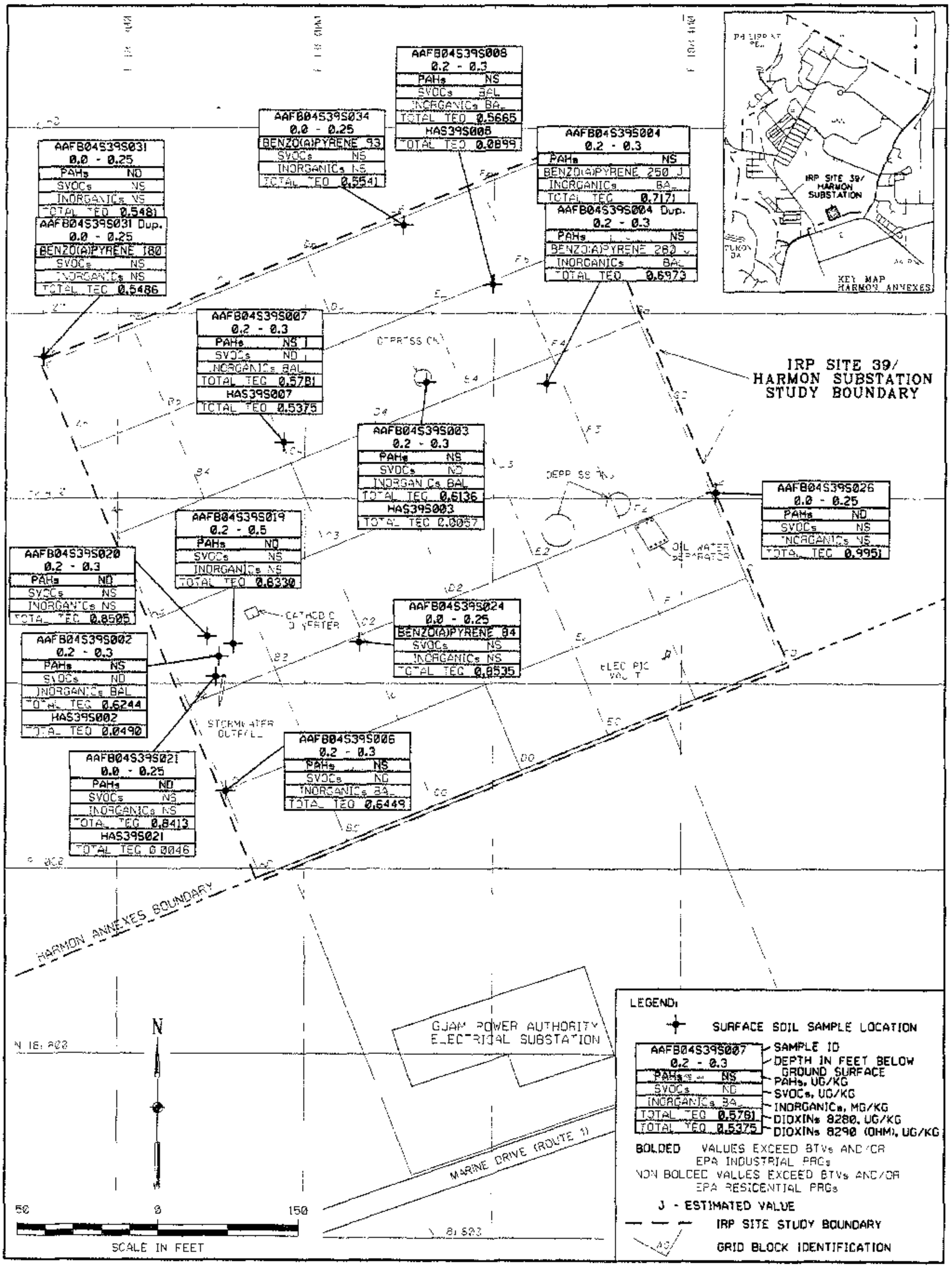

Figure 2-16 Surface Soil Sample Locations and Results at IRP Site 39/Harmon Substation, Andersen AFB, Guam

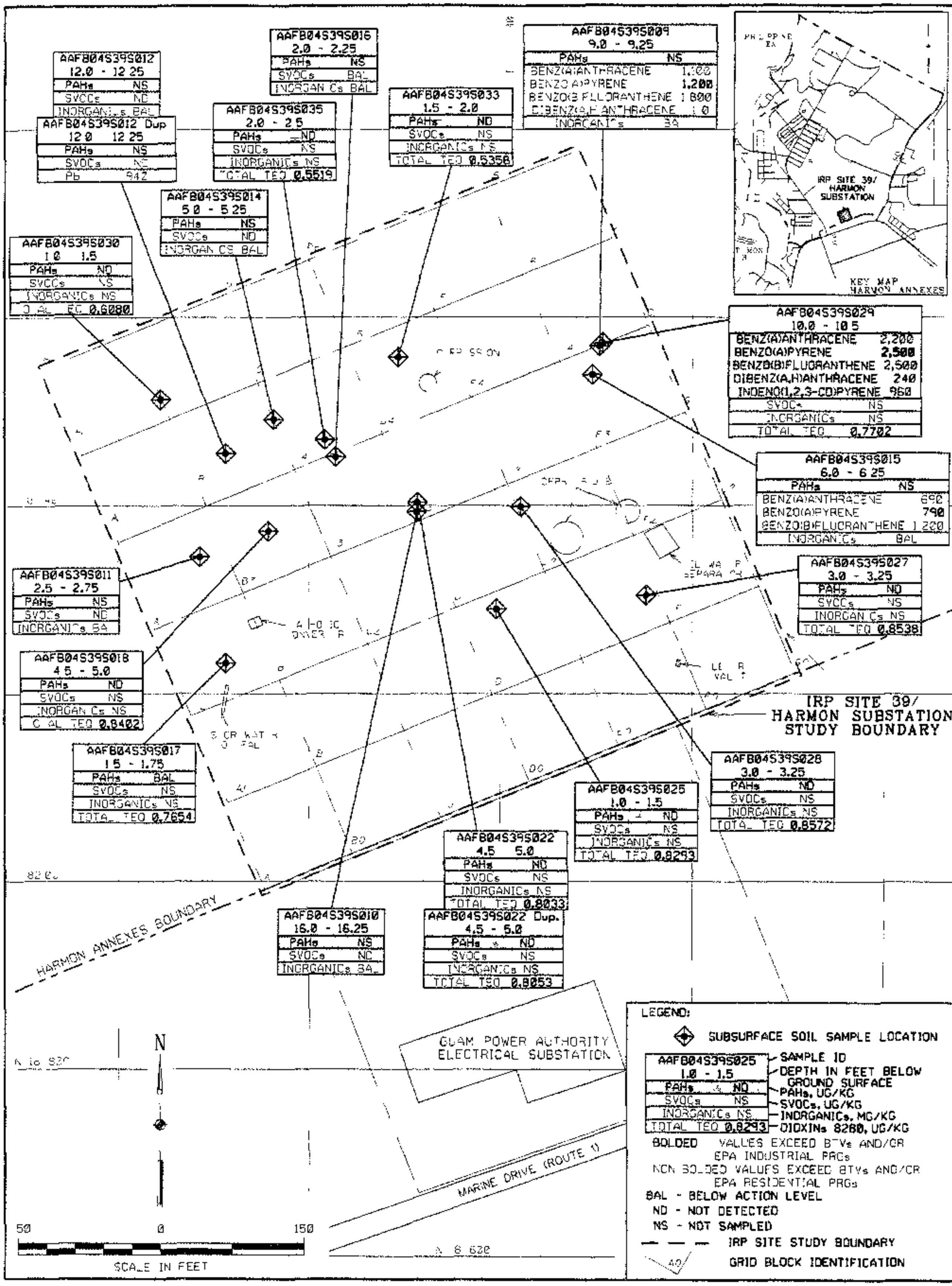

Figure 2-17 Subsurface Soil Sample Locations and Results at IRP Site 39/Harmon Substation, Andersen AFB, Guam

TABLE 2-7. SURFACE SOIL ANALYTICAL RESULTS FOR IRP SITE 39, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Residential		Industrial		S39S002	S39S003	S39S004	S39S004dup	S39S006	S39S007	S39S008	S39S019
	Sample Identifer			Screening Basis				S39S002	S39S003	S39S004	S39S004dup	S39S006	S39S007	S39S008	S39S019
	Sample Depth (feet)			1998 USEPA Region IX PRGs				0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.2 - 0.3	0.17-0.5
	Sample Date							21-Jan-97	21-Jan-97	21-Jan-97	21-Jan-97	21-Jan-97	21-Jan-97	21-Jan-97	22-Oct-97
PAHs															
SW8310	BENZ(A)ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS	NS	NS	<26
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	NS	NS	NS	NS	NS	NS	<26
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS	NS	NS	<26
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	NS	NS	NS	NS	NS	NS	NS	<26
SW8310	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	NS	NS	NS	NS	NS	NS	NS	<64
SW8310	FLUORANTHENE	µg/kg	N/A	**2,000,000**	nc	**37,400,000**	nc	NS	NS	NS	NS	NS	NS	NS	<90
SW8310	INDENO (1,2,3-cd) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS	NS	NS	<26
SW8310	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	NS	NS	NS	NS	NS	NS	NS	<120
SEMIVOLATILE ORGANIC COMPOUNDS															
SW8270	ACENAPHTHYLENE	µg/kg	N/A	**2,550,000**	nc	**28,000,000**	nc	<4,600	<4,900	<540	120 J	<520	<1,100	<420	NS
SW8270	BENZ(A)ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<4,600	<4,900	200 J	220 J	<520	<1,100	<420	NS
SW8270	BENZO(A)PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	<4,600	<4,900	**250 J**	**280 J**	<520	<1,100	<420	NS
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<4,600	<4,900	370 J	420 J	<520	<1,100	98 J	NS
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	NA		NA		<4,600	<4,900	<540	110 J	<520	<1,100	<420	NS
SW8270	BENZO(K)FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	<4,600	<4,900	150 J	160 J	<520	<1,100	<420	NS
SW8270	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	<4,600	<4,900	190 J	220 J	<520	<1,100	<420	NS
SW8270	FLUORANTHENE	µg/kg	N/A	**2,000,000**		**37,400,000**		<4,600	<4,900	190 J	240 J	<520	<1,100	<420	NS
SW8270	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	<4,600	<4,900	380 J	450 J	<520	<1,100	<420	NS
INORGANICS															
SW6010	ALUMINUM	mg/kg	**173,500**	74,900	nc	100,000	max	30,700	37,700	39,000	45,800	100,000	69,200	52,800	NS
SW6010	ANTIMONY	mg/kg	**63**	30	nc	**749**	nc	4.5 BN	9 BN	6.9 BN	8.3 BN	10.3 BN	19.9 N	5.1 BN	NS
SW6010	ARSENIC	mg/kg	**62**	0.38	ca*	2.99	ca	4.9	4.3 B	16.7 N*	20.9 N*	31.5 N*	35.1 N*	16.1 N*	NS
SW6010	BARIUM	mg/kg	335	**5,150**	nc	**100,000**	max	47.4	30.6	67.2	66.8	29.6	35.5	21.6	NS
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**3,400**	nc	0.62 B	0.79 B	0.86 B	1.0 B	2.7	1.5	1.2	NS
SW6010	CADMIUM	mg/kg	6.5	**38**	nc	**934**	nc	1.8	2.5	3.5	3.5	5 9	3.4	2.6	NS
SW6010	CALCIUM	mg/kg	N/A	N/A	--	N/A	--	230,000 *	206,000 *	195,000 *	201,000 *	27,200 *	172,000 *	208,000 *	NS
SW6010	CHROMIUM	mg/kg	**1,080**	210	ca	450	ca	179	242	242	304	833	503	368	NS
SW6010	COBALT	mg/kg	29	**3,250**	nc	**28,600**	nc	9.9	14	10.3	11.3	25.8	16.6	11.5	NS
SW6010	COPPER	mg/kg	72	**2,780**	nc	**69,600**	nc	103	36.7	48.4	55	10.4	18.3	9.2	NS
SW9012	CYANIDE	mg/kg	1.47	**1,100**	nc	**21,400**	nc	<0.26	0.34	<0.36	<0.31	<0.33	<0.26	<0.28	NS
SW6010	IRON	mg/kg	**116,495**	22,500	nc	100,000	max	36,000	36,300	46,400	50,800	112,000	73,600	51,100	NS
SW6010	LEAD	mg/kg	166	**400**	nc	**1,000**	nc	121 *	54.6 *	130 *	115 *	49 7 *	66.9 S	23.4	NS
SW6010	MAGNESIUM	mg/kg	N/A	N/A	--	N/A	--	3,250 E	2,110 E	1,890 E	2,000 E	944 E	1,540 E	1,590 E	NS
SW6010	MANGANESE	mg/kg	**7100** (1)	3,120	nc	**45,300**	nc	854	445	709	754	2,580	1,610	1,400	NS
SW7471	MERCURY	mg/kg	0.28	**23**	nc	**562**	nc	0.17 B J	0.35 B J	0.55 B J	0.62 B J	0.33 B J	0.17 B J	0.19 B J	NS
SW6010	NICKEL	mg/kg	242.5	**1,500**	nc	**37,500**	nc	49.1 N	50 N	53.7 N	63 1 N	138 N	93 N	66 9 N	NS
SW6010	POTASSIUM	mg/kg	N/A	N/A	--	N/A	--	98.9 B	128 B	100 B	111 B	20.6 B	18.3 B	57.1 B	NS

TABLE 2-7. SURFACE SOIL ANALYTICAL RESULTS FOR IRP SITE 39, ANDERSEN AFB, GUAM.

	Sample Identifer							S39S020	S39S021	S39S024	S39S026	S39S031	S39S031dup	S39S034
	Sample Depth (feet)			Screening Basis				0-0.25	0-0.25	0-0.25	0-0.25	0-0.25	0-0.25	0-0.25
	Sample Date			1998 USEPA Region IX PRGs				22-Oct-97	22-Oct-97	22-Oct-97	22-Oct-97	23-Oct-97	23-Oct-97	23-Oct-97
Method	Analyte	Units	BTV	Residential		Industrial								
PAHs														
SW8310	BENZ(A)ANTHRACENE	µg/kg	N/A	560	ca	3,590	ca	<28	<26	60	<31	<26	130	55
SW8310	BENZO(A)PYRENE	µg/kg	N/A	56	ca	360	ca	<28	<26	84	<31	<26	180	93
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	560	ca	3,590	ca	<28	<26	77	<31	<26	140	81
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	5,570	ca	35,900	ca	<28	<26	37	<31	<26	57	36
SW8310	CHRYSENE	µg/kg	N/A	55,700	ca	359,000	ca	<69	<66	<68	<77	<64	200	86
SW8310	FLUORANTHENE	µg/kg	N/A	2,000,000	nc	37,400,000	nc	<97	<92	<95	<110	<90	340	<95
SW8310	INDENO (1,2,3-cd) PYRENE	µg/kg	N/A	560	ca	3,590	ca	<28	<26	34	<31	<26	69	34
SW8310	PYRENE	µg/kg	N/A	1,480,000	nc	26,500,000	nc	<130	<120	<120	<140	<120	530	130
SEMIVOLATILE ORGANIC COMPOUNDS														
SW8270	ACENAPHTHYLENE	µg/kg	N/A	2,550,000	nc	28,000,000	nc	NS	NS	NS	NS	NS	NS	NS
SW8270	BENZ(A)ANTHRACENE	µg/kg	N/A	560	ca	3,590	ca	NS	NS	NS	NS	NS	NS	NS
SW8270	BENZO(A)PYRENE	µg/kg	N/A	56	ca	360	ca	NS	NS	NS	NS	NS	NS	NS
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	560	ca	3,590	ca	NS	NS	NS	NS	NS	NS	NS
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	NA		NA		NS	NS	NS	NS	NS	NS	NS
SW8270	BENZO(K)FLUORANTHENE	µg/kg	N/A	5,570	ca	35,900	ca	NS	NS	NS	NS	NS	NS	NS
SW8270	CHRYSENE	µg/kg	N/A	55,700	ca	359,000	ca	NS	NS	NS	NS	NS	NS	NS
SW8270	FLUORANTHENE	µg/kg	N/A	2,000,000		37,400,000		NS	NS	NS	NS	NS	NS	NS
SW8270	PYRENE	µg/kg	N/A	1,480,000	nc	26,500,000	nc	NS	NS	NS	NS	NS	NS	NS
INORGANICS														
SW6010	ALUMINUM	mg/kg	173,500	74,900	nc	100,000	max	NS	NS	NS	NS	NS	NS	NS
SW6010	ANTIMONY	mg/kg	63	30	nc	749	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	ARSENIC	mg/kg	62	0.38	ca*	2.99	ca	NS	NS	NS	NS	NS	NS	NS
SW6010	BARIUM	mg/kg	335	5,150	nc	100,000	max	NS	NS	NS	NS	NS	NS	NS
SW6010	BERYLLIUM	mg/kg	3.34	150	nc	3,400	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	CADMIUM	mg/kg	6.5	38	nc	934	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	CALCIUM	mg/kg	N/A	N/A	--	N/A	--	NS	NS	NS	NS	NS	NS	NS
SW6010	CHROMIUM	mg/kg	1,080	210	ca	450	ca	NS	NS	NS	NS	NS	NS	NS
SW6010	COBALT	mg/kg	29	3,250	nc	28,600	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	COPPER	mg/kg	72	2,780	nc	69,600	nc	NS	NS	NS	NS	NS	NS	NS
SW9012	CYANIDE	mg/kg	1.47	1,100	nc	21,400	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	IRON	mg/kg	116,495	22,500	nc	100,000	max	NS	NS	NS	NS	NS	NS	NS
SW6010	LEAD	mg/kg	166	400	nc	1,000	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	MAGNESIUM	mg/kg	N/A	N/A	--	N/A	--	NS	NS	NS	NS	NS	NS	NS
SW6010	MANGANESE	mg/kg	7100 [1]	3,120	nc	45,300	nc	NS	NS	NS	NS	NS	NS	NS
SW7471	MERCURY	mg/kg	0.28	23	nc	562	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	NICKEL	mg/kg	242.5	1,500	nc	37,500	nc	NS	NS	NS	NS	NS	NS	NS
SW6010	POTASSIUM	mg/kg	N/A	N/A	--	N/A	--	NS	NS	NS	NS	NS	NS	NS

TABLE 2-8. SUBSURFACE SOIL ANALYTICAL RESULTS FOR SITE 39, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Screening Basis 1998 USEPA Region IX PRGs Residential		Industrial		S39S009	S39S010	S39S011	S39S012	S39S012dup	S39S014	S39S015
	Sample Identifer							S39S009	S39S010	S39S011	S39S012	S39S012dup	S39S014	S39S015
	Sample Depth (feet)							9	16	2.5	12	12	5	6
	Sample Date							30-Jan-97	30-Jan-97	3-Feb-97	3-Feb-97	3-Feb-97	4-Feb-97	4-Feb-97
PAHs														
SW8310	ANTHRACENE	µg/kg	N/A	**14,300,000**	nc	**222,000,000**	nc	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZO (A) PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	BENZO (K) FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	FLUORANTHENE	µg/kg	N/A	**2,000,000**	nc	**37,400,000**	nc	NS	NS	NS	NS	NS	NS	NS
SW8310	INDENO (1,2,3-cd) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS	NS	NS
SW8310	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	NS	NS	NS	NS	NS	NS	NS
SEMIVOLATILE ORGANIC COMPOUNDS														
SW8270	2-METHYLNAPHTHALENE	µg/kg	N/A	NA		NA		<430	<460	<420	<2,100	<430	<390	<390
SW8270	ACENAPHTHYLENE	µg/kg	N/A	**2,550,000**	nc	**28,000,000**	nc	420 J	<460	<420	<2,100	<430	<390	170 J
SW8270	ANTHRACENE	µg/kg	N/A	**14,300,000**	nc	**222,000,000**	nc	94 J	<460	<420	<2,100	<430	<390	<390
SW8270	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	**1,100**	<460	<420	<2,100	<430	<390	**690**
SW8270	BENZO (A) PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	**1,200**	<56	<51	<260	<53	<48	**790**
SW8270	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	**1,800**	<460	<420	<2,100	<430	<390	**1,200**
SW8270	BENZO (G,H,I) PERYLENE	µg/kg	N/A	NA		NA		390 J	<460	<420	<2,100	<430	<390	<390
SW8270	BENZO (K) FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	580	<460	<420	<2,100	<430	<390	400
SW8270	BENZOIC ACID	µg/kg	N/A	**100,000,000**	max	**100,000,000**	max	<2,400	<2,300	<2,000	<1,000	<2,100	<1,900	570 J
SW8270	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	1,100	<460	<420	<2,100	<430	<390	680
SW8270	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	**56**	ca	**360**	ca	**110**	<85	<420	<2,100	<430	<390	<71
SW8270	DI-N-OCTYL PHTHALATE	µg/kg	N/A	**5,500,000**	nc	**107,000,000**	sat	<430	<460	<420	<2,100	<430	<390	160 J
SW8270	FLUORANTHENE	µg/kg	N/A	**2,000,000**		**37,400,000**		1,300	<460	<420	<2,100	<430	<390	870
SW8270	INDENO (1,2,3-CD) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	450	<460	<420	<2,100	<430	<390	<390
SW8270	NAPHTHALENE	µg/kg	N/A	**54,800**		**188,000**		<430	<460	<420	<2,100	<430	<390	<390
SW8270	PHENANTHRENE	µg/kg	N/A	NA		NA		200 J	<460	<420	<2,100	<430	<390	160 J
SW8270	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	2,100	<460	<420	<2,100	<430	<390	1,000
INORGANICS														
SW6010	ALUMINUM	mg/kg	173,500	74,900	nc	100,000	max	49,000 *	48,100 *	65,100 *	58,900 *	73,900 *	112,000 *	16,600 *
SW6010	ANTIMONY	mg/kg	63	30	nc	749	nc	12.4 BN	10.1 BN	14.2 BN	11.2 BN	14.3 BN	12.1 BN	3.7 BN
SW6010	ARSENIC	mg/kg	62	0.38	ca	2.99	ca	<5	<5.2	9.5 NW	<4.7	<5.2	9.7 NW	<4.7
SW6010	BARIUM	mg/kg	335	**5,150**	nc	**100,000**	max	277	43.2	17.7	16	22.8	36.7	15.7
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**3,400**	nc	1.1	1.1	1.4	1.2	1.5	2.4	0.31
SW6010	CADMIUM	mg/kg	6.5	**38**	nc	**934**	nc	3.4	2.6	2.9	2.4	3.1	4.5	1
SW6010	CALCIUM	mg/kg	N/A	N/A	--	N/A	--	208,000	268,000	202,000	209,000	192,000	109,000	327,000
SW6010	CHROMIUM	mg/kg	1,080	210	ca	450	ca	374	385	508	347	474	665	106

TABLE 2-8. SUBSURFACE SOIL ANALYTICAL RESULTS FOR SITE 39, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Screening Basis 1998 USEPA Region IX PRGs Residential		Industrial		S39S016	S39S017	S39S018	S39S022	S39S022dup	S39S025	S39S027
	Sample Identifer							S39S016	S39S017	S39S018	S39S022	S39S022dup	S39S025	S39S027
	Sample Depth (feet)							2	1 5	4 5-5	5	5	1	3
	Sample Date							4-Feb-97	22-Oct-97	22-Oct-97	22-Oct-97	22-Oct-97	22-Oct-97	23-Oct-97
PAHs														
SW8310	ANTHRACENE	µg/kg	N/A	**14,300,000**	nc	**222,000,000**	nc	NS	<66	<70	<67	<68	<68	<72
SW8310	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	<26	<28	<27	<27	<27	<29
SW8310	BENZO (A) PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	40	<28	<27	<27	<27	<29
SW8310	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	69	<28	<27	<27	<27	<29
SW8310	BENZO (K) FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	NS	<26	<28	<27	<27	<27	<29
SW8310	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	NS	<66	<70	<67	<68	<68	<72
SW8310	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	27	<28	<27	<27	<27	<29
SW8310	FLUORANTHENE	µg/kg	N/A	**2,000,000**	nc	**37,400,000**	nc	NS	<92	<99	<93	<95	<95	<100
SW8310	INDENO (1,2,3-cd) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	51	<28	<27	<27	<27	<29
SW8310	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	NS	<120	<130	<120	<120	<120	<130
SEMIVOLATILE ORGANIC COMPOUNDS														
SW8270	2-METHYLNAPHTHALENE	µg/kg	N/A	NA		NA		1,200 J	NS	NS	NS	NS	NS	NS
SW8270	ACENAPHTHYLENE	µg/kg	N/A	**2,550,000**	nc	**28,000,000**	nc	<3,900	NS	NS	NS	NS	NS	NS
SW8270	ANTHRACENE	µg/kg	N/A	**14,300,000**	nc	**222,000,000**	nc	<3,900	NS	NS	NS	NS	NS	NS
SW8270	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<3,900	NS	NS	NS	NS	NS	NS
SW8270	BENZO (A) PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	<480	NS	NS	NS	NS	NS	NS
SW8270	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<3,900	NS	NS	NS	NS	NS	NS
SW8270	BENZO (G,H,I) PERYLENE	µg/kg	N/A	NA		NA		<3,900	NS	NS	NS	NS	NS	NS
SW8270	BENZO (K) FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	<3,900	NS	NS	NS	NS	NS	NS
SW8270	BENZOIC ACID	µg/kg	N/A	**100,000,000**	max	**100,000,000**	max	<19,000	NS	NS	NS	NS	NS	NS
SW8270	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	<3,900	NS	NS	NS	NS	NS	NS
SW8270	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	**56**	ca	**360**	ca	<710	NS	NS	NS	NS	NS	NS
SW8270	DI-N-OCTYL PHTHALATE	µg/kg	N/A	**5,500,000**	nc	**107,000,000**	sat	<3,900	NS	NS	NS	NS	NS	NS
SW8270	FLUORANTHENE	µg/kg	N/A	**2,000,000**		**37,400,000**		<3,900	NS	NS	NS	NS	NS	NS
SW8270	INDENO (1,2,3-CD) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<3,900	NS	NS	NS	NS	NS	NS
SW8270	NAPHTHALENE	µg/kg	N/A	**54,800**		**188,000**		2,200 J	NS	NS	NS	NS	NS	NS
SW8270	PHENANTHRENE	µg/kg	N/A	NA		NA		<3,900	NS	NS	NS	NS	NS	NS
SW8270	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	<3,900	NS	NS	NS	NS	NS	NS
INORGANICS														
SW6010	ALUMINUM	mg/kg	**173,500**	74,900	nc	100,000	max	64,100 *	NS	NS	NS	NS	NS	NS
SW6010	ANTIMONY	mg/kg	**63**	30	nc	**749**	nc	9 7 BN	NS	NS	NS	NS	NS	NS
SW6010	ARSENIC	mg/kg	**62**	0 38	ca	2 99	ca	<4 7	NS	NS	NS	NS	NS	NS
SW6010	BARIUM	mg/kg	335	**5,150**	nc	**100,000**	max	26 5	NS	NS	NS	NS	NS	NS
SW6010	BERYLLIUM	mg/kg	3 34	**150**	nc	**3,400**	nc	1 4	NS	NS	NS	NS	NS	NS
SW6010	CADMIUM	mg/kg	6 5	**38**	nc	**934**	nc	3	NS	NS	NS	NS	NS	NS
SW6010	CALCIUM	mg/kg	N/A	N/A	--	N/A	--	145,000	NS	NS	NS	NS	NS	NS
SW6010	CHROMIUM	mg/kg	**1,080**	210	ca	450	ca	455	NS	NS	NS	NS	NS	NS

TABLE 2-8. SUBSURFACE SOIL ANALYTICAL RESULTS FOR SITE 39, ANDERSEN AFB, GUAM.

	Sample Identifer			Screening Basis				S39S028	S39S029	S39S030	S39S033	S39S035
	Sample Depth (feet)			1998 USEPA Region IX PRGs				3	10	1	1.5	2
	Sample Date							23-Oct-97	23-Oct-97	23-Oct-97	23-Oct-97	23-Oct-97
Method	Analyte	Units	BTV	Residential		Industrial						
PAHs												
SW8310	ANTHRACENE	µg/kg	N/A	**14,300,000**	nc	**222,000,000**	nc	<67	390	<64	<61	<66
SW8310	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<27	**2,200**	<26	<24	<26
SW8310	BENZO (A) PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	<27	**2,500**	<26	<24	<26
SW8310	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<27	**2,500**	<26	<24	<26
SW8310	BENZO (K) FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	<27	1,200	<26	<24	<26
SW8310	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	<67	2,200	<64	<61	<26
SW8310	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	**56**	ca	**360**	ca	<27	**240**	<26	<24	<26
SW8310	FLUORANTHENE	µg/kg	N/A	**2,000,000**	nc	**37,400,000**	nc	<93	4,800	<90	<85	<92
SW8310	INDENO (1,2,3-cd) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	<27	**960**	<26	<24	<26
SW8310	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	<120	3,900 D	<120	<110	<120
SEMIVOLATILE ORGANIC COMPOUNDS												
SW8270	2-METHYLNAPHTHALENE	µg/kg	N/A	NA		NA		NS	NS	NS	NS	NS
SW8270	ACENAPHTHYLENE	µg/kg	N/A	**2,550,000**	nc	**28,000,000**	nc	NS	NS	NS	NS	NS
SW8270	ANTHRACENE	µg/kg	N/A	**14,300,000**	nc	**222,000,000**	nc	NS	NS	NS	NS	NS
SW8270	BENZ (A) ANTHRACENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS
SW8270	BENZO (A) PYRENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	NS	NS	NS	NS
SW8270	BENZO (B) FLUORANTHENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS
SW8270	BENZO (G,H,I) PERYLENE	µg/kg	N/A	NA		NA		NS	NS	NS	NS	NS
SW8270	BENZO (K) FLUORANTHENE	µg/kg	N/A	**5,570**	ca	**35,900**	ca	NS	NS	NS	NS	NS
SW8270	BENZOIC ACID	µg/kg	N/A	**100,000,000**	max	**100,000,000**	max	NS	NS	NS	NS	NS
SW8270	CHRYSENE	µg/kg	N/A	**55,700**	ca	**359,000**	ca	NS	NS	NS	NS	NS
SW8270	DIBENZ (A,H) ANTHRACENE	µg/kg	N/A	**56**	ca	**360**	ca	NS	NS	NS	NS	NS
SW8270	DI-N-OCTYL PHTHALATE	µg/kg	N/A	**5,500,000**	nc	**107,000,000**	sat	NS	NS	NS	NS	NS
SW8270	FLUORANTHENE	µg/kg	N/A	**2,000,000**		**37,400,000**		NS	NS	NS	NS	NS
SW8270	INDENO (1,2,3-CD) PYRENE	µg/kg	N/A	**560**	ca	**3,590**	ca	NS	NS	NS	NS	NS
SW8270	NAPHTHALENE	µg/kg	N/A	**54,800**		**188,000**		NS	NS	NS	NS	NS
SW8270	PHENANTHRENE	µg/kg	N/A	NA		NA		NS	NS	NS	NS	NS
SW8270	PYRENE	µg/kg	N/A	**1,480,000**	nc	**26,500,000**	nc	NS	NS	NS	NS	NS
INORGANICS												
SW6010	ALUMINUM	mg/kg	**173,500**	74,900	nc	100,000	max	NS	NS	NS	NS	NS
SW6010	ANTIMONY	mg/kg	**63**	30	nc	**749**	nc	NS	NS	NS	NS	NS
SW6010	ARSENIC	mg/kg	**62**	0.38	ca	2.99	ca	NS	NS	NS	NS	NS
SW6010	BARIUM	mg/kg	335	**5,150**	nc	**100,000**	max	NS	NS	NS	NS	NS
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**3,400**	nc	NS	NS	NS	NS	NS
SW6010	CADMIUM	mg/kg	6.5	**38**	nc	**934**	nc	NS	NS	NS	NS	NS
SW6010	CALCIUM	mg/kg	N/A	N/A	--	N/A	--	NS	NS	NS	NS	NS
SW6010	CHROMIUM	mg/kg	**1,080**	210	ca	450	ca	NS	NS	NS	NS	NS

TABLE 2-9. SLUDGE ANALYTICAL RESULTS FOR THE OIL/WATER SEPARATOR AT IRP SITE 39, ANDERSEN AFB, GUAM.

Method	Analyte	Units	BTV	Screening Basis 1998 USEPA Region IX PRGs Residential		Industrial		S39Q001	S39Q002
	Sample Identifer							S39Q001	S39Q002
	Sample Depth (feet)							5	5
	Sample Date							28-Jan-97	28-Jan-97
VOLATILE ORGANIC COMPOUNDS									
SW8260	1,2,4-TRIMETHYLBENZENE	µg/kg	NA	NA		NA		2,600	<3,900
SW8260	1,4-DICHLOROBENZENE	µg/kg	NA	**3,000**		**7,300**		**9,800**	<3,900
SW8260	NAPHTHALENE	µg/kg	NA	**54,800**		**188,000**		5,700	1,800 J
SW8260	P-ISOPROPYLTOLUENE	µg/kg	NA	NA		NA		1,000 J	<3,900
SW8260	SEC-BUTYLBENZENE	µg/kg	NA	NA		NA		800 J	<3,900
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	2-METHYLNAPHTHALENE	µg/kg	NA	NA		NA		1,000 J	5,900 J
SW8270	NAPHTHALENE	µg/kg	NA	**54,800**		**188,000**		1,100 J	3,500 J
SW8270	PHENANTHRENE	µg/kg	NA	NA		NA		290 J	<10,000
PESTICIDES/PCB									
SW8080	4,4'-DDD	µg/kg	NA	**2,360**	ca	**18,700**	ca	42 P	**12,000**
SW8080	4,4'-DDE	µg/kg	NA	**1,660**	ca	**13,200**	ca	810 P	**3,500 P**
SW8080	4,4'-DDT	µg/kg	NA	**1,660**	ca	**13,200**	ca*	98	140 P
SW8080	ALPHA-BHC	µg/kg	NA	NA		NA		<6	17 P
SW8080	ALPHA-CHLORDANE	µg/kg	NA	NA		NA		<6	500 EP
SW8080	DIELDRIN	µg/kg	NA	**28**	ca	**190**	ca	<12	**95 P**
SW8080	ENDOSULFAN II	µg/kg	NA	NA		NA		<12	140
SW8080	ENDRIN	µg/kg	NA	**16,400**	nc	**321,000**	nc	35	65 P
SW8080	GAMMA-CHLORDANE	µg/kg	NA	NA		NA		79 EP	<9.5
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	74,900	nc	100,000	max	36,900 E	13,300 E
SW6010	ANTIMONY	mg/kg	**63**	30	nc	**749**	nc	17.7 BEN	16.0 BEN
SW6010	ARSENIC	mg/kg	**62**	0.38	ca	2.99	ca	10.9 BN*	19.3 BNW*
SW6010	BARIUM	mg/kg	335	**5,150**	nc	**100,000**	max	146	138
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**3,400**	nc	0.74	<0.62
SW6010	CADMIUM	mg/kg	6.5	**38**	nc	**934**	nc	4.9 E	5.3 E
SW6010	CALCIUM	mg/kg	N/A	N/A	--	N/A	--	140,000	100,000
SW6010	CHROMIUM	mg/kg	**1,080**	210	ca	450	ca	273 E	127 E
SW6010	COBALT	mg/kg	29	**3,250**	nc	**28,600**	nc	8 B	<6.9
SW6010	COPPER	mg/kg	72	**2,780**	nc	**69,600**	nc	125	238
SW9012	CYANIDE	mg/kg	1.47	**1,100**	nc	**21,400**	nc	<0.86	<1.3
SW6010	IRON	mg/kg	**116,495**	22,500	nc	100,000	max	62,900	55,100
SW6010	LEAD	mg/kg	166	**400**	nc	**1,000**	nc	**440 ***	**650 ***
SW6010	MAGNESIUM	mg/kg	N/A	N/A	--	N/A	--	1,490	1,360
SW6010	MANGANESE	mg/kg	**7,100** (1)	3,120	nc	**45,300**	nc	432	284
SW7471	MERCURY	mg/kg	0.28	**23**	nc	**562**	nc	2	2.1 B
SW6010	NICKEL	mg/kg	242.5	**1,500**	nc	**37,500**	nc	62.8	39.8 B
SW6010	POTASSIUM	mg/kg	N/A	N/A	--	N/A	--	81.5 B	162 B
SW7740	SELENIUM	mg/kg	N/A	**375**	nc	**9,370**	nc	<0.39	0.69 BN
SW6010	SILVER	mg/kg	14.9	**375**	nc	**9,370**	nc	<1.6	7.2 B
SW6010	SODIUM	mg/kg	N/A	N/A	--	N/A	--	458	714
SW7841	THALLIUM	mg/kg	1.42	**6**	nc	**150**	nc	<0.39	<0.62
SW6010	VANADIUM	mg/kg	206	**525**	nc	**13,100**	nc	57	23.5 B
SW6010	ZINC	mg/kg	111	**22,500**	nc	**100,000**	max	1,560 EN	2,430 EN

Notes:
J = Estimated Value; N/A = Not Applicable
E = Compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
PRG = Preliminary Remediation Goal
P = Greater than 25% difference in the two Gas Chromatograph columns during analysis
BTV = Background Threshold Limit
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.
(1) - Recalculated BTV concentration established in December 2001 (EA, 2001)
E = Reported value is estimated because of presence of interference.
N = Spike sample recovery is not within control limits absorbance is less than 50% of spike absorbance.
* = Duplicate analyses is not within control limits.
B = Reported value is less than the Contract Required Detection Limit but greater than the Instrument Detection Limit.
nc = non-carcinogen; ca = Cancer PRGs; max = ceiling limit
W = Postdigestion spike for Graphite Furnace Atomic Absorption analysis is out of control limits (86-115%) and sample absorbance is less than 50% of spike absorbance.
Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

TABLE 2-10. LIQUID AND FLOATING PRODUCT SAMPLE RESULTS FOR THE OIL/WATER SEPARATOR AT IRP SITE 39, ANDERSEN AFB, GUAM.

	Sample Identifier			S39L002	S39L002	S39L003	S39L003	S39L004
	Sample Date			22-Jan-97	22-Jan-97	22-Jan-97	22-Jan-97	28-Jan-97
Method	Analyte	Units	Screening Basis MCLs	Total Metals	Dissolved Metals	Total Metals	Dissolved Metals	Floating Product
VOLATILE ORGANIC COMPOUNDS								
SW8260	CARBON DISULFIDE	µg/L	N/A	NS	<1	NS	<1	<630
SW8260	CHLOROFORM	µg/L	100/80	NS	<1	NS	<1	<630
SW8260	TOLUENE	µg/L	1000	NS	<1	NS	<1	1,000
SEMIVOLATILE ORGANIC COMPOUNDS								
SW8270	NAPHTHALENE	µg/L	N/A	NS	<10	NS	1 J	NS
SW8270	BIS(2-ETHYLHEXYL)PHTHALATE	µg/L	6	NS	<10	NS	<10	NS
PESTICIDES/PCB								
SW8080	ALPHA-CHLORDANE	µg/L	2	NS	<0.14	NS	<0.14	730 PD
SW8080	4'4 - DDD	µg/L	N/A	NS	<0.11	NS	27 P	22,000 D
SW8080	4'4 - DDT	µg/L	N/A	NS	<0.04	NS	<0.04	1,200 PD
SW8080	ENDRIN	µg/L	2	NS	<0.06	NS	<0.06	<3,600
INORGANICS								
SW6010	ALUMINUM	µg/L	N/A	43.2 B	54.6 B	27.4 B	55.6 B	13.1 BE
SW6010	ANTIMONY	µg/L	6	<2	<2	<2	<2	0.21 BEN
SW6010	BARIUM	µg/L	2,000	<22	<22	<22	<22	216
SW6010	CALCIUM	µg/L	N/A	47,000	53,400	47,400	47,800	1,010
SW6010	COPPER	µg/L	1,300	<6	<6	<6	<6	1.4 B
SW9012	CYANIDE	µg/L	200	NA	<0.01	NA	<0.01	<0.22
SW6010	IRON	µg/L	300	<40	**1,180**	**750**	**8,590**	244
SW6010	LEAD	µg/L	15	<1	<1	<1	1.4 B	2.7 S
SW6010	MAGNESIUM	µg/L	N/A	9,660	10,500	11,700	11,500	24.3 B
SW6010	MANGANESE	µg/L	50	**264**	**321**	**286**	**325**	7.7
SW7471	MERCURY	µg/L	2	0.24 B	0.22 B	0.22 B	0.25 B	<0.1
SW6010	POTASSIUM	µg/L	N/A	10,300	11,300	13,700	13,300	<6.1
SW7740	SELENIUM	µg/L	50	<1	<1	<1	<1	0.11 BN
SW6010	SODIUM	µg/L	N/A	11,200	12,300	10,100	9,600	82.8 B
SW6010	ZINC	µg/L	N/A	<12	<12	<12	<12	18.1 EN
TOTAL PETROLEUM HYDROCARBONS (TPH)								
M8015M	DIESEL RANGE	mg/kg		NS	NS	NS	NS	240,000
M8015V	GASOLINE RANGE	µg/kg		NS	NS	NS	NS	<12,000
REACTIVITY, IGNITABILITY, AND CORROSIVITY								
SW9045	pH	pH		NS	NS	NS	NS	7
SW1010	FLASH POINT	°C		NS	NS	NS	NS	45
SW9030	SULFATE	mg/L		NS	NS	NS	NS	<10

Notes
B = The analyte found in the assoicated blank as well as in the sample
MCL = USEPA 1996 Maximum Contaminent Level
N/A = Not Applicable, TR or J = Indicates an estimated value
* = Duplicate analysis not within control limits
NS = Not Sampled, or not analyzed, for these parameters
(1) - Recalculated BTV concentration established in December 2001 (EA, 2001)
N = Spiked sample recovery is not within control limits
P = >25% difference between the two Gas Chromatograph columns
D = Dilution required, µg/L = micrograms per liter
E = Reported value is estimated due to interference
°C = Degrees Celsius, mg/kg = milligrams per liter
S = Reported value is determined by method of standard additions

TABLE 2-11. SURFACE SOIL DIOXIN ANALYTICAL RESULTS AT IRP SITE 39, ANDERSEN AFB, GUAM.

Sample Identifer					S39S002		HAS39S002(OHM)		HAS39S002dup		S39S003		HAS39S003 (OHM)	
Sample Depth (feet)					0.2 - 0.3		0.2 - 0 3		0.2 - 0.3		0.2 - 0 3		0.2 - 0.3	
Sample Date					21-Jan-97		8-May-98		8-May-98		21-Jan-97		8-May-98	
Analytical Method		Screening Basis			SW8280		SW8290		SW8290		SW8280		SW8290	
Analyte	Units	WHO TEF	1998 USEPA Region IX PRG Residental	1998 USEPA Region IX PRG Residental	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)
2,3,7,8-TCDD	μg/kg	1	0.0038 ca	0.030 ca	<0.14	0 0700	0.00097	0.0010	0.00089	0.0009	<0.139	0.0695	<0.00044	0 0002
1,2,3,7,8-PeCDD	μg/kg	0.5			<0.783	0.1958	0.0082	0.0041	0.0085	0.0043	<0.781	0.1953	<0.00069	0 0003
1,2,3,4,7,8-HxCDD	μg/kg	0.1			<0.545	0.0273	0.0175	0.0018	0.0161	0.0016	<0.544	0.0272	<0.0011	0.0006
1,2,3,6,7,8-HxCDD	μg/kg	0.1			<0.489	0.0245	0 0506	0.0051	0.0425	0.0043	<0.488	0.0244	0.0025	0.0003
1,2,3,7,8,9-HxCDD	μg/kg	0.1			<0.42	0.0210	0 0384	0.0038	0.0333	0.0033	<0.418	0.0209	0.0016	0.0002
1,2,3,4,6,7,8-HpCDD	μg/kg	0.01			0.997	0.0100	1.14	0.0114	1.04	0.0104	<0.836	0.0042	0.0534	0.0005
1,2,3,4,6,7,8,9-OCDD	μg/kg	0.001			6.250	0.0063	9.57	0.0096	8.54	0.0085	3.060	0.0031	0 363	0.0004
TOTAL PCDD	μg/kg					0 3547		0.0367		0.0333		0.3445		0.0024
2,3,7,8-TCDF	μg/kg	0.1			<0.112	0.0056	0.0064	0.0006	0.005	0.0005	<0.112	0.0056	<0.00036	0.0002
1,2,3,7,8-PeCDF	μg/kg	0.05			<0.573	0.0143	0.0033	0.0002	0.0031	0.0002	<0.572	0.0143	<0.00055	0.0003
2,3,4,7,8PeCDF	μg/kg	0.5			<0.545	0.1363	0.004	0.0020	0.0033	0.0017	<0.544	0.1360	<0.00056	0.0003
1,2,3,4,7,8-HxCDF	μg/kg	0.1			<0.699	0.0350	0.0142	0.0014	0.0095	0.0010	<0.697	0.0349	<0.00071	0.0004
1,2,3,6,7,8-HxCDF	μg/kg	0.1			<0.657	0.0329	0.0093	0.0009	0.006	0.0006	<0.655	0.0328	<0.00063	0.0003
2,3,4,6,7,8-HxCDF	μg/kg	0.1			<0.503	0.0252	0.0078	0.0008	0.0102	0.0010	<0.502	0.0251	<0.00077	0.0004
1,2,3,7,8,9-HxCDF	μg/kg	0.1			<0.308	0.0154	[0.0029]	0.0003	[0.0014]	0.0001	<0.307	0.0154	<0.00089	0.0004
1,2,3,4,6,7,8-HpCDF	μg/kg	0.01			<0.503	0.0025	0.538	0.0054	0.178	0.0018	<0.502	0.0025	[0.0062]	0.0001
1,2,3,4,7,8,9-HpCDF	μg/kg	0.01			<0.447	0.0022	0.0093	0.0001	0.0051	0.0001	<0.446	0.0022	<0.0019	0.0010
1,2,3,4,6,7,8,9-OCDF	μg/kg	0.001			<0.839	0.0004	0.658	0.0007	0.259	0.0003	<0.836	0.0004	0.008	0.0000
TOTAL PCDF	μg/kg					0.2697		0.0124		0.0071		0.2691		0.0033
TOTAL EPA TEQs	μg/kg		**0.0038 ca**	**0.030 ca**		**0.6244**		**0.0490**		**0.0404**		**0.6136**		**0.0057**

Notes:

TEQ = Toxicity Equivalent Quotient - Sum of TEFs Present;

TEQ* represents sum of (detects x TEF) + (detection limit x TEF for NDs)

Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.

Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

PRG = Preliminary Remediation Goal; TEF = Toxicity Equivalent Factor

μg/kg = micrograms/kilogram (parts per billion)

WHO = World Health Organization

ND = Not Detected

MDL = Method Detetction Limit

ca = cancer PRG

TABLE 2-11. SURFACE SOIL DIOXIN ANALYTICAL RESULTS AT IRP SITE 39, ANDERSEN AFB, GUAM.

Sample Identifer					HAS39S007 (OHM)		S39S008		HAS39S008		S39S019	
Sample Depth (feet)					0.2 - 0.3		0.2 - 0.3		0.2 - 0.3		0.2 - 0.5	
Sample Date					8-May-98		21-Jan-97		8-May-98		22-Oct-97	
Analytical Method		Screening Basis			SW8290		SW8280		SW8290		SW8280	
Analyte	Units	WHO TEF	1998 USEPA Region IX PRG Residental	1998 USEPA Region IX PRG Residental	Reported Conc./ MDL	TEQ * (detect) or (0.5 ND)	Reported Conc./ MDL	TEQ * (detect) or (0.5 ND)	Reported Conc./ MDL	TEQ * (detect) or (0.5 ND)	Reported Conc./ MDL	TEQ * (detect) or (0.5 ND)
2,3,7,8-TCDD	µg/kg	1	0.0038 ca	0.030 ca	[0.003]	0.0030	<0.129	0.0645	<0.00086	0.0004	<0.1	0.0500
1,2,3,7,8-PeCDD	µg/kg	0.5			0.0669	0.0335	<0.724	0.1810	0.0119	0.0060	<1.0	0.2500
1,2,3,4,7,8-HxCDD	µg/kg	0.1			0.218	0.0218	<0.504	0.0252	0.0351	0.0035	<0.3	0.0150
1,2,3,6,7,8-HxCDD	µg/kg	0.1			0.934	0.0934	<0.453	0.0227	0.152	0.0152	<0.5	0.0250
1,2,3,7,8,9-HxCDD	µg/kg	0.1			0.431	0.0431	<0.388	0.0194	0.0792	0.0079	<0.4	0.0200
1,2,3,4,6,7,8-HpCDD	µg/kg	0.01			16.44	0.1644	<0.776	0.0039	2.73	0.0273	<1.1	0.0055
1,2,3,4,6,7,8,9-OCDD	µg/kg	0.001			111.19	0.1112	<0.931	0.0005	18.47	0.0185	4.5	0.0045
TOTAL PCDD	µg/kg					0.4703		0.3171		0.0788		0.3700
2,3,7,8-TCDF	µg/kg	0.1			0.0048	0.0005	<0.103	0.0052	0.0012	0.0001	<0.09	0.0045
1,2,3,7,8-PeCDF	µg/kg	0.05			0.031	0.0016	<0.530	0.0133	[0.005]	0.0003	<0.5	0.0125
2,3,4,7,8PeCDF	µg/kg	0.5			0.0363	0.0182	<0.504	0.1260	0.0053	0.0027	<0.9	0.2250
1,2,3,4,7,8-HxCDF	µg/kg	0.1			0.101	0.0101	<0.647	0.0324	0.0153	0.0015	<1.2	0.0600
1,2,3,6,7,8-HxCDF	µg/kg	0.1			0.0712	0.0071	<0.608	0.0304	0.0121	0.0012	<1.2	0.0600
2,3,4,6,7,8-HxCDF	µg/kg	0.1			0.119	0.0119	<0.466	0.0233	[0.0193]	0.0019	<0.9	0.0450
1,2,3,7,8,9-HxCDF	µg/kg	0.1			[0.0284]	0.0028	<0.284	0.0142	[0.0059]	0.0006	<1.0	0.0500
1,2,3,4,6,7,8-HpCDF	µg/kg	0.01			1.26	0.0126	<0.466	0.0023	0.242	0.0024	<0.4	0.0020
1,2,3,4,7,8,9-HpCDF	µg/kg	0.01			0.073	0.0007	<0.414	0.0021	0.0137	0.0001	<0.7	0.0035
1,2,3,4,6,7,8,9-OCDF	µg/kg	0.001			1.64	0.0016	<0.776	0.0004	0.246	0.0002	<0.9	0.0005
TOTAL PCDF	µg/kg					0.0671		0.2494		0.0111		0.4630
TOTAL EPA TEQs	µg/kg		**0.0038 ca**	**0.030 ca**		**0.5375**		**0.5665**		**0.0899**		**0.8330**

Notes:

TEQ = Toxicity Equivalent Quotient - Sum of TEFs Present;

TEQ* represents sum of (detects x TEF) + (detection limit x TEF for NDs)

Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.

Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

PRG = Preliminary Remediation Goal; TEF = Toxicity Equivalent Factor

µg/kg = micrograms/kilogram (parts per billion)

WHO = World Health Organization

ND = Not Detected

MDL = Method Detetction Limit

ca = cancer PRG

TABLE 2-11. SURFACE SOIL DIOXIN ANALYTICAL RESULTS AT IRP SITE 39, ANDERSEN AFB, GUAM.

Sample Identifer					S39S026		S39S031		S39S031Dup		S39S034	
Sample Depth (feet)					0-0 25		0-0.25		0-0.25		0-0.25	
Sample Date					22-Oct-97		23-Oct-97		23-Oct-97		23-Oct-97	
Analytical Method			Screening Basis		SW8280		SW8280		SW8280		SW8280	
Analyte	Units	WHO TEF	1998 USEPA Region IX PRG Residental	1998 USEPA Region IX PRG Residental	Reported Conc./ MDL	TEQ * (detect) or (0.5 ND)	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)	Reported Conc./ MDL	TEQ * (detect) or (0 5 ND)	Reported Conc / MDL	TEQ * (detect) or (0.5 ND)
2,3,7,8-TCDD	µg/kg	1	0.0038 ca	0.030 ca	<0.1	0.0500	<0.1	0.0500	<0.1	0 0500	<0.1	0 0500
1,2,3,7,8-PeCDD	µg/kg	0.5			<1.2	0.3000	<0.7	0.1750	<0.7	0.1750	<0.7	0.1750
1,2,3,4,7,8-HxCDD	µg/kg	0.1			<0.4	0.0200	<0 5	0.0250	<0.5	0.0250	<0.5	0.0250
1,2,3,6,7,8-HxCDD	µg/kg	0.1			<0.6	0.0300	<0.5	0.0250	<0.5	0.0250	<0.5	0.0250
1,2,3,7,8,9-HxCDD	µg/kg	0.1			<0.4	0.0200	<0 4	0.0200	<0.4	0.0200	<0.4	0.0200
1,2,3,4,6,7,8-HpCDD	µg/kg	0.01			<1.3	0.0065	<0.8	0.0040	<0.8	0.0040	<0 8	0.0040
1,2,3,4,6,7,8,9-OCDD	µg/kg	0.001			2.00	0.0020	1.7	0.0017	2.2	0.0022	2.7	0.0027
TOTAL PCDD	µg/kg					0.4285		0.3007		0.3012		0.3017
2,3,7,8-TCDF	µg/kg	0.1			<0.1	0.0050	<0.1	0.0050	<0.1	0.0050	<0.1	0.0050
1,2,3,7,8-PeCDF	µg/kg	0.05			<0.6	0.0150	<0.5	0.0125	<0.5	0.0125	<0.5	0.0125
2,3,4,7,8PeCDF	µg/kg	0.5			<1.1	0.2750	<0.5	0.1250	<0.5	0.1250	<0.5	0.1250
1,2,3,4,7,8-HxCDF	µg/kg	0.1			<1.5	0.0750	<0.6	0.0300	<0.6	0.0300	<0.7	0.0350
1,2,3,6,7,8-HxCDF	µg/kg	0.1			<1.5	0.0750	<0.6	0.0300	<0.6	0.0300	<0.6	0.0300
2,3,4,6,7,8-HxCDF	µg/kg	0.1			<1.1	0.0550	<0.5	0.0250	<0.5	0.0250	<0.5	0.0250
1,2,3,7,8,9-HxCDF	µg/kg	0.1			<1.2	0.0600	<0.3	0.0150	<0.3	0.0150	<0.3	0.0150
1,2,3,4,6,7,8-HpCDF	µg/kg	0.01			<0.4	0.0020	<0.5	0.0025	<0.5	0.0025	<0.5	0.0025
1,2,3,4,7,8,9-HpCDF	µg/kg	0.01			<0.8	0.0040	<0.4	0.0020	<0.4	0.0020	<0.4	0.0020
1,2,3,4,6,7,8,9-OCDF	µg/kg	0.001			<1.1	0.0006	<0.8	0.0004	<0.8	0.0004	<0.8	0.0004
TOTAL PCDF	µg/kg					0.5666		0.2474		0.2474		0.2524
TOTAL EPA TEQs	µg/kg		**0.0038 ca**	**0.030 ca**		**0.9951**		**0.5481**		**0.5486**		**0.5541**

Notes:

TEQ = Toxicity Equivalent Quotient - Sum of TEFs Present;

TEQ* represents sum of (detects x TEF) + (detection limit x TEF for NDs)

Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.

Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

PRG = Preliminary Remediation Goal; TEF = Toxicity Equivalent Factor

µg/kg = micrograms/kilogram (parts per billion)

WHO = World Health Organization

ND = Not Detected

MDL = Method Detection Limit

ca = cancer PRG

TABLE 2-12. SUBSURFACE SOIL DIOXIN ANALYTICAL RESULTS AT IRP SITE 39, ANDERSEN AFB, GUAM.

	Sample Identifer					S39S017		S39S018		S39S022		S39S022dup		S39S025	
	Sample Depth (feet)					1 5		4 5-5 0		5		5		1 0	
	Sample Date		Screening Basis			22 Oct-97		22-Oct-97		22 Oct-97		22-Oct-97		22 Oct-97	
Analytical Method	Analyte	Units	WHO TEF	1998 USEPA Region IX PRG Residental	1998 USEPA Region IX PRG Residental	Reported Conc / MDL	TEQ * (detect) or (0 5 ND)	Reported Conc / MDL	TEQ * (detect) or (0 5 ND)	Reported Conc / MDL	TEQ * (detect) or (0 5 ND)	Reported Conc / MDL	TEQ * (detect) or (0 5 ND)	Reported Conc / MDL	TEQ * (detect) or (0 5 ND)
SW8280	2 3,7,8-TCDD	µg/kg	1	0 0038 ca	0 030 ca	<0 1	0 0500	<0 1	0 0500	<0 1	0 0500	<0 1	0 0500	<0 1	0 0500
SW8280	1,2,3,7,8-PeCDD	µg/kg	0 5			<0 9	0 2250	<1 0	0 2500	<1 0	0 2500	<1 0	0 2500	<1 0	0 2500
SW8280	1,2,3,4,7,8-HxCDD	µg/kg	0 1			<0 3	0 0150	<0 3	0 0150	<0 3	0 0150	<0 3	0 0150	<0 3	0 0150
SW8280	1 2,3,6,7,8-HxCDD	µg/kg	0 1			<0 5	0 0250	<0 5	0 0250	<0 5	0 0250	<0 5	0 0250	<0 5	0 0250
SW8280	1,2,3,7,8,9-HxCDD	µg/kg	0 1			<0 3	0 0150	<0 4	0 0200	<0 4	0 0200	<0 4	0 0200	<0 4	0 0200
SW8280	1,2,3,4,6,7,8-HpCDD	µg/kg	0 01			<1 0	0 0050	<1 1	0 0055	<1 0	0 0050	<1 0	0 0050	<1 1	0 0055
SW8280	1,2,3,4,6,7,8,9 OCDD	µg/kg	0 001			3 500	0 0035	[1 2]	0 0012	0 44	0 0004	[2 3]	0 0023	0 86	0 0009
	TOTAL PCDD	µg/kg					0 3385		0 3667		0 3654		0 3673		0 3664
SW8280	2,3,7,8-TCDF	µg/kg	0 1			<0 09	0 0045	<0 1	0 0050	<0 09	0 0045	<0 09	0 0045	<0 09	0 0045
SW8280	1,2,3,7,8-PeCDF	µg/kg	0 05			<0 5	0 0125	<0 5	0 0125	<0 5	0 0125	<0 5	0 0125	<0 5	0 0125
SW8280	2,3,4,7,8PeCDF	µg/kg	0 5			<0 8	0 2000	<0 9	0 2250	<0 8	0 2000	<0 8	0 2000	<0 9	0 2250
SW8280	1,2,3,4,7,8-HxCDF	µg/kg	0 1			<1 1	0 0550	<1 3	0 0650	<1 2	0 0600	<1 2	0 0600	<1 2	0 0600
SW8280	1,2,3,6,7,8-HxCDF	µg/kg	0 1			<1 2	0 0600	<1 3	0 0650	<1 2	0 0600	<1 2	0 0600	<1 2	0 0600
SW8280	2,3,4,6,7,8-HxCDF	µg/kg	0 1			<0 9	0 0450	<0 9	0 0450	<0 9	0 0450	<0 9	0 0450	<0 9	0 0450
SW8280	1,2,3,7,8,9-HxCDF	µg/kg	0 1			<0 9	0 0450	<1 0	0 0500	<1 0	0 0500	<1 0	0 0500	<1 0	0 0500
SW8280	1,2,3,4,6,7,8-HpCDF	µg/kg	0 01			<0 30	0 0015	<0 4	0 0020	<0 4	0 0020	<0 4	0 0020	<0 4	0 0020
SW8280	1,2,3,4,7,8,9-HpCDF	µg/kg	0 01			<0 6	0 0030	<0 7	0 0035	<0 7	0 0035	<0 7	0 0035	<0 7	0 0035
SW8280	1 2,3,4,6,7,8,9 OCDF	µg/kg	0 001			<0 8	0 0004	<0 9	0 0005	<0 8	0 0004	<0 9	0 0005	<0 9	0 0005
	TOTAL PCDF	µg/kg					0 4269		0 4735		0 4379		0 4380		0 4630
	TOTAL EPA TEQs	µg/kg	1 0	**0.0038 ca**	**0.030 ca**		**0.7654**		**0.8402**		**0.8033**		**0.8053**		**0.8293**

Notes PRG = Preliminary Remediation Goal, TEF = Toxicity Equivalent Factor

TEQ = Toxicity Equivalent Quotient - Sum of TEFs Present,

TEQ* represents sum of (detects x TEF) + (detection limit x TEF for NDs)

Bold = Concentrations equal or exceed either the BTVs or the Residential PRGs, whichever is higher.

Bold & Shaded = Concentrations equal or exceed either the BTVs or the Industrial PRGs, whichever is higher.

µg/kg = micrograms/kilogram (parts per billion)

WHO – World Health Organization

ND = Not Detected

MDL = Method Detetction Limit

ca = cancer PRG

dioxin analytical Method SW8280, confirmation samples (using USEPA Method SW8290) verified the presence of dioxin at the site. Due to the ubiquitous presence of dioxins at concentrations greater than Residential PRGs, the remedial action for dioxins was based on risk assessment. Consequently, additional dioxin confirmation samples using USEPA Method SW8290 were collected at Site 39. These sample results, along with risk assessment results are presented in Appendices B and C of this report.

Monitoring well IRP-36, located nearest to Site 39 (Figure 2-3), was installed in 1996 and has been sampled biannually. Based on groundwater monitoring results at IRP-36, groundwater beneath Site 39 is approximately 320 feet bgs and flows westward towards the Philippine Sea. Six rounds of groundwater samples were collected from IRP-36 between fall 1996 and fall 1999 and analyzed for VOCs, SVOCs, PAHs, pesticides, PCBs, and metals.

As presented in Table 2-13, chromium and nickel were detected in some of the samples collected from IRP-36 at concentrations above the MCLs. However, chromium and nickel were not believed to be due to groundwater contamination. The presence of chromium and some nickel is attributed to corrosion of the stainless steel piston pump and stainless steel well screen.

2.6 Summary of Site Risks

As indicated in the previous section of this ROD, to evaluate risk associated with each contaminant, the concentrations of each laboratory-detected analyte were compared to the 1998 PRGs. If the analyte concentrations exceeded the higher of the PRGs and BTVs, those analytes were regarded as constituents of potential concern (COPCs). Subsequent to determining the COPCs, the frequency of occurrence and concentration of each COPC were evaluated. Those COPCs with elevated concentrations (exceeding PRGs) and a high frequency of occurrence were regarded as COCs. Finally, the Remedial Action Objectives (RAOs) were established for medium-specific remediation goals in order to protect human health and the environment (USEPA, 1988). RAOs identify the specific media (soil, water, and air) and exposure pathways (ingestion, inhalation, and dermal contact) that need to be targeted for remediation. RAOs are often expressed in terms of Remedial Goal Objectives (RGOs) to establish cleanup levels and the extent of cleanup.

To expedite the transfer of Harmon Annex sites to GovGuam, the USAF established conservative cleanup standards based on the stringent USEPA Region IX Residential PRGs. An Action Memorandum was developed and soils above the Residential PRGs were removed except for one location, the PAHs at the buried drum area of Site 39. Based on a human health risk assessment, the residual PAH concentrations at the buried drum area resulted in acceptable risks to human health.

2.6.1 Summary of Site 18 Risks

Based on the RI results (EA, 2000), no storage (for greater than one year), release, or disposal of hazardous substances, petroleum products, or their derivatives has occurred at Site 18. Consequently, there are no current or future human health or ecological risks associated with the site and remediation is not required at Site 18. Andersen AFB concluded that the "landfill" did not exist at Site 18 and the site was classified as an Area of No Suspected Contamination. In February 1998, a Final Decision Document No Further Response Action Planned (NFRAP) for Site 18 was submitted and approved by the USEPA and GEPA (EA, 1998d).

2.6.2 Summary of Site 19 Risks

The USAF decided to expedite cleanup of the hot spots by time-critical removal and off-site disposal because Site 19 is excess land to be transferred to GovGuam. The USEPA has categorized remedial actions into three types: emergency, time-critical, and non-time-critical. Emergency and time-critical remedial actions respond to releases requiring action within 6 months. Non-time-critical remedial actions respond to releases requiring action that can start later than 6 months after the determination that a response is necessary.

In January 1998, a Draft Site Characterization Summary Report for Site 19 was submitted and removal action was approved by the USEPA and GEPA (EA, 1998b) for the impacted areas at Site 19. The proposed removal areas at Site 19 were comprised of only small portions (less than 1 percent) of the site (Figure 2-18). The RAOs at Site 19 were to clean up:

- Shallow subsurface soil impacted by benzo(a) pyrene at Parcel A, including the drum in which VOCs were detected

- Surface soil impacted with lead and antimony in the central portion of Parcel C (This area included the suspected asbestos-containing transite pipe).

The cleanup of hot spots at Parcels A and C was proposed to protect human health from exposure to COCs. Andersen AFB selected the most stringent cleanup standards, those for Residential PRGs. Because all COCs were removed to meet the Residential PRGs, no risk assessment was necessary. The cleanup standards for Site 19 were:

- 56 µg/kg for soil containing benzo(a) pyrene at Parcel A

- 400 µg/kg and 63 µg/kg for soil containing lead and antimony, respectively, at Parcel C

- removal of transite pipe at Parcel C

If the selected remedial action had not been implemented, actual or potential releases of COCs from Site 19 might have presented an imminent and substantial impact to public health, welfare, or the environment. The remedial actions were completed in June 1999 and included the excavation, removal, and disposal of waste materials and impacted soil at Site 19.

In March 1998, an Action Memorandum was prepared for the site including the above-referenced removal actions. The March 1998 Action Memorandum was approved by the USEPA and the GEPA. The extent of excavation was based on confirmation soil sample analytical results. After the completion of remedial actions, Site 19 was restored by backfilling

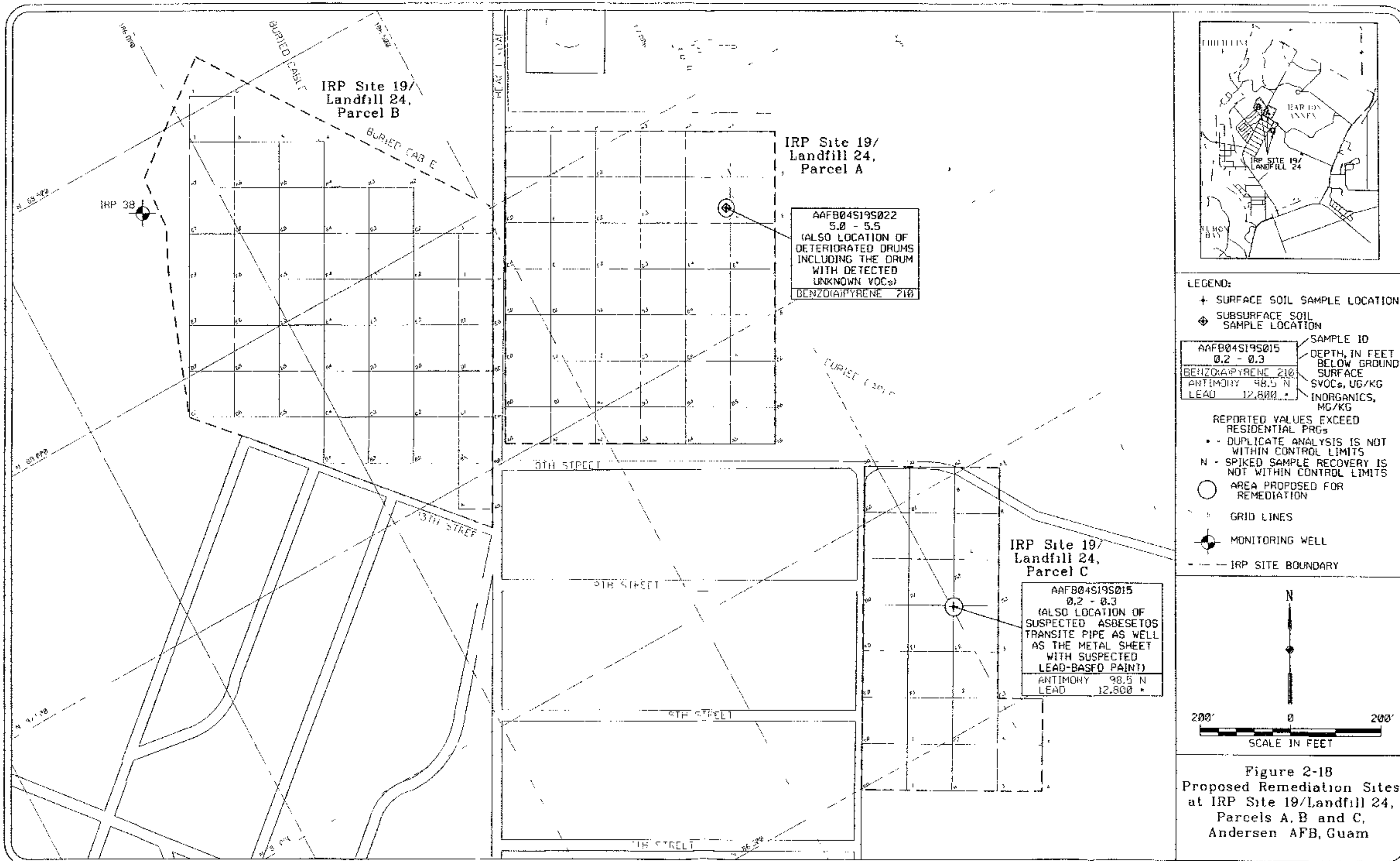

Figure 2-18
Proposed Remediation Sites at IRP Site 19/Landfill 24, Parcels A, B and C, Andersen AFB, Guam

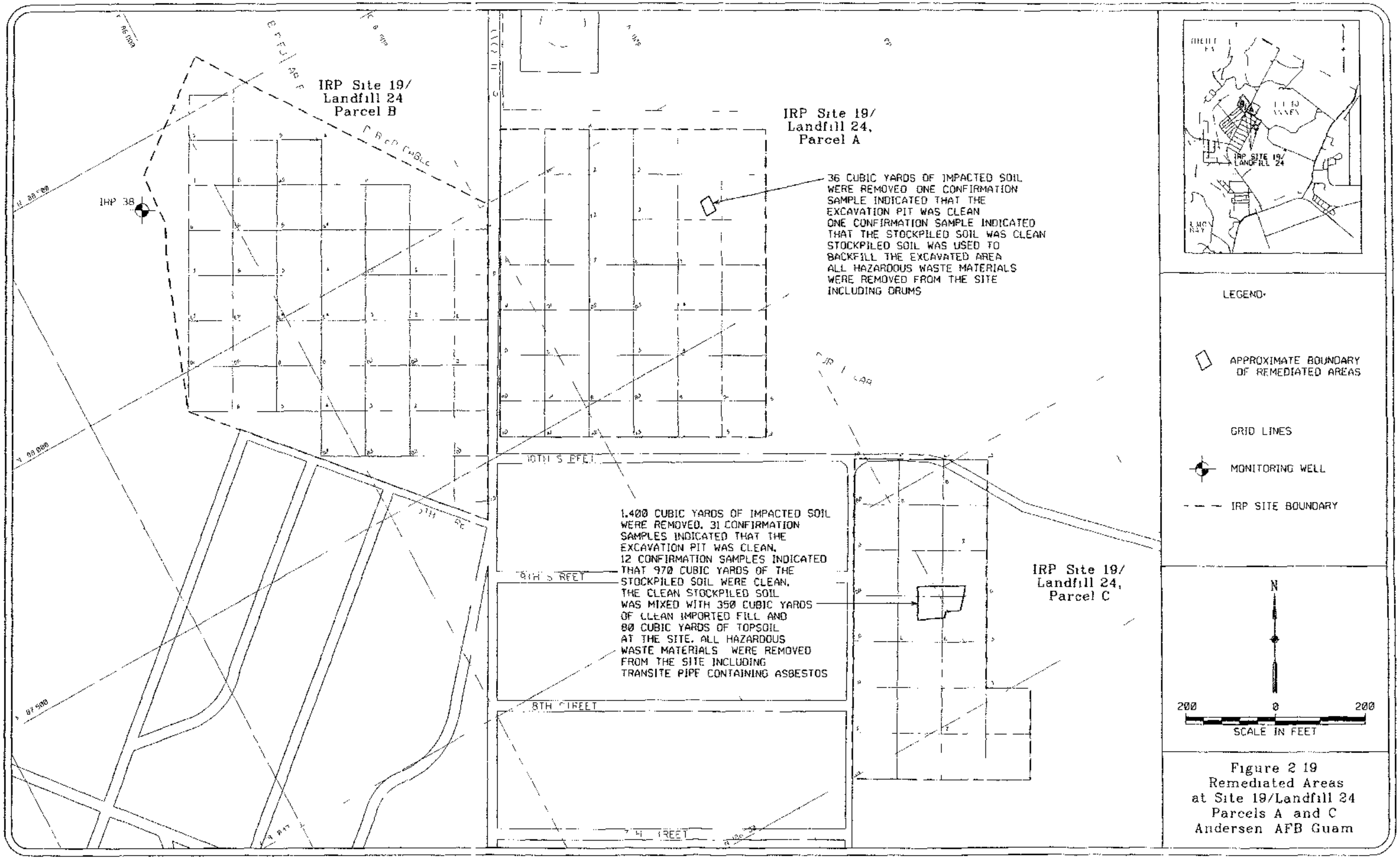

Figure 2 19
Remediated Areas
at Site 19/Landfill 24
Parcels A and C
Andersen AFB Guam

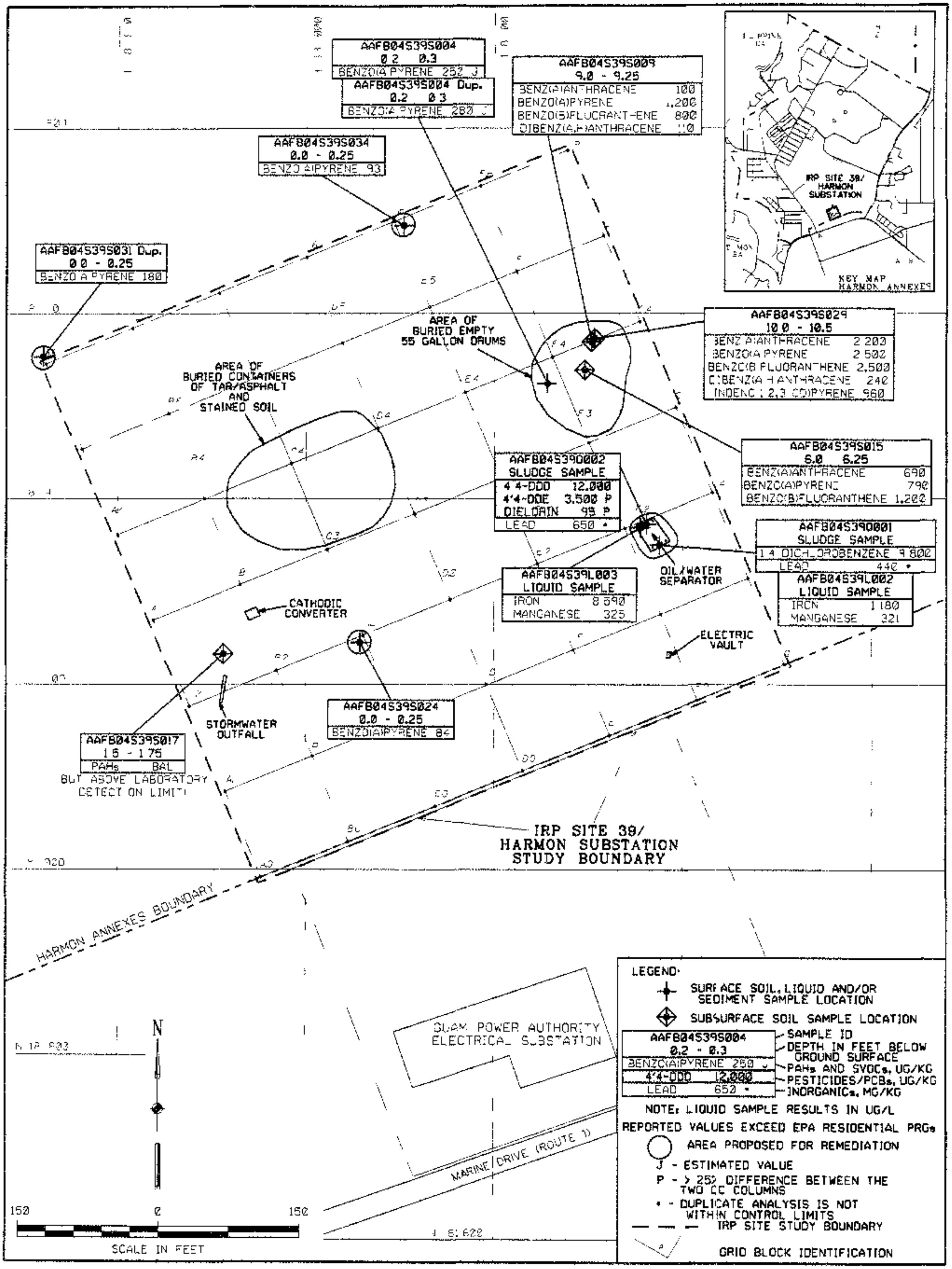

Figure 2-20 Proposed Remediation Sites at IRP Site 39/Harmon Substation, Andersen AFB, Guam

the excavation pits using compacted clean fill materials. The sites were graded, but not to their original topography. Therefore, the amount of excavated material did not equal the amount of fill material.

In December 1998, the cleanup of Parcel A began by clearing and grubbing the areas to be excavated (Figure 2-19). A total of nine 55-gallon drums were excavated. Seven of the nine 55-gallon drums were empty and deteriorated. These drums and other metal debris at the site were transported to the Andersen AFB Landfill for disposal (Table 2-14). One drum of asphalt was transported to IRP Site 35/Waste Pile 1, near Andersen AFB Landfill, for asphalt recycling. Another drum, with approximately 25 gallons of liquid, was consolidated and transported to the U.S. mainland for disposal as hazardous materials (IT/OHM, 1999b).

After the disposal of drums and debris, approximately 36 cubic yards (CY) of soil were excavated and stockpiled at the site. One six-point composite confirmation sample was collected at 6 feet bgs. One four-point composite sample was also collected from the stockpiled soil. These soil samples were analyzed for VOCs, PAHs, and SVOCs. As presented in Appendix B, no COCs were detected in either sample at concentrations exceeding the cleanup standards. Subsequently, the excavation pit was backfilled with the stockpiled soil and other site fill materials. The backfilled area was graded and compacted to 85 percent of the maximum dry density (IT/OHM, 1999b).

Between February and April 1999, after clearing and grubbing at Parcel C, approximately 1,400 CY of soil were excavated and stockpiled at the site (Table 2-14). A total of 34 discrete confirmation samples (including three duplicate samples) were collected at depths ranging from 2.5 to 5 feet bgs. Additionally, 17 composite samples (including one duplicate sample) were collected from the stockpiled soil (Table 2-14).

The excavation at Parcel C was completed in two stages. At the end of the first stage, three of 22 confirmation samples collected from the excavation pit had lead concentrations that exceeded the cleanup standards. Consequently, the second stage of excavation was continued and 12 additional confirmation samples were collected until the results of the confirmation samples indicated that all impacted soil had been removed from the excavation pit (Appendix B).

Based on analytical results from 17 confirmation samples collected from the stockpiled soil, approximately 970 CY had acceptable lead and antimony concentrations. However, 530 CY of soil had lead concentrations exceeding the cleanup standards (Appendix B). The 530 CY of lead-impacted soil were transported to the Andersen AFB Landfill for disposal (Table 2-14). The excavation pit was then backfilled with the 970 CY stockpiled soil mixed with 350 CY of imported fill and 80 CY of clean topsoil from Site 19. The amount of excavated material exceeded the amount of backfill material and site grade was slightly lower than its original topography. The backfilled area was graded and compacted to 85 percent of the maximum dry density (IT/OHM, 1999b).

Approximately 4 CY of asbestos-containing transite pipe were removed from Parcel C and transported to the Andersen AFB Landfill for disposal (Table 2-14).

TABLE 2-14. REMEDIAL ACTION AT AT IRP SITE 19, ANDERSEN AFB, GUAM.

		Confirmation Sampling					Disposal Sites			Backfilling Source		
Remedial Location/COCs	Excavated and On-Site Stockpiled Soil (CY)	Confirmation Analysis	Total Number of Confirmation Samples from Excavation Pit	Number of Clean Confirmation Samples from Excavation Pit	Total Number of Confirmation Samples from Stockpile	Number of Clean Confirmation Samples from Stockpile	Andersen AFB Landfill	Andersen AFB Landfill Asphalt Recycling Center	Off-Island Hazardous Disposal Facility	Backfill using Clean Portion of Stockpiled Soil (CY)	Backfill using Clean On-Site Topsoil (CY)	Estimated Backfill Clean Imported Fill (CY)
Parcel A												
Grid Cell F5/benzo(a)pyrene	36	VOCs, SVOCs, PAHs	1	1	1	1	Seven empty, deteriorated 55-gallon drums	One 55-gallon drum of asphalt	One drum with 25 gallons of liquid	36	None	None
Parcel C												
Grid Cell E3/lead and antimony	1,400	lead and antimony	34	31	17	12	530 CY of lead-impacted soil and about 4 CY of asbestos-containing transite pipe	None	None	970	80	350

Notes
COCs = Constituents of Concern, CY = Cubic Yards
Duplicate samples are included in the reported number of samples
All clean fill materials were supplied using on-island sources
All potential hazardous materials were tested before seding off-island for disposal
Clean portion of stockpile soil = Portion of stockpile with sample results below cleanup standards
Clean confirmation samples = All detected analytes were below cleanup standards

Control Act, or any other disposal requirements. Upon removal and disposal of the oil/water separator, the cleanup standard for confirmation soil beneath the oil/water separator was established using the Residential PRGs, or risk-based remedial goal options (cleanup standards).

If the selected remedial action had not been implemented, actual or threatened releases of COCs from Site 39 might have presented an imminent and substantial impact to public health, welfare, or the environment. The remedial actions were completed in June 1999 and included the excavation, removal, and disposal of waste materials and impacted soil at Site 39.

In March 1998, an Action Memorandum was prepared for the site including the above-referenced removal actions. The March 1998 Action Memorandum was approved by the USEPA and GEPA. The extent of excavation was based on confirmation of soil sample analytical results. After the completion of remedial actions, the sites were restored by backfilling the excavation pits using compacted clean fill materials. The remedial areas at Site 39 were graded, but not to their original topography. Therefore, the amount of excavated material did not equal the amount of fill material.

As presented in Figure 2-20, the small surface and subsurface benzo(a) pyrene-impacted areas near grid cells E6, A6, C2, and the stormwater outfall required cleanup. The soil beneath the empty buried drum near grid cells F3 and F4 was impacted by benzo(a) pyrene, benz(a) anthracene, benzo(b) fluoranthene, dibenz(a, h) anthracene, and indeno(l, 2,3-cd) pyrene also required cleanup. Finally, the buried tar-like material containers near grid cells C3 and C4 and the oil/water separator and its contents required removal and cleanup.

In May 1998, the removal action for the oil/water separator began by clearing and grubbing the areas around the oil/water separator (Figure 2-21). The liquid, oil/water mixture, and sludge from the oil/water separator were analyzed and determined to contain PCBs. The PCB-impacted liquid, oil/water mixture, and sludge were placed in 175 containers (55-gallon drums) and shipped off-island for disposal as hazardous waste material. The PCB-impacted sediments from the oil/water separator were placed in 36 containers (2,800-pound bulk bags) and shipped off-island for disposal as hazardous waste material. Similarly, the TPH-impacted rinsate water from decontamination of the oil/water separator was placed in 40 containers (55-gallon drums) and shipped off-island for disposal as hazardous waste material. A total of 6,150 gallons of non-hazardous liquid from the oil/water separator and the oil/water chambers were shipped to an on-island facility for disposal and recycling (IT/OHM, 1999c).

After disposal of the oil/water separator and its contents, 846 CY of soil were excavated and stockpiled at the site. A total of 55 composite confirmation samples (including 2 duplicate samples) were collected from beneath the former oil/water separator at depths ranging from 1 to 11 feet bgs. Additionally, one composite sample was collected from the 100 CY of stockpiled soil originating from the excavation of the oil/water separator pipeline. These soil samples were analyzed for PAHs, pesticides/PCBs, total lead, and Total Recoverable Petroleum Hydrocarbons.

The excavation at the location of the oil/water separator was completed in four stages. At the end of the first stage, seven of 21 confirmation samples collected from the excavation pit had

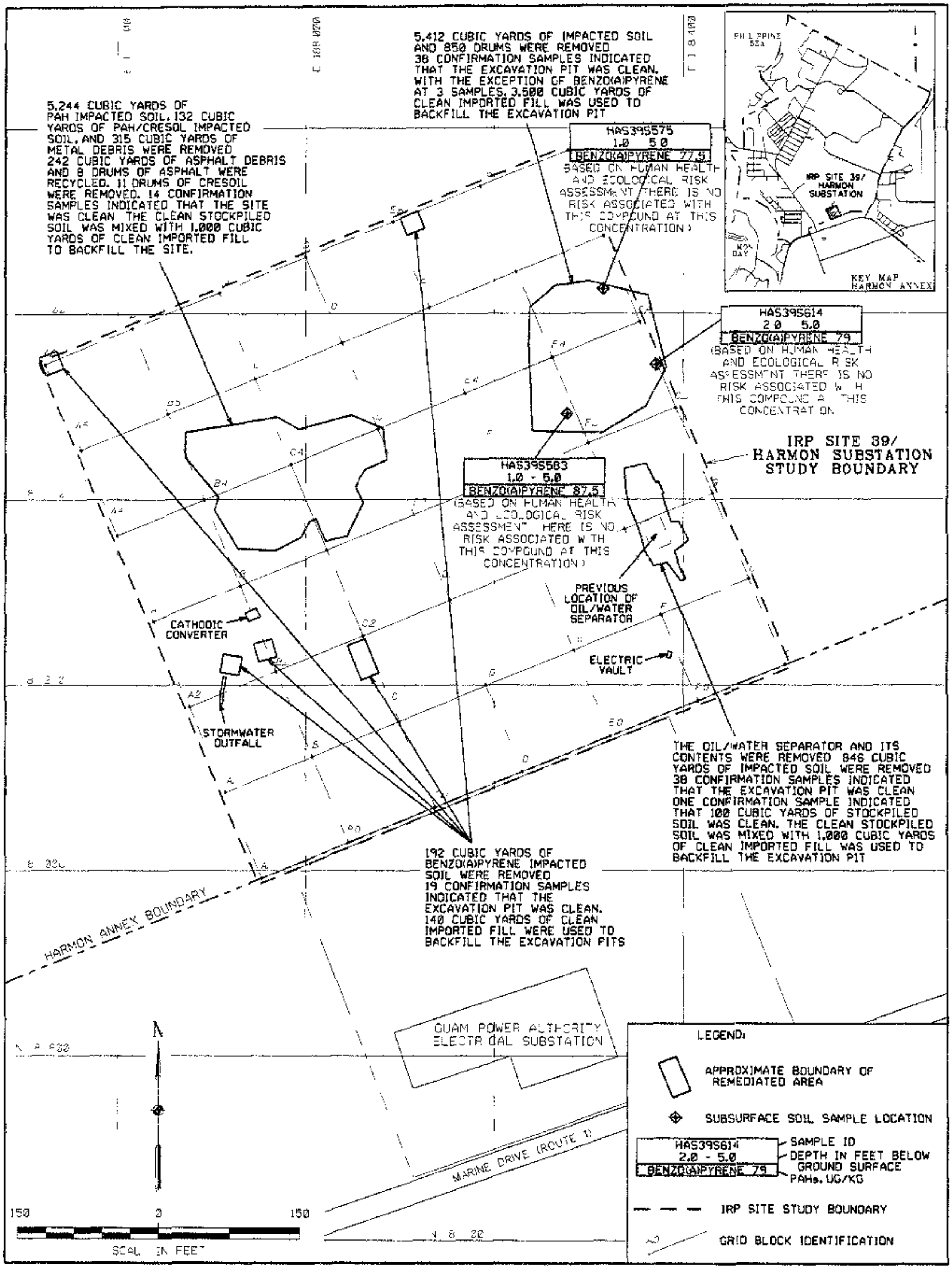

Figure 2-21 Remediated Areas at IRP Site 39/Harmon Substation Andersen AFB, Guam

PCB concentrations exceeding the cleanup standards. After the second stage of excavation, nine of 22 confirmation samples collected from the excavation pit contained PCBs and pesticides exceeding the cleanup standards. After the third stage of excavation, only one of 11 confirmation samples collected from the excavation pit contained pesticides that exceeded the cleanup standards. Finally, following the fourth stage of excavation, the results of the last confirmation sample indicated that all impacted soil had been removed from the excavation pit (Appendix B).

All 846 CY of the excavated soil from the location of the oil/water separator were transported to Andersen AFB Landfill for disposal (Table 2-15). Based on sample results, 100 CY of stockpiled soil from the oil/water separator pipeline were not impacted by any COC. Subsequently the oil/water separator excavation pit was backfilled with the 100 CY of stockpiled soil mixed with 1,000 CY of imported fill. The backfilled area was then graded and compacted to 85 percent of the maximum dry density (IT/OHM, 1999c).

In September 1998, the remedial action for the small benzo(a) pyrene hot spots near grid cells E6, A6, C2, and the stormwater outfall began (Figure 2-21). After clearing and grubbing, approximately 192 CY of soil were excavated and stockpiled at the site. A total of 19 composite confirmation samples (including two duplicate samples) were collected at depths ranging from 1 to 5 feet bgs. These soil samples were analyzed for PAHs. As presented in Appendix B, with the exception of one final confirmation sample, COCs were detected in all other confirmation samples at concentrations exceeding the cleanup standards. Consequently, all 192 CY of the excavated soil from the hot spots near grid cells E6, A6, C2, and stormwater outfall were transported to Andersen AFB Landfill for disposal (Table 2-15). The excavation pits near grid cells E6, A6, C2, and the stormwater outfall were backfilled with 140 CY of imported fill. The backfilled area was then graded and compacted to 85 percent of the maximum dry density (IT/OHM, 1999c).

In July 1998, the remedial action for the benzo(a) pyrene, benz(a) anthracene, benzo(b) fluoranthene, dibenz(a, h) anthracene, and indeno(l ,2,3-cd) pyrene in soil at the vicinity of the empty buried drum area near grid cells F3 and F4 began (Figure 2-21). After clearing and grubbing, approximately 5,412 CY of soil and 850 containers (55-gallon empty and deteriorated drums) were excavated and stockpiled at the site. A total of 70 composite confirmation samples (including eight duplicate samples) were collected at depths ranging from 1 to 14 feet bgs. These soil samples were analyzed for PAHs. A total of 16 samples were also analyzed for PCBs and eight samples were analyzed for dioxins (Table 2-15).

The excavation at the location of the empty buried drum area was completed in five stages. At the end of the first stage, 15 of 25 confirmation samples collected from the excavation pit had PAHs exceeding the cleanup standards. No PCBs or dioxins were detected in any of the samples analyzed for PCBs/dioxins at concentrations above action standards. After the second stage of excavation, none of the 10 confirmation samples collected from the excavation pit floor contained PAHs exceeding the cleanup standards. The excavation pit floor was confirmed to be clean. The excavation of the walls continued after the third stage, and six of nine confirmation samples collected from the walls of the excavation pit had PAHs exceeding the cleanup standards. After the fourth and fifth stages of excavation only three of 27 confirmation samples,

TABLE 2-15. REMEDIAL ACTION AT IRP SITE 39, ANDERSEN AFB, GUAM.

Remedial Location/COCs	Excavated and On-Site Stockpiled Soil (CY)	Confirmation Sampling					Disposal Sites				Backfilling Source	
		Confirmation Analysis	Total Number of Confirmation Samples from Excavation Pit	Number of Clean Confirmation Samples from Excavation Pit	Total Number of Confirmation Samples from Stockpile	Number of Clean Confirmation Samples from Stockpile	Andersen AFB Landfill	Andersen AFB Landfill Asphalt Recycling Center	Off-Island Hazardous Disposal Facility	On-Island Nonhazardous Disposal and Recycling Facility	Backfill using Clean Portion of Stockpiled Soil (CY)	Estimated Backfill Clean Imported Fill (CY)
Buried Tar-Asphalt Container Area												
Grid Cells C3 and C4/Tar/Asphalt	5,244	VOCs, PAHs, SVOCs, PCBs, Pesticides, Dioxin(4)	13	12	11	9	1,416 CY of PAH-impacted soil, 132 CY of PAH/cresol-impacted soil, and 315 CY of metal debris	242 CY of asphalt debris and 8 (55-gallon) drums of asphalt.	11containers (55-gallon drums) with liquid and solid cresol	None	3,757	1,000

Notes:
COCs = Constituents of Concern; CY = Cubic Yards
Duplicate samples are included in the reported number of samples.
All clean fill materials were supplied using on-island sources
All potential hazardous materials were tested before seding off-island for disposal.
Clean portion of stockpile soil = Portion of stockpile with sample results below cleanup standards
Clean confirmation sample results = All detected analytes were below cleanup standards.

1 = TRPH analysis was performed on the first 21 samples only.
2 = Dioxin analysis was also performed on the Stormwater Oufall samples.
3 = PCB analysis was performed on the first 16 samples and dioxin analysis was performed on the first 7 samples samples only
4 = Dioxin analysis was performed on 3 samples and PAH analysis was performed on the first 5 samples only.

Based on stockpile sample results, no COCs were detected in nine of 11 stockpiled soil samples and approximately 3,757 CY of the excavated soil were not impacted. Therefore, the excavation pits at the buried tar-asphalt container area near grid cells C3 and C4 were backfilled with a total of 3,757 of excavated soil and 1,000 CY of imported fill. The backfilled area was then graded and compacted to 85 percent of the maximum dry density (IT/OHM, 1999c).

Human health and ecological risk assessments were performed at Site 39 for benzo(a) pyrene, detected at the empty buried drum area near grid cells F3 and F4, and dioxins, detected in surface soil site wide. In addition to benzo(a) pyrene and dioxin as COCs, other COPCs were also considered for the human health and ecological risk assessments.

Conservative and realistic present and future scenarios were used in the evaluation of potential risk to receptors that may be exposed to the site. The selected ecological receptors included representative key trophic level species and generic plants including musk shrew, Norway rat, feral dog, Micronesian starling, and the monitor lizard. Based on risk assessment results, there is negligible ecological risk associated with any of the benzo(a) pyrene, dioxin, and other COPCs at Site 39 (Appendix C).

For the human health risk assessment, cancer and noncancer risks associated with exposure to benzo(a) pyrene, dioxin, and other COPCs were evaluated for hypothetical receptors including groundkeepers, sportsmen, trespassers, and residents. Based on the human health risk assessment, there are no adverse health effects associated with benzo(a) pyrene, dioxin, or any other COPCs at Site 39 (Appendix C).

2.7 Description of No Further Action Alternative

The No Further Action alternative was selected for the Harmon Annex OU because all COCs have been removed from these sites and the sites are already in a protective state posing no current or future risks to human health and the environment.

2.7.1 No Further Action Alternative for Site 18

No storage (for greater than one year), release, or disposal of hazardous substances, petroleum products, or their derivatives has occurred at Site 18. There are no current or future human health or ecological risks associated with the site and remediation is not required at Site 18. Therefore, the No Further Action alternative is proposed for this site.

2.7.2 No Further Action Alternative for Site 19

After removing the COC-impacted soil and debris from Site 19, the statutory requirements of Section 121 of CERCLA were met. Soil removal at Site 19 eliminated site COCs and then-potential exposure to human health and the environment. The implementation of the soil removal did not create any short-term risk, nor any cross-media consequences. Any residual risk remaining at the site to human health and the environment is minimal. The implementation of

TABLE 2-16. SUMMARY OF PERTINENT ARARs FOR IRP SITES 19 AND 39, ANDERSEN AFB, GUAM.

Act or Authority	Requirement	Requirement's Impact on Soil Removal and Off-site Disposal
Federal Chemical-Specific ARARs		
USEPA Region IX Preliminary Remediation Goals (PRGs)	Screens and establishes Risk-based Cleanup Goals for chemicals in soil, air, and water.	Soils exceeding PRGs were excavated and removed from the site.
Federal Insecticide, Fungicide, and Rodenticide ACT (FIFRA) 60 CFR 32094	Regulates the disposal and storage of pesticides and their containers.	Soils impacted by pesticides were excavated and removed from the site.
Toxic Substances Control ACT (TSCA) 60 CFR 761	Regulates wastes containing PCB constituents.	Soils, liquid, sludge, and sediments impacted by PCBs were excavated and removed from the site.
Federal Location-Specific ARARs		
Endangered Species Act 16 USC 1531 and 50 CFR 200, 402	Promotes actions to conserve endangered species or habitats.	All migratory routes for endangered species were examined prior to soil removal and off-site disposal. There were no endangered species, or migratory routes, at or near the site.
Federal Action-Specific ARARs		
Clean Air Act (CAA) 40 CFR 50	Regulates the air quality against National Ambient Air Quality Standards.	Air monitoring plan was established during soil removal action. The dust control measures were implemented using water trucks and spray.
Hazardous Materials Transportation Act (HMTA) 40 CFR 100-177	Regulates the transportation of hazardous waste materials on national highways in accordance with Department of Transportation (DOT).	All excavated impacted soils and hazardous waste materials that were disposed of at an off-island landfill were handled in accordance with HMTA and DOT.
Territorial (Guam)-Specific ARARs		
Resource Conservation and Recovery Act (RCRA) 40 CFR 261, 262, 263, and 268	Tracks the destiny of hazardous waste from "cradle to grave."	All hazardous waste materials were handled, stored, and transported off-site at the Andersen AFB landfill in accordance with RCRA.
Solid Waste Management Act, 10 Guam Code Annotated (GCA), Chapter 51	Regulates solid waste collection and disposal on Guam.	All solid decontamination wastes (i.e., non-hazardous waste) were transported and disposed at Andersen AFB landfill in accordance with Guam's solid waste management.

3. RESPONSIVENESS SUMMARY

The community response regarding the Harmon Annex OU is an important part of this ROD due to the land transfer issue. In this section, a summary of public involvement and comments are presented.

In an effort to inform and involve the local community, the RAB was established in 1995 comprising community members, elected officials, Air Force officials, and representatives from regulatory agencies. Since 1995, the RAB has regularly held quarterly meetings that were open to the public. During the RAB meetings, the progress of the environmental investigations at Andersen AFB's IRP site was discussed. The RAB served as a major focal point for environmental exchange between Andersen AFB and the local community.

Furthermore, the RI and Proposed Plan for the Harmon Annex OU was released to the public in November 2000 and February 2001, respectively. Later, Andersen AFB published a notice of availability for the RI and Proposed Plan reports regarding the Harmon Annex OU in Guam's Pacific Daily News from 06 through 08 February 2001. The notice also included the dates of public comment period from 06 February to 08 March 2001. A public meeting was held in the Hilton Hotel on 22 February 2001 in Guam where representatives from USEPA, GEPA, and Andersen AFB responded to public inquiries regarding the Proposed Plan for the Harmon Annex OU.

Upon completion of the public comment period, no written comments were received from the public. A transcript of questions and comments generated at the public meeting are presented on the following pages.

ANDERSEN AIR FORCE BASE HARMON PROPOSED PLAN MEETING MINUTES
22 February 2001

ATTENDEES

Board Members and Support

Col. E. Schoeck (AAFB) - Installation Co-chair
Mr. C. Crisostomo - Mediator
Mr. J. Jocson - RAB Member
Mr. M. Gawel - RAB Member
Mr. F. Castro - RAB Member
Ms. M. Quenga - RAB Member
Mr. E. Artero - RAB Member
Ms. J. Duwel - RAB
Mr. T. Quillen - TechLaw for USEPA
Mr. W. Leon Guerrero - GEPA
Mr. D. W. Longa - GEPA
Ms. G. O. Garces - GEPA
Mr. L. Richman - GEPA
Mr. D. Perez - GEPA
Ms. J. Poland - AAFB
Capt. O. D. Leff- AAFB
Capt. M. Escudie - AAFB
Mr. J. Torres - AAFB
Mr. G. Ikehara - AAFB
Mr. D. Agar - AAFB
Mr. J. Hill - AFCEE
Mr. J. Sullivan - PACAF
Mr. G. Fujimoto - PACAF

Public

Mr. J. Iglesias - for Congressman Underwood
Mr. C. Arnsfield - IT
Mr. Brian Gilkison, IT
Mr. P. Ono - IT
Ms. N Acedera - IT
Mr. K. Damiro - BOP
Dr. J. Rosacker - UNITEC
Mr. T. Towers - Weston
Mr. J. Floden - UNITEC
Mr. T. Ghofrani - EA
Mr. R. Shambach - EA
Mr. D. Mercadante - EA
Mr. J. Lazzeri - EA
Mr. J. Morrell - EA
Mr. M. Price - EA
Dr. M. Knight - URS
Mr. M Bone - Foster Wheeler
Mr. S. Seyedian - Foster Wheeler
Ms. M. Donahue - Earth Tech
Mr. D. Griffin - Earth Tech
Mr. D. Baxley - Earth Tech
Mr. J. Fern - Earth Tech
Mr. G. Delson - Earth Tech
Ms. T. Torres Mr. C. Herndon - RAG
Mr. J. A. Flores - BEI
Dr. S. Hewins - Texas A& M University

[Please note that the comments in brackets are added for further clarification]

Introduction:

Mr. G. Ikehara introduced Mr. C. Crisostomo as the meeting mediator. Mr. C. Crisostomo stated that during this portion of the program, the study, cleanup, and the Final Proposed Plan for the three sites at Harmon Annex were to be presented. Mr. C. Crisostomo pointed out that the locations of these sites were indicated on maps located on tripods at the entrance of the meeting room. Writing materials were provided to the public for note taking and/or writing of questions that might come up during the presentation. Additionally, post cards were provided for any written comments that could be submitted later to Andersen AFB by 08 March 2001. Mr. C. Crisostomo then introduced Mr. J. Torres to present the Harmon Proposed Plan.

At Site 19, metal debris, asbestos containing transite pipe, and 55-gallon drums were identified during the detailed site inventory. Soil samples were collected and dioxin, benzo(a) pyrene, antimony, and lead concentrations exceeded Residential PRGs. Because of the urgency in transferring Harmon Annex, Andersen AFB decided to establish conservative cleanup standards based on the USEPA Region IX Residential PRGs and remove the drums, asbestos piping, and impacted soil from Site 19. About 530 cubic yards of impacted soil (exceeding Residential PRGs), nine 55-gallon drums, and other metal debris were transported to the Andersen AFB Landfill for disposal. About 4 cubic yards of transite pipe was removed from the site and shipped to an off-island hazardous disposal and recycling facility. After removing the impacted soil and conducting confirmation sampling, the excavated areas were backfilled with clean fill.

At Harmon Substation, Site 39, an oil/water separator, tar/asphalt drums, asphalt and metal debris, and electrical power components were identified. Soil samples were collected and benzo(a) pyrene and dioxin concentrations exceeded Residential PRGs. The impacted soil, drums, and debris were removed from Site 39 and transported to the Andersen AFB Landfill for disposal. The excavated areas were then backfilled with clean fill. Also, the oil/water separator with its PCB-impacted contents was removed from Site 39 and transported to an on-island disposal facility. About 7,998 cubic yards of benzo(a) pyrene impacted soil, 850 empty drums, and 315 cubic yards of metal debris were transported to the Andersen AFB Landfill for disposal. Also, 6,150 gallons of non-hazardous liquid from the oil/water separator was transported to an on-island, nonhazardous disposal and recycling facility. A total of 175 drums (55-gallon) with liquid/sludge, 2,800 pounds of PCB-impacted sediments, 40 drums of TPH-impacted liquid, and 1 1 drums of liquid/solid cresol were transported to an off-island hazardous disposal and recycling facility.

Additionally, groundwater monitoring at the Harmon Substation began in 1995 and in 1996 three monitoring wells were installed at Harmon Annex. Based on sampling and monitoring of the wells at Harmon, only nickel and chromium were detected at concentrations above EPA standards. However, nickel and chromium detection is related to premature deterioration of the stainless steel pumps and the well screens.

Mr. J. Torres then summarized his presentation by indicating that the remedial investigation extended from July 1996 to December 1997, followed by cleanup work from May of 1998 to June of 1999. Andersen AFB is now proposing No Further Action for Sites 18, 19, and 39. The final remedial investigation and cleanup reports have all been completed and approved by the USEPA and GEPA, and the Final ROD is expected to be completed by October 2001 after incorporating any public comments. Mr. J. Torres then opened the forum for any questions or comments from public.

Q/A:

1st Question by Mr. E. Artero?: Once the contaminated soils are excavated where do they go?

1st and only response by Mr. J. Torres: That depends on the soil. If soil is tested to be hazardous, it will be shipped off-island. If the soil is non-hazardous waste and meets PRGs

9th Question by Ms. T. Torres: What do you mean by No Further Action?

1st and the only response by Mr. G. Ikehara: As Mr. J. Torres explained, No Further Action means that all cleanup actions have already been taken to completion and there is no other human or ecological risk at the site; therefore, no further remediation is needed at the site.

10th Question by Ms. C. Herndon: If any other drum is found at these sites in the future, who will be responsible for the cleanup?

1st and only response by Mr. G. Ikehara: As long as the waste is related to Andersen AFB activities, Andersen AFB will be responsible for the cleanup.

11th Question by Ms. T. Torres: Wouldn't moving of contaminated soil to the Andersen AFB Landfill pose a future problem?

1st and only response by Mr. G. Ikehara: Before moving any soil to Andersen AFB, the soil will be tested to make sure that it is not hazardous. If it is hazardous soil, it will be shipped off-island for disposal. If the soil is not hazardous waste, and below industrial PRGs, it can be transported to the Andersen AFB Landfill for disposal.

2nd and only response by Ms. J. Poland: The impacted soils at Harmon were removed so that these sites are safe for future residential use. When soils are impacted at levels between Residential and Industrial PRGs, they can be safely disposed at the Andersen AFB Landfill. Furthermore, the Andersen AFB Landfill includes a liner that prevents any potential leaching to groundwater. Andersen AFB's Landfill is the only permitted landfill on-island and complies with the most stringent environmental regulations.

At the conclusion of the meeting, Mr. G. Ikehara reiterated that any other questions or comments could be sent to Andersen AFB. There are two repositories where hard copies of the Harmon Proposed Plan are available for public review. The two repositories are the Nieves M. Flores Memorial Library in Hagatna and the Robert F. Kennedy Memorial Library at the University of Guam.

4. REGULATORY COMMENTS AND AIR FORCE RESPONSES

In this section of the ROD, all USEPA and GEPA comments will be presented along with the USAF responses. All original USEPA and GEPA comments are presented as received, in reference to the May 2001 *Draft Record of Decision for Harmon Annex Operable Unit* (Draft ROD). However, the responses are presented in reference to this Final ROD.

Response to USEPA Comments on the
May 2001 Draft Record of Decision
for Harmon Annex Operable Unit
Andersen Air Force Base, Guam

The *Draft Record of Decision for Harmon Annex Operable Unit* (Draft ROD) was reviewed for completeness and technical adequacy considering historical site information and the USEPA Guidance document *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (ROD Guidance) dated July 1999 (EPA 540-R-98-031, found at http://www.epa.gov/superfund/resources/remedy/rods/).

GENERAL COMMENTS

The ROD should contain an Administrative Record Index for the site.

<u>Response to General Comment. 1</u>; The following sentence will be added to the first paragraph of Page 2-7:

"A complete Administrative Record Index is presented in Appendix A."

The ROD should include a placeholder section for regulatory comments and DOD responses to comments on the ROD.

<u>Response to General Comment 2</u>: The following section will be added to the ROD to include the regulatory comments and USAF responses:

"4. REGULATORY COMMENTS AND AIR FORCE RESPONSES

In this section of the ROD, all USEPA and GEPA comments will be presented along with the USAF responses."

The Air Force should provide more justification in the ROD for not conducting an ecological risk assessment at Site 19.

<u>Response to General Comment 3</u>: A short discussion will be added to Section 2.6.2 as follows:

"An ecological risk assessment was not conducted at Site 19; however, a habitat inventory was conducted that identified grassland and Tangantangan forest containing mostly non-indigenous

fauna. In addition, no rare, threatened, or endangered species have been observed in the site or vicinity. Given a possible future residential use for the site, the decision was made to perform cleanup using EPA Region IX Residential PRGs as cleanup goals. A comparison of PRGs to the residual COC concentrations and the ecological receptors observed at Site 19 indicated no risk to the human health or the environment."

SPECIFIC COMMENTS

Page 1-1, Title. Please remove the subtitle: "Statutory Preference ... is Not Required". These statements should be within a Statutory Determinations section. Insert a new section, either after 1.3 or after 1.4 that reviews the statutory requirements of CERCLA 121 and the regulatory requirements of the NCP. The applicability of the five-year review should also be in this new section.

Response to Specific Comment 1: The statement "Statutory Preference for Treatment as a Principal Element is Met and Five-Year Site Review is Not Required" will be omitted from the title of the Declaration.

According to the USEPA *Interim Final Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Agreement*, Report No. OSWER 9335.3-02, Chapter 9, Exhibit 9-2, Statutory Determination is not required for documenting a No Action Decision. Consequently, no Statutory Determination will be added after either Sections 1.3 or 1.4.

Page 1-2, First Paragraph. Replace the word remedial in the first sentence with removal.

Response to Specific Comment 2: The first paragraph of Page 1-2 will be revised to state that:

"This removal action was protective of human health and the environment and complied with federal and territorial (Guam) requirements that were legally applicable or relevant and appropriate."

Page 1-2, First Paragraph. I don't like the phrase "not impacted by the COCs detected in the soils that were eventually removed from Sites 19 and 39". Perhaps change the sentence to " No COCs were detected in the groundwater under the Harmon Annex above (*detection limits*, *background levels* or *health based action levels*, whichever is true)".

Response to Specific Comment 3: The first paragraph of Page 1-2 will be revised to state that:

"No COCs were detected in the groundwater under Harmon Annex above MCLs, or PRGs for tap water, with the exception of chloroform, chromium, and nickel These compounds do not represent groundwater contamination because chloroform is associated with laboratory contamination and chromium and nickel are attributed to corrosion of the stainless steel piston pump and well screen."

Decision Summary, Section 2.1. The Draft ROD does not identify the National Superfund database identification number (e.g., CERCLIS) for the site. This number helps to identify the site for future information inquiries. Please revise Section 2.1 of the ROD to provide information related to the CERCLIS number for Andersen Air Force Base and, if applicable, the Harmon Annex.

Response to Specific Comment 4: The following sentence will be added at the end of the second paragraph on Page 2-5:

"The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number for Andersen AFB is GU657] 999519."

Decision Summary, Section 2.2. The second sentence of this paragraph states that "either cesspools, open pits, oil/water separators, or surface debris were suspected as the source of surface soil contamination by COCs...." This language is confusing as the "source" of the constituents of concern (COC) should be an operational process that took place at the Harmon Annex. For example, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT are listed in the 4th paragraph as COCs and these compounds are pesticides. It seems that the pesticide application process and the area to which the pesticides were applied should be identified as the "source" of these compounds. It is not clear from the text presented in the Draft ROD whether the basins listed above happened to just be accumulation points for these contaminants or whether the areas were in fact the "source" of the COCs. Please revise the Draft ROD to more clearly describe the source of the COCs described in Section 2.2, 4th paragraph.

Response to Specific Comment 5; The fourth paragraph of Section 2.2 will be revised to state that:

"At these seven AOCs, surface and subsurface samples were collected from abandoned cesspools, open pits, oil/water separators, and waste piles. Based on laboratory analytical results, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, antimony, lead, and/or benzo(a) pyrene were detected in soil samples collected from these accumulation points at concentrations that exceeded the Residential PRGs (EA, 1997). Subsequently, in 1998, material from the cesspools, open pits, oil/water separators, contaminated waste piles, and suspected asbestos containing material were removed from the seven AOCs and transferred to the Andersen AFB Landfill for disposal. The features were backfilled to grade with clean material"

Decision Summary, Section 2.2, 4th paragraph. The last sentence of this paragraph mentions "action limits" related to the remediation that took place at the Harmon annex AOCs. The specific action limits that were applied are not specified. This information would be useful for assessing the nature of the remedial activities that took place at the AOCs. Please revise the Draft ROD to specify the action limits that were applied to the Harmon Annex AOC remedial activities. In addition, the Air Force may want to provide information on Guam and EPA Region IX regulatory interaction related to the AOC remedial actions.

<u>Response to Specific Comment 6</u>: The fourth paragraph of Section 2.2 will be revised to state that:

"Confirmation soil sampling and analyses at the seven AOCs indicated that all impacted soils were removed such that the analytical results were below Residential PRGs (IT/OHM, 1999a)."

Decision Summary, Section 2.3. Section 2.3, Highlights of Community Participation, does not mention a Community Relations Plan for Andersen Air Force Base. Please revise the ROD to reference the Andersen Air Force Base Community Relations Plan, if such a document affected community involvement in the remedial activities that took place at the Harmon Annex.

<u>Response to Specific Comment 7</u>: The first paragraph of Section 2.3 will be revised to state that:

"In August 1992, to inform and involve the local community, Andersen AFB conducted 67 interviews with local government officials, residents, and concerned citizens to determine the level of community concern and interest in the environmental investigations. These community interviews provided the basis for the 1993 Community Relations Plan (CRP) (ICF Technology, 1993). The 1993 CRP described activities to keep the nearby communities informed of the progress of the environmental investigations at Andersen AFB sites and provide opportunities for input from residents regarding cleanup plans. In response to the USEPA request, Andersen AFB conducted 27 additional interviews in 1998, and updated the CRP (EA, 1998).

The USAF has promoted community relations and encouraged public involvement in cleanup decisions through the Restoration Advisory Board (RAB), established in 1995. Currently, the RAB is comprised of community members, elected officials, USAF officials, and representatives from regulatory agencies. The RAB meets on a quarterly basis to discuss program progress and to advise the community on the status and plans for the various IRP sites."

Decision Summary, Section 2.3. Section 2.3, Highlights of Community Participation, does not mention the February 22, 2001 public meeting that took place for the Harmon Annex Operable Unit Proposed Plan. Even though this meeting is discussed in Section 3, Responsiveness Summary, of the Draft ROD, the occurrence of the meeting should also be mentioned in Section 2.3 as it was a significant community participation milestone.

<u>Response to Specific Comment 8</u>: The following paragraph will be added following the last paragraph of Section 2.3:

"In February 2001, the Proposed Plan for the Harmon Annex OU was released to the public for review and comments, with a public comment period from 06 February to 08 March 2001. A public meeting was held in the Guam Hilton Hotel on 22 February 2001 where the Proposed Plan was presented and representatives from USEPA, GEPA, and Andersen AFB responded to public comments. The results of the public meeting and responses to public comments are presented in Section 3 of this ROD."

Decision Summary, Section 2.5. The third paragraph in Section 2.5, Site Characterization, mentions background threshold values (BTV) that were, established for the Andersen Air Force Base project. The ROD does not provide a reference to additional information regarding the derivation of the BTVs. Please revise Section 2.5 of the ROD to provide a reference for the derivation of the BTVs used during the Harmon Annex remedial activities.

<u>Response to Specific Comment 9</u>; The third paragraph of Section 2.5 will be revised to include a reference to BTVs, as follows:

"Some metal concentrations in Guam soils occur naturally at relatively high concentrations. Background threshold values (BTVs) were established for each metal based on cumulative probability plots of the entire surface soil data set (JCF Technology, 1996). The data set for each metal was evaluated to distinguish background populations from contaminant populations." At the August 2001 Remedial Program Manager (RPM) meeting, USEPA and GEPA requested that BTVs for specific metals (particularly arsenic and manganese) be reviewed using the updated soil analytical database with a consideration for the effects of grain size. A review of the updated database revealed no change in BTV for arsenic (62 mg/kg). However, the review resulted in an increase of the BTV for manganese from 3,150 mg/kg to 7,100 mg/kg (EA, 2001).

Decision Summary, Section 2.5. Section 2.5, Site Characterization, does not describe or provide a reference to the conceptual site models (CSM) used during the risk assessment or the remedial actions at the Harmon Annex. Conceptual Site Models are useful tools for understanding the occurrence and exposure pathways of the contaminants identified at environmental remediation sites. The CSM for IRP Site 39 is included in Appendix E of the Draft ROD yet the CSM is not discussed or referenced in Section 2.5. No CSM information is presented for IRP Site 18, if applicable, or IRP Site 19. Please revised the Draft ROD to present CSMs and provide a discussion of the CSMs that were used to described contamination for the IRP Sites at the Harmon Annex. This discussion will help frame a better understanding of the remedial actions that took place at the Harmon Annex IRP Sites.

<u>Response to Specific Comment 10</u>; The following Conceptual Site Model section will be inserted immediately after Section 2.5, as follows:

"Conceptual Site Models (CSMs) are useful in assessing the fate and transport of COPCs and evaluating potential exposure pathways relative to present and future receptors. In order to expedite the property transfer of Harmon Annex sites to GovGuam, the USAF established conservative cleanup standards based on the stringent USEPA Region IX Residential PRGs rather than conducting human and ecological risk assessments. A CSM that is applicable to Sites 18,19, and 39 is presented in Appendix E of the Final El for Harmon OU (EA, 2000)."

Decision Summary, Section 2.5.2. The fourth paragraph in Section 2.5.2, Site 19 Contaminant Characteristics, discusses dioxin sampling results. The fourth sentence in this paragraph states "As shown in Table 2-5, only dioxin results analyzed by Method 8290 were used due to a more sensitive detection limit." The meaning of this sentence is not clear - specifically it is not clear specifically what the Method 8290 results were "used" for, in this discussion of the remediation process. In addition, more information on the dismissal of the Method 8280 results would be appropriate in the ROD considering Method procedures, sample characteristics, laboratory quality control, and aspects of the data validation that support discounting the use of the Method 8280 results. Please revise Section 2.5.2 of the ROD to provide this additional information on the dioxin results for IRP Site 19.

Response to Specific Comment 11: The third sentence of the fourth paragraph of Section 2.5.3 will be revised to state that:

"As presented in Tables 2-4 and 2-5, at Parcel A, in the fill area on the southwest corner of the site, benzo(a) pyrene, manganese, and dioxins were detected at concentrations above Residential PRGs (Figure 2-14). The initial dioxin subsurface soil samples collected from Site 19 during the RI were analyzed using USEPA Method SW8280. As the Method SW8280 reporting limits (RLs) for individual congeners were above their respective Residential PRGs the data set did not meet DOOs. Subsequently, one subsurface soil sample was collected from each of two locations (AAFB04S19S022 andAAFB04S19S023) in Parcel A. These subsurface samples were analyzed for dioxins using Method SW8290. As presented in Table 2-5, Method SW8290provided significantly lower RLs than Method SW8280. Sample AAFB04S10S023, as analyzed by Method SW8290, also included dioxins at concentrations above Residential PRGs. However, in accordance with an agreement between the USAF, GEPA, and the USEPA Region IX, the subsurface dioxin cleanup standard was established at 1.0 microgram per kilogram (µg/kg) and no cleanup was recommended for dioxins at Parcel A (IT/OHM, 1999b)."

Page 2-8, Section 2.5.1. Please include more information from the Decision Summary, No Further Action Planned for IRP Site 18 (dated September, 1997), to justify this conclusion. Four soil samples in 42 acres does not sound like enough, unless you include the trenching, geophysical work and soil vapor testing that was also performed. Also explain that the four samples were biased in that they were taken from the only areas that had any potential sources of contamination.

Response to Specific Comment 12: The first and third paragraphs of Section 2.5.2 will be revised as follows:

"Site 18 is located in an undeveloped area of the Harmon Annex. Based on several record searches, site reconnaissance, geophysical survey, 21 test ditch excavations, and 14 active and 1 passive soil gas samples there was no supporting evidence that the site was ever used as a landfill (EA, 2000). No stressed vegetation, stained soil, or fill materials were identified at Site 18 that could be deemed as evidence of waste disposal activities."

"Four biased surface soil samples (including one duplicate sample) were collected at Site 18. All surface soil samples were collected from 2.0 to 4.0 inches (0.2 to 0.3 feet) bgs and were analyzed for semivolatile organic compounds (SVOCs) and metals (inorganics)."

Page 2-9, Section 2.5.2. Please change the last sentence in the second paragraph to something like: "The drum was wrapped in plastic and was subsequently disposed of ____________ (insert off-island, into main base landfill, recycled, etc.).

Response to Specific Comment 13: **The last sentence of the second paragraph of Section 2.5.3 will be revised to state that:**

"The drum was wrapped in plastic and was subsequently disposed of off-island."

Page 2-10, Second Paragraph. Same comment as above.

<u>**Response to Specific Comment 14**</u>: **The second paragraph of Page 2-11 will be revised to state that:**

"This drum was wrapped in plastic and was subsequently disposed of off-island."

Page 2-10, First Paragraph. The statement "the potential for exposure is unlikely" is not sufficient to explain why a hot spot of COCs found at a depth of 10 feet do not pose a risk. Either provide a conclusion from a risk assessment that the site wide risk is acceptable, or you may have to have an institutional control with a restriction against digging to that depth.

<u>**Response to Specific Comment 15**</u>; The fifth paragraph of Section 2.5.3 revised to read:

"As presented in Tables 2-4 and 2-5, three subsurface soil samples and a duplicate soil sample were collected from between 10 and 14 ft bgs, in the southwest corner Jill area of Parcel A (Figure 2-14). Benzo(a) pyrene (SVOCs by USEPA MethodSW8270) was detected in a single sample (AAFB04S19S030 at 140 µg/kg) at a concentration that exceeded the Residential PRG (56 µg/kg), but less than the Industrial PRG (360 µg/kg). This result was considered suspect as benzo(a) pyrene was not detected in the same sample using the more accurate USEPA Method SW8310, and benzo(a) pyrene was not detected in the duplicate sample (AAFB04S19S031D) using either Method SW8270 or SW8310. Manganese was detected in a single sample (AAFB04S19S023 at 7,090 mg/kg) at a concentration that exceeded the Residential PRG (3,120 mg/kg). However, this manganese concentration is just below the revised BTV of 7,100 mg/kg (EA, 2001). Total dioxin (Toxicity Equivalent Quotient [TEQ] by USEPA Method SW8290) was detected in subsurface soil sample AAFB04S19S023 (0.0164 µg/kg) at concentrations exceeding the Residential PRG (0.0038 µg/kg), but less than the industrial PRG (0.03 µg/kg). This TEQ concentration is considerably lower than the subsurface dioxin cleanup standard of 1.0 µg/kg established by the USAF, GEPA, and the OSWER directive (IT/OHM, 1999c), and no further action is required.

Page 2-10, Third Paragraph. What does impacted by dioxins mean. Is this above or below action levels. If this is above action levels, then the statement "at depths unlikely for potential exposure" is again not sufficient. If so, then either provide a conclusion from a risk assessment that the site wide risk is acceptable, provide an institutional control with a restriction against digging to that depth, or do the following. Move and edit the second paragraph down from this one up and explain that the agreement between EPA and the Air Force about dioxin concerns an EPA OSWER Directive (1998, number 9200.4-26) that says that dioxin cleanup levels should be 1 ppb in soil. The Air Force decided to be more conservative than the EPA cleanup level for near surface soils.

<u>**Response to Specific Comment 16**</u>; **The third sentence of the third paragraph of Page 2-11 will be revised to state that:**

"The subsurface fill area on the northern portion of Parcel B also included samples with dioxins at concentrations above the Residential PRG. As mentioned earlier, USEPA Method SW8280 was used for dioxin analysis during the initial subsurface soil sampling at Site 19. To compare the dioxin sample results of Method SW8280 and Method SW8290, one subsurface soil sample each was collected from the same locations in Parcel B as samples AAFB04S19S019 andAAFB04S19S032. These subsurface samples were analyzed for dioxins using Method SW8290. When comparing dioxin sample results of Method SW8280 and Method SW8290, Method SW8290 provided significantly lower RLs, below the respective Residential PRGs (Table 2-5). Subsequently, the USAF, GEPA, and the USEPA Region IX established the subsurface dioxin cleanup standard at 1.0 µg/kg and no cleanup for dioxins was necessary at Parcel B (IT/OHM, 1999c)."

Page 2-11, First Paragraph. Again, a statement like "Risks to groundwater ... are unlikely" is not sufficient. Its probably best to just delete this sentence.

<u>Response to Specific Comment 17</u>; **The last two sentences of Section 2.5.3 will be revised to state that:**

"As presented in Table 2-6, no VOCs, SVOCs, PAHs, pesticides/PCBs, or metals have been detected consistently in any of the samples collected from IRP-38 at concentrations above the MCLs or PRGs for tap water, with the exception of chromium. However, chromium is attributed to corrosion of the stainless steel piston pump and well screen and it is not believed to represent groundwater contamination."

Decision Summary, Section 2.5.2. The second-to-last paragraph in Section 2.5.2 (page 2-10), Site 19 Contaminant Characteristics, references an agreement between the USAF and USEPA Region IX related to the dioxin cleanup standard applied at the Harmon Annex. The sentence describing this agreement provides a reference to "USEPA, 1998." The only reference provided in Section 4, References, of the Draft ROD for USEPA, 1998 is a reference to the U.S. EPA Region IX Preliminary Remediation Goals. It seems that a references should be provided for OSWER Directive 9200.4-26, the April 13, 1998 directive from Tim Fields related to dioxin cleanup levels. Please revise Section 2.5.2 of the ROD to address this discrepancy.

<u>Response to Specific Comment 18</u>: **The reference to "(USEPA, 1998)" will be corrected to cite:**

"(IT/OHM, 1999b)"

Section 2.6. This entire section is confusing. The second paragraph on page 2-13 says that a risk assessment was performed for any residual COCs left behind, then a general overview of the RA process is provided in Section 2.6.1. However, Sections 2.6.3 and 2.6.4 say that no risk assessment was necessary. It might be better to end Section 2.6 with a statement that the sites were cleaned to meet either PRGs or to levels determined to be protective in a Risk Assessment. Then move directly to the individual site discussions beginning with Section 2.6.3.

<u>Response to Specific Comment 19</u>: Sections 2.6.1 and 2.6.2 will be omitted and the last paragraph of Section 2.6 will be revised to state that:

"To expedite the transfer of Harmon Annex sites to GovGuam, the USAF established conservative cleanup standards based on the stringent USEPA Region IX Residential PRGs. An Action Memorandum was developed and soils above the residential PRGs were removed except for one location, the PAHs at the buried drum area of Site 39. Based on a human health risk assessment, the residual PAH concentrations at the buried drum area resulted in acceptable risks to human health."

Page 2-17. In the first paragraph of the page, delete the two sentences "Therefore, no human ... using the stringent Residential PRGs". Change the second paragraph to: The cleanup of hot spots at Parcels A and C was proposed to protect human health from exposure to COCs. The Air Force selected the most stringent cleanup standards, those for Residential PRGs. Because all COCs were removed to meet the Residential PRGs, no risk assessment was necessary. The cleanup standards for Site 19 were: (Then continue on with the bullets).

<u>Response to Specific Comment 20</u>: The third paragraph of Page 2-15 will be omitted and the second paragraph will be revised to state that:

"The cleanup of hot spots at Parcels A and C was proposed to protect human health from exposure to COCs. Andersen AFB selected the most stringent cleanup standards, those for Residential PRGs. Because all COCs were removed to meet the Residential PRGs, no risk assessment was necessary. The cleanup standards for Site 19 were:"

Page 2-17. In the last two paragraphs, should the references to Site 39 really be Site 19.

<u>Response to Specific Comment 21</u>; The fourth sentence of the fourth paragraph of Page 2-15 and the sixth sentence of the last paragraph of Page 2-16 will be respectively revised to state that:

"After the completion of remedial actions, Site 19 was restored by backfilling the excavation pits using compacted clean fill materials."

"Another drum, with approximately 25 gallons of liquid, was consolidated and transported to the U.S. mainland for disposal as hazardous materials (IT/OHM, 1999b)."

Page 2-18, first Paragraph. Change the language for the composite samples to include the number of samples in the composite, i.e., a composite of X samples ...

<u>Response to Specific Comment 22</u>: The second and third sentences of the first complete paragraph of Page 2-16 will be revised to state that:

"One six-point composite confirmation sample was collected at 6 feet bgs. One four-point composite sample was also collected from the stockpiled soil."

Page 2-18, fourth Paragraph. Change the paragraph to read: "Based on analytical results from the 17 confirmation samples collected from the stockpiled soil, approximately 970 CY had acceptable lead and antimony concentrations. However, 530 CY of soil had lead concentrations exceeding the cleanup standard. The 530 CY ...".

<u>Response to Specific Comment 23</u>: The first and second sentences of the fourth complete paragraph of Page 2-16 will be revised to state that:

"Based on analytical results from 17 confirmation samples collected from the stockpiled soil, approximately 970 CY had acceptable lead and antimony concentrations. However, 530 CY of soil had lead concentrations exceeding the cleanup standards (Appendix B)."

Page 2-23, Section 2.7. Edit the first sentence to "... have been removed from these sites and the sites are already ...".

<u>Response to Specific Comment 24</u>; Section 2.7 will be revised to state that:

"The No Further Action alternative was selected for the Harmon Annex OU because all COCs have been removed from these sites and the sites are already in a protective state posing no current or future risks to human health and the environment."

Decision Summary, Section 2.7.3. The text in Section 2.7.3, No Further Action Alternative for Site 39, mentions residual dioxin remaining at the site and references the Risk Assessment that was conducted to assess residual risk related to this compound at this site. Following excavation activities described in Section 2.6.5, it seems that residual benzo(a) pyrene concentrations remain at IRP Site 39 in addition to dioxin. Section 2.7.3 does not mention that residual concentrations of this compound remain at IRP Site 39 nor does this section provide a reference to the risk assessment that supports leaving concentration of this compound in place at the site at levels exceeding the EPA Region IX PRGs. Please revise Section 2.7.3 of the ROD to address residual benzo(a) pyrene remaining at IRP Site 39.

<u>Response to Specific Comment 25</u>; The first sentence of the second paragraph of Section 2.7.3 will be revised to state that:

"Residual dioxin and benzo(a) pyrene risks remaining at the site are acceptable to human health and the environment in accordance with risk assessment results presented in Appendix C."

Page 2-24, Section 2.8. Change the phrase 'significant comments' to 'substantive comments'.

<u>Response to Specific Comment 26</u>: The second sentence of Section 2.8 will be revised to state that:

"Upon closure of the comment period, no substantive comments were received from either the public or the Territory of Guam."

Decision Summary, Table 2-16. Table 2-16 summarizes Applicable or Relevant and Appropriate Requirements (ARAR) for IRP Sites 19 and 39. This Table does not identify some of the following which appear to be ARARs for the site: Federal Safe Drinking Water Act Maximum Contaminant Levels (MCL); RCRA regulations on land disposal restrictions (LDRs) and on landfills; Toxic Substances Control Act (TSCA) requirements governing the management of asbestos containing materials such as the transite pipe removed from Parcel C at IRP Site 19 and PCB materials from the oil-water separator; GovGuam's listing the Micronesian Starling as endangered, as described in Section 2.6 of the Screening Ecological Risk Assessment contained in the RI Report for Harmon Annex; and ARARs that may have been considered related to the historic or archeological aspects of the IRP Sites. Please revise Table 2-16 to included these ARARs, to the extent they are applicable to the work described in the ROD. Also, RCRA is listed as a territorial ARAR. It should be listed as a Federal ARAR.

Response to Specific Comment 27; **Table 2-16 will be revised to expand the ARARs, as shown attached.**

ERRATA

1. **Declaration, Section 1.2.** The second line in the second paragraph in this section references a document as "(1989a)." Please revise this reference to indicate USEPA as the author of this referenced document.

Response to Errata 1: **The "(1989a)" will be replaced by "(USEPA, 1989a).**

2. **Decision Summary, Section 2.5.3.** In the fifth paragraph, sixth line, of Section 2.5.3, Site 39 Contaminant Characteristics, please delete the word "was" between the two sentences.

Response to Errata 2**: The sixth line of Section 2.5.4 will be revised as requested.**

3. **Decision Summary, Section 2.7.3.** The second paragraph of Section 2.7.3, Description of No Further Action Alternative, references Appendix B for the risk assessment. The risk assessment is presented in Appendix E. Please revise the Draft ROD to address this discrepancy.

Response to Errata 3**: The first sentence of the second paragraph of Section 2.7.3 will be revised to state that:**

"Residual dioxin and benzo(a) pyrene risks remaining at the site are acceptable to human health and the environment in accordance with risk assessment results presented in Appendix C."

4. **Decision Summary, Various Tables**. Tables 2-3, 2-4, 2-7, 2-8, and 2-9 contain incomplete screening references in the column headers. The "Screening Basis" columns reference "1998 USEPA IX Residential" and "1998 USEPA IX Industrial." These column headers apparently should reference " 1998 USEPA Region IX PRGs" for Residential and Industrial scenarios. A similar discrepancy may be seen in Table 2-11. Please revise the tables in the ROD to provide clear information in the column headers.

Response to Errata 4: The heading for Tables 2-3, 2-4, 2-7, 2-8, 2-9, and 2-11 will be corrected.

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Appendix A

Andersen Air Force Base
Administrative Record Index

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
27-Nov-96	**Administrative Record Index**	**LABAT-ANDERSON INCORPORATED**	**1**
01-Jun-84	**SOW, Phase I Records Search**	**HQ AFSEC/DEVP**	**2**
01-Aug-84	GEPA Letter to Base Regarding Landfill Closure Plan for Sites 01, 02, 03, 29, and 35	Branch, James B Guam Environmental Protection Agency	3
01-Mar-85	**Phase I, Record Search Report**	**Environmental Science and Engineering, Inc.**	**4**
30-May-85	**Base Letter to Governor of Guam Regarding Phase I Record Search**	**Sachse, Billy E, Col 43 CSG/CC**	**5**
05-Jun-85	**Newspaper Article, "Air Force Probes Waste Disposal- Sites"**	**The Pacific Daily News**	**6**
17-Jun-85	**Newspaper Article, "Dump Site Study to Sample Water"**	**The Pacific Daily News**	**7**
13-Aug-85	**GEPA Letter to Base Regarding Comments on Phase I Record Search**	**Branch, James B Guam Environmental Protection Agency**	**8**
18-Oct-85	**Base Letter to GEPA Regarding Phase II Presurvey Conference**	**Sachse, Billy E, Col 43 CSG/CC**	**9**
19-Mar-86	**Congressman Letter to Secretary of the Air Force Regarding Phase I Record Search**	**Synar, Mike Guam House of Representatives**	**10**
08-Apr-86	GEPA Letter to Base Regarding Landfill Closure Plan for Sites 01, 02, 03, 29, and 35	Branch, James B Guam Environmental Protection Agency	11
Sep-86	**Phase II, Technical Operations Plan, Confirmation/Quantification Survey**	**Battelle**	**12**
08-Oct-86	**EPA Region IX Letter to US General Accounting Office Regarding DoD Management of IRP and Phase I Record Search Comments**	**Takata, Keith EPA Region IX**	**13**
Dec-86	**RCRA Facility Assessment Report, Solid Waste Management Units**	**Science Applications International Corp.**	**14**
13-Mar-87	**GEPA Letter to Base Regarding SOW, Stage 1 Comments**	**Crisostomo, Charles Guam Environmental Protection Agency**	**15**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
19-May-87	GEPA letter to Base Regarding Site 01 Monitoring Wells	Crisostomo, Charles Guam Environmental Protection Agency	16
19-Jun-87	GEPA Letter to OEHL Regarding Sites 01, 02, and 03 Monitoring Wells	Crisostomo, Charles Guam Environmental Protection Agency	17
29-Feb-88	GEPA Letter to Base Regarding Landfill Closure Plan for Sites 01, 02, 03, 29, and 35	Crisostomo, Charles Guam Environmental Protection Agency	18
01-Jul-88	GEPA Letter to Guam Attorney General Regarding Legal Action for Landfill 5	Solivio, Rolando B Guam Environmental Protection Agency	19
11-Aug-88	**GEPA Letter to Base Regarding Comments on Draft Final Report, Apr 88**	**Crisostomo, Charles Guam Environmental Protection Agency**	**20**
17-Aug-88	GEPA Letter to Base Regarding Comments on Landfill Closure Plan Modification	Crisostomo, Charles Guam Environmental Protection Agency	21
30-Sep-88	GEPA Letter to Base Regarding Approval of Landfill Closure Plan Modification	Crisostomo, Charles Guam Environmental Protection Agency	22
30-Sep-88	GEPA Letter to Base Regarding Comments on Landfill Closure Plan Modification	Crisostomo, Charles Guam Environmental Protection Agency	23
01-Nov-88	Revised Landfill and Waste Pile Closure Plan	Battelle	24
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume I of VI**	**Battelle**	**25**
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume I of VI, Appendices A-G**	**Battelle**	**26**
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume II of VI, Appendix H-J**	**Battelle**	**27**
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume III of VI, Appendices K1-K2a**	**Battelle**	**28**
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume IV of VI, Appendix K2b**	**Battelle**	**29**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume IV of VI, Appendix K2c**	**Battelle**	**30**
01-Jan-89	**Phase II Stage 1, Final Confirmation/Quantification Report, Volume VI of VI, Appendices L-N**	**Battelle**	**31**
01-Jan-89	**Phase II Stage 2, Quality Assurance Project Plan**	**Battelle**	**32**
01-Jan-89	**Phase II Stage 2, Work Plan**	**Battelle**	**33**
09-Jan-89	**GEPA Letter to Base Regarding Comments on Phase II Stage 2 Health and Safety Plan**	**Crisostomo, Charles Guam Environmental Protection Agency**	**34**
09-Feb-89	GEPA Letter to Base Regarding Landfill Post Closure Permit	Castro, Fred M Guam Environmental Protection Agency	35
21-Feb-89	GEPA Letter to Base Regarding Comments on Landfill Modified Closure/Post Closure Plan	Castro, Fred M Guam Environmental Protection Agency	36
24-Feb-89	GEPA Letter to Base Regarding Comments on Landfill Post Closure Permit	Castro, Fred M Guam Environmental Protection Agency	37
24-Feb-89	**Newspaper Article, "Notice to Public"**	**The Pacific Daily News**	**38**
27-Mar-89	Base Letter to GEPA Regarding Modified Landfill Closure Plan	Green, Frederick L, Col 43 CSG/CC	39
03-Apr-89	GEPA Letter to Base Regarding Approval for Amended Modified Landfill Closure Plan	Castro, Fred M Guam Environmental Protection Agency	40
03-May-89	Base Letter to GEPA Regarding Exchange of Information and Comments on Landfill Closure Plan	Green, Frederick L, Col 43 CSG/CC	41
22-May-89	GEPA Letter to Base Regarding Comments in Base Letter of 3 May 89	Castro, Fred M Guam Environmental Protection Agency	42
25-May-89	**GEPA Letter to Base Regarding Groundwater Monitoring Comments in Base Letter of 3 May 89**	**Castro, Fred M Guam Environmental Protection Agency**	**43**
01-Jul-89	RCRA Post-Closure Permit Application, Sites 01, 02, 03, 29, and 35	Harding Lawson Associates	44
10-Aug-89	Base Letter to GEPA Regarding RCRA Post-Closure Permit Application	Green, Frederick L, Col 43 CSG/CC	45

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
20-Sep-89	GEPA Letter to Base Regarding Landfill Cover, Fence, and Test Results	Castro, Fred M Guam Environmental Protection Agency	46
31-Oct-89	Base Letter to GEPA Regarding Landfill Closure Cover and Test Results	Green, Frederick L, Col 633 ABW/CC	47
06-Nov-89	GEPA Letter to Base Regarding Comments for FTA and RCRA Landfill Closure Permit	Solivio, Rolando B Guam Environmental Protection Agency	48
22-Nov-89	GEPA Letter to Base Regarding Landfill Closure Plan	Solivio, Rolando B Guam Environmental Protection Agency	49
01-Dec-89	**Phase II Stage 2, Informal Technical Information Report, Vol I of III, Analytical Data**	**Science Applications International Corp.**	**50**
01-Dec-89	**Phase II Stage 2, Informal Technical Information Report, Vol II of III, Analytical Data**	**Science Applications International Corp.**	**51**
01-Dec-89	**Phase II Stage 2, Informal Technical Information Report, Vol III of III, Analytical Data**	**Science Applications International Corp.**	**52**
02-May-90	GEPA Letter to Base Regarding Fire Training Area 2	Castro, Fred M Guam Environmental Protection Agency	53
03-May-90	GEPA Letter to Base Regarding Comments on Approved Landfill Closure Plan	Castro, Fred M Guam Environmental Protection Agency	54
03-Aug-90	GEPA Letter to Base Regarding Fire Training Area 2 Concrete Cap	Castro, Fred M Guam Environmental Protection Agency	55
29-Aug-90	GEPA Letter to Base Regarding Landfill Closure Plan Deficiencies	Castro, Fred M Guam Environmental Protection Agency	56
13-Sep-90	Base Letter to GEPA Regarding Landfill Closure Plan Modification	DeGovanni, George, Col 633 ABW/CC	57
28-Sep-90	Base Letter to GEPA Regarding Landfill Closure Plan Modification	DeGovanni, George, Col 633 ABW/CC	58
03-Jan-91	GEPA Letter to Base Regarding Comments on Modified Landfill Closure Plan	Castro, Fred M Guam Environmental Protection Agency	59
04-Feb-91	**EPA Region IX Letter to Base Regarding Comments on Comprehensive Groundwater Monitoring Evaluation**	**EPA Region IX**	**60**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
14-Mar-91	GEPA Letter to Base Regarding Comments on Fire Training Area 2, "Decision for Remedial Action"	Castro, Fred M Guam Environmental Protection Agency	61
22-Mar-91	**Newspaper Article, "Air Force Continues Waste Sites Cleanup"**	**The Pacific Daily News**	**62**
28-Mar-91	Modified Landfill Closure Plan	Science Applications International Corp.	63
15-Apr-91	News Release, "Public Hearing for Modified Closure Plan on Base Landfill"	633 ABW/DEV	64
30-Apr-91	Base Letter to GEPA Regarding Negotiations for Modified Closure Plan for Base Landfill	DeGovanni, George, Col 633 ABW/CC	65
15-May-91	Public Hearing Meeting Minutes, 14 May 91	Mackey, Gary W 633 ABW/DEV	66
20-May-91	Base Letter to GEPA Regarding Requirements of Public Notification for Modification of the Closure Plan	Schauz, William G, LtCol 633 ABW/DE	67
24-May-91	Base Letter to EPA Region IX Regarding Cover Design for Modified Landfill Closure Plan and Stage 3 SAP	Schauz, William G, LtCol 633 ABW/DE	68
28-May-91	Base Letter to US Fish and Wildlife Service Regarding Consultation on Endangered Species Act, Landfill 2	Nault, Gary S 633 ABW/DEV	69
31-May-91	Base Letter to US Fish and Wildlife Service Regarding Consultation on Endangered Species Act for Topographic Survey, Landfill 2	Nault, Gary S 633 ABW/DEV	70
03-Jun-91	US Fish and Wildlife Service Letter to Base Regarding Consultation for Clearing Vegetation, Landfill 2	Smith, Robert P US Fish and Wildlife Service	71
06-Jun-91	US Fish and Wildlife Service Letter to Base Regarding Consultation on Endangered Species Act, Landfill 2	Smith, Robert P US Fish and Wildlife Service	72
08-Jul-91	GEPA Letter to Base Regarding Negotiated Modified Landfill Closure Plan	Brown, Joanne M Guam Environmental Protection Agency	73
16-Jul-91	**Base Letter to US Fish and Wildlife Service Regarding Consultation to Install 11 Boreholes**	**Nault, Gary S 633 ABW/DEV**	**74**
18-Jul-91	GEPA Letter to Base Regarding Approved Modifications for Landfill Closure Plan	Castro, Fred M Guam Environmental Protection Agency	75

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
26-Jul-91	**EPA Region VII Letter to EPA Region IX Regarding Review Comments for Stage 3, SAP**	**Baxter, Terry E EPA Region VII**	**76**
02-Aug-91	**EPA Region IX Letter to AFCEE-ESO/ER Regarding Comments for Exploratory Borehole Locations**	**Hagemann, Matthew EPA Region IX**	**77**
22-Aug-91	**US Fish and Wildlife Service Letter to Base Regarding Consultation for Endangered Mariana Crow and Mariana Fruit Bat, Landfill 2**	**Kramer, William R US Fish and Wildlife Service**	**78**
28-Aug-91	Base Letter to GEPA Regarding Alternative Cover Design for Landfill Cap	Schauz, William G, LtCol 633 ABW/DE	79
03-Sep-91	Base Letter to GEPA Regarding Using a Synthetic Cover for Landfill Cap	Schauz, William G, LtCol 633 ABW/DE	80
04-Sep-91	Base Letter to GEPA Regarding Comments on Modifications on Closure Plan for Landfill Area	DeGovanni, George, Col 633 ABW/CC	81
13-Sep-91	**Base Letter to GEPA Regarding Borehole Drilling**	**Trowbridge, Julia A 633 ABW/DE**	**82**
15-Sep-91	Documentation Report, Disposal Activities of Landfill 1 and 2	ICF Technology, Inc.	83
16-Sep-91	Base Letter to GEPA Requesting Amendment to Modified Closure Plan	Trowbridge, Julia A 633 ABW/DE	84
24-Sep-91	**GEPA Letter to Base Regarding Comments on Stage 3 SAP**	**Brown, Joanne M Guam Environmental Protection Agency**	**85**
24-Sep-91	**GEPA Letter to Base Regarding for Exploratory Borehole Locations**	**Brown, Joanne M Guam Environmental Protection Agency**	**86**
26-Sep-91	**Base Letter to GEPA Regarding Failure to Receive Review Comments on Phase II Stage 2 RI/FS Report**	**Trowbridge, Julia A 633 ABW/DE**	**87**
11-Oct-91	Newspaper Article, "Notice to the Public Regarding Availability of Amended Closure Item for Modified Closure Plan"	The Pacific Daily News	88
11-Oct-91	**Base Letter to EPA Region IX Regarding Review Comments on Proposal for Borehole Locations**	**Schauz, William G, LtCol 633 ABW/DE**	**89**
31-Oct-91	**GEPA Letter to Base Regarding Site Inspection for Borehole Activity**	**Castro, Fred M Guam Environmental Protection Agency**	**90**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Nov-91	**Groundwater Monitoring Plan**	**Science Applications International Corp.**	**91**
01-Dec-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol I of VI**	**Science Applications International Corp.**	**92**
01-Nov-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol II of VII, Appendices A and C-F**	**Science Applications International Corp**	**93**
01-Nov-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol III of VII, Appendix G1 (Part 1)**	**Science Applications International Corp**	**94**
01-Nov-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol IV of VII, Appendix G1 (Parts 2a-c)**	**Science Applications International Corp**	**95**
01-Nov-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol V of VII, Appendix G1 (Part 3)**	**Science Applications International Corp**	**96**
01-Nov-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol VI of VII, Appendix G2 (Parts la-b)**	**Science Applications International Corp**	**97**
01-Nov-91	**Phase II Stage 2, Final RI/FS Technical Report, Vol VII of VII, Appendix G2 (Parts 2a-b)- G5, H and K**	**Science Applications International Corp**	**98**
05-Nov-91	GEPA Letter to Base Regarding Modification Request for "Conceptual Design Report, Landfill Operable Unit Cap Design"	Castro, Fred M. Guam Environmental Protection Agency	99
03-Dec-91	GEPA Letter to Base Regarding Comments for Synthetic Cap, "Conceptual Design Report, Landfill Operable Unit Cap"	Brown, Joanne M Guam Environmental Protection Agency	100
13-Dec-91	GEPA Letter to Base Regarding Comments on 16 Sep 91 Letter Requesting Amendment for Modified Landfill Closure Plan	Brown, Joanne M Guam Environmental Protection Agency	101
13-Dec-91	**SOW, RI/FS Stage 3, Part U**	**AFCEE/ESR**	**102**
23-Dec-91	Base Letter to GEPA Regarding Placing Topsoil Cover on Site 27	Schauz, William G, LtCol 633 ABW/DE	103
01-Jan-92	RI/FS Stage 3, Final Landfill Unit Work Plan	ICF Kaiser Engineers	104
14-Jan-92	Base Letter to GEPA Regarding Alternative Cover Designs for Landfill Cap, Site 02	Schauz, William G, LtCol 633 ABW/DE	105
14-Jan-92	Base Letter to GEPA Regarding Transmittal of Draft Design Drawings, Specifications, and Correspondence for Alternative Cover Designs and Comments for Landfill Cap, Site 02	Schauz, William G, LtCol 633 ABW/DE	106

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
22-Jan-92	GEPA Letter to Base Regarding Comments on Field Sampling Plan for Landfill 2 Test Pits and Background Soil Samples	Castro, Fred M Guam Environmental Protection Agency	107
06-Feb-92	**Newspaper Article, "Notice to Public Regarding Andersen AFB Proposed Placement on the NPL"**	**The Pacific Daily News**	**108**
27-Feb-92	**Base Letter to GEPA Regarding Boreholes Drilling and Sampling Analysis**	**Schauz, William G, LtCol 633 ABW/DE**	**109**
01-Mar-92	Groundwater Dye Tracing Study, SAP	ICF Kaiser Engineers	110
17-Mar-92	SOW, RI/FS Stage 3 and FTA Cover	AFCEE/ERS	111
01-Apr-92	Geologic and Hydrogeologic Report of Landfill Complex	ICF Kaiser Engineers	112
07-Apr-92	**US Fish and Wildlife Service Letter to Base Regarding Consultation for Surveying Sampling Site and Drilling Wells**	**Kramer, William R US Fish and Wildlife Service**	**113**
22-Apr-92	GEPA Letter to Base Regarding Comments on Groundwater Dye Tracer Study	Castro, Fred M Guam Environmental Protection Agency	114
15-May-92	**US Fish and Wildlife Service Letter to Base Regarding Consultation to Define and Locate Landfill Boundaries, Fill Trenches, and Conduct Topographical Survey**	**Smith, Robert P US Fish and Wildlife Service**	**115**
19-Jun-92	**US Fish and Wildlife Service Letter to Base Regarding Consultation Comments to Define and Locate Landfill Boundaries, Fill Trenches, and Conduct Topographical Survey**	**Kramer, William R US Fish and Wildlife Service**	**116**
30-Jul-92	SOW, Landfill 5 Cap	AFCEE/ESR	117
01-Aug-92	**Fact Sheet, "Environmental Cleanup at Andersen Air Force Base"**	**633CES/DEV**	**118**
06-Oct-92	**JACE Letter to EPA Region IX Regarding Andersen AFB CERCLA Federal Facility Agreement, Remaining Issues**	**Swenson, Raymond T, LtCo Air Force Legal Services Agency, Regional Counsel (JACE)**	**119**
07-Oct-92	**EPA Region IX Letter to HQ PACAF/DE Regarding Andersen AFB CERCLA Federal Facility Agreement**	**Anderson, Julie EPA Region IX**	**120**
19-Oct-92	**Guam Attorney General Letter to SAF/ESO Regarding Federal Facility Agreement**	**Barrett-Anderson, Elizabeth Guam Attorney General**	**121**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
18-Dec-92	**SOW, RI/FS, OU-4**	**AFCEE/ESR**	**122**
29-Jan-93	**Federal Facility Agreement: EPA Region IX, GEPA, and USAF**	**EPA Region IX**	**123**
01-Mar-93	EE/CA, OU-1, Landfill 5	ICF Technology, Inc.	124
01-**Mar-93**	**RI/FS, Health and Safety Plan, OU-1**	**ICF Technology, Inc.**	**125**
15-Mar-93	EPA Region IX Letter to Base Regarding Comments on Draft Final Work Plans and SAPs for OU-2 and OU-3	Levine, Herbert EPA Region IX	126
15-Mar-93	EPA Region IX Letter to Base Regarding Comments on EE/CA for Landfill 5 and CRP	Levine, Herbert EPA Region IX	127
01-Apr-93	Landfill 5 Cap Construction, Site Safety and Health Plan	Hensel-Phelps Construction Co. Woodward-Clyde	128
01-Apr-93	Landfill 5 Cap Construction, Erosion Control Plan	Hensel-Phelps Construction Co. Woodward-Clyde	129
01-Apr-93	Landfill 5 Cap Construction, Sampling and Analysis Plan	Hensel-Phelps Construction Co. Woodward-Clyde	130
06-Apr-93	TRC Meeting Agenda, 06 Apr 93	633 CES/DEV	131
07-Apr-93	GEPA Letter to Base Regarding Comments on EE/CA for Landfill 5	Castro, Fred M Guam Environmental Protection Agency	132
01-May-93	Landfill 5 Cap Construction, Construction Quality Plan	Hensel-Phelps Construction Co. Woodward-Clyde	133
15-May-93	Newspaper Article, "Public Notice for EE/CA, Landfill 5"	The Pacific Daily	134
22-Apr-93	**GEPA Letter to Base Regarding Comments on CRP**	**News Castro, Fred M Guam Environmental Protection Agency**	**135**
01-May-93	Fact Sheet, "Landfill 5 Removal Action at Andersen Air Force Base"	633 CES/DEV	136
10-May-93	GEPA Letter to Base Regarding Comments on EE/CA, Technical Specifications, Construction Quality Plan, and Sampling and Analysis Plan for Landfill 5	Castro, Fred M Guam Environmental Protection Agency	137

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
12-May-93	GEPA Letter to Hansel Phelps Construction Co. Regarding Comments on Clearing and Grading of Landfill 5	Castro, Fred M Guam Environmental Protection Agency	138
12-May-93	TRC Meeting Minutes, 12 May 93	Stanfill, Ronnie A, Col 633 ABW/CV	139
28-May-93	Base Letter to GEPA Regarding Revised Landfill 5 Cap Construction Quality Plan (CQP) and Comments on GEPA's CQP and SAP Comments	Poland, Joan 633 CES/DEV	140
01-Jun-93	Technical Specifications, Landfill 5 Cap Design	ICF Technology, Inc.	141
01-Jun-93	**RI/FS, Expanded Source Investigation Work Plan, OU-6**	**ICF Technology, Inc.**	**142**
21-Jun-93	**US Fish and Wildlife Service Letter to Base Regarding Reinitiation of Endangered Species Act Section 7 Consultation 1-2-92-F-08, Landfills**	**Smith, Robert P.** **US Fish and Wildlife Service**	**143**
28-Jun-93	GEPA Letter to Base Regarding Comments for Landfill 5 Cap Construction Quality Plan, Technical Specifications, and Sampling and Analysis Plan	Wuerch, Victor Guam Environmental Protection Agency	144
15-Jul-93	**EPA Region IX Letter to Base Regarding Comments for Expanded Source Investigation Work Plan**	**Levine, Herbert** **EPA Region IX**	**145**
19-Jul-93	**GEPA Letter to Base Regarding Comments on Expanded Source Investigation Work Plan**	**Wuerch, Victor** **Guam Environmental Protection Agency**	**146**
29-Jul-93	Informal Technical Information Report, Title II Services, Landfill 5 Cap	Jacobs Engineering Group Inc.	147
23-Aug-93	**SOW, RI/FS, OU-6**	**AFCEE/ESR**	**148**
26-Aug-93	**EPA Region IX Letter to Base Regarding Comments for OU-6 Basewide Work Plan and SAP**	**Levine, Herbert** **EPA Region IX**	**149**
01-Sep-93	**Basewide Health and Safety Plan, OU-6**	**ICF Technology, Inc.**	**150**
07-Sep-93	**GEPA Letter to Base Regarding Comments for RI/FS, Basewide Work Plan and SAP, OU-6**	**Wuerch, Victor** **Guam Environmental Protection Agency**	**151**
07-Oct-93	**EPA Region IX Letter to Base Regarding Comments For RI/FS, Work Plan and SAP, OU-2**	**Levine, Herbert** **EPA Region IX**	**152**
29-Oct-93	**RPM Meeting Minutes, 8-10 Sept 93**	**Poland, Joan** **633 CES/CEVR**	**153**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Nov-93	**RI/FS, Health and Safety Plan, OU-1**	**ICF Technology, Inc.**	**154**
01-Nov-93	**RI/FS, Health and Safety Plan, OU-2**	**ICF Technology, Inc.**	**155**
01-Nov-93	**RI/FS, Health and Safety Plan, OU-3**	**ICF Technology, Inc.**	**156**
01-Nov-93	**RI/FS, Health and Safety Plan, OU-4**	**ICF Technology, Inc.**	**157**
01-Nov-93	**RI/FS, Health and Safety Plan, OU-5**	**ICF Technology, Inc.**	**158**
01-Nov-93	**Community Relations Plan**	**ICF Technology, Inc.**	**159**
04-Nov-93	EPA Region IX Letter to Base Regarding Comments for RI/FS, Work Plan and SAP, OU-3	Levine, Herbert EPA Region IX	160
01-Dec-93	Landfill 5 Cap Construction, Certification of Closure Report	Hensel-Phelps Construction Co. Woodward-Clyde	161
01-Dec-93	Landfill 5 Cap Construction, Operation and Maintenance Manual	Hensel-Phelps Construction Co. Woodward-Clyde	162
06-Dec-93	**EPA Region IX Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-1**	**Levine, Herbert EPA Region IX**	**163**
16-Dec-93	GEPA Letter to Base Regarding Comments on RI/FS Basewide Work Plan and SAP, OU-6	Wuerch, Victor Guam Environmental Protection Agency	164
01-Jan-94	**Fact Sheet, "TRC Update"**	**633 CES/CEVR**	**165**
01-Jan-94	Final Inspection Report, Landfill 5 Cap	Jacobs Engineering Group Inc.	166
07-Jan-94	Base Letter to EPA Region IX Regarding Base Comments on RI/FS Work Plan, OU-2	633 CES/CEVR	167
11-Jan-94	**EPA Region IX Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-4**	**Levine, Herbert EPA Region IX**	**168**
13-Jan-94	EPA Region IX Letter to Base Regarding Comments on RI/FS Basewide SAP, OU-6	Levine, Herbert EPA Region IX	169
21-Jan-94	**GEPA Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-1**	**Wuerch, Victor Guam Environmental Protection Agency**	**170**
01-Feb-94	RI/FS, Landfill 2 Cap Construction, Cost Evaluation Report	ICF Technology, Inc.	171

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Feb-94	Final Landfill 5 Cap Construction Report	Hensel-Phelps Construction Co. Woodward-Clyde	172
01-Feb-94	**RI/FS, Natural Resource Survey Report, Vol I of II**	**ICF Technology, Inc.**	**173**
01-Feb-94	**RI/FS, Natural Resource Survey Report, Vol II of II**	**ICF Technology, Inc.**	**174**
01-Feb-94	Fact Sheet, "Dye Tracer Project Near Completion"	Guam Coastal Management Program	175
08-Feb-94	EPA Region IX Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-5	Levine, Herbert EPA Region IX	176
17-Feb-94	**GEPA Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-4**	**Wuerch, Victor Guam Environmental Protection Agency**	**177**
18-Feb-94	GEPA Letter to Base Regarding Comments on RI/FS Work Plan, OU-3	Levine, Herbert Guam Environmental Protection Agency	178
21-Mar-94	GEPA Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-5	Wuerch, Victor Guam Environmental Protection Agency	179
07-Apr-94	**TRC Meeting Minutes, 17 Feb 94**	**Stanfill, Ronnie A, Col 633 ABW/CV**	**180**
14-Apr-94	**SOW, RI/FS, OU-6**	**AFCEE/ERD**	**181**
10-May-94	Base Letter to GEPA Regarding Landfill Complex Dye Trace Project Sampling	Poland, Joan 633 CES/CEVR	182
01-Jun-94	SOW, RI/FS, OU-3	AFCEE/ERD	183
23-Jun-94	**EPA Region IX Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-4**	**Levine, Herbert EPA Region IX**	**184**
01-Jul-94	Final Geologic and Hydrogeologic Report, Landfill Complex	ICF Technology, Inc.	185
25-Jul-94	**GEPA Letter to Base Regarding Comments on RI/FS Work Plan and SAP, OU-4**	**Wuerch, Victor Guam Environmental Protection Agency**	**186**
02-Aug-94	SOW, RI/FS, OU-3	AFCEE/ERD	187
01-Sep-94	RI/FS, Final Sampling and Analysis Plan Addendum, OU-3	ICF Technology, Inc.	188

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Sep-94	RI/FS, Final Work Plan Addendum, OU-3	ICF Technology, Inc.	189
01-Sep-94	RI/FS/RD, Data Summary, Conclusions, and Recommendations for Initial RI Activities at Landfill 29, War Dog Borrow Pit, and Waste Pile 6	ICF Technology, Inc.	190
09-Sep-94	**SOW, RI/FS, Mod 1 for OU-2**	**AFCEE/COR**	**191**
01-Oct-94	**RI/FS, Final Sampling and Analysis Plan Addendum, OU-2**	**ICF Technology, Inc.**	**192**
01-Oct-94	**RI/FS, Final Work Plan Addendum, OU-2**	**ICF Technology, Inc.**	**193**
01-Oct-94	RI/FS, Informal Technical Information Report Ecological Habitat Survey of OU-3	ICF Technology, Inc.	194
01-Oct-94	**RI/FS, Final Sampling and Analysis Plan Addendum, OU-4**	**ICF Technology, Inc.**	**195**
01-Oct-94	**RI/FS, Final Work Plan Addendum, OU-4**	**ICF Technology, Inc.**	**196**
01-Oct-94	RI/FS, Final Sampling and Analysis Plan Addendum, OU-5	ICF Technology, Inc.	197
01-Oct-94	RI/FS, Final Work Plan Addendum, OU-5	ICF Technology, Inc.	198
19-Oct-94	SOW, RI/FS, OU-5	AFCEE/ESR	199
01-Nov-94	**RI/FS, Final Sampling and Analysis Plan Addendum, OU-1**	**ICF Technology, Inc.**	**200**
01-Nov-94	**RI/FS, Final Work Plan Addendum, OU-1**	**ICF Technology, Inc.**	**201**
11-Nov-94	**SOW, RI/FS/RD, Test Pit and Test Trench Excavations**	**AFCEE/ERS**	**202**
29-Nov-94	**TRC Meeting Minutes, 07 Nov 94**	**Saunders, Ralph S, Jr, Col 633 ABW/CC**	**203**
01-Jan-95	**Fact Sheet, "Andersen Air Force Base's Environmental Investigation"**	**633 CES/CEVR**	**204**
01-Jan-95	**RI/FS, Final Basewide Sampling and Analysis Plan, OU-6**	**ICF Technology, Inc**	**205**
01-Jan-95	**RI/FS, Final Basewide Work Plan, OU-6**	**ICF Technology, Inc**	**206**
11-Jan-95	Meeting Minutes for Telephone Conference with Base, GEPA, and EPA Region IX Regarding Monitoring Well Pumps, OU-2	ICF Technology, Inc	207

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Feb-95	RI/FS/RD, Final Groundwater Dye Trace Program and Well Cluster Proposal for the Landfill Area	ICF Technology, Inc.	208
03-Feb-95	RI/FS/RD, Data Summary, Conclusions, and Recommendations for Initial RI Activities at Waste Pile 7, Waste Pile 5, and MARBO Laundry	ICF Technology, Inc.	209
15-Feb-95	**RAB Meeting Minutes, 15 Feb 95**	**633 CES/CEVR**	**210**
24-Feb-95	**RPM Meeting Minutes, 15-16 Feb 95**	**633 CES/CEVR**	**211**
09-Mar-95	**EPA Region IX Letter to Base Regarding Comments on Draft Groundwater Monitoring Plan**	**Schutz, Michelle EPA Region IX**	**212**
10-Mar-95	SOW, RI/FS, OU-1	AFCEE/ESR	213
20-Mar-95	RI/FS/RD, Data Summary, Conclusions, and Recommendations for Initial RI Activities at Relocated Waste Pile 6 and Relocated Landfill 29	ICF Technology, Inc.	214
24-Mar-95	**RAB Meeting Minutes, 24 Mar 95**	**Saunders, Ralph S, Jr, Col 633 ABW/CC**	**215**
24-Mar-95	**SOW, RI/FS, OU-6**	**AFCEE/ESR**	**216**
06-Apr-95	**EPA Region IX Letter to Base Regarding Comments on RI/FS Base Background Soil Field Sampling Plan**	**Schutz, Michelle EPA Region IX**	**217**
20-Apr-95	**RAB Meeting Minutes, 20 Apr 95**	**Saunders, Ralph S, Jr, Col 633 ABW/CC**	**218**
01-May-95	SOW, RI/FS, OU-1	AFCEE/ESR	219
08-May-95	Base Letter to GEPA Regarding Comments on Drilling Pilot Holes	Poland, Joan 633 CES/CEVR	220
18-May-95	**RAB Meeting Minutes, 18 May 95**	**Saunders, Ralph S, Jr, Col 633 ABW/CC**	**221**
19-May-95	RI/FS/RD, Soil Gas Results, Conclusions, and Recommendations Report, OU-3	ICF Technology, Inc.	222
22-May-95	**RPM Meeting Minutes, 19-22 May 1995**	**633 CES/CEVR**	**223**
24-May-95	Newspaper Article, "Putting the Lid on an Old Problem"	633 CES/CEVR	224
26-May-95	GEPA Letter to Base Regarding Comments on Monitoring Wells Report, MARBO	Wuerch, Victor Guam Environmental Protection Agency	225
01-Jun-95	**RI/FS, Basewide Health and Safety Plan, OU-6**	**EA Engineering, Science and Technology**	**226**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
06-Jun-95	**EPA Region IX Letter to Base Regarding Comments on Draft Groundwater Monitoring Plan**	**Schutz, Michelle EPA Region IX**	**227**
22-Jun-95	EPA Region IX Letter to Base Regarding Comments for Soil Gas Results, Conclusions, and Recommendations for OU-3	Schutz, Michelle EPA Region IX	228
29-Jun-95	SOW, EE/CA for FTA 2 and Landfill 9 in OU-4	AFCEE/ESR	229
20-Jul-95	SOW, RI/FS/RD, OU-3	AFCEE/ERD	230
21-Jul-95	Base Letter to EPA Region IX Regarding Responses to EPA Comments on Soil Gas Results, Conclusions, and Recommendations Report for OU-3	633 CES/CEVR	231
24-Jul-95	GEPA Letter to Base Regarding Comments on Soil Gas Results, Conclusions, and Recommendations Report for OU-3	Wuerch, Victor Guam Environmental Protection Agency	232
08-Aug-95	**GEPA Letter to Base Regarding Comments on Draft Groundwater Monitoring Plan**	**Wuerch, Victor Guam Environmental Protection Agency**	**233**
23-Aug-95	**SOW, Third-Party Data Validation**	**AFCEE/COR**	**234**
18-Sep-95	**Base Letter to EPA Region IX Requesting Modification to Testing Methods Specified in QAPP**	**Poland, Joan 633 CES/CEVR**	**235**
01-Oct-95	**RI/FS/RD, Final Groundwater Monitoring Plan**	**ICF Technology, Inc.**	**236**
01-Oct-95	**RI/FS, Final Basewide Health and Safety Plan**	**EA Engineering, Science and Technology**	**237**
11-Oct-95	**EPA Region IX Letter to Base Regarding Comments on QAPP**	**Schutz, Michelle EPA Region IX**	**238**
12-Oct-95	**RAB Meeting Minutes, 12 Oct 95**	**Jaroch, Victor D, Col 36 ABW/CV**	**239**
15-Nov-95	Base Letter to EPA Region IX Regarding Responses to Comments on Soil Gas Results, Conclusions, and Recommendations Report for OU-3	Poland, Joan 36 CES/CEVR	240
01-Dec-95	Final Management Action Plan	EA Engineering, Science and Technology	241
29-Jan-96	RI/FS, Data Summary, Conclusions, and Recommendations for Initial RI Activities at Waste Pile 3	ICF Technology, Inc.	242

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Feb-96	**RI/FS, Final Records Search**	**ICF Technology, Inc.**	**243**
06-Feb-96	EPA Region IX Letter to Base Regarding Comments on Media Sample Data Report, OU-3	Schutz, Michelle EPA Region IX	244
15-Feb-96	**RAB Meeting Minutes, 15 Feb 96**	**Jaroch, Victor D, Col 36 ABW/CV**	**245**
16-Feb-96	**RPM Meeting Minutes, 15-16 Feb 96**	**36 ABW/CV**	**246**
22-Mar-96	GEPA Letter to Base Regarding Responses to GEPA Comments on Soil Gas Results, Conclusions, and Recommendations Report for OU-3	Wuerch, Victor Guam Environmental Protection Agency	247
01-Apr-96	**RI/FS/RD, Groundwater Elevations and Water Level Map, Informal Technical Information Report, MARBO Annex and Harmon Annex, Vol I of II**	**ICF Technology, Inc**	**248**
01-Apr-96	**RI/FS/RD, Groundwater Elevations and Water Level Map, Informal Technical Information Report, North And Northwest Fields, Vol II of II**	**ICF Technology, Inc**	**249**
26-Jun-96	**RAB Meeting Minutes, 16 May 96**	**Jaroch, Victor D, Col 36 ABW/CV**	**250**
26-Jun-96	SOW, EE/CA, Landfills 21, 23 and 26, Hazardous Waste Storage Area 1, and Waste Pile 4, OU-4	AFCEE/COR	251
04-Mar-96	SOW, EE/CA, Landfills 14, 15, and 16, and PCB Storage Area	AFCEE/COR	252
12-Jan-96	**SOW, RI/FS, OU-2**	**AFCEE/ERD**	**253**
01-Sep-93	**EPA Superfund Technical Assistance Grants Fact Sheet**	**HQ USEPA**	**254**
19-Apr-01	**Newspaper Article, "Andersen Landfill Waiting for Cleanup"**	**The Pacific Daily News**	**255**
15-Oct-92	**Newspaper Article, "EPA Puts Andersen on Superfund Priority List"**	**The Pacific Daily News**	**256**
16-Oct-92	**Newspaper Article, "Andersen is Named to Superfund"**	**Tropic Topics**	**257**
16-Oct-92	**Newspaper Article, "Andersen Cleanup Contract Awaits Agreement" News**	**The Pacific Daily**	**258**
01-Jul-94	**Base Newsletter, Jul 94**	**633 CES/CEVR**	**259**
20-Jul-95	**EPA Region IX Letter to Base Regarding Review of Purge/Stablization Test for Groundwater Monitoring Wells**	**Schutz, Michelle EPA Region IX**	**260**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
03-Aug-95	EPA Region IX Letter to Base Regarding Response to Comments of Purge Stablization Test	Schutz, Michelle EPA Region IX	261
14-Nov-95	Base Letter to EPA Region IX Regarding Proposed Landfill Groundwater Monitoring Well Network	Poland, Joan 36 CES/CEVR	262
08-Feb-96	GEPA Letter to Base Regarding Review of Draft Media Sample Data Report, OU-3	Wuerch, Victor Guam Environmental Protection Agency	263
29-Aug-96	GEPA Letter to Base Regarding Review Comments on RI, OU-3	Wuerch, Victor Guam Environmental Protection Agency	264
17-Sep-96	**RAB Meeting Minutes, 15 Aug 96**	**Jaroch, Victor D, Co** **36 ABW/CV**	**265**
31-Oct-96	**RPM Meeting Minutes, 24-25 Sep-96**	**36 CES/CEVR**	**266**
06-Apr-93	**Newspaper Article, "Chamoru Nation Seeks U.S. Help in Local Cancer Study" News**	**The Pacific Daily**	**267**
10-Jul-92	**Base Newspaper Article, " Community Relations Vital for Environmental Program"**	**Poland, D. Joan** **633 CES**	**268**
10-Nov-92	Newspaper Article, "Angel Santos Stakes Claim to Land" Pacific Daily News	Brooks, Donovan	269
14-May-93	**News Release, "Public Notice, Schedule of Proposed Deadlines for Completion of Draft Primary Documents: Work Plan, Sampling & Analysis Plan, RI Report, Feasibility Report, Proposed Plan, & ROD"**	**Pacific Daily News**	**270**
23-Mar-94	**Letter from Atty Peter Sgro, Jr., to Base Regarding Elevated Levels of Cadmium and Lead; Failure to Adhere to Quality Control & Quality Assurance of Drinking Water & Necessity for Public Hearings**	**Sgro, Jr., Peter R.** **Atty-At-Law**	**271**
19-Jul-94	GEPA Fax to Base Regarding Approval of the Reseeding of LF-5 GEPA	Damian, Francis	272
09-Aug-94	Fax Documents to Base Concerning Fact Sheet from Atty Peter Sgro, Jr., on the EE/CA for LF-5 Community Relations Plan & Letter to PUAG & GEPA	Sgro, Jr., Peter R. Atty-At-Law	273
01-Feb-95	**Fact Sheet, "Andersen AFB Restoration Advisory Board (RAB)"**	**36 CES/CEVR**	**274**
21-Mar-95	**Installation Restoration Program Site Tour**		**275**
18-May-95	**RAB Charter Revisions**	**36 CES/CEVR**	**276**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
26-Sep-95	**RAB Letter Concerning Trichloroethylene Contamination**	**Brown, Joanne M. Senator, Guam Legislature**	**277**
06-Jan-96	**USEPA Region IX Letter to Base Regarding Comments on the Basewide QAPP**	**Schutz, Michelle USEPA Region IX**	**278**
01-Apr-96	**Newsletter Article, "Air Force Plans the Installation of Air Stripper"**		**279**
01-Aug-96	**Newspaper Article, "Harmon Cliffline Permits Revoked"**	**Sterne, Bernadette Pacific Daily News**	**280**
19-Aug-96	Base Letter to GEPA Regarding Transmittal of Copies of the Draft OU-3 Feasibility Study Report	Poland, D. Joan 36 CES/CEVR	281
22-Aug-96	USEPA Region IX Letter to Base Regarding Comments on the OU-3 RI Report	Schutz, Michelle USEPA Region IX	282
23-Aug-96	GEPA Letter to Base Regarding Extension for Review of the OU-3 RI Report	Wuerch, H. Victor GEPA	283
30-Aug-96	**Newsletter Article, "Defense Cleanup"**	**Pasha Publication**	**284**
18-Sep-96	Base Fax to USEPA Region IX Fax to Base Regarding Second Attempt to Drill Hole in IRP 52a Well	Ikehara, Gregg N. 36 CES/CEVR	285
04-Oct-96	**USEPA Region IX Letter to GEPA Regarding Reported Drums Located on Marine Drive, Guam**	**Burnett, Bryant K. USEPA Region IX**	**286**
11-Oct-96	**Base Letter to Guam Governor Requesting AF Reconsidering Revocation of Harmon Cliffline Permit**	**Deloney, John M. Colonel, USAF 36 ABW/CC**	**287**
15-Oct-96	Base Letter to GEPA Regarding Transmittal of Copies of Draft NFRAP for IRP Site 7/LF-9	Poland, D. Joan 36 CES/CEVR	288
15-Oct-96	Base Letter to USEPA Region IX Regarding Transmittal of Copies of Draft NFRAP for IRP Site 7/LF-9	Poland, D. Joan 36 CES/CEVR	289
16-Oct-96	News Article, "Landowners Threaten Forcible Eviction"	Loerzel, Adrienne Pacific Daily News	290
21-Oct-96	USEPA Region IX Letter to Base Regarding Comments on the OU-3 Focused Feasibility Study Report	Schutz, Michelle USEPA Region IX	291
22-Oct-96	GEPA Letter to Base Regarding Comments on the OU-3 Focused Feasibility Study Report	Wuerch, H. Victor GEPA	292
23-Oct-96	**Newspaper Article, "Well Contamination Needs Close Scrutiny"**	**(Editorial) Pacific Daily News**	**293**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
29-Oct-96	**Base Letter to GEPA Regarding Transmittal of Copies of the Consensus Statement and the Revised Primary Document Deadlines**	**Poland, D. Joan 36 CES/CEVR**	**294**
29-Oct-96	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Consensus Statement and the Revised Primary Document Deadlines**	**Poland, D. Joan 36 CES/CEVR**	**295**
29-Oct-96	**Water Issues Between the Air Force & Public Utilities Agency of Guam**	**Quintanilla, R. PUAG**	**296**
01-Nov-96	Base Letter to GEPA Regarding Transmittal of Copies of the Draft OU-2 RI Report & Appendices	Poland, D. Joan 36 CES/CEVR	297
15-Nov-96	Extended Draft Final RI Report for OU-3, MARBO & Updated Risk Assessment Concurrence	Wuerch, H. Victor Guam EPA	298
21-Nov-96	**RAB Meeting Minutes, 21 Nov 96**	**EA Engineering**	**299**
01-Dec-96	OU-3, Remedial Investigation Report Vol 1 - Text, Final	ICF Technology	300
01-Dec-96	OU-3, Remedial Investigation Report Vol 2 - Appendices A through D, Final	ICF Technology	301
01-Dec-96	OU-3, Remedial Investigation Report Vol 3 - Appendix E, Final	ICF Technology	302
01-Dec-96	OU-3, Remedial Investigation Report Vol 4 - Appendices F-l through F-7, Final	ICF Technology	303
01-Dec-96	OU-3, Remedial Investigation Report Vol 5 - Appendices F-8 through J, Final	ICF Technology	304
09-Dec-96	**RPM Meeting Minutes, 21-22 Nov 96**	**EA Engineering**	**305**
02-Dec-96	**Revised Risk Assessment Procedures**	**Schutz, Michelle USEPA Region IX**	**306**
02-Dec-96	EPA Region IX Comments on Draft Final NFRAP for IRP Site 7/LF-9	Schutz, Michelle USEPA Region IX	307
05-Dec-96	**Amend Deadlines on Federal Facilities Agreement**	**Schutz, Michelle USEPA Region IX**	**308**
09-Dec-96	Newspaper Article, "Asphalt from Bellows Pit Recycled for Isle Potholes"	Honolulu Star Bulletin	309
17-Dec-96	GEPA Fax to Base Regarding Review & Approval of Draft Final NFRAP for IRP Site 7/LF-9	Wuerch, H. Victor GEPA	310

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
18-Dec-96	**USEPA Region IX Letter to Base Regarding Procedure for Completion & Deletion of National Priorities List Sites**	**Schutz, Michelle USEPA Region IX**	**311**
19-Jun-05	**Article, "Community Involvement in Guam Helps Save More than $175,000"**	**Bureau of Planning Man, Land & Sea**	**312**
01-Jan-97	OU-3, Focused Feasibility Study Report, Final	ICF Technology	313
01-Jan-97	Final NFRAP for IRP Site 7/LF-9	EA Engineering	314
01-Jan-97	Fact Sheet, "Technology: Air Stripping"	36 CES/CEVR	315
06-Jan-97	USEPA Region IX Letter to Base Requesting Extension to the Comment Period for OU-2, RI Report, MARBO Annex	Ripperda, Mark USEPA Region IX	316
08-Jan-97	USEPA Region IX Letter to Base & GEPA Regarding 30 Day Extension to Review Draft Final OU-3 RI Report	Schutz, Michelle USEPA Region IX	317
09-Jan-97	USEPA Region IX Letter to Base Regarding Review of the Draft RI Report for OU-2 MARBO Annex	Ripperda, Mark USEPA Region IX	318
09-Jan-97	**Base Letter to RAB Members Regarding Transmittal of Quarterly RAB Meeting Minutes, 21 Nov 96**	**Jaroch, Victor D. Colonel, USAF 36 ABW/CV**	**319**
23-Jan-97	**Base Letter to RAB Members Regarding Next Quarterly RAB Meeting**	**Jaroch, Victor D. Colonel, USAF 36 ABW/CV**	**320**
24-Jan-97	GEPA Letter to Base Regarding Comments on the Draft RI Report for OU-2	Wuerch, H. Victor GEPA	321
27-Jan-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final OU-3 (MARBO Annex) Feasibility Study Report	Poland, D. Joan 36 CES/CEVR	322
27-Jan-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final OU-3 (MARBO Annex) Feasibility Study Report	Poland, D. Joan 36 CES/CEVR	323
29-Jan-97	**USEPA Region IX Letter to Base Regarding Response to Review & Amendment of QAPP for Federal Facility Cleanup Sites**	**Opalski, Dan USEPA Region IX**	**324**
29-Jan-97	**Base Letter to GEPA Regarding Transmittal of Copies of the Final Revised Standard Operating Procedures (SOPs) for the RI/FS Activities**	**Poland, D. Joan**	**325**
31-Jan-97	GEPA Letter to Base Regarding Comments on the Draft RI Report for OU-2	Wuerch, H. Victor GEPA	326

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
31-Jan-97	**GEPA Letter to Base Regarding Comments on Phase II EBS for P.L. 103-339 Parcels**	**Wuerch, H. Victor GEPA**	**327**
31-Jan-97	**USEPA Region IX Letter to Base Regarding Response to the Potential Impacts of the Eureka Laboratory Fraud Case of Federal Facilities Cleanup**	**Opalski, Dan USEPA Region IX**	**328**
01-Feb-97	**Fact Sheet, "Harmon Annex"**	**36 CES/CEVR**	**329**
12-Feb-97	Peer Review Report of Draft Final Focused Feasibility Study for OU-3	Poland, D. Joan 36 CES/CEVR	330
13-Feb-97	Technical Document to Support NFRAP Declaration IPR Site 7/LF-9	36 CES/CEVR	331
19-Feb-97	**Base Letter to GEPA Regarding Requesting Approval to Use Triangle Laboratories & Data Chem Labs to Conduct Dioxin and Furan Analyses**	**Poland, D. Joan 36 CES/CEVR**	**332**
19-Feb-97	**Base Letter to USEPA Region IX Regarding Requesting Approval to Use Triangle Laboratories & Data Chem Labs to Conduct Dioxin and Furan Analyses**	**Poland, D. Joan 36 CES/CEVR**	**333**
21-Feb-97	Base Letter to USEPA Region IX Regarding Deadline Extension Request for Draft Feasibility Report for OU-2	Poland, D. Joan 36 CES/CEVR	334
26-Feb-97	Base Letter to Guam EPA (GEPA) Regarding Transmittal of NFRAP Documents for IRP Site 7/LF-9	Poland, D. Joan 36 CES/CEVR	335
26-Feb-97	Base Letter to USEPA Region IX Regarding Transmittal of Final NFRAP Documents for IRP Site 7/LF-9	Poland, D. Joan 36 CES/CEVR	336
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 1 - Text, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 2A - Appendix A-C, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 2B - Appendix A-C, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 3A - Appendix E -F, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 3B - Appendix G, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 4A - Appendix H-I, Final	ICF Technology	

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 4B - Appendix J-L, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 5 - Appendix M-O, Final	ICF Technology	
01-Mar-97	OU-2, MARBO Annex, Remedial Investigation Report Vol 6 - Appendix P-T, Final	ICF Technology	
03-Mar-97	**RPM Meeting Minutes, 12-13 Feb 97**	**EA Engineering**	**337**
04-Mar-97	**Base Letter to USEPA Region IX Regarding Notification of Laboratories to be Utilized by EA Engineering**	**Poland, D. Joan 36 CES/CEVR**	**338**
30-Mar-97	**Action Memorandum - Request & Document Approval of Proposed Action for Site 39/Harmon Substation**	**36 CES/CEVR**	**339**
02-Apr-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final RI Report for Groundwater (OU-2)	Poland, D. Joan 36 CES/CEVR	340
02-Apr-97	Base Letter to USEPA Region IX Regarding Transmittal of the Draft Final RI Report for Groundwater (OU-2)	Poland, D. Joan 36 CES/CEVR	341
03-Apr-97	**USEPA Region IX Letter to Base Regarding Evaluation of Base Response to Quality Assurance Questionnaire**	**Opalski, Dan USEPA Region IX**	**342**
03-Apr-97	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final Basewide Sampling & Analysis Plan, QAPP**	**Poland, D. Joan 36 CES/CEVR**	**343**
03-Apr-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Focused Feasibility Study Report for Groundwater (OU-2)	Poland, D. Joan 36 CES/CEVR	344
03-Apr-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Focused Feasibility Study Report for Groundwater (OU-2)	Poland, D. Joan 36 CES/CEVR	345
03-Apr-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final OU-3 Focused Feasibility Report Revision Pages	Poland, D. Joan 36 CES/CEVR	346
03-Apr-97	Base Letter to GEPA Regarding Transmittal of Copies of the Final OU- Focused Feasiblity Report Revision Pages	Poland, D. Joan 36 CES/CEVR	347
03-Apr-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final OU-3 RI Revision Pages	Poland, D. Joan 36 CES/CEVR	348

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
03-Apr-97	Base Letter to GEPA Regarding Transmittal of Copies of the Final OU-3 RI Revision Pages	Poland, D. Joan 36 CES/CEVR	349
08-Apr-97	**RAB Quarterly Meeting Minutes, 20 Feb 97**	**Higgle, Albert F. Colonel, USAF 36 SPTG/CC**	**350**
09-Apr-97	**Base Letter to GEPA Regarding Transmittal of Copies of Draft Final Phase II EBS for P.L. 103-339 Parcels**	**Poland, D. Joan 36 CES/CEVR**	**351**
29-Apr-97	USEPA Region IX Letter to Base Regarding Comments on the Draft Final OU-2 RI Report	Ripperda, Mark USEPA Region IX	352
07-May-97	GEPA Letter to Base Regarding Comments on the Draft Final Basewide Sampling & Analysis Plan, QAPP and the Draft Final RI Report for Groundwater OU-2, MARBO Annex	Wuerch, H. Victor GEPA	353
07-May-97	**USEPA Region IX Letter to Base Regarding Comments on the Draft Final QAPP**	**Ripperda, Mark USEPA Region IX**	**354**
15-May-97	Base Letter to Mr. Tony Artero Regarding Assessment of Disposed Materials on Lot #10080	Riggle, Albert F. Colonel, USAF 36 SPTG/CC	355
19-May-97	**List of Interviewees for the IRP Community Relations Plan Revisions**	**36 CES/CEVR**	**356**
20-May-97	USEPA Region IX Letter to Base Regarding Comments on the Focused Feasibility Study Report for MARBO Annex OU-2 USEPA Region IX	Ripperda, Mark USEPA Region IX	357
29-May-97	**Base Letter to USEPA Region IX Regarding Clarification to the QAPP for Federal Facility Cleanup Sites Questionnaire**	**Poland, D. Joan 36 CES/CEVR**	**358**
29-May-97	Base Letter to GEPA Regarding Requesting Modifications to the OU-4 Work Plan for IRP Site 27/Hazardous Waste Storage Area 1 & OU-5 Work Plan for IRP Site 34/PCB Storage Area	Poland, D. Joan 36 CES/CEVR	359
29-May-97	Base Letter to USEPA Region IX Regarding Requesting Modifications to the OU-4 Work Plan for IRP Site 27/Hazardous Waste Storage Area 1 & OU-5 Work Plan for IRP Site 34/PCB Storage Area	Poland, D. Joan 36 CES/CEVR	360
03-Jun-97	GEPA Letter to Base Regarding Comments on the Focused Feasibility Study for MARBO Annex OU-2	Wuerch, H. Victor GEPA	361
19-Jun-97	**Base Letter to RAB Members Regarding Next Quarterly RAB Meeting & Minutes of 15 May 97 RAB Meeting**	**Riggle, Albert F. Colonel, USAF 36 SPTG/CC**	**362**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
30-Jun-97	**USEPA Region IX Letter to Base Regarding Approval to Use Method SW 3540 A/8310 for PAH Analysis**	**Ripperda, Mark USEPA Region IX**	**363**
08-Jul-97	**Summary of Community Interviews**	**36 CES/CEVR**	**364**
11-Jul-97	Base Letter to GEPA Regarding Transmittal of the Draft Proposed Plan for MARBO Annex OU (Soils & Groundwater)	Poland, D. Joan 36 CES/CEVR	365
11-Jul-97	Base Letter to USEPA Region IX Regarding Transmittal of the Draft Proposed Plan for MARBO Annex OU (Soils & Groundwater)	Poland, D. Joan 36 CES/CEVR	366
11-Jul-97	Base Letter to Mr. Tony Artero Regarding Completion of Field Work on Lot 10080 by AF's Environmental Assessment Contractor	Riggle, Albert F. Colonel, USAF 36 SPTG/CC	367
30-Jul-97	**Base Letter to RAB Members Regarding Introductory Relative Risk Assessment Workshop for 31 Jul 97**	**McGoldrick, Tim Colonel, USAF 36 ABW/CV**	**368**
30-Jul-97	**Recommended Community Relations Activities for FY98**	**36 CES/CEVR**	**369**
01-Aug-97	Fact Sheet, "Vertical Landfill Expansion"	36 CES/CEVR	370
14-Aug-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final MARBO Annex OU-2 (Groundwater) Focused Feasibility Study Report	Poland, D. Joan 36 CES/CEVR	371
14-Aug-97	Base Letter to USEPA Region IX Regarding Transmittal of the Draft Final MARBO Annex OU-2 (Groundwater) Focused Feasibility Study Report	Poland, D. Joan 36 CES/CEVR	372
25-Aug-97	GEPA Fax to Base Regarding Comments on the Draft Proposed Plan for MARBO Annex OU	Wuerch, H. Victor GEPA	373
29-Aug-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final Proposed Plan for MARBO Annex OU (Soils & Groundwater)	Poland, Joan 36 CES/CEVR	374
29-Aug-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final Proposed Plan for MARBO Annex OU (Soils & Groundwater)	Poland, Joan 36 CES/CEVR	375
01-Sep-97	Fact Sheet, "Landfill 7"	36 CES/CEVR	376
23-Sep-97	GEPA Letter to Base Regarding Air Force Response to GEPA Comments on the MARBO Annex OU Focused Feasibility Study Report	Wuerch, D. Victor GEPA	377

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Oct-97	Final MARBO Annex OU-2 Focused Feasibility Study Report	Montgomery Watson	378
01-Oct-97	**Final Basewide Quality Assurance Project Plan**		**379**
01-Oct-97	Final Proposed Plan, MARBO Annex OU	36 CES/CEVR	380
01-Oct-97	**IRP Newsletter, "Restoration Advisory Board Recommends Cleanup Priorities"**	**36 CES/CEVR**	**381**
08-Oct-97	News Release, "Notice of Availability, MARBO Annex OU Proposed Plan"	Pacific Daily News	382
14-Oct-97	**Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site 18/LF-23 & Copies of the Final Proposed Plan for MARBO Annex OU & Inserts for MARBO Annex OU-2 Focused Feasibility Study Report**	**Poland, D. Joan 36 CES/CEVR**	**383**
20-Oct-97	Base Letter to GPA Authorizing Installation of Power Connection for IRP Contractor OHM	Poland, D. Joan 36 CES/CEVR	384
22-Oct-97	**RPM Minutes, 22 Oct 97**	**EA Engineering**	**385**
28-Oct-97	**USEPA Letter to HQ ACC Regarding Clarification of Requirements for Administrative Record Files**	**Luftig, Stephen D. USEPA**	**386**
21-Nov-97	**RAB Meeting Minutes, 16 Oct 97**	**EA Engineering**	**387**
24-Nov-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for ERP Site 3/WP-3 & Copies of the Draft Site Characterization Report for WP 1, 2, & 3	Poland, D. Joan 36 CES/CEVR	388
24-Nov-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site 3/Waste Pile 3 & Copies of the Draft Site Characterization Report for WP 1, 2, & 3	Poland, D. Joan 36 CES/CEVR	389
01-Dec-97	Final Quality Program Plan, Interim Remedial Actions, Main Base, MARBO, & Harmon OUs, Vol 1		390
01-Dec-97	Final Environmental Cleanup Plan, Interim Remedial Actions, Main Base, MARBO, & Harmon OUs, Vol 2		391
04-Dec-97	**USEPA Region IX Letter to Base Regarding Comments on the Draft Decision Summary NFRAP for IRP Site 18/LF-23**	**Ripperda, Mark USEPA Region IX**	**392**
09-Dec-97	USEPA Region IX Letter to Base Regarding Comments on the Draft Decision Summary NFRAP for IRP Site 3/Waste Pile 3	Ripperda, Mark USEPA Region IX	393

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
09-Dec-97	USEPA Region IX Letter to Base Regarding Comments on the Draft Decision Summary NFRAP for IRP Site 3/Waste Pile 3	Ripperda, Mark USEPA Region IX	393
09-Dec-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Proposed Remediation Activities Project Memorandum for Waste Piles 1 & 2	Poland, D. Joan 36 CES/CEVR	394
09-Dec-97	Base Letter to GEPA Regarding Transmittal of Copies of the Proposed Remediation Activities Project Memorandum for Waste Piles 1 & 2	Poland, D. Joan 36 CES/CEVR	395
10-Dec-97	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Bioventing & Vapor Extraction Pilot Study for FTA-2	Poland, D. Joan 36 CES/CEVR	396
10-Dec-97	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Bioventing & Vapor Extraction Pilot Study for FTA-2	Poland, D. Joan 36 CES/CEVR	397
15-Dec-97	Base Letter to USEPA Region IX Regarding Transmittal of the Draft ROD for Soils & Groundwater MARBO Annex OU	Poland, D. Joan 36 CES/CEVR	398
15-Dec-97	Base Letter to GEPA Regarding Transmittal of the Draft ROD for Soils & Groundwater MARBO Annex OU	Poland, D. Joan 36 CES/CEVR	399
15-Dec-97	**Base Letter to USEPA Region IX Regarding Modification to QAPP to Incorporate Method SW 8290 for Analysis of Dioxins & Furans**	**Poland, D. Joan 36 CES/CEVR**	**400**
15-Dec-97	**Base Letter to GEPA Regarding Modification to QAPP to Incorporate Method SW 8290 for Analysis of Dioxins & Furans**	**Poland, D. Joan 36 CES/CEVR**	**401**
01-Jan-98	Final Bioventing & Vapor Extraction Pilot Study Work Plan FTA-2	EA Engineering	402
28-Jan-98	GEPA Fax to Base Regarding Comments on the Draft Bioventing & Vapor Extraction Pilot Study Work Plan for FTA-2	Wuerch, H. Victor GEPA	403
01-Feb-98	**Base Letter to GEPA Requesting Adjustments to AF Permit**	**Hodges, William Colonel, USAF 36 ABW/CC**	**404**
02-Feb-98	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Action Memorandum & Site Characterization Summary Report for IRP Site 39/Harmon Substation**	**Poland, D. Joan 36 CES/CEVR**	**405**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
02-Feb-98	Base Letter to GEPA Regarding Transmittal of the Final Bioventing & Vapor Extraction Pilot Study Work Plan for FTA-2	Poland, D. Joan 36 CES/CEVR	406
11-Feb-98	USEPA Region IX Letter to Base Regarding Comments on the Draft Final MARBO Annex OU ROD	Ripperda, Mark USEPA Region IX	407
25-Feb-98	**Base Letter to GEPA Regarding Transmittal of Copies of the NFRAP for IRP Site 18/LF-23**	**Ikehara, Gregg N. 36 CES/CEVR**	**408**
26-Feb-98	**Base Letter to GEPA Regarding Transmittal of Copies of the Site Characterization Report for IRP Site 19/LF-24**	**Ikehara, Gregg N. 36 CES/CEVR**	**409**
26-Feb-98	**Base Letter to GEPA Regarding Transmittal of Copies of the Draft Basewide Groundwater Summary Report**	**Ikehara, Gregg N. 36 CES/CEVR**	**410**
01-Mar-98	Decision Summary, NFRAP, BRP Site 3/Waste Pile 3	ICF Technology	411
01-Mar-98	Site Characterization Report, Waste Piles 1, 2, & 3 Vol 1 - Text	ICF Technology	412
01-Mar-98	Site Characterization Report, Waste Piles 1, 2, & 3 Vol 2 - Appendices (2 of 2)	ICF Technology	413
01-Mar-98	**Fact Sheet, "Asphalt Recycling Operations"**	**36 CES/CEVR**	**414**
04-Mar-98	**RPM Meeting Minutes, 18 Feb 98**	**EA Engineering**	**415**
23-Mar-98	**Base Letter to GEPA Regarding Modification of the Target Analyte List in the Basewide QAPP**	**Poland, D. Joan 36 CES/CEVR**	**416**
23-Mar-98	**Base Letter to USEPA Region IX Regarding Modification of the Target Analyte List in the Basewide QAPP**	**Poland, D. Joan 36 CES/CEVR**	**417**
24-Mar-98	Technical Document to Support NFRAP Declaration for IRP Site 3/Waste Pile 3	36 CES/CEVR	418
26-Mar-98	**Base Letter to USEPA Region IX Regarding Approval for Addition of OHM Services Corp to the QAPP**	**Poland, D. Joan 36 CES/CEVR**	**419**
26-Mar-98	**Base Letter to GEPA Regarding Approval for Addition of OHM Services Corp to the QAPP**	**Poland, D. Joan 36 CES/CEVR**	**420**
26-Mar-98	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Decision Summary NFRAP for IRP Site 3/Waste Pile 3	Poland, D. Joan 36 CES/CEVR	421

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
26-Mar-98	**Base Letter to GEPA Regarding Transmittal of Copies of the Final Decision Summary NFRAP for IRP Site 3/Waste Pile 3**	**Poland, D. Joan 36 CES/CEVR**	**422**
31-Mar-98	**USEPA Region IX Letter to Base Regarding Modifications to the QAPP Target Analyte List**	**Ripperda, Mark USEPA Region IX**	**423**
31-Mar-98	**USEPA Region IX Letter to Base Regarding Modifications to the QAPP**	**Ripperda, Mark USEPA Region IX**	**424**
01-Apr-98	**Fact Sheet, "Andersen AFB Restoration Advisory Board (RAB)"**	**36 CES/CEVR**	**425**
15-Apr-98	**GEPA Letter to Base Regarding Comments on the Action Memorandum & Site Characterization Summary Report for IRP Site 39/Harmon Substation & Addition of OHM Services Corp., EMAX Inc., to the QAPP**	**Wuerch, H. Victor GEPA**	**426**
16-Apr-98	**RPM Meeting Minutes, 16 Apr 98**	**36 CES/CEVR**	**427**
16-Apr-98	**Technical Document to Support NFRAP Declaration for DIP Site 18/LF-23**	**36 CES/CEVR**	**428**
30-Apr-98	Town Hall Meeting Minutes Regarding Landfill 7 Located in Base Housing	Miclat, Marriane 36 CES/CEVR	429
01-May-98	Final MARBO Annex OU Record of Decision	36 CES/CEVR	430
01-May-98	**Base Letter to GPA Authorizing Installation of Power Connection for IRP Contractor OHM**	**Poland, D. Joan 36 CES/CEVR**	**431**
15-Jun-98	RAB Meeting Minutes, 16 Apr 98	EA Engineering	432
15-Jun-98	US Dept of Interior to Base Regarding Concurrence of Base Finding for IRP Site 8/LFs 10A, 10B, IOC, & IRP Site 33/Drum Storage Area 2	DiRosa, Roger Refuge Manager GNWR	433
15-Jun-98	**UOG Letter to Base Regarding Resignation of Dr. John Jenson from RAB & Nomination of Mr. John Jocson to RAB**	**Jenson, John W. Ph. D., UOG, WERI Institute**	**434**
01-Jul-98	**Final Site Characterization Summary Report for IRP Site 39/Harmon Substation**	**EA Engineering**	**435**
10-Jul-98	**Press Release, "AAFB Conducts RAB Meeting"**	**36 CES/CEVR Pacific Daily News**	**436**
21-Jul-98	**RAB Meeting Minutes, 16 Jul 98**	**EA Engineering**	**437**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Aug-98	**Newsletter Article, "Air Force Recycling Effort Paves Island Roads"**	**Bureau of Planning Man, Land, & Sea**	**438**
01-Aug-98	**Final Groundwater Summary Report for AAFB**	**EA Engineering**	**439**
01-Aug-98	Site Summary Report for FTA-2	Jacobs Engineering	440
01-Aug-98	Operation & Maintenance Plan, FTA-2, Soil Vapor Extraction System, AAFB	Jacobs Engineering	441
25-Aug-98	**Base Letter to GEPA Regarding Transmittal of Copies of the Final Groundwater Summary Report for AAFB**	**Poland, D. Joan 36 CES/CEVR**	**442**
04-Sep-98	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of Updated Draft Community Relations Plan**	**Poland, D. Joan 36 CES/CEVR**	**443**
04-Sep-98	**Base Letter to GEPA Regarding Transmittal of Copies of Updated Draft Community Relations Plan**	**Poland, D. Joan 36 CES/CEVR**	**444**
04-Sep-98	Base Letter to GEPA Regarding Transmittal of Copies of Final MARBO Annex OU ROD	Poland, D. Joan 36 CES/CEVR	445
13-Oct-98	Base Letter to GEPA Regarding Transmittal of the Draft Decision Summary NFRAP for IRP Site 11/Lfs l5A & 15B	Poland, D. Joan 36 CES/CEVR	446
13-Oct-98	Base Letter to USEPA Region IX Regarding Transmittal of Copies of Draft Decision Summary NFRAP for IRP Site ll/LFs 15A & 15B	Poland, D. Joan 36 CES/CEVR	447
19-Oct-98	**USEPA Region IX Letter to Base Regarding Comments on the Draft Community Relations Plan**	**Ripperda, Mark USEPA Region IX**	**448**
01-Nov-98	**Final Spring 1998 Groundwater Data Monitoring Report**	**EA Engineering**	**449**
05-Nov-98	Base Letter to GEPA Regarding Transmittal of Copies of Draft Quality Program Plan (Vol 1) & Draft Environmental Cleanup Plan (Vol 2) for MARBO Annex OU	Poland, D. Joan 36 CES/CEVR	450
05-Nov-98	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Quality Program Plan (Vol 1) & Draft Environmental Cleanup Plan (Vol 2) for MARBO Annex OU	Poland, D. Joan 36 CES/CEVR	451
11-Nov-98	News Release, "Notice of Availability, ROD for the MARBO IRP Sites"	36 CES/CEVR Pacific Daily News	452
12-Nov-98	News Release, "Notice of Availability, ROD for the MARBO IRP Sites"	36 CES/CEVR Pacific Daily News	453

DOC. DATE	**SUBJECT OR TITLE**	**AUTHOR or CORP. AUTHOR**	**FILE NUMBER**
13-Nov-98	News Release, "Notice of Availability, ROD for the MARBO IRP Sites"	36 CES/CEVR Pacific Daily News	454
23-Nov-98	Base Letter to GEPA Regarding Transmittal of the Draft EE/CA for IRP Site 34/PCB Storage Area	Poland, D. Joan 36 CES/CEVR	455
23-Nov-98	Base Letter to USEPA Region IX Regarding Transmittal of the Draft EE/CA for IRP Site 34/PCB Storage Area	Poland, D. Joan 36 CES/CEVR	456
23-Nov-98	Base Letter to USEPA Region IX Regarding Transmittal of the Draft NFRAP for IRP Site 27/Hazardous Waste Storage Area 1	Poland, D. Joan 36 CES/CEVR	457
01-Dec-98	Base Letter to USEPA Region IX Regarding Transmittal of the Draft EE/CA for IRP Site 10/LF-14	Poland, D. Joan 36 CES/CEVR	458
01-Dec-98	Base Letter to GEPA Regarding Transmittal of the Draft EE/CA for IRP Site 10/LF-14	Poland, D. Joan 36 CES/CEVR	459
08-Dec-98	**Base Letter to USEPA Region IX Regarding Transmittal of the Project Memorandum for the Proposed Remediation Activities for P.L. 103-339 AOCs**	**Poland, D. Joan 36 CES/CEVR**	**460**
08-Dec-98	**Base Letter to GEPA Regarding Transmittal of the Project Memorandum for the Proposed Remediation Activities for P.L. 103-339 AOCs**	**Poland, D. Joan 36 CES/CEVR**	**461**
10-Dec-98	Base Letter to USEPA Region IX Regarding Transmittal of the Draft EE/CA for IRP Site 31/Chemical Storage Area 4	Poland, D. Joan 36 CES/CEVR	462
10-Dec-98	Base Letter to USEPA Region IX Regarding Transmittal of the Draft EE/CA for IRP Site 16/LF-21	Poland, D. Joan 36 CES/CEVR	463
10-Dec-98	Base Letter to GEPA Regarding Transmittal of the Draft EE/CA for IRP Site 16/LF-21	Poland, D. Joan 36 CES/CEVR	464
10-Dec-98	Base Letter to GEPA Regarding Transmittal of the Draft EE/CA for IRP Site 31/Chemical Storage Area 4	Poland, D. Joan 36 CES/CEVR	465
16-Dec-98	**Base Letter to GEPA Regarding Transmittal of Copies of the Final Community Relations Plan**	**Poland, D. Joan 36 CES/CEVR**	**466**
16-Dec-98	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Community Relations Plan**	**Poland, D. Joan 36 CES/CEVR**	**467**
16-Dec-98	Base Letter to GEPA Regarding Transmittal of the Draft Decision Summary Report for IRP Site 32/Drum Storage Area 1	Poland, D. Joan 36 CES/CEVR	468

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
28-Dec-98	GEPA Letter to Base Regarding Comments on the Draft EE/CA for IRP Site 31/Chemical Storage Area 4	Wuerch, H. Victor GEPA	469
29-Dec-98	GEPA Letter to Base Regarding Comments on the Draft EE/CA for IRP Site 34/PCB Storage Area	Wuerch, H. Victor GEPA	470
06-Jan-99	**RAB Meeting Minutes, 15 Oct 98**	**EA Engineering**	**471**
06-Jan-99	GEPA Letter to Base Regarding Comments on the Draft NFRAP for IRP Site 27/Hazardous Waste Storage Area 1	Wuerch, H. Victor GEPA	472
06-Jan-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary Report for IRP Site 33/Drum Storage Area 2	Poland, D. Joan 36 CES/CEVR	473
06-Jan-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Decision Summary Report for IRP Site 33/Drum Storage Area 2	Poland, D. Joan 36 CES/CEVR	474
15-Jan-99	USEPA Region IX Letter to Base Regarding Comments on Draft NFRAP Decision Document for IRP Site 27/Hazardous Waste Storage Area 1	Ripperda, Mark USEPA Region IX	475
16-Jan-99	USEPA Letter to Base Regarding Comments on Agency Draft EE/CA for IRP Site 34/PCB Storage Area	Ripperda, Mark USEPA Region IX	476
01-Feb-99	Final Decision Document NFRAP for IRP Site 11/ LFs- 15A & 15B	EA Engineering	477
13-Feb-99	USEPA Region IX Letter to Base Regarding Comments on Draft EE/CA for IRP Site 16/LF-21	Ripperda, Mark USEPA Region IX	478
13-Feb-99	USEPA Region IX Letter to Base Regarding Comments on Draft EE/CA for IRP Site 31/Chemical Storage Area 4	Ripperda, Mark USEPA Region IX	479
19-Feb-99	USEPA Region IX Letter to Base Regarding Comments on Draft EE/CA for IRP Site 10/LF-14	Ripperda, Mark USEPA Region IX	480
19-Feb-99	**USEPA Region IX Letter to Base Regarding Concurrence of Sample Purge Field Change Request**	**Ripperda, Mark USEPA Region IX**	**481**
19-Feb-99	USEPA Region IX Letter to Base Regarding Comments on Draft Decision Summary Report for IRP Site 32/Drum Storage Area 1	Ripperda, Mark USEPA Region IX	482
19-Feb-99	GEPA Letter to Base Regarding Comments on the Draft Decision Summary Report for IRP Site 32/Drum Storage Area 1	Wuerch, H. Victor GEPA	483

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
19-Feb-99	Dept of Interior Letter to Base Regarding Review of the Proposed Work Plan for IRP Sites 28 & 12	Ritter, Michael Guam NWR	484
19-Feb-99	GEPA Letter to Base Regarding Comments on the Draft EE/CA for IRP Site 16/LF-21	Wuerch, H. Victor GEPA	485
01-Mar-99	**Final Basewide Quality Assurance Project Plan, Revision 2.0**	**EA Engineering**	**486**
08-Mar-99	**Cover Letter & RAB Meeting Minutes, 21 Jan 99**	**EA Engineering**	**487**
22-Mar-99	**Base Letter to GWA Regarding Status of Tumon-Maui & MW-2 Water Wells & Possible Exploratory Activity at Harmon Annex**	**Gehri, Mark J. D. Colonel, USAF 36 ABW/CC**	**488**
25-Mar-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft NFRAP for IRP Site 11/LFs ISA & 15B	Poland, D. Joan 36 CES/CEVR	489
01-Apr-99	Final NFRAP Decision Document for IRP Site 27/Hazardous Waste Storage Area 1	EA Engineering	490
01-Apr-99	Final EE/CA for IRP Site 34/PCB Storage Area	EA Engineering	491
10-Apr-99	**News Release, "Vacancy Announcement Andersen AFB Restoration Advisory Board Members"**	**36 CES/CEVR Pacific Daily News**	**492**
11-Apr-99	**News Release, "Vacancy Announcement Andersen AFB Restoration Advisory Board Members"**	**36 CES/CEVR Pacific Daily News**	**493**
12-Apr-99	**News Release, "Vacancy Announcement Andersen AFB Restoration Advisory Board Members"**	**36 CES/CEVR Pacific Daily News**	**494**
15-Apr-99	**RAB Meeting Minutes, 15 April 99**	**EA Engineering**	**495**
20-Apr-99	**News Article, "Officials Disagree on Wells"**	**SantoTomas, Jojo Pacific Daily News**	**496**
27-Apr-99	Base Letter to Guam National Wildlife Refuge Regarding Conducting Environmental Investigations at IRP Site 36/Ritidian Dump Site	Larcher, Shawn D. Capt, USAF 36 CES/CEV	497
01-May-99	Final EE/CA for IRP Site 10/LF-14	EA Engineering	498
01-May-99	Final EE/CA Report for IRP Site 16/LF-21	EA Engineering	499
19-May-99	**RPM Meeting Minutes, 19 May 99**	**EA Engineering**	**500**
01-Jun-99	Decision Summary Report for IRP Site 33/Drum Storage Area 2	EA Engineering	501
01-Jun-99	Final EE/CA for IRP Site 31/Chemical Storage Area 4	EA Engineering	502

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
04-Jun-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Draft, EE/CA for IRP Site 34/PCB Storage Area, Site 10/LF-14, Site 16/LF-21, & Site 31/Chemical Storage Area 4	Poland, D. Joan 36 CES/CEVR	503
04-Jun-99	Base Letter to GEPA Regarding Transmittal of Copies of the Final Draft, EE/CA for IRP Site 34/PCB Storage Area, Site 10/LF-14, Site 16/LF-21, & Site 31/Chemical Storage Area 4	Poland, D. Joan 36 CES/CEVR	504
09-Jun-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the NFRAP Decision Document for IRP Site 27/Hazardous Waste Storage Area	Poland, D. Joan 36 CES/CEVR	505
09-Jun-99	Base Letter to GEPA Regarding Transmittal of Copies of the NFRAP Decision Document for IRP Site 27/Hazardous Waste Storage Area	Poland, D. Joan 36 CES/CEVR	506
12-Jun-99	News Article, "Notice of Availability for IRP Sites: LF-14, PCB Storage Area, Chemical Storage Area 4, & LF-21"	36 CES/CEVR Pacific Daily News	507
13-Jun-01	LF-14, PCB Storage Area, Chemical Storage Area 4, & LF-21"	36 CES/CEVR Pacific Daily News	508
14-Jun-99	News Article, "Notice of Availability for IRP Sites: LF-14, PCB Storage Area, Chemical Storage Area 4, & LF-21"	36 CES/CEVR Pacific Daily News	509
15-Jun-99	**Base Letter to GEPA Regarding Transmittal of Copies of Memos Discussing the Discontinuation of Groundwater Monitoring at NWF and Harmon**	**Poland, D. Joan 36 CES/CEVR**	**510**
15-Jun-99	Fax Letter to Base Authorizing Air Force Limited Right of Entry to IRP Site 36/Ritidian Dump Site to Conduct Environmental Survey	Artero, Tony Landowners Representative	511
01-Jul-99	**Remediation Verification Report, HIP Site 19/LF-24**	**IT Corporation**	**512**
01-Jul-99	**Remediation Verification Report, HIP Site 39/Harmon Substation, Vol 1**	**IT Corporation**	**513**
01-Jul-99	Remediation Verification Report, IRP Site 39/Harmou Substation, Vol 2	IT Corporation	514
06-Jul-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft EE/CA Reports for IRP Site 21/LF-26	Poland, D. Joan 36 CES/CEVR	515
06-Jul-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft EE/CA Reports for IRP Site 21/LF-26	Poland, D. Joan 36 CES/CEVR	516

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
21-Jul-99	**Base Letter to USEPA Region IX Regarding Appointment of Mr. Gregg Ikehara as New AAFB Remedial Project Manager (RPM)**	**Poland, D. Joan 36 CES/CEVR**	**517**
21-Jul-99	**Base Letter to GEPA Regarding Appointment of Mr. Gregg Ikehara As New AAFB Remedial Project Manager**	**Poland, D. Joan 36 CES/CEVR**	**518**
30-Jul-99	**Base Letter to GEPA Regarding Notification of a New Project Laboratory with Columbia Analytical Services**	**Ikehara, Gregg N. 36 CES/CEVR**	**519**
30-Jul-99	**Base Letter to USEPA Region IX Regarding Notification of a New Project Laboratory with Columbia Analytical Services**	**Ikehara, Gregg N. 36 CES/CEVR**	**520**
30-Jul-99	**Base Letter to GEPA Regarding Transmittal of Copies of the Remediation Verification Reports for TKP Site 39/Harmon Substation, Site 19/LF-24, & AOCs 1,2,3,4, 5, 12, & 22 at Harmon Annex**	**Ikehara, Gregg N 36 CES/CEVR**	**521**
30-Jul-99	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Remediation Verification Reports for IRP Site 39/Harmon Substation, Site 19 LF-24, & AOCs 1,2,3, 4,5,12, & 22 at Harmon Annex**	**Ikehara, Gregg N 36 CES/CEVR**	**522**
02-Aug-99	Base Letter to GEPA Regarding Transmittal of Copies of the Final Decision Summary Report for IRP Site 32/Drum Storage Area 1 & the Basewide QAPP, Rev 2	Ikehara, Gregg N 36 CES/CEVR	523
03-Aug-99	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Fall 1998 and Spring 1999 Groundwater Data Monitoring Reports**	**Ikehara, Gregg N 36 CES/CEVR**	**524**
03-Aug-99	**Base Letter to GEPA Regarding Transmittal of Copies of the Final Fall 1998 and Spring 1999 Groundwater Data Monitoring Reports**	**Ikehara, Gregg N 36 CES/CEVR**	**525**
06-Aug-99	Base Letter to GEPA Regarding Transmittal of the Final NFRAP Decision Documents for IRP Site 27/Hazardous Waste Storage Area	Ikehara, Gregg N 36 CES/CEVR	526
06-Aug-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final NFRAP Decision Documents for IRP Site 27/Hazardous Waste Storage Area	Ikehara, Gregg N. 36 CES/CEVR	527
06-Aug-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Project Work Plans for IRP Site 34/PCB Storage Area, IRP Site 10/LF-14, IRP Site 16/LF-21 & IRP Site 31/Chemical Storage Area 4	Ikehara, Gregg N. 36 CES/CEVR	528

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
06-Aug-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Project Work Plans for IRP Site 34/PCB Storage Area, IRP Site 10/LF-14, IRP Site 16/LF-21 & IRP Site 31/Chemical Storage Area 4	Ikehara, Gregg N. 36 CES/CEVR	529
06-Aug-99	USEPA Region IX Letter to Base Regarding Comments on the Draft Decision Summary NFRAP for IRP Site 21/LF-26	Ripperda, Mark USEPA Region IX	530
19-Aug-99	**Base Letter to GEPA Regarding Proposed Variance Request for Columbia Analytical Services Laboratory**	**Ikehara, Gregg N. 36 CES/CEVR**	**531**
19-Aug-99	**Base Letter to USEPA Region IX Regarding Proposed Variance Request for Columbia Analytical Services Laboratory**	**Ikehara, Gregg N. 36 CES/CEVR**	**532**
19-Aug-99	**USEPA Region IX Letter to Base Regarding Approval of the Proposed Variance Request**	**Ripperda, Mark USEPA Region IX**	**533**
19-Aug-99	**USEPA Region IX Letter to Base Regarding Approval of the Remedial Verification Report for IRP Site 39/Harmon Substation**	**Ripperda, Mark USEPA Region IX**	**534**
19-Aug-99	**USEPA Region IX Letter to Base Regarding Approval of the Remedial Verification Report for HIP Site 19 LF-24**	**Ripperda, Mark USEPA Region IX**	**535**
24-Aug-99	USEPA Region IX Letter to Base Regarding Comments on the Draft Project Work Plans for IRP Site 34/PCB Storage Area, IRP Site 10/LF-14 IRP Site 16/LF-21 & IRP Site 31/Chemical Storage Area 4	Ripperda, Mark USEPA Region IX	536
27-Aug-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft EE/CA for IRP Site 2/LF-2 & IRP Site 5/LF-7	Ikehara, Gregg N. 36 CES/CEVR	537
01-Sep-99	Final Decision Summary NFRAP for IRP Site 21/LF-26	EA Engineering	538
09-Sep-99	Technical Document to Support NFRAP Declaration for IRP Site 21/LF-26	36 CES/CEVR	539
15-Sep-99	**RPM Meeting Minutes, 9 Sep 99**	**EA Engineering**	**540**
28-Sep-99	Base Letter to GEPA Regarding Transmittal of the Basewide QAPP Revision 2 & Final Reports for IRP Site 27/Hazardous Storage Area 1, Site 32/Drum Storage Area 1, & Site 33/Drum Storage Area 2	Ikehara, Gregg N. 36 CES/CEVR	541
6-Oct-99	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft RI Report for Harmon Annex OU**	**Ikehara, Gregg N. 36 CES/CEVR**	**542**
6-Oct-99	**Base Letter to GEPA Regarding Transmittal of Copies of the Draft RI Report for Harmon Annex OU**	**Ikehara, Gregg N. 36 CES/CEVR**	**543**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
12-Oct-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Decision Summary for IRP Site 21/LF-26	Ikehara, Gregg N. 36 CES/CEVR	544
12-Oct-99	Base Letter to GEPA Regarding Transmittal of Copies of the Final Decision Summary for IRP Site 21/LF-26	Ikehara, Gregg N. 36 CES/CEVR	545
12-Oct-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft EE/CA for IRP Site 26/FTA-2	Ikehara, Gregg N. 36 CES/CEVR	546
12-Oct-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft EE/CA for IRP Site 26/FTA-2	Ikehara, Gregg N. 36 CES/CEVR	547
13-Oct-99	GEPA Letter to Base Regarding Comments on Draft EE/CA Report for IRP Site 2/LF-2	Wuerch, H. Victor GEPA	548
16-Oct-99	USEPA Region IX Letter to Base Regarding Comments on Draft EE/CA for IRP Site 5/LF-7 & IRP Site 2/LF-2	Ripperda, Mark USEPA Region IX	549
22-Oct-99	GEPA Letter to Base Regarding Comments on Draft Decision Summary NFRAP for IRP Site 21/LF-26	Wuerch, H. Victor GEPA	550
22-Oct-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft EE/CA for IRP Site 8/LF-10A, 10B, & 10C	Ikehara, Gregg N. 36 CES/CEVR	551
22-Oct-99	Base Letter to GEPA Regarding Transmittal of Copies the Draft EE/CA for IRP Site 8/LF-10A, 10B, & 10C	Ikehara, Gregg N. 36 CES/CEVR	552
26-Oct-99	GEPA Letter to Base Regarding Comments on Draft EE/CA Report for IRP Site 5/LF-7	Wuerch, H. Victor GEPA	553
10-Dec-99	GEPA Letter to Base Regarding Comments on Draft EE/CA for IRP Site 26/FTA-2	Salas, Jesus T. GEPA	554
10-Dec-99	**Base Letter to GEPA Regarding Responses to Comments for RVR of IRP Site 39/Harmon Substation, IRP Site 19/LF 24 & AOCs 1, 2, 3, 4, 5,12, & 22**	**Ikehara, Gregg N. 36 CES/CEVR**	**555**
16-Dec-99	**USEPA Region IX Letter to Base Regarding Comments on the Draft RI Report for Harmon Annex**	**Ripperda, Mark USEPA Region IX**	**556**
23-Dec-99	GEPA Letter to Base Regarding Comments on the Draft EE/CA Report for IRP Site 8/LF-10A, 10B, & 10C	Salas, Jesus T. GEPA	557
01-Jan-00	Final EE/CA for IRP Site 5/LF-7	EA Engineering	558
01-Jan-00	Draft Proposed Plan, Harmon Annex OU	36 CES/CEVR	559
18-Jan-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of Action Memorandum for IRP Site 34/PCB Storage Area, IRP Site 16/LF-21, IRP Site 10/LF-14, & IRP Site 31/Chemical Storage Area 4	Ikehara, Gregg N. 36 CES/CEVR	560

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
18-Jan-00	Base Letter to GEPA Regarding Transmittal of Copies of Action Memorandum for IRP Site 34/PCB Storage Area, IRP Site 16/LF-21, IRP Site 10/LF-14, & IRP Site 31/Chemical Storage Area 4	Ikehara, Gregg N. 36 CES/CEVR	561
18-Jan-00	Action Memorandum to Request and Document Approval of the Proposed Removal Action for IRP Site 34/PCB Storage Area	Ikehara, Gregg N. 36 CES/CEVR	562
18-Jan-00	Action Memorandum to Request and Document Approval of the Proposed Removal Action for IRP Site 16/LF-21	Ikehara, Gregg N. 36 CES/CEVR	563
18-Jan-00	Action Memorandum to Request and Document Approval of the Proposed Removal Action for IRP Site 10/LF-14	Ikehara, Gregg N. 36 CES/CEVR	564
18-Jan-00	Action Memorandum to Request and Document Approval of the Proposed Removal Action for IRP Site 31/Chemical Storage Area 4	Ikehara, Gregg N. 36 CES/CEVR	565
27-Jan-00	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Proposed Plan for HIP Sites in the Harmon Annexes**	**Ikehara, Gregg N. 36 CES/CEVR**	**566**
27-Jan-00	**Base Letter to GEPA Regarding Transmittal of Copies of the Draft Proposed Plan for IRP Sites in the Harmon Annexes**	**Ikehara, Gregg N. 36 CES/CEVR**	**567**
27-Jan-00	**Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final RI Report for IRP Sites in the Harmon Annexes**	**Ikehara, Gregg N. 36 CES/CEVR**	**568**
27-Jan-00	**Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final RI Report for IRP Sites in the Harmon Annexes**	**Ikehara, Gregg N. 36 CES/CEVR**	**569**
27-Jan-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final EE/CA for IRP Site 5/LF-7	Ikehara, Gregg N. 36 CES/CEVR	570
28-Jan-00	**RAB Meeting Minutes, 21 Oct 99**	**EA Engineering**	**571**
31-Jan-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final EE/CA for IRP Site 2/LF-2	Ikehara, Gregg N. 36 CES/CEVR	572
31-Jan-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final EE/CA for IRP Site 2/LF-2	Ikehara, Gregg N. 36 CES/CEVR	573
01-Feb-00	Final EE/CA for IRP Site 2/LF-2	EA Engineering	574
03-Feb-00	USEPA Region IX Letter to Base Regarding Comments on the Draft EE/CA for IRP Site 8/LF-10	Ripperda, Mark USEPA Region IX	575
07-Feb-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final Decision Summary Document for IRP Site 1/LF-1	Ikehara, Gregg N. 36 CES/CEVR	576

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
11-Feb-00	**Base Letter to Mangilao Mayor Nonito Bias Regarding Termination of Mayor as a RAB Member**	**Scboeck, Edward Colonel, USAF 36 ABW/CV**	**577**
11-Feb-00	**Base Letter to RAB Members Regarding Quarterly RAB Meeting**	**Schoeck, Edward Colonel, USAF 36 ABW/CV**	**578**
16-Feb-00	**RPM Meeting Minutes, 16 Feb 00**	**EA Engineering**	**579**
18-Feb-00	**News Article, "S6M for Cleanup"**	**Loerzel, Adrienne Pacific Daily News**	**580**
25-Feb-00	**GEPA Letter to Base Regarding Comments on Draft RI Report for Harmon Annex OUs IRP Site 18/LF-23, IRP Site 19/LF-24 & IRP Site 39/Harmon Substation**	**Salas, Jesus T. GEPA**	**581**
28-Feb-00	**News Article, "GovGuam Seeks Quick End to Land-Return Issue"**	**Loerzel, Adrienne Pacific Daily News**	**582**
29-Feb-00	Dept of Interior Letter to Base Regarding Formal Section 7 Consultation for IRP Site 9/LF-13, IRP Site 13/LF-18, IRP Site 14/LF-19, & IRP Site 15/LF-20	DiRosa, Roger GNWR	583
22-Mar-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final NFRAP Report for IRP Site 28/Chemical Storage Area 1	Ikehara, Gregg N. 36 CES/CEVR	584
22-Mar-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final NFRAP Report for IRP Site 28/Chemical Storage Area 1	Ikehara, Gregg N. 36 CES/CEVR	585
28-Mar-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final NFRAP Report for IRP Site 17/LF-22	Torres, Jess F. 36 CES/CEVR	586
28-Mar-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final NFRAP Report for IRP Site 17/LF-22	Torres, Jess F. 36 CES/CEVR	587
26-Apr-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft NFRAP for IRP Site 30/Waste Pile 4	Ikehara, Gregg N. 36 CES/CEVR	588
26-Apr-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft NFRAP for IRP Site 30/Waste Pile 4	Ikehara, Gregg N. 36 CES/CEVR	589
02-May-00	Base Letter to GEPA Regarding Transmittal of Copies of the Final Decision Summary Document of IRP Site l/LF-l	Ikehara, Gregg N. 36 CES/CEVR	590
02-May-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Decision Summary Document of IRP Site l/LF-l	Ikehara, Gregg N. 36 CES/CEVR	591

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
04-May-00	**RAB Meeting Minutes, 04 May 2000**	**EA Engineering**	**592**
09-Jun-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site 4/LF6	Ikehara, Gregg N. 36 CES/CEVR	593
09-Jun-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site 4/LF6	Ikehara, Gregg N. 36 CES/CEVR	594
22-Jun-00	**RPM Meeting Minutes, 22 June 00**	**EA Engineering**	**595**
03-Aug-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site 251 Fire Training Area 1	Ikehara, Gregg N. 36 CES/CEVR	596
25-Aug-00	GEPA Letter to Base Regarding GEPA Comments on the Draft Decision NFRAP for IRP Site 4/LF-6	Salas, Jesus T. GEPA	597
29-Aug-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final EE/CA Report of IRP Site 8/LFs 10A, 10B, 10C.	Ikehara, Gregg N. 36 CES/CEVR	598
31-Aug-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Final EE/CA Decision Summary NFRAP Report for Site 4/LF-6	Ikehara, Gregg N. 36 CES/CEVR	599
31-Aug-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final Decision Summary NFRAP Report for Site 4/LF6	Ikehara, Gregg N. 36 CES/CEVR	600
31-Aug-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of Final NFRAP Dec. Summ. Rpt for Site 4/LF-6	Ikehara, Gregg N. 36 CES/CEVR	601
31-Aug-00	Base Letter to GEPA Regarding Transmittal of Copies of Final NFRAP Dec. Summ. Rpt for Site 4/LF-6	Ikehara, Gregg N. 36 CES/CEVR	602
07-Sep-00	Base Letter to GEPA Regarding Transmittal of Copies of the Final Spring Groundwater 2000 Monitoring Report for MARBO Annex & Northwest Field Operable Units	Ikehara, Gregg N. 36 CES/CEVR	603
07-Sep-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Spring Groundwater 2000 Monitoring Report for MARBO Annex & Northwest Field Operable Units	Ikehara, Gregg N. 36 CES/CEVR	604
15-Sep-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Quality Program Plan & Environmental Cleanup Plan For Site 24/LF-29 MARBO Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	605
15-Sep-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Quality Program Plan & Environmental Cleanup Plan for Site 24/LF-29 MARBO Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	606

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
22-Sep-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Environmental Cleanup Plan for Site 2/LF-2 Main Base Operable Units	Ikehara, Gregg N. 36 CES/CEVR	607
22-Sep-00	Base Letter to USEPA Region TX Regarding Transmittal of Copies of the Draft Environmental Cleanup Plan for Site 2/LF 2 Main Base Operable Units	Ikehara, Gregg N. 36 CES/CEVR	608
03-Oct-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Environmental Cleanup Plan for Site 5/LF 7	Ikehara, Gregg N. 36 CES/CEVR	609
03-Oct-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Environmental Cleanup Plan for Site 5/LF 7	Ikehara, Gregg N. 36 CES/CEVR	610
26-Oct-00	USEPA Region IX Letter Regarding EPA Comments on Draft Environmental Cleanup Plan for Site 24/LF 29 and Site 2/LF 2	Ikehara, Gregg N. 36 CES/CEVR	611
01-Nov-00	Base Letter to GEPA Regarding Transmittal of Copies of the Spring 2000 Groundwater Monitoring Report for Main Base Operable Units	Ikehara, Gregg N. 36 CES/CEVR	612
01-Nov-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Spring 2000 Groundwater Monitoring Report for Main Base Operable Units	Ikehara, Gregg N. 36 CES/CEVR	613
06-Nov-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Remedial Verification Report for Site 38/MARBO Laundry Facility and Site 20/Waste Pile 7 AAFB	Ikehara, Gregg N. 36 CES/CEVR	614
06-Nov-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Remedial Verification Report for Site 38/MARBO Laundry Facility and Site 20/Waste Pile 7	Ikehara, Gregg N. 36 CES/CEVR	615
06-Nov-00	Base Letter to RAB Members Regarding Next Quarterly Meeting	Schoeck, Edward Colonel, USAF 36 ABW/CV	616
15-Nov-00	**RPM Meeting Minutes, 15 November 00**	**EA Engineering**	**617**
16-Nov-00	**RAB Meeting Minutes, 16 Nov 00**	**EA Engineering**	**618**
16-Nov-00	**GEPA Letter to Base Designating Walter Leon Guerrero as an EPA Representative**	**Salas, Jesus T. GEPA**	**619**
22-Nov-00	Base Letter to GEPA Regarding Transmittal of Copies of the Final Asphalt Recovery Status Reports for Site 351 Waste Pile 1 and Site 29/Waste Pile 2	Ikehara, Gregg N. 36 CES/CEVR	620
22-Nov-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Asphalt Recovery Status Reports for Site 35/Waste Pile 1 and Site 29/Waste Pile 2	Ikehara, Gregg N. 36 CES/CEVR 2	621

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
22-Nov-00	Base Letter to GEPA Regarding Transmittal of Copies of the Sampling and Analysis Plan for Remedial Investigation/ Feasibility Study for Urunao Dumpsites 1 & 2, Urunao Operable Unit, AAFB	Ikehara, Gregg N. 36 CES/CEVR	622
22-Nov-00	Base Letter to GEPA Regarding Transmittal of Copies of the Final Remedial Investigation Report for Harmon Annex Operable Unit, AAFB	Ikehara, Gregg N. 36 CES/CEVR	623
22-Nov-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies for the Sampling and Analysis Plan for Remedial Investigation/Feasibility Study for Urunao Dumpsites 1 & 2, Urunao Operable Unit, AAFB	Ikehara, Gregg N. 36 CES/CEVR	624
30-Nov-00	Base Letter to GEPA Regarding Transmittal of Copies of the Final Environmental Cleanup Plan Report for Site 24/Landfill 29, MARBO Operable Unite, AAFB	Ikehara, Gregg N. 36 CES/CEVR	625
30-Nov-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Environmental Cleanup Report for Site 24/Landfill 29, MARBO Operable Unit, AAFB	Ikehara, Gregg N. 36 CES/CEVR	626
05-Dec-00	Base Letter to GEPA Regarding Transmittal of Copies of for the Amendment of the Record of Decision of the MARBO Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	627
05-Dec-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies for the Amendment of the Record of Decision of the MARBO Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	628
13-Dec-00	**Base Letter to GEPA Regarding Variances for IRP IRP Basewide QAPP, 3/99 for AAFB**	**Ikehara, Gregg N. 36 CES/CEVR**	**629**
13-Dec-00	**Base Letter to USEPA Region IX Regarding Variances for IRP Basewide QAPP, 3/99 for AAFB**	**Ikehara, Gregg N. 36 CES/CEVR**	**630**
13-Dec-00	**Base Letter to USEPA Region IX Regarding Transmittal of Copies for the Draft Proposed Plan for the Harmon Operable Unit**	**Ikehara, Gregg N. 36 CES/CEVR**	**631**
15-Dec-00	**USEPA Region IX Letter to Base Regarding a Request for Variances (13 Dec 00) for IRP Basewide Quality Assurance Project Plan (3/99) for AAFB**	**Ripperda, Mark USEPA Region IX**	**632**
15-Dec-00	Base Letter to GEPA Regarding Transmittal of Copies for the Final Environmental Cleanup Plan Report for Site 5/LF 7, Main Base Operable Unit, AAFB	Ikehara, Gregg N. 36 CES/CEVR	633
15-Dec-00	Base Letter to GEPA Regarding Transmittal of Copies for the Final Environmental Cleanup Plan Report for Site 2/Landfill 2	Ikehara, Gregg N. 36 CES/CEVR	634

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
15-Dec-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies for the Final Environmental Cleanup Plan Report for Site 2/Landfill 2, AAFB	Ikehara, Gregg N. 36 CES/CEVR	635
15-Dec-00	Base Letter to GEPA Regarding Transmittal of Copies for the Final Environmental Cleanup Plan Report for Site 2/Landfill 2	Ikehara, Gregg N. 36 CES/CEVR	636
16-Jan-01	**Base Letter to RAB Members Regarding Quarterly RAB Meeting**	**Schoeck, Edward Colonel, USAF ABW, CV**	**637**
23-Jan-01	GEPA Letter to Base Regarding Comments on the Record of Decision Amendment for the MARBO Annex OU Site 24/Landfill 29	Salas, Jesus T. GEPA	638
23-Jan-01	GEPA Letter to Base Regarding Comments on the to the Sampling and Analysis Plan for Remedial Investigation/ Feasibility Study (RI/FS) for Urunao Dumpsites 1 & 2	Salas, Jesus T. GEPA	639
24-Jan-01	News Article, "Private Firm to Remove Unexploded Ordnance"	Duenas, Joseph E. Guam Variety	640
06-Feb-01	**News Article, "Notice of Availability for Proposed Plan for the Harmon Annex Operable Unit"**	**36 CES/CEVR Pacific Daily News**	**641**
07-Feb-01	**News Article, "Notice of Availability for Proposed Plan for the Harmon Annex Operable Unit**	**36 CES/CEVR Pacific Daily News**	**642**
08-Feb-01	**News Article, "Notice of Availability for Proposed Plan for the Harmon Annex Operable Unit**	**36 CES/CEVR Pacific Daily News**	**643**
08-Feb-01	Base Letter to GEPA Regarding Transmittal of Copies for the Final Asphalt Removal Report, Site 6/Landfill 8, AAFB	Ikehara, Gregg N. 36 CES/CEVR	644
08-Feb-01	Base Letter to USEPA Region IX Regarding Transmittal of Copies for the Final Asphalt Removal Report, Site 6/LF 8	Ikehara, Gregg N. 36 CES/CEVR	645
13-Feb-01	**Base Letter to RAB Members Regarding the Proposed Plan for the Harmon Annex Operable Unit**	**Ikehara, Gregg N. 36 CES/CEVR**	**646**
19-Feb-01	**News Article, "Public Notice Announcement for the RAB Meeting and the Proposed Plan for the Harmon Annex Operable Unit Meeting**	**36 CES/CEVR Pacific Daily News**	**647**
20-Feb-01	**News Article, "Public Notice Announcement for the RAB Meeting and the Proposed Plan for the Harmon Annex Operable Unit Meeting**	**36 CES/CEVR Pacific Daily News**	**648**
21-Feb-01	**RPM Meeting Minutes, 21 Feb 01**	**EA Engineering**	**649**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
21-Feb-01	News Article, "Public Notice Announcement for the RAB Meeting and the Proposed Plan for the Harmon Annex Operable Unit Meeting	36 CES/CEVR Pacific Daily News	650
21-Feb-01	Base Letter to USEPA Region IX Regarding Transmittal of Copies for Draft EE/CA for Site 36/Ritidian Dump Site, Northwest Field Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	651
21-Feb-01	Base Letter to GEPA Regarding Transmittal of Copies for the Draft EE/CA for Site 36/Ritidian Dump Site, Northwest Field Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	652
21-Feb-01	Base Letter to GEPA Regarding Transmittal of Copies for the Revision for ARAR's in the MARBO ROD Amendment	Ikehara, Gregg N. 36 CES/CEVR	653
22-Feb-01	Base Letter to USEPA Region IX Regarding Transmittal of the Revised MARBO ROD Amendment	Ikehara, Gregg N. 36 CES/CEVR	654
00-Feb-01	Final Quality Program Plan & Final Environmental Cleanup Plan for Site 24/Landfill 29 (CD-ROM)	Arnsfield, Chris IT Corporation	655
00-Feb-01	Final Quality Program Plan & Final Environmental Cleanup Plan for Site2/Landfill 2 (CD-ROM)	Arnsfield, Chris IT Corporation	656
00-Feb-01	Final Quality Program Plan & Final Environmental Cleanup Plan for Site 5/Landfill 7 (CD-ROM)	Arnsfield, Chris IT Corporation	657
16-Mar-01	Base Letter to EA Engineering Regarding Site 15/LF 20 Natural Resources Clearance	Poland, D. Joan 36 CES/CEVR	658
26-Mar-01	Base Letter to GEPA Regarding Final SAP for RI/FS Urunao Dumpsites 1 & 2, Urunao OU	Ikehara, Gregg N. 36 CES/CEVR	659
27-Mar-01	Base Letter to GEPA Regarding Transmittal of Copies for the Final EE/CA report for Site 8/Landfills 10A, 10B, 10C, Main Base Operable Unit AAFB	Ikehara, Gregg N. 36 CES/CEVR	660
17-May-01	**RPM Meeting Minutes, dtd 17 May 01**	**EA Engineering**	**661**
22-May-01	**Base Letter to GEPA Regarding Transmittal of Copies for the Agency Draft Harmon Annex OU Record of Decision**	**Ikehara, Gregg N. 36 CES/CEVR**	**662**

Bolded items indicate applicability to the Harmon Annex Record of Decision

Appendix B

IRP Sites 19 and 39 Confirmation Sample Results (IT/OHM, 1999)

Confirmation Soil Sample Analytical Results for IRP Site 19 Parcel A, Parcel B, and Parcel C

Table 2-1
Confirmation Soil Sample Analysis for Parcel A
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S453	
Location						Excavation	
Sample Depth (ft bgs)						6	
COC Number						58-071HA	
Sample Delivery Group Number						98L241	
Date Collected						28-Dec-98	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration	
Volatile Organic Compounds (VOCs)	µg/kg	8260A					
Acetone			NA	1 400,000	6 100,000	44 9	
Benzene			NA	620	1,400	0 29	U
Bromodichloromethane			NA	980	2,300	0 30	U
2 Butanone (Methyl ethyl ketone)			NA	6 900,000	27,000,000	5 9	U
Carbon disulfide			NA	350,000	1,200,000	0 15	U
Carbon tetrachloride			NA	230	520	0 91	U
Chlorobenzene			NA	54,000	180,000	0 23	U
Chloroform			NA	240	520	0 49	U
Chloromethane			NA	1,200	2,600	2 4	U
Dibromomethane			NA	NA	NA	0 40	U
1 1 Dichloroethene			NA	52	120	0 62	U
cis-1,2-Dichloroethene			NA	42,000	150,000	0 34	U
Ethylbenzene			NA	230,000	230,000	0 45	U
2-Hexanone			NA	NA	NA	1 4	U
Methylene chloride			NA	8,500	20,000	0 47	U
4-Methyl-2-pentanone (MIBK)			NA	NA	NA	1 3	U
Naphthalene			NA	NA	NA	0 46	U
1 1,2,2-Tetrachloroethane			NA	360	870	0.38	U
Tetrachloroethene (PCE)			NA	4,700	16,000	0.28	U
Toluene			NA	520,000	520,000	0 36	U
1 2,3-Trichlorobenzene			NA	NA	NA	0.29	U
1,2 4-Trichlorobenzene			NA	480,000	1,700,000	0.49	U
1 1 1-Trichloroethane			NA	680,000	1,400,000	0.38	U
1 1,2-Trichloroethane			NA	820	1,900	0.27	U
Trichloroethene			NA	2,700	6,100	0.30	U
Trichlorofluoromethane			NA	380,000	1,300,000	0.33	U
Vinyl chloride			NA	21	48	1.2	U
m Xylene			NA	210,000	210,000	0 87	U
o-Xylene			NA	280,000	280,000	0.39	U
p-Xylene			NA	370 000	370,000	0 87	U

Notes.
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in BOLD exceed the residential PRG and BTV

Data Qualifiers
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)
J The analyte was positively identified, the quantitation is an estimation
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Table 2-1
Confirmation Soil Sample Analysis for Parcel A
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S453	
Location						Excavation	
Sample Depth (ft bgs)						6	
COC Number						58-071HA	
Sample Delivery Group Number						98L241	
Date Collected						28-Dec-98	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration	
Semi-Volatile Organic Compounds (SVOCs)	µg/kg	8270B					
Acenaphthene			NA	2,600,000	28,000 000	1,200	U
Acenaphthylene			NA	NA	NA	1,200	U
Anthracene			NA	14,000 000	220,000,000	780	U
Benzo(a)anthracene			NA	560	3,600	800	U
Benzo(a)pyrene			NA	56	360	430	U
Benzo(b)fluoranthene			NA	560	3,600	740	U
Benzo(k)fluoranthene			NA	5,600	36,000	790	U
Benzo(ghi)perylene			NA	NA	NA	470	U
Bis(2-ethylhexyl) phthlate			NA	32,000	210,000	980	U
Butyl benzylphthalate			NA	930,000	930,000	880	U
Carbazole			NA	22,000	150,000	910	U
Chrysene			NA	56,000	360,000	1,000	U
Di-n-butyl phthalate			NA	NA	NA	920	U
Dibenzo(a,h)anthracene			NA	56	360	370	U
Dibenzofuran			NA	210,000	3,200,000	1,200	U
Fluoranthene			NA	2,000,000	37,000,000	890	U
Indeno(1,2,3-cd) pyrene			NA	560	3,600	490	U
Naphthalene			NA	55,000	190,000	1,600	U
Pentachlorophenol			NA	2,500	15,000	920	U
Phenanthrene			NA	NA	NA	760	U
Pyrene			NA	1 500 000	26 000 000	1,000	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310					
Anthracene			NA	14 000 000	220,000,000	1 7	U
Fluoranthene			NA	2,000,000	37,000,000	3 8	U
Pyrene			NA	1,500,000	26,000,000	2 3	U
Benzo(a)anthracene			NA	560	3,600	3 2	U
Chrysene			NA	56,000	360,000	9 04	J
Benzo(b)fluoranthene			NA	560	3,600	4.38	J
Benzo(k)fluoranthene			NA	5,600	36,000	3.9	U
Benzo(a)pyrene			NA	56	360	3.92	J
Dibenzo(a,h)anthracene			NA	56	360	8 1	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3 5	U

Notes

NA Not Applicable

PRG denotes Preliminary Remediation Goal

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in **BOLD** exceed the residential PRG and BTV

Data Qualifiers

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Table 2-1
Confirmation Soil Sample Analysis for Parcel A
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID				HAS39S450	HAS39S451
Location				Dioxin Hot Spot- Same as EA 04S19S023	Excavation
Sample Depth (ft bgs)				15	6
COC Number				58-067HA	58-067HA
Sample Delivery Group Number				47581	47581
Date Collected				21 Dec-98	23 Dec-98
Analyte	Units	EPA Method	Subsurface Clean-Up Goal	Concentration	
Dioxins	µg/kg	8290			
Total WHO TEQ			1 0	0 0164	0 00160

Notes
NA Not Applicable

Data Qualifiers
U The analyte was analyzed for, but not detected The associated numerical value is at or below the MDL
J The analyte was positively identified, the quantitation is an estimation
UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank, as well as in the sample
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

Table 2-2
Confirmation Soil Sample Analysis for Parcel B
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID			HAS39S413	HAS39S414
Location			Dioxin Hot Spot - Same as EA 04S19S019	Dioxin Hot Spot - Same as EA 04S19S032
Sample Depth (ft bgs)			4 5	5
COC Number			58-063HA	58-063HA
Sample Delivery Group Number			48480	48480
Date Collected			12-Dec-98	12-Dec-98
Analyte	**Units**	**EPA Method**	**Concentration**	
Dioxins	**µg/kg**	**8290**		
Total WHO TEQ			0.0006	0 0005

Data Qualifiers.

U The analyte was analyzed for, but not detected The associated numerical value is at or below the method detection limit (MDL)..

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank, as well as in the sample.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S537		HAS19S538		HAS19S539		HAS19S540		HAS19S541	
Location						Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor	
Sample Depth (ft bgs)						5.0		5 0		5 0		5 0		5 0	
COC Number						58-083HA		58-083HA		58-083HA		58-083HA		58-083HA	
Sample Delivery Group Number						99B071		99B071		99B071		99B071		99B071	
Date Collected						05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration									
Metals	mg/kg	6010A													
Antimony			63	30	750	4.4	U	4.2	U	4.2	U	9 06	J	4.3	U
Lead			166	400	1,000	24.3		6.77		4.78		387		5.28	

Notes:
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in BOLD exceed the residential PRG and BTV

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data.

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S542		HAS19S543		HAS19S544		HAS19S545		HAS19S546	
Location						Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor	
Sample Depth (ft bgs)						5 0		5.0		5.0		5.0		5.0	
COC Number						58-083HA		58-083HA		58-083HA		58-083HA		58-083HA	
Sample Delivery Group Number						99B071		99B071		99B071		99B071		99B071	
Date Collected						05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**									
Metals	**mg/kg**	**6010A**													
Antimony			63	30	750	5.23	J	4.3	U	4.4	U	6 26	J	4 3	U
Lead			166	400	1,000	24.3		45.6		5.07		47.9		26.6	

Notes:
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in **BOLD** exceed the residential PRG and BTV

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data.

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S547		HAS19S548		HAS19S549		HAS19S550		HAS19S551	
Location						Excavation Floor		Excavation Floor		Duplicate of HAS19S537		North Wall		North Wall	
Sample Depth (ft bgs)						5.0		5 0		5 0		2.5		2 5	
COC Number						58-084HA		58-084HA		58-084HA		58-084HA		58-084HA	
Sample Delivery Group Number						99B071		99B071		99B071		99B071		99B071	
Date Collected						05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**									
Metals	**mg/kg**	**6010A**													
Antimony			63	30	750	4.1	U	4.2	U	4 3	U	4.1	U	5.9	J
Lead			166	400	1,000	5.21		21.3		17.7		15.6		27.8	

Notes:
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in **BOLD** exceed the residential PRG and BTV

Data Qualifiers:
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J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data.

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S552		HAS19S553		HAS19S554		HAS19S555	HAS19S556
Location						East Wall		East Wall		South Wall		South Wall	West Wall
Sample Depth (ft bgs)						2.5		2.5		2.5		2.5	2.5
COC Number						58-084HA		58-084HA		58-084HA		58-084HA	58-084HA
Sample Delivery Group Number						99B071		99B071		99B071		99B071	99B071
Date Collected						05-Feb-99		05-Feb-99		05-Feb-99		05-Feb-99	05-Feb-99
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**							
Metals	**mg/kg**	**6010A**											
Antimony			63	30	750	4.1	U	4.7	U	4.3	U	27 8	18 3
Lead			166	400	1,000	50.5		50.2		43.6		**998**	**831**

Notes.
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in **BOLD** exceed the residential PRG and BTV

Data Qualifiers:
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J The analyte was positively identified, the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S557	HAS19S558	HAS19S590	HAS19S591	HAS19S592
Location						West Wall	Duplicate of HAS19S554	Excavation Floor	Excavation Floor	Excavation Floor
Sample Depth (ft bgs)						2.5	2.5	5.0	5.0	5.0
COC Number						58-085HA	58-085HA	58-091HA	58-091HA	58-091HA
Sample Delivery Group Number						99B071	99B071	99E006	99E006	99E006
Date Collected						05-Feb-99	05-Feb-99	26-Apr-99	26-Apr-99	26-Apr-99
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**				
Metals	**mg/kg**	**6010A**								
Antimony			63	30	750	32.2	4.2 U	4.6 U	4.4 U	4.3 U
Lead			166	400	1,000	**1,140**	85	37.7 J	56.4 J	14.7 J

Notes:
NA Not Applicable
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[3] EPA Region 9 Industrial PRG (May, 1998)
Values in **BOLD** exceed the residential PRG and BTV

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J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S593		HAS19S594		HAS19S595		HAS19S596		HAS19S597	
Location						Excavation Floor		Excavation Floor		North Wall		West Wall		West Wall	
Sample Depth (ft bgs)						5.0		5.0		2.5		2 5		2.5	
COC Number						58-091HA		58-091HA		58-091HA		58-091HA		58-091HA	
Sample Delivery Group Number						99E006		99E006		99E006		99E006		99E006	
Date Collected						26-Apr-99		26-Apr-99		26-Apr-99		26-Apr-99		26-Apr-99	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**									
Metals	**mg/kg**	**6010A**													
Antimony			63	30	750	4.4	U	4.3	U	5.3	U	4.7	U	5.2	U
Lead			166	400	1,000	18.2	J	32.9	J	63.5	J	82.9	J	65.3	J

Notes:
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in **BOLD** exceed the residential PRG and BTV

Data Qualifiers:
U The analyte was analyzed for, but not detected The associated numerical value is at or below the Method Detection Limit (MDL).
J *The analyte was positively identified; the quantitation is an estimation.*
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data.

Table 2-3
Confirmation Soil Sample Analysis for Parcel C
IRP Site 19/Landfill 24, Andersen AFB, Guam

Sample ID						HAS19S598		HAS19S599		HAS19S600		HAS19S601	
Location						South Wall		Duplicate of HAS39S596		Excavation Floor		South Wall	
Sample Depth (ft bgs)						2.5		2.5		5.0		2.5	
COC Number						58-091HA		58-091HA		58-092HA		58-092HA	
Sample Delivery Group Number						99E006		99E006		99E006		99E006	
Date Collected						26-Apr-99		26-Apr-99		26-Apr-99		26-Apr-99	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**							
Metals	**mg/kg**	**6010A**											
Antimony			63	30	750	4.9	U	4.6	U	4.4	U	5.1	U
Lead			166	400	1,000	184	J	72.6	J	65.3	J	61.2	J

Notes:
NA Not Applicable
PRG denotes Preliminary Remediation Goal
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in **BOLD** exceed the residential PRG and BTV

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data.

Confirmation Soil Sample Analytical Results for IRP Site 39 Oil/Water Separator

Table 2-1
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S122	
Location						Oil/Water Separator Floor	
Sample Depth bgs (feet)						7	
COC Number						58-021HA	
Sample Delivery Group Number						98G031	
Date Collected						26-Jul-98	
Analyte	**Units**	**EPA Method**	**BTV** [1]	**EPA PRG Res** [2]	**EPA PRG Indust** [3]	**Concentration**	
Total Petroleum Hydrocarbons	mg/kg	418.1					
Total Recoverable Petroleum Hydrocarbons			NA	NA	NA	200	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081					
Aroclor 1016			NA	NA	NA	9.0	U
Aroclor 1221			NA	NA	NA	8.9	U
Aroclor 1232			NA	NA	NA	8.8	U
Aroclor 1242			NA	NA	NA	3.2	U
Aroclor 1248			NA	NA	NA	5.3	U
Aroclor 1254			NA	NA	NA	3.5	U
Aroclor 1260			NA	NA	NA	119	
Total PCBs			NA	200	1,300	119	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US
Pesticides	µg/kg	8081					
gamma-BHC (Lindane)			NA	420	3,200	NA	
delta-BHC			NA	NA	NA	NA	
Aldrin			NA	26	180	NA	
Heptachlor epoxide			NA	49	330	NA	
gamma-Chlordane			NA	1,600	12,000	NA	
alpha-Chlordane			NA	1,600	12,000	NA	
4,4'-DDE			NA	1,700	13,000	NA	
Dieldrin			NA	28	190	NA	
Endrin			NA	16,000	320,000	NA	
4,4'-DDD			NA	2,400	19,000	NA	
4,4'-DDT			NA	1,700	13,000	NA	
Endrin aldehyde			NA	16,000	320,000	NA	
Methoxychlor			NA	270,000	5,300,000	NA	
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310					
Anthracene			NA	14,000,000	220,000,000	NA	
Fluoranthene			NA	2,000,000	37,000,000	NA	
Pyrene			NA	1,500,000	26,000,000	NA	
Benzo(a)anthracene			NA	560	3,600	NA	
Chrysene			NA	56,000	360,000	NA	
Benzo(b)fluoranthene			NA	560	3,600	NA	
Benzo(k)fluoranthene			NA	5,600	36,000	NA	
Benzo(a)pyrene			NA	56	360	NA	
Dibenzo(a,h)anthracene			NA	56	360	NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA	
Metals	mg/kg	7421					
Lead			166	400	1,000	18.0	

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] *Background Threshold Value*

[2] *EPA Region 9 Residential PRG (May, 1998)*

[3] *EPA Region 9 Industrial PRG (May, 1998)*

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S123		HAS39S287	
Location						Oil/Water Separator Floor		Re-sample of HAS39S123 for additional analyses	
Sample Depth bgs (feet)						7		7	
COC Number						58-021HA		58-046HA	
Sample Delivery Group Number						98G031		98I037	
Date Collected						06-Jul-98		02-Sep-98	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration			
Total Petroleum Hydrocarbons	mg/kg	418.1							
Total Recoverable Petroleum Hydrocarbons			NA	NA	NA	520		NA	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	8.8	U	NA	
Aroclor 1221			NA	NA	NA	8.7	U	NA	
Aroclor 1232			NA	NA	NA	8.6	U	NA	
Aroclor 1242			NA	NA	NA	3.2	U	NA	
Aroclor 1248			NA	NA	NA	5.2	U	NA	
Aroclor 1254			NA	NA	NA	3.4	U	NA	
Aroclor 1260			NA	NA	NA	121		NA	
Total PCBs			NA	200	1,300	121		NA	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US	NA	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	NA		3.5	U
delta-BHC			NA	NA	NA	NA		2.1	U
Aldrin			NA	26	180	NA		1.5	U
Heptachlor epoxide			NA	49	330	NA		1.9	U
gamma-Chlordane			NA	1,600	12,000	NA		15.2	
alpha-Chlordane			NA	1,600	12,000	NA		20.2	J
4,4'-DDE			NA	1,700	13,000	NA		224	
Dieldrin			NA	28	190	NA		8.1	U
Endrin			NA	16,000	320,000	NA		7.8	U
4,4'-DDD			NA	2,400	19,000	NA		13.1	J
4,4'-DDT			NA	1,700	13,000	NA		188	
Endrin aldehyde			NA	16,000	320,000	NA		5.0	U
Methoxychlor			NA	270,000	5,300,000	NA		40	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	NA		1.6	U
Fluoranthene			NA	2,000,000	37,000,000	NA		3.7	U
Pyrene			NA	1,500,000	26,000,000	NA		2.3	U
Benzo(a)anthracene			NA	560	3,600	NA		3.1	U
Chrysene			NA	56,000	360,000	NA		2.3	U
Benzo(b)fluoranthene			NA	560	3,600	NA		4.1	U
Benzo(k)fluoranthene			NA	5,600	36,000	NA		3.9	U
Benzo(a)pyrene			NA	56	360	NA		2.8	U
Dibenzo(a,h)anthracene			NA	56	360	NA		8.0	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA		3.4	U
Metals	mg/kg	7421 or 6010A							
Lead			166	400	1,000	20.5		17.6	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S125		HAS39S126	
Location						Oil/Water Separator Floor		Oil/Water Separator Floor	
Sample Depth bgs (feet)						7		7	
COC Number						58-021HA		58-021HA	
Sample Delivery Group Number						98G031		98G031	
Date Collected						06-Jul-98		06-Jul-98	
Analyte	**Units**	**EPA Method**	**BTV** [1]	**EPA PRG Res** [2]	**EPA PRG Indust** [3]	**Concentration**			
Total Petroleum Hydrocarbons	mg/kg	418.1							
TRPH			NA	NA	NA	220		160	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	8 8	U	9 3	U
Aroclor 1221			NA	NA	NA	8 7	U	9 2	U
Aroclor 1232			NA	NA	NA	8 6	U	9 2	U
Aroclor 1242			NA	NA	NA	3.2	U	3 4	U
Aroclor 1248			NA	NA	NA	5.2	U	5 6	U
Aroclor 1254			NA	NA	NA	2 4	U	3 6	U
Aroclor 1260			NA	NA	NA	27.6	J	111	
Total PCBs			NA	200	1,300	27.6	J	111	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US	500	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	NA		NA	
delta-BHC			NA	NA	NA	NA		NA	
Aldrin			NA	26	180	NA		NA	
Heptachlor epoxide			NA	49	330	NA		NA	
gamma-Chlordane			NA	1,600	12,000	NA		NA	
alpha-Chlordane			NA	1,600	12,000	NA		NA	
4,4'-DDE			NA	1,700	13,000	NA		NA	
Dieldrin			NA	28	190	NA		NA	
Endrin			NA	16,000	320,000	NA		NA	
4,4'-DDD			NA	2,400	19,000	NA		NA	
4,4'-DDT			NA	1,700	13,000	NA		NA	
Endrin aldehyde			NA	16,000	320,000	NA		NA	
Methoxychlor			NA	270,000	5,300,000	NA		NA	
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	NA		NA	
Fluoranthene			NA	2,000,000	37,000,000	NA		NA	
Pyrene			NA	1,500,000	26,000,000	NA		NA	
Benzo(a)anthracene			NA	560	3,600	NA		NA	
Chrysene			NA	56,000	360,000	NA		NA	
Benzo(b)fluoranthene			NA	560	3,600	NA		NA	
Benzo(k)fluoranthene			NA	5,600	36,000	NA		NA	
Benzo(a)pyrene			NA	56	360	NA		NA	
Dibenzo(a,h)anthracene			NA	56	360	NA		NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA		NA	
Metals	mg/kg	7421							
Lead			166	400	1,000	16.1		26.6	

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S127		HAS39S128	
Location						Oil/Water Separator Floor		Oil/Water Separator Floor	
Sample Depth bgs (feet)						7		7	
COC Number						58-021HA		53-021HA	
Sample Delivery Group Number						98G031		98G031	
Date Collected						05-Jul-98		06-Jul-98	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration			
Total Petroleum Hydrocarbons	mg/kg	418.1							
TXPH			NA	NA	NA	190		110	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.2	U	9.2	U
Aroclor 1221			NA	NA	NA	9.1	U	9.1	U
Aroclor 1232			NA	NA	NA	9.0	U	9.0	U
Aroclor 1242			NA	NA	NA	3.3	U	3.3	U
Aroclor 1248			NA	NA	NA	5.5	U	5.5	U
Aroclor 1254			NA	NA	NA	3.6	U	3.6	U
Aroclor 1260			NA	NA	NA	52.5		46.5	
Total PCBs			NA	200	1,300	52.5		46.5	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US	500	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	NA		NA	
delta-BHC			NA	NA	NA	NA		NA	
Aldrin			NA	26	180	NA		NA	
Heptachlor epoxide			NA	49	330	NA		NA	
gamma-Chlordane			NA	1,600	12,000	NA		NA	
alpha-Chlordane			NA	1,600	12,000	NA		NA	
4,4'-DDE			NA	1,700	13,000	NA		NA	
Dieldrin			NA	28	190	NA		NA	
Endrin			NA	16,000	320,000	NA		NA	
4,4'-DDD			NA	2,400	19,000	NA		NA	
4,4'-DDT			NA	1,700	13,000	NA		NA	
Endrin aldehyde			NA	16,000	320,000	NA		NA	
Methoxychlor			NA	270,000	5,300,000	NA		NA	
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	NA		NA	
Fluoranthene			NA	2,000,000	37,000,000	NA		NA	
Pyrene			NA	1,500,000	26,000,000	NA		NA	
Benzo(a)anthracene			NA	560	3,600	NA		NA	
Chrysene			NA	56,000	360,000	NA		NA	
Benzo(b)fluoranthene			NA	560	3,600	NA		NA	
Benzo(k)fluoranthene			NA	5,600	36,000	NA		NA	
Benzo(a)pyrene			NA	56	360	NA		NA	
Dibenzo(a,h)anthracene			NA	56	360	NA		NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA		NA	
Metals	mg/kg	7421							
Lead			166	400	1,000	20.2		19.7	

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S129		HAS39S130	
Location						Oil/Water Separator Floor		Oil/Water Separator Floor	
Sample Depth bgs (feet)						7		7	
COC Number						58-021HA		58-021HA	
Sample Delivery Group Number						98G031		98G031	
Date Collected						06-Jul-98		06-Jul-98	
Analyte	**Units**	**EPA Method**	**BTV** [1]	**EPA PRG Res** [2]	**EPA PRG Indust** [3]	**Concentration**			
Total Petroleum Hydrocarbons	**mg/kg**	**418.1**							
TRPH			NA	NA	NA	290		220	
Polychlorinated Biphenyls (PCBs)	**µg/kg**	**8081**							
Aroclor 1016			NA	NA	NA	9 0	U	8 9	U
Aroclor 1221			NA	NA	NA	8 9	U	8 8	U
Aroclor 1232			NA	NA	NA	8 8	U	8 7	U
Aroclor 1242			NA	NA	NA	3 2	U	3 2	U
Aroclor 1248			NA	NA	NA	5 4	U	5 3	U
Aroclor 1254			NA	NA	NA	3 5	U	3 5	U
Aroclor 1260			NA	NA	NA	178		160	
Total PCBs			NA	290	1,300	178		160	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US	500	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	NA		NA	
delta-BHC			NA	NA	NA	NA		NA	
Aldrin			NA	26	180	NA		NA	
Heptachlor epoxide			NA	49	330	NA		NA	
gamma-Chlordane			NA	1,600	12,000	NA		NA	
alpha-Chlordane			NA	1,600	12,000	NA		NA	
4,4'-DDE			NA	1,700	13,000	NA		NA	
Dieldrin			NA	28	190	NA		NA	
Endrin			NA	16,000	320,000	NA		NA	
4,4'-DDD			NA	2,400	19,000	NA		NA	
4,4'-DDT			NA	1,700	13,000	NA		NA	
Endrin aldehyde			NA	16,000	320,000	NA		NA	
Methoxychlor			NA	270,000	5,300,000	NA		NA	
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**							
Anthracene			NA	14,000,000	220,000,000	NA		NA	
Fluoranthene			NA	2,000,000	37,000,000	NA		NA	
Pyrene			NA	1,500,000	26,000,000	NA		NA	
Benzo(a)anthracene			NA	560	3,600	NA		NA	
Chrysene			NA	56,000	360,000	NA		NA	
Benzo(b)fluoranthene			NA	560	3,600	NA		NA	
Benzo(k)fluoranthene			NA	5,600	36,000	NA		NA	
Benzo(a)pyrene			NA	56	360	NA		NA	
Dibenzo(a,h)anthracene			NA	56	360	NA		NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA		NA	
Metals	mg/kg	7421							
Lead			166	400	1,000	19 6		26 4	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May 1998)

[3] EPA Region 9 Industrial PRG (May 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers

U The analyte was analyzed for but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S132		HAS39S135	
Location						Oil/Water Separator Wall		Oil/Water Separator Wall	
Sample Depth bgs (feet)						NA		NA	
COC Number						58-022HA		58-022HA	
Sample Delivery Group Number						98G031		98G031	
Date Collected						06-Jul-98		06-Jul-98	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration			
Total Petroleum Hydrocarbons	mg/kg	418.1							
TRPH			NA	NA	NA	2,900		140	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.2	U	9.2	U
Aroclor 1221			NA	NA	NA	9.1	U	9.1	U
Aroclor 1232			NA	NA	NA	9.0	U	9.0	U
Aroclor 1242			NA	NA	NA	3.3	U	3.3	U
Aroclor 1248			NA	NA	NA	5.5	U	5.5	U
Aroclor 1254			NA	NA	NA	3.6	U	3.6	U
Aroclor 1260			NA	NA	NA	45.7		124	
Total PCBs			NA	200	1,300	45.7		124	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	300	US	300	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	NA		NA	
delta-BHC			NA	NA	NA	NA		NA	
Aldrin			NA	26	180	NA		NA	
Heptachlor epoxide			NA	49	330	NA		NA	
gamma-Chlordane			NA	1,600	12,000	NA		NA	
alpha-Chlordane			NA	1,600	12,000	NA		NA	
4,4'-DDE			NA	1,700	13,000	NA		NA	
Dieldrin			NA	28	190	NA		NA	
Endrin			NA	16,000	320,000	NA		NA	
4,4'-DDD			NA	2,400	19,000	NA		NA	
4,4'-DDT			NA	1,700	13,000	NA		NA	
Endrin aldehyde			NA	16,000	320,000	NA		NA	
Methoxychlor			NA	270,000	5,300,000	NA		NA	
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	NA		NA	
Fluoranthene			NA	2,000,000	37,000,000	NA		NA	
Pyrene			NA	1,500,000	26,000,000	NA		NA	
Benzo(a)anthracene			NA	560	3,600	NA		NA	
Chrysene			NA	56,000	360,000	NA		NA	
Benzo(b)fluoranthene			NA	560	3,600	NA		NA	
Benzo(k)fluoranthene			NA	5,600	36,000	NA		NA	
Benzo(a)pyrene			NA	56	360	NA		NA	
Dibenzo(a,h)anthracene			NA	56	360	NA		NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA		NA	
Metals	mg/kg	7421							
Lead			166	400	1,000	65.0		49.8	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May 1998)

[3] EPA Region 9 Industrial PRG (May 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers

U The analyte was analyzed for but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified, the quantitation is an estimation.

UJ The analyte was analyzed for but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S141		HAS39S142	
Location						Oil/Water Separator Wall		Oil/Water Separator Wall	
Sample Depth bgs (feet)						NA		NA	
COC Number						58-022HA		58-023HA	
Sample Delivery Group Number						98G031		98G031	
Date Collected						05-Jul-98		06-Jul-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Total Petroleum Hydrocarbons	mg/kg	418.1							
TRPH			NA	NA	NA	32		16	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.3	U	9.2	U
Aroclor 1221			NA	NA	NA	9.2	U	9.1	U
Aroclor 1232			NA	NA	NA	9.1	U	9.0	U
Aroclor 1242			NA	NA	NA	3.3	U	3.3	U
Aroclor 1248			NA	NA	NA	5.5	U	5.5	U
Aroclor 1254			NA	NA	NA	3.6	U	3.6	U
Aroclor 1260			NA	NA	NA	5.7	U	5.6	U
Total PCBs			NA	200	1,300	—		—	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US	500	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.72	U	7.2	U
delta-BHC			NA	NA	NA	0.43	U	4.3	U
Aldrin			NA	26	180	0.30	U	3.0	U
Heptachlor epoxide			NA	49	330	0.39	U	3.9	U
gamma-Chlordane			NA	1,600	12,000	0.38	U	3.8	U
alpha-Chlordane			NA	1,600	12,000	0.39	U	3.9	U
4,4'-DDE			NA	1,700	13,000	1.11	J	371	
Dieldrin			NA	28	190	1.7	U	16	U
Endrin			NA	16,000	320,000	1.6	U	16	U
4,4'-DDD			NA	2,400	19,000	1.4	U	14.5	J
4,4'-DDT			NA	1,700	13,000	1.4	U	392	
Endrin aldehyde			NA	16,000	320,000	1.0	U	10	U
Methoxychlor			NA	270,000	5,300,000	8.2	U	82	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.7	U	1.7	U
Fluoranthene			NA	2,000,000	37,000,000	3.8	U	3.6	U
Pyrene			NA	1,500,000	26,000,000	2.4	U	2.3	U
Benzo(a)anthracene			NA	560	3,600	3.2	U	3.2	U
Chrysene			NA	56,000	360,000	2.3	U	2.3	U
Benzo(b)fluoranthene			NA	560	3,600	4.2	U	4.2	U
Benzo(k)fluoranthene			NA	5,600	36,000	4.0	U	3.9	U
Benzo(a)pyrene			NA	56	360	2.9	U	2.8	U
Dibenzo(a,h)anthracene			NA	56	360	[illegible]	U	8.1	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.5	U	3.5	U
Metals	mg/kg	7421							
Lead			166	400	1,000	31.9		44.6	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S143		HAS39S259	
Location						Oil/Water Separator Wall		Pipelines	
Sample Depth bgs (feet)						NA		7	
COC Number						58-023HA		58-043HA	
Sample Delivery Group Number						98G031		98I037	
Date Collected						06-Jul-98		02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Total Petroleum Hydrocarbons	mg/kg	418.1							
TRPH			NA	NA	NA	200		NA	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.5	U	8.8	U
Aroclor 1221			NA	NA	NA	9.4	U	8.7	U
Aroclor 1232			NA	NA	NA	9.3	U	8.6	U
Aroclor 1242			NA	NA	NA	3.4	U	3.2	U
Aroclor 1248			NA	NA	NA	5.6	U	5.2	U
Aroclor 1254			NA	NA	NA	3.7	U	3.4	U
Aroclor 1260			NA	NA	NA	5.8	U	60.2	
Total PCBs			NA	200	1,300	—		60.2	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	500	US	NA	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	NA		6.8	UJ
delta-BHC			NA	NA	NA	NA		4.1	U
Aldrin			NA	26	180	NA		2.8	UJ
Heptachlor epoxide			NA	49	330	NA		3.7	U
gamma-Chlordane			NA	1,600	12,000	NA		21.0	
alpha-Chlordane			NA	1,600	12,000	NA		19.9	J
4,4'-DDE			NA	1,700	13,000	NA		189	
Dieldrin			NA	28	190	NA		16	U
Endrin			NA	16,000	320,000	NA		15	U
4,4'-DDD			NA	2,400	19,000	NA		33.9	J
4,4'-DDT			NA	1,700	13,000	NA		224	
Endrin aldehyde			NA	16,000	320,000	NA		9.6	U
Methoxychlor			NA	270,000	5,300,000	NA		78	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	NA		1.6	U
Fluoranthene			NA	2,000,000	37,000,000	NA		3.6	U
Pyrene			NA	1,500,000	26,000,000	NA		2.7	U
Benzo(a)anthracene			NA	560	3,600	NA		10.8	F
Chrysene			NA	56,000	360,000	NA		5.9	J
Benzo(b)fluoranthene			NA	560	3,600	NA		12.4	J
Benzo(k)fluoranthene			NA	5,600	36,000	NA		3.8	U
Benzo(a)pyrene			NA	56	360	NA		18	J
Dibenzo(a,h)anthracene			NA	56	360	NA		7.8	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	NA		12	J
Metals	mg/kg	7421							
Lead			166	400	1,000	49.1		33	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May 1998)

[3] EPA Region 9 Industrial PRG (May 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S260		HAS39S261	
Location						Pipelines		Pipelines	
Sample Depth bgs (feet)						7		7	
COC Number						58-043HA		58-043HA	
Sample Delivery Group Number						98J037		98J037	
Date Collected						02-Sep-98		02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV[1]**	**EPA PRG Res[2]**	**EPA PRG Indust[3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	8.8	U	8.6	U
Aroclor 1221			NA	NA	NA	8.8	U	8.5	U
Aroclor 1232			NA	NA	NA	8.7	U	8.4	U
Aroclor 1242			NA	NA	NA	3.2	U	3.1	U
Aroclor 1248			NA	NA	NA	5.3	U	5.3	U
Aroclor 1254			NA	NA	NA	3.4	U	3.4	U
Aroclor 1260			NA	NA	NA	163		5.3	U
Total PCBs			NA	200	1,300	163		—	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	14	UJ	6.7	UJ
delta-BHC			NA	NA	NA	6.3	U	4.0	U
Aldrin			NA	26	180	5.7	UJ	2.8	UJ
Heptachlor epoxide			NA	49	330	7.5	U	3.6	U
gamma-Chlordane			NA	1,600	12,000	37.7	J	3.5	U
alpha-Chlordane			NA	1,600	12,000	22.4	J	3.6	U
4,4'-DDE			NA	1,700	13,000	407		364	
Dieldrin			NA	28	190	32	U	15	U
Endrin			NA	16,000	320,000	30	U	15	U
4,4'-DDD			NA	2,400	19,000	48.3	J	17.6	J
4,4'-DDT			NA	1,700	13,000	552		244	
Endrin aldehyde			NA	16,000	320,000	19	U	9.4	U
Methoxychlor			NA	270,000	5,300,000	160	U	76	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.6	U	1.6	U
Fluoranthene			NA	2,000,000	37,000,000	3.6	U	3.5	U
Pyrene			NA	1,500,000	26,000,000	2.2	U	2.2	U
Benzo(a)anthracene			NA	560	3,600	3.1	U	3.0	U
Chrysene			NA	56,000	360,000	2.2	U	2.2	U
Benzo(b)fluoranthene			NA	560	3,600	4.0	U	3.9	U
Benzo(k)fluoranthene			NA	5,600	36,000	3.8	U	3.7	U
Benzo(a)pyrene			NA	56	360	2.8	U	2.7	U
Dibenzo(a,h)anthracene			NA	56	360	7.8	U	7.6	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.3	U	3.2	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	37		38	

Notes:
bgs denotes below ground surface
NA Not Applicable / Not Analyzed
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in BOLD exceed the residential PRG
mg/kg denotes milligrams per kilogram
µg/kg denotes micrograms per kilogram

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS395264	
Location						Pipelines	
Sample Depth bgs (feet)						7	
COC Number						58-043HA	
Sample Delivery Group Number						98I037	
Date Collected						02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**	
Polychlorinated Biphenyls (PCBs)	µg/kg	8081					
Aroclor 1016			NA	NA	NA	8.6	U
Aroclor 1221			NA	NA	NA	8.5	U
Aroclor 1232			NA	NA	NA	8.4	U
Aroclor 1242			NA	NA	NA	3.1	U
Aroclor 1248			NA	NA	NA	5.1	U
Aroclor 1254			NA	NA	NA	3.3	U
Aroclor 1260			NA	NA	NA	5.2	U
Total PCBs			NA	200	1,300	—	
Pesticides	µg/kg	8081					
gamma-BHC (Lindane)			NA	420	3,200	0.67	UJ
delta-BHC			NA	NA	NA	0.40	U
Aldrin			NA	26	180	0.28	UJ
Heptachlor epoxide			NA	49	330	2.07	
gamma-Chlordane			NA	1,600	12,000	1.66	J
alpha-Chlordane			NA	1,600	12,000	1.51	J
4,4'-DDE			NA	1,700	13,000	1380	
Dieldrin			NA	28	190	1.5	U
Endrin			NA	16,000	320,000	1.5	U
4,4'-DDD			NA	2,400	19,000	166	J
4,4'-DDT			NA	1,700	13,000	1080	
Endrin aldehyde			NA	16,000	320,000	8.87	
Methoxychlor			NA	270,000	5,300,000	7.6	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310					
Anthracene			NA	14,000,000	220,000,000	1.6	U
Fluoranthene			NA	2,000,000	37,000,000	2.5	U
Pyrene			NA	1,500,000	26,000,000	2.2	U
Benzo(a)anthracene			NA	560	3,600	3.0	U
Chrysene			NA	56,000	360,000	2.1	U
Benzo(b)fluoranthene			NA	560	3,600	3.9	U
Benzo(k)fluoranthene			NA	5,600	36,000	3.7	U
Benzo(a)pyrene			NA	56	360	2.7	U
Dibenzo(a,h)anthracene			NA	56	360	7.6	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.2	U
Metals	mg/kg	6010A					
Lead			166	400	1,000	149	

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S266		HAS39S267	
Location						Pipelines		Pipelines	
Sample Depth bgs (feet)						7		NA	
COC Number						58-043HA		58-043HA	
Sample Delivery Group Number						98I037		98I037	
Date Collected						02-Sep-98		02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	8.9	U	9.0	U
Aroclor 1221			NA	NA	NA	8.8	U	8.9	U
Aroclor 1232			NA	NA	NA	8.7	U	8.8	U
Aroclor 1242			NA	NA	NA	3.2	U	3.2	U
Aroclor 1248			NA	NA	NA	5.3	U	5.4	U
Aroclor 1254			NA	NA	NA	3.5	U	3.5	U
Aroclor 1260			NA	NA	NA	67.9		5.5	U
Total PCBs			NA	200	1,300	67.9		---	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.69	UJ	7.0	UJ
delta-BHC			NA	NA	NA	0.42	U	4.2	U
Aldrin			NA	26	180	0.29	UJ	2.9	UJ
Heptachlor epoxide			NA	49	330	0.879	J	3.8	U
gamma-Chlordane			NA	1,600	12,000	1.02	J	3.7	U
alpha-Chlordane			NA	1,600	12,000	1.02	J	3.8	U
4,4'-DDE			NA	1,700	13,000	966		127	
Dieldrin			NA	28	190	1.6	U	16	U
Endrin			NA	16,000	320,000	1.5	U	15	U
4,4'-DDD			NA	2,400	19,000	39.5		14	U
4,4'-DDT			NA	1,700	13,000	266		16.4	J
Endrin aldehyde			NA	16,000	320,000	7.01		9.8	U
Methoxychlor			NA	270,000	5,300,000	7.9	U	80	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.6	U	1.6	U
Fluoranthene			NA	2,000,000	37,000,000	3.6	U	3.7	U
Pyrene			NA	1,500,000	26,000,000	2.3	U	2.3	U
Benzo(a)anthracene			NA	560	3,600	3.1	U	3.1	U
Chrysene			NA	56,000	360,000	2.2	U	2.2	U
Benzo(b)fluoranthene			NA	560	3,600	4.1	U	4.1	U
Benzo(k)fluoranthene			NA	5,600	36,000	3.8	U	3.8	U
Benzo(a)pyrene			NA	56	360	2.8	U	2.8	U
Dibenz(a,h)anthracene			NA	56	360	7.9	U	7.9	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.4	U	3.4	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	58.6		38.2	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S268		HAS39S347	
Location						Pipelines		HAS39S268 after Overexcavation	
Sample Depth bgs (feet)						NA		NA	
COC Number						58-043HA		58-053HA	
Sample Delivery Group Number						981037		98J051	
Date Collected						02-Sep-98		05-Oct-98	
Analyte	**Units**	**EPA Method**	**BTV[1]**	**EPA PRG Res[2]**	**EPA PRG Indust[3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.7	U	NA	
Aroclor 1221			NA	NA	NA	9.6	U	NA	
Aroclor 1232			NA	NA	NA	9.5	U	NA	
Aroclor 1242			NA	NA	NA	3.5	U	NA	
Aroclor 1248			NA	NA	NA	5.8	U	NA	
Aroclor 1254			NA	NA	NA	3.8	U	NA	
Aroclor 1260			NA	NA	NA	6.0	U	NA	
Total PCBs			NA	200	1,300	---		NA	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	76	UJ	0.75	U
delta-BHC			NA	NA	NA	45	U	0.45	U
Aldrin			NA	26	180	31	UJ	0.31	U
Heptachlor epoxide			NA	49	330	41	U	0.41	U
gamma-Chlordane			NA	1,600	12,000	40	U	0.40	U
alpha-Chlordane			NA	1,600	12,000	41	U	0.41	U
4,4'-DDE			NA	1,700	13,000	**1870**		201	
Dieldrin			NA	28	190	170	U	1.7	U
Endrin			NA	16,000	320,000	170	U	1.7	U
4,4'-DDD			NA	2,400	19,000	313	J	1.5	U
4,4'-DDT			NA	1,700	13,000	**3720**		13.3	
Endrin aldehyde			NA	16,000	320,000	110	U	1.0	U
Methoxychlor			NA	270,000	5,300,000	860	U	8.6	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.6	U	NA	
Fluoranthene			NA	2,000,000	37,000,000	4.0	U	NA	
Pyrene			NA	1,500,000	26,000,000	2.3	U	NA	
Benzo(a)anthracene			NA	560	3,600	3.4	U	NA	
Chrysene			NA	56,000	360,000	2.4	U	NA	
Benzo(b)fluoranthene			NA	560	3,600	4.4	U	NA	
Benzo(k)fluoranthene			NA	5,600	36,000	4.2	U	NA	
Benzo(a)pyrene			NA	56	360	3.0	U	NA	
Dibenzo(a,h)anthracene			NA	56	360	2.6	U	NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.7	U	NA	
Metals	mg/kg	6010A							
Lead			166	400	1,000	26.5		NA	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS395269	
Location						Pipelines	
Sample Depth bgs (feet)						NA	
COC Number						584044HA	
Sample Delivery Group Number						981037	
Date Collected						02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV** [1]	**EPA PRG Res** [2]	**EPA PRG Indust** [3]	**Concentration**	
Polychlorinated Biphenyls (PCBs)	**µg/kg**	**8081**					
Aroclor 1016			NA	NA	NA	8 6	U
Aroclor 1221			NA	NA	NA	8 6	U
Aroclor 1232			NA	NA	NA	8 5	U
Aroclor 1242			NA	NA	NA	3 7	U
Aroclor 1248			NA	NA	NA	5 2	U
Aroclor 1254			NA	NA	NA	3 4	U
Aroclor 1260			NA	NA	NA	5 3	U
Total PCBs			NA	200	1,300	—	
Pesticides	**µg/kg**	**8081**					
gamma-BHC (Lindane)			NA	420	3,200	6 7	UJ
delta-BHC			NA	NA	NA	4 0	U
Aldrin			NA	26	180	2 8	UJ
Heptachlor epoxide			NA	49	330	3 6	U
gamma-Chlordane			NA	1,600	12,000	3 5	U
alpha-Chlordane			NA	1,600	12,000	3 6	U
4,4'-DDE			NA	1,700	13,000	1350	
Dieldrin			NA	28	190	10	U
Endrin			NA	16,000	320,000	15	U
4,4'-DDD			NA	2,400	19,000	13	U
4,4'-DDT			NA	1,700	13,000	77 6	
Endrin aldehyde			NA	16,000	320,000	9 4	U
Methoxychlor			NA	270,000	5,300,000	77	U
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**					
Anthracene			NA	14,000,000	220,000,000	1.6	U
Fluoranthene			NA	2,000,000	37,000,000	3.5	U
Pyrene			NA	1,500,000	26,000,000	2.2	U
Benzo(a)anthracene			NA	560	3,600	3 0	U
Chrysene			NA	56,000	360,000	2 2	U
Benzo(b)fluoranthene			NA	560	3,600	4.0	U
Benzo(k)fluoranthene			NA	5,600	36,000	3 7	U
Benzo(a)pyrene			NA	56	360	2 7	U
Dibenzo(a,h)anthracene			NA	56	360	7 6	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3 3	U
Metals	**mg/kg**	**6010A**					
Lead			166	400	1,000	34 4	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May 1998)

[3] EPA Region 9 Industrial PRG (May 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S270		HAS39S383	
Location						Pipelines		HAS39S270 after Overexcavation	
Sample Depth bgs (feet)						NA		NA	
COC Number						58-044HA		58-056HA	
Sample Delivery Group Number						98I037		98I147	
Date Collected						02-Sep-98		21-Oct-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.6	U	NA	
Aroclor 1221			NA	NA	NA	9.5	U	NA	
Aroclor 1232			NA	NA	NA	9.4	U	NA	
Aroclor 1242			NA	NA	NA	3.4	U	NA	
Aroclor 1248			NA	NA	NA	5.7	U	NA	
Aroclor 1254			NA	NA	NA	3.7	U	NA	
Aroclor 1260			NA	NA	NA	5.9	U	NA	
Total PCBs			NA	200	1,300	---		NA	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	150	UJ	0.90	U
delta-BHC			NA	NA	NA	90	U	0.54	U
Aldrin			NA	26	180	62	UJ	0.37	U
Heptachlor epoxide			NA	49	330	81	U	0.49	U
gamma-Chlordane			NA	1,600	12,000	78	U	0.47	U
alpha-Chlordane			NA	1,600	12,000	81	U	0.49	U
4,4'-DDE			NA	1,700	13,000	1140		5.97	
Dieldrin			NA	28	190	340	U	2.1	U
Endrin			NA	16,000	320,000	330	U	2.0	U
4,4'-DDD			NA	2,400	19,000	300	U	1.8	U
4,4'-DDT			NA	1,700	13,000	**6780**		23.1	
Endrin aldehyde			NA	16,000	320,000	210	U	1.2	U
Methoxychlor			NA	270,000	5,300,000	1700	U	30	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.7	U	NA	
Fluoranthene			NA	2,000,000	37,000,000	3.9	U	NA	
Pyrene			NA	1,500,000	26,000,000	2.4	U	NA	
Benzo(a)anthracene			NA	560	3,600	3.3	U	NA	
Chrysene			NA	56,000	360,000	2.4	U	NA	
Benzo(b)fluoranthene			NA	560	3,600	4.4	U	NA	
Benzo(k)fluoranthene			NA	5,600	36,000	4.1	U	NA	
Benzo(a)pyrene			NA	56	360	3.0	U	NA	
Dibenzo(a,h)anthracene			NA	56	360	8.5	U	NA	
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.6	U	NA	
Metals	mg/kg	6010A							
Lead			166	400	1,000	56.5		NA	

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S271		HAS39S272	
Location						Pipelines		Pipelines	
Sample Depth bgs (feet)						NA		NA	
COC Number						58-044HA		58-044HA	
Sample Delivery Group Number						98I037		98I037	
Date Collected						02-Sep-98		02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTY [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.0	U	9.3	U
Aroclor 1221			NA	NA	NA	3.9	U	9.2	U
Aroclor 1232			NA	NA	NA	3.8	U	9.2	U
Aroclor 1242			NA	NA	NA	3.2	U	3.4	U
Aroclor 1248			NA	NA	NA	5.4	U	5.6	U
Aroclor 1254			NA	NA	NA	3.5	U	3.6	U
Aroclor 1260			NA	NA	NA	5.5	U	5.7	U
Total PCBs			NA	200	1,300	----		----	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.70	UJ	7.3	UJ
delta-BHC			NA	NA	NA	0.42	U	4.4	U
Aldrin			NA	26	180	0.29	UJ	3.0	UJ
Heptachlor epoxide			NA	49	330	0.38	U	4.0	U
gamma-Chlordane			NA	1,600	12,000	0.37	U	3.8	U
alpha-Chlordane			NA	1,600	12,000	0.28	U	4.0	U
4,4'-DDE			NA	1,700	13,000	463		156	
Dieldrin			NA	28	190	1.6	U	17	U
Endrin			NA	16,000	320,000	1.5	U	16	U
4,4'-DDD			NA	2,400	19,000	8.88		14	U
4,4'-DDT			NA	1,700	13,000	82.2		38	J
Endrin aldehyde			NA	16,000	320,000	0.58	U	10	U
Methoxychlor			NA	270,000	5,300,000	8.0	U	83	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	8.2	U	1.7	U
Fluoranthene			NA	2,000,000	27,000,000	16	U	3.8	U
Pyrene			NA	1,500,000	26,000,000	11	U	2.4	U
Benzo(a)anthracene			NA	560	3,600	17.7	J	3.2	U
Chrysene			NA	56,000	360,000	11	U	2.3	U
Benzo(b)fluoranthene			NA	560	3,600	20	U	6.94	J
Benzo(k)fluoranthene			NA	5,600	36,000	15	U	4.0	U
Benzo(a)pyrene			NA	56	360	34.1	J	2.9	U
Dibenzo(a,h)anthracene			NA	56	360	40	U	6.3	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	17	U	3.5	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	39.6		32	

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S275		HAS39S281	
Location						Pipelines		Oil/Water Separator Wall	
Sample Depth bgs (feet)						3		NA	
COC Number						58-044HA		58-045HA	
Sample Delivery Group Number						98I037		98I037	
Date Collected						02-Sep-98		02-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV** [1]	**EPA PRG Res** [2]	**EPA PRG Indust** [3]	**Concentration**			
Polychlorinated Biphenyls (PCBs)	**µg/kg**	**8081**							
Aroclor 1016			NA	NA	NA	9.6	U	8.4	U
Aroclor 1221			NA	NA	NA	9.5	U	8.4	U
Aroclor 1232			NA	NA	NA	9.4	U	8.3	U
Aroclor 1242			NA	NA	NA	3.4	U	3.0	U
Aroclor 1248			NA	NA	NA	5.7	U	5.0	U
Aroclor 1254			NA	NA	NA	3.7	U	3.3	U
Aroclor 1260			NA	NA	NA	5.9	U	5.2	U
Total PCBs			NA	200	1,300	----		----	
Pesticides	**µg/kg**	**8081**							
gamma-BHC (Lindane)			NA	420	3,200	0.75	UJ	0.66	U
delta-BHC			NA	NA	NA	0.45	U	0.39	U
Aldrin			NA	26	180	0.31	UJ	0.27	U
Heptachlor epoxide			NA	49	330	0.40	U	0.36	U
gamma-Chlordane			NA	1,600	12,000	0.675	J	0.34	U
alpha-Chlordane			NA	1,600	12,000	0.40	U	0.36	U
4,4'-DDE			NA	1,700	13,000	593		1.98	J
Dieldrin			NA	28	190	1.7	U	1.5	U
Endrin			NA	16,000	320,000	1.6	U	1.4	U
4,4'-DDD			NA	2,400	19,000	13.5		1.3	U
4,4'-DDT			NA	1,700	13,000	32.8	J	1.3	U
Endrin aldehyde			NA	16,000	320,000	1.0	U	0.92	U
Methoxychlor			NA	270,000	5,300,000	8.5	U	7.5	U
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**							
Anthracene			NA	14,000,000	220,000,000	1.7	U	1.5	U
Fluoranthene			NA	2,000,000	37,000,000	3.9	U	3.5	U
Pyrene			NA	1,500,000	26,000,000	2.4	U	2.1	U
Benzo(a)anthracene			NA	560	3,600	3.3	U	2.9	U
Chrysene			NA	56,000	360,000	2.4	U	2.1	U
Benzo(b)fluoranthene			NA	560	3,600	40.6		3.9	U
Benzo(k)fluoranthene			NA	5,600	36,000	29.7		3.6	U
Benzo(a)pyrene			NA	56	360	42.6		2.6	U
Dibenzo(a,h)anthracene			NA	56	360	8.5	U	7.5	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	44.3		3.2	U
Metals	**mg/kg**	**6010A**							
Lead			166	400	1,000	36.7		0.28	U

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S282		HAS39S237	
Location						Oil/Water Separator Wall		Oil/Water Separator Wall	
Sample Depth bgs (feet)						NA		NA	
COC Number						58-045HA		58-052HA	
Sample Delivery Group Number						98J037		98J051	
Date Collected						02 Sep 98		05-Oct-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.2	U	11	U
Aroclor 1221			NA	NA	NA	9.1	U	11	U
Aroclor 1232			NA	NA	NA	9.0	U	11	U
Aroclor 1242			NA	NA	NA	3.3	U	4.0	U
Aroclor 1248			NA	NA	NA	5.5	U	6.6	U
Aroclor 1254			NA	NA	NA	3.6	U	4.3	U
Aroclor 1260			NA	NA	NA	5.6	U	6.8	U
Total PCBs			NA	200	1,300	----		—	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	NA		100	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.72	U	0.87	UJ
delta-BHC			NA	NA	NA	0.43	U	0.52	UJ
Aldrin			NA	26	180	0.30	U	0.36	U
Heptachlor epoxide			NA	49	330	0.39	U	0.47	U
gamma-Chlordane			NA	1,600	12,000	0.585	J	0.45	U
alpha-Chlordane			NA	1,600	12,000	0.39	U	0.47	U
4,4'-DDE			NA	1,700	13,000	34.3		1.6	J
Dieldrin			NA	28	190	1.6	U	2.0	UJ
Endrin			NA	16,000	320,000	1.6	U	1.9	UJ
4,4'-DDD			NA	2,400	19,000	3.63	J	1.7	U
4,4'-DDT			NA	1,700	13,000	45.5	J	1.7	U
Endrin aldehyde			NA	16,000	320,000	1.0	U	1.2	UJ
Methoxychlor			NA	270,000	5,300,000	8.2	U	9.5	UJ
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.7	U	2.0	U
Fluoranthene			NA	2,000,000	37,000,000	3.8	U	4.6	U
Pyrene			NA	1,500,000	26,000,000	2.3	U	2.8	U
Benzo(a)anthracene			NA	560	3,600	3.2	U	3.8	U
Chrysene			NA	56,000	360,000	2.3	U	2.8	U
Benzo(b)fluoranthene			NA	560	3,600	4.2	U	5.1	U
Benzo(k)fluoranthene			NA	5,600	36,000	3.9	U	4.8	U
Benzo(a)pyrene			NA	56	360	2.8	U	3.4	U
Dibenzo(a,h)anthracene			NA	56	360	8.1	U	9.8	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.5	U	4.2	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	17.0		43.7	J

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S338		HAS39S339	
Location						Oil/Water Separator Wall		Pipelines	
Sample Depth bgs (feet)						NA		6	
COC Number						58-052HA		58-052HA	
Sample Delivery Group Number						98J051		98J051	
Date Collected						05-Oct-98		05-Oct-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	11	U	8.4	U
Aroclor 1221			NA	NA	NA	11	U	8.4	U
Aroclor 1232			NA	NA	NA	11	U	8.3	U
Aroclor 1242			NA	NA	NA	4.0	U	3.0	U
Aroclor 1248			NA	NA	NA	6.6	U	5.0	U
Aroclor 1254			NA	NA	NA	4.3	U	3.3	U
Aroclor 1260			NA	NA	NA	6.8	U	5.2	U
Total PCBs			NA	200	1,300	—		—	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	300	US	NA	
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	4.3	U	0.66	U
delta-BHC			NA	NA	NA	2.6	U	0.39	U
Aldrin			NA	26	180	1.8	U	0.27	U
Heptachlor epoxide			NA	49	330	2.4	U	0.36	U
gamma-Chlordane			NA	1,600	12,000	2.3	U	0.34	U
alpha-Chlordane			NA	1,600	12,000	2.4	U	0.36	U
4,4'-DDE			NA	1,700	13,000	63.1		13.2	
Dieldrin			NA	28	190	10	U	1.5	U
Endrin			NA	16,000	320,000	9.5	U	1.4	U
4,4'-DDD			NA	2,400	19,000	8.6	U	1.3	U
4,4'-DDT			NA	1,700	13,000	11.7	J	6.71	
Endrin aldehyde			NA	16,000	320,000	6.1	U	0.92	U
Methoxychlor			NA	270,000	5,300,000	49	U	7.5	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	2.0	U	1.5	U
Fluoranthene			NA	2,000,000	37,000,000	4.6	U	3.5	U
Pyrene			NA	1,500,000	26,000,000	2.8	U	2.1	U
Benzo(a)anthracene			NA	560	3,600	3.8	U	2.9	U
Chrysene			NA	56,000	360,000	2.8	U	2.1	U
Benzo(b)fluoranthene			NA	560	3,600	5.1	U	3.9	U
Benzo(k)fluoranthene			NA	5,600	36,000	4.8	U	3.6	U
Benzo(a)pyrene			NA	56	360	3.4	U	2.6	U
Dibenzo(a,h)anthracene			NA	56	360	9.8	U	7.5	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	4.2	U	3.2	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	47.3	J	<0.28	R

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

µg/kg denotes micrograms per kilogram

Data Qualifiers

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data

Table 2-3 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S340		HAS39S341	
Location						Oil/Water Separator Floor		Oil/Water Separator Floor	
Sample Depth bgs (feet)						7		7	
COC Number						58-052HA		58-052HA	
Sample Delivery Group Number						98J051		98J051	
Date Collected						05-Oct-98		05-Oct-98	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]	Concentration			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	9.8	U	10	U
Aroclor 1221			NA	NA	NA	9.7	U	9.9	U
Aroclor 1232			NA	NA	NA	9.6	U	9.8	U
Aroclor 1242			NA	NA	NA	3.5	U	3.6	U
Aroclor 1248			NA	NA	NA	5.8	U	6.0	U
Aroclor 1254			NA	NA	NA	3.8	U	3.9	U
Aroclor 1260			NA	NA	NA	6.0	U	6.1	U
Total PCBs			NA	200	1,300	—		—	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	100	U	100	U
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.76	U	0.78	U
delta-BHC			NA	NA	NA	0.46	U	0.47	U
Aldrin			NA	26	180	0.32	U	0.32	U
Heptachlor epoxide			NA	49	330	2.92		0.42	U
gamma-Chlordane			NA	1,600	12,000	1.81	J	1.44	J
alpha-Chlordane			NA	1,600	12,000	2.85		2.16	
4,4'-DDE			NA	1,700	13,000	154		63.1	
Dieldrin			NA	28	190	1.8	U	1.8	U
Endrin			NA	16,000	320,000	1.7	U	1.7	U
4,4'-DDD			NA	2,400	19,000	15.9		10.7	
4,4'-DDT			NA	1,700	13,000	106		11.7	J
Endrin aldehyde			NA	16,000	320,000	1.1	U	1.1	U
Methoxychlor			NA	270,000	5,300,000	8.7	U	8.9	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.8	U	1.8	U
Fluoranthene			NA	2,000,000	37,000,000	4.0	U	4.1	U
Pyrene			NA	1,500,000	26,000,000	2.5	U	2.5	U
Benzo(a)anthracene			NA	560	3,600	3.4	U	3.5	U
Chrysene			NA	56,000	360,000	2.4	U	2.5	U
Benzo(b)fluoranthene			NA	560	3,600	4.5	U	4.6	U
Benzo(k)fluoranthene			NA	5,600	36,000	4.2	U	4.3	U
Benzo(a)pyrene			NA	56	360	3.0	U	3.1	U
Dibenzo(a,h)anthracene			NA	56	360	8.7	U	8.8	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.7	U	3.8	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	19.3	J	27.2	J

Notes:
bgs denotes below ground surface
NA Not Applicable / Not Analyzed
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in BOLD exceed the residential PRG
mg/kg denotes milligrams per kilogram
µg/kg denotes micrograms per kilogram

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data.

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S342		HAS39S343	
Location						Oil/Water Separator Floor		Pipelines	
Sample Depth bgs (feet)						11		9	
COC Number						58-052HA		58-052HA	
Sample Delivery Group Number						98J051		98J051	
Date Collected						05-Oct-98		05-Oct-98	
Analyte	**Units**	**EPA Method**	**BTV (1)**	**EPA PRG Res (2)**	**EPA PRG Indust (3)**	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	8.8	U	8.8	U
Aroclor 1221			NA	NA	NA	8.7	U	8.7	U
Aroclor 1232			NA	NA	NA	8.6	U	8.6	U
Aroclor 1242			NA	NA	NA	3.2	U	3.2	U
Aroclor 1248			NA	NA	NA	5.2	U	5.2	U
Aroclor 1254			NA	NA	NA	3.4	U	3.4	U
Aroclor 1260			NA	NA	NA	5.4	U	5.4	U
Total PCBs			NA	200	1,300	---		---	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	100	UJS	360	S
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.69	U	0.68	U
delta-BHC			NA	NA	NA	0.41	U	0.41	U
Aldrin			NA	26	180	0.28	U	0.28	U
Heptachlor epoxide			NA	49	330	0.37	U	0.37	U
gamma-Chlordane			NA	1,600	12,000	3.45		0.35	U
alpha-Chlordane			NA	1,600	12,000	3.36		1.12	J
4,4'-DDE			NA	1,700	13,000	3.7		101	
Dieldrin			NA	28	190	1.6	U	1.6	U
Endrin			NA	16,000	320,000	1.5	U	1.5	U
4,4'-DDD			NA	2,400	19,000	1.4	U	6.87	
4,4'-DDT			NA	1,700	13,000	1.3	U	35.2	J
Endrin aldehyde			NA	16,000	320,000	0.96	U	0.96	U
Methoxychlor			NA	270,000	5,300,000	7.8	U	7.8	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.6	U	1.6	U
Fluoranthene			NA	2,000,000	37,000,000	3.6	U	3.6	U
Pyrene			NA	1,500,000	26,000,000	2.2	U	2.2	U
Benzo(a)anthracene			NA	560	3,600	3.0	U	3.0	U
Chrysene			NA	56,000	360,000	2.2	U	2.2	U
Benzo(b)fluoranthene			NA	560	3,600	4.0	U	4.0	U
Benzo(k)fluoranthene			NA	5,600	36,000	3.8	U	3.8	U
Benzo(a)pyrene			NA	56	360	2.7	U	2.7	U
Dibenzo(a,h)anthracene			NA	56	360	7.8	U	7.8	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.3	U	3.3	U
Metals	mg/kg	7421							
Lead			166	400	1,000	<0.29	R	8.94	J

Notes:

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

(1) Background Threshold Value

(2) EPA Region 9 Residential PRG (May, 1998)

(3) EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

ug/kg denotes micrograms per kilogram

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data

Table 2-1 (continued)
Confirmation Soil Sample Analysis for the Oil/Water Separator
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S344		HAS39S345	
Location						Pipelines		Pipelines	
Sample Depth bgs (feet)						9		9	
COC Number						58-052HA		58-052HA	
Sample Delivery Group Number						98J051		98J051	
Date Collected						05-Oct-98		05-Oct-93	
Analyte	**Units**	**EPA Method**	**BTV**[1]	**EPA PRG Res**[2]	**EPA PRG Indust**[3]	**Concentration**			
Polychlorinated Biphenyls (PCBs)	µg/kg	8081							
Aroclor 1016			NA	NA	NA	8.6	U	9.0	U
Aroclor 1221			NA	NA	NA	8.5	U	8.9	U
Aroclor 1232			NA	NA	NA	8.4	U	8.8	U
Aroclor 1242			NA	NA	NA	3.1	U	3.2	U
Aroclor 1248			NA	NA	NA	5.3	U	5.4	U
Aroclor 1254			NA	NA	NA	3.4	U	3.5	U
Aroclor 1260			NA	NA	NA	5.3	U	5.5	U
Total PCBs			NA	200	1,300	—		—	
Ohmicron Field Screen	µg/kg	NA	NA	NA	NA	100	US	100	US
Pesticides	µg/kg	8081							
gamma-BHC (Lindane)			NA	420	3,200	0.67	U	0.70	U
delta-BHC			NA	NA	NA	0.40	U	0.42	U
Aldrin			NA	26	180	0.28	U	0.29	U
Heptachlor epoxide			NA	49	330	0.36	U	0.38	U
gamma-Chlordane			NA	1,600	12,000	0.35	U	0.37	U
alpha-Chlordane			NA	1,600	12,000	0.36	U	0.38	U
4,4'-DDE			NA	1,700	13,000	118		61	
Dieldrin			NA	28	190	1.5	U	1.6	U
Endrin			NA	16,000	320,000	1.5	U	1.6	U
4,4'-DDD			NA	2,400	19,000	11.9		6.05	
4,4'-DDT			NA	1,700	13,000	78.4		40.1	
Endrin aldehyde			NA	16,000	320,000	0.94	U	0.98	U
Methoxychlor			NA	270,000	5,300,000	7.6	U	8.0	U
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310							
Anthracene			NA	14,000,000	220,000,000	1.6	U	1.6	U
Fluoranthene			NA	2,000,000	37,000,000	3.5	U	3.7	U
Pyrene			NA	1,500,000	26,000,000	2.2	U	2.2	U
Benzo(a)anthracene			NA	560	3,600	3.0	U	3.1	U
Chrysene			NA	56,000	360,000	2.2	U	2.2	U
Benzo(b)fluoranthene			NA	560	3,600	4.0	U	4.1	U
Benzo(k)fluoranthene			NA	5,600	36,000	3.7	U	3.9	U
Benzo(a)pyrene			NA	56	360	2.7	U	2.8	U
Dibenzo(a,h)anthracene			NA	56	360	7.6	U	8.0	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.2	U	3.4	U
Metals	mg/kg	6010A							
Lead			166	400	1,000	10.0	J	5.99	J

Notes

bgs denotes below ground surface

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

mg/kg denotes milligrams per kilogram

Data Qualifiers

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data

Confirmation Soil Sample Analytical Results for IRP Site 39 PAH "Hot Spots"

Table 2-2
Confirmation Soil Sample Analysis for the PAH Hot Spot at "A6"
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S291		HAS39S292	
Location					Excavation		Excavation	
Sample Depth bgs (feet)					1 0		1 0	
COC Number					58-048HA		58-048HA	
Sample Delivery Group Number					981110		981110	
Date Collected					14-Sep-98		14-Sep-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**			
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**						
Anthracene			14,000,000	220,000,000	1 8	U	1 7	U
Fluoranthene			2,000,000	37,000,000	4 0	U	3 9	U
Pyrene			1,500,000	26,000,000	2 5	U	2 4	U
Benzo(a)anthracene			560	3,600	3 4	U	3 3	U
Chrysene			56,000	360,000	2 4	U	2 4	U
Benzo(b)fluoranthene			560	3,600	6 94	J	4 3	U
Benzo(k)fluoranthene			5,600	36,000	4 2	U	4 1	U
Benzo(a)pyrene			56	360	3 0	U	2 9	U
Dibenzo(a,h)anthracene			56	360	8 7	U	8 4	U
Indeno(1,2,3-cd)pyrene			560	3,600	3 7	U	3 6	U
Ohmicron Field Screen	**µg/kg**	NA	NA	NA	32	S	53	S

Notes

NA Not Applicable / Not Analyzed

PRG denotes Preliminary Remediation Goal

[1] EPA Region 9 Residential PRG (May, 1998)

[2] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

Data Qualifiers

U The analyte was analyzed for, but not detected The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

S Applied to all field screening data

Table 2-3
Confirmation Soil Sample Analysis for the PAH Hot Spot at "C2"
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S293		HAS39S294		HAS39S295		HAS39S296		HAS39S297	
Location						Excavation		Excavation		Excavation		Excavation		Excavation	
Sample Depth bgs (feet)						1.0		1.0		1.0		1.0		1.0	
COC Number						58-048HA		58-048HA		58-048HA		58-048HA		58-048HA	
Date Collected						11-Sep-98		11-Sep-98		11-Sep-98		11-Sep-98		11-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	**ug/kg**	**8310**													
Anthracene			NA	14,000,000	220,000,000	1.7	U	1.7	U	1.7	U	1.7	U	1.8	U
Fluoranthene			NA	2,000,000	37,000,000	3.8	U	3.9	U	3.9	U	3.9	U	4.0	U
Pyrene			NA	1,500,000	26,000,000	2.4	U	4.82	J	2.4	U	2.4	U	2.5	U
Benzo(a)anthracene			NA	560	3,600	3.2	U	3.2	U	3.2	U	3.3	U	3.4	U
Chrysene			NA	56,000	360,000	2.3	U	2.4	U	2.4	U	2.4	U	2.4	U
Benzo(b)fluoranthene			NA	560	3,600	4.3	U	4.3	U	4.3	U	4.3	U	4.5	U
Benzo(k)fluoranthene			NA	5,600	36,000	4.0	U	4.0	U	4.0	U	4.0	U	4.2	U
Benzo(a)pyrene			NA	56	360	2.9	U	2.9	U	2.9	U	2.9	U	3.0	U
Dibenzo(a,h)anthracene			NA	56	360	8.3	U	8.3	U	8.3	U	8.4	U	8.6	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3.5	U	3.6	U	3.6	U	3.6	U	3.7	U
Ohmicron Field Screen	ug/kg	NA	NA	NA	NA	32	S	32	S	120	S	110	S	39	S

Notes.
NA Not Applicable / Not Analyzed
(1) Background Threshold Value
(2) EPA Region 9 Residential PRG (May, 1998)
(3) EPA Region 9 Industrial PRG (May, 1998)
Values in ***BOLD*** *exceed the residential PRG.*

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL
J The analyte was positively identified, the quantitation is an estimation
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank, as well as in the sample
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data

Table 2-3 (continued)
Confirmation Soil Sample Analysis for the PAH Hot Spot at "C2"
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S298		HAS39S299		HAS39S300		HAS39S301		HAS39S305	
Location						Excavation		Excavation		Excavation		Excavation		Dup of -300	
Sample Depth bgs (feet)						1 0		1 0		1 0		1 0		1 0	
COC Number						58-048HA		58-048HA		58-048HA		58-049HA		58-049HA	
Date Collected						11-Sep-98		11-Sep-98		11-Sep-98		11-Sep-98		11-Sep-98	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	**ug/kg**	**8310**													
Anthracene			NA	14,000,000	220,000,000	1 7	U	1 9	U	1 9	U	1.9	U	3 9	U
Fluoranthene			NA	2,000,000	37,000,000	3.9	U	32 5	J	28.1	J	19.7	J	8.7	U
Pyrene			NA	1,500,000	26,000,000	2.4	U	30 2	J	37.6	J	2.7	U	5 4	U
Benzo(a)anthracene			NA	560	3,600	3 3	U	46 1		24.4		15 4		9 61	J
Chrysene			NA	56,000	360,000	2.4	U	27 1	J	14.9	J	2.6	U	5 3	U
Benzo(b)fluoranthene			NA	560	3,600	4.4	U	53.8		28 9		13 6	J	18 5	J
Benzo(k)fluoranthene			NA	5,600	36,000	4.1	U	37.0		24.9		13.3	J	9 1	U
Benzo(a)pyrene			NA	56	360	3.0	U	**58.4**		43.4		21.4		23	J
Dibenzo(a,h)anthracene			NA	56	360	8.4	U	9.3	U	9 4	U	9.4	U	19	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	3 6	U	67.9		39.2	J	17.8	J	22.4	J
Ohmicron Field Screen	ug/kg	NA	NA	NA	NA	46	S	210	S	390	S	210	S	NA	

Notes:
NA Not Applicable / Not Analyzed
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG.*

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
J The analyte was positively identified, the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank, as well as in the sample
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data.

Table 2-4
Confirmation Soil Sample Analysis for the PAH Hot Spot at "E6"
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S302		HAS39S303		HAS39S304	
Location					Excavation		Excavation		Duplicate of -303	
Sample Depth bgs (feet)					1.0		1.0		1.0	
COC Number					58-049HA		58-049HA		58-049HA	
Sample Delivery Group Number					981110		981110		981110	
Date Collected					14-Sep-98		14-Sep-98		14-Sep-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res (1)**	**EPA PRG Indust (2)**	**Concentration**					
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**								
Anthracene			14,000,000	220,000,000	4.72	J	3.9	U	2.0	U
Fluoranthene			2,000,000	37,000,000	29	J	8.7	U	46.9	J
Pyrene			1,500,000	26,000,000	21	J	5.4	U	33.8	J
Benzo(a)anthracene			560	3,600	9.08	J	7.3	U	27.6	
Chrysene			56,000	360,000	9.32	J	17.9	J	13.2	J
Benzo(b)fluoranthene			560	3,600	18.2		27.8	J	25.8	
Benzo(k)fluoranthene			5,600	36,000	14.9		9.1	U	21.7	
Benzo(a)pyrene			56	360	24.3		28.6	J	37.2	
Dibenzo(a,h)anthracene			56	360	9.0	U	19	U	9.9	U
Indeno(1,2,3-cd)pyrene			560	3,600	27.5	J	26.4	J	33.2	J
Ohmicron Field Screen	µg/kg	NA	NA	NA	120	S	140	S	NA	

Notes:

NA Not Applicable / Not Analyzed

PRG denotes Preliminary Remediation Goal

(1) EPA Region 9 Residential PRG (May, 1998)

(2) EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

S Applied to all field screening data

Table 2-5
Confirmation Soil Sample Analysis for the PAH Hot Spot at the Stormwater Outfall
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S257		HAS39S258		HAS39S289		HAS39S290	
Location					Drain Area		Drain Area		Pole Area		Pole Area	
Sample Depth bgs (feet)					5.0		5.0		1.5		1.5	
COC Number					58-042HA		58-042HA		58-042HA		58-042HA	
Sample Delivery Group Number					981037 / 46721r1		981037 / 46721r1		981037 / 46721r1		981037 / 46721r1	
Date Collected					01-Sep-98		01-Sep-98		03-Sep-98		03-Sep-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**							
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**										
Anthracene			14,000,000	220,000,000	1.6	U	3.4	U	1.7	U	1.8	U
Fluoranthene			2,000,000	37,000,000	3.7	U	7.6	U	3.9	U	4.0	U
Pyrene			1,500,000	26,000,000	2.3	U	7.34	J	2.4	U	2.5	U
Benzo(a)anthracene			560	3,600	3.1	U	6.4	U	3.3	U	3.4	U
Chrysene			56,000	360,000	2.3	U	4.6	U	2.4	U	2.4	U
Benzo(b)fluoranthene			560	3,600	4.1	U	8.5	U	4.3	U	9.93	J
Benzo(k)fluoranthene			5,600	36,000	3.9	U	7.9	U	4.1	U	4.2	U
Benzo(a)pyrene			56	360	2.8	U	5.8	U	3.0	U	7.83	J
Dibenzo(a,h)anthracene			56	360	8.0	U	16	U	8.4	U	8.7	U
Indeno(1,2,3-cd)pyrene			560	3,600	3.4	U	7.0	U	3.6	U	3.7	U
Ohmicron Field Screen	µg/kg	NA	NA	NA	17	S	66	S	31	S	136	S
Dioxins	**µg/kg**	**8290**	**Subsurface Clean-up Goal**									
Total WHO TEQ			1.0		0.0014		0.0038		0.0051		0.0050	

Notes:
bgs denotes below ground surface
NA Not Applicable / Not Analyzed
PRG Denotes Preliminary Remediation Goal
[1] EPA Region 9 Residential PRG (May, 1998)
[2] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data

Confirmation Soil Sample Analytical Results for IRP Site 39 Buried Drum Area

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S241		HAS39S242		HAS39S243		HAS39S244		HAS39S245	
Location					Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor	
Sample Depth bgs (feet)					10		10		10		10		10	
COC Number					58-039HA		58-039HA		58-039HA		58-0391IA		58-039HA	
Sample Delivery Group Number					981003		981003		981003		981003		981003	
Date Collected					28-Aug-98		28-Aug 98		28-Aug-98		28-Aug 98		28-Aug 98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polychlorinated Biphenyls (PCBs)	**µg/kg**	**8081**												
Aroclor 1016			NA	NA	7 9	U	7 9	U	7 9	U	7 9	U	7 9	U
Aroclor 1221			NA	NA	7 8	U	7 8	U	7 8	U	7 8	U	7 8	U
Aroclor 1232			NA	NA	7 8	U	7 8	U	7 8	U	7 8	U	7 8	U
Aroclor 1242			NA	NA	2 8	U	2 8	U	2 8	U	2 8	U	2 8	U
Aroclor 1248			NA	NA	4 7	U	4 7	U	4 7	U	4 7	U	4 7	U
Aroclor 1254			NA	NA	3 1	U	3 1	U	3 1	U	3 1	U	3 1	U
Aroclor 1260			NA	NA	4 9	U	4 9	U	4 9	U	4 9	U	4 9	U
Total PCBs			200	1,300	-------		-------		-------		-------		-------	

Notes
NA Not Applicable / Not Analyzed
PRG denotes Pi eliminary Remediation Goal
[1] EPA Region 9 Residential PRG (May, 1998)
[2] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers
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S Applied to all field screening data

Table 2-6

Confirmation Soil Sample Analysis for the Buried Drum Area

IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S246		HAS39S247		HAS39S248		HAS39S249		HAS39S250	
Location					Excavation Floor		West Wall		West Wall		North Wall		North Wall	
Sample Depth bgs (feet)					10		NA		NA		NA		NA	
COC Number					58-039HA		58-039HA		58-039HA		58-039HA		58-039HA	
Sample Delivery Group Number					981003		981003		981003		981003		981003	
Date Collected					28-Aug-98		28-Aug-98		28-Aug-98		28-Aug-98		28-Aug-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res** [1]	**EPA PRG Indust** [2]	**Concentration**									
Polychlorinated Biphenyls (PCBs)	µg/kg	8081												
Aroclor 1016			NA	NA	7.9	U	7.9	U	7.9	U	7.9	U	7.9	U
Aroclor 1221			NA	NA	7.8	U	7.8	U	7.8	U	7.8	U	7.8	U
Aroclor 1232			NA	NA	7.8	U	7.8	U	7.8	U	7.8	U	7.8	U
Aroclor 1242			NA	NA	2.8	U	2.8	U	2.8	U	2.8	U	2 8	U
Aroclor 1248			NA	NA	4.7	U	4.7	U	4.7	U	4.7	U	4.7	U
Aroclor 1254			NA	NA	3.1	U	3 1	U	3.1	U	3.1	U	3 1	U
Aroclor 1260			NA	NA	4 9	U	4 9	U	4 9	U	4.9	U	4.9	U
Total PCBs			200	1,300	------		------		------		------		------	

Notes.

NA Not Applicable / Not Analyzed

PRG denotes Preliminary Remediation Goal

(1) EPA Region 9 Residential PRG (May, 1998)

(2) EPA Region 9 Industrial PRG (May, 1998)

*Values in **BOLD** exceed the residential PRG*

Data Qualifiers:

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J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

S Applied to all field screening data.

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S251		HAS39S252		HAS39S253		HAS39S254	
Location					East Wall		East Wall		South Wall		South Wall	
Sample Depth bgs (feet)					NA		NA		NA		NA	
COC Number					58-040HA		58-040HA		58-040HA		58 040HA	
Sample Delivery Group Number					981003		981003		981003		981003	
Date Collected					28-Aug 98		28-Aug-98		28 Aug 98		28 Aug 98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res (1)**	**EPA PRG Indust (2)**	**Concentration**							
Polychlorinated Biphenyls (PCBs)	**µg/kg**	**8081**										
Aroclor 1016			NA	NA	79	U	79	U	79	U	79	U
Aroclor 1221			NA	NA	78	U	78	U	78	U	78	U
Aroclor 1232			NA	NA	78	U	78	U	78	U	78	U
Aroclor 1242			NA	NA	28	U	28	U	28	U	28	U
Aroclor 1248			NA	NA	47	U	47	U	47	U	47	U
Aroclor 1254			NA	NA	31	U	31	U	31	U	31	U
Aroclor 1260			NA	NA	49	U	49	U	49	U	49	U
Total PCBs			200	1,300	-------		-------		--- -		-------	

Notes
NA Not Applicable / Not Analyzed
PRG denotes Preliminary Remediation Goal
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(2) EPA Region 9 Industrial PRG (May, 1998)
Values in BOLD exceed the residential PRG

Data Qualifiers
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UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
S Applied to all field screening data

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S373		HAS39S374		HAS39S375		HAS39S376		HAS39S377	
Location					Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor	
Sample Depth bgs (feet)					14		14		14		14		14	
COC Number					58 055HA		58-055HA		58 055HA		58 055HA		58 055HA	
Sample Delivery Group Number					98J147		98J147		98J147		98J147		98J147	
Date Collected					20-Oct-98		20 Oct 98		20-Oct 98		20-Oct-98		20 Oct 98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**												
Anthracene			14,000,000	220,000,000	1 7	U	1 7	U	1 6	U	1 7	U	1 7	U
Fluoranthene			2,000,000	37,000,000	3 8	U	3 8	U	3 7	U	3 8	U	3 7	U
Pyrene			1,500,000	26,000,000	2 4	U	2 3	U	2 3	U	2 4	U	2 3	U
Benzo(a)anthracene			560	3,600	3 2	U	3 2	U	3 1	U	3 2	U	3 2	U
Chrysene			56,000	360,000	2 3	U	2 3	U	2 2	U	2 3	U	2 3	U
Benzo(b)fluoranthene			560	3,600	4 2	U	4 2	U	4 1	U	4 3	U	4 2	U
Benzo(k)fluoranthene			5,600	36,000	4 0	U	3 9	U	3 8	U	4 0	U	3 9	U
Benzo(a)pyrene			56	360	2 9	U	2 8	U	2 8	U	2 9	U	2 8	U
Dibenzo(a,h)anthracene			56	360	8 2	U	8 1	U	8 0	U	8 3	U	8 1	U
Indeno(1,2,3-cd)pyrene			560	3,600	3 5	U	3 4	U	3 4	U	3 5	U	3 4	U
Ohmicron Field Screen	**µg/kg**	**NA**	NA	NA	130	S	20	US	20	US	32	S	20	US

Notes

NA Not Applicable / Not Analyzed

PRG denotes Preliminary Remediation Goal

[1] EPA Region 9 Residential PRG (May, 1998)

[2] EPA Region 9 Industrial PRG (May, 1998)

*Values in **BOLD** exceed the residential PRG*

Data Qualifiers

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B The analyte was found in an associated blank

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S378		HAS39S379		HAS39S380		HAS39S381		HAS39S572	
Location					Excavation Floor		Excavation Floor		Excavation Floor		Excavation Floor		North Wall	
Sample Depth bgs (feet)					14		14		14		14		5 to 10	
COC Number					58-055HA		58-055HA		58-055HA		58-055HA		58-089HA	
Sample Delivery Group Number					98J147		98J147		98J147		98J147		99D124	
Date Collected					20-Oct-98		20-Oct-98		20-Oct-98		20-Oct-98		21-Apr-99	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310												
Anthracene			14,000,000	220,000,000	1.7	U	1.6	U	1.6	U	1.6	U	1.6	U
Fluoranthene			2,000,000	37,000,000	3.7	U	3.7	U	3.7	U	3.6	U	24.4	J
Pyrene			1,500,000	26,000,000	2.3	U	2.3	U	2.3	U	2.3	U	50.6	J
Benzo(a)anthracene			560	3,600	3.2	U	3.1	U	3.1	U	3.1	U	28.9	J
Chrysene			56,000	360,000	2.3	U	2.3	U	2.2	U	2.2	U	18.2	J
Benzo(b)fluoranthene			560	3,600	4.2	U	4.1	U	4.1	U	4.1	U	58.9	J
Benzo(k)fluoranthene			5,600	36,000	3.9	U	3.9	U	3.8	U	3.8	U	10.1	J
Benzo(a)pyrene			56	360	2.8	U	2.8	U	2.8	U	2.8	U	55.4	J
Dibenzo(a,h)anthracene			56	360	8.1	U	8.0	U	8.0	U	7.9	U	3.64	J
Indeno(1,2,3-cd)pyrene			560	3,600	3.4	U	3.4	U	3.4	U	3.4	U	41.2	J
Ohmicron Field Screen	µg/kg	NA	NA	NA	20	US	25	S	20	US	20	US	20	US

Notes:
NA Not Applicable / Not Analyzed
PRG denotes Preliminary Remediation Goal
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[2] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers.
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B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S575		HAS39S576		HAS39S578		HAS39S580		HAS39S581	
Location					North Wall		East Wall		East Wall		South Wall		South Wall	
Sample Depth bgs (feet)					1 to 5		5 to 10		5 to 10		5 to 10		1 to 5	
COC Number					58-089HA		58-089HA		58 089HA		58-089HA		58 089HA	
Sample Delivery Group Number					99D124		99D124		99D124		99D124		99D124	
Date Collected					21-Apr-99		21-Apr-99		21-Apr-99		21-Apr 99		21-Apr-99	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**												
Anthracene			14,000,000	220,000,000	2 74	J	1 6	U	1 7	U	1 7	U	1 7	U
Fluoranthene			2,000,000	37,000,000	127	J	3 6	U	3 8	U	3 8	U	19 4	J
Pyrene			1,500,000	26,000,000	124	J	2 2	U	2 4	U	2 3	U	32 4	J
Benzo(a)anthracene			560	3,600	71 6		3 0	U	3 2	U	3 2	U	20 7	
Chrysene			56,000	360,000	49 6	J	2 2	U	2 3	U	2 3	U	13 3	J
Benzo(b)fluoranthene			560	3,600	89		4 0	U	4 2	U	4 2	U	28	
Benzo(k)fluoranthene			5,600	36,000	41 1		3 8	U	4 0	U	3 9	U	13 3	
Benzo(a)pyrene			56	360	**77.5**		2 7	U	2 9	U	2 9	U	25 1	
Dibenzo(a,h)anthracene			56	360	9 2	U	7 8	U	8 2	U	8 2	U	8 4	U
Indeno(1,2,3-cd)pyrene			560	3,600	79 6		3 3	U	3 5	U	3 5	U	26 2	J

Notes
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PRG denotes Preliminary Remediation Goal
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*Values in **BOLD** exceed the residential PRG*

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B The analyte was found in an associated blank
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S582		HAS39S583		HAS39S607		HAS39S608		HAS39S609	
Location					South Wall		South Wall		West Wall		West Wall		West Wall	
Sample Depth bgs (feet)					5 to 10		1 to 5		4		4		NA	
COC Number					58-090HA		58-090HA		58 094HA		58-094HA		58-094HA	
Sample Delivery Group Number					99D124		99D124		99E027		99E027		99E027	
Date Collected					21-Apr-99		21-Apr-99		05 May-99		05-May-99		05-May-99	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**												
Anthracene			14,000,000	220,000,000	1 7	U	1 7	U	1 6	U	1 7	U	1 6	U
Fluoranthene			2,000,000	37,000,000	41 1	J	71 8	J	3 7	U	3 8	U	3 6	U
Pyrene			1,500,000	26,000,000	39 6	J	62	J	18	J	2 3	U	2 2	U
Benzo(a)anthracene			560	3,600	21 2		51 7		18		3 2	U	3 1	U
Chrysene			56,000	360,000	14 7	J	38 5	J	10	J	2 3	U	2 2	U
Benzo(b)fluoranthene			560	3,600	30 9		86 9		26		4 2	U	4 0	U
Benzo(k)fluoranthene			5,600	36,000	13 8		38 9		16		4 0	U	3 8	U
Benzo(a)pyrene			56	360	25 9		87.5		27		2 9	U	2 7	U
Dibenzo(a,h)anthracene			56	360	8 2	U	6 38	J	7 9	U	8 2	U	7 8	U
Indeno(1,2,3-cd)pyrene			560	3,600	19 7	J	80		30	J	3 5	U	3 3	U

Notes

NA Not Applicable / Not Analyzed

PRG denotes Preliminary Remediation Goal

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[2] EPA Region 9 Industrial PRG (May, 1998)

*Values in **BOLD** exceed the residential PRG*

Data Qualifiers

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B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

Table 2-6
Confirmation Soil Sample Analysis for the Buried Drum Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S610		HAS39S611		HAS39S612		HAS39S613		HAS39S614	
Location					West Wall		North Wall		North Wall		East Wall		East Wall	
Sample Depth bgs (feet)					NA		2.5		2.5		2.5		2.5	
COC Number					58-094HA		58-095HA		58-095HA		58-095HA		58-095HA	
Sample Delivery Group Number					99E027		99E049		99E049		99E049		99E049	
Date Collected					05-May-99		06-May-99		06-May-99		06-May-99		06-May-99	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**												
Anthracene			14,000,000	220,000,000	1.6	U	17	J	1.7	U	1.6	U	1 8	U
Fluoranthene			2,000,000	37,000,000	3.6	U	210		3.8	U	12	J	140	J
Pyrene			1,500,000	26,000,000	2.3	U	110	J	2.4	U	9 7	J	98	J
Benzo(a)anthracene			560	3,600	3.1	U	53		3.2	U	5 8	J	60	
Chrysene			56,000	360,000	2.2	U	27	J	2.3	U	3.7	J	34	J
Benzo(b)fluoranthene			560	3,600	4.1	U	46		4 3	U	7 4	J	69	
Benzo(k)fluoranthene			5,600	36,000	3.8	U	28		4.0	U	6.1	J	41	
Benzo(a)pyrene			56	360	2.8	U	47		2.9	U	8.3	J	79	
Dibenzo(a,h)anthracene			56	360	7.9	U	8.2	U	8.2	U	8.0	U	8 5	U
Indeno(1,2,3-cd)pyrene			560	3,600	3 4	U	45		3.5	U	3 4	U	70	

Notes.
NA Not Applicable / Not Analyzed
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*Values in **BOLD** exceed the residential PRG*

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B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Table 2-6 (continued)
Confirmation Soil Sample Analysis for Buried Drum Area,
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID				HAS39S241/2	HAS39S243/4	HAS39S245/6	HAS39S247/8	HAS39S249/50
Location				Excavation Floor	Excavation Floor	Excavation Floor	West Wall	North Wall
Sample Depth bgs (feet)				10	10	10	NA	NA
COC Number				58-041HA	58-041HA	58-041HA	58-041HA	58-041HA
Sample Delivery Group Number				46643	46643	46643	46643	46643
Date Collected				28-Aug-98	28-Aug-98	28-Aug-98	28-Aug-98	28-Aug-98
Analyte	**Units**	**EPA Method**	**Subsurface Clean-Up Goal**	**Concentration**				
Dioxins	**µg/kg**	**8290**						
Total WHO TEQ			1.0	0.0081	0.0098	0 0052	0 0059	0.0052

Notes:
NA Not Applicable / Not Analyzed

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
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UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank.
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Table 2-6 (continued)
Confirmation Soil Sample Analysis for Buried Drum Area,
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID				HAS39S251/2	HAS39S253/4	HAS39S255
Location				East Wall	South Wall	Dup of -241/2
Sample Depth bgs (feet)				NA	NA	10
COC Number				58-041HA	58-041HA	58-041HA
Sample Delivery Group Number				46643	46643	46643
Date Collected				28-Aug-98	28-Aug-98	28-Aug-98
Analyte	**Units**	**EPA Method**	**Subsurface Clean-Up Goal**	**Concentration**		
Dioxins	**µg/kg**	**8290**				
Total WHO TEQ			1.0	0.0063	0.0059	0.0099

Notes:
NA Not Applicable / Not Analyzed

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Confirmation Soil Sample Analytical Results for IRP Site 39 Miscellaneous Container Area

Table 2-7

Confirmation Soil Sample Analysis for the Miscellaneous Container Area

IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S568		HAS39S570	
Location						Power Pole		Duplicate of HAS39S568	
Sample Depth bgs (feet)						16		16	
COC Number						58-087HA		58 087HA	
Date Collected						13-Apr-99		13-Apr-99	
Analyte	**Units**	**EPA Method**	**BTV [1]**	**EPA PRG Res [2]**	**EPA PRG Indust [3]**	**Concentration**			
Volatile Organic Compounds (VOCs)	**ug/kg**	**8260A**							
Acetone			NA	1,400,000	6,100,000	5.0	U	5.2	U
Benzene			NA	620	1,400	0.30	U	0.31	U
Bromodichloromethane			NA	980	2,300	0.32	U	0.33	U
2 Butanone (Methyl Ethyl Ketone)			NA	6,900,000	27,000,000	6.3	U	6.5	U
Carbon disulfide			NA	350,000	1,200,000	0.15	U	0.16	U
Carbon Tetrachloride			NA	230	520	0.97	U	1.0	U
Chlorobenzene			NA	54,000	180,000	0.24	U	0.25	U
Chloroform			NA	240	520	0.52	U	0.54	U
Chloromethane			NA	1,200	2,600	2.5	U	2.6	U
Dibromomethane			NA	NA	NA	0.42	U	0.44	U
1,1-Dichloroethene			NA	52	120	0.66	U	0.68	U
cis-1,2-Dichloroethene			NA	42,000	150,000	0.36	U	0.37	U
Ethylbenzene			NA	230,000	230,000	0.48	U	0.49	U
2 Hexanone			NA	NA	NA	1.5	U	1.6	U
Methylene Chloride			NA	8,500	20,000	0.50	U	0.52	U
4-Methyl-2-pentanone (MIBK)			NA	NA	NA	1.4	U	1.4	U
Naphthalene			NA	NA	NA	0.48	U	0.50	U
1,1,2,2-Tetrachloroethane			NA	360	870	0.40	U	0.42	U
Tetrachloroethene (PCE)			NA	4,700	16,000	0.30	U	0.31	U
Toluene			NA	520,000	520,000	0.38	U	0.40	U
1,2,3-Trichlorobenzene			NA	NA	NA	0.31	U	0.32	U
1,2,4-Trichlorobenzene			NA	480,000	1,700,000	0.52	U	0.53	U
1,1,1-Trichloroethane			NA	680,000	1,400,000	0.40	U	0.42	U
1,1,2-Trichloroethane			NA	820	1,900	0.28	U	0.29	U
Trichloroethene			NA	2,700	6,100	0.31	U	0.32	U
Trichlorofluoromethane			NA	380,000	1,300,000	0.35	U	0.36	U
Vinyl Chloride			NA	21	48	1.2	U	1.3	U
m-Xylene			NA	210,000	210,000	0.92	U	0.95	U
o-Xylene			NA	280,000	280,000	0.41	U	0.43	U
p-Xylene			NA	370,000	370,000	0.92	U	0.95	U

Notes:

NA Not Applicable / Not Analyzed

[1] Background Threshold Value

[2] EPA Region 9 Residential PRG (May, 1998)

[3] EPA Region 9 Industrial PRG (May, 1998)

Values in BOLD exceed the residential PRG

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank, as well as in the sample

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S568		HAS39S570	
Location						Power Pole		Duplicate of HAS39S568	
Sample Depth bgs (feet)						16		16	
COC Number						58-087HA		58-087HA	
Date Collected						13-Apr-99		13 Apr 99	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]				
Semi-Volatile Organic Compounds (SVOCs)	ug/kg	8270B							
Acenaphthene			NA	2,600,000	28,000,000	250	U	260	U
Acenaphthylene			NA	NA	NA	250	U	260	U
Anthracene			NA	14,000,000	220,000,000	160	U	170	U
Benzo(a)anthracene			NA	560	3,600	170	U	170	U
Benzo(a)pyrene			NA	56	360	90	U	93	U
Benzo(b)fluoranthene			NA	560	3,600	160	U	160	U
Benzo(k)fluoranthene			NA	5,600	36,000	170	U	170	U
Benzo(ghi)perylene			NA	NA	NA	100	U	100	U
Bis(2-ethylhexyl) phalate			NA	32,000	210,000	210	U	210	U
Butyl benzylphthalate			NA	930,000	930,000	190	U	190	U
Carbazole			NA	22,000	150,000	190	U	200	U
Chrysene			NA	56,000	360,000	220	U	230	U
Di-n-butyl phthalate			NA	NA	NA	200	U	200	U
Dibenzo(a,h)anthracene			NA	56	360	78	U	81	U
Dibenzofuran			NA	210,000	3,200,000	230	U	260	U
Fluoranthene			NA	2,000,000	37,000,000	190	U	190	U
Indeno(1,2,3-cd) pyrene			NA	560	3,600	100	U	110	U
Naphthalene			NA	55,000	190,000	330	U	340	U
Pentachlorophenol			NA	2,500	15,000	200	U	200	U
Phenanthrene			NA	NA	NA	160	U	170	U
Pyrene			NA	1,500,000	26,000,000	220	U	230	U
Polynuclear Aromatic Hydrocarbons (PAHs)	ug/kg	8310							
Anthracene			NA	14,000,000	220,000,000	17 7	J	1 8	U
Fluoranthene			NA	2,000,000	37,000,000	20	U	4 1	U
Pyrene			NA	1,500,000	26,000,000	12	U	7 32	J
Benzo(a)anthracene			NA	560	3,600	17	U	8 09	J
Chrysene			NA	56,000	360,000	188	J	7 54	J
Benzo(b)fluoranthene			NA	560	3,600	22	U	39 5	
Benzo(k)fluoranthene			NA	5,600	36,000	21	U	1 94	J
Benzo(a)pyrene			NA	56	360	15 3	J	13 3	J
Dibenzo(a,h)anthracene			NA	56	360	43	U	8 8	U
Indeno(1,2,3-cd)pyrene			NA	560	3,600	18	U	25	J

Notes
NA Not Applicable / Not Analyzed
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May, 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
Values in BOLD exceed the residential PRG

Data Qualifiers:
U The analyte was analyzed for, but not detected The associated numerical value is at or below the MDL
J The analyte was positively identified, the quantitation is an estimation
UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank, as well as in the sample.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data.

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID						HAS39S568		HAS39S570	
Location						Power Pole		Duplicate of HAS39S568	
Sample Depth bgs (feet)						16		16	
COC Number						58 087HA		58 087HA	
Date Collected						13 Apr 99		13 Apr 99	
Analyte	Units	EPA Method	BTV [1]	EPA PRG Res [2]	EPA PRG Indust [3]				
Pesticides	ug/kg	8081							
Gamma BHC (Lindane)			NA	420	3,200	0 76	U	0 78	U
Delta BHC			NA	NA	NA	0 45	U	0 47	U
Aldrin			NA	26	180	0 31	U	0 32	U
Heptachlor Epoxide			NA	49	330	0 41	U	0 42	U
Gamma-Chlordane			NA	1,600	12,000	0 40	U	0 41	U
Alpha Chlordane			NA	1,600	12,000	0.41	U	0 42	U
4,4' DDE			NA	1,700	13,000	3 3	J	3 9	J
Dieldrin			NA	28	190	1 7	U	1 8	U
Endrin			NA	16,000	320,000	1 7	U	1 7	U
4 4' DDD			NA	2,400	19,000	1 5	U	1 5	U
4,4' DDT			NA	1,700	13,000	12		39	
Endrin Aldehyde			NA	16,000	320,000	1 1	U	1 1	U
Methoxychlor			NA	270,000	5,300,000	8 6	U	8 9	U

Notes
NA Not Applicable / Not Analyzed
[1] Background Threshold Value
[2] EPA Region 9 Residential PRG (May 1998)
[3] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers
U The analyte was analyzed for, but not detected The associated numerical value is at or below the MDL
J The analyte was positively identified the quantitation is an estimation
UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank, as well as in the sample.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data.

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S385		HAS39S386		HAS39S387		HAS39S388		HAS39S403	
Location					Segment 1		Segment 1		Segment 2		Duplicate of HAS39S385		Re-sample of HAS39S386	
Sample Depth bgs (feet)					Various		Various		Various		Various		Various	
COC Number					58-058HA		58-058HA		58-058HA		58-058HA		58-058HA	
Sample Delivery Group Number					98K080		98K080		98K080		98K080		98K080	
Date Collected					05-Nov-98		05-Nov-98		05-Nov-98		05-Nov-98		05-Nov-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Polynuclear Aromatic Hydrocarbons (PAHs)	µg/kg	8310												
Anthracene			14,000,000	220,000,000	1.9	U	1.9	U	1.9	U	1.9	U	1.9	U
Fluoranthene			2,000,000	37,000,000	4.4	U	4.2	U	4.3	U	4.2	U	4.2	U
Pyrene			1,500,000	26,000,000	2.7	U	2.6	U	2.6	U	2.6	U	2.6	U
Benzo(a)anthracene			560	3,600	3.7	U	10.9	J	3.6	U	3.5	U	3.5	U
Chrysene			56,000	360,000	2.7	U	42.3	J	7.29	J	2.5	U	2.6	U
Benzo(b)fluoranthene			560	3,600	4.9	U	126		7.65	J	4.6	U	4.7	U
Benzo(k)fluoranthene			5,600	36,000	4.6	U	24.3	J	4.5	U	4.4	U	4.4	U
Benzo(a)pyrene			56	360	3.3	U	31.5		3.2	U	3.2	U	3.2	U
Dibenzo(a,h)anthracene			56	360	9.4	U	30.3	J	9.2	U	9.0	U	9.1	U
Indeno(1,2,3-cd)pyrene			560	3,600	4.0	U	207		3.9	U	3.8	U	3.9	U
Ohmicron Field Screen	µg/kg	NA	NA	NA	30	S	1,070	S	97	S	NA		41	S

Notes:
NA Not Applicable / Not Analyzed
PRG denotes Preliminary Remediation Goal
[1] EPA Region 9 Residential PRG (May, 1998)
[2] EPA Region 9 Industrial PRG (May, 1998)
Values in ***BOLD*** *exceed the residential PRG*

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
S Applied to all field screening data.

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID				HAS39S393
Location				Segment 1 & 2
Sample Depth bgs (feet)				Various
COC Number				58-059HA
Sample Delivery Group Number				
Date Collected				05-Nov-98
Analyte	**Units**	**EPA Method**	**Subsurface Clean-Up Goal**	**Concentration**
Dioxins	**µg/kg**	**8290**		
Total WHO TEQ			1.0	0.0055

Notes:
NA Not Applicable / Not Analyzed

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S419		HAS39S420		HAS39S421		HAS39S423		HAS39S424	
Location					Excavation Segment 3		Excavation Segment 3		Duplicate of -419		Excavation Segment 4		Excavation Segment 4	
Sample Depth bgs (feet)					6'		6'		6'		NA		NA	
COC Number					58-064HA		58-064HA		58-064HA		58-066HA		58-066HA	
Sample Delivery Group Number					98L168		98L168		98L168		98L236		98L236	
Date Collected					15-Dec-98		15-Dec-98		15-Dec-98		21-Dec-98		21-Dec-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res** [1]	**EPA PRG Indust** [2]	***Concentration***									
Volatile Organic Compounds (VOCs)	µg/kg	8260A												
Acetone			1,400,000	6,100,000	20.3	J	29.8	J	5.3	UJ	4.6	UJ	33	J
Benzene			620	1,400	0.34	UJ	0.31	UJ	0.32	UJ	0.28	UJ	0.26	UJ
Bromodichloromethane			980	2,300	0.36	UJ	0.32	UJ	0.34	UJ	0.29	UJ	0.27	UJ
2-Butanone (Methyl ethyl ketone)			6,900,000	27,000,000	7.1	UJ	6.4	UJ	6.6	UJ	5.7	UJ	5.3	UJ
Carbon disulfide			350,000	1,200,000	0.17	UJ	0.16	UJ	0.16	UJ	0.14	UJ	0.13	UJ
Carbon tetrachloride			230	520	1.1	UJ	0.99	UJ	1.0	UJ	0.88	UJ	0.81	UJ
Chlorobenzene			54,000	180,000	0.27	UJ	0.25	UJ	0.26	UJ	0.22	UJ	0.20	UJ
Chloroform			240	520	0.59	UJ	0.53	UJ	0.55	UJ	0.47	UJ	0.44	UJ
Chloromethane			1,200	2,600	2.8	UJ	2.6	UJ	2.7	UJ	2.3	UJ	2.1	UJ
Dibromomethane			NA	NA	0.48	UJ	0.44	UJ	0.45	UJ	0.39	UJ	0.36	U
1,1-Dichloroethene			52	120	0.74	UJ	0.68	UJ	0.70	UJ	0.60	UJ	0.55	UJ
cis-1,2-Dichloroethene			42,000	150,000	0.40	UJ	0.37	UJ	0.38	UJ	0.32	UJ	0.30	UJ
Ethylbenzene			230,000	230,000	0.54	UJ	0.49	UJ	0.51	UJ	0.44	UJ	0.40	UJ
2-Hexanone			NA	NA	1.7	UJ	1.6	UJ	1.6	UJ	1.4	UJ	1.3	UJ
Methylene chloride			8,500	20,000	0.57	UJ	2.23	J	3.38	J	2.19	J	3.12	J
4-Methyl-2-pentanone (MIBK)			NA	NA	1.6	UJ	1.4	UJ	1.5	UJ	1.3	UJ	1.2	UJ
Naphthalene			NA	NA	0.55	UJ	0.50	UJ	0.51	UJ	0.44	UJ	0.41	UJ
1,1,2,2-Tetrachloroethane			360	870	0.46	UJ	0.42	UJ	0.43	UJ	0.37	UJ	0.34	UJ
Tetrachloroethene (PCE)			4,700	16,000	0.34	UJ	0.30	UJ	0.31	UJ	0.27	UJ	0.25	UJ
Toluene			520,000	520,000	0.43	UJ	0.453	J	0.41	UJ	0.35	UJ	0.32	UJ
1,2,3-Trichlorobenzene			NA	NA	0.35	UJ	0.32	UJ	0.33	UJ	0.28	UJ	0.26	UJ
1,2,4-Trichlorobenzene			480,000	1,700,000	0.58	UJ	0.53	UJ	0.55	UJ	0.47	UJ	0.44	UJ
1,1,1-Trichloroethane			680,000	1,400,000	0.46	UJ	0.42	UJ	0.43	UJ	0.37	UJ	0.34	UJ
1,1,2-Trichloroethane			820	1,900	0.32	UJ	0.29	UJ	0.30	UJ	0.26	UJ	0.24	UJ
Trichloroethene			2,700	6,100	0.35	UJ	0.32	UJ	0.33	UJ	0.28	UJ	0.26	UJ
Trichlorofluoromethane			380,000	1,300,000	0.39	UJ	0.36	UJ	0.37	UJ	0.32	UJ	0.29	UJ
Vinyl chloride			21	48	1.4	UJ	1.3	UJ	1.3	UJ	1.1	UJ	1.0	UJ
m-Xylene			210,000	210,000	1.0	UJ	0.94	UJ	0.97	UJ	0.83	UJ	0.77	UJ
o-Xylene			280,000	280,000	0.47	UJ	0.42	UJ	0.44	UJ	0.38	UJ	0.35	UJ
p-Xylene			370,000	370,000	1.0	UJ	0.94	UJ	0.97	UJ	0.83	UJ	0.77	UJ

Notes:

NA Not Applicable / Not Analyzed

PRG denotes Preliminary Remediation Goal

(1) EPA Region 9 Residential PRG (May, 1998)

(2) EPA Region 9 Industrial PRG (May, 1998)

*Values in **BOLD** exceed the residential PRG*

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S419		HAS39S420		HAS39S421		HAS39S423		HAS39S424	
Location					Excavation Segment 3		Excavation Segment 3		Duplicate of 419		Excavation Segment 4		Excavation Segment 4	
Sample Depth bgs (feet)					6'		6'		6		NA		NA	
COC Number					58-064HA		58 064HA		58 064HA		58 066HA		58-066HA	
Sample Delivery Group Number					98L168		98L168		98L168		98L236		98L236	
Date Collected					15 Dec 98		15 Dec 98		15 Dec 98		21 Dec 98		21 Dec 98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res[1]**	**EPA PRG Indust[2]**	**Concentration**									
Semivolatile Organic Compounds (SVOCs)	**µg/kg**	**8270B**												
Acenaphthene			2,600,000	28,000,000	8,600	U	7,800	U	8,100	U	3,500	U	3,200	U
Acenaphthylene			NA	NA	8,600	U	7,800	U	8,000	U	3,400	U	3,200	U
Anthracene			14,000,000	220,000,000	5,600	U	5,000	U	5,200	U	2,200	U	2,100	U
Benzo(a)anthracene			560	3,600	5,700	U	5,200	U	5,400	U	2 300	U	2,100	U
Benzo(a)pyrene			56	360	3,100	U	2,800	U	2,900	U	1,200	U	1,100	U
Benzo(b)fluoranthene			560	3,600	5,300	U	4,800	U	5,000	U	2,100	U	2,000	U
Benzo(k)fluoranthene			5,600	36,000	5,600	U	5,100	U	5,300	U	2,300	U	2,100	U
Benzo(ghi)perylene			NA	NA	3,400	UJ	3,100	U	3,200	U	1,400	U	1,300	U
Bis(2-ethylhexyl) phthlate			32,000	210,000	7,000	U	6,400	U	6,600	U	2,800	U	2,600	U
Butyl benzylphthalate			930,000	930,000	6,300	U	5,700	U	5,900	U	2,500	U	2,300	U
Carbazole			22,000	150,000	6,600	U	6,000	U	6,100	U	2,600	U	2,400	U
Chrysene			56,000	360,000	7,500	U	6,800	U	7,000	U	3,000	U	2,800	U
Di n-butyl phthalate			NA	NA	6,600	U	6,000	U	6,200	U	2,700	U	2,500	U
Dibenzo(a,h)anthracene			56	360	2,700	U	2,400	U	2,500	U	1,100	U	990	U
Dibenzofuran			210,000	3,200,000	8,600	U	7,800	U	8,100	U	3,500	U	3,200	U
Fluoranthene			2,000,000	37,000,000	6,400	U	5,800	U	6,000	U	2,600	U	2,400	U
Indeno(1,2,3-cd) pyrene			560	3,600	3,500	UJ	3,200	U	3,300	U	1,400	U	1,300	U
Naphthalene			55,000	190,000	11,000	U	10,000	U	10,000	U	4 500	U	4,200	U
Pentachlorophenol			2,500	15,000	6,600	U	6,030	U	6,200	U	2,700	U	2,500	U
Phenanthrene			NA	NA	5,500	U	5,000	U	5,100	U	2,200	U	2,000	U
Pyrene			1,500,000	26,000,000	7,500	U	6,800	U	7,000	U	3,000	U	2,800	U
Polynuclear Aromatic Hydrocarbons (PAHs)	**µg/kg**	**8310**												
Anthracene			14,000,000	220,000,000	6 32	J	1 8	U	1 9	U	1 6	U	1 6	U
Fluoranthene			2,000,000	37,000,000	14 8	J	15 6	J	4 2	U	5 52	J	3 6	U
Pyrene			1,500,000	26,000,000	2 8	U	2 5	U	2 6	U	19 6	J	12 9	J
Benzo(a)anthracene			560	3,600	3 8	U	5 17	J	3 5	U	8 71	J	2 51	J
Chrysene			56,000	360,000	2 7	U	3 9	J	7 98	J	11 6	J	2 2	U
Benzo(b)fluoranthene			560	3,600	13 7	J	10 4	J	11 6	J	32 9		76	J
Benzo(k)fluoranthene			5,600	36,000	4 43	J	4 3	UJ	4 4	UJ	9 5	J	4 86	J
Benzo(a)pyrene			56	360	3 4	UJ	3 1	UJ	3 2	UJ	13 3	J	2 7	UJ
Dibenzo(a,h)anthracene			56	360	9 7	UJ	8 8	UJ	9 1	UJ	9 04	J	7 7	UJ
Indeno(1,2,3-cd)pyrene			560	3,600	33 3	J	7 27	J	16 6	J	91 2	J	42 3	J

Notes
NA Not Applicable / Not Analyzed
PRG denotes Preliminary Remediation Goal
[1] EPA Region 9 Residential PRG (May, 1998)
[2] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers
U The analyte was analyzed for, but not detected The associated numerical value is at or below the Method Detection Limit (MDL)
J The analyte was positively identified, the quantitation is an estimation
UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID					HAS39S419		HAS39S420		HAS39S421		HAS39S423		HAS39S424	
Location					Excavation Segment 3		Excavation Segment 3		Duplicate of -419		Excavation Segment 4		Excavation Segment 4	
Sample Depth bgs (feet)					6'		6'		6'		NA		NA	
COC Number					58-064HA		58-064HA		58-064HA		58-066HA		58-066HA	
Sample Delivery Group Number					98L168		98L168		98L168		98L236		98L236	
Date Collected					15-Dec-98		15-Dec-98		15-Dec-98		21-Dec-98		21-Dec-98	
Analyte	**Units**	**EPA Method**	**EPA PRG Res [1]**	**EPA PRG Indust [2]**	**Concentration**									
Pesticides	µg/kg	8081												
gamma-BHC (Lindane)			420	3,200	0.86	U	0.78	U	0.80	UJ	0.69	UJ	0.68	UJ
delta-BHC			NA	NA	0.51	U	0.46	U	0.48	UJ	0.41	UJ	0.41	UJ
Aldrin			26	180	0.35	U	0.32	U	0.33	U	0.28	U	0.28	UJ
Heptachlor epoxide			49	330	0.46	U	0.42	U	0.43	UJ	0.37	UJ	4.95	J
gamma-Chlordane			1,600	12,000	0.45	U	0.41	U	0.62	UJ	0.36	UJ	0.36	UJ
alpha-Chlordane			1,600	12,000	0.46	U	0.42	U	0.43	U	0.37	UJ	0.37	UJ
4,4'-DDE			1,700	13,000	3.34	J	3.79	J	5.61	J	0.74	UJ	0.73	U
Dieldrin			28	190	2.0	U	1.8	U	1.8	UJ	3.15	UJ	2.06	J
Endrin			16,000	320,000	1.9	U	1.7	U	1.8	UJ	1.5	UJ	1.5	UJ
4,4'-DDD			2,400	19,000	1.6	U	1.4	U	1.4	UJ	1.4	UJ	7.15	J
4,4'-DDT			1,700	13,000	1.7	U	1.5	U	4.28	J	20.1	J	30.6	J
Endrin aldehyde			16,000	320,000	1.2	U	1.1	U	1.1	UJ	0.96	UJ	0.95	UJ
Methoxychlor			270,000	5,300,000	9.7	U	8.8	U	9.1	UJ	7.8	UJ	7.7	UJ
Polychlorinated Biphenyls (PCBs)	µg/kg	8081												
Aroclor 1254			970	18,000	NA		NA		NA		84.3		153	

Notes:
NA Not Applicable / Not Analyzed
PRG denotes Preliminary Remediation Goal
[1] EPA Region 9 Residential PRG (May, 1998)
[2] EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

Table 2-7 (continued)
Confirmation Soil Sample Analysis for the Miscellaneous Container Area
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID				HAS39S426
Location				Excavation Segments 3 & 4
Sample Depth bgs (feet)				NA
COC Number				58-067HA
Sample Delivery Group Number				47581
Date Collected				21-Dec-98
Analyte	**Units**	**EPA Method**	**Subsurface Clean-Up Goal**	**Concentration**
Dioxins	**µg/kg**	**8290**		
Total WHO TEQ			1.0	0.0060

Notes:
NA Not Applicable / Not Analyzed
PRG denotes Preliminary Remediation Goal
(1) EPA Region 9 Residential PRG (May, 1998)
(2) EPA Region 9 Industrial PRG (May, 1998)
*Values in **BOLD** exceed the residential PRG*

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria
S Applied to all field screening data.

Soil Sample Analysis Results for IRP Site 39 Site Wide Dioxin Sampling

Table 2-8
Soil Sample Analysis for the Site Wide Dioxin Sampling
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID			HAS39S153	HAS39S154	HAS39S155	HAS39S156	HAS39S157
Location			Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Dup of -153
Sample Depth bgs (feet)			0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3
COC Number			58-026HA	58-026HA	58-026HA	58-026HA	58-026HA
Sample Delivery Group Number			46267	46267	46267	46267	46267
Date Collected			16-Jul-98	16-Jul-98	17-Jul-98	17-Jul-98	17-Jul-98
Analyte	**Units**	**EPA Method**	**Concentration**				
Dioxins	**µg/kg**	**8290**					
Total EPA TEQ			0.00921	0.01727	2.2066	0.01692	0.00940
Total WHO TEQ			0.00862	0.01465	1.4121	0.01415	0.00880

Notes:

NA Not Applicable / Not Analyzed

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-8
Soil Sample Analysis for the Site Wide Dioxin Sampling
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID			HAS39S200	HAS39S201	HAS39S202	HAS39S203	HAS39S204
Location			Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation
Sample Depth bgs (feet)			0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3	0 1-0 3
COC Number			58-033HA	58-033HA	58-033HA	58-033HA	58-033HA
Sample Delivery Group Number			46460r1	46460	46460	46460	46460
Date Collected			04-Aug-98	04-Aug-98	04-Aug-98	04-Aug-98	04-Aug-98
Analyte	**Units**	**EPA Method**	**Concentration**				
Dioxins	**µg/kg**	**8290**					
Total EPA TEQ			0.00930	0.01440	0.01668	0.01060	0.02100
Total WHO TEQ			0.00753	0.01146	0.01377	0.00912	0.01718

Notes:

NA Not Applicable / Not Analyzed

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-8 (continued)
Soil Sample Analysis for the Site Wide Dioxin Sampling
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID			HAS39S205	HAS39S206	HAS39S207	HAS39S208	HAS39S209
Location			Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation
Sample Depth bgs (feet)			0 1-0.3	0.1-0.3	0.1-0.3	0 1-0.3	0.1-0 3
COC Number			58-033HA	58-033HA	58-033HA	58-033HA	58-033HA
Sample Delivery Group Number			46460	46460	46460	46460	46460
Date Collected			04-Aug-98	04-Aug-98	04-Aug-98	04-Aug-98	04-Aug-98
Analyte	**Units**	**EPA Method**	**Concentration**				
Dioxins	**µg/kg**	**8290**					
Total EPA TEQ			0.02100	0.00866	0 00773	0.01910	0.00710
Total WHO TEQ			0 01790	0.00787	0.00700	0.01636	0.00678

Notes:
NA Not Applicable / Not Analyzed

Data Qualifiers:
U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)
J The analyte was positively identified; the quantitation is an estimation.
UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
B The analyte was found in an associated blank.
R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.
S Applied to all field screening data.

Table 2-8 (continued)
Soil Sample Analysis for the Site Wide Dioxin Sampling
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID			HAS39S210	HAS39S211	HAS39S212	HAS39S213	HAS39S214
Location			Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation	Site 39 Harmon Substation
Sample Depth bgs (feet)			0 1-0.3	0.1-0.3	0.1-0.3	0.1-0.3	0.1-0.3
COC Number			58-034HA	58-034HA	58-034HA	58-034HA	58-034HA
Sample Delivery Group Number			46460	46460	46460	46460	46460
Date Collected			07-Aug-98	07-Aug-98	07-Aug-98	07-Aug-98	07-Aug-98
Analyte	**Units**	**EPA Method**	**Concentration**				
Dioxins	**µg/kg**	**8290**					
Total EPA TEQ			0.00660	0.05550	0.42020	0.12470	0 01370
Total WHO TEQ			0.00589	0.04501	0.36385	0.11005	0 01226

Notes:

NA Not Applicable / Not Analyzed

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL).

J The analyte was positively identified, the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria.

S Applied to all field screening data.

Table 2-8 (continued)
Soil Sample Analysis for the Site Wide Dioxin Sampling
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID			HAS39S406	HAS39S407	HAS39S408	HAS39S409
Location			HAS39S155A	HAS39S155A	HAS39S155B	HAS39S155B
Sample Depth bgs (feet)			0 5	1 5	0.5	1.5
COC Number			58-062HA	58-062HA	58-062HA	58-062HA
Sample Delivery Group Number			47480r1	47480r1	47480r1	47480r1
Date Collected			07-Dec-98	07-Dec-98	07-Dec-98	07-Dec-98
Analyte	**Units**	**EPA Method**	**Concentration**			
Dioxins	**µg/kg**	**8290**				
Total WHO TEQ			0.0207	0 0015	0.0353	0.0622

Notes:

NA Not Applicable / Not Analyzed

Data Qualifiers:

U The analyte was analyzed for, but not detected The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified, the quantitation is an estimation

UJ The analyte was analyzed for, but not detected The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data.

Table 2-8 (continued)
Soil Sample Analysis for the Site Wide Dioxin Sampling
IRP Site 39/Harmon Substation, Andersen AFB, Guam

Sample ID			HAS39S410	HAS39S411	HAS39S412
Location			HAS39S155C	HAS39S155C	Duplicate of HAS39S406
Sample Depth bgs (feet)			0.5	1.5	0.5
COC Number			58-062HA	58-062HA	58-062HA
Sample Delivery Group Number			48480r1	47480r2	47480r1
Date Collected			07-Dec-98	07-Dec-98	07-Dec-98
Analyte	**Units**	**EPA Method**	**Concentration**		
Dioxins	**µg/kg**	**8290**			
Total WHO TEQ			0.0010	.00162*	0.0217

Notes:

NA Not Applicable / Not Analyzed

** preliminary result*

Data Qualifiers:

U The analyte was analyzed for, but not detected. The associated numerical value is at or below the Method Detection Limit (MDL)

J The analyte was positively identified; the quantitation is an estimation.

UJ The analyte was analyzed for, but not detected. The reported MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

B The analyte was found in an associated blank.

R The data are unusable due to deficiencies in the ability to analyze the sample and meet QC criteria

S Applied to all field screening data.

Appendix C

Human Health and Ecological Risk Assessments
(IT/OHM, 1999)

Final

Confirmation Human Health Risk Assessment For IRP Site 39/Harmon Substation Andersen Air Force Base, Guam

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee

July 26, 1999

Revision 1

Table of Contents

Page M-

Table of Contents (Continued)

Page M-

List of Tables

List of Figures

List of Acronyms

AAFB	Andersen Air Force Base
cm^2	square centimeters
COPC	chemical(s) of potential concern
CRQL	contract-required quantitation limit
CSEM	conceptual site exposure model
EPA	U.S. Environmental Protection Agency
g/m^3	grams per cubic meter
GAF	gastroinstestinal absorption factor
Harmon Substation	IRP Site 39/Harmon Substation
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
ILCR	incremental lifetime cancer risk
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
kg	kilogram
m^3	cubic meter
mg/day	milligrams per day
MDC	maximum detected concentrations
NCEA	National Center for Environmental Assessment
PAH	polynuclear aromatic hydrocarbon
PRG	preliminary remediation goal
RfC	reference concentration
RfD	reference dose
RME	reasonable maximum exposure
SF	slope factor
UCL	upper confidence limit

M.1 Introduction

This Appendix presents a confirmation human health risk assessment (HHRA) to assess residual risk from Installation Restoration Program (IRP) Site 39/Harmon Substation (Harmon Substation), Andersen Air Force Base (AAFB), Guam. This HHRA was performed to verify the results of the removal actions performed by the United States Air Force under the IRP. These activities are discussed in detail in the body of this report. Determining the presence or absence of residual risk will support risk management decision regarding additional remediation requirements, if any, and land use options for the site. Residual risk to human health from environmental media remaining at Harmon Substation was characterized in accordance with U.S. Environmental Protection Agency (EPA) guidance for performing baseline risk assessments (EPA, 1989a; EPA, 1991a; EPA, 1992a,b,c). The location and layout of Harmon Substation are described in Section 1 of this report and depicted in Figures 1-2 and 2-1, respectively.

The remainder of this Appendix is organized as follows: Section M.2 discusses site history, analytical data validation, selection of chemicals of potential concern (COPC), and estimation of source-term concentrations for each COPC in each medium. Section M.3 describes the processes used to determine exposure scenarios, plausible receptors, exposure pathways, exposure-point concentrations (for COPC), and estimate dose or contact rates for each COPC. Section M.4 provides the toxicity assessment and describes the hazard evaluation (i.e., the adverse health effects associated with each of the COPC) and the dose-response evaluation, (i.e., the relationship between dose or contact rate and the magnitude of the adverse effect). Section M.5 presents the risk characterization that quantifies the risk to each receptor through combining output from the exposure analysis with that from the toxicity analysis. Finally, Section M.6 describes the uncertainty evaluations, and qualitatively addresses uncertainties associated with assumptions and parameters used in the HHRA.

M.2 Data Evaluation

Data were collected from the site and evaluated in accordance with EPA guidelines. This process includes evaluating sample collection and analytical methods, evaluating the quality of the data, and comparing the data to EPA Region IX Preliminary Remediation Goals (PRGs) (1998). The purpose of this selection process is to identify any chemicals that could be harmful to human health if they are present at the site, identify those chemicals that are likely to be site-related, and evaluate the acceptability of the analytical data for use in the quantitative risk assessment (EPA, 1989a).

M.2.1 Data Sources and History

M.2.1.1 Background

A large number of samples from Operable Unit 3 investigations were used to develop threshold values for inorganic chemicals at AAFB. Lead was the only inorganic chemical evaluated as a potential COPC at Harmon Substation. Lead concentrations were below the PRG for lead, therefore comparison with background was not required in order to characterize risk from lead at the site.

M.2.1.2 Site Investigation and Remediation History

Historical information regarding site usage and environmental investigation and remediation activities is provided in the body of this document. Section 1 provides general background information, and Section 2 provides remediation background information.

M.2.2 Data Validation

Data validation is an after-the-fact, independent, systematic process of evaluating data. Data are compared to pre-established criteria to confirm that the data are of acceptable technical quality. Specific criteria are reviewed to determine whether the data meet the established data quality objectives for the project. There are five principal quality objectives:

- Precision
- Accuracy
- Completeness
- Comparability
- Representativeness.

To verify that these objectives are met, field measurements, sampling and handling procedures, laboratory analysis and reporting, and nonconformances and discrepancies in the data are examined to determine compliance with appropriate and applicable procedures. The procedures and criteria for validation are defined in the Andersen Air Force Base, Final Basewide Quality Assurance Project Plan (AAFB, 1997), the U.S. EPA SW-846, "Test Methods for Evaluating Solid Waste," Update II (EPA, 1994a), and the U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic and Organic Data Review (EPA, 1994b).

The validation process for data from Harmon Substation was divided into two phases. The first phase considered field data to verify the completeness, accuracy, and representativeness of field sampling. The second phase dealt with analytical chemical validation. The important field data reviewed in the validation process are:

- Field logbooks
- Specific field forms for sample collection and handling
- Analytical Request (AR)/Chain-of-custody (COC)
- Field instrument calibrations
- Field personnel training
- Variances and surveillance of field activities.

The primary analytical data and parameters reviewed in the validation process are:

- Organic constituent analyses:
  - Holding times and preservation
  - Gas chromatography or high performance liquid chromatography performance
  - Initial and continuing instrument calibration
    - Surrogate recoveries
    - Internal standards
    - Method blanks
    - Laboratory control samples
    - Matrix spikes and matrix spike duplicates
    - Compound quantitation and identification
    - Field duplicate precision

- Inorganic constituent analyses:
  - Holding times and preservation
  - Instrument performance checks
  - Initial and continuing calibrations
  - Matrix spike and matrix spike duplicate evaluations
  - ICP serial dilution and interference checks
  - Laboratory control sample checks
    - Duplicate sample analysis
    - Compound quantitation and identification
    - Field duplicate precision.

The data used to complete confirmation HHRA is presented in Attachment 1 to this Appendix. A subset of the data was validated by a third party (Jacobs Engineering, Inc., California). The remaining sample data were validated by contractor chemists assigned to the project who are experienced in data validation protocols. Detailed data quality assessment reports are available upon request, for all data packages containing data used for risk assessment purposes.

All environmental sampling data are evaluated for suitability for use in the risk assessment. Analytical results for chemicals are reported using Air Force Center for Environmental Excellence and Contract Laboratory Program data qualifiers. Chemicals flagged with a "U" qualifier are considered to be not detected, or detected at a concentration below the normal, random "noise" of the analytical instrument. Estimated quantitative results such as those identified by a "J" qualifier are used in the assessment. The "J" qualifier describes an estimated value when a compound is present (spectral identification criteria are met), but at values less than the contract-required quantitation limit (CRQL), or when quality control samples suggest that the sample results may be in error (e.g., when spike samples are outside of required limits or when holding times are just outside limits). Data with a "UJ" qualifier are treated as not detected for the purposes of data evaluation and risk assessment. If validation of the data reveals that samples must be rejected (assigned an "R" qualifier), the rejected data are not used for the risk assessment. The data utilized in this risk assessment have been validated, and determined suitable for use in a Human Health Risk Assessment to address potential residual risk from soil at Harmon Substation.

M.2.3 Selection of Chemicals of Potential Concern

Chemicals of potential concern are selected following the validation of data, compilation of summary statistics, and comparison with site background and PRGs (EPA 1989a, 1998). The COPC selection criteria for chemicals to be retained as COPC, as recommended by EPA (1989a, 1998), are illustrated in Table M-1, and are as follows:

- ***Frequency of Detection.*** Chemicals were eliminated if they were detected infrequently (5 percent or lower frequency of detection), providing there was no evidence that infrequent detection reflected a "hot spot" location.

- ***Risk-Based Screening.*** The risk-based screening is applied in a phased manner. First, the maximum detected concentration (MDC) of a chemical is compared with the corresponding EPA (1998) PRG value for residential soil; chemicals are excluded from further consideration if the MDC is less than or equal to the PRG. If the MDC exceeds the PRG, the source-term concentration, based on the best-fit distribution of the data, is then compared with the PRG. A chemical is excluded from further consideration if the source-term concentration is less than or equal to the PRG.

- ***Background.*** If the mean chemical concentration of a sample is less than the mean of the background concentration, the chemical is excluded from further consideration as a COPC. If the mean of the chemical concentration is marginally greater than the background mean, a statistical analyses may be performed to determine if the sample mean is statistically greater than the background mean.

Table M-1

Selection of Chemicals of Potential Concern, Total Soil [a]
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Chemical	Detection Frequency	Range of values, µg/kg: Detected Concentrations Minimum	Detected Concentrations Maximum	Detection Limits [f] Minimum	Detection Limits Maximum	Statistical Distribution [b]	Mean µg/kg	95% UCL µg/kg [c]	Risk-Based Screening Criterion µg/kg [d]	COPC? [e,f]	Source-Term Concentration µg/kg [g]
oxin											
OXIN (WHO) TEQ	39 / 39	0.001	1.4121	NA	NA	NP	6.06E-02	1.38E-02	3.80E-03	Y	1.38E-02
organics											
ad	32 / 35	5990	149000	NA	NA	U	3.18E+04		4.00E+05	N (a)	—
lynuclear Aromatic Hydrocarbons (PAH)											
nthracene	8 / 88	2.74	29.4	NA	NA	U	2.12E+00		1.40E+06	N (a)	—
nzo(a)anthracene	27 / 88	2.51	71.6	NA	NA	U	9.53E+00		5.57E+02	N (a)	—
nzo(a)pyrene	29 / 88	6.22	87.5	NA	NA	L	1.21E+01	1.66E+01	5.60E+01	Y	1.66E+01
nzo(b)fluoranthene	35 / 88	6.94	126	NA	NA	U	1.76E+01		5.60E+02	N (a)	—
nzo(k)fluoranthene	25 / 88	1.84	41.1	NA	NA	U	7.45E+00		5.60E+03	N (a)	—
irysene	28 / 88	3.7	188	NA	NA	U	9.43E+00		5.60E+04	N (a)	—
benzo(a,h)anthracene	5 / 88	3.64	30.3	NA	NA	U	5.79E+00		5.60E+01	N (a)	—
ioranthene	21 / 88	5.52	289	NA	NA	U	1.85E+01		2.00E+05	N (a)	—
leno(1,2,3-cd)pyrene	29 / 88	7.27	207	NA	NA	U	1.72E+01		5.60E+02	N (a)	—
rene	23 / 88	4.82	241	NA	NA	U	1.43E+01		1.50E+05	N (a)	—
sticides											
4'-DDD	21 / 36	3.63	166	NA	NA	U	1.42E+01		2.36E+03	N (a)	—
4'-DDE	34 / 36	1.11	1380	NA	NA	U	2.05E+02		1.66E+03	N (a)	—
4'-DDT	30 / 36	4.28	1080	NA	NA	U	1.05E+02		1.66E+03	N (a)	—
pha-Chlordane	9 / 36	1.02	22.4	NA	NA	U	2.48E+00		1.60E+03 h	N (a)	—
aldrin	5 / 36	2.06	4.52	NA	NA	U	2.96E+00		2.80E+01	N (a)	—
drin aldehyde	3 / 36	3.76	8.87	NA	NA	U	2.11E+00		1.60E+03 i	N (a)	—
imma-Chlordane	11 / 36	0.585	37.7	NA	NA	U	2.79E+00		1.60E+03 h	N (a)	—
ptachlor Epoxide	6 / 36	0.879	4.95	NA	NA	U	9.91E-01		4.88E+01	N (a)	—
lychlorinated Biphenyls (PCB)											
oclor 1254	3 / 51	84.3	208	NA	NA	L	1.03E+01	5.47E+00	9.70E+01	Y	5.47E+00
oclor 1260	13 / 48	27.6	178	NA	NA	U	2.85E+01		1.98E+02	N (a)	—
latile Organics											
etone	5 / 12	18.5	37	NA	NA	U	1.30E+01		1.40E+05	N (a)	—
thylene chloride	9 / 12	1.62	12.3	NA	NA	U	3.61E+00		8.50E+03	N (a)	—

otal soil equals post-remedial surface, subsurface, and stockpile soil sampled and remaining on-site.
tatistical Distribution: L = Lognormal distribution; NP = Nonparametric distribution for data sets with greater than 50% detects if data set fails normal and lognormal;
= Distribution not determined if maximum concentration is less than screening criteria.
5% Upper confidence limit calculated for chemicals with maximum detected concentrations greater than screening criteria.
ased on Region 9 preliminary remediation goals (PRG) for residential soil ingestion, adjusted, if necessary to reflect an incremental lifetime cancer risk of 1E-6 and a hazard ndex of 0.1 (EPA, 1998, *PRG Table*, 1 May, EPA Region 9).

Table M-1

Selection of Chemicals of Potential Concern, Total Soil [a]
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

[e] Rationale for exclusion of chemical as a contaminant of potential concern (COPC):
(a) = maximum detection is less than screening criteria.
[f] N = Chemical is not chosen as a COPC; Y = Chemical is chosen as COPC.
[g] Concentration used in risk assessment equal to 95% UCL or maximum value, whichever is less.
[h] Based on PRG for chlordane.
[i] Based on PRG for endrin.
[j] Derived, see text.
[k] Detection limits were either unreliable or unavailable and are not reported.

NA = Not available
TEQ = TCDD equivalent concentration for dioxins

- ***Chemical Specificity.*** Analytical results that were not specific for a particular compound were excluded from further consideration, unless toxicity values were located that sufficiently reflect the toxicity of the chemical (e.g., PCBs for Aroclor 1248, chlordane for alpha-chlordane).

M.2.4 Summary Statistics of Site-Related Data

The statistical methods used in data evaluation are discussed in this section, and reflect EPA guidance (EPA, 1989a). Summary statistics for soil samples from Harmon Substation are included in the COPC Table (Table M-1). The following information was tabulated in each:

- Chemical name
- Detection frequency
- Range of detected concentrations
- Range of detection limits
- Statistical distribution
- Mean concentrations
- 95 percent upper confidence limit (UCL) on the mean
- Risk-based screening criterion
- COPC selection
- Source-term concentration.

Because of the uncertainty associated with characterizing contamination in environmental media, the UCL of the mean was estimated for each chemical in each specific media. In general, "outliers" were included in the calculation of the UCL because high values in site-related data are seldom outliers. Inclusion of outliers increases the overall conservatism of the risk estimate. Chemical data sets containing five or more samples are tested for normality and lognormality using the Shapiro-Wilks test (EPA, 1992d), from the software package STATISTICA™ (StatSoft, Inc., 1995). UCL estimates are performed only for those chemicals whose MDCs exceed their PRG. If statistical tests support the assumption that the data is normally distributed, the UCL for a normal distribution is calculated. If the statistical analysis shows the data to be lognormally distributed, the UCL is calculated for a lognormal distribution. If the data fit both normal and lognormal distributions, the UCL is calculated for the distribution that appears to provide the best fit.

The UCL is calculated for a normal distribution as follows (EPA, 1992a):

$$UCL = \bar{x} + t_{1-\alpha,n-1} \times (s/\sqrt{n})$$

where:

$\bar{x}$	=	sample arithmetic mean
t_1	=	critical value for student's plus distribution
α	=	0.05 (95 percent confidence limit for a one-tailed test)
n	=	number of samples in the set
s	=	sample standard deviation.

The UCL is calculated for a lognormal distribution as follows (Gilbert, 1987):

$$UCL = e^{\left(\bar{y} + (0.5 \cdot s_y^2) + \left[H_{0.95} \cdot \frac{s_y}{(n-1)^{0.5}}\right]\right)}$$

where:

$\bar{y}$	=	sample arithmetic mean of the log-transformed data, y = ln x
s_y	=	sample standard deviation of the log-transformed data
n	=	number of samples in the data set
$H_{0.95}$	=	value for computing the one-sided upper 95 percent confidence limit on a lognormal mean from standard statistical tables (Land, 1975).

A nonparametric confidence limit is used when the data fit neither a normal nor a lognormal distribution as identified with a Shapiro-Wilks test. This occurs commonly in environmental chemical concentration data sets when most of the data points are nondetects or very low concentrations, and one or two data points are relatively high, yielding a skewed distribution with a large tail to the right. Although lognormal parameters can be estimated for these data sets, their use in UCL estimation is generally not appropriate, resulting in the estimation of UCLs orders of magnitude above the MDC. Treating these data sets as lognormal effectively ignores the fact that most of the data were nondetects or very low values, and incorrectly imposes the MDC as a reasonably conservative estimate of average. The nonparametric UCL is introduced to address this problem while not failing to capture the size of the upper tail in truly lognormal distributions.

The nonparametric UCL is the UCL on the median, rather than the mean, because the median is a better estimate of central tendency for a nonparametric distribution. It is estimated by ranking the data observations from smallest to largest. The rank order of the observation selected as the UCL is estimated from the following equation (Gilbert, 1987):

$$u = p(n + 1) + Z_{1-\alpha} \sqrt{np(1 - p)}$$

where:

- u = rank order for data point selected as the UCL
- p = quantile on which UCL is being calculated; $p = 0.5$
- n = number of samples in the set
- α = confidence limit; 95 percent
- $Z_{1-\alpha}$ = normal deviate variable for one-sided UCL = 1.645.

For data sets of small samples sizes (less than 10), the nonparametric UCL is generally the MDC

Analytical results are presented as nondetects, whenever chemical concentrations in samples do not exceed the detection or quantitation limits for the analytical procedures of those samples. Generally, the detection limit is the lowest concentration of a chemical that can be "seen" above the normal, random "noise" of an analytical instrument or method. To apply the previously mentioned statistical procedures to a data set containing nondetected values, a concentration must be assigned to the nondetect. In this assessment, a value of one-half the detection limit is assigned to nondetected values (EPA, 1989a).

M.2.5 Chemicals of Potential Concern

This risk assessment evaluates risk from chemicals in total soil sampled, analyzed, and remaining at Harmon Substation. Summary statistics and the selection of COPC for chemicals detected in total soil (surface and subsurface) remaining at the site are presented in Table M-2. A total soil approach is applied, because post-sampling backfilling activities at Harmon Substation make it difficult to positively identify the locations of sampled strata. Samples collected from surface soil may now represent subsurface soils; and samples collected from subsurface soil may now represent surface soils. Assessment of risk from chemicals in "total soil" is the only practicable media evaluation option for Harmon Substation, because it is possible that, in the future any given soil unit could end up as either on- or off-site surface or subsurface soil.

It is possible that stockpile or other soil from Harmon Substation will be removed by nearby residents or contractors in the future and applied as fill material at either on- or off-site construction projects. As discussed in Section M.3.5 below, the construction worker receptor scenario is

Table M-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors IRP Site 39/Harmon Substation Andersen Air Force Base, Guam

(Page 1 of 2)

Pathway Variable	Groundskeeper	Trespasser	Resident[h]
General Parameters Used in All Intake Models			
Exposure Duration (years)	25[a]	10[b]	NA
Adult	NA	NA	24
Child	NA	NA	6
Exposure Frequency (days/year)	250[a]	52[b]	350
Body Weight (kg)	70[a]	45[b]	NA
Adult	NA	NA	70
Child	NA	NA	15
Averaging Time-Noncancer (days)	9125 [d]	3650 [d]	2190
Averaging Time-Cancer (days)	25550 [e]	25550 [e]	25550
Inhalation of Resuspended Dust from Soil			
Inhalation Rate (m^3/hour) Adult	2.5[a]	1.9[b]	NA
Inhalation Rate-Air (m^3/day)			
Adult	NA	NA	20
Child	NA	NA	10
Inhalation Factor$_{adj}$ (m^3-yr/kg-day)	NA	NA	10.9
Exposure Time (hours/day)	8[a]	6[b]	NA
Incidental Ingestion of Soil			
Ingestion Rate-Soil (mg/day)	100[a]	100[a]	NA
Ingestion Rate-Soil (mg/day)			
Adult	NA	NA	100
Child	NA	NA	200
Ingestion Factor$_{sdj}$ (mg-yr/kg-day)	NA	NA	114
Dermal Contact with Soil			
Skin Adherence-Soil (cm^2)	5000 [b]	3700 [b]	NA
Skin Adherence-Soil (cm^2)			
Adult	NA	NA	5000
Child	NA	NA	2000
SFS$_{adj}$ (mg-yr/kg-day)	NA	NA	344
Adherence Factor (mg/cm^2)	0.2 [g]	0.2 [g]	0.2 [g]
Absorption Factor (unitless)	csv	csv	csv

Table M-2

Variables Used to Estimate Potential Chemical Intakes and Contact Rates for Receptors IRP Site 39/Harmon Substation Andersen Air Force Base, Guam

[a] EPA,1991, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual Supplemental Guidance, Standard Default Exposure Factors, Interim Final.*
[b] Assumed; see text.
[c] Refer to Section 6.3.8.
[d]Calculated as the product of ED (years) x 365 days/year.
[e]Calculated as the product of 70 years [assumed human lifetime (EPA,1989, *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*] x 365 days/year.
[f]Calculated, see text
[g]EPA, 1992, *Dermal Exposure Assessment: Principles and Applications*, EPA/600/8-91/011B
[h]EPA, 1996, Region IX Preliminary Remediation Goals (PRGs), EPA Region IX, San Francisco, California, August.

NA = Not Applicable.
csv = Chemical-specific value.

not evaluated, because a more conservative estimate of risk from soil ingestion is included in the evaluation of risk to the groundskeeper.

Based on the PRG-based selection procedures and criteria previously described, the COPC for total soil at Harmon Substation, as selected in Table M-1, are:

- Total WHO Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin, samples were analyzed for total rather than individual dioxins)
- PAH (Benzo(a)pyrene)
- PCB (Aroclor 1254).

M.3 Exposure Assessment

Exposure is the contact of a receptor with a chemical or physical agent. An exposure assessment estimates the type and magnitude of potential exposure of a receptor to a COPC found at or migrating from a site (EPA, 1989a). The exposure assessment included the following steps:

1) Characterization of the physical setting
2) Identification of chemical sources, release mechanisms, and migration pathways
3) Identification of potentially exposed populations or receptors
4) Identification of potential exposure pathways
5) Estimation of exposure concentrations
6) Estimation of chemical intake or contact rates.

The exposure assessment includes the development of the conceptual site exposure model (CSEM) (Figure M-1) and the development of inputs used in the risk assessment. The latter are presented in Table M-2, Variables Used to Estimate Potential Chemical Intakes, and Table M-3, Toxicity Values Applied to Evaluate Chemicals of Potential Concern.

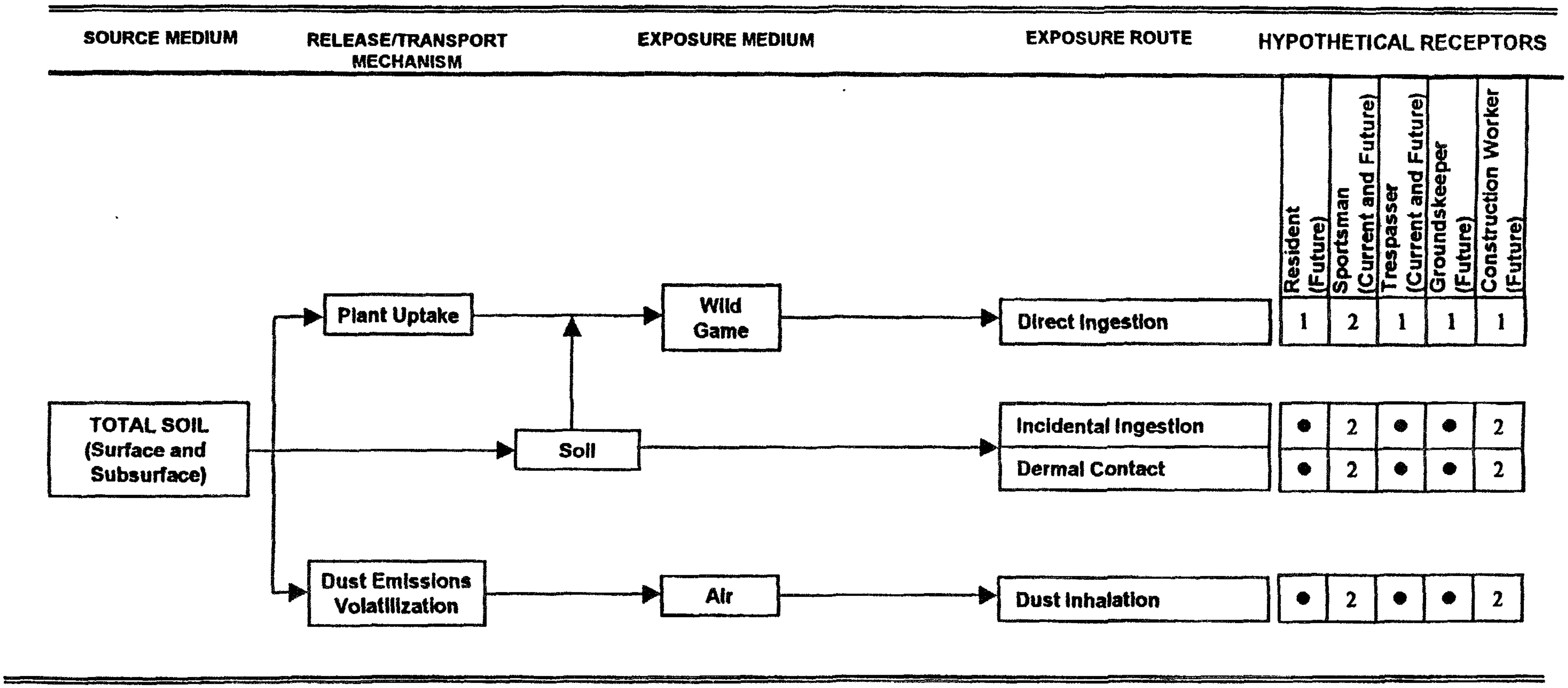
M.3.1 Characterization of Physical Setting & Site Background

Section 1 of this report describes the physical characteristics of this site, including communities that may be in the area that may be affected by chemicals at the site.

Harmon Substation is located in the Harmon Annexes of AAFB, Guam. The site, which is heavily overgrown with swordgrass, is approximately nine acres in size. The surrounding land is either industrial (Harmon Substation) or undeveloped/vegetated. There are no residential or recreational areas adjacent to the site. The nearest surface water body is the Philippine Sea, which is

Figure M-1

Conceptual Site Exposure Model
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam



● = Evaluated - complete exposure pathway.
1 = Incomplete exposure pathway.
2 = Not evaluated - complete exposure pathway (see text Section M.3.5 for explanation).

Table M-3

Toxicity Values Applied to Evaluate Chemicals of Potential Concern
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Chemical of Potential Concern	Gastrointestinal Absorption Factor	Soil Absorption Factor	Oral Slope Factor (kg-day/mg)	Oral Reference Dose (mg/kg-day)	Inhalation Slope Factor (kg-day/mg)	Inhalation Reference Dose (mg/kg-day)	Dermal Slope Factor (kg-day/mg)	Dermal Reference Dose (mg/kg-day)
ioxin								
ioxin (2,3,7,8-TCDD)	0.9	1.00E-02	1.50E+05	ND	1.10E+05	ND	1.67E+05	ND
AH								
enzo(a)pyrene	0.5	1.00E-02	7.30E+00	ND	3.10E+00	ND	1.46E+01	ND
CB								
roclor 1254	0.9	6.00E-02	2.00E+00	2.00E-05	2.00E+00	ND	2.22E+00	1.80E-05

D = No data
,3,7,8-TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin
AH = Polynuclear aromatic hydrocarbon
CB = Polychlorinated biphenyl
oxicological references used to derive the data in this table are listed in **Appendix M, Attachment 1, Toxicological Profiles for Chemicals of Potential Concern.**

located approximately one mile west of the site. In Chapter 1.0, see Figure 1-1 "Location Map Harmon Annexes, Andersen AFB, Guam" and Figure 1-2, "Location Map IRP Site 39/Harmon Substation, Harmon Annexes, Andersen AFB, Guam," for the precise location of this site.

Harmon Substation is a former waste disposal site. There is little recorded information available regarding waste disposal practices and previous historic land use at the site. Most available information originated in a report addressing buried drums found at the site in 1989, during excavation activities related to the petroleum, oil, lubricants pipeline which borders the northern edge of the site. Additional investigation and remediation-related information is provided in Section 2, supra.

Removal actions were conducted at Harmon Substation beginning in April of 1998. The objectives of the remedial actions were to:

- Clean, remove, demolish, and remediate the "oil/water separator system"
- Remediate the "buried drum area"
- Remediate the polynuclear aromatic hydrocarbon (PAH) "hot spots"
- Remediate the "miscellaneous container area"
- Perform confirmation sampling and analysis following all remedial activities
- Evaluate dioxin contamination
- Ensure safe and compliant off-site transportation and disposal of all wastes, contaminated soil and related debris
- Backfill the excavations
- Prepare a remedial verification report.

The removal actions have been completed. A complete account of operational and remediation activities at Harmon Substation is presented in Chapters 2 and 3 of this document.

M.3.2 Conceptual Site Exposure Model

The CSEM provides the basis for identifying and evaluating potential risks to human health in the HHRA. The CSEM (Figure M-1) includes both current and future land-use scenarios for Harmon

Substation, receptors appropriate to all plausible scenarios, source media, chemical release and transport mechanisms, exposure media, and potential exposure pathways. By graphically presenting all plausible pathways and exposure routes, the conceptual site model facilitates the consistent and comprehensive evaluation of risk to human health, and helps ensure that potential pathways are not overlooked. The elements necessary to construct a complete exposure pathway and develop the CSEM include:

- Source (i.e., chemicals in environmental media)
- Chemical release mechanisms
- Chemical transport pathways
- Receptors
- Exposure pathways.

Chemical release mechanisms and transport pathways are not required for direct receptor contact with a source medium.

M.3.3 Source and Exposure Media

Source and exposure media at Harmon Substation include soil and air (Figure M-1). Soil may be further divided into subsurface and surface soil, although "total soil" is evaluated in this HHRA, for the reasons presented in Section M.2.5. Surface and groundwater and sediment were eliminated as media of potential concern within the baseline characterization and remediation activities for this site (Chapter 3).

M.3.4 Release Mechanisms and Transport Pathways

Potential chemical release mechanisms and transport pathways considered in this assessment include soil dust emissions and volatilization into air (Figure M-1). Again, water-related pathways were eliminated in Chapter 3, Supra.

M.3.5 Receptor Scenario and Exposure Pathway Assessments

The objective of these assessments is to identify potential human receptors that may be exposed to site-related chemicals at Harmon Substation. This is applied to both current and future land-use scenarios. At Harmon Substation, plausible current receptors include the sportsman, trespasser and the remediation worker. In this HHRA current risk is only characterized for the trespasser. Current (as well as future risk to) the remediation worker is excluded from this risk assessment, because it is assumed that the remediation worker is cognizant of, and appropriately protected from, all chemical and physical hazards at the Site, in accordance with applicable Occupational

Safety and Health Administration requirements. Therefore, neither current nor potential future risks to the remediation worker are characterized herein.

The sportsman receptor scenario is not characterized for reasons discussed below.

The risk assessment identifies potential future contaminant sources, as well as release mechanisms and pathways, through which receptors may be exposed to site-related chemicals.

The future land use projected for Harmon Substation is industrial, although the site could also be used for residential purposes some time in the future. There are several plausible receptors, who may be exposed under future land-use scenarios for Harmon Substation. The following receptor scenarios are evaluated in this assessment because they provide information that is useful for making decisions regarding additional remediation requirements and land use options for the Site:

- Groundskeeper
- Trespasser
- Resident.

As shown in the CSEM (Figure M-1), each of the receptors evaluated could potentially be exposed to soil via the following exposure routes:

- Incidental ingestion of soil
- Dermal contact with soil
- Inhalation of chemicals that are released from soil as dust.

Groundskeeper (Occupational Receptor): The site is currently used for military/industrial purposes. This land use scenario is likely to continue into the future. The groundskeeper receptor scenario is an occupational worker scenario that generally captures the upper risk for incidental ingestion, inhalation and dermal exposure to surface or total soil. The scenario consists of daily maintenance activities that expose the groundskeeper to chemicals in soil for many years. Currently, workers, including groundskeepers are not present at this site. Thus, the groundskeeper scenario is only evaluated for future land use purposes.

Trespasser: Quantification of risk for the trespasser includes the possibility of current as well as future land-use conditions. The (7 to 16-year-old) trespasser scenario is presented as the only plausible current (along with future) receptor scenario for Harmon Substation. This scenario captures potential risk from Harmon Substation during the time period from the completion of recent remediation actions until some unspecified time in the future, when the site is transitioned to an alternative land use.

Resident: The residential risk scenario is evaluated for a hypothetical on-site resident exposed to total soil at Harmon Substation. Even though a residential scenario at this site is unlikely, this residential risk scenario is evaluated in order to provide risk managers an estimate of site risks and hazards based on EPA (1998) Region IX default parameters and assumptions used to derive the PRGs. The residential scenario combines the child and adult receptor scenarios in accordance with Region IX EPA (1998) policy. This scenario often provides the upper boundary for both cancer and noncancer risk from a site. Generally, the adult resident scenario provides the higher cancer risk estimate. Potential risk to an off-site resident from soil removed from the site and used off-site is also covered by this receptor scenario.

Construction Worker: The construction worker scenario is generally the most conservative measure of risk from exposure to subsurface soil. The construction worker scenario is not evaluated, because total, rather than surface and subsurface soil, is evaluated in this HHRA. Where total soil is evaluated, the groundskeeper scenario provides a more conservative risk characterization, and evaluation of the construction worker scenario provides no additional benefit.

Sportsman: This scenario consists of the hunter who enters the site while hunting wild pig or other game. The sportsman is not evaluated as a plausible current scenario, because it is believed that the sportsman does not hunt at this site, and neither pig nor deer have been spotted. Furthermore, it is highly probable that even if the sportsman was hunting at this site, the impacts from Harmon Substation alone would be negligible, given the small size of the site relative to the large foraging and grazing ranges generally associated with wild pig and deer.

The sportsman receptor scenario is not characterized as a future receptor scenario, because the resident receptor scenario provides a much more conservative measure of risk from soil inhalation and dermal exposure pathways. Generally, the sportsman is only included (in addition to the residential receptor) if there is a significant chance of capturing additional risk from direct ingestion of wild game.

A careful analysis of the risk from hunting and consumption of wild deer and pigs across AAFB was conducted in the HHRA for IRP-16 (ICF Kaiser, Inc., 1999). That risk assessment used actual animal sample tissue studies to determine that "the [cancer] risk estimated for ingestion of deer and wild pig meat were zero, because the carcinogenic COPCs selected at Site 16 were non-detect in all of the deer and pig tissue samples. Therefore there are no concerns for cancer risk resulting from these (sportsman and residential) exposure scenarios". The HHRA for IRP 16 further indicates that it is appropriate to extrapolate this conclusion to other IRP Sites at AAFB. The IRP 16 HHRA further states that, "Generally, home ranges for deer and wild pig cover areas 50 to 100 times the size of an IRP site. Therefore, these data are appropriate for use in assessing environmental impacts at Site 16, and for hunters across the base" (ICF Kaiser, Inc., 1999).

M.3.6 Quantification of Exposure-Point Concentrations

M.3.6.1 Exposure-Point Concentrations in Soil

The source-term concentrations estimated for the COPC in total soil are selected as the exposure-point concentration for the direct contact pathways (ingestion and dermal contact), and as the source-term concentration from which chemical concentrations in air are estimated for the indirect pathway (inhalation). Table M-1 presents the source-term concentrations for the chemicals evaluated for COPC selection. Adopting the source-term concentration as the exposure-point concentration is consistent with EPA (1992a) guidance, which specifies that the mean is the appropriate exposure-point concentration to use to estimate risk from chronic exposure. The source-term is generally the UCL on the mean (or the MDC, whichever is smaller) on an unweighted data set, rather than the mean itself. This compensates for uncertainty about the true mean caused by sample limitations. Application of the unweighted UCL is generally a good screening approach when limited site data are available. However use of a more rigorous goestatistical estimation process will provide significant reduction in the overall uncertainty of the risk assessment, when estimating a representative site-mean where significant site data are available.

M.3.6.2 Exposure-Point Concentrations in Ambient Air

COPC concentrations in ambient air potentially arise from volatilization of volatile organic compounds and COPC-bearing dust from soil resulting from activity on the site. COPC concentrations in ambient air inside a building can arise from resuspension of COPC-bearing removable surface dust. The model used to estimate exposure-point concentrations for indirect exposure via ambient air is presented in the following paragraphs.

Dust Emissions. Inhalation exposure to particulate emissions from soils arises from construction or other site activities that raise dust. Therefore, the most appropriate approach for estimating chemical concentrations in ambient air is the use of an activity-based dust loading equation (DOE, 1989):

$$C_a = (D)(C_s)(CF_1)$$

where:

C_a = chemical concentration in air (mg/m^3 of air)
D = dust loading factor (g of soil/m^3 of air)
C_s = chemical concentration in soil (mg/kg)
CF_1 = conversion factor (10^{-3} kg/g).

Plausible values for D include 6×10^{-4} grams per cubic meter (g/m^3) for construction work (DOE, 1983), and 1×10^{-4} g/m^3 for all other occupational work (NCRP, 1984).

Volatilization From Soil. The volatilization model applies only to compounds with Henry's law constant greater than 10^{-5} atm-m^3/mol and molecular weights less than 200 g/mol (EPA, 1991a). Chemical-specific toxicity parameters for COPC are listed in Table M-3. The organic COPC in Table M-3 are not treated as volatile because their molecular weights are greater than 200 g/mol; thus, the volatilization model was not applied in this assessment and the requisite volatilization model is not reported.

Exposure point concentrations in soil, dust, and ambient air for all the receptors and pathways that were quantified, are listed in the far right column of Table M-1.

M.3.7 Quantification of Chemical Intake

This section describes the models used to quantify dose and intake rates for COPC relative to the exposure pathways previously identified. Table M-2 presents the dose and intake values applied in this HHRA and relevant source references. The intake model variables generally reflect 50th or 95th percentile values, which, when applied to the exposure-point concentrations derived (as described in Section M.3.6) ensure that the estimated intakes represent the reasonable maximum exposure (RME). The RME scenario also accounts for exposures to sensitive subpopulations such as infants, children, elderly persons, and pregnant and nursing women. Models were taken or modified from EPA (1989a and 1998) unless otherwise indicated. The intake equations for the residential receptor are distinguished from the other receptors because these equations have age-adjusted parameters to include both adult and child residents based on EPA (1991a) guidance and the precedent set by EPA (1996a). Chemical intakes calculated with the models described below are presented in the receptor-specific risk characterization tables (Tables M-4 through M-6).

M.3.7.1 Inhalation of Chemicals in Air

The following equation is used to estimate the inhaled dose of COPC in air for all except the residential receptors (EPA, 1989a):

$$I_a = \frac{(C_a)(IR_a)(ET)(EF)(ED)}{(BW)(AT)}$$

where:

I_a = inhaled dose of COPC (mg/kg-day)
C_a = concentration of COPC in air (mg/m^3)
IR_a = inhalation rate (m^3/hour)
ET = exposure time (hours/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight (kg)
AT = averaging time (days).

M.3.7.2 Incidental Ingestion of Chemicals in Soil

The ingested dose of COPC in soil is estimated for all except the residential receptors from the equation (EPA, 1989a):

$$I_s = \frac{(C_s)(IR_s)(EF)(ED)(CF_4)}{(BW)(AT)}$$

where:

I_s = ingested dose of COPC in soil (mg/kg-day)
C_s = concentration of COPC in soil (mg/kg)
IR_s = ingestion rate of soil (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
CF_4 = conversion factor (10^{-6} kg/mg)
BW = body weight (kg)
AT = averaging time (days).

M.3.7.3 Dermal Contact with Chemicals in Soil and Dust

Unlike the methodologies for estimating inhaled or ingested dose of COPC, which quantify the dose presented to the barrier membrane (the pulmonary or gastrointestinal mucosa, respectively), dermal dose is estimated as the dose crossing the skin that is systemically absorbed. For this reason, dermal toxicity values are also based on absorbed dose. The absorbed dose of COPC for all except the residential receptors is estimated from the equation (EPA, 1992b).

$$DAD = \frac{(C_s)(AF)(ABS)(SA_s)(EF)(ED)(CF_4)(CF_5)}{(BW)(AT)}$$

where:

DAD = average dermal absorbed dose of COPC (mg/kg-day)
C_s = concentration of COPC in soil (mg/kg)
AF = soil-to-skin adherence factor (mg/cm²-event)
ABS = absorption fraction (unitless, chemical-specific value).
SA_s = surface area of the skin available for contact with soil (cm²)
EF = exposure frequency (days/year)
ED = exposure duration (years)
CF_4 = conversion factor (10^{-6} kg/mg)
CF_5 = conversion factor (1 event/day)
BW = body weight (kg)
AT = averaging time (days).

The dimensional integrity of this equation is maintained through assuming that one exposure event occurs in each exposure day.

M.3.8 Justification of Intake Model Variables

In keeping with EPA (1991b) guidance, variables chosen for the RME receptor for ingestion rate, exposure frequency, and exposure duration are generally upperbounds. Other variables, e.g., body weight and surface area are generally central or average values. In the case of contact rates consisting of multiple components, e.g., dermal contact with soil, consisting of absorption factor, and adherence factor, the conservatism built into the individual variables assures that the entire estimate for contact rate is more than sufficiently conservative.

The averaging time for noncancer evaluation is computed as the product of exposure duration (years) times 365 days per year, to estimate an average daily dose over the entire exposure period. For cancer evaluation, averaging time is computed as the product of 70 years, the assumed human lifetime, times 365 days per year, to estimate an average daily dose prorated over a lifetime, regardless of the frequency or duration of exposure. This methodology assumes that the risk from short-term exposure to a high dose of a given carcinogen is equivalent to long-term exposure to a correspondingly lower dose, provided that the total lifetime doses are equivalent. This approach is consistent with current EPA (1986) policy of carcinogen evaluation, although it introduces considerable uncertainty into the cancer risk assessment.

Justification for each of the variables used in the intake equations described in the previous section is presented in the following sections. The intake variable values applied in this risk assessment are summarized in Table M-2.

M.3.8.1 Groundskeeper

The groundskeeper is assumed to be a 70 kilogram (kg) adult, who uses the site 8 hours per day, approximately 5 days per week, for a total of 250 days per year, for 25 years (EPA, 1991b). The respiratory rate for the groundskeeper is assumed to be 20 cubic meters (m^3) per 8-hour workday (2.5 m^3/hour), and the soil incidental ingestion rate is assumed to be 100 milligrams per day (mg/day), comparable to that of an agricultural worker.

Clothing provides partial protection against dermal contact with soil, restricting potential contact to approximately 25 percent of the body, or approximately 3,200 square centimeters (cm^2) (EPA, 1992b). EPA (1992b) recommends a default value of 0.2 mg/cm^2, the lower end of the range of 0.2 to 1.0 mg/cm^2, as an average coefficient for soil-to-skin adherence.

M.3.8.2 Trespasser

The trespasser is assumed to be a nearby child resident who makes sporadic visits to Harmon Substation. Based on the demographics of the area and the distances from centers of population to the site, it is assumed that the trespasser makes one successful entry per week (52 days per year), and spends 6 hours per day in the restricted area. The 6 hours per day is assumed to be spent in contact with surface soil.

EPA (1995) defines the trespasser as a 7 to 16-year-old youth with an average BW of 45 kg exposed for 12 years. A respiratory rate of 31.6 L/minute, equivalent to an inhalation rate of 1.9 m3/hour, is estimated for the 45-kg youth engaged in moderate activity (EPA, 1990). An ingestion rate of 100 mg/day is assumed for persons over 6 years old to account for incidental soil and dust ingestion by a resident (EPA, 1991b). EPA (1989a) permits the development of a fraction term to reflect the proportion of his total daily exposure to soil that a receptor obtains from the contaminated media. It is assumed that the 6 hours per day that the trespasser spends in contact with surface soil, on sites where surface water is not present, represents 38 percent of his daily exposure to soil (potential exposure to soil throughout his waking hours, assumed to be 16 hours per day).

The surface area of the child for dermal contact is estimated to be 3,700 cm^2 (EPA, 1996a). The soil adherence factor is assumed to be 0.2 mg/cm^2 (EPA, 1992b).

M.3.8.3 Resident

The resident receptor scenario is applied to account for both the on- and off-site resident who could be exposed to soil at or from Harmon Substation, respectively. In keeping with EPA Region IX guidance, the residential receptor is a 30-year residential exposure divided into two parts (EPA, 1998). First, a 6-year exposure is calculated for a child, which accounts for a lower body weight (15 kg) and inhalation rate (10 m^3/day), and the highest soil ingestion rate of 200 mg/day (EPA, 1998). Second, a 24-year exposure duration is assessed for older children and adults by using an adult body weight (70 kg) and inhalation rate (20 m^3/day), and a lower soil ingestion rate of 100 mg/day (EPA, 1998).

The surface area of the adult for dermal contact is estimated to be 5,000 cm^2 (EPA, 1998). The surface area available for dermal contact for the residential child is estimated to be 2,000 cm^2 (EPA, 1998). The soil adherence factor is assumed to be 0.2 mg/cm^2 (EPA, 1992b).

M.4 Toxicity Assessment

Toxicity is defined as the ability of a chemical to induce adverse effects in biological systems. The purpose of the toxicity assessment is two-fold:

- Identify the cancer and noncancer effects that may arise from exposure of humans to the COPC (hazard assessment); and
- Provide an estimate of the quantitative relationship between the magnitude and duration of exposure and the probability or severity of adverse effects (dose-response assessment).

The latter is accomplished by the derivation of cancer and noncancer toxicity values, as described in the following sections and discussed in detail in Attachment 2 to this Appendix.

M.4.1 Evaluation of Cancer Effects

A few chemicals are known, and many more are suspected, to be human carcinogens. The evaluation of the potential carcinogenicity of a chemical includes both a qualitative and a quantitative aspect (EPA, 1986). The qualitative aspect is a weight-of-evidence evaluation of the likelihood that a chemical might induce cancer in humans. The EPA (1986) recognizes six weight-of-evidence group classifications for carcinogenicity:

- ***Group A - Human Carcinogen:*** Human data are sufficient to identify the chemical as a human carcinogen.
- ***Group B1 - Probable Human Carcinogen:*** Human data indicate that a causal association is credible, but alternative explanations cannot be dismissed.
- ***Group B2 - Probable Human Carcinogen:*** Human data are insufficient to support a causal association, but testing data in animals support a causal association.
- ***Group C - Possible Human Carcinogen:*** Human data are inadequate or lacking, but animal data suggest a causal association, although the studies have deficiencies that limit interpretation.
- ***Group D - Not Classifiable as to Human Carcinogenicity:*** Human and animal data are lacking or inadequate.
- ***Group E - Evidence of Noncarcinogenicity to Humans:*** Human data are negative or lacking, and adequate animal data indicate no association with cancer.

The toxicity value for carcinogenicity, called a cancer slope factor (SF), is an estimate of potency. Potency estimates are developed only for chemicals in Groups A, B1, B2 and C, and only if the data are sufficient. The potency estimates are statistically derived from the dose-response curve from the best human or animal study or studies of the chemical. Although human data are often considered to be more reliable than animal data because there is no need to extrapolate the results obtained in one species to another, most human studies have one or more of the following limitations:

- The duration of exposure is usually considerably less than lifetime.
- The concentration or dose of chemical to which the humans were exposed can be only crudely approximated, usually from historical data.
- Concurrent exposure to other chemicals frequently confounds interpretation.

- Data regarding other factors (tobacco, alcohol, illicit or medicinal drug use, nutritional factors and dietary habits, heredity) are usually insufficient to eliminate confounding or quantify its effect on the results.

- Most epidemiologic studies are occupational investigations of workers, which may not accurately reflect the range of sensitivities of the general population.

- Most epidemiologic studies lack the statistical power (i.e., sample size) to detect a low, but chemical-related increased incidence of tumors.

Most potency estimates are derived from animal data, which present different limitations:

- It is necessary to extrapolate from results in animals to predict results in humans; this is usually done by estimating an equivalent human dose from the animal dose.

- The range of sensitivities arising from genotypic and phenotypic diversity in the human population is not reflected in the animal models ordinarily used in cancer studies.

- Usually very high doses of chemical are used, which may alter normal biology, creating a physiologically artificial state and introducing substantial uncertainty regarding the extrapolation to the low-dose range expected with environmental exposure.

- Individual studies vary in quality (e.g., duration of exposure, group size, scope of evaluation, adequacy of control groups, appropriateness of dose range, absence of concurrent disease, sufficient long-term survival to detect tumors with long induction or latency periods).

The SF is usually expressed as "extra risk" per unit dose, that is, the additional risk above background in a population corrected for background incidence. It is calculated by the expression:

$$(p_{(d)} - p_{(0)}) / (1 - p_{(0)})$$

where:

$p_{(d)}$ = the probability of cancer associated with dose = 1 mg/kg-day
$p_{(0)}$ = the background probability of developing cancer at dose = 0 mg/kg-day.

The SF is expressed as risk per mg/kg-day. To be appropriately conservative, the SF is usually the 95 percent upper bound on the slope of the dose-response curve extrapolated from high (experimental) doses to the low-dose range expected in environmental exposure scenarios. The EPA (1986) assumes that there are no thresholds for carcinogenic expression; therefore, any exposure represents some quantifiable risk.

The oral SF is usually derived directly from the experimental dose data, because oral dose is usually expressed as mg/kg-day. When the test chemical was administered in the diet or drinking water, oral dose first must be estimated from data for the concentration of the test chemical in the food or water, food or water intake data, and body weight data.

The EPA (1999) Integrated Risk Information System (IRIS) expresses inhalation cancer potency as a unit risk based on concentration, or risk per μg of chemical/m^3 of ambient air. Because cancer risk characterization requires a potency expressed as risk per mg/kg-day, the unit risk must be converted to the mathematical equivalent of an inhalation cancer SF, or risk per unit dose. Because the inhalation unit risk is based on continuous lifetime exposure of an adult human (assumed to inhale 20 m^3 of air/day and to weigh 70 kg), the mathematical conversion consists of multiplying the unit risk (per μg/m^3) by 70 kg and by 1,000 μg/mg, and dividing the result by 20 m^3/day. Relevant toxicity input values applied in this HHRA are presented in Table M-3.

M.4.2 Evaluation of Noncancer Effects

M.4.2.1 Noncancer Toxicity Reference Values

Many chemicals, whether or not associated with carcinogenicity, are associated with noncancer effects. The evaluation of noncancer effects (EPA, 1989b) involves:

- Qualitative identification of the adverse effect(s) associated with the chemical; these may differ depending on the duration (acute or chronic) or route (oral or inhalation) of exposure

- Identification of the critical effect for each duration of exposure (i.e., the first adverse effect that occurs as dose is increased)

- Estimation of the threshold dose for the critical effect for each duration of exposure

- Development of an uncertainty factor, i.e., quantification of the uncertainty associated with interspecies extrapolation, intraspecies variation in sensitivity, severity of the critical effect and slope of the dose-response curve, and deficiencies in the database, in regard to developing a reference dose (RfD) for human exposure

- Identification of the target organ for the critical effect for each route of exposure.

These information points are used to derive an exposure route- and duration-specific toxicity value called an RfD, expressed as mg/kg-day, which is considered to be the dose for humans, with uncertainty of an order of magnitude or greater, at which adverse effects are not expected to occur. Mathematically, it is estimated as the ratio of the threshold dose to the uncertainty factor. For risk assessment purposes, chronic exposure is defined as equal to or greater than seven years, i.e., at least 10 percent of expected lifespan; subchronic exposure is defined as 2 weeks to 7 years. The child exposure scenario, however, is considered chronic, because the exposure duration (6 years) exceeds 10 percent of the time that an individual spends as a child.

IRIS (EPA, 1999) and the Health Effects Assessment Summary Tables (HEAST) (EPA, 1997) express the inhalation noncancer reference value as a reference concentration (RfC) in units of mg/m^3. Because noncancer risk characterization requires a reference value expressed as mg/kg-day, the RfC must be converted to an inhalation RfD. Because the inhalation RfC is based on continuous exposure of an adult human (assumed to inhale 20 m^3 of air per day and to weigh 70 kg), the mathematical conversion consists of multiplying the RfC (mg/m^3) by 20 m^3/day and dividing the result by 70 kg.

M.4.2.2 Target Organ Toxicity

As a matter of science policy, EPA (1989a) assumes dose- and effect-additivity for noncancer effects. This assumption provides the justification for adding the hazard quotients (HQ) or hazard indices (HI) in the risk characterization for noncancer effects resulting from exposure to multiple chemicals, pathways, or media. EPA (1989a), however, acknowledges that adding all HQ or HI values may overestimate risk, because the assumption of additivity is probably appropriate only for those chemicals that exert their toxicity by the same mechanism.

Mechanism of toxicity data sufficient for predicting additivity with a high level of confidence are available for very few chemicals. In the absence of such data, EPA (1989a) assumes that chemicals that act on the same target organ may do so by the same mechanism of toxicity, i.e., target organ serves as a surrogate for mechanism of toxicity. When total HI for all media for a receptor exceeds 1 due to the contributions of several chemicals, it is appropriate to segregate the chemicals by route of exposure and mechanism of toxicity (i.e., target organ) and estimate separate HI values for each.

As a practical matter, since human environmental exposures are likely to involve near- or subthreshold doses, the target organ chosen for a given chemical is the one associated with the critical effect. If more than one organ is affected at the threshold, the more severely affected is chosen. Target organ is also selected on the basis of duration of exposure (i.e., the target organ for chronic or subchronic exposure to low or moderate doses is selected rather than the target organ for acute exposure to high doses) and route of exposure. Because dermal RfD values are derived from oral RfD values, the oral target organ is adopted as the dermal target organ. For some chemicals, no target organ is identified. This may arise when no adverse effects are observed or when adverse effects such as reduced longevity or growth rate are not accompanied by recognized organ- or system-specific functional or morphologic alteration.

M.4.3 Dermal Toxicity Values

Dermal RfD values and SFs are derived from the corresponding oral values, provided there is no evidence to suggest that dermal exposure induces exposure route-specific effects that are not appropriately modeled by oral exposure data. In the derivation of a dermal RfD, the oral RfD is multiplied by the gastrointestinal absorption factor (GAF), expressed as a decimal fraction. The resulting dermal RfD, therefore, is based on absorbed dose. The RfD based on absorbed dose is the appropriate value with which to compare a dermal dose, because dermal doses are expressed as absorbed rather than exposure doses. The dermal SF is derived by dividing the oral SF by the GAF. The oral SF is divided, rather than multiplied, by the GAF because SFs are expressed as reciprocal dose. The GAFs, dermal SFs, and RfDs for the COPC are presented in Table M-3.

M.4.4 Sources of Toxicity Information Used in the Risk Assessment

M.4.4.1 Toxicity Values

Selection of toxicity values is discussed in detail in Attachment 2 to this Appendix. Generally, they are chosen using the following hierarchy:

- EPA's on-line IRIS database (EPA, 1999) containing toxicity values that have undergone the most rigorous Agency review

- The latest version of the annual HEAST, including all supplements (EPA, 1997)

- Other EPA documents, memoranda, or former Environmental Criteria and Assessment Office or National Center for Environmental Assessment (NCEA) derivations for the Superfund Technical Support Center.

All toxicity values, regardless of their source, are evaluated for appropriateness for use in HHRA. When toxicity values are not located, the primary literature is surveyed to derive a toxicity value. The use of surrogate chemicals is also considered, if the chemical structure, adverse effects, and toxic potency of the surrogate and chemical of interest are sufficiently similar.

M.4.4.2 Gastrointestinal Absorption Factors

GAFs used to derive dermal RfD values and SFs from the corresponding oral toxicity values, are obtained from the following sources:

- EPA's on-line IRIS database (EPA, 1999)
- Oral absorption efficiency data compiled by the NCEA for the Superfund Health Risk Technical Support Center of the EPA
- Federal agency reviews of the empirical data, such as Agency for Toxic Substances and Disease Registry Toxicological Profiles and various EPA criteria documents
- Other published reviews of empirical data
- Primary literature.

GAFs obtained from reviews are compared to empirical (especially more recent) data, when possible, and are evaluated for suitability for use for deriving dermal toxicity values from oral toxicity values. The suitability of the GAF increases when the following similarities are present in the oral pharmacokinetic study from which the GAF is derived and in the key toxicity study from which the oral toxicity value is derived:

- The same strain, sex, age, and species of test animal were used.
- The same chemical form (e.g., the same salt or complex of an inorganic element or organic compound) was used.
- The same mode of administration (e.g., diet, drinking water, or gavage vehicle) was used.
- Similar dose rates were used.

The most defensible GAF for each chemical is used in the HHRA.

When quantitative data are insufficient, a default GAF is used. As noted by EPA (1989a), the gastrointestinal absorption of many metals is limited, and 0.05 is a reasonable default for metals. EPA (1989a) did not recommend a default value for organic chemicals. A compilation of data for 19 organic chemicals presented gastrointestinal absorption efficiencies ranging from 0.5 to 1.0 (Jones and Owen, 1989). All but three of these chemicals had absorption efficiencies of at least 0.9, indicating that organic chemicals are generally readily absorbed. The arithmetic average of the absorption efficiencies for the 19 organic chemicals, 0.91368 (equivalent to 0.9 when rounded to one significant figure), appears to be a reasonable default GAF for organic chemicals, and is used when quantitative data are insufficient.

M.5 Risk Characterization

Risk characterization combines the results of the exposure assessment and toxicity assessment to yield quantitative expressions of risk for each of the receptor scenario evaluated in the HHRA. Quantitative estimates are developed for individual chemicals, exposure pathways, and exposure media for each receptor. The results of the risk characterization are presented as quantitative expressions of cancer risk and noncancer hazard. The risk characterization is used to guide risk management decisions.

Generally, the risk characterization follows the methodology prescribed by the EPA (1989a), as modified by more recent information and guidance cited in Section M.1 of this document. The EPA methods are, appropriately, designed to be health-protective, and tend to overestimate, rather than underestimate, risk. Risk results are generally highly conservative, because risk characterization involves multiplication of the conservatisms built into the estimation of source-term and exposure-point concentrations, the exposure (intake) estimates, and the toxicity dose-response assessments.

M.5.1 Risk Characterization Methodology

Although some chemicals induce both cancer and noncancer effects, the risks for each type of effect are calculated separately for each receptor and each site. The COPC identified at Harmon Substation in Table M-1 may present carcinogenic risk and/or noncancer hazards to the receptors discussed above.

M.5.1.1 Cancer Effects of Chemicals

The risk of exposure to potential chemical carcinogens is estimated as the probability of an individual developing cancer over a lifetime. In the low-dose range, which would be expected for most environmental exposures, cancer risk is estimated from the following linear equation (EPA, 1989a):

$$ILCR = (CDI)(SF)$$

where.

ILCR = incremental lifetime cancer risk, a unitless expression of the probability of developing cancer, adjusted for background incidence
CDI = chronic daily intake, averaged over 70 years (mg/kg-day)
SF = cancer slope factor $(mg/kg\text{-}day)^{-1}$.

The use of the preceding equation assumes that chemical carcinogenesis does not exhibit a threshold, and that the dose-response relationship is linear in the low dose range. Because this equation could generate theoretical cancer risks greater than 1 for high dose levels, it is considered to be inaccurate at cancer risks greater than 1 x 10^{-2}. In these cases, cancer risk is estimated by the "one-hit model" (EPA, 1989a):

$$ILCR = 1 - e^{-(CDI)(SF)}$$

where:

ILCR = incremental lifetime cancer risk, a unitless expression of the probability of developing cancer, adjusted for background incidence
$e^{-(CDI)(SF)}$ = the exponential of the negative of the risk calculated in the equation above

As a matter of policy, the EPA (1986) considers the carcinogenic potency of simultaneous exposure to low doses of carcinogenic chemicals to be additive, regardless of the chemical's mechanisms of toxicity or sites (organs of the body) of action. Cancer risk arising from simultaneous exposure by a given pathway to multiple chemicals is estimated from the equation (EPA, 1989a):

$$Risk_p = ILCR_{(chem1)} + ILCR_{(chem2)} + \ldots ILCR_{(chemi)}$$

where:

$Risk_p$ = total pathway risk of cancer incidence
ILCR(chemi) = individual chemical cancer risk.

Cancer risk for a given receptor across pathways and across media is summed in the same manner.

The site-specific residential risk characterization for Harmon Substation was completed for the selected COPCs, through first dividing the source-term concentration by the PRG (EPA, 1998), and second multiplying the quotient by the target risk (10^{-6}) for the appropriate COPC. Relying on the Region IX residential PRG value and a target risk level of 10^{-6} ensures the derivation of highly conservative cancer and noncancer risk values for the combined child and adult resident. These values will adequately protect either on- or off-site residents in the vicinity of Harmon Substation.

M.5.1.2 Noncancer Effects of Chemicals

The hazards associated with the noncancer effects of chemicals are evaluated by comparing an exposure level or intake with a RfD. The HQ, defined as the ratio of intake to RfD, is defined as (EPA, 1989a):

$$HQ = I/RfD$$

where:

HQ	=	hazard quotient (unitless)
I	=	intake of chemical (mg/kg-day)
RfD	=	reference dose (mg/kg-day).

This approach is different from the probabilistic approach used to evaluate cancer risks. An HQ of 0.01 does not imply a 1 in 100 chance of an adverse effect, but indicates that the estimated intake is 100 times lower than the RfD. An HQ of unity indicates that the estimated intake equals the RfD. If the HQ is greater than unity, there may be concern for potential adverse health effects.

In the case of simultaneous exposure of a receptor to several chemicals, an HI is calculated as the sum of the HQs by (EPA, 1989a):

$$HI = I_1/RfD_1 + I_2/RfD_2 + ..I_i/RfD_i$$

where:

HI = hazard index (unitless)
I_i = intake for the i^{th} toxicant (mg/kg-day)
RfD_i = reference dose for the i^{th} toxicant (mg/kg-day).

If HI for a given pathway exceeds 1.0, individual HI values are calculated for each target organ

M.5.2 Risk Characterization Results

Cancer and noncancer risk from total soil at Harmon Substation was characterized separately for the groundskeeper, trespasser, and resident receptor scenarios. Cancer risk is reported as an incremental lifetime cancer risk (ILCR) value and noncancer risk is reported as a HI value. The ILCR and HI are reported by receptor scenario for each COPC in Tables M-4 through M-6 Table M-7 provides a summary of total site ILCRs and HIs from Harmon Substation, for all the potential risk characterized receptor in Tables M-4 through M-6..

M.5.2.1 Cancer Risk

Cancer risk from Harmon Substation, as it currently exists, is within acceptable risk limits for AAFB. Total site ILCR for each of the three COPC selected for Harmon Substation are below the recommended EPA target risk level of 1×10^{-4} for each of the receptors evaluated. The only COPC that marginally approaches a point of interest is dioxin (WHO TEQ), for the resident receptor scenario. The resident scenario has an ILCR of 3.63×10^{-6} for dioxin TEQ, and an ILCR of 3.98 x 10-6 for the total site. The total site ILCR is 8.67 x 10-7 for the groundskeeper and 3.10 x 10-6 for the trespasser.

M.5.2.2 Noncancer Hazard

Noncancer hazard from Harmon Substation, as it currently exists, is within acceptable risk limits for AAFB. The PCB Aroclor 1254 is the only COPC selected for Harmon Substation with published hazard toxicity values. Total site HI for Aroclor 1254 is well below the AAFB target-level HI of 1.0 for each of the receptor scenarios evaluated. Total site HI are 4.46 x 10-4 for the groundskeeper, 5.16 x 10-5 for the trespasser, and 5.64 x 10-3 for the resident.

M.6 Uncertainty Evaluation

M.6.1 Uncertainty Terminology

Generally, risk assessments carry two types of uncertainty. Measurement uncertainty refers to the usual variance that accompanies scientific measurements, e.g., instrument uncertainty (accuracy and precision) associated with chemical concentrations. The results of the risk assessment reflect

Table M-4

Groundskeeper Intake Doses and Risk Hazard Estimates for Exposure to Total Soil
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

(Page 1 of 2)

Chemical	Source-Term Concentration (mg/kg)	Concentration in Air (mg/m^3)	Inhalation of COPC in Dust from Total Soil: Cancer (mg/kg-day)	Inhalation of COPC in Dust from Total Soil: Noncancer (mg/kg-day)	ILCR from Inhalation	HQ from Inhalation
Dioxin						
Dioxin TEQ	1.38E-05	1.38E-12	9.62E-14	2.69E-13	1.06E-08	NA
PAH						
Benzo(a)pyrene	1.66E-02	1.66E-09	1.16E-10	3.25E-10	3.60E-10	NA
PCB						
Aroclor 1254	5.47E-03	5.47E-10	3.83E-11	1.07E-10	7.65E-11	NA
Total Pathway ILCR and HI					**1.10E-08**	**NA**
Total ILCR and HI						

COPC = Chemical of potential concern
TEQ = TCDD equivalent concentration for dioxins
PAH = Polynuclear aromatic hydrocarbon
PCB = Polychlorinated biphenyl
ILCR = Incremental lifetime cancer risk
HQ = Hazard quotient
HI = Hazard index
NA = Not applicable

Table M-4

Groundskeeper Intake Doses and Risk Hazard Estimates for Exposure to Total Soil
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Chemical	Ingestion of COPC in Total Soil Cancer (mg/kg-day)	Ingestion of COPC in Total Soil Noncancer (mg/kg-day)	ILCR from Incidental Ingestion	HQ from Incidental Ingestion	Dermally Absorbed Dose of COPC Cancer (mg/kg-day)	Dermally Absorbed Dose of COPC Noncancer (mg/kg-day)	ILCR from Dermal Contact	HQ from Dermal Contact	Sum ILCR	SUM HI
Dioxin										
Dioxin TEQ	4.81E-12	1.35E-11	7.22E-07	NA	4.81E-13	1.35E-12	8.02E-08	NA	**8.13E-07**	**NA**
PAH										
Benzo(a)pyrene	5.81E-09	1.63E-08	4.24E-08	NA	5.81E-10	1.63E-09	8.48E-09	NA	**5.12E-08**	**NA**
PCB										
Aroclor 1254	1.91E-09	5.36E-09	6.50E-10	2.68E-04	1.15E-09	3.21E-09	2.55E-09	1.79E-04	**3.28E-09**	**4.46E-04**
Total Pathway ILCR and HI			**7.65E-07**	**2.68E-04**			**9.12E-08**	**1.79E-04**		
Total ILCR and HI									**8.67E-07**	**4.46E-04**

COPC = Chemical of potential co
TEQ = TCDD equivalent concentr
PAH = Polynuclear aromatic hydr
PCB = Polychlorinated biphenyl
ILCR = Incremental lifetime canc
HQ = Hazard quotient
HI = Hazard index
NA = Not applicable

Table M-5

Trespasser Intake Doses and Risk Hazard Estimates for Exposure to Total Soil
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Chemical	Source-Term Concentration (mg/kg)	Concentration in Air (mg/m^3)	Inhalation of COPC in Total Soil: Cancer (mg/kg-day)	Inhalation of COPC in Total Soil: Noncancer (mg/kg-day)	ILCR from Inhalation	HQ from Inhalation
Dioxin						
Dioxin TEQ	1.38E-05	9.26E-15	3.34E-17	2.34E-16	3.68E-12	NA
PAH						
Benzo(a)pyrene	1.66E-02	1.12E-11	4.03E-14	2.82E-13	1.25E-13	NA
PCB						
Aroclor 1254	5.47E-03	3.68E-12	1.33E-14	9.30E-14	2.66E-14	NA
Total Pathway ILCR and HI					**3.83E-12**	**NA**
Total ILCR and HI						

COPC = Chemical of potential concern
TEQ = TCDD equivalent concentration for dioxins
PAH = Polynuclear aromatic hydrocarbon
PCB = Polychlorinated biphenyl
ILCR = Incremental lifetime cancer risk
HQ = Hazard quotient
HI = Hazard index
NA = Not available

Table M-5

Trespasser Intake Doses and Risk Hazard Estimates for Exposure to Total Soil
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Chemical	Ingestion of COPC in Total Soil Cancer (mg/kg-day)	Noncancer (mg/kg-day)	ILCR from Incidental Ingestion	HQ from Incidental Ingestion	Dermally Absorbed Dose of COPC Cancer (mg/kg-day)	Noncancer (mg/kg-day)	ILCR from Dermal Contact	HQ from Dermal Contact	Sum ILCR	SUM HI
Dioxin										
Dioxin TEQ	1.56E-13	1.09E-12	2.34E-08	NA	3.23E-14	2.26E-13	5.38E-09	NA	**2.87E-08**	**NA**
PAH										
Benzo(a)pyrene	1.88E-10	1.31E-09	1.37E-09	NA	3.89E-11	2.72E-10	5.68E-10	NA	**1.94E-09**	**NA**
PCB										
Aroclor 1254	6.19E-11	4.33E-10	1.24E-10	2.17E-05	7.70E-11	5.39E-10	1.71E-10	2.99E-05	**2.95E-10**	**5.16E-05**
Total Pathway ILCR and HI			**2.48E-08**	**2.17E-05**			**6.12E-09**	**2.99E-05**		
Total ILCR and HI									**3.10E-08**	**5.16E-05**

COPC = Chemical of potential con
TEQ = TCDD equivalent concentrat
PAH = Polynuclear aromatic hydro
PCB = Polychlorinated biphenyl
ILCR = Incremental lifetime cancer
HQ = Hazard quotient
HI = Hazard index
NA = Not available

Table M-6

Residential Intake Doses and Risk Hazard Estimates for Exposure to Total Soil
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Chemical	EPA Region 9 Residential Soil PRG µg/kg	Source-Term Concentration µg/kg	Residential ILCR	Residential HI
Dioxin				
Dioxin TEQ	3.80E-03	1.38E-02	3.63E-06	NA
PAH				
Benzo(a)pyrene	5.60E+01	1.66E+01	2.96E-07	NA
PCB				
Aroclor 1254	9.70E+01	5.47E+00	5.64E-08	5.64E-03
	TOTAL	**=**	**3.98E-06**	**5.64E-03**

PRG = Preliminary remediation goal
TEQ = TCDD equivalent concentration for dioxins
PAH = Polynuclear aromatic hydrocarbon
PCB = Polychlorinated biphenyl
ILCR = Incremental lifetime cancer risk
HI = Hazard index
NA = Not available

Table M-7

Summary of Risks and Hazards from Total Soil
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Receptor	Total Site ILCR	Total Site HI
Groundskeeper	8.67E-07	4.46E-04
Trespasser	3.10E-08	5.16E-05
Resident	3.98E-06	5.64E-03

ILCR = Incremental lifetime cancer risk
HI = Hazard index

the accumulated variances of the individual measured values used to develop it. A different kind of uncertainty, called informational uncertainty, stems from data gaps, i.e., the fact that additional information is needed to complete the database for the assessment. Often the data gap is significant, such as the absence of information on the effects of human exposure to a chemical or on the biological mechanism of action of an agent (EPA, 1992c).

Reliance on a simplified numerical presentation of dose and risk without consideration of uncertainties, limitations, and assumptions inherent in the assessment process can be misleading. For example, a lifetime cancer risk of 10^{-6} may be calculated for a given exposure scenario. However, if the uncertainty in this estimate is several orders of magnitude, the real risk may be higher than the risk from another scenario that has a calculated lifetime risk of cancer of 10^{-5} but a smaller degree of uncertainty.

Alternatively, a lifetime cancer risk of 10^{-2} may be calculated and appear to represent an unacceptable risk. The actual risk, however, may be one, two, or even three orders of magnitude smaller. Situations like this occur frequently, because the estimated risk reflects conservative assumptions on lifestyles and land-use scenarios, maximum or near-maximum values for almost all modeling and exposure variables, limited information and uncertainty in the calculational parameters, and conservative assumptions in the toxicity value derivations.

M.6.2 Sources of Uncertainty

As noted previously, uncertainties are associated with the information and data used in each phase of the HHRA. Uncertainties associated with information and data are evaluated in this section to provide a sound, balanced basis for evaluating the overall quality of the risk assessment results. Sources of uncertainty, as well as the direction of bias that results (i.e., whether conservatism is increased or decreased) are presented in the following sections.

M.6.2.1 Selection and Quantification of COPC

Uncertainty associated with the selection process used to determine the COPC and estimation of source-term concentrations arises from the following:

- Estimated source-term concentrations are uncertain. For statistical purposes, if a chemical is positively identified at a site and has at least a single positive hit, all the samples with nondetects are assumed to have a value equal to half the detection limit and are included in the data set. These procedures introduce a conservative bias into the risk assessment.

- Soil in the area is heterogeneous in nature. The direction of bias is unclear.

- Limited number of samples results in the calculation of wide confidence intervals on the mean concentration and high source-term concentrations. Where the 95 percent UCL exceeded the maximum value, the maximum value was chosen as the source-term. The use of elevated confidence limits imparts a conservative bias upon the risk assessment.

- Laboratory analytical techniques have a degree of uncertainty associated with them. These uncertainties are documented by using data qualifiers to reflect the degree of certainty of measurement. The direction of bias is unclear.

- UCLs are used for source-term concentrations according to EPA (1989a). This means that 95 percent of the time, the actual mean concentration can be less than the value used in the exposure assessment. Conversely, 5 percent of the time, the actual mean concentration can be greater than the value used in the exposure assessment. Therefore, the exposure assessment may underestimate the exposures in 5 percent of the cases, and overestimate exposures 95 percent of the time, imparting an overall conservative bias to the risk assessment.

M.6.2.2 Estimation of Modeled Exposure Point Concentrations

Uncertainty associated with the modeled exposure point concentrations arises from calculating air concentrations. Uncertainty is introduced in the form of a dust-loading factor that converts chemical concentrations in soil to concentrations in air. In general, fate and transport modeling imparts a conservative bias upon the risk assessment.

M.6.2.3 Selection of Hypothetical Receptors and Potential Exposure Pathways

Generally, the hypothetical receptors and exposure pathways are chosen to "cover" the most highly exposed individual or subpopulation, introducing a conservative bias to the risk results.

M.6.2.4 Quantification of Intakes

Ingestion rates, inhalation rates, exposure durations, and exposure frequencies are based on upperbound values (EPA, 1991b), even though it is well established that serial multiplication of ultraconservative variable values lead to gross overestimation of chemical intakes.

M.6.2.5 Toxicity Assessment

Considerable uncertainty is associated with the qualitative (hazard assessment) and quantitative (dose-response) evaluations of a toxicity assessment. Hazard assessment of carcinogenicity is evaluated as a weight-of-evidence determination (EPA, 1986). Positive animal cancer test data suggest that humans also contain tissue(s) that may manifest a carcinogenic response; however, the animal data cannot necessarily be used to predict the target tissue in humans. In the hazard assessment of noncancer effects, however, positive animal data suggest the nature of the effects (i.e., the target tissues and type of effects) anticipated in humans (EPA, 1989b).

Uncertainty in hazard assessment arises from the nature and quality (sensitivity and selectivity) of the animal and human data. Uncertainty is decreased when similar effects are observed across species, strain, sex, and exposure route; when the magnitude of the response is clearly dose-related; when pharmacokinetic data indicate a similar fate in animals and humans; when postulated mechanisms of toxicity are similar for humans and animals; and when the COPC is structurally similar to other chemicals for which the toxicity is more completely characterized.

There are many sources of uncertainty in the dose-response evaluation for cancer (i.e., computation of a slope factor or unit risk) and noncancer effects (i.e., computation of an RfD). First is the uncertainty regarding interspecies (animal-to-human) extrapolation, which, in the absence of quantitative pharmacokinetic, dosimetric, or mechanistic data, is usually based on consideration of interspecies differences in basal metabolic rate. Second is the uncertainty regarding intraspecies, or individual, variation. Most toxicity experiments are performed with animals that are very similar in age and genotype, so that intragroup biological variation is minimal, but the human population of concern may reflect wide heterogeneity, including unusual sensitivity to the COPC. Even toxicity data from human groundskeeper exposure reflect a bias because only those individuals sufficiently healthy to attend work regularly and those not unusually sensitive to the COPC are likely to be occupationally exposed. Third, uncertainty arises from the quality of the key study (from which the quantitative estimate is derived) and the database. For cancer effects, the uncertainty associated with some quality factors (e.g., group size) is expressed within the 95 percent upper bound of the SF. For noncancer effects, additional uncertainty factors may be applied in the derivation of the RfD to reflect poor quality of the key study or gaps in the database.

Another source of uncertainty regarding quantitative risk estimation for carcinogenicity is the method by which data from high doses in animal studies are extrapolated to the dose range expected for environmentally exposed humans. The linearized multi-stage model, which is used in nearly all quantitative estimations of human cancer risk from animal data, is based on a non-threshold assumption of carcinogenesis. An impressive body of evidence, however, suggests that epigenetic carcinogens, as well as many genotoxic carcinogens, have a threshold below which they are noncarcinogenic (EPA, 1996b); therefore, the use of the linearized multi-stage model is ultraconservative for chemicals that exhibit a threshold for carcinogenicity.

A further source of uncertainty for noncancer effects arises from use of an effect level in the estimation of an RfD or RfC, because this estimation is predicated on the assumption of a threshold below which adverse effects are not expected. Therefore, an additional uncertainty factor is usually applied to estimate a no-effect level. Additional uncertainty arises from estimation of an RfD for chronic exposure from less-than-chronic data. Unless empirical data indicate that effects do not worsen with increasing duration of exposure, an additional uncertainty factor is applied to the no-effect level in the less than chronic study. Uncertainty also arises from the presence of chemicals (e.g., lead) for which there are no EPA-approved toxicity values, and for which quantitative risk characterization is not possible. In this case, however, lead concentrations in soil are clearly below those that might be associated with adverse effects (EPA, 1994c).

M.6.2.6 Risk Characterization

Risk characterization is the process of quantifying the risk of cancer due to exposure to carcinogens. Following EPA (1989a) guidelines, this assessment uses the one-hit model to estimate risk. However, there is uncertainty associated with the one-hit model, and with other risk models, because most studies of carcinogenic effects provide limited dose-response information for risk estimation (ICRP, 1990).

This effort to identify potential uncertainties associated with each step of the risk assessment is not intended to discredit the calculated results, but to point out that risks are calculated for hypothetical receptors under a definite, strict method. Refinements of sampling plans, analytical techniques, data statistical evaluation, exposure assessment models and parameters, hazard evaluation, dose-response assessment, and risk characterization could reduce these uncertainties.

M.6.3 Site Specific Uncertainty

Additional uncertainty exists that is related to site-specific variables and factors. Typically, there is statistical uncertainty associated with smaller numbers of samples. In general, where the number of samples is less than approximately 30, statistical confidence will be low, and complimentary uncertainty will be relatively high. In this HHRA uncertainty related to sample size is minimal due to the relatively large number of samples (n = apprximately 80) collected and analyzed for this relatively small (9 acre) IRP Site. Uncertainty may also result from data gaps associated with horizontal or vertical gaps in the spatial distribution of sample locations. Again, sampling of the

Harmon Substation IRP was extensive and thorough (see Sections 2 and 3, above). Thus uncertainty associated with spatial sampling data gaps should be minimal.

Potentially significant uncertainty could exist with respect to potential future hunting and game meat consumption associated with AAFB IRP sites. At present it is believed that hunting of wild pigs and deer does not take place at Harmon Substation, however the more significant question is; what contribution will COPC in soil at Harmon Substation make to tissue in deer and wild pig across AAFB? And, how much of that game meat will eventually be ingested by humans? More extensive tissue sampling and modeling would be needed to answer these questions with certainty Of particular concern is the potential for biotransfer of dioxin and PCB to humans, from pig tissue uptake associated with pig rooting activities at the site. However, at Harmon Substation, it is reasonable to assume that additional modeling will not reveal significant additional risk, because the source term concentrations for PCB and dioxin and associated risk to human health from Harmon Substation are relatively low (see Tables M-1 and M-4 through M7), and the site is relatively small.

Another potential site-specific source of uncertainty that may have impacted the characterization of risk from Harmon Substation, relates to the movement of site soils following the completion of sampling activities at the site. In general, post-remedial (and post-sampling) backfilling operations at the site should have helped to reduce risk from site soil through making what little contamination there is at Harmon Substation even less accessible than it was prior to backfilling operations. However, there is a very slight chance that backfilling activities could have brought additional contaminated soil to the surface. This would have increased potential for human exposure to COPC at the site.

In conclusion, site-specific uncertainty at Harmon Substation appears to be within reasonable limits. This conclusion is supported by the relatively low concentrations of COPC in soil remaining at the site, and associated relatively low human health risk levels demonstrated in Table M-7.

M.7 Summary of the Baseline Human Health Risk Assessment

A HHRA was performed following the methodology of EPA (1989a) and subsequent EPA (Region IX) guidance (EPA, 1998). Risk from Harmon Substation was characterized for three hypothetical receptors; a groundskeeper, a trespasser, and a resident. Each of these receptors was theoretically exposed to total soil at Harmon Substation. According to the results of this HHRA, both total site ILCR and total site HI for Harmon Substation are within acceptable risk limits.

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Appendix M: Attachment 1

Data Used to Complete Confirmation HHRA

IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
XIN TEQ	0.00662		µg/kg	Dioxins	DIOXIN-153	AS395153	0.08	0.33	7/16/98
XIN TEQ	0.01465		µg/kg	Dioxins	DIOXIN-154	AS398154	0.08	0.33	7/16/98
XIN TEQ	1.4171		µg/kg	Dioxins	DIOXIN-155	AS398155	0.08	0.33	7/16/98
XIN TEQ	0.01415		µg/kg	Dioxins	DIOXIN-156	AS398156	0.08	0.33	7/16/98
XIN TEQ	0.0066		µg/kg	Dioxins	DIOXIN-153	AS398157	0.08	0.33	7/16/98
XIN TEQ	0.00753		µg/kg	Dioxins	DIOXIN-200	AS398200	0.08	0.33	8/4/98
XIN TEQ	0.01146		µg/kg	Dioxins	DIOXIN-201	AS398201	0.08	0.33	8/4/98
XIN TEQ	0.01377		µg/kg	Dioxins	DIOXIN-202	AS398202	0.08	0.33	8/4/98
XIN TEQ	0.00912		µg/kg	Dioxins	DIOXIN-203	AS398203	0.08	0.33	8/4/98
XIN TEQ	0.01716		µg/kg	Dioxins	DIOXIN-204	AS398204	0.08	0.33	8/4/98
XIN TEQ	0.0179		µg/kg	Dioxins	DIOXIN-205	AS398205	0.08	0.33	8/4/98
XIN TEQ	0.00757		µg/kg	Dioxins	DIOXIN-206	AS398206	0.08	0.33	8/4/98
XIN TEQ	0.007		µg/kg	Dioxins	DIOXIN-207	AS398207	0.08	0.33	8/4/98
XIN TEQ	0.01636		µg/kg	Dioxins	DIOXIN-208	AS398208	0.08	0.33	8/7/98
XIN TEQ	0.00678		µg/kg	Dioxins	DIOXIN-209	AS398209	0.08	0.33	8/7/98
XIN TEQ	0.00589		µg/kg	Dioxins	DIOXIN-210	AS398210	0.08	0.33	8/7/98
XIN TEQ	0.04501		µg/kg	Dioxins	DIOXIN-211	AS398211	0.08	0.33	8/7/98
XIN TEQ	0.36385		µg/kg	Dioxins	DIOXIN-212	AS398212	0.08	0.33	8/7/98
XIN TEQ	0.11005		µg/kg	Dioxins	DIOXIN-213	AS398213	0.08	0.33	8/7/98
XIN TEQ	0.01226		µg/kg	Dioxins	DIOXIN-214	AS398214	0.08	0.33	8/7/98
XIN TEQ	0.0061		µg/kg	Dioxins	DIOXIN-241/2	AS398241/2	10	10	8/28/98
XIN TEQ	0.0066		µg/kg	Dioxins	DIOXIN-243/4	AS398243/4	10	10	8/28/98
XIN TEQ	0.0052		µg/kg	Dioxins	DIOXIN-245/6	AS398245/6	10	10	8/28/98
XIN TEQ	0.0059		µg/kg	Dioxins	DIOXIN-247/8	AS398247/8	NA	NA	8/28/98
XIN TEQ	0.0052		µg/kg	Dioxins	DIOXIN-249/50	AS398249/50	NA	NA	8/28/98
XIN TEQ	0.0063		µg/kg	Dioxins	DIOXIN-251/2	AS398251/2	NA	NA	8/28/98
XIN TEQ	0.0058		µg/kg	Dioxins	DIOXIN-253/4	AS398253/4	NA	NA	8/28/98
XIN TEQ	0.0098		µg/kg	Dioxins	DIOXIN-241/2	AS398255	10	10	8/28/98
XIN TEQ	0.0056		µg/kg	Dioxins	MCA-393	AS398393	NA	NA	11/5/98
XIN TEQ	0.0063		µg/kg	Dioxins	MCA-394	AS398394	NA	NA	11/5/98
XIN TEQ	0.0207		µg/kg	Dioxins	DIOXIN-406	AS398406	0.5	0.5	12/7/98
XIN TEQ	0.0016		µg/kg	Dioxins	DIOXIN-407	AS398407	1.5	1.5	12/7/98
XIN TEQ	0.0353		µg/kg	Dioxins	DIOXIN-408	AS398408	0.5	0.5	12/7/98
XIN TEQ	0.0622		µg/kg	Dioxins	DIOXIN-409	AS398409	1.5	1.5	12/7/98
XIN TEQ	0.001		µg/kg	Dioxins	DIOXIN-410	AS398410	0.5	0.5	12/7/98
XIN TEQ	0.00162		µg/kg	Dioxins	DIOXIN-411	AS398411	1.5	1.5	12/7/98
XIN TEQ	0.0217		µg/kg	Dioxins	DIOXIN-412	AS398412	0.5	0.5	12/7/98
XIN TEQ	0.008		µg/kg	Dioxins	MCA-426	AS398426	NA	NA	12/21/98
XIN TEQ	0.0218		µg/kg	Dioxins	MCA-427	AS398427	NA	NA	12/21/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
ad	18		mg/kg	Metals	OWS-127	AS399122	7.17	7.33	7/6/98
ad	20.5		mg/kg	Metals	OWS-123	AS395123	7.17	7.33	7/6/98
ad	18.1		mg/kg	Metals	OWS-125	AS398125	7.17	7.33	7/6/98
ad	28.8		mg/kg	Metals	OWS-126	AS398126	7.17	7.33	7/6/98
ad	20.2		mg/kg	Metals	OWS-127	AS398127	7.17	7.33	7/6/98
ad	18.7		mg/kg	Metals	OWS-128	AS395128	7.17	7.33	7/6/98
ad	19.6		mg/kg	Metals	OWS-129	AS395129	7.17	7.33	7/6/98
ad	20.4		mg/kg	Metals	OWS-130	AS398130	7.17	7.33	7/6/98
ad	65		mg/kg	Metals	OWS-132	AS398132	NA	NA	7/6/98
ad	49.8		mg/kg	Metals	OWS-135	AS399135	NA	NA	7/6/98
ad	31.9		mg/kg	Metals	OWS-141	AS398141	NA	NA	7/6/98
ad	44.6		mg/kg	Metals	OWS-142	AS398142	NA	NA	7/6/98
ad	49.1		mg/kg	Metals	OWS-143	AS399143	NA	NA	7/6/98
ad	33		mg/kg	Metals	OWS-259	AS398259	7	7	9/2/98
ad	37		mg/kg	Metals	OWS-260	AS398260	7	7	9/2/98
ad	38		mg/kg	Metals	OWS-261	AS398261	7	7	9/2/98
ad	148		mg/kg	Metals	OWS-264	AS398264	7	7	9/2/98
ad	58.8		mg/kg	Metals	OWS-266	AS398266	7	7	9/2/98
ad	38.2		mg/kg	Metals	OWS-267	AS398267	NA	NA	9/2/98
ad	34.4		mg/kg	Metals	OWS-269	AS398269	NA	NA	9/2/98
ad	39.8		mg/kg	Metals	OWS-271	AS398271	NA	NA	9/2/98
ad	32		mg/kg	Metals	OWS-272	AS398272	NA	NA	9/2/98
ad	38.7		mg/kg	Metals	OWS 276	AS398276	3	3	9/2/98
ad	0.28	U	mg/kg	Metals	OWS-281	AS398281	NA	NA	9/2/98
ad	17		mg/kg	Metals	OWS-282	AS398282	NA	NA	9/2/98
ad	17.6		mg/kg	Metals	OWS-123	AS398287	7.17	7.33	9/2/98
ad	43.7		mg/kg	Metals	OWS-337	AS398337	NA	NA	10/5/98
ad	47.3		mg/kg	Metals	OWS-338	AS398338	NA	NA	10/5/98
ad	0.29	U	mg/kg	Metals	OWS-339	AS398339	8	8	10/5/98
ad	29.3		mg/kg	Metals	OWS-340	AS398340	7	7	10/5/98
ad	27.2		mg/kg	Metals	OWS-341	AS398341	7	7	10/5/98
ad	0.29	U	mg/kg	Metals	OWS-342	AS398342	11	11	10/5/98
ad	6.84		mg/kg	Metals	OWS-343	AS398343	8	8	10/5/98
ad	10		mg/kg	Metals	OWS-344	AS398344	8	8	10/5/98
ad	5.99		mg/kg	Metals	OWS-345	AS398345	8	8	10/5/98
4'-DDD	1.4	U	µg/kg	Pesticides	OWS-141	AS398141	NA	NA	7/6/98
4'-DDD	14.6	J	µg/kg	Pesticides	OWS-142	AS398142	NA	NA	7/6/98
4'-DDD	33.9	J	µg/kg	Pesticides	OWS-259	AS398259	7	7	9/2/98
4'-DDD	48.3	J	µg/kg	Pesticides	OWS-260	AS398260	7	7	9/2/98
4'-DDD	17.6	J	µg/kg	Pesticides	OWS-261	AS398261	7	7	9/2/98
4'-DDD	166	J	µg/kg	Pesticides	OWS-264	AS398264	7	7	9/2/98
4'-DDD	38.6		µg/kg	Pesticides	OWS-266	AS398266	7	7	9/2/98
4'-DDD	14	U	µg/kg	Pesticides	OWS-267	AS398267	NA	NA	9/2/98
4'-DDD	13	U	µg/kg	Pesticides	OWS-269	AS398269	NA	NA	9/2/98
4'-DDD	8.88		µg/kg	Pesticides	OWS 271	AS398271	NA	NA	9/2/98
4'-DDD	14	U	µg/kg	Pesticides	OWS-272	AS398272	NA	NA	9/2/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
-DDD	13.5		µg/kg	Pesticides	OWS-275	AS395275	3	3	9/2/98
DDD	1.3	U	µg/kg	Pesticides	OWS-281	AS395281	NA	NA	9/2/98
-DDD	3.63	J	µg/kg	Pesticides	OWS-282	AS395282	NA	NA	9/2/98
-DDD	13.1	J	µg/kg	Pesticides	OWS-123	AS395287	7.17	7.33	9/2/98
-DDD	1.7	U	µg/kg	Pesticides	OWS-337	AS395337	NA	NA	10/5/98
-DDD	8.8	U	µg/kg	Pesticides	OWS-338	AS395338	NA	NA	10/5/98
-DDD	1.3	U	µg/kg	Pesticides	OWS-339	AS395339	6	6	10/5/98
-DDD	15.8		µg/kg	Pesticides	OWS-340	AS395340	7	7	10/5/98
-DDD	10.7		µg/kg	Pesticides	OWS-341	AS395341	7	7	10/5/98
-DDD	1.4	U	µg/kg	Pesticides	OWS-342	AS395342	11	11	10/5/98
-DDD	6.67		µg/kg	Pesticides	OWS-343	AS395343	9	9	10/5/98
-DDD	11.9		µg/kg	Pesticides	OWS-344	AS395344	9	9	10/5/98
-DDD	6.05		µg/kg	Pesticides	OWS-345	AS395345	9	9	10/5/98
-DDD	20.9		µg/kg	Pesticides	MCA-415	AS395415	NA	NA	12/15/98
-DDD	9.83		µg/kg	Pesticides	MCA-416	AS395416	NA	NA	12/15/98
-DDD	17.3		µg/kg	Pesticides	MCA-417	AS395417	NA	NA	12/15/98
-DDD	70.1		µg/kg	Pesticides	MCA-418	AS395418	NA	NA	12/15/98
DDD	1.6	U	µg/kg	Pesticides	MCA-419	AS395419	6	7	12/15/98
DDD	1.4	U	µg/kg	Pesticides	MCA-420	AS395420	6	7	12/15/98
DDD	1.4	U	µg/kg	Pesticides	MCA-419	AS395421	6	7	12/15/98
DDD	1.4	U	µg/kg	Pesticides	MCA-423	AS395423	NA	NA	12/21/98
DDD	7.15		µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
'-DDD	3.79		µg/kg	Pesticides	MCA-425	AS395425	NA	NA	12/21/98
'-DDD	1.5	U	µg/kg	Pesticides	MCA-568	AS395568	16	16	4/13/99
'-DDD	1.5	U	µg/kg	Pesticides	MCA-570	AS395570	16	16	4/13/99
'-DDE	1.11	J	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/8/98
'-DDE	371		µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/8/98
'-DDE	189		µg/kg	Pesticides	OWS-258	AS395258	7	7	9/2/98
'-DDE	407		µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
'-DDE	364		µg/kg	Pesticides	OWS-261	AS395261	7	7	9/2/98
'-DDE	1380		µg/kg	Pesticides	OWS-264	AS395264	7	7	9/2/98
'-DDE	968		µg/kg	Pesticides	OWS-266	AS395266	7	7	9/2/98
'-DDE	127		µg/kg	Pesticides	OWS-267	AS395267	NA	NA	9/2/98
'-DDE	1360		µg/kg	Pesticides	OWS-269	AS395269	NA	NA	9/2/98
'-DDE	483		µg/kg	Pesticides	OWS-271	AS395271	NA	NA	9/2/98
'-DDE	156		µg/kg	Pesticides	OWS-272	AS395272	NA	NA	9/2/98
'-DDE	593		µg/kg	Pesticides	OWS-275	AS395275	3	3	9/2/98
'-DDE	1.98	J	µg/kg	Pesticides	OWS-281	AS395281	NA	NA	9/2/98
'-DDE	34.3		µg/kg	Pesticides	OWS-282	AS395282	NA	NA	9/2/98
'-DDE	224		µg/kg	Pesticides	OWS-123	AS395287	7.17	7.33	9/2/98
'-DDE	1.6	J	µg/kg	Pesticides	OWS-337	AS395337	NA	NA	10/5/98
'-DDE	63.1		µg/kg	Pesticides	OWS-338	AS395338	NA	NA	10/5/98
'-DDE	13.2		µg/kg	Pesticides	OWS-339	AS395339	6	6	10/5/98
'-DDE	164		µg/kg	Pesticides	OWS-340	AS395340	7	7	10/5/98
'-DDE	53.1		µg/kg	Pesticides	OWS-341	AS395341	7	7	10/5/98
'-DDE	3.7		µg/kg	Pesticides	OWS-342	AS395342	11	11	10/5/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
,4'-DDE	101		µg/kg	Pesticides	OWS-343	AS39S343	9	9	10/5/98
,4'-DDE	118		µg/kg	Pesticides	OWS-344	AS39S344	9	9	10/5/98
,4'-DDE	61		µg/kg	Pesticides	OWS-345	AS39S345	9	8	10/5/98
,4'-DDE	31.8		µg/kg	Pesticides	MCA-415	AS39S415	NA	NA	12/15/98
,4'-DDE	24.5		µg/kg	Pesticides	MCA-416	AS39S416	NA	NA	12/15/98
,4'-DDE	40.7		µg/kg	Pesticides	MCA-417	AS39S417	NA	NA	12/15/98
,4'-DDE	27.1		µg/kg	Pesticides	MCA-418	AS39S418	NA	NA	12/15/98
,4'-DDE	3.34	J	µg/kg	Pesticides	MCA-419	AS39S419	6	7	12/15/98
,4'-DDE	3.79	J	µg/kg	Pesticides	MCA-420	AS39S420	6	7	12/15/98
,4'-DDE	5.81		µg/kg	Pesticides	MCA-419	AS39S421	6	7	12/15/98
,4'-DDE	0.74	U	µg/kg	Pesticides	MCA-423	AS39S423	NA	NA	12/21/98
,4'-DDE	0.73	U	µg/kg	Pesticides	MCA-424	AS39S424	NA	NA	12/21/98
,4'-DDE	22.8		µg/kg	Pesticides	MCA-425	AS39S425	NA	NA	12/21/98
,4'-DDE	3.3	J	µg/kg	Pesticides	MCA-568	AS39S568	16	16	4/13/99
,4'-DDE	3.9	J	µg/kg	Pesticides	MCA 570	AS39S570	16	16	4/13/99
,4'-DDT	1.4	U	µg/kg	Pesticides	OWS-141	AS39S141	NA	NA	7/8/98
,4'-DDT	392		µg/kg	Pesticides	OWS-142	AS39S142	NA	NA	7/8/98
,4'-DDT	224		µg/kg	Pesticides	OWS-259	AS39S259	7	7	9/2/98
,4'-DDT	552		µg/kg	Pesticides	OWS-260	AS39S260	7	7	9/2/98
,4'-DDT	244		µg/kg	Pesticides	OWS-261	AS39S261	7	7	9/2/98
,4'-DDT	1080		µg/kg	Pesticides	OWS-264	AS39S264	7	7	9/2/98
,4'-DDT	268		µg/kg	Pesticides	OWS-266	AS39S266	7	7	9/2/98
,4'-DDT	16.4	J	µg/kg	Pesticides	OWS-267	AS39S267	NA	NA	9/2/98
,4'-DDT	77.8		µg/kg	Pesticides	OWS 269	AS39S269	NA	NA	9/2/98
,4'-DDT	82.2		µg/kg	Pesticides	OWS-271	AS39S271	NA	NA	9/2/98
,4'-DDT	38	J	µg/kg	Pesticides	OWS-272	AS39S272	NA	NA	9/2/98
,4'-DDT	32.8	J	µg/kg	Pesticides	OWS-275	AS39S275	3	3	9/2/98
,4'-DDT	1.3	U	µg/kg	Pesticides	OWS-281	AS39S281	NA	NA	9/2/98
,4'-DDT	48.5	J	µg/kg	Pesticides	OWS-282	AS39S282	NA	NA	9/2/98
,4'-DDT	188		µg/kg	Pesticides	OWS-123	AS39S267	7.17	7.33	9/2/98
,4'-DDT	1.7	U	µg/kg	Pesticides	OWS-337	AS39S337	NA	NA	10/5/98
,4'-DDT	11.7	J	µg/kg	Pesticides	OWS-338	AS39S338	NA	NA	10/5/98
,4'-DDT	6.7		µg/kg	Pesticides	OWS-339	AS39S339	6	6	10/5/98
,4'-DDT	106		µg/kg	Pesticides	OWS-340	AS39S340	7	7	10/5/98
,4'-DDT	11.7	J	µg/kg	Pesticides	OWS-341	AS39S341	7	7	10/5/98
,4'-DDT	1.3	U	µg/kg	Pesticides	OWS-342	AS39S342	11	11	10/5/98
,4'-DDT	55.2	J	µg/kg	Pesticides	OWS-343	AS39S343	9	9	10/5/98
,4'-DDT	78.4		µg/kg	Pesticides	OWS-344	AS39S344	9	9	10/5/98
,4'-DDT	40.1		µg/kg	Pesticides	OWS-345	AS39S345	8	8	10/5/98
,4'-DDT	15.2		µg/kg	Pesticides	MCA-415	AS39S415	NA	NA	12/15/98
,4'-DDT	14.5		µg/kg	Pesticides	MCA-416	AS39S416	NA	NA	12/15/98
,4'-DDT	36.9		µg/kg	Pesticides	MCA 417	AS39S417	NA	NA	12/15/98
,4'-DDT	32.6		µg/kg	Pesticides	MCA-418	AS39S418	NA	NA	12/15/98
4-DDT	1.7	U	µg/kg	Pesticides	MCA-419	AS39S419	6	7	12/15/98
4-DDT	1.5	U	µg/kg	Pesticides	MCA-420	AS39S420	6	7	12/15/98
4-DDT	4.28		µg/kg	Pesticides	MCA-419	AS39S421	6	7	12/15/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
DDT	20.1		µg/kg	Pesticides	MCA-423	AS398423	NA	NA	12/21/98
DDT	30.6		µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
DDT	28.9		µg/kg	Pesticides	MCA-425	AS395426	NA	NA	12/21/98
DDT	12		µg/kg	Pesticides	MCA-568	AS398568	16	16	4/13/99
DDT	39		µg/kg	Pesticides	MCA-570	AS399570	16	16	4/13/99
n	0.3	U	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/6/98
n	3	U	µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/6/98
n	2.8	U	µg/kg	Pesticides	OWS-259	AS395259	7	7	9/2/98
n	5.7	U	µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
in	2.8	U	µg/kg	Pesticides	OWS-261	AS398261	7	7	9/2/98
in	0.28	U	µg/kg	Pesticides	OWS-264	AS399264	7	7	9/2/98
in	0.20	U	µg/kg	Pesticides	OWS-266	AS395266	7	7	9/2/98
in	2.8	U	µg/kg	Pesticides	OWS-267	AS398267	NA	NA	9/2/98
in	2.8	U	µg/kg	Pesticides	OWS-269	AS398269	NA	NA	9/2/98
in	0.28	U	µg/kg	Pesticides	OWS-271	AS395271	NA	NA	9/2/98
in	3	U	µg/kg	Pesticides	OWS-272	AS398272	NA	NA	9/2/98
in	0.31	U	µg/kg	Pesticides	OWS-275	AS398275	3	3	9/2/98
in	0.27	U	µg/kg	Pesticides	OWS-281	AS398281	NA	NA	9/2/98
in	0.3	U	µg/kg	Pesticides	OWS-282	AS395282	NA	NA	9/2/98
in	1.6	U	µg/kg	Pesticides	OWS-123	AS396297	7.17	7.33	9/2/98
in	0.38	U	µg/kg	Pesticides	OWS-337	AS398337	NA	NA	10/5/98
in	1.8	U	µg/kg	Pesticides	OWS-338	AS398338	NA	NA	10/5/98
rin	0.27	U	µg/kg	Pesticides	OWS-339	AS398339	6	6	10/5/98
rin	0.32	U	µg/kg	Pesticides	OWS-340	AS398340	7	7	10/5/98
rin	0.32	U	µg/kg	Pesticides	OWS-341	AS398341	7	7	10/5/98
rin	0.28	U	µg/kg	Pesticides	OWS-342	AS398342	11	11	10/5/98
rin	0.29	U	µg/kg	Pesticides	OWS-343	AS398343	9	9	10/5/98
rin	0.28	U	µg/kg	Pesticides	OWS-344	AS398344	9	9	10/5/98
rin	0.29	U	µg/kg	Pesticides	OWS-345	AS398345	9	9	10/5/98
rin	0.33	U	µg/kg	Pesticides	MCA-415	AS395415	NA	NA	12/15/98
rin	0.29	U	µg/kg	Pesticides	MCA-416	AS395416	NA	NA	12/15/98
rin	0.3	U	µg/kg	Pesticides	MCA-417	AS396417	NA	NA	12/15/98
rin	0.32	U	µg/kg	Pesticides	MCA-418	AS398418	NA	NA	12/15/98
rin	0.35	U	µg/kg	Pesticides	MCA-419	AS395419	8	7	12/15/98
rin	0.32	U	µg/kg	Pesticides	MCA-420	AS396420	6	7	12/15/98
rin	0.33	U	µg/kg	Pesticides	MCA-419	AS396421	6	7	12/15/98
rin	0.26	U	µg/kg	Pesticides	MCA-423	AS395423	NA	NA	12/21/98
rin	0.26	U	µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
rin	0.28	U	µg/kg	Pesticides	MCA-425	AS398425	NA	NA	12/21/98
rin	0.31	U	µg/kg	Pesticides	MCA-568	AS399568	16	16	4/13/99
rin	0.32	U	µg/kg	Pesticides	MCA-570	AS399570	16	16	4/13/99
ha-Chlordane	0.30	U	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/6/98
ha-Chlordane	3.9	U	µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/6/98
ha-Chlordane	19.9		µg/kg	Pesticides	OWS-259	AS395259	7	7	9/2/98
ha-Chlordane	22.4	J	µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
ha-Chlordane	3.6	U	µg/kg	Pesticides	OWS-261	AS398261	7	7	9/2/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
lpha-Chlordane	1.51	J	µg/kg	Pesticides	OWS-264	AS398264	7	7	9/2/98
lpha-Chlordane	1.02	J	µg/kg	Pesticides	OWS-266	AS398266	7	7	9/2/98
lpha-Chlordane	3.8	U	µg/kg	Pesticides	OWS-267	AS398267	NA	NA	9/2/98
lpha-Chlordane	3.8	U	µg/kg	Pesticides	OWS-269	AS398269	NA	NA	9/2/98
lpha-Chlordane	0.38	U	µg/kg	Pesticides	OWS-271	AS398271	NA	NA	9/2/98
lpha-Chlordane	4	U	µg/kg	Pesticides	OWS-272	AS398272	NA	NA	9/2/98
lpha-Chlordane	0.4	U	µg/kg	Pesticides	OWS-275	AS398275	3	3	9/2/98
lpha-Chlordane	0.38	U	µg/kg	Pesticides	OWS-281	AS398281	NA	NA	9/2/98
lpha-Chlordane	0.39	U	µg/kg	Pesticides	OWS-282	AS398282	NA	NA	9/2/98
lpha-Chlordane	20.2		µg/kg	Pesticides	OWS-123	AS398287	7.17	7.33	9/2/98
lpha-Chlordane	0.47	U	µg/kg	Pesticides	OWS-337	AS398337	NA	NA	10/5/98
lpha-Chlordane	2.4	U	µg/kg	Pesticides	OWS-338	AS398338	NA	NA	10/5/98
lpha-Chlordane	0.38	U	µg/kg	Pesticides	OWS-339	AS398339	6	6	10/5/98
lpha-Chlordane	2.85		µg/kg	Pesticides	OWS-340	AS398340	7	7	10/5/98
lpha-Chlordane	2.16		µg/kg	Pesticides	OWS-341	AS398341	7	7	10/5/98
lpha-Chlordane	3.38		µg/kg	Pesticides	OWS-342	AS398342	11	11	10/5/98
lpha-Chlordane	1.12	J	µg/kg	Pesticides	OWS-343	AS398343	9	9	10/5/98
lpha-Chlordane	0.39	U	µg/kg	Pesticides	OWS-344	AS398344	9	9	10/5/98
lpha-Chlordane	0.39	U	µg/kg	Pesticides	OWS-345	AS398345	9	9	10/5/98
lpha-Chlordane	0.44	U	µg/kg	Pesticides	MCA-415	AS398415	NA	NA	12/15/98
lpha-Chlordane	0.36	U	µg/kg	Pesticides	MCA-416	AS398416	NA	NA	12/15/98
lpha-Chlordane	0.39	U	µg/kg	Pesticides	MCA-417	AS398417	NA	NA	12/15/98
lpha-Chlordane	0.42	U	µg/kg	Pesticides	MCA-418	AS398418	NA	NA	12/15/98
lpha-Chlordane	0.45	U	µg/kg	Pesticides	MCA-419	AS398419	6	7	12/15/98
lpha-Chlordane	0.42	U	µg/kg	Pesticides	MCA-420	AS398420	6	7	12/15/98
lpha-Chlordane	0.43	U	µg/kg	Pesticides	MCA-419	AS398421	6	7	12/15/98
lpha-Chlordane	0.37	U	µg/kg	Pesticides	MCA-423	AS398423	NA	NA	12/21/98
lpha-Chlordane	0.37	U	µg/kg	Pesticides	MCA-424	AS398424	NA	NA	12/21/98
lpha-Chlordane	0.37	U	µg/kg	Pesticides	MCA-425	AS398425	NA	NA	12/21/98
lpha-Chlordane	0.41	U	µg/kg	Pesticides	MCA-568	AS398568	16	16	4/13/99
lpha-Chlordane	0.42	U	µg/kg	Pesticides	MCA-570	AS398570	16	16	4/13/99
elta-BHC	0.43	U	µg/kg	Pesticides	OWS-141	AS398141	NA	NA	7/6/98
elta-BHC	4.3	U	µg/kg	Pesticides	OWS-142	AS398142	NA	NA	7/6/98
elta-BHC	4.1	U	µg/kg	Pesticides	OWS-259	AS398259	7	7	9/2/98
elta-BHC	8.3	U	µg/kg	Pesticides	OWS-260	AS398260	7	7	9/2/98
elta-BHC	4	U	µg/kg	Pesticides	OWS-261	AS398261	7	7	9/2/98
elta-BHC	0.4	U	µg/kg	Pesticides	OWS-264	AS398264	7	7	9/2/98
elta-BHC	0.42	U	µg/kg	Pesticides	OWS-266	AS398266	7	7	9/2/98
elta-BHC	4.2	U	µg/kg	Pesticides	OWS-267	AS398267	NA	NA	9/2/98
elta-BHC	4	U	µg/kg	Pesticides	OWS-269	AS398269	NA	NA	9/2/98
elta-BHC	0.42	U	µg/kg	Pesticides	OWS-271	AS398271	NA	NA	9/2/98
elta-BHC	4.4	U	µg/kg	Pesticides	OWS-272	AS398272	NA	NA	9/2/98
elta-BHC	0.46	U	µg/kg	Pesticides	OWS-275	AS398275	3	3	9/2/98
elta-BHC	0.39	U	µg/kg	Pesticides	OWS-281	AS398281	NA	NA	9/2/98
elta-BHC	0.43	U	µg/kg	Pesticides	OWS-282	AS398282	NA	NA	9/2/98
elta-BHC	2.1	U	µg/kg	Pesticides	OWS-123	AS398287	7.17	7.33	9/2/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
-BHC	0.52	U	µg/kg	Pesticides	OWS-337	AS395337	NA	NA	10/5/98
-BHC	2.6	U	µg/kg	Pesticides	OWS-338	AS395338	NA	NA	10/5/98
-BHC	0.39	U	µg/kg	Pesticides	OWS-339	AS395339	6	6	10/5/98
-BHC	0.46	U	µg/kg	Pesticides	OWS-340	AS395340	7	7	10/5/98
-BHC	0.47	U	µg/kg	Pesticides	OWS-341	AS395341	7	7	10/5/98
-BHC	0.41	U	µg/kg	Pesticides	OWS-342	AS395342	11	11	10/5/98
-BHC	0.41	U	µg/kg	Pesticides	OWS-343	AS395343	9	9	10/5/98
-BHC	0.4	U	µg/kg	Pesticides	OWS-344	AS395344	9	9	10/5/98
-BHC	0.42	U	µg/kg	Pesticides	OWS-345	AS395345	9	9	10/5/98
-BHC	0.46	U	µg/kg	Pesticides	MCA-415	AS395415	NA	NA	12/15/98
-BHC	0.43	U	µg/kg	Pesticides	MCA-416	AS395416	NA	NA	12/15/98
-BHC	0.43	U	µg/kg	Pesticides	MCA-417	AS395417	NA	NA	12/15/98
-BHC	0.48	U	µg/kg	Pesticides	MCA-418	AS395418	NA	NA	12/15/98
-BHC	0.51	U	µg/kg	Pesticides	MCA-419	AS395419	6	7	12/15/98
-BHC	0.48	U	µg/kg	Pesticides	MCA-420	AS395420	6	7	12/15/98
-BHC	0.48	U	µg/kg	Pesticides	MCA-419	AS395421	6	7	12/15/98
-BHC	0.41	U	µg/kg	Pesticides	MCA-423	AS395423	NA	NA	12/21/98
-BHC	0.41	U	µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
-BHC	0.41	U	µg/kg	Pesticides	MCA-425	AS395425	NA	NA	12/21/98
-BHC	0.45	U	µg/kg	Pesticides	MCA-568	AS395568	16	16	4/13/99
-BHC	0.47	U	µg/kg	Pesticides	MCA-570	AS395570	16	16	4/13/99
drin	1.7	U	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/6/98
drin	16	U	µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/6/98
drin	16	U	µg/kg	Pesticides	OWS-259	AS395259	7	7	9/2/98
drin	32	U	µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
drin	16	U	µg/kg	Pesticides	OWS-261	AS395261	7	7	9/2/98
drin	1.5	U	µg/kg	Pesticides	OWS-264	AS395264	7	7	9/2/98
drin	1.6	U	µg/kg	Pesticides	OWS-266	AS395266	7	7	9/2/98
drin	16	U	µg/kg	Pesticides	OWS-267	AS395267	NA	NA	9/2/98
drin	16	U	µg/kg	Pesticides	OWS-269	AS395269	NA	NA	9/2/98
drin	1.6	U	µg/kg	Pesticides	OWS-271	AS395271	NA	NA	9/2/98
drin	17	U	µg/kg	Pesticides	OWS-272	AS395272	NA	NA	9/2/98
drin	1.7	U	µg/kg	Pesticides	OWS-276	AS395276	3	3	9/2/98
ldrin	1.5	U	µg/kg	Pesticides	OWS-281	AS395281	NA	NA	9/2/98
ldrin	1.6	U	µg/kg	Pesticides	OWS-282	AS395282	NA	NA	9/2/98
ldrin	8.1	U	µg/kg	Pesticides	OWS-123	AS395287	7.17	7.33	9/2/98
ldrin	2	U	µg/kg	Pesticides	OWS-337	AS395337	NA	NA	10/5/98
ldrin	10	U	µg/kg	Pesticides	OWS-338	AS395338	NA	NA	10/5/98
ldrin	1.5	U	µg/kg	Pesticides	OWS-339	AS395339	6	6	10/5/98
ldrin	1.8	U	µg/kg	Pesticides	OWS-340	AS395340	7	7	10/5/98
ldrin	1.8	U	µg/kg	Pesticides	OWS-341	AS395341	7	7	10/5/98
ldrin	1.6	U	µg/kg	Pesticides	OWS-342	AS395342	11	11	10/5/98
ldrin	1.6	U	µg/kg	Pesticides	OWS-343	AS395343	9	9	10/5/98
ldrin	1.5	U	µg/kg	Pesticides	OWS-344	AS395344	9	9	10/5/98
ldrin	1.6	U	µg/kg	Pesticides	OWS-345	AS395345	9	9	10/5/98
ldrin	4.52		µg/kg	Pesticides	MCA-415	AS395415	NA	NA	12/15/98

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
ldrin	1.8	U	µg/kg	Pesticides	MCA-416	AS395416	NA	NA	12/15/98
ldrin	2.34	J	µg/kg	Pesticides	MCA-417	AS395417	NA	NA	12/15/98
ldrin	1.8	U	µg/kg	Pesticides	MCA-418	AS395418	NA	NA	12/15/98
ldrin	2.0	U	µg/kg	Pesticides	MCA-419	AS395419	6	7	12/15/98
ldrin	1.8	U	µg/kg	Pesticides	MCA-420	AS395420	6	7	12/15/98
ldrin	1.8	U	µg/kg	Pesticides	MCA-418	AS395421	6	7	12/15/98
ldrin	3.15	J	µg/kg	Pesticides	MCA-423	AS395423	NA	NA	12/21/98
ldrin	2.05	J	µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
ldrin	2.96	J	µg/kg	Pesticides	MCA-425	AS395425	NA	NA	12/21/98
ldrin	1.7	U	µg/kg	Pesticides	MCA-568	AS395568	16	16	4/13/99
ldrin	1.8	U	µg/kg	Pesticides	MCA-570	AS395570	16	16	4/13/99
drin	1.9	U	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/8/98
drin	19	U	µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/8/98
drin	15	U	µg/kg	Pesticides	OWS-259	AS395259	7	7	9/2/98
drin	30	U	µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
drin	15	U	µg/kg	Pesticides	OWS-261	AS395261	7	7	9/2/98
drin	1.5	U	µg/kg	Pesticides	OWS-264	AS395264	7	7	9/2/98
drin	1.5	U	µg/kg	Pesticides	OWS-266	AS395266	7	7	9/2/98
drin	15	U	µg/kg	Pesticides	OWS-267	AS395267	NA	NA	9/2/98
drin	15	U	µg/kg	Pesticides	OWS-269	AS395269	NA	NA	9/2/98
drin	1.5	U	µg/kg	Pesticides	OWS-271	AS395271	NA	NA	9/2/98
drin	16	U	µg/kg	Pesticides	OWS-272	AS395272	NA	NA	9/2/98
drin	1.6	U	µg/kg	Pesticides	OWS-275	AS395275	3	3	9/2/98
drin	1.4	U	µg/kg	Pesticides	OWS-281	AS395281	NA	NA	9/2/98
drin	1.6	U	µg/kg	Pesticides	OWS-282	AS395282	NA	NA	9/2/98
drin	7.8	U	µg/kg	Pesticides	OWS-123	AS395287	7.17	7.33	9/2/98
drin	1.9	U	µg/kg	Pesticides	OWS-337	AS395337	NA	NA	10/5/98
drin	9.5	U	µg/kg	Pesticides	OWS-338	AS395338	NA	NA	10/5/98
drin	1.4	U	µg/kg	Pesticides	OWS-339	AS395339	6	6	10/5/98
drin	1.7	U	µg/kg	Pesticides	OWS-340	AS395340	7	7	10/5/98
drin	1.7	U	µg/kg	Pesticides	OWS-341	AS395341	7	7	10/5/98
drin	1.8	U	µg/kg	Pesticides	OWS-342	AS395342	11	11	10/5/98
drin	1.5	U	µg/kg	Pesticides	OWS-343	AS395343	8	9	10/5/98
drin	1.6	U	µg/kg	Pesticides	OWS-344	AS395344	9	9	10/5/98
drin	1.8	U	µg/kg	Pesticides	OWS-345	AS395345	9	9	10/5/98
drin	1.8	U	µg/kg	Pesticides	MCA-415	AS395415	NA	NA	12/16/98
drin	1.6	U	µg/kg	Pesticides	MCA-416	AS395416	NA	NA	12/16/98
drin	1.6	U	µg/kg	Pesticides	MCA-417	AS395417	NA	NA	12/16/98
drin	1.7	U	µg/kg	Pesticides	MCA-418	AS395418	NA	NA	12/16/98
drin	1.9	U	µg/kg	Pesticides	MCA-419	AS395419	6	7	12/16/98
drin	1.7	U	µg/kg	Pesticides	MCA-420	AS395420	6	7	12/16/98
drin	1.8	U	µg/kg	Pesticides	MCA-418	AS395421	6	7	12/16/98
drin	1.5	U	µg/kg	Pesticides	MCA-423	AS395423	NA	NA	12/21/98
drin	1.5	U	µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
drin	1.5	U	µg/kg	Pesticides	MCA-425	AS395425	NA	NA	12/21/98
drin	1.7	U	µg/kg	Pesticides	MCA-568	AS395568	16	16	4/13/99

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
in	1.7	U	µg/kg	Pesticides	MCA-570	AS395570	16	16	4/13/99
in aldehyde	1	U	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/6/98
in aldehyde	10	U	µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/6/98
in aldehyde	9.6	U	µg/kg	Pesticides	OWS-259	AS395259	7	7	9/2/98
in aldehyde	19	U	µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
in aldehyde	9.4	U	µg/kg	Pesticides	OWS-261	AS395261	7	7	9/2/98
in aldehyde	6.87		µg/kg	Pesticides	OWS-264	AS395264	7	7	9/2/98
in aldehyde	7.01		µg/kg	Pesticides	OWS-266	AS395266	7	7	9/2/98
in aldehyde	9.8	U	µg/kg	Pesticides	OWS-267	AS395267	NA	NA	9/2/98
in aldehyde	9.4	U	µg/kg	Pesticides	OWS-269	AS395269	NA	NA	9/2/98
in aldehyde	0.98	U	µg/kg	Pesticides	OWS-271	AS395271	NA	NA	9/2/98
in aldehyde	10	U	µg/kg	Pesticides	OWS-272	AS395272	NA	NA	9/2/98
in aldehyde	1	U	µg/kg	Pesticides	OWS-275	AS395275	3	3	9/2/98
in aldehyde	0.82	U	µg/kg	Pesticides	OWS-281	AS395281	NA	NA	9/2/98
in aldehyde	1	U	µg/kg	Pesticides	OWS-282	AS395282	NA	NA	9/2/98
in aldehyde	6	U	µg/kg	Pesticides	OWS-123	AS395287	7.17	7.33	9/2/98
in aldehyde	1.2	U	µg/kg	Pesticides	OWS-337	AS395337	NA	NA	10/5/98
in aldehyde	6.1	U	µg/kg	Pesticides	OWS-338	AS395338	NA	NA	10/5/98
in aldehyde	0.92	U	µg/kg	Pesticides	OWS-339	AS395339	6	6	10/5/98
in aldehyde	1.1	U	µg/kg	Pesticides	OWS-340	AS395340	7	7	10/5/98
in aldehyde	1.1	U	µg/kg	Pesticides	OWS-341	AS395341	7	7	10/5/98
in aldehyde	0.96	U	µg/kg	Pesticides	OWS-342	AS395342	11	11	10/5/98
in aldehyde	0.96	U	µg/kg	Pesticides	OWS-343	AS395343	9	9	10/5/98
in aldehyde	0.94	U	µg/kg	Pesticides	OWS-344	AS395344	9	9	10/5/98
in aldehyde	0.98	U	µg/kg	Pesticides	OWS-345	AS395345	9	9	10/5/98
in aldehyde	3.76	J	µg/kg	Pesticides	MCA-415	AS395415	NA	NA	12/15/98
in aldehyde	0.99	U	µg/kg	Pesticides	MCA-416	AS395416	NA	NA	12/15/98
in aldehyde	1	U	µg/kg	Pesticides	MCA-417	AS395417	NA	NA	12/15/98
in aldehyde	1.1	U	µg/kg	Pesticides	MCA-418	AS395418	NA	NA	12/16/98
in aldehyde	1.2	U	µg/kg	Pesticides	MCA-419	AS395419	6	7	12/15/98
in aldehyde	1.1	U	µg/kg	Pesticides	MCA-420	AS395420	6	7	12/15/98
in aldehyde	1.1	U	µg/kg	Pesticides	MCA-419	AS395421	6	7	12/15/98
in aldehyde	0.98	U	µg/kg	Pesticides	MCA-423	AS395423	NA	NA	12/21/98
in aldehyde	0.95	U	µg/kg	Pesticides	MCA-424	AS395424	NA	NA	12/21/98
in aldehyde	0.96	U	µg/kg	Pesticides	MCA-425	AS395425	NA	NA	12/21/98
in aldehyde	1.1	U	µg/kg	Pesticides	MCA-568	AS395568	16	16	4/13/99
in aldehyde	1.1	U	µg/kg	Pesticides	MCA-570	AS395570	16	16	4/13/99
mma-BHC (Lindane)	0.72	U	µg/kg	Pesticides	OWS-141	AS395141	NA	NA	7/6/98
mma-BHC (Lindane)	7.2	U	µg/kg	Pesticides	OWS-142	AS395142	NA	NA	7/6/98
mma-BHC (Lindane)	6.8	U	µg/kg	Pesticides	OWS-259	AS395259	7	7	9/2/98
mma-BHC (Lindane)	14	U	µg/kg	Pesticides	OWS-260	AS395260	7	7	9/2/98
mma-BHC (Lindane)	6.7	U	µg/kg	Pesticides	OWS-261	AS395261	7	7	9/2/98
mma-BHC (Lindane)	0.67	U	µg/kg	Pesticides	OWS-264	AS395264	7	7	9/2/98
mma-BHC (Lindane)	0.69	U	µg/kg	Pesticides	OWS-266	AS395266	7	7	9/2/98
mma-BHC (Lindane)	7	U	µg/kg	Pesticides	OWS-267	AS395267	NA	NA	9/2/98
mma-BHC (Lindane)	6.7	U	µg/kg	Pesticides	OWS-269	AS395269	NA	NA	9/2/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
amma-BHC (Lindane)	0.7	U	µg/kg	Pesticides	OWS-271	AS39S271	NA	NA	9/2/98
amma-BHC (Lindane)	7.3	U	µg/kg	Pesticides	OWS-272	AS39S272	NA	NA	9/2/98
amma-BHC (Lindane)	0.75	U	µg/kg	Pesticides	OWS-275	AS39S275	3	3	9/2/98
amma-BHC (Lindane)	0.68	U	µg/kg	Pesticides	OWS-281	AS39S281	NA	NA	9/2/98
amma-BHC (Lindane)	0.72	U	µg/kg	Pesticides	OWS-282	AS39S282	NA	NA	9/2/98
amma-BHC (Lindane)	3.6	U	µg/kg	Pesticides	OWS-123	AS39S287	7.17	7.33	9/2/98
amma-BHC (Lindane)	0.87	U	µg/kg	Pesticides	OWS-337	AS39S337	NA	NA	10/5/98
amma-BHC (Lindane)	4.3	U	µg/kg	Pesticides	OWS-338	AS39S338	NA	NA	10/6/98
amma-BHC (Lindane)	0.68	U	µg/kg	Pesticides	OWS-339	AS39S339	6	6	10/5/98
amma-BHC (Lindane)	0.76	U	µg/kg	Pesticides	OWS-340	AS39S340	7	7	10/5/98
amma-BHC (Lindane)	0.78	U	µg/kg	Pesticides	OWS-341	AS39S341	7	7	10/5/98
amma-BHC (Lindane)	0.69	U	µg/kg	Pesticides	OWS-342	AS39S342	11	11	10/5/98
amma-BHC (Lindane)	0.68	U	µg/kg	Pesticides	OWS-343	AS39S343	9	9	10/5/98
amma-BHC (Lindane)	0.87	U	µg/kg	Pesticides	OWS-344	AS39S344	9	9	10/5/98
amma-BHC (Lindane)	0.7	U	µg/kg	Pesticides	OWS-345	AS39S345	9	9	10/5/98
amma-BHC (Lindane)	0.81	U	µg/kg	Pesticides	MCA-415	AS39S415	NA	NA	12/15/98
amma-BHC (Lindane)	0.71	U	µg/kg	Pesticides	MCA-416	AS39S416	NA	NA	12/15/98
amma-BHC (Lindane)	0.72	U	µg/kg	Pesticides	MCA-417	AS39S417	NA	NA	12/15/98
amma-BHC (Lindane)	0.77	U	µg/kg	Pesticides	MCA-418	AS39S418	NA	NA	12/15/98
amma-BHC (Lindane)	0.85	U	µg/kg	Pesticides	MCA-419	AS39S419	6	7	12/15/98
amma-BHC (Lindane)	0.78	U	µg/kg	Pesticides	MCA-420	AS39S420	6	7	12/15/98
amma-BHC (Lindane)	0.80	U	µg/kg	Pesticides	MCA-419	AS39S421	6	7	12/15/98
amma-BHC (Lindane)	0.69	U	µg/kg	Pesticides	MCA-423	AS39S423	NA	NA	12/21/98
amma-BHC (Lindane)	0.66	U	µg/kg	Pesticides	MCA-424	AS39S424	NA	NA	12/21/98
amma-BHC (Lindane)	0.66	U	µg/kg	Pesticides	MCA-425	AS39S425	NA	NA	12/21/98
amma-BHC (Lindane)	0.76	U	µg/kg	Pesticides	MCA-568	AS39S568	16	16	4/13/99
amma-BHC (Lindane)	0.76	U	µg/kg	Pesticides	MCA-570	AS39S570	16	16	4/13/99
amma-Chlordane	0.38	U	µg/kg	Pesticides	OWS-141	AS39S141	NA	NA	7/6/98
amma-Chlordane	3.8	U	µg/kg	Pesticides	OWS-142	AS39S142	NA	NA	7/6/98
amma-Chlordane	21		µg/kg	Pesticides	OWS-259	AS39S259	7	7	9/2/98
amma-Chlordane	37.7	J	µg/kg	Pesticides	OWS-260	AS39S260	7	7	9/2/98
amma-Chlordane	3.5	U	µg/kg	Pesticides	OWS-261	AS39S261	7	7	9/2/98
amma-Chlordane	1.66	J	µg/kg	Pesticides	OWS-264	AS39S264	7	7	9/2/98
amma-Chlordane	1.02	J	µg/kg	Pesticides	OWS-266	AS39S266	7	7	9/2/98
amma-Chlordane	3.7	U	µg/kg	Pesticides	OWS-267	AS39S267	NA	NA	9/2/98
amma-Chlordane	3.5	U	µg/kg	Pesticides	OWS-269	AS39S269	NA	NA	9/2/98
amma-Chlordane	0.37	U	µg/kg	Pesticides	OWS-271	AS39S271	NA	NA	9/2/98
amma-Chlordane	3.8	U	µg/kg	Pesticides	OWS-272	AS39S272	NA	NA	9/2/98
amma-Chlordane	0.675	J	µg/kg	Pesticides	OWS-275	AS39S275	3	3	9/2/98
amma-Chlordane	0.34	U	µg/kg	Pesticides	OWS-281	AS39S281	NA	NA	9/2/98
amma-Chlordane	0.585	J	µg/kg	Pesticides	OWS-282	AS39S282	NA	NA	9/2/98
amma-Chlordane	15.2		µg/kg	Pesticides	OWS-123	AS39S287	7.17	7.33	9/2/98
amma-Chlordane	0.45	U	µg/kg	Pesticides	OWS-337	AS39S337	NA	NA	10/5/98
amma-Chlordane	2.3	U	µg/kg	Pesticides	OWS-338	AS39S338	NA	NA	10/5/98
amma-Chlordane	0.34	U	µg/kg	Pesticides	OWS-339	AS39S339	6	6	10/5/98
amma-Chlordane	1.61	J	µg/kg	Pesticides	OWS-340	AS39S340	7	7	10/5/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

METER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
na-Chlordane	1.44	J	µg/kg	Pesticides	OWS-341	AS398341	7	7	10/5/98
na-Chlordane	3.46		µg/kg	Pesticides	OWS-342	AS398342	11	11	10/5/98
na-Chlordane	0.36	U	µg/kg	Pesticides	OWS-343	AS398343	9	9	10/5/98
na-Chlordane	0.35	U	µg/kg	Pesticides	OWS-344	AS398344	9	9	10/5/98
na-Chlordane	0.37	U	µg/kg	Pesticides	OWS-345	AS398345	9	9	10/5/98
na-Chlordane	1.76	J	µg/kg	Pesticides	MCA-415	AS398415	NA	NA	12/15/98
na-Chlordane	0.37	U	µg/kg	Pesticides	MCA-416	AS398416	NA	NA	12/15/98
na-Chlordane	0.38	U	µg/kg	Pesticides	MCA-417	AS398417	NA	NA	12/15/98
na-Chlordane	0.41	U	µg/kg	Pesticides	MCA-418	AS398418	NA	NA	12/16/98
na-Chlordane	0.45	U	µg/kg	Pesticides	MCA-419	AS398419	6	7	12/16/98
na-Chlordane	0.41	U	µg/kg	Pesticides	MCA-420	AS398420	6	7	12/16/98
na-Chlordane	0.62	U	µg/kg	Pesticides	MCA-419	AS398421	6	7	12/16/98
na-Chlordane	0.36	U	µg/kg	Pesticides	MCA-423	AS398423	NA	NA	12/21/98
na-Chlordane	0.36	U	µg/kg	Pesticides	MCA-424	AS398424	NA	NA	12/21/98
na-Chlordane	0.38	U	µg/kg	Pesticides	MCA-425	AS398425	NA	NA	12/21/98
na-Chlordane	0.4	U	µg/kg	Pesticides	MCA-568	AS398568	16	16	4/13/99
na-Chlordane	0.41	U	µg/kg	Pesticides	MCA-570	AS398570	16	16	4/13/99
chlor Epoxide	0.39	U	µg/kg	Pesticides	OWS-141	AS398141	NA	NA	7/6/98
chlor Epoxide	3.9	U	µg/kg	Pesticides	OWS-142	AS398142	NA	NA	7/6/98
chlor Epoxide	3.7	U	µg/kg	Pesticides	OWS-258	AS398258	7	7	9/2/98
chlor Epoxide	7.6	U	µg/kg	Pesticides	OWS-260	AS398260	7	7	9/2/98
chlor Epoxide	3.8	U	µg/kg	Pesticides	OWS-261	AS398261	7	7	9/2/98
chlor Epoxide	2.07		µg/kg	Pesticides	OWS-264	AS398264	7	7	9/2/98
chlor Epoxide	0.878	J	µg/kg	Pesticides	OWS-266	AS398266	7	7	9/2/98
chlor Epoxide	3.6	U	µg/kg	Pesticides	OWS-267	AS398267	NA	NA	9/2/98
chlor Epoxide	3.6	U	µg/kg	Pesticides	OWS-269	AS398269	NA	NA	9/2/98
chlor Epoxide	0.38	U	µg/kg	Pesticides	OWS-271	AS398271	NA	NA	9/2/98
chlor Epoxide	4	U	µg/kg	Pesticides	OWS-272	AS398272	NA	NA	9/2/98
chlor Epoxide	0.4	U	µg/kg	Pesticides	OWS-276	AS398276	3	3	9/2/98
chlor Epoxide	0.36	U	µg/kg	Pesticides	OWS-281	AS398281	NA	NA	9/2/98
chlor Epoxide	0.39	U	µg/kg	Pesticides	OWS-282	AS398282	NA	NA	9/2/98
chlor Epoxide	1.9	U	µg/kg	Pesticides	OWS-123	AS398287	7.17	7.33	9/2/98
chlor Epoxide	0.47	U	µg/kg	Pesticides	OWS-337	AS398337	NA	NA	10/5/98
chlor Epoxide	2.4	U	µg/kg	Pesticides	OWS-338	AS398338	NA	NA	10/5/98
chlor Epoxide	0.38	U	µg/kg	Pesticides	OWS-339	AS398339	6	6	10/5/98
chlor Epoxide	2.82		µg/kg	Pesticides	OWS-340	AS398340	7	7	10/5/98
chlor Epoxide	0.42	U	µg/kg	Pesticides	OWS-341	AS398341	7	7	10/5/98
chlor Epoxide	0.37	U	µg/kg	Pesticides	OWS-342	AS398342	11	11	10/5/98
chlor Epoxide	0.37	U	µg/kg	Pesticides	OWS-343	AS398343	9	9	10/5/98
chlor Epoxide	0.36	U	µg/kg	Pesticides	OWS-344	AS398344	9	9	10/5/98
chlor Epoxide	0.38	U	µg/kg	Pesticides	OWS-345	AS398345	9	9	10/5/98
chlor Epoxide	2.04	J	µg/kg	Pesticides	MCA-415	AS398415	NA	NA	12/15/98
chlor Epoxide	0.39	U	µg/kg	Pesticides	MCA-416	AS398416	NA	NA	12/15/98
chlor Epoxide	0.39	U	µg/kg	Pesticides	MCA-417	AS398417	NA	NA	12/15/98
chlor Epoxide	0.42	U	µg/kg	Pesticides	MCA-418	AS398418	NA	NA	12/15/98
chlor Epoxide	0.46	U	µg/kg	Pesticides	MCA-419	AS398419	6	7	12/15/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
ptachlor Epoxide	0.42	U	µg/kg	Pesticides	MCA-420	AS39S420	6	7	12/15/98
ptachlor Epoxide	0.43	U	µg/kg	Pesticides	MCA-419	AS39S421	6	7	12/15/98
ptachlor Epoxide	0.37	U	µg/kg	Pesticides	MCA-423	AS39S423	NA	NA	12/21/98
ptachlor Epoxide	4.95		µg/kg	Pesticides	MCA-424	AS39S424	NA	NA	12/21/98
ptachlor Epoxide	1.44	J	µg/kg	Pesticides	MCA-425	AS39S425	NA	NA	12/21/98
ptachlor Epoxide	0.41	U	µg/kg	Pesticides	MCA-569	AS39S569	16	16	4/13/99
ptachlor Epoxide	0.42	U	µg/kg	Pesticides	MCA-570	AS39S570	16	16	4/13/99
ethoxychlor	8.2	U	µg/kg	Pesticides	OWS-141	AS39S141	NA	NA	7/6/98
ethoxychlor	92	U	µg/kg	Pesticides	OWS-142	AS39S142	NA	NA	7/6/98
ethoxychlor	78	U	µg/kg	Pesticides	OWS-259	AS39S259	7	7	9/2/98
ethoxychlor	160	U	µg/kg	Pesticides	OWS-260	AS39S260	7	7	9/2/98
ethoxychlor	78	U	µg/kg	Pesticides	OWS-261	AS39S261	7	7	9/2/98
ethoxychlor	7.6	U	µg/kg	Pesticides	OWS-264	AS39S264	7	7	9/2/98
ethoxychlor	7.9	U	µg/kg	Pesticides	OWS-266	AS39S266	7	7	9/2/98
ethoxychlor	80	U	µg/kg	Pesticides	OWS-267	AS39S267	NA	NA	9/2/98
ethoxychlor	77	U	µg/kg	Pesticides	OWS-269	AS39S269	NA	NA	9/2/98
ethoxychlor	8	U	µg/kg	Pesticides	OWS-271	AS39S271	NA	NA	9/2/98
ethoxychlor	83	U	µg/kg	Pesticides	OWS-272	AS39S272	NA	NA	9/2/98
ethoxychlor	8.5	U	µg/kg	Pesticides	OWS-275	AS39S275	3	3	9/2/98
ethoxychlor	7.5	U	µg/kg	Pesticides	OWS-281	AS39S281	NA	NA	9/2/98
ethoxychlor	8.2	U	µg/kg	Pesticides	OWS-282	AS39S282	NA	NA	9/2/98
ethoxychlor	40	U	µg/kg	Pesticides	OWS-123	AS39S287	7.17	7.33	9/2/98
ethoxychlor	9.3	U	µg/kg	Pesticides	OWS-337	AS39S337	NA	NA	10/5/98
ethoxychlor	49	U	µg/kg	Pesticides	OWS-338	AS39S338	NA	NA	10/5/98
ethoxychlor	7.5	U	µg/kg	Pesticides	OWS-339	AS39S339	6	6	10/5/98
ethoxychlor	8.7	U	µg/kg	Pesticides	OWS-340	AS39S340	7	7	10/5/98
ethoxychlor	8.9	U	µg/kg	Pesticides	OWS-341	AS39S341	7	7	10/5/98
ethoxychlor	7.8	U	µg/kg	Pesticides	OWS-342	AS39S342	11	11	10/5/98
ethoxychlor	7.8	U	µg/kg	Pesticides	OWS-343	AS39S343	9	9	10/5/98
ethoxychlor	7.8	U	µg/kg	Pesticides	OWS-344	AS39S344	9	9	10/5/98
ethoxychlor	8	U	µg/kg	Pesticides	OWS-345	AS39S345	9	9	10/5/98
ethoxychlor	8.2	U	µg/kg	Pesticides	MCA-415	AS39S415	NA	NA	12/15/98
ethoxychlor	8.1	U	µg/kg	Pesticides	MCA-416	AS39S416	NA	NA	12/15/98
ethoxychlor	8.2	U	µg/kg	Pesticides	MCA-417	AS39S417	NA	NA	12/15/98
ethoxychlor	8.8	U	µg/kg	Pesticides	MCA-418	AS39S418	NA	NA	12/15/98
ethoxychlor	8.7	U	µg/kg	Pesticides	MCA-419	AS39S419	6	7	12/15/98
ethoxychlor	8.8	U	µg/kg	Pesticides	MCA-420	AS39S420	6	7	12/15/98
ethoxychlor	8.1	U	µg/kg	Pesticides	MCA-419	AS39S421	6	7	12/15/98
ethoxychlor	7.6	U	µg/kg	Pesticides	MCA-423	AS39S423	NA	NA	12/21/98
ethoxychlor	7.7	U	µg/kg	Pesticides	MCA-424	AS39S424	NA	NA	12/21/98
ethoxychlor	7.3	U	µg/kg	Pesticides	MCA-425	AS39S425	NA	NA	12/21/98
ethoxychlor	8.6	U	µg/kg	Pesticides	MCA-569	AS39S569	16	16	4/13/99
ethoxychlor	8.9	U	µg/kg	Pesticides	MCA-570	AS39S570	16	16	4/13/99
rochlor 1016	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS39S122	7.17	7.33	7/6/98
rochlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS39S123	7.17	7.33	7/6/98
rochlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS39S125	7.17	7.33	7/6/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
chlor 1016	9.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS395126	7.17	7.33	7/6/98
chlor 1016	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS395127	7.17	7.33	7/6/98
chlor 1016	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS395128	7.17	7.33	7/6/98
chlor 1016	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS395129	7.17	7.33	7/6/98
chlor 1016	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS395130	7.17	7.33	7/6/98
chlor 1016	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS395132	NA	NA	7/6/98
chlor 1016	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-135	AS395135	NA	NA	7/6/98
chlor 1016	9.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS395141	NA	NA	7/6/98
chlor 1016	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS395142	NA	NA	7/6/98
chlor 1016	9.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS395143	NA	NA	7/6/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS395241	10	10	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS395242	10	10	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS395243	10	10	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS395244	10	10	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS395245	10	10	8/28/98
chlor 1016	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS395246	10	10	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS395247	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS395248	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS395249	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS395250	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS395251	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS395252	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS395253	NA	NA	8/28/98
chlor 1016	7.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS395254	NA	NA	8/28/98
chlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-258	AS395258	7	7	9/2/98
chlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS395260	7	7	9/2/98
chlor 1016	8.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS395261	7	7	9/2/98
chlor 1016	8.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS395264	7	7	9/2/98
chlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-266	AS395266	7	7	9/2/98
chlor 1016	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS395267	NA	NA	9/2/98
chlor 1016	8.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS395269	NA	NA	9/2/98
chlor 1016	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS395271	NA	NA	9/2/98
chlor 1016	9.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS395272	NA	NA	9/2/98
chlor 1016	8.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS395275	3	3	9/2/98
chlor 1016	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS395281	NA	NA	9/2/98
chlor 1016	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS395282	NA	NA	9/2/98
chlor 1016	11	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS395337	NA	NA	10/5/98
chlor 1016	11	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS395338	NA	NA	10/5/98
chlor 1016	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS395339	6	6	10/5/98
chlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS395340	7	7	10/5/98
chlor 1016	10	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS395341	7	7	10/5/98
chlor 1016	8.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS395342	11	11	10/5/98
chlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS395343	9	9	10/5/98
chlor 1016	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS395344	9	9	10/5/98
chlor 1016	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS395345	9	9	10/5/98
chlor 1221	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS395122	7.17	7.33	7/6/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
rochlor 1221	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS398123	7.17	7.33	7/8/98
rochlor 1221	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS398125	7.17	7.33	7/8/98
rochlor 1221	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS398126	7.17	7.33	7/8/98
rochlor 1221	9.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS398127	7.17	7.33	7/8/98
rochlor 1221	9.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS398128	7.17	7.33	7/8/98
rochlor 1221	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS398129	7.17	7.33	7/8/98
rochlor 1221	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS398130	7.17	7.33	7/8/98
rochlor 1221	9.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS398132	NA	NA	7/8/98
rochlor 1221	9.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-135	AS398135	NA	NA	7/8/98
rochlor 1221	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS398141	NA	NA	7/8/98
rochlor 1221	9.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS398142	NA	NA	7/8/98
rochlor 1221	9.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS398143	NA	NA	7/8/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS398241	10	10	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS398242	10	10	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS398243	10	10	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS398244	10	10	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS398245	10	10	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS398246	10	10	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS398247	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS398248	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS398249	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS398250	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS398251	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS398252	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS398253	NA	NA	8/28/98
rochlor 1221	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS398254	NA	NA	8/28/98
rochlor 1221	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-259	AS398259	7	7	9/2/98
rochlor 1221	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS398260	7	7	9/2/98
rochlor 1221	8.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS398261	7	7	9/2/98
rochlor 1221	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS398264	7	7	9/2/98
ochlor 1221	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-266	AS398266	7	7	9/2/98
ochlor 1221	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS398267	NA	NA	9/2/98
ochlor 1221	8.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS398269	NA	NA	9/2/98
ochlor 1221	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS398271	NA	NA	9/2/98
ochlor 1221	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS398272	NA	NA	9/2/98
ochlor 1221	9.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS398275	3	3	9/2/98
ochlor 1221	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS398281	NA	NA	9/2/98
ochlor 1221	9.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS398282	NA	NA	9/2/98
ochlor 1221	11	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS398337	NA	NA	10/5/98
ochlor 1221	11	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS398338	NA	NA	10/5/98
ochlor 1221	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS398339	8	8	10/5/98
ochlor 1221	9.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS398340	7	7	10/5/98
ochlor 1221	9.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS398341	7	7	10/5/98
ochlor 1221	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS398342	11	11	10/5/98
ochlor 1221	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS398343	9	9	10/5/98
ochlor 1221	8.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS398344	9	9	10/5/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
hlor 1221	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS39S345	9	9	10/5/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS39S122	7.17	7.33	7/8/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS39S123	7.17	7.33	7/8/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS39S125	7.17	7.33	7/8/98
chlor 1232	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS39S126	7.17	7.33	7/8/98
chlor 1232	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS39S127	7.17	7.33	7/8/98
chlor 1232	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS39S128	7.17	7.33	7/8/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS39S129	7.17	7.33	7/8/98
chlor 1232	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS39S130	7.17	7.33	7/8/98
chlor 1232	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS39S132	NA	NA	7/8/98
chlor 1232	8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-135	AS39S135	NA	NA	7/8/98
chlor 1232	9.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS39S141	NA	NA	7/8/98
chlor 1232	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS39S142	NA	NA	7/8/98
chlor 1232	9.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS39S143	NA	NA	7/8/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS39S241	10	10	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS39S242	10	10	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS39S243	10	10	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS39S244	10	10	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS39S245	10	10	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS39S246	10	10	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS39S247	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS39S248	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS39S249	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS39S250	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS39S251	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS39S252	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS39S253	NA	NA	8/28/98
chlor 1232	7.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS39S254	NA	NA	8/28/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-259	AS39S259	7	7	9/2/98
chlor 1232	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS39S260	7	7	9/2/98
chlor 1232	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS39S261	7	7	9/2/98
chlor 1232	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS39S264	7	7	9/2/98
chlor 1232	8.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-266	AS39S266	7	7	9/2/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS39S267	NA	NA	9/2/98
chlor 1232	8.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS39S269	NA	NA	9/2/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS39S271	NA	NA	9/2/98
chlor 1232	9.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS39S272	NA	NA	9/2/98
chlor 1232	9.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS39S275	3	3	9/2/98
chlor 1232	8.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS39S281	NA	NA	9/2/98
chlor 1232	9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS39S282	NA	NA	9/2/98
chlor 1232	11	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS39S337	NA	NA	10/5/98
chlor 1232	11	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS39S338	NA	NA	10/5/98
chlor 1232	9.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS39S339	6	6	10/5/98
chlor 1232	9.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS39S340	7	7	10/5/98
chlor 1232	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS39S341	7	7	10/5/98
chlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS39S342	11	11	10/5/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
ochlor 1232	8.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS39S343	9	9	10/5/98
ochlor 1232	8.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS39S344	9	9	10/5/98
ochlor 1232	8.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS39S345	9	9	10/5/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS39S122	7.17	7.33	7/6/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS39S123	7.17	7.33	7/6/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS39S125	7.17	7.33	7/6/98
ochlor 1242	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS39S126	7.17	7.33	7/6/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS39S127	7.17	7.33	7/6/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS39S128	7.17	7.33	7/6/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS39S129	7.17	7.33	7/6/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS39S130	7.17	7.33	7/6/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS39S132	NA	NA	7/6/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-135	AS39S135	NA	NA	7/6/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS39S141	NA	NA	7/6/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS39S142	NA	NA	7/6/98
ochlor 1242	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS39S143	NA	NA	7/6/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS39S241	10	10	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS39S242	10	10	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS39S243	10	10	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS39S244	10	10	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS39S245	10	10	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS39S246	10	10	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS39S247	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS39S248	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS39S249	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS39S250	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS39S251	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS39S252	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS39S253	NA	NA	8/28/98
ochlor 1242	2.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS39S254	NA	NA	8/28/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-259	AS39S259	7	7	9/2/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS39S260	7	7	9/2/98
ochlor 1242	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS39S261	7	7	9/2/98
ochlor 1242	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS39S264	7	7	9/2/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-266	AS39S266	7	7	9/2/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS39S267	NA	NA	9/2/98
ochlor 1242	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS39S269	NA	NA	9/2/98
ochlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS39S271	NA	NA	9/2/98
ochlor 1242	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS39S272	NA	NA	9/2/98
ochlor 1242	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS39S275	3	3	9/2/98
ochlor 1242	3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS39S281	NA	NA	9/2/98
ochlor 1242	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS39S282	NA	NA	9/2/98
ochlor 1242	4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS39S337	NA	NA	10/5/98
ochlor 1242	4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS39S338	NA	NA	10/5/98
ochlor 1242	3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS39S339	6	6	10/5/98
ochlor 1242	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS39S340	7	7	10/5/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
hlor 1242	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS39S341	7	7	10/5/98
hlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS39S342	11	11	10/5/98
hlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS39S343	9	9	10/5/98
hlor 1242	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS39S344	9	9	10/5/98
hlor 1242	3.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS39S345	8	8	10/5/98
hlor 1248	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS39S122	7.17	7.33	7/6/98
hlor 1248	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS39S123	7.17	7.33	7/6/98
hlor 1248	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS39S125	7.17	7.33	7/6/98
hlor 1248	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS39S126	7.17	7.33	7/6/98
hlor 1248	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS39S127	7.17	7.33	7/6/98
hlor 1248	5.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS39S128	7.17	7.33	7/6/98
hlor 1248	5.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS39S129	7.17	7.33	7/6/98
hlor 1248	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS39S130	7.17	7.33	7/6/98
hlor 1248	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS39S132	NA	NA	7/6/98
hlor 1248	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-136	AS39S136	NA	NA	7/6/98
hlor 1248	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS39S141	NA	NA	7/6/98
hlor 1248	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS39S142	NA	NA	7/6/98
hlor 1248	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS39S143	NA	NA	7/6/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS39S241	10	10	8/28/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS39S242	10	10	8/28/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS39S243	10	10	8/28/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS39S244	10	10	8/28/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS39S245	10	10	8/28/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS39S246	10	10	8/28/98
hlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS39S247	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS39S248	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS39S249	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS39S250	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS39S251	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS39S252	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS39S253	NA	NA	8/28/98
chlor 1248	4.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS39S254	NA	NA	8/28/98
chlor 1248	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-259	AS39S259	7	7	9/2/98
chlor 1248	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS39S260	7	7	9/2/98
chlor 1248	5.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS39S261	7	7	9/2/98
chlor 1248	5.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS39S264	7	7	9/2/98
chlor 1248	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-266	AS39S266	7	7	9/2/98
chlor 1248	5.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS39S267	NA	NA	9/2/98
chlor 1248	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS39S269	NA	NA	9/2/98
chlor 1248	5.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS39S271	NA	NA	9/2/98
chlor 1248	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS39S272	NA	NA	9/2/98
chlor 1248	5.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS39S275	3	3	9/2/98
chlor 1248	6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS39S281	NA	NA	9/2/98
chlor 1248	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS39S282	NA	NA	9/2/98
chlor 1248	6.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS39S337	NA	NA	10/5/98
chlor 1248	6.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS39S338	NA	NA	10/5/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
ochlor 1248	6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS395339	6	6	10/5/98
ochlor 1248	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS395340	7	7	10/5/98
ochlor 1248	6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS395341	7	7	10/5/98
ochlor 1248	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS395342	11	11	10/5/98
ochlor 1248	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS395343	9	9	10/5/98
ochlor 1248	5.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS395344	9	9	10/5/98
ochlor 1248	5.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS395345	9	9	10/5/98
ochlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS395122	7.17	7.33	7/6/98
ochlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS395123	7.17	7.33	7/6/98
ochlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS395125	7.17	7.33	7/6/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS395126	7.17	7.33	7/6/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS395127	7.17	7.33	7/6/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS395128	7.17	7.33	7/6/98
ochlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS395129	7.17	7.33	7/6/98
ochlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS395130	7.17	7.33	7/6/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS395132	NA	NA	7/6/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-135	AS395135	NA	NA	7/6/98
ochlor 1254	3.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS395141	NA	NA	7/6/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS395142	NA	NA	7/6/98
ochlor 1254	3.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS395143	NA	NA	7/6/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS395241	10	10	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS395242	10	10	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS395243	10	10	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS395244	10	10	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS395245	10	10	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS395246	10	10	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS395247	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS395248	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS395249	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS395250	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS395251	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS395252	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS395253	NA	NA	8/28/98
ochlor 1254	3.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS395254	NA	NA	8/28/98
ochlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-259	AS395259	7	7	9/2/98
ochlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS395260	7	7	9/2/98
ochlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS395261	7	7	9/2/98
ochlor 1254	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS395264	7	7	9/2/98
ochlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-266	AS395266	7	7	9/2/98
ochlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS395267	NA	NA	9/2/98
ochlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS395269	NA	NA	9/2/98
ochlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS395271	NA	NA	9/2/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS395272	NA	NA	9/2/98
ochlor 1254	3.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS395275	3	3	9/2/98
ochlor 1254	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS395281	NA	NA	9/2/98
ochlor 1254	3.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS395282	NA	NA	9/2/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
hlor 1254	4.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS39S337	NA	NA	10/5/98
hlor 1254	4.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS39S338	NA	NA	10/5/98
hlor 1254	3.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS39S339	6	6	10/5/98
hlor 1254	3.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS39S340	7	7	10/5/98
hlor 1254	3.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS39S341	7	7	10/5/98
hlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS39S342	11	11	10/5/98
hlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS39S343	9	9	10/5/98
hlor 1254	3.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS39S344	8	8	10/5/98
hlor 1254	3.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS39S345	9	9	10/5/98
hlor 1254	54.3		µg/kg	Polychlorinated Biphenyls (PCBs)	MCA-423	AS39S423	NA	NA	12/21/98
hlor 1254	153		µg/kg	Polychlorinated Biphenyls (PCBs)	MCA-424	AS39S424	NA	NA	12/21/98
hlor 1254	209		µg/kg	Polychlorinated Biphenyls (PCBs)	MCA-425	AS39S425	NA	NA	12/21/98
chlor 1260	119		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-122	AS39S122	7.17	7.33	7/8/98
chlor 1260	121		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-123	AS39S123	7.17	7.33	7/8/98
chlor 1260	27.6	J	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-125	AS39S125	7.17	7.33	7/8/98
chlor 1260	111		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-126	AS39S126	7.17	7.33	7/8/98
chlor 1260	52.5		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-127	AS39S127	7.17	7.33	7/8/98
chlor 1260	49.5		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-128	AS39S128	7.17	7.33	7/8/98
chlor 1260	178		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-129	AS39S129	7.17	7.33	7/8/98
chlor 1260	160		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-130	AS39S130	7.17	7.33	7/8/98
chlor 1260	45.7		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-132	AS39S132	NA	NA	7/8/98
chlor 1260	124		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-135	AS39S135	NA	NA	7/8/98
chlor 1260	5.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-141	AS39S141	NA	NA	7/8/98
chlor 1260	5.6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-142	AS39S142	NA	NA	7/8/98
chlor 1260	5.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-143	AS39S143	NA	NA	7/8/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-241	AS39S241	10	10	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-242	AS39S242	10	10	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-243	AS39S243	10	10	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-244	AS39S244	10	10	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-245	AS39S245	10	10	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-246	AS39S246	10	10	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-247	AS39S247	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-248	AS39S248	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-249	AS39S249	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-250	AS39S250	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-251	AS39S251	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-252	AS39S252	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-253	AS39S253	NA	NA	8/28/98
chlor 1260	4.9	U	µg/kg	Polychlorinated Biphenyls (PCBs)	DRUM-254	AS39S254	NA	NA	8/28/98
chlor 1260	60.2		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-259	AS39S259	7	7	9/2/98
chlor 1260	163		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-260	AS39S260	7	7	9/2/98
chlor 1260	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-261	AS39S261	7	7	9/2/98
chlor 1260	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-264	AS39S264	7	7	9/2/98
chlor 1260	67.9		µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-265	AS39S265	7	7	9/2/98
chlor 1260	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-267	AS39S267	NA	NA	9/2/98
chlor 1260	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-269	AS39S269	NA	NA	9/2/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
rochlor 1260	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-271	AS39S271	NA	NA	9/2/98
rochlor 1260	5.7	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-272	AS39S272	NA	NA	9/2/98
rochlor 1260	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-275	AS39S275	3	3	9/2/98
rochlor 1260	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-281	AS39S281	NA	NA	9/2/98
rochlor 1260	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-282	AS39S282	NA	NA	9/2/98
rochlor 1260	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-337	AS39S337	NA	NA	10/5/98
rochlor 1260	5.8	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-338	AS39S338	NA	NA	10/5/98
rochlor 1260	5.2	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-339	AS39S339	8	8	10/5/98
rochlor 1260	6	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-340	AS39S340	7	7	10/5/98
rochlor 1260	6.1	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-341	AS39S341	7	7	10/5/98
rochlor 1260	5.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-342	AS39S342	11	11	10/5/98
rochlor 1260	5.4	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-343	AS39S343	9	9	10/5/98
rochlor 1260	5.3	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-344	AS39S344	9	9	10/5/98
rochlor 1260	5.5	U	µg/kg	Polychlorinated Biphenyls (PCBs)	OWS-345	AS39S345	9	9	10/5/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS39S141	NA	NA	7/8/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS39S142	NA	NA	7/8/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS39S257	5	5	9/1/98
nthracene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS39S258	5	5	9/1/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS39S259	7	7	9/2/98
nthracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS39S260	7	7	9/2/98
nthracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS39S261	7	7	9/2/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS39S264	7	7	9/2/98
nthracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS39S266	7	7	9/2/98
nthracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS39S267	NA	NA	9/2/98
nthracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS39S269	NA	NA	9/2/98
nthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS39S271	NA	NA	9/2/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS39S272	NA	NA	9/2/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS39S275	3	3	9/2/98
nthracene	1.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS39S281	NA	NA	9/2/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS39S282	NA	NA	9/2/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS39S287	7.17	7.33	9/2/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS39S289	1.5	1.5	9/3/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS39S290	1.5	1.5	9/3/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A8-291	AS39S291	1	1	9/14/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A8-292	AS39S292	1	1	9/14/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS39S293	1	1	9/11/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS39S294	1	1	9/11/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S295	1	1	9/11/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS39S296	1	1	9/11/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS39S297	1	1	9/11/98
nthracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS39S298	1	1	9/11/98
nthracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS39S299	1	1	9/11/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S300	1	1	9/11/98
nthracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS39S301	1	1	9/11/98
nthracene	4.72	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E8-302	AS39S302	1	1	9/14/98
nthracene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E8-303	AS39S303	1	1	9/14/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
racene	2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS398304	1	1	9/14/98
racene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS398305	1	1	9/11/98
hracene	2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS398337	NA	NA	10/5/98
racene	2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS398338	NA	NA	10/5/98
racene	1.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS398339	6	6	10/5/98
racene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS398340	7	7	10/5/98
racene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS398341	7	7	10/6/98
racene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS398342	11	11	10/5/98
hracene	1.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS398343	9	9	10/5/98
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS398344	9	9	10/5/98
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS398345	9	9	10/5/98
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS398373	14	14.5	10/20/98
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS398374	14	14.5	10/20/98
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS398375	14	14.5	10/20/98
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS398376	14	14.5	10/20/98
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS398377	14	14.5	10/20/98
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS398378	14	14.5	10/20/98
hracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS398379	14	14.5	10/20/98
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS398380	14	14.5	10/20/98
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS398381	14	14.5	10/20/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS398385	3	7	11/5/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS398386	3	7	11/5/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS398387	2	5	11/5/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-388	AS398388	3	7	11/5/98
hracene	10	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS398389	NA	NA	11/5/98
hracene	9.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS398391	NA	NA	11/5/98
hracene	9.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS398392	NA	NA	11/5/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-388	AS398403	3	7	11/5/98
hracene	16.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS398415	NA	NA	12/15/98
hracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS398416	NA	NA	12/15/98
hracene	3.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS398417	NA	NA	12/15/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS398418	NA	NA	12/15/98
hracene	0.32	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS398419	6	7	12/15/98
hracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS398420	6	7	12/15/98
hracene	1.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS398421	6	7	12/15/98
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS398423	NA	NA	12/21/98
hracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS398424	NA	NA	12/21/98
hracene	28.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS398425	NA	NA	12/21/98
hracene	17.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-568	AS398568	16	10	4/13/99
hracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS398570	16	18	4/13/99
hracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS398572	5	10	4/21/99
hracene	2.74	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS398575	1	5	4/21/99
hracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS398576	5	10	4/21/99
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS398578	5	10	4/21/99
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS398580	5	10	4/21/99
hracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS398581	1	5	4/21/99

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
thracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS395582	5	10	4/21/98
thracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS395583	1	5	4/21/98
thracene	1.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS395607	4	4	5/5/98
thracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS395608	4	4	5/5/98
thracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS395609	NA	NA	5/5/98
thracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS395610	NA	NA	5/5/98
thracene	17	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS395611	2.5	2.5	5/8/98
thracene	1.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS395612	2.5	2.5	5/8/98
thracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS395613	2.5	2.5	5/8/98
thracene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS395614	2.5	2.5	5/8/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS395141	NA	NA	7/8/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS395142	NA	NA	7/8/98
nzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS395257	5	5	8/1/98
nzo(a)anthracene	6.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS395258	5	5	8/1/98
nzo(a)anthracene	10.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS395259	7	7	9/2/98
nzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS395260	7	7	9/2/98
nzo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS395261	7	7	9/2/98
nzo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS395264	7	7	9/2/98
nzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS395266	7	7	9/2/98
nzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS395267	NA	NA	9/2/98
nzo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS395269	NA	NA	9/2/98
nzo(a)anthracene	17.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS395271	NA	NA	9/2/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS395272	NA	NA	9/2/98
nzo(a)anthracene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS395275	3	3	9/2/98
nzo(a)anthracene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS395281	NA	NA	9/2/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS395282	NA	NA	9/2/98
nzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS395287	7.17	7.33	9/2/98
nzo(a)anthracene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS395289	1.5	1.5	9/3/98
nzo(a)anthracene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS395290	1.5	1.5	9/3/98
nzo(a)anthracene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS395291	1	1	9/14/98
nzo(a)anthracene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS395292	1	1	9/14/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS395293	1	1	9/11/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS395294	1	1	9/11/98
nzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS395295	1	1	9/11/98
nzo(a)anthracene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS395296	1	1	9/11/98
nzo(a)anthracene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS395297	1	1	9/11/98
nzo(a)anthracene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS395298	1	1	9/11/98
nzo(a)anthracene	46.1		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS395299	1	1	9/11/98
nzo(a)anthracene	24.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395300	1	1	9/11/98
nzo(a)anthracene	15.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS395301	1	1	9/11/98
nzo(a)anthracene	9.08	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS395302	1	1	9/14/98
nzo(a)anthracene	7.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395303	1	1	9/14/98
nzo(a)anthracene	27.6		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395304	1	1	9/14/98
nzo(a)anthracene	8.81	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395305	1	1	9/11/98
nzo(a)anthracene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS395337	NA	NA	10/5/98
nzo(a)anthracene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-336	AS395338	NA	NA	10/5/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
zo(a)anthracene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS395339	6	6	10/5/98
zo(a)anthracene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS395340	7	7	10/5/98
zo(a)anthracene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS395341	7	7	10/5/98
zo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS395342	11	11	10/5/98
zo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS395343	9	9	10/5/98
zo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS395344	9	9	10/5/98
zo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS395345	9	9	10/5/98
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS395373	14	14.5	10/20/98
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS395374	14	14.5	10/20/98
zo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS395375	14	14.5	10/20/98
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS395376	14	14.5	10/20/98
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS395377	14	14.5	10/20/98
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS395378	14	14.5	10/20/98
zo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS395379	14	14.5	10/20/98
zo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS395380	14	14.5	10/20/98
zo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS395381	14	14.5	10/20/98
zo(a)anthracene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395385	3	7	11/5/98
zo(a)anthracene	10.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS395386	3	7	11/5/98
zo(a)anthracene	3.0	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS395387	2	5	11/5/98
zo(a)anthracene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395388	3	7	11/5/98
zo(a)anthracene	18	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS395389	NA	NA	11/5/98
zo(a)anthracene	18	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS395391	NA	NA	11/5/98
zo(a)anthracene	19	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS395392	NA	NA	11/5/98
zo(a)anthracene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS395403	3	7	11/5/98
zo(a)anthracene	20.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS395415	NA	NA	12/15/98
zo(a)anthracene	9.94	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS395416	NA	NA	12/15/98
zo(a)anthracene	60.1		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS395417	NA	NA	12/15/98
zo(a)anthracene	18.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS395418	NA	NA	12/15/98
zo(a)anthracene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395419	6	7	12/15/98
zo(a)anthracene	5.17	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS395420	6	7	12/15/98
zo(a)anthracene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395421	6	7	12/15/98
zo(a)anthracene	8.71	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS395423	NA	NA	12/21/98
zo(a)anthracene	2.51	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS395424	NA	NA	12/21/98
zo(a)anthracene	64		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS395425	NA	NA	12/21/98
zo(a)anthracene	17	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-568	AS395568	10	16	4/13/99
zo(a)anthracene	8.09	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS395570	10	16	4/13/99
zo(a)anthracene	28.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS395572	5	10	4/21/99
zo(a)anthracene	71.6		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS395575	1	5	4/21/99
zo(a)anthracene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS395576	5	10	4/21/99
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS395578	5	10	4/21/99
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS395580	5	10	4/21/99
zo(a)anthracene	20.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS395581	1	5	4/21/99
zo(a)anthracene	21.2		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS395582	5	10	4/21/99
zo(a)anthracene	51.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS395583	1	5	4/21/99
zo(a)anthracene	18		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS395607	4	4	5/5/99
zo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS395608	4	4	5/5/99

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
enzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS39S609	NA	NA	5/5/98
enzo(a)anthracene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS39S610	NA	NA	5/5/98
enzo(a)anthracene	53		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS39S611	2.5	2.5	6/6/99
enzo(a)anthracene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS39S612	2.5	2.5	5/6/99
enzo(a)anthracene	5.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS39S613	2.5	2.5	5/6/99
enzo(a)anthracene	60		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS39S614	2.5	2.5	5/6/99
enzo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS39S141	NA	NA	7/6/98
enzo(a)pyrene	1.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS39S142	NA	NA	7/6/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS39S257	5	5	9/1/98
enzo(a)pyrene	5.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS39S258	5	5	9/1/98
enzo(a)pyrene	18		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS39S259	7	7	9/2/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS39S260	7	7	9/2/98
enzo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS39S261	7	7	9/2/98
enzo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS39S264	7	7	9/2/98
enzo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS39S266	7	7	9/2/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS39S267	NA	NA	9/2/98
enzo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS39S269	NA	NA	9/2/98
enzo(a)pyrene	34.1	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS39S271	NA	NA	9/2/98
enzo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS39S272	NA	NA	9/2/98
enzo(a)pyrene	42.6		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS39S275	3	3	9/2/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS39S281	NA	NA	9/2/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS39S282	NA	NA	9/2/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS39S287	7.17	7.33	9/2/98
enzo(a)pyrene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS39S289	1.5	1.5	9/3/98
enzo(a)pyrene	7.83	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS39S290	1.5	1.5	9/3/98
enzo(a)pyrene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS39S291	1	1	9/14/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS39S292	1	1	9/14/98
enzo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS39S293	1	1	9/11/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS39S294	1	1	9/11/98
enzo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S295	1	1	9/11/98
enzo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS39S296	1	1	9/11/98
enzo(a)pyrene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS39S297	1	1	9/11/98
enzo(a)pyrene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS39S298	1	1	9/11/98
enzo(a)pyrene	58.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS39S299	1	1	9/11/98
enzo(a)pyrene	43.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S300	1	1	9/11/98
enzo(a)pyrene	21.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS39S301	1	1	9/11/98
enzo(a)pyrene	24.3		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS39S302	1	1	9/14/98
enzo(a)pyrene	28.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S303	1	1	9/14/98
enzo(a)pyrene	37.2		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S304	1	1	9/14/98
enzo(a)pyrene	23	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S305	1	1	9/11/98
enzo(a)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS39S337	NA	NA	10/5/98
enzo(a)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS39S338	NA	NA	10/5/98
enzo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS39S339	6	6	10/5/98
enzo(a)pyrene	3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS39S340	7	7	10/5/98
enzo(a)pyrene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS39S341	7	7	10/5/98
enzo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS39S342	11	11	10/5/98

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
zo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS395343	9	9	10/5/98
zo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS395344	9	9	10/5/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS395345	9	9	10/5/98
zo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS395373	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS395374	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS395375	14	14.5	10/20/98
zo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS395376	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS395377	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS395378	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS395379	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS395380	14	14.5	10/20/98
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS395381	14	14.5	10/20/98
zo(a)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395385	3	7	11/5/98
zo(a)pyrene	31.5		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS395386	3	7	11/5/98
zo(a)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS395387	2	5	11/5/98
zo(a)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395388	3	7	11/5/98
zo(a)pyrene	17	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS395389	NA	NA	11/5/98
zo(a)pyrene	18	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS395391	NA	NA	11/5/98
zo(a)pyrene	17	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS395392	NA	NA	11/5/98
zo(a)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-388	AS395403	3	7	11/5/98
zo(a)pyrene	8.22	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS395415	NA	NA	12/10/98
zo(a)pyrene	9.19	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS395416	NA	NA	12/15/98
zo(a)pyrene	30		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS395417	NA	NA	12/15/98
zo(a)pyrene	17	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS395418	NA	NA	12/15/98
zo(a)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395419	6	7	12/15/98
zo(a)pyrene	3.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA 420	AS395420	6	7	12/15/98
zo(a)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395421	6	7	12/15/98
zo(a)pyrene	13.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS395423	NA	NA	12/21/98
zo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS395424	NA	NA	12/21/98
zo(a)pyrene	60.1		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS395425	NA	NA	12/21/98
zo(a)pyrene	15.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-568	AS395568	16	16	4/13/99
zo(a)pyrene	13.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS395570	16	10	4/13/99
zo(a)pyrene	55.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS395572	5	10	4/21/99
zo(a)pyrene	77.5		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS395575	1	5	4/21/99
zo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS395576	5	10	4/21/99
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS395578	5	10	4/21/99
zo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS395580	5	10	4/21/99
zo(a)pyrene	25.1		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS395581	1	5	4/21/99
zo(a)pyrene	25.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS395582	5	10	4/21/99
zo(a)pyrene	87.5		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS395583	1	5	4/21/99
zo(a)pyrene	27		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS395607	4	4	5/5/99
zo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS395608	4	4	5/5/99
zo(a)pyrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS395609	NA	NA	5/5/99
zo(a)pyrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS395610	NA	NA	5/5/99
zo(a)pyrene	47		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS395611	2.5	2.5	5/6/99
zo(a)pyrene	2.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS395612	2.5	2.5	5/6/99

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
nzo(a)pyrene	8.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS39S613	2.5	2.5	6/6/98
nzo(a)pyrene	79		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS39S614	2.5	2.5	6/6/98
nzo(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS39S141	NA	NA	7/6/98
nzo(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS39S142	NA	NA	7/6/98
nzo(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS39S257	5	5	9/1/98
nzo(b)fluoranthene	8.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS39S258	5	5	9/1/98
nzo(b)fluoranthene	12.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS39S259	7	7	9/2/98
nzo(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS39S260	7	7	9/2/98
nzo(b)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS39S261	7	7	9/2/98
nzo(b)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS39S264	7	7	9/2/98
nzo(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS39S266	7	7	9/2/98
nzo(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS39S267	NA	NA	9/2/98
nzo(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS39S269	NA	NA	9/2/98
nzo(b)fluoranthene	20	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS39S271	NA	NA	9/2/98
nzo(b)fluoranthene	6.84	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS39S272	NA	NA	9/2/98
nzo(b)fluoranthene	40.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS39S275	3	3	9/2/98
nzo(b)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS39S281	NA	NA	9/2/98
nzo(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS39S282	NA	NA	9/2/98
nzo(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS39S287	7.17	7.33	9/2/98
nzo(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS39S289	1.5	1.5	9/3/98
nzo(b)fluoranthene	9.93	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS39S290	1.5	1.5	9/3/98
nzo(b)fluoranthene	8.94	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS39S291	1	1	9/14/98
nzo(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS39S292	1	1	9/14/98
nzo(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS39S293	1	1	9/11/98
nzo(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS39S294	1	1	9/11/98
nzo(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S295	1	1	9/11/98
nzo(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S296	1	1	9/11/98
nzo(b)fluoranthene	4.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS39S297	1	1	9/11/98
nzo(b)fluoranthene	4.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS39S298	1	1	9/11/98
nzo(b)fluoranthene	53.6		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS39S299	1	1	9/11/98
nzo(b)fluoranthene	29.6		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S300	1	1	9/11/98
nzo(b)fluoranthene	13.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS39S301	1	1	9/11/98
nzo(b)fluoranthene	10.2		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS39S302	1	1	9/14/98
nzo(b)fluoranthene	27.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S303	5	1	9/14/98
nzo(b)fluoranthene	25.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S304	1	1	9/14/98
nzo(b)fluoranthene	18.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S305	1	1	9/11/98
nzo(b)fluoranthene	5.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS39S337	NA	NA	10/5/98
nzo(b)fluoranthene	5.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS39S338	NA	NA	10/5/98
nzo(b)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS39S339	6	6	10/5/98
nzo(b)fluoranthene	4.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS39S340	7	7	10/5/98
nzo(b)fluoranthene	4.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS39S341	7	7	10/5/98
nzo(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS39S342	11	11	10/5/98
nzo(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS39S343	9	9	10/5/98
nzo(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS39S344	8	8	10/5/98
nzo(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS39S345	9	9	10/5/98
nzo(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS39S373	14	14.5	10/20/98

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
o(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS395374	14	14.5	10/20/98
o(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS395375	14	14.5	10/20/98
o(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS395376	14	14.5	10/20/98
o(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS395377	14	14.5	10/20/98
o(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS395378	14	14.5	10/20/98
o(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS395379	14	14.5	10/20/98
o(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS395380	14	14.5	10/20/98
o(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS395381	14	14.5	10/20/98
o(b)fluoranthene	4.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395385	3	7	11/5/98
o(b)fluoranthene	126		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS395386	3	7	11/5/98
o(b)fluoranthene	7.85	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS395387	2	6	11/5/98
o(b)fluoranthene	4.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-388	AS395388	3	7	11/5/98
o(b)fluoranthene	25	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS395389	NA	NA	11/5/98
o(b)fluoranthene	24	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS395391	NA	NA	11/5/98
o(b)fluoranthene	73.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS395392	NA	NA	11/5/98
o(b)fluoranthene	4.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-403	AS395403	3	7	11/5/98
o(b)fluoranthene	34.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS395415	NA	NA	12/15/98
o(b)fluoranthene	22.2		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS395416	NA	NA	12/15/98
o(b)fluoranthene	71.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS395417	NA	NA	12/15/98
o(b)fluoranthene	40.3		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS395418	NA	NA	12/15/98
o(b)fluoranthene	13.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395419	6	7	12/15/98
o(b)fluoranthene	10.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS395420	6	7	12/15/98
o(b)fluoranthene	11.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-421	AS395421	6	7	12/15/98
o(b)fluoranthene	32.9		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS395423	NA	NA	12/21/98
o(b)fluoranthene	76		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS395424	NA	NA	12/21/98
o(b)fluoranthene	87.3		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS395425	NA	NA	12/21/98
o(b)fluoranthene	22	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-568	AS395568	15	16	4/13/99
o(b)fluoranthene	39.5		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS395570	15	16	4/13/99
o(b)fluoranthene	58.9		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS395572	5	10	4/21/99
o(b)fluoranthene	88		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS395575	1	5	4/21/99
o(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS395576	5	10	4/21/99
o(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS395578	5	10	4/21/99
o(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS395580	5	10	4/21/99
o(b)fluoranthene	26		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS395581	1	5	4/21/99
o(b)fluoranthene	30.9		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS395582	5	10	4/21/99
o(b)fluoranthene	98.9		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS395583	1	5	4/21/99
o(b)fluoranthene	26		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS395607	4	4	5/5/99
o(b)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS395608	4	4	5/5/99
o(b)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS395609	NA	NA	5/5/99
o(b)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS395610	NA	NA	5/5/99
o(b)fluoranthene	48		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS395611	2.5	2.5	5/6/99
o(b)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS395612	2.5	2.5	5/6/99
o(b)fluoranthene	7.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS395613	2.5	2.5	5/6/99
o(b)fluoranthene	69		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS395614	2.5	2.5	5/6/99
o(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS395141	NA	NA	7/8/98
o(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS395142	NA	NA	7/8/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
nzo(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS395257	5	5	9/1/98
nzo(k)fluoranthene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS395258	5	5	9/1/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS395259	7	7	9/2/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS395260	7	7	9/2/98
nzo(k)fluoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS395261	7	7	9/2/98
nzo(k)fluoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS395264	7	7	9/2/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS395266	7	7	9/2/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS395267	NA	NA	9/2/98
nzo(k)fluoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS395269	NA	NA	9/2/98
nzo(k)fluoranthene	19	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS395271	NA	NA	9/2/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS395272	NA	NA	9/2/98
nzo(k)fluoranthene	28.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS395275	3	3	9/2/98
nzo(k)fluoranthene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS395281	NA	NA	9/2/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS395282	NA	NA	9/2/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS395287	7.17	7.33	9/2/98
nzo(k)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS395289	1.5	1.5	9/3/98
nzo(k)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS395290	1.5	1.5	9/3/98
nzo(k)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS395291	1	1	9/14/98
nzo(k)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS395292	1	1	9/14/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS395293	1	1	9/11/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS395294	1	1	9/11/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS395295	1	1	9/11/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS395296	1	1	9/11/98
nzo(k)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS395297	1	1	9/11/98
nzo(k)fluoranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS395298	1	1	9/11/98
nzo(k)fluoranthene	37		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS395299	1	1	9/11/98
nzo(k)fluoranthene	24.9		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395300	1	1	9/11/98
nzo(k)fluoranthene	13.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS395301	1	1	9/11/98
nzo(k)fluoranthene	14.9		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS395302	1	1	9/14/98
nzo(k)fluoranthene	9.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395303	1	1	9/14/98
nzo(k)fluoranthene	21.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395304	1	1	9/14/98
nzo(k)fluoranthene	9.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395305	1	1	9/11/98
nzo(k)fluoranthene	4.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS395337	NA	NA	10/5/98
nzo(k)fluoranthene	4.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS395338	NA	NA	10/5/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS395339	6	6	10/5/98
nzo(k)fluoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS395340	7	7	10/5/98
nzo(k)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS395341	7	7	10/5/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS395342	11	11	10/5/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS395343	9	9	10/5/98
nzo(k)fluoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS395344	9	9	10/5/98
nzo(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS395345	9	9	10/5/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS395373	14	14.5	10/20/98
nzo(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS395374	14	14.5	10/20/98
nzo(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS395375	14	14.5	10/20/98
nzo(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS395376	14	14.5	10/20/98
nzo(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS395377	14	14.5	10/20/98

METER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
o(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS39S378	14	14.5	10/20/98
o(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS39S379	14	14.5	10/20/98
o(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS39S380	14	14.5	10/20/98
o(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS39S381	14	14.5	10/20/98
o(k)fluoranthene	4.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S385	3	7	11/5/98
o(k)fluoranthene	24.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S386	3	7	11/5/98
o(k)fluoranthene	4.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS39S387	2	6	11/5/98
o(k)fluoranthene	4.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-388	AS39S388	3	7	11/5/98
o(k)fluoranthene	23	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS39S389	NA	NA	11/5/98
o(k)fluoranthene	22	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS39S391	NA	NA	11/5/98
o(k)fluoranthene	23	UJ	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS39S392	NA	NA	11/5/98
o(k)fluoranthene	4.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-396	AS39S403	3	7	11/5/98
o(k)fluoranthene	7.56	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS39S415	NA	NA	12/15/98
o(k)fluoranthene	3.81	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS39S416	NA	NA	12/15/98
o(k)fluoranthene	31		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS39S417	NA	NA	12/15/98
o(k)fluoranthene	9.86	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS39S418	NA	NA	12/15/98
o(k)fluoranthene	4.43	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS39S419	6	7	12/15/98
o(k)fluoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS39S420	6	7	12/15/98
o(k)fluoranthene	4.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS39S421	6	7	12/15/98
o(k)fluoranthene	9.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS39S423	NA	NA	12/21/98
o(k)fluoranthene	4.86	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS39S424	NA	NA	12/21/98
o(k)fluoranthene	31.4		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS39S425	NA	NA	12/21/98
o(k)fluoranthene	21	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-568	AS39S568	16	16	4/13/99
o(k)fluoranthene	1.94	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS39S570	16	16	4/13/99
o(k)fluoranthene	10.1	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS39S572	5	10	4/21/99
o(k)fluoranthene	41.1		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS39S575	1	5	4/21/99
o(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS39S576	5	10	4/21/99
o(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-579	AS39S579	5	10	4/21/99
o(k)fluoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS39S580	5	10	4/21/99
o(k)fluoranthene	13.3		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS39S581	1	5	4/21/99
o(k)fluoranthene	13.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS39S582	5	10	4/21/99
o(k)fluoranthene	38.5		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS39S583	1	5	4/21/99
o(k)fluoranthene	16		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS39S607	4	4	5/5/99
o(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS39S608	4	4	5/5/99
o(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS39S609	NA	NA	5/5/99
o(k)fluoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS39S610	NA	NA	5/5/99
o(k)fluoranthene	28		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS39S611	2.5	2.5	5/8/99
o(k)fluoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS39S612	2.5	2.5	5/8/99
o(k)fluoranthene	6.1	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS39S613	2.5	2.5	5/8/99
o(k)fluoranthene	41		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS39S614	2.5	2.5	5/8/99
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS39S141	NA	NA	7/8/98
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS39S142	NA	NA	7/8/98
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS39S257	5	5	9/1/98
ysene	4.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS39S258	5	5	9/1/98
ysene	5.9	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS39S259	7	7	9/2/98
ysene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS39S260	7	7	9/2/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS395261	7	7	9/2/98
hrysene	2.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS395264	7	7	9/2/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS395266	7	7	9/2/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS395267	NA	NA	9/2/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS395269	NA	NA	9/2/98
hrysene	11	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS395271	NA	NA	9/2/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS395272	NA	NA	9/2/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS395275	3	3	9/2/98
hrysene	2.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS395281	NA	NA	9/2/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS395282	NA	NA	9/2/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS395287	7.17	7.33	9/2/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL288	AS395288	1.5	1.5	9/3/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS395290	1.5	1.5	9/3/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS395291	1	1	9/14/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS395292	1	1	9/14/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS395293	1	1	9/11/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS395294	1	1	9/11/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS395295	1	1	9/11/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS395296	1	1	9/11/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS395297	1	1	9/11/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS395298	1	1	9/11/98
hrysene	27.1	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS395299	1	1	9/11/98
hrysene	14.9	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395300	1	1	9/11/98
hrysene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS395301	1	1	9/11/98
hrysene	8.32	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS395302	1	1	9/14/98
hrysene	17.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395303	1	1	9/14/98
hrysene	13.2	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395304	1	1	9/14/98
hrysene	5.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395305	1	1	9/11/98
hrysene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS395337	NA	NA	10/5/98
hrysene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS395338	NA	NA	10/5/98
hrysene	2.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS395339	6	6	10/5/98
hrysene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS395340	7	7	10/5/98
hrysene	2.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS395341	7	7	10/5/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS395342	11	11	10/5/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS395343	9	9	10/5/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS395344	9	9	10/5/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS395345	9	9	10/5/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS395373	14	14.5	10/20/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS395374	14	14.5	10/20/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS395375	14	14.5	10/20/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS395376	14	14.5	10/20/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS395377	14	14.5	10/20/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS395378	14	14.5	10/20/98
hrysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS395379	14	14.5	10/20/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS395380	14	14.5	10/20/98
hrysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS395381	14	14.5	10/20/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
sene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395385	3	7	11/5/98
sene	42.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS396386	3	7	11/5/98
sene	7.29	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS395307	2	5	11/5/98
sene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-395	AS395396	3	7	11/5/98
sene	32	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS395389	NA	NA	11/5/98
sene	13	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS395391	NA	NA	11/5/98
sene	50.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS395392	NA	NA	11/5/98
sene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-398	AS395403	3	7	11/5/98
sene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS395415	NA	NA	12/15/98
sene	14.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS395416	NA	NA	12/15/98
sene	38.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS395417	NA	NA	12/15/98
sene	15	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS395418	NA	NA	12/15/98
sene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS395418	6	7	12/15/98
sene	3.9	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS395420	6	7	12/15/98
sene	7.98	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395421	6	7	12/15/98
sene	11.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS395423	NA	NA	12/21/98
sene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS395424	NA	NA	12/21/98
sene	32.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS395425	NA	NA	12/21/98
ysene	198	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-569	AS395569	10	10	4/13/99
ysene	7.54	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS395570	18	18	4/13/99
ysene	18.2	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS395572	5	10	4/21/99
ysene	49.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS395575	1	5	4/21/99
ysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS395578	5	10	4/21/99
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-579	AS395579	5	10	4/21/99
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS395580	5	10	4/21/99
ysene	13.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS395581	1	5	4/21/99
ysene	14.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS395582	5	10	4/21/99
ysene	38.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS395583	1	5	4/21/99
ysene	10	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS395607	4	4	5/5/99
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS395608	4	4	5/5/99
ysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS395609	NA	NA	5/5/99
ysene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS395610	NA	NA	5/5/99
ysene	27	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS395611	2.5	2.5	5/6/99
ysene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS395612	2.5	2.5	5/6/99
ysene	3.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS395613	2.5	2.5	5/6/99
ysene	34	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS395614	2.5	2.5	5/6/99
enzo(a,h)anthracene	6.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS395141	NA	NA	7/8/98
enzo(a,h)anthracene	6.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS395142	NA	NA	7/8/98
enzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS395257	5	5	9/1/98
enzo(a,h)anthracene	18	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS395258	5	5	9/1/98
enzo(a,h)anthracene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS395259	7	7	9/2/98
enzo(a,h)anthracene	7.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS395260	7	7	9/2/98
enzo(a,h)anthracene	7.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS395261	7	7	9/2/98
enzo(a,h)anthracene	7.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS395264	7	7	9/2/98
enzo(a,h)anthracene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS395266	7	7	9/2/98
enzo(a,h)anthracene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS395267	NA	NA	9/2/98

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
benzo(a,h)anthracene	7.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS395269	NA	NA	9/2/98
benzo(a,h)anthracene	40	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS395271	NA	NA	9/2/98
benzo(a,h)anthracene	8.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS395272	NA	NA	9/2/98
benzo(a,h)anthracene	8.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS395275	3	3	9/2/98
benzo(a,h)anthracene	7.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS395281	NA	NA	9/2/98
benzo(a,h)anthracene	8.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS395282	NA	NA	9/2/98
benzo(a,h)anthracene	9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS395287	7.17	7.33	9/2/98
benzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS395289	1.5	1.6	9/3/98
benzo(a,h)anthracene	8.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS395290	1.5	1.5	9/3/98
benzo(a,h)anthracene	8.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS395291	1	1	9/14/98
benzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS395292	1	1	9/14/98
benzo(a,h)anthracene	8.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS395293	1	1	9/11/98
benzo(a,h)anthracene	8.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS395294	1	1	9/11/98
benzo(a,h)anthracene	8.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS395295	1	1	9/11/98
benzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS395296	1	1	9/11/98
benzo(a,h)anthracene	8.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS395297	1	1	9/11/98
benzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS395298	1	1	9/11/98
benzo(a,h)anthracene	8.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS395299	1	1	9/11/98
benzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395300	1	1	9/11/98
benzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS395301	1	1	9/11/98
benzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS395302	1	1	9/14/98
benzo(a,h)anthracene	19	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395303	1	1	9/14/98
benzo(a,h)anthracene	8.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS395304	1	1	9/14/98
benzo(a,h)anthracene	19	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS395305	1	1	9/11/98
benzo(a,h)anthracene	8.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS395337	NA	NA	10/5/98
benzo(a,h)anthracene	8.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS395338	NA	NA	10/5/98
benzo(a,h)anthracene	7.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS395339	8	8	10/5/98
benzo(a,h)anthracene	8.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS395340	7	7	10/5/98
benzo(a,h)anthracene	8.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS395341	7	7	10/5/98
benzo(a,h)anthracene	7.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS395342	11	11	10/5/98
benzo(a,h)anthracene	7.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS395343	8	9	10/5/98
benzo(a,h)anthracene	7.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS395344	9	9	10/5/98
benzo(a,h)anthracene	9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS395345	8	8	10/5/98
benzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS395373	14	14.5	10/20/98
benzo(a,h)anthracene	8.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS395374	14	14.5	10/20/98
benzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS395375	14	14.5	10/20/98
benzo(a,h)anthracene	8.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS395376	14	14.5	10/20/98
benzo(a,h)anthracene	8.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS395377	14	14.5	10/20/98
benzo(a,h)anthracene	8.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS395378	14	14.5	10/20/98
benzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS395379	14	14.5	10/20/98
benzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS395380	14	14.5	10/20/98
benzo(a,h)anthracene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS395381	14	14.5	10/20/98
benzo(a,h)anthracene	9.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395385	3	7	11/5/98
benzo(a,h)anthracene	30.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS395386	3	7	11/5/98
benzo(a,h)anthracene	9.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS395387	2	5	11/5/98
benzo(a,h)anthracene	9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS395388	3	7	11/5/98

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
enzo(a,h)anthracene	48	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS398389	NA	NA	11/5/98
enzo(a,h)anthracene	46	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS398391	NA	NA	11/5/98
enzo(a,h)anthracene	48	UJ	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS398392	NA	NA	11/5/98
enzo(a,h)anthracene	9.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS398403	3	7	11/5/98
enzo(a,h)anthracene	9.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS398415	NA	NA	12/15/98
enzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS398416	NA	NA	12/15/98
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS398417	NA	NA	12/15/98
enzo(a,h)anthracene	8.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS398418	NA	NA	12/15/98
enzo(a,h)anthracene	9.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS398419	6	7	12/15/98
enzo(a,h)anthracene	8.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS398420	6	7	12/15/98
enzo(a,h)anthracene	9.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS398421	6	7	12/15/98
enzo(a,h)anthracene	8.04	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS398423	NA	NA	12/21/98
enzo(a,h)anthracene	7.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS398424	NA	NA	12/21/98
enzo(a,h)anthracene	8.23	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS398425	NA	NA	12/21/98
enzo(a,h)anthracene	43	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-569	AS398569	16	16	4/13/99
enzo(a,h)anthracene	8.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS398570	16	16	4/13/99
enzo(a,h)anthracene	3.84	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS398572	5	10	4/21/99
enzo(a,h)anthracene	9.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS398575	1	5	4/21/99
enzo(a,h)anthracene	7.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS398576	5	10	4/21/99
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS398578	5	10	4/21/99
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS398580	5	10	4/21/99
enzo(a,h)anthracene	8.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS398581	1	5	4/21/99
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS398582	5	10	4/21/99
enzo(a,h)anthracene	8.38	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS398583	1	5	4/21/99
enzo(a,h)anthracene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS398607	4	4	5/5/99
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS398608	4	4	5/5/99
enzo(a,h)anthracene	7.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS398609	NA	NA	5/5/99
enzo(a,h)anthracene	7.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS398610	NA	NA	5/5/99
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS398611	2.5	2.5	5/6/99
enzo(a,h)anthracene	8.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS398612	2.5	2.5	5/6/99
enzo(a,h)anthracene	8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS398613	2.5	2.5	5/6/99
enzo(a,h)anthracene	8.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS398614	2.5	2.5	5/6/99
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS398141	NA	NA	7/8/98
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS398142	NA	NA	7/8/98
oranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS398257	5	5	9/1/98
oranthene	7.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS398258	5	5	9/1/98
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS398259	7	7	9/2/98
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS398260	7	7	9/2/98
oranthene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS398261	7	7	9/2/98
oranthene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS398264	7	7	9/2/98
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS398266	7	7	9/2/98
oranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS398267	NA	NA	9/2/98
oranthene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS398269	NA	NA	9/2/98
oranthene	16	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS398271	NA	NA	9/2/98
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS398272	NA	NA	9/2/98
oranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS398275	3	3	9/2/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
luoranthene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS39S281	NA	NA	9/2/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS39S282	NA	NA	9/2/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS39S287	7.17	7.33	9/2/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS39S289	1.5	1.5	9/3/98
luoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS39S290	1.5	1.5	9/3/98
luoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS39S291	1	1	9/14/98
luoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS39S292	1	1	9/14/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS39S293	1	1	9/11/98
luoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS39S294	1	1	9/11/98
luoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S295	1	1	9/11/98
luoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS39S296	1	1	9/11/98
luoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS39S297	1	1	9/11/98
luoranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS39S298	1	1	9/11/98
luoranthene	32.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS39S299	1	1	9/11/98
luoranthene	28.1	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S300	1	1	9/11/98
luoranthene	19.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS39S301	1	1	9/11/98
luoranthene	29	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS39S302	1	1	9/14/98
luoranthene	8.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S303	1	1	9/14/98
luoranthene	40.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S304	1	1	9/14/98
luoranthene	8.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S305	1	1	9/11/98
luoranthene	4.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS39S337	NA	NA	10/5/98
luoranthene	4.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS39S338	NA	NA	10/5/98
luoranthene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS39S339	6	6	10/5/98
luoranthene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS39S340	7	7	10/5/98
luoranthene	4.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS39S341	7	7	10/5/98
luoranthene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS39S342	11	11	10/5/98
luoranthene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS39S343	9	9	10/5/98
luoranthene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS39S344	9	9	10/5/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS39S345	9	9	10/5/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS39S373	14	14.5	10/20/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS39S374	14	14.5	10/20/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS39S375	14	14.5	10/20/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS39S376	14	14.5	10/20/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS39S377	14	14.5	10/20/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS39S378	14	14.5	10/20/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS39S379	14	14.5	10/20/98
luoranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS39S380	14	14.5	10/20/98
luoranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS39S381	14	14.5	10/20/98
luoranthene	4.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S385	3	7	11/5/98
luoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S386	3	7	11/5/98
luoranthene	4.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS39S387	2	6	11/5/98
luoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S388	3	7	11/5/98
luoranthene	22	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS39S389	NA	NA	11/5/98
luoranthene	21	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS39S391	NA	NA	11/5/98
luoranthene	22	UJ	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS39S392	NA	NA	11/5/98
luoranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S403	3	7	11/5/98

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
oranthene	38	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS395415	NA	NA	12/15/98
oranthene	19.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS395416	NA	NA	12/15/98
oranthene	269		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS395417	NA	NA	12/15/98
oranthene	11	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS395418	NA	NA	12/15/98
oranthene	14.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395419	6	7	12/15/98
oranthene	15.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS395420	6	7	12/15/98
oranthene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS395421	6	7	12/15/98
oranthene	5.52	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS395423	NA	NA	12/21/98
oranthene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS395424	NA	NA	12/21/98
oranthene	254		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS395425	NA	NA	12/21/98
oranthene	20	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-566	AS395566	18	18	4/13/99
oranthene	4.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS395570	18	18	4/13/99
oranthene	24.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS395572	5	10	4/21/99
oranthene	127	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS395575	1	5	4/21/99
oranthene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS395576	5	10	4/21/99
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS395578	5	10	4/21/99
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS395580	5	10	4/21/99
oranthene	19.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS395581	1	5	4/21/99
oranthene	41.1	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS395582	5	10	4/21/99
oranthene	71.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS395583	1	5	4/21/99
oranthene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS395607	4	4	5/5/99
oranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS395608	4	4	5/5/99
oranthene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS395609	NA	NA	5/5/99
oranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS395610	NA	NA	5/5/99
oranthene	210		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS395611	2.5	2.5	5/6/99
oranthene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS395612	2.5	2.5	5/6/99
oranthene	12	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS395613	2.5	2.5	5/6/99
oranthene	140	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS395614	2.5	2.5	5/6/99
leno(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS395141	NA	NA	7/8/98
leno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS395142	NA	NA	7/8/98
leno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS395257	5	5	9/1/98
leno(1,2,3-cd)pyrene	7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS395258	5	5	9/1/98
leno(1,2,3-cd)pyrene	12	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS395259	7	7	9/2/98
leno(1,2,3-cd)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS395260	7	7	9/2/98
leno(1,2,3-cd)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS395261	7	7	9/2/98
leno(1,2,3-cd)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS395264	7	7	9/2/98
leno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS395266	7	7	9/2/98
leno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS395267	NA	NA	9/2/98
leno(1,2,3-cd)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS395269	NA	NA	9/2/98
leno(1,2,3-cd)pyrene	17	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS395271	NA	NA	9/2/98
leno(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS395272	NA	NA	9/2/98
leno(1,2,3-cd)pyrene	44.3		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS395275	3	3	9/2/98
leno(1,2,3-cd)pyrene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS395281	NA	NA	9/2/98
leno(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS395282	NA	NA	9/2/98
leno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS395287	7.17	7.33	9/2/98
leno(1,2,3-cd)pyrene	3.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL288	AS395288	1.5	1.5	9/3/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
deno(1,2,3-cd)pyrene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS39S290	1.5	1.5	9/3/98
deno(1,2,3-cd)pyrene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS39S291	1	1	9/14/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-292	AS39S292	1	1	9/14/98
deno(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-293	AS39S293	1	1	9/11/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS39S294	1	1	9/11/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S295	1	1	9/11/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS39S296	1	1	9/11/98
deno(1,2,3-cd)pyrene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS39S297	1	1	9/11/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS39S298	1	1	9/11/98
deno(1,2,3-cd)pyrene	67.8		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS39S299	1	1	9/11/98
deno(1,2,3-cd)pyrene	39.2	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S300	1	1	9/11/98
deno(1,2,3-cd)pyrene	17.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS39S301	1	1	9/11/98
deno(1,2,3-cd)pyrene	27.5	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-302	AS39S302	1	1	9/14/98
deno(1,2,3-cd)pyrene	28.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S303	1	1	9/14/98
deno(1,2,3-cd)pyrene	33.2	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E6-303	AS39S304	1	1	9/14/98
deno(1,2,3-cd)pyrene	22.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S305	1	1	9/11/98
deno(1,2,3-cd)pyrene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS39S337	NA	NA	10/5/98
deno(1,2,3-cd)pyrene	4.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS39S338	NA	NA	10/5/98
deno(1,2,3-cd)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS39S339	6	6	10/5/98
deno(1,2,3-cd)pyrene	3.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS39S340	7	7	10/5/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS39S341	7	7	10/5/98
deno(1,2,3-cd)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS39S342	11	11	10/5/98
deno(1,2,3-cd)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS39S343	9	9	10/5/98
deno(1,2,3-cd)pyrene	3.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS39S344	9	9	10/5/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS39S345	8	8	10/5/98
deno(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS39S373	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS39S374	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS39S375	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS39S376	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS39S377	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS39S378	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS39S379	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS39S380	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS39S381	14	14.5	10/20/98
deno(1,2,3-cd)pyrene	4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S385	3	7	11/5/98
deno(1,2,3-cd)pyrene	207		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S386	3	7	11/5/98
deno(1,2,3-cd)pyrene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS39S387	2	5	11/5/98
deno(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S388	3	7	11/5/98
deno(1,2,3-cd)pyrene	21	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS39S389	NA	NA	11/5/98
deno(1,2,3-cd)pyrene	20	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS39S391	NA	NA	11/5/98
deno(1,2,3-cd)pyrene	105	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS39S392	NA	NA	11/5/98
deno(1,2,3-cd)pyrene	3.9	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S403	3	7	11/5/98
deno(1,2,3-cd)pyrene	20.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS39S415	NA	NA	12/15/98
deno(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS39S416	NA	NA	12/15/98
deno(1,2,3-cd)pyrene	32.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS39S417	NA	NA	12/15/98
deno(1,2,3-cd)pyrene	27.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS39S418	NA	NA	12/15/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
no(1,2,3-cd)pyrene	33.3	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS398419	6	7	12/15/98
no(1,2,3-cd)pyrene	7.27	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS398420	6	7	12/15/98
no(1,2,3-cd)pyrene	16.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS398421	6	7	12/15/98
no(1,2,3-cd)pyrene	91.2		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS398423	NA	NA	12/21/98
no(1,2,3-cd)pyrene	42.3		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS398424	NA	NA	12/21/98
no(1,2,3-cd)pyrene	64.7		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS398425	NA	NA	12/21/98
no(1,2,3-cd)pyrene	18	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-568	AS399568	18	18	4/13/99
no(1,2,3-cd)pyrene	25	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS399570	18	18	4/13/99
no(1,2,3-cd)pyrene	41.2		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS399572	5	10	4/21/99
no(1,2,3-cd)pyrene	78.6		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS399575	1	5	4/21/99
no(1,2,3-cd)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS399576	5	10	4/21/99
no(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS399578	5	10	4/21/99
no(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS399580	5	10	4/21/99
no(1,2,3-cd)pyrene	26.2	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS399581	1	5	4/21/99
no(1,2,3-cd)pyrene	19.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS399582	5	10	4/21/99
no(1,2,3-cd)pyrene	60		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS399583	1	5	4/21/99
no(1,2,3-cd)pyrene	30	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS399607	4	4	5/5/99
no(1,2,3-cd)pyrene	3.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS399608	4	4	5/5/99
no(1,2,3-cd)pyrene	3.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS399609	NA	NA	5/5/99
no(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS399610	NA	NA	5/5/99
no(1,2,3-cd)pyrene	45		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS399611	2.5	2.5	5/6/99
no(1,2,3-cd)pyrene	3.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS399612	2.5	2.5	5/6/99
no(1,2,3-cd)pyrene	3.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS399613	2.5	2.5	5/6/99
no(1,2,3-cd)pyrene	70		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS399614	2.5	2.5	5/6/99
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-141	AS398141	NA	NA	7/6/98
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-142	AS398142	NA	NA	7/6/98
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL257	AS398257	5	5	9/1/98
ene	7.34	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL258	AS398258	5	5	9/1/98
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-259	AS398259	7	7	9/2/98
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-260	AS398260	7	7	9/2/98
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-261	AS398261	7	7	9/2/98
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-264	AS398264	7	7	9/2/98
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-266	AS398266	7	7	9/2/98
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-267	AS398267	NA	NA	9/2/98
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-269	AS398269	NA	NA	9/2/98
ene	11	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-271	AS398271	NA	NA	9/2/98
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-272	AS398272	NA	NA	9/2/98
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-275	AS398275	3	3	9/2/98
ene	2.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-281	AS398281	NA	NA	9/2/98
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-282	AS398282	NA	NA	9/2/98
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-123	AS398287	7.17	7.33	9/2/98
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL289	AS398289	1.5	1.5	9/3/98
ene	2.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OUTFALL290	AS398290	1.5	1.5	9/3/98
ene	2.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A6-291	AS398291	1	1	9/14/98
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	A8 292	AS398292	1	1	9/14/98
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2 293	AS398293	1	1	9/11/98

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
yrene	4.82	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-294	AS39S294	1	1	9/11/98
yrene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-295	AS39S295	1	1	9/11/98
yrene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-296	AS39S296	1	1	9/11/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-297	AS39S297	1	1	9/11/98
yrene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-298	AS39S298	1	1	9/11/98
yrene	30.2	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-299	AS39S299	1	1	9/11/98
yrene	37.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S300	1	1	9/11/98
yrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-301	AS39S301	1	1	9/11/98
yrene	21	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E8-302	AS39S302	1	1	9/14/98
yrene	5.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E8-303	AS39S303	1	1	9/14/98
yrene	33.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	E9-303	AS39S304	1	1	9/14/98
yrene	5.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	C2-300	AS39S305	1	1	9/11/98
yrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-337	AS39S337	NA	NA	10/5/98
yrene	2.8	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-338	AS39S338	NA	NA	10/5/98
yrene	2.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-339	AS39S339	6	6	10/5/98
yrene	2.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-340	AS39S340	7	7	10/5/98
yrene	2.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-341	AS39S341	7	7	10/5/98
yrene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-342	AS39S342	11	11	10/5/98
yrene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-343	AS39S343	8	8	10/5/98
yrene	2.1	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-344	AS39S344	9	9	10/5/98
yrene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	OWS-345	AS39S345	9	9	10/5/98
yrene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-373	AS39S373	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-374	AS39S374	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-375	AS39S375	14	14.5	10/20/98
yrene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-376	AS39S376	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-377	AS39S377	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-378	AS39S378	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-379	AS39S379	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-380	AS39S380	14	14.5	10/20/98
yrene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-381	AS39S381	14	14.5	10/20/98
yrene	2.7	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S385	3	7	11/5/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S386	3	7	11/5/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-387	AS39S387	2	6	11/5/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-385	AS39S388	3	7	11/5/98
yrene	14	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-389	AS39S389	NA	NA	11/5/98
yrene	13	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-391	AS39S391	NA	NA	11/5/98
yrene	14	UJ	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-392	AS39S392	NA	NA	11/5/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-386	AS39S403	3	7	11/5/98
yrene	42.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-415	AS39S415	NA	NA	12/15/98
yrene	14.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-416	AS39S416	NA	NA	12/15/98
yrene	123	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-417	AS39S417	NA	NA	12/15/98
yrene	6.56	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-418	AS39S418	NA	NA	12/15/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS39S419	6	7	12/15/98
yrene	2.5	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-420	AS39S420	6	7	12/15/98
yrene	2.6	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-419	AS39S421	6	7	12/15/98
yrene	18.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-423	AS39S423	NA	NA	12/21/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
ene	12.9	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-424	AS39S424	NA	NA	12/21/98
ene	24.1		µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-425	AS39S425	NA	NA	12/21/98
ene	12	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-569	AS39S569	16	16	4/13/99
ene	7.32	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	MCA-570	AS39S570	10	10	4/13/99
ene	50.6	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-572	AS39S572	5	10	4/21/99
ene	124	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-575	AS39S575	1	5	4/21/99
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-576	AS39S576	5	10	4/21/99
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-578	AS39S578	5	10	4/21/99
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-580	AS39S580	5	10	4/21/99
ene	32.4	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-581	AS39S581	1	5	4/21/99
ene	39.8	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-582	AS39S582	5	10	4/21/99
ene	62	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-583	AS39S583	1	5	4/21/99
ene	18	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-607	AS39S607	4	4	5/5/99
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-608	AS39S608	4	4	5/5/99
ene	2.2	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-609	AS39S609	NA	NA	5/5/99
ene	2.3	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-610	AS39S610	NA	NA	5/5/99
ene	110	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-611	AS39S611	2.5	2.5	5/6/99
ene	2.4	U	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-612	AS39S612	2.5	2.5	5/6/99
ene	8.7	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-613	AS39S613	2.5	2.5	5/6/99
ene	98	J	µg/kg	Polynuclear Aromatic Hydrocarbons (PAHs)	DRUM-614	AS39S614	2.5	2.5	5/6/99
naphthene	8200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS39S415	NA	NA	12/15/98
naphthene	7200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS39S416	NA	NA	12/15/98
naphthene	7300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS39S417	NA	NA	12/15/98
naphthene	7800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS39S418	NA	NA	12/15/98
naphthene	8,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS39S419	6	7	12/15/98
naphthene	7,900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS39S420	6	7	12/15/98
naphthene	8,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS39S421	6	7	12/15/98
naphthene	3,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS39S423	NA	NA	12/21/98
naphthene	3,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS39S424	NA	NA	12/21/98
naphthene	3400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS39S425	NA	NA	12/21/98
naphthene	250	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-569	AS39S569	16	16	4/13/99
naphthene	260	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS39S570	16	16	4/13/99
naphthylene	8100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS39S415	NA	NA	12/15/98
naphthylene	7100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS39S416	NA	NA	12/15/98
naphthylene	7200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS39S417	NA	NA	12/15/98
naphthylene	7700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS39S418	NA	NA	12/15/98
naphthylene	8,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS39S419	6	7	12/15/98
naphthylene	7,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS39S420	6	7	12/15/98
naphthylene	8,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS39S421	6	7	12/15/98
naphthylene	3,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS39S423	NA	NA	12/21/98
naphthylene	3,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS39S424	NA	NA	12/21/98
naphthylene	3400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS39S425	NA	NA	12/21/98
naphthylene	250	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-569	AS39S569	16	16	4/13/99
naphthylene	260	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS39S570	16	16	4/13/99
thracene	8300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS39S415	NA	NA	12/15/98
thracene	4600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS39S416	NA	NA	12/15/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
nthracene	4700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
nthracene	5000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
nthracene	5,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
nthracene	5,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
nthracene	5,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
nthracene	2,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
nthracene	2,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
nthracene	2200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
nthracene	160	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
nthracene	170	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
nzo(a)anthracene	5400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
nzo(a)anthracene	4800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
nzo(a)anthracene	4880	J	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
nzo(a)anthracene	5200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
nzo(a)anthracene	5,700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
nzo(a)anthracene	5,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
nzo(a)anthracene	5,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
nzo(a)anthracene	2,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
nzo(a)anthracene	2,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
nzo(a)anthracene	2300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
nzo(a)anthracene	170	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
nzo(a)anthracene	170	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
nzo(a)pyrene	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
nzo(a)pyrene	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
nzo(a)pyrene	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
nzo(a)pyrene	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
nzo(a)pyrene	3,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
nzo(a)pyrene	2,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
nzo(a)pyrene	2,900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
nzo(a)pyrene	1,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
nzo(a)pyrene	1,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
nzo(a)pyrene	1200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
nzo(a)pyrene	80	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
nzo(a)pyrene	83	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
nzo(b)fluoranthene	5000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
nzo(b)fluoranthene	4400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
nzo(b)fluoranthene	4500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
nzo(b)fluoranthene	4800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
nzo(b)fluoranthene	5,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
nzo(b)fluoranthene	4,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
nzo(b)fluoranthene	5,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
nzo(b)fluoranthene	2,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
nzo(b)fluoranthene	2,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
nzo(b)fluoranthene	2100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
nzo(b)fluoranthene	160	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
nzo(b)fluoranthene	160	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
zo(ghi)perylene	3200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS398415	NA	NA	12/15/98
zo(ghi)perylene	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS398416	NA	NA	12/15/98
zo(ghi)perylene	2900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS398417	NA	NA	12/15/98
zo(ghi)perylene	3100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS398418	NA	NA	12/15/98
zo(ghi)perylene	3,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398419	6	7	12/15/98
zo(ghi)perylene	3,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS398420	6	7	12/15/98
zo(ghi)perylene	3,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398421	6	7	12/15/98
zo(ghi)perylene	1,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS398423	NA	NA	12/21/98
zo(ghi)perylene	1,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS398424	NA	NA	12/21/98
zo(ghi)perylene	1400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS398425	NA	NA	12/21/98
zo(ghi)perylene	100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS398568	16	16	4/13/99
zo(ghi)perylene	100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS399570	16	16	4/13/99
zo(k)fluoranthene	5300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS398415	NA	NA	12/15/98
zo(k)fluoranthene	4700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS398416	NA	NA	12/15/98
zo(k)fluoranthene	4900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS398417	NA	NA	12/15/98
zo(k)fluoranthene	5100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS398418	NA	NA	12/15/98
zo(k)fluoranthene	5,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398419	6	7	12/15/98
zo(k)fluoranthene	5,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS398420	6	7	12/15/98
zo(k)fluoranthene	5,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398421	6	7	12/15/98
zo(k)fluoranthene	2,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS398423	NA	NA	12/21/98
zo(k)fluoranthene	2,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS398424	NA	NA	12/21/98
zo(k)fluoranthene	2200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS398425	NA	NA	12/21/98
zo(k)fluoranthene	170	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS398568	16	16	4/13/99
zo(k)fluoranthene	170	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS398570	16	16	4/13/99
(2-Ethylhexyl)phthalate	6700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS398415	NA	NA	12/15/98
(2-Ethylhexyl)phthalate	5900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS398416	NA	NA	12/15/98
(2-Ethylhexyl)phthalate	6000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS398417	NA	NA	12/15/98
(2-Ethylhexyl)phthalate	6400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS398418	NA	NA	12/15/98
(2-Ethylhexyl)phthalate	7,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398419	6	7	12/15/98
(2-Ethylhexyl)phthalate	6,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS398420	6	7	12/15/98
(2-Ethylhexyl)phthalate	6,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398421	6	7	12/15/98
(2-Ethylhexyl)phthalate	2,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS398423	NA	NA	12/21/98
(2-Ethylhexyl)phthalate	2,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS398424	NA	NA	12/21/98
(2-Ethylhexyl)phthalate	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS398425	NA	NA	12/21/98
(2-Ethylhexyl)phthalate	210	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS398568	16	16	4/13/99
(2-Ethylhexyl)phthalate	210	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS398570	16	16	4/13/99
tyl benzylphthalate	6000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS398415	NA	NA	12/15/98
tyl benzylphthalate	5200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS398416	NA	NA	12/15/98
tyl benzylphthalate	5400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS398417	NA	NA	12/15/98
tyl benzylphthalate	5700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS398418	NA	NA	12/15/98
tyl benzylphthalate	6,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398419	6	7	12/15/98
tyl benzylphthalate	5,700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS398420	6	7	12/15/98
tyl benzylphthalate	5,900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS398421	6	7	12/15/98
tyl benzylphthalate	2,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS398423	NA	NA	12/21/98
tyl benzylphthalate	2,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS398424	NA	NA	12/21/98
tyl benzylphthalate	2500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS398425	NA	NA	12/21/98

Data Used to Compute Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
tyl benzylphthalate	180	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	18	18	4/13/99
tyl benzylphthalate	190	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA 570	AS395570	18	18	4/13/99
arbazole	6200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
arbazole	5400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
arbazole	5600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
arbazole	5900	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
arbazole	6,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
arbazole	6,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
arbazole	6,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
arbazole	2,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
arbazole	2,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
arbazole	2800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
arbazole	180	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	18	18	4/13/99
arbazole	200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	18	18	4/13/99
hrysene	7100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
hrysene	6200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
hrysene	6300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
hrysene	6800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
hrysene	7,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
hrysene	6,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
hrysene	7,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
hrysene	3,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
hrysene	2,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
hrysene	3000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
hrysene	220	V	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	18	18	4/13/99
hrysene	230	V	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	18	18	4/13/99
benzo(a,h)anthracene	2500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA 415	AS395415	NA	NA	12/15/98
benzo(a,h)anthracene	2200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
benzo(a,h)anthracene	2200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
benzo(a,h)anthracene	2400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
benzo(a,h)anthracene	2,700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
benzo(a,h)anthracene	2,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA 420	AS395420	6	7	12/15/98
benzo(a,h)anthracene	2,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
benzo(a,h)anthracene	1,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
benzo(a,h)anthracene	990	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA 424	AS395424	NA	NA	12/21/98
benzo(a,h)anthracene	1000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
benzo(a,h)anthracene	76	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA 568	AS395568	18	18	4/13/99
benzo(a,h)anthracene	81	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	18	18	4/13/99
benzofuran	8200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
benzofuran	7200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
benzofuran	7300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
benzofuran	7800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA 418	AS395418	NA	NA	12/15/98
benzofuran	8,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
benzofuran	7,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
benzofuran	8,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
benzofuran	3,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
nzofuran	3,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
enzofuran	3400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
enzofuran	230	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
nzofuran	260	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
n-butyl phthalate	6300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
-butyl phthalate	5800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
-butyl phthalate	5600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
-butyl phthalate	6000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
-butyl phthalate	5,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
butyl phthalate	5,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
-butyl phthalate	5,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
-butyl phthalate	2,700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
-butyl phthalate	2,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
-butyl phthalate	2600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
-butyl phthalate	200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
-butyl phthalate	200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
oranthene	6000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
oranthene	6300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
oranthene	10900	J	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
oranthene	6000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
oranthene	5,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
oranthene	5,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
oranthene	5,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
oranthene	2,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
oranthene	2,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
oranthene	2500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
oranthene	190	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
oranthene	190	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
eno(1,2,3-cd)pyrene	3300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
eno(1,2,3-cd)pyrene	2600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
eno(1,2,3-cd)pyrene	3000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
eno(1,2,3-cd)pyrene	3200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
eno(1,2,3-cd)pyrene	3,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
eno(1,2,3-cd)pyrene	3,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
eno(1,2,3-cd)pyrene	3,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
eno(1,2,3-cd)pyrene	1,400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
eno(1,2,3-cd)pyrene	1,300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
eno(1,2,3-cd)pyrene	1400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
eno(1,2,3-cd)pyrene	100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
eno(1,2,3-cd)pyrene	110	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
phthalene	11000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
phthalene	9300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
phthalene	9500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
phthalene	10000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
phthalene	11,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
phthalene	10,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
aphthalene	10,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
aphthalene	4,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
aphthalene	4,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
aphthalene	4400	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
aphthalene	330	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
aphthalene	340	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
ntachlorophenol	6300	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
ntachlorophenol	5500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
ntachlorophenol	5800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
ntachlorophenol	6000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
ntachlorophenol	6,600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
ntachlorophenol	6,030	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
ntachlorophenol	6200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
ntachlorophenol	2,700	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
ntachlorophenol	2,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
ntachlorophenol	2600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
ntachlorophenol	200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
ntachlorophenol	200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
enanthrene	5200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
enanthrene	4600	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
enanthrene	8800	J	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
enanthrene	5000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
enanthrene	5,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
enanthrene	5,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
enanthrene	5,100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
enanthrene	2,200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
enanthrene	2,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
enanthrene	2200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
enanthrene	160	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
enanthrene	170	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
rene	7100	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-415	AS395415	NA	NA	12/15/98
rene	6200	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-416	AS395416	NA	NA	12/15/98
rene	13900	J	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-417	AS395417	NA	NA	12/15/98
rene	6800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-418	AS395418	NA	NA	12/15/98
rene	7,500	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395419	6	7	12/15/98
rene	6,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-420	AS395420	6	7	12/15/98
rene	7,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-419	AS395421	6	7	12/15/98
rene	3,000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-423	AS395423	NA	NA	12/21/98
rene	2,800	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-424	AS395424	NA	NA	12/21/98
rene	3000	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-425	AS395425	NA	NA	12/21/98
rene	220	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-568	AS395568	16	16	4/13/99
rene	230	U	µg/kg	Semivolatile Organic Compounds (SVOCs)	MCA-570	AS395570	16	16	4/13/99
TPH	200		mg/kg	Total Petroleum Hydrocarbon	OWS-122	AS395122	7.17	7.33	7/6/98
TPH	620		mg/kg	Total Petroleum Hydrocarbon	OWS-123	AS395123	7.17	7.33	7/6/98
TPH	220		mg/kg	Total Petroleum Hydrocarbon	OWS-125	AS395125	7.17	7.33	7/6/98
TPH	160		mg/kg	Total Petroleum Hydrocarbon	OWS-126	AS395126	7.17	7.33	7/6/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
H	190		mg/kg	Total Petroleum Hydrocarbon	OWS-127	AS39S127	7.17	7.33	7/6/98
H	110		mg/kg	Total Petroleum Hydrocarbon	OWS-128	AS39S128	7.17	7.33	7/6/98
H	290		mg/kg	Total Petroleum Hydrocarbon	OWS-129	AS39S129	7.17	7.33	7/6/98
H	220		mg/kg	Total Petroleum Hydrocarbon	OWS-130	AS39S130	7.17	7.33	7/6/98
H	2900		mg/kg	Total Petroleum Hydrocarbon	OWS-132	AS39S132	NA	NA	7/6/98
H	140		mg/kg	Total Petroleum Hydrocarbon	OWS-135	AS39S135	NA	NA	7/6/98
H	12		mg/kg	Total Petroleum Hydrocarbon	OWS-141	AS39S141	NA	NA	7/6/98
H	16		mg/kg	Total Petroleum Hydrocarbon	OWS-142	AS39S142	NA	NA	7/6/98
H	200		mg/kg	Total Petroleum Hydrocarbon	OWS-143	AS39S143	NA	NA	7/6/98
,1-Trichloroethane	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
,1-Trichloroethane	0.35	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
,1-Trichloroethane	0.39	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
,1-Trichloroethane	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
1-Trichloroethane	0.46	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
1-Trichloroethane	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
1-Trichloroethane	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
1-Trichloroethane	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
1-Trichloroethane	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
,1-Trichloroethane	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
,1-Trichloroethane	0.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
,1-Trichloroethane	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
,2,2-Tetrachloroethane	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
,2,2-Tetrachloroethane	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
,2,2-Tetrachloroethane	0.39	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
,2,2-Tetrachloroethane	0.41	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
2,2-Tetrachloroethane	0.46	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
2,2-Tetrachloroethane	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
2,2-Tetrachloroethane	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
2,2-Tetrachloroethane	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
2,2-Tetrachloroethane	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
,2,2-Tetrachloroethane	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
,2,2-Tetrachloroethane	0.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
,2,2-Tetrachloroethane	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
,2-Trichloroethane	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
,2-Trichloroethane	0.27	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
,2-Trichloroethane	0.26	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
,2-Trichloroethane	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
2-Trichloroethane	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
2-Trichloroethane	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
2-Trichloroethane	0.30	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
2-Trichloroethane	0.26	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
2-Trichloroethane	0.24	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
,2-Trichloroethane	0.26	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
,2-Trichloroethane	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
,2-Trichloroethane	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
Dichloroethane	0.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
,1-Dichloroethene	0.62	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
,1-Dichloroethene	0.63	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
,1-Dichloroethene	0.67	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
,1-Dichloroethene	0.74	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
,1-Dichloroethene	0.68	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
,1-Dichloroethene	0.70	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
,1-Dichloroethene	0.60	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
,1-Dichloroethene	0.55	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
,1-Dichloroethene	0.58	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
,1-Dichloroethene	0.66	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
,1-Dichloroethene	0.66	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
,2,3-Trichlorobenzene	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
,2,3-Trichlorobenzene	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
,2,3-Trichlorobenzene	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
,2,3-Trichlorobenzene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
2,3-Trichlorobenzene	0.35	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
,2,3-Trichlorobenzene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
,2,3-Trichlorobenzene	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
,2,3-Trichlorobenzene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
,2,3-Trichlorobenzene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
,2,3-Trichlorobenzene	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
,2,3-Trichlorobenzene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
,2,3-Trichlorobenzene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
,2,4-Trichlorobenzene	0.55	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
,2,4-Trichlorobenzene	0.49	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
,2,4-Trichlorobenzene	0.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
,2,4-Trichlorobenzene	0.53	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
2,4-Trichlorobenzene	0.58	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
2,4-Trichlorobenzene	0.53	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
,2,4-Trichlorobenzene	0.55	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
2,4-Trichlorobenzene	0.47	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
2,4-Trichlorobenzene	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
,2,4-Trichlorobenzene	0.46	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
,2,4-Trichlorobenzene	0.52	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
,2,4-Trichlorobenzene	0.53	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA 570	AS39S570	16	16	4/13/99
Butanone	6.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
-Butanone	5.9	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
-Butanone	6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA 417	AS39S417	NA	NA	12/15/98
Butanone	6.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
Butanone	7.1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
Butanone	6.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
Butanone	6.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
Butanone	5.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
Butanone	5.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
Butanone	5.8	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA 425	AS39S425	NA	NA	12/21/98
-Butanone	6.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99

PARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
utanone	6.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS398570	16	16	4/13/99
exanone	1.8	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS398415	NA	NA	12/15/98
exanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS398416	NA	NA	12/15/98
exanone	1.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS398417	NA	NA	12/15/98
exanone	1.8	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS398418	NA	NA	12/15/98
exanone	1.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398419	6	7	12/15/98
exanone	1.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS398420	6	7	12/15/98
exanone	1.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398421	6	7	12/15/98
exanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS398423	NA	NA	12/21/98
exanone	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS398424	NA	NA	12/21/98
exanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS398425	NA	NA	12/21/98
exanone	1.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS398568	16	16	4/13/99
exanone	1.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS398570	16	16	4/13/99
ethyl-2-pentanone	1.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS398415	NA	NA	12/15/98
ethyl-2-pentanone	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS398416	NA	NA	12/15/98
ethyl-2-pentanone	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS398417	NA	NA	12/15/98
ethyl-2-pentanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS398418	NA	NA	12/15/98
ethyl-2-pentanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398419	6	7	12/15/98
ethyl-2-pentanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS398420	6	7	12/15/98
ethyl-2-pentanone	1.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398421	6	7	12/15/98
ethyl-2-pentanone	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS398423	NA	NA	12/21/98
ethyl-2-pentanone	1.2	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS398424	NA	NA	12/21/98
ethyl-2-pentanone	1.2	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS398425	NA	NA	12/21/98
ethyl-2-pentanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS398568	16	16	4/13/99
ethyl-2-pentanone	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS398570	16	16	4/13/99
tone	37		µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS398415	NA	NA	12/15/98
tone	4.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS398416	NA	NA	12/15/98
tone	4.9	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS398417	NA	NA	12/15/98
tone	5.1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS398418	NA	NA	12/15/98
tone	20.3		µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398419	6	7	12/15/98
tone	29.9		µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS398420	6	7	12/15/98
tone	5.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398421	6	7	12/15/98
tone	4.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS398423	NA	NA	12/21/98
tone	33		µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS398424	NA	NA	12/21/98
tone	18.8		µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS398425	NA	NA	12/21/98
tone	5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS398568	16	16	4/13/99
tone	5.2	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS398570	16	16	4/13/99
zene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS398415	NA	NA	12/15/98
zene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS398416	NA	NA	12/15/98
zene	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS398417	NA	NA	12/15/98
zene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS398418	NA	NA	12/15/98
zene	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398419	6	7	12/15/98
zene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS398420	6	7	12/15/98
zene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS398421	6	7	12/15/98
zene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS398423	NA	NA	12/21/98
zene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS398424	NA	NA	12/21/98

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
nzene	0.27	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
nzene	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
nzene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
omodichloromethane	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
omodichloromethane	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
omodichloromethane	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
omodichloromethane	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
omodichloromethane	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
omodichloromethane	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
omodichloromethane	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
omodichloromethane	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
omodichloromethane	0.27	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
omodichloromethane	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
omodichloromethane	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
omodichloromethane	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
rbon disulfide	0.16	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
rbon disulfide	0.14	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
rbon disulfide	0.15	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
rbon disulfide	0.16	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
rbon disulfide	0.17	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
rbon disulfide	0.16	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
rbon disulfide	0.16	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
rbon disulfide	0.14	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
rbon disulfide	0.13	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
rbon disulfide	0.14	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
rbon disulfide	0.15	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
rbon disulfide	0.16	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
rbon tetrachloride	1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
rbon tetrachloride	0.91	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
rbon tetrachloride	0.93	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
rbon tetrachloride	0.99	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
rbon tetrachloride	1.1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
rbon tetrachloride	0.89	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
rbon tetrachloride	1.0	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
rbon tetrachloride	0.86	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
rbon tetrachloride	0.81	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
rbon tetrachloride	0.87	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
rbon tetrachloride	0.97	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
rbon tetrachloride	1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
lorobenzene	1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
lorobenzene	0.23	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
lorobenzene	0.23	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
lorobenzene	0.25	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
lorobenzene	0.27	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
lorobenzene	0.25	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
lorobenzene	0.26	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98

Data Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
lorobenzene	0.22	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
lorobenzene	0.20	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
lorobenzene	0.22	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
lorobenzene	0.24	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS395569	16	16	4/13/99
lorobenzene	0.25	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
loroform	0.56	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
loroform	0.49	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
loroform	0.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
loroform	0.53	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
loroform	0.59	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
loroform	0.53	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
loroform	0.55	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
loroform	0.47	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
loroform	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
loroform	0.48	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
loroform	0.52	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS395569	16	16	4/13/99
loroform	0.54	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
loromethane	2.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
loromethane	2.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
loromethane	2.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
loromethane	2.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
loromethane	2.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
loromethane	2.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
loromethane	2.7	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
loromethane	2.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
loromethane	2.1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
loromethane	2.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
loromethane	2.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS395569	16	16	4/13/99
loromethane	2.6	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
-1,2-Dichloroethene	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
-1,2-Dichloroethene	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
-1,2-Dichloroethene	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
-1,2-Dichloroethene	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
1,2-Dichloroethene	0.40	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
1,2-Dichloroethene	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
1,2-Dichloroethene	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
1,2-Dichloroethene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
1,2-Dichloroethene	0.30	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
1,2-Dichloroethene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
1,2-Dichloroethene	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS395569	16	16	4/13/99
-1,2-Dichloroethene	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
romomethane	0.40	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS395415	NA	NA	12/15/98
romomethane	0.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
romomethane	0.41	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
romomethane	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
romomethane	0.48	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98

RAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
bromomethane	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
bromomethane	0.45	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
bromomethane	0.39	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
bromomethane	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
bromomethane	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
bromomethane	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
bromomethane	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
hylbenzene	0.51	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
hylbenzene	0.45	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
hylbenzene	0.48	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
hylbenzene	0.49	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
hylbenzene	0.54	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
hylbenzene	0.49	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
hylbenzene	0.51	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
hylbenzene	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
hylbenzene	0.40	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
hylbenzene	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
hylbenzene	0.48	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
hylbenzene	0.49	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
lethylene chloride	12.3		µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
lethylene chloride	1.62	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
lethylene chloride	11.6		µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
lethylene chloride	3.13	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
lethylene chloride	0.57	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
lethylene chloride	2.23	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
lethylene chloride	3.38	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
lethylene chloride	2.18	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
lethylene chloride	3.12	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
lethylene chloride	3	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
lethylene chloride	0.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
lethylene chloride	0.52	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
-Xylene	0.88	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
-Xylene	0.88	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
-Xylene	0.86	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98
-Xylene	0.84	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/15/98
-Xylene	1.0	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
-Xylene	0.94	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
-Xylene	0.97	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
-Xylene	0.83	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
-Xylene	0.77	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
-Xylene	0.82	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
-Xylene	0.92	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
-Xylene	0.95	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
aphthalene	0.52	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
aphthalene	0.46	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/15/98
aphthalene	0.47	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/15/98

AMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
hthalene	0.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S416	NA	NA	12/16/98
hthalene	0.55	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
hthalene	0.50	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
hthalene	0.51	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
hthalene	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
hthalene	0.41	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
hthalene	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
hthalene	0.48	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS39S569	16	16	4/13/99
hthalene	0.5	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
ylene	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
ylene	0.39	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/16/98
ylene	0.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/16/98
ylene	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/16/98
ylene	0.47	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
ylene	0.42	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
ylene	0.44	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
ylene	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
ylene	0.35	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
ylene	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
ylene	0.41	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS39S569	16	16	4/13/99
ylene	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
ylene	0.98	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
ylene	0.86	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/16/98
ylene	0.88	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/16/98
ylene	0.94	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/16/98
ylene	1.0	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
ylene	0.94	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
ylene	0.97	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
ylene	0.83	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
ylene	0.77	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
ylene	0.82	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
ylene	0.92	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS39S568	16	16	4/13/99
ylene	0.95	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
rachloroethene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98
rachloroethene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS39S416	NA	NA	12/16/98
rachloroethene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS39S417	NA	NA	12/16/98
rachloroethene	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS39S418	NA	NA	12/16/98
rachloroethene	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S419	6	7	12/15/98
rachloroethene	0.30	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS39S420	6	7	12/15/98
rachloroethene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS39S421	6	7	12/15/98
rachloroethene	0.27	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS39S423	NA	NA	12/21/98
rachloroethene	0.25	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS39S424	NA	NA	12/21/98
rachloroethene	0.27	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS39S425	NA	NA	12/21/98
rachloroethene	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-569	AS39S569	16	16	4/13/99
rachloroethene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS39S570	16	16	4/13/99
uene	0.41	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-415	AS39S415	NA	NA	12/15/98

ARAMETER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DATE
luene	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/16/98
luene	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
luene	0.39	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
luene	0.43	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
luene	0.453	J	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
luene	0.41	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7.	12/15/98
luene	0.35	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
luene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
luene	0.34	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
luene	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
luene	0.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
ichloroethene	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
ichloroethene	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
ichloroethene	0.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
ichloroethene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
ichloroethene	0.35	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
ichloroethene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
ichloroethene	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
ichloroethene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
ichloroethene	0.26	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
ichloroethene	0.28	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
ichloroethene	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
ichloroethene	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
ichlorofluoromethane	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
ichlorofluoromethane	0.33	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
ichlorofluoromethane	0.39	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
ichlorofluoromethane	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
ichlorofluoromethane	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
ichlorofluoromethane	0.38	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
ichlorofluoromethane	0.37	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
ichlorofluoromethane	0.32	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
ichlorofluoromethane	0.29	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
ichlorofluoromethane	0.31	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
ichlorofluoromethane	0.35	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99
ichlorofluoromethane	0.36	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-570	AS395570	16	16	4/13/99
nyl chloride	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
nyl chloride	1.2	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-416	AS395416	NA	NA	12/15/98
nyl chloride	1.2	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-417	AS395417	NA	NA	12/15/98
nyl chloride	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-418	AS395418	NA	NA	12/15/98
nyl chloride	1.4	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395419	6	7	12/15/98
nyl chloride	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-420	AS395420	6	7	12/15/98
nyl chloride	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-419	AS395421	6	7	12/15/98
nyl chloride	1.1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-423	AS395423	NA	NA	12/21/98
nyl chloride	1.0	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-424	AS395424	NA	NA	12/21/98
nyl chloride	1.1	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-425	AS395425	NA	NA	12/21/98
nyl chloride	1.2	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-568	AS395568	16	16	4/13/99

...ata Used to Complete Confirmation HHRA
IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

...METER	RESULT	QUALIFIER	UNIT	ANALYSIS	LOCATION	SAMPLE NUMBER	DEPTH RANGE		SAMPLE DA...
...chloride	1.3	U	µg/kg	Volatile Organic Compounds (VOCs)	MCA-670	AB395670	16	16	4/13/99

...mation Sampling Location Designations:
... = Oil/Water Separator Area
... = Miscellaneous Container Area
...ALL = Stormwater Outfall Area
...A = Buried Drum Area
... PAH Hot Spot at "A8"
... PAH Hot Spot at "C2"
... PAH Hot Spot at "E8"

Appendix M: Attachment 2

Toxicological Profiles
for Chemicals of Potential Concern

IRP Site 39/Harmon Substation
Andersen Air Force Base, Guam

Toxicological profiles are brief descriptions of the nature of the adverse effects associated with the COPCs selected for evaluation because their concentrations in one or more environmental media exceed a very conservatively derived risk-based screening concentration. It is important to note that a discussion of adverse effects without a discussion of dose is incomplete and potentially misleading, because virtually any chemical may be toxic at some dose, and many chemicals (e.g., nutritionally required minerals, vitamins, amino acids, etc.) enhance human health at some low dose. An ever growing and compelling body of evidence suggests that many environmental contaminants also enhance health at low doses (Hart and Frame, 1996).

When sufficient data are available, the EPA Integrated Risk Information System (IRIS) presents the EPA's Reference Dose (RfD)/Reference Concentration (RfC) Work Group-verified chronic toxicity values for threshold, or noncancer, effects, and the Carcinogen Risk Assessment Verification Endeavor (CRAVE) Work Group-verified toxicity values for cancer risk (EPA, 1999). The toxicity values for noncancer effects include an RfD expressed in milligrams per kilogram per day (mg/kg-day) for chronic oral exposure, and a RfC, in milligrams per cubic meter (mg/m^3), for chronic inhalation exposure. The inhalation RfC in units of mg/m^3 may be converted to an equivalent inhalation RfD by assuming continuous chronic exposure of humans with a body weight of 70 kg and an inhalation rate of 20 m^3/day. In other words, the RfC expressed as mg/m^3 is multiplied by the inhalation rate of 20 m^3/day, and the result is divided by the body weight of 70 kg to yield an inhalation RfD expressed as mg/kg-day.

RfDs and RfCs are usually derived from empirical benchmark doses (BMD) or concentrations called no-observed-effect levels (NOEL) or no-observed-adverse-effect levels (NOAEL) from animal toxicity or human epidemiology studies. If the data do not permit identifying a NOEL or NOAEL, a lowest-observed-adverse-effect level (LOAEL) or lowest-effect level (LEL) may be used. A frank-effect level (FEL), e.g., mortality, shortened life span or serious neurologic or behavioral disturbances, is generally considered an inappropriate benchmark from which to develop an RfD or RfC. Some RfD and RfC derivations employ a BMD that is a statistically estimated dose for humans at which some low proportion of the population may experience some minimally adverse effect. A BMD at which 10 percent of the population may be expected to respond is expressed as BMD_{10}. The RfD or RfC is derived by dividing the benchmark level (e.g., NOAEL or BMD_{10}) by a series of uncertainty and modifying factors, collectively designated the uncertainty factor (UF).

For cancer effects, IRIS presents an EPA cancer weight-of-evidence group classification that reflects qualitatively the likelihood that the chemical is carcinogenic to humans. IRIS also presents a slope factor (SF) for oral exposure, expressed as the risk per mg/kg-day ingested dose, and a unit risk factor (URF) for inhalation exposure, expressed as the risk per $\mu g/m^3$ in ambient air. These quantitative estimates are generally provided for chemicals in EPA weight-of-evidence Groups A and B and C, if the data are adequate. The SF or URF is usually estimated as an upper bound on the slope of the dose- or concentration-response curve from animal toxicity or human epidemiology studies. The inhalation URF in units of risk per $\mu g/m^3$ may be converted to an equivalent inhalation SF in units of risk per mg/kg-day by assuming continuous lifetime exposure of humans with a body weight to 70 kg and an inhalation rate of 20 m^3/day. In other words, the URF expressed as risk per $\mu g/m^3$ is divided by the inhalation rate of 20 m^3/day, and multiplied by the assumed body weight of 70 kg and a conversion factor of 1000 μg/mg.

Toxicity values are not estimated for acute toxicity and acute exposure is not evaluated in the risk assessment. Nonetheless, the levels associated with acute lethality and data regarding the effects of acute exposure to levels higher than ordinarily observed in chronic environmental exposure provide additional perspective regarding the toxicity of the chemical. Therefore, this information is usually included in the profiles. Lethality data for laboratory animals are generally expressed as the oral dose associated with lethality of 50 percent of a test group (LD_{50}) or the concentration in air associated with lethality of 50 percent of a test group (LC_{50}). Occasionally the dose associated with lethality in a low percentage of exposed individuals (LD_{LO}) is presented.

The toxicity profiles may also provide documentation for physical constants that are important for chemical transport modeling, such as molecular weight (MW) in grams per mole (g/mole), the log of the octanol/water partition coefficient (log K_{ow}), Henry's law constant (H) in atmosphere-cubic meter/mole (atm-m^3/mole), the soil/water partition coefficient (K_d) in liters per kilogram (L/kg) for metals, the log of the soil/organic carbon partition coefficient (log K_{oc}) (unitless) for organic chemicals, diffusivity in air (D_a) in square centimeters per second (cm^2/s), diffusivity in water (D_w) in cm^2/s, vapor pressure (VP) in atmospheres (atm), and solubility in water (S) in milligrams per liter (mg/L). In addition, organic chemicals are designated as volatile organic compounds (VOC) or semivolatile organic compounds (SVOC) based on their propensity to volatilize from environmental media. VOCs generally have a MW less than 200 g/mole and H greater than 1E-5 atm-m^3/mole (EPA, 1991).

The physical constants generally are taken from the most reliable source (i.e., the source that provides the highest level of documentation). Values for interrelated properties are usually taken from the same source (e.g., H is often estimated from VP and S; therefore, the same source is usually used for all three property values). When one source provides several values for a given property, professional judgement is used to select the most appropriate. Obvious outliers may be dropped from consideration. The average or the midpoint of a range of values may be selected. K_d values for metals and K_{oc} values for ionizing organic compound are based on a default pH of 6.8 (EPA, 1996). VP and S values are limited to those provided for normal ambient temperatures (0 to 30°C), but the temperatures reported in the original sources for VP and S are not presented in the toxicity profile, nor is any attempt made to extrapolate VP and S to any default temperature.

The toxicity profiles provide documentation for the gastrointestinal (GI) absorption factor (GAF), which is used to develop the dermal RfD and SF, the dermal absorption factor (ABS), which describes the extent of dermal uptake from soil, and the permeability coefficient (PC) and tau (τ), which are used to estimate the rate of dermal uptake from water. Usually PC and τ are taken from EPA (1992), unless EPA (1992) provides no values, or professional judgement suggests that a log K_{ow} value other than the one provided by EPA (1992) is clearly more appropriate. In these cases, PC is calculated as follows (EPA, 1992):

$$Log(PC) = -2.72 + 0.71(\log K_{ow}) - 0.0061(MW)$$

where:

PC	=	permeability coefficient (cm/hour, calculated)
log K_{ow}	=	log of the octanol/water partition coefficient (unitless)
MW	=	molecular weight

and τ is calculated as follows (EPA, 1992):

$$\tau = \frac{L_{sc}}{6 \cdot 10^{(-2.72 - 0.0061 * MW)}}$$

where:

τ	=	time for concentration of contaminant in stratum corneum to reach steady state (hours, chemical-specific)
L_{sc}	=	effective thickness of the stratum corneum (1E-3 cm)
MW	=	molecular weight.

Biotransfer factors such as water-to-fish bioconcentration factors (BCF), soil-to-plant or plant-to-animal transfer factors are not included, because the method for their derivation may be EPA region-, program- or site-specific. Biota-sediment accumulation factors (BSAF) are included for the few SVOCs for which values are available.

References for Introduction

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POLYAROMATIC HYDROCARBONS (PAHs)

The PAHs regularly observed in environmental media include acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, carbazole, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene. All are **SVOCs** except naphthalene, which is a **VOC**. PAHs are the products of incomplete combustion of fossil fuels or other organic matter, hence include both natural and anthropogenic sources (ATSDR, 1993a). The PAHs are ubiquitous, reflecting natural combustion, the widespread practice of fossil fuel combustion, and wide dissemination via wind currents. Relevant physical properties for selected PAH are compiled below:

MW (g/mole)	log K_{ow} (unitless)	H (atm-m^3/mole)	log K_{oc} (unitless)	D_a (cm^2/s)	D_w (cm^2/s)	VP (atm)	S (mg/L)
Anthracene							
178.2	4.45[a]	8.6E-5[a]	4.15[a]	3.24E-2[c]	7.74E-6[c]	2.2E-8[a]	I[a]
Benzo(a)anthracene							
228.29	5.66[d]	1E-6[a]	5.30[a]	5.10E-2[c]	9.00E-6[c]	2.9E-11[a]	I[a]
Benzo(a)pyrene							
252.3	6.16[d]	4.9E-7[a]	6.74[a]	4.30E-2[c]	9.00E-6[c]	7.4E-12[a]	3.8E-3[a]
Benzo(b)fluoranthene							
252.3	6.12[d]	1.22E-5[a]	5.74[a]	2.26E-2[c]	5.56E-6[c]	1.3E-9[a]	I[a]
Benzo(k)fluoranthene.							
252.3	6.06[a]	3.87E-5[a]	5.74[a]	2.26E-2[c]	5.56E-6[c]	6.6E-10[a]	I[a]
Chrysene							
228.3	5.66[d]	1.05E-6[a]	5.30[a]	2.48E-2[c]	6.21E-6[c]	8.3E-12[a]	I[a]
Dibenzo(a,h)anthracene							
278.35	6.84[d]	7.3E-8[a]	6.52[a]	2.02E-2[c]	5.18E-6[c]	8.2E-12[a]	5E-7[a]
Fluoranthene							
202.26	4.95[d]	6.5E-6[a]	4.58[a]	3.02E-2[c]	6.35E-6[c]	6.6E-9[a]	2.06E-1[c]
Indeno(1,2,3-cd)pyrene							
276.3	6.58[d]	6.95E-8[a]	6.20[a]	1.90E-2[c]	5.66E-6[c]	1.3E-12[a]	6.23E-2[a]
Pyrene							
202.3	4.88[a]	5.1E-6[a]	4.58[a]	2.72E-2[c]	7.24E-6[c]	3.3E-9[a]	I[a]

MW (g/mole)	log K_{ow} (unitless)	H (atm-m^3/mole)	log K_{oc} (unitless)	D_a (cm^2/s)	D_w (cm^2/s)	VP (atm)	S (mg/L)

ND = no data, I = virtually insoluble in water.
[a]Agency for Toxic Substances and Disease Registry (ATSDR), 1993a, ***Update Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)***, Draft for Public Comment, U.S. Department of Health and Human Services, Atlanta, Georgia, October.
[b]Montgomery, J.H., 1996, ***Groundwater Chemicals Desk Reference, Second Edition***, Lewis Publishers, New York.
[c]U.S. Environmental Protection Agency (EPA), 1996, ***Soil Screening Guidance: Users Guide***, Office of Solid Waste and Emergency Response, Washington, DC, Publication 9355.4-23, April.
[d]U.S. Environmental Protection Agency (EPA), 1992, ***Dermal Exposure Assessment: Principles and Applications***, Interim Report, Office of Research and Development, Washington, DC, EPA/600/8-91/011B, January.
[e]U.S. Environmental Protection Agency (EPA), 1994, ***Technical Background Document for Soil Screening Guidance***, Review Draft, Office of Solid Waste and Emergency Response, Washington, DC, Publication No. 9355.4-17, EPA540/R-94/106, PB95-963532, November.
[f] Agency for Toxic Substances and Disease Registry, (ATSDR), 1993b, ***Update Toxicological Profile for Naphthalene***, Draft for Public Comment, U.S. Public Health Service, Atlanta, Georgia, October.

Jones and Owen (1989) report that the GI absorption of naphthalene is 100 percent. The GAF of 1.0 from the Jones and Owen (1989) compilation is adopted for naphthalene. Toxicokinetic studies of several PAHs summarized by ATSDR (1993a) provide limited quantitative information regarding the extent of GI absorption. Qualitatively, these studies indicate that absorption is incomplete. A study of benzo(a)pyrene in rats suggested that GI absorption ranges from 38 to 58 percent. The GAF of 0.5 (Jones and Owen, 1989), near the midpoint of the range from the rat study, is selected for benzo(a)pyrene and the other PAHs for which quantitative data are not available. A study in rats reported absorption efficiency for anthracene ranging from 53 to 74 percent; 0.7 is selected as the GAF for this evaluation. GI absorption of pyrene, chrysene and dibenzo(a,h)anthracene is described as high; a GAF of 0.8 is assumed for these compounds.

Anecdotal evidence from using cloth diapers stored in contact with naphthalene indicates that naphthalene is absorbed by the skin, but quantitative data are not available (ATSDR, 1993b). Empirical data with pure compound dissolved or suspended in vehicles suggest that dermal uptake of benzo(a)pyrene is extensive (ATSDR, 1993a). EPA (1998), recommends an ABS of 0.13 for all the PAHs, which is adopted and used herein. PC and τ values are estimated as follows:

Chemical	PC (cm/hour)	τ (hours)
Anthracene	2.25E-1[a]	1.07E+0[a]
Benzo(a)anthracene	8.1E-1[b]	2.23E+0[b]
Benzo(a)pyrene	1.2E+0[b]	2.9E+0[b]
Benzo(b)fluoranthene	1.2E+0[b]	3.0E+0[b]
Benzo(k)fluoranthene	1.11E+0[a]	3.03E+0[a]
Chrysene	8.1E-1[b]	2.2E+0[b]
Dibenzo(a,h)anthracene	2.7E+0[b]	4.4E+0[b]
Fluoranthene	3.6E-1[b]	1.5E+0[b]
Indeno(1,2,3-cd)pyrene	1.9E+0[b]	4.2E+0[b]
Pyrene	3.24E-1[a]	1.50E+0[a]

[a]Estimated by the method of U.S. Environmental Protection Agency (EPA), 1992, ***Dermal Exposure Assessment: Principles and Applications***, Interim Report, Office of Research and Development, Washington, DC, EPA/600/8-91/011B, January.
[b]Taken from U.S. Environmental Protection Agency (EPA), 1992, ***Dermal Exposure Assessment: Principles and Applications***, Interim Report, Office of Research and Development, Washington, DC, EPA/600/8-91/011B, January.

Data regarding the toxicity of acute oral exposure to the PAHs are generally scarce. Prolonged exposure is associated with a number of renal, hematologic and other effects, depending on the compound to which exposed.

A verified RfD of 3E-1 mg/kg-day for chronic oral exposure to anthracene was derived from a NOEL of 1000 mg/kg-day, the highest dose tested, in a 90-day gavage study in mice (EPA, 1999). An uncertainty factor of 3000 was applied. Confidence in the RfD is low. The data are inadequate to identify a target organ for prolonged oral exposure to anthracene.

Subchronic exposure to fluoranthene induces liver and kidney effects in orally treated mice (EPA, 1999). A verified RfD of 4E-2 mg/kg-day for chronic oral exposure was derived from a NOAEL of 125 mg/kg-day in a 13-week gavage study. The LOAEL was 250 mg/kg-day in this study. An uncertainty factor of 3000 was applied. Confidence in the oral RfD is low. The kidney and liver are chosen as the target organs for prolonged oral exposure to fluoranthene.

Subchronic exposure to pyrene induces mild renal tubular degeneration and reduced kidney weight in orally treated mice (EPA, 1999). A verified RfD of 3E-2 mg/kg-day for chronic oral exposure was derived from a NOAEL of 75 mg/kg-day in a 13-week gavage study. The

LOAEL was 125 mg/kg-day in this study. An uncertainty factor of 3000 was applied. Confidence in the oral RfD is low. The kidney is chosen as the target organ for chronic oral exposure to pyrene.

Acenaphthylene, anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene and pyrene are classified in EPA cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans) because of a lack of human data and inadequate animal data (EPA, 1999). Data regarding the carcinogenicity of acenaphthene were not located.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene are classified in EPA weight-of-evidence Group B2 (probable human carcinogens) (EPA, 1999, 1997). Benzo(a)pyrene is the most extensively studied member of the class, inducing tumors in tissues at the point of contact of virtually all laboratory species tested by all routes of exposure. Although epidemiology studies suggested that complex mixtures that contain PAHs (coal tar, soots, coke oven emissions, cigarette smoke) are carcinogenic to humans, the carcinogenicity cannot be attributed to PAHs alone because of the presence of other potentially carcinogenic substances in these mixtures (ATSDR, 1993a). In addition, recent investigations showed that the PAH fraction of roofing tar, cigarette smoke and coke oven emissions accounted for only 0.1-8% of the total mutagenic activity in *Salmonella* of the unfractionated complex mixture (Lewtas, 1988). Aromatic amines, nitrogen heterocyclic compounds, highly oxygenated quinones, diones, and nitrooxygenated compounds, none of which would be expected to arise from in vivo metabolism of PAHs, probably accounts for the majority of the mutagenicity of coke oven emissions and cigarette smoke. Furthermore, coal tar, which contains a mixture of many PAHs, has a long history of use in the clinical treatment of a variety of skin disorders in humans (ATSDR, 1993a).

Because of the lack of human cancer data, assignment of individual PAHs to EPA cancer weight-of-evidence groups is based largely on the results of animal studies with large doses of purified compound (EPA, 1999). Frequently, unnatural routes of exposure, including implants of the test chemical in beeswax and trioctanoin in the lungs of female rats, intratracheal instillation, and subcutaneous or intraperitoneal injection, were used.

EPA (1999) verified a SF for oral exposure to benzo(a)pyrene of 7.3E+0 per mg/kg-day, based on several dietary studies in mice and rats. Recent reevaluations of the carcinogenicity and mutagenicity of the Group B2 PAHs suggest that there are large differences between individual PAHs in cancer potency (Krewski et al., 1989). Based on the available cancer and mutagenicity data, and assuming that there is a constant relative potency between different carcinogens across different bioassay systems and that the PAHs under consideration have similar dose-response curves, EPA (1993b) adopted relative potency values for several PAHs. These values and the corresponding oral SFs, based on a relative potency for benzo(a)pyrene of 1.0, are presented below.

Relative Potencies and Slope Factors for PAHs				
PAH	Relative Potency	Oral Slope Factor (/mg/kg-day)	Inhalation	
			Unit Risk (/$\mu g/m^3$)	Slope Factor (/mg/kg-day)
Benzo[a]pyrene	1.0	7.3E+0	8.8E-4	3.1E+0
Benzo[a]anthracene	0.1	7.3E-1	8.8E-5	3.1E-1
Benzo[b]fluoranthene	0.1	7.3E-1	8.8E-5	3.1E-1
Benzo[k]fluoranthene	0.01	7.3E-2	8.8E-6	3.1E-2
Chrysene	0.001	7.3E-3	8.8E-7	3.1E-3
Dibenzo[a,h]anthracene	1.0	7.3E+0	8.8E-4	3.1E+0
Indeno[1,2,3-cd]pyrene	0.1	7.3E-1	8.8E-5	3.1E-1

Although the EPA has not verified SFs for Group B2 PAHs other than benzo(a)pyrene, the SFs above represent reasonable estimates based on the data available. The relative potency approach employed here meets criteria considered to be desirable for this type of analysis (Lewtas, 1988). For example, the chemicals compared have similar chemical structures and would be expected to have similar toxicokinetic fate in mammalian systems. In addition, the available data suggest that the Group B2 PAHs have a similar mechanism of action, inducing frameshift mutations in *Salmonella* and tumor initiation in the mouse skin painting assay. Similar noncancer effects (minor changes in the blood, liver, kidneys) of the Group D PAHs support the hypothesis of a common mechanism of toxicity. Finally, the same endpoints of toxicity, i.e., potency in various cancer assays, and related data, were used to derive the relative potency values (Krewski et al., 1989). The oral SF for benzo(a)pyrene of 7.3E+0 per mg/kg-day, and the SFs presented above for the other Group B2 PAHs are adopted for the purposes of this evaluation.

A recent EPA (1994) evaluation of the inhalation cancer data suggests adoption of an inhalation SF for benzo(a)pyrene of 3.1E+0 per mg/kg-day, based on the incidence of upper respiratory and digestive tract tumors in hamsters. Applying the relative potency estimates presented above yield the inhalation SFs for the other Group B2 PAHs presented above.

References for PAHs

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POLYCHLORINATED DIBENZO-p-DIOXINS (PCDD) AND DIBENZOFURANS (PCDF)

The PCDD/PCDF are a class of SVOCs including 75 possible positional congeners of PCDD and 135 possible positional congeners of PCDF (EPA, 1994). PCDD/PCDF are not commercially produced in the U.S.; they are produced as undesirable by-products during the manufacture of chlorinated phenolic compounds for which 2,4,5-trichlorophenol is a synthetic intermediate (ATSDR, 1989). The predominant source of PCDD/PCDF release to the environment is emissions from incinerators (EPA, 1994).

The development of toxicity equivalency factors (TEF) to facilitate evaluation of exposure to the PCDD/PCDF (see below) has encouraged refinement of the analytical techniques for these compounds in environmental media, because it is assumed that only those homologues with chlorine substituents in the 2,3,7,8-positions (including 7 PCDD and 10 PCDF congeners) exhibit significant toxicity. Whereas formerly PCDD/PCDF analysis yielded estimates of specific homologues (PCDD or PCDF with the same number of chlorine substituents, regardless of their spacial arrangement), modern analysis identifies individual congeners, or at least homologues with chlorine substituents at the 2,3,7,8-positions. The toxicologically significant PCDD/PCDF may be evaluated individually or may be evaluated by converting their concentrations to equivalent concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), or TCDD equivalents (TEQ), which are summed to yield total TEQ. Physical constants are not available for all the toxicologically significant PCDD/PCDF congeners; therefore, the physical constants for 2,3,7,8-TCDD are usually applied to the individual congeners or to the TEQ. Relevant physical properties of 2,3,7,8-TCDD are compiled below:

MW (g/mole)	log K_{ow} (unitless)	H (atm-m^3/mole)	log K_{oc} (unitless)	D_a (cm^2/s)	D_w (cm^2/s)	VP (atm)	S (mg/L)
322.0	6.80[a]	5.4E-23[b]	6.6[b]	ND	4.9E-6[b]	8.4E-13[b]	3.2E-4[b]

ND = no data.
[a]U.S. Environmental Protection Agency (EPA), 1992, ***Dermal Exposure Assessment: Principles and Applications***, Interim Report, Office of Research and Development, Washington, DC, EPA/600/8-91/011B, January.
[b]Montgomery, J.H., 1996, ***Groundwater Chemicals Desk Reference, Second Edition***, Lewis Publishers, New York.

Data were not located regarding the toxicokinetics of all the PCDD/PCDF that may be identified in environmental media; however, TCDD is used as a surrogate for other members of these chemical classes. Estimates of the GI absorption of TCDD range from 50 to 86% of the administered dose in rats; comparable data were obtained for hamsters (EPA, 1985, ATSDR, 1989). The efficiency of absorption is greater when the test material is given in a corn oil vehicle (70-86%) than when it is incorporated in the diet (50-60%) or soil (quantification not provided) (EPA, 1985). An approximate GAF of 0.9 is adopted for this evaluation. Dermal absorption of TCDD in methanol by rats after 24 hours approximated 40% of that absorbed by the GI tract after an equivalent dose in ethanol (EPA, 1985). EPA (1998) recommends an ABS of 0.03 for TCDD, which is used herein. EPA (1992) provides a PC of 1.4E+0 cm/hour and a τ of 8.1E+0 hours.

The PCDD/PCDF are among the compounds that bioaccumulate in food chain pathways and are of special concern for biomagnification from sediment in benthic fish. EPA (1995b) reported log K_{ow} and BSAF values for the PCDD/PCDF as follows:

PCDD/PCDF Congener	log K_{ow}	BSAF Value
2,3,7,8-TCDD	7.02[a]	0.059
1,2,3,7,8-PeCDD	7.50	0.054
1,2,3,4,7,8-HxCDD	7.80	0.018
1,2,3,6,7,8-HxCDD	7.80	0.0073
1,2,3,7,8,9-HxCDD	7.80	0.0081
1,2,3,4,6,7,8-HpCDD	8.20	0.0031
OCDD	8.60	0.00074
2,3,7,8-TCDF	6.5	0.047
1,2,3,7,8-PeCDF	7.0	0.013
2,3,4,7,8-PeCDF	7.0	0.095
1,2,3,4,7,8-HxCDF	7.5	0.0045
1,2,3,6,7,8-HxCDF	7.5	0.011
2,3,4,6,7,8-HxCDF	7.5	0.040
1,2,3,7,8,9-HxCDF	7.5	0.037
1,2,3,4,6,7,8-HpCDF	8.0	0.00065
1,2,3,4,7,8,9-HpCDF	8.0	0.023
OCDF	8.80	0.001

[a]Note that this value differs slightly from that provided by U.S. Environmental Protection Agency (EPA), 1992, ***Dermal Exposure Assessment: Principles and Applications***, Interim Report, Office of Research and Development, Washington, DC, EPA/600/8-91/011B, January.

TCDD = tetrachlorodibenzo-p-dioxin, PeCDD = pentachlorodibenzo-p-dioxin, HxCDD = hexachlorodibenzo-p-dioxin, HpCDD = heptachlorodibenzo-p-dioxin, OCDD = octachlorodibenzo-p-dioxin, TCDF = tetrachlorodibenzofuran, PeCDF = pentachlorodibenzofuran, HxCDF = hexachlorodibenzofuran, HpCDF = heptachlorodibenzofuran, OCDF = octachlorodibenzofuran.

The BSAF values may be applied to the individual PCDD/PCDF congeners to derive a "BSAF" that is applied to the total TEQ.

The only effect in humans clearly attributable to TCDD is chloracne (ATSDR, 1989). The epidemiological data, however, also associate exposure to TCDD with hepatotoxicity and neurotoxicity, although the association is not strong. In animals, toxicity of TCDD is most commonly manifested as a wasting syndrome with thymic atrophy terminating in death, with a large number of organ systems showing non-specific effects. Chronic treatment of animals with TCDD or a mixture of two isomers of hexachlorodibenzo-p-dioxin results in liver damage. Immunologic effects may be among the more sensitive endpoints of exposure to the PCDDs in animals. TCDD is a developmental and reproductive toxicant in animals. Data were not located regarding the noncancer toxicity of the other PCDDs or PCDFs. No verified or provisional noncancer toxicity values were located for any of the PCDD/PCDF.

Data regarding the carcinogenicity of TCDD to humans, obtained from epidemiologic studies of workers exposed to pesticides or to other chlorinated chemicals known to be contaminated with TCDD, are conflicting (ATSDR, 1989). The interpretation of these studies is clouded because exposure to TCDD was not quantified, multiple routes of exposure (dermal, inhalation, oral) were involved, and the workers were exposed to other potentially carcinogenic compounds. TCDD, however, is clearly carcinogenic in animals, inducing thyroid, lung and liver tumors in orally treated rats and mice (EPA, 1985). Similarly, oral treatment with a mixture of two hexachlorodibenzo-p-dioxin isomers induces liver tumors in rats and mice. On the basis of the animal data, TCDD and the hexachlorodibenzo-p-dioxins were assigned to EPA cancer weight-of-evidence Group B2 (probable human carcinogen). All the PCDD/PCDFs are treated as probable human carcinogens.

EPA (1997) presents provisional oral and inhalation SFs for TCDD of 1.5E+5 per mg/kg-day, based on the incidence of liver and lung tumors in an oral study in rats. The inhalation SF, however, is adjusted to 1.1E+5 per mg/kg-day to account for route-specific differences in absorption. In the absence of satisfactory congener-specific cancer data, EPA (1989) derived TEFs for the other PCDDs and PCDFs, by assuming that all manifestations of toxicity of all members of these classes are mediated by a common mechanism, i.e., binding to the intracellular AH receptor of target cells. Applying the TEFs to the SF for TCDD, SFs are estimated for the other PCDD/PCDF as follows:

Compound	TEF	Oral SF (per mg/kg-day)	Inhalation SF (per mg/kg-day)
Mono-, di- and tri-CDD	0	NA	NA
2,3,7,8-TCDD	1	1.5E+5	1.1E+5
Other TCDD	0	NA	NA
2,3,7,8-PeCDD	0.5	7.5E+4	5.5E+4
Other PeCDD	0	NA	NA
2,3,7,8-HxCDD	0.1	1.5E+4	1.1E+4
Other HxCDD	0	NA	NA

Compound	TEF	Oral SF (per mg/kg-day)	Inhalation SF (per mg/kg-day)
2,3,7,8-HpCDD	0.01	1.5E+3	1 1E+3
OCDD	0.001	1.5E+2	1.1E+2
Mono-, di- and tri-CDF	0	NA	NA
2,3,7,8-TCDF	0.1	1.5E+4	1.1E+4
Other TCDF	0	NA	NA
1,2,3,7,8-PeCDF	0.05	7.5E+3	5.5E+3
2,3,4,7,8-PeCDF	0.5	7.5E+4	5.5E+4
Other PeCDF	0	NA	NA
2,3,7,8-HxCDF	0.1	1.5E+4	1.1E+4
Other HxCDF	0	NA	NA
2,3,7,8-HpCDF	0.01	1.5E+3	1.1E+3
Other HpCDF	0	NA	NA
OCDF	0.001	1.5E+2	1.1E+2

TEF = toxicity equivalency factor, SF = slope factor, CDD = chlorinated dibenzo-p-dioxin, NA = not applicable, TCDD = tetrachlorodibenzo-p-dioxin, PeCDD = pentachlorodibenzo-p-dioxin, HxCDD = hexachlorodibenzo-p-dioxin, HpCDDs = heptachlorodibenzo-p-dioxin, OCDD = octachlorodibenzo-p-dioxin, TCDF = tetrachlorodibenzofuran, PeCDF = pentachlorodibenzofuran, HxCDF = hexachlorodibenzofuran, HpCDF = heptachlorodibenzofuran, OCDF = octachlorodibenzofuran

The TEFs were derived not from cancer data, but from in vitro data such as enzyme induction, which is hypothetically related to the carcinogenic mode of action. For example, the TEF of 0.001 for OCDD and OCDF is based on the appearance of "dioxin-like" effects and detectable levels of OCDD late in a 13-week study in male rats treated with OCDD, and on in vitro evidence of enzyme induction (EPA, 1989).

References for PCDD/PCDF

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U.S. Environmental Protection Agency (EPA), 1989, ***Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and -Dibenzofurans (CDDs and CDFs) and 1989 Update***, Prepared by the Risk Assessment Forum for the Office of Health and Environmental Assessment, Washington, DC, EPA/625/3-89/016, NTIS PB90-145756/AS.

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U.S. Environmental Protection Agency (EPA), 1995b, ***Great Lakes Water Quality Initiative, Technical Support Document for the Procedure to Determine Bioaccumulation Factors***, EPA.820.8.95.CC5, PB95-187290.

U.S. Environmental Protection Agency (EPA), 1997, ***Health Effects Assessment Summary Tables, FY 1997 Update***, Office of Solid Waste and Emergency Response, 9200.6-303 (97-1), EPA-540-R-97-036, NTIS No. PB97-921199.

U.S. Environmental Protection Agency (EPA), 1998, ***Region 9 Preliminary Remediation Goals (PRGs) 1998***, online, http://www.epa.gov/region 09/.

POLYCHLORINATED BIPHENYLS (PCBs)

The PCBs are a class of **SVOCs** including 209 possible individual congeners, each consisting of a biphenyl structure and 1 to 10 chlorine atoms (ATSDR, 1995). The PCBs manufactured and used in the U.S. are called Aroclors. The Aroclors are mixtures of several PCB congeners and related compounds. Aroclors were used as dielectric and heat exchange agents in several open and closed systems, but since the middle 1970s, use has been restricted largely to electrical transformers and capacitors.

Analysis of PCBs in environmental media frequently involves "fingerprinting" the mixture, and reporting the result as the Aroclor(s) that most closely reflect the fingerprint(s) (ATSDR, 1995). Recently, however, more attention has been paid to analyzing and reporting individual congeners, because of the possibility that certain congeners may be dioxin-like in their action of toxicity. The Aroclors most commonly identified in environmental media include Aroclor-1016, -1221, -1232, -1242, -1248, -1254, -1260, -1262, and -1268. Relevant physical properties are compiled below:

MW (g/mole)	log K_{ow} (unitless)	H (atm-m^3/mole)	log K_{oc} (unitless)	D_a (cm^2/s)	D_w (cm^2/s)	VP (atm)	S (mg/L)
Aroclor-1016							
257.9[a,b]	5.6[b]	2.9E-4[b]	4.96[c]	ND	6.8E-6[c]	5.3E-7[b]	4.2E-1[b]
Aroclor-1221							
200.7[a,b]	4.7[b]	3.5E-3[b]	2.44[c]	ND	7.5E-6[c]	8.8E-6[b]	5.9E-1[b]
Aroclor-1232							
232.2[a,b]	5.1[b]	8.64E-4[c]	2.83[c]	ND	7.2E-6[c]	5.34E-6[b]	4.5E-1[b]
Aroclor-1242							
266.5[a,b]	5.6[b]	5.2E-4[b]	4.59[c]	ND	6.1E-6[c]	5.34-7[b]	2.2E-1[b]
Aroclor-1248							
299.5[a,b]	6.2[b]	2.8E-3[b]	5.64[c]	ND	6.6E-6[c]	6.5E-7[b]	5.7E-2[b]
Aroclor-1254							
328[a,b]	6.5[b]	2.0E-3[b]	5.00[c]	ND	5.6E-6[c]	1.01E-7[b]	3.5E-2[b]
Aroclor-1260							
375.7[a,b]	6.8[b]	4.6E-3[b]	6.42[c]	ND	5.3E-6[c]	5.33E-8[b]	4.1E-2[b]
Aroclor-1262							
389[a,b]	ND	ND	ND	ND	ND	ND	5.2E-2[b]
Aroclor-1268							
453[a,b]	ND	ND	ND	ND	ND	ND	3.0E-1[b]

ND = no data.
[a]Average molecular mass for the proportions of individual congeners in the commercial product.
[b]Agency for Toxic Substances and Disease Registry (ATSDR), 1995, ***Update Toxicological Profile for Polychorinted Biphenyls***, Draft for Public Comment, U.S. Department of Health and Human Services, Atlanta, Georgia, August.
[c]Montgomery, J.H., 1996, ***Groundwater Chemicals Desk Reference, Second Edition***, Lewis Publishers, New York.

The PCBs are among the compounds that bioaccumulate in food chain pathways and are of special concern for biomagnification from sediment in benthic fish. EPA (1995) reported a BSAF for total PCBs of 1.85 for trout in the Great Lakes ecosystem. The BSAF of 1.85 is applied to all PCBs in this evaluation.

Toxicokinetic data from laboratory animals suggests that the efficiency of GI absorption is roughly inversely related to the degree of chlorination (ATSDR, 1995). The GI absorption of mono-to hexachlorinated biphenyls exceeds 90 percent. Dichlorobiphenyl GI absorption efficiency is approximately 95 percent, but the absorption efficiency of octachlorobiphenyl approximates only 75 percent. GI absorption efficiency of Aroclor-1254 approximates 85.4 percent in ferrets and greater than 90 percent in monkeys. These data generally support the GAF of 0.9, which is adopted for all PCBs in this evaluation. However, an oral-to-dermal absorption factor of 1 is used for the cancer evaluation to be consistent with the application of the cancer SF recommended by EPA (1999).

The PCBs appear to be readily absorbed by the skin when applied as neat compound or mixed with a suitable vehicle (ATSDR, 1995), but efficiency falls off when soil is the medium of exchange. The EPA (1992) recommended ABS of 0.06 for PCBs is used in this evaluation. EPA (1992) provides PC and τ values for 4-chlorobiphenyl and hexachlorobiphenyl. Generally, the more highly chlorinated PCB congeners are the more persistent in the environment; therefore, the PC of 7.1E-1 cm/hour and the τ of 1.4E+1 hours for hexachlorobiphenyl are applied to all PCBs in this evaluation.

The acute oral toxicity of the PCBs is low to moderate, as indicated by LD_{50} values in laboratory animals ranging from 750 mg/kg (mink) to 4250 mg/kg (rats) (ATSDR, 1993). Death appears to be due to respiratory depression and dehydration from diarrhea.

The best known incident involving oral exposure by humans is the "Yusho" incident in Japan, in which persistent chloracne, gastrointestinal irritation and central nervous symptoms followed ingestion of cooking oil contaminated with PCBs (Gaffey, 1983). Further investigation, however, revealed that concentrations of polychlorinated dibenzofurans (PCDF) and polychlorinated quaterphenyls in the cooking oil were similar to those of PCBs, which confounds the interpretation of the results of this study.

Prolonged oral exposure of laboratory animals leads to liver damage, signs of chloracne, immunological effects, and neurological impairment, particularly of the young. A verified oral RfD for Aroclor-1254 of 2E-5 mg/kg-day for chronic oral exposure is based on a LOAEL of 5E-3 mg/kg-day associated with chloracne and related signs and immunological effects in monkeys treated with the test material in gelatin capsules for over five years (EPA, 1999). An uncertainty factor of 300 was applied. Confidence in the RfD is medium. The immune system and skin are considered the target organs for prolonged oral exposure to Aroclor-1254. A verified oral RfD of 7E-5 mg/kg-day for Aroclor-1016 is based on a NOAEL of 7E-3 mg/kg-day in a long-term perinatal and neurobehavioral toxicity study in monkeys. An uncertainty factor of 100 was applied to the NOAEL. The LOAEL (2.8E-2 mg/kg-day) was associated with low birth weights. The fetus is considered the sensitive target tissue for prolonged oral exposure to Aroclor-1016. Confidence in the oral RfD is medium.

Occupational exposure to PCBs, which involved both inhalation and dermal exposure, was associated with upper respiratory tract and ocular irritation, loss of appetite, liver enlargement and increased serum concentrations of liver enzymes, skin irritation, rashes and chloracne, and, in heavily exposed female workers, decreased birth weight of their infants (ATSDR, 1995). Concurrent exposure to PCB contaminants, such as PCDFs, confound the interpretation of the occupational exposure studies. Rats, mice, rabbits and guinea pigs intermittently exposed to Aroclor-1254 vapors exhibit moderate liver degeneration, decreased body weight gain and slight renal tubular degeneration; however, the accuracy of the reported exposure concentration is in doubt. Neither verified nor provisional chronic inhalation RfC values are available.

EPA (1999) classified PCBs in cancer weight-of-evidence Group B2 (probable human carcinogen) based on adequate evidence for liver tumors in laboratory animals and inadequate data in humans. EPA (1999) established a tiered approach for estimating the cancer potency of exposure to the PCBs. For the high risk tier, A SF of 2.0E+0 per mg/kg-day is verified as an upper-bound for exposure to PCBs via ingestion in the food chain, ingestion of soil or sediment, inhalation of dust or aerosol, or dermal contact with soil or sediment if an absorption factor is applied. In addition, the SF of 2.0E+0 per mg/kg-day is used for any congeners considered to be persistent or acting in a dioxin-like manner, and for any early life exposures. The high risk tier SF for central tendency (CT) analyses is 1.0E+0 per mg/kg-day. EPA (1999) verified an upper-bound SF of 4.0E-1 per mg/kg-day for the low risk tier, which includes ingestion of water-soluble congeners, inhalation of evaporated congeners, and dermal exposure if no absorption factor is applied. A SF of 3E-1 per mg/kg-day is recommended for the low risk CT evaluation. The SF of 2.0E+0 per mg/kg-day is used for all exposure scenarios and exposure routes in this evaluation because analytical data that demonstrate the absence of dioxin-like or persistent congeners are not available, and the exposure of children or youths is plausible.

<u>References for PCBs</u>

Agency for Toxic Substances and Disease Registry, (ATSDR), 1995, ***Update Toxicological Profile for Polychlorinated Biphenyls***, Draft for Public Comment, U.S. Public Health Service, Atlanta, Georgia, August.

Gaffey, W.R., 1983, "The epidemiology of PCBs," In: ***PCBs: Human and Environmental Hazards***, F.M. D'itri and M.A. Kamrin, Eds., Boston: Butterworth Publishers.

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U.S. Environmental Protection Agency (EPA), 1995, ***Great Lakes Water Quality Initiative, Technical Support Document for the Procedure to Determine Bioaccumulation Factors***, EPA.820.8.95.CC5, PB95-187290.

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FINAL
SCREENING ECOLOGICAL RISK ASSESSMENT FOR IRP SITE 39/HARMON SUBSTATION ANDERSEN AIR FORCE BASE GUAM

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July 1999

Executive Summary

This screening level ecological risk assessment has been prepared in support of the U.S. Air Force Installation Restoration Program. The scope of work for this project includes an evaluation of potential risks to biota that may presently or in the future utilize IRP Site 39/Harmon Substation, Harmon Annexes, Andersen Air Force Base, Guam. This document is in support of the Remediation Verification Report for the site.

This risk assessment was performed in accordance with federal and regional EPA guidance on ecological risk assessment (EPA, 1992; EPA, 1997; EPA, 1998a; Callahan, 1998). Both conservative and realistic assumptions were used in the evaluation of potential risk to biota that may use the site either at present or in the future. Ecological receptors selected for analysis were a generic plant, insectivorous small mammal, omnivorous small mammal, predatory mammal, insectivorous bird, and a predatory reptile. Emphasis in this assessment was on the protection of upper trophic level receptors.

The results of this screening level risk assessment indicate no inorganics, volatile organic compounds, polycyclic aromatic hydrocarbons (PAH), or polychlorinated biphenyls (PCB) present significant risk to terrestrial receptors at this site. Potential risks to insectivorous birds from exposures to 4,4'-DDE and 4,4'-DDT were initially identified under the most conservative modeling conditions; however, the evaluation of uncertainties associated with these predictions makes such predictions of risk dubious and the actual risk is probably negligible. The screening level assessment initially identified potential risk to all wildlife receptors from exposures to dioxins and furans. Factors associated with uncertainties and ecological significance support the conclusions that these risk predictions for the insectivorous bird and predatory mammal (and thereby indirectly predicted for the predatory reptile) are overestimations and that the actual risks to these receptors are negligible. The same is probably also true for the omnivorous small mammal. However, the predicted risk to the insectivorous small mammal was relatively high, and if this taxa is present on the site, it may be adversely affected by exposure to dioxins and furans. Because the site is small, highly disturbed, and is not located in important natural habitat, and because neither of the small mammal receptors represent ecologically significant or protected species, it is concluded that the overall ecological risks at this site are negligible and that there is adequate information to conclude that no further investigation or remediation are required.

Table of Contents

Table of Contents (Continued)

List of Tables

List of Figures

List of Abbreviations/Acronyms

AFB	Air Force Base
bgs	below ground surface
BHC	benzene hexachloride
BTV	background threshold value
COPEC	constituent of potential ecological concern
d	day
DDD	1,1-dichloro-2,2-bis(p-chlorophenyl)ethane
DDE	1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene
DDT	1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane
Dept.	Department
EPA	Unites States Environmental Protection Agency
F	Fahrenheit
ft.	feet
HpCDD	heptachlorodibenzo-p-dioxin
HpCDF	heptachlorodibenzofuran
HQ	hazard quotient
HxCDD	hexachlorodibenzo-p-dioxin
HxCDF	hexachlorodibenzofuran
in.	inch(es)
IRP	Installation Restoration Program
K_{ow}	octanol/water partition coefficient
kg	kilogram(s)
km	kilometer
LOAEL	lowest-observed-adverse-effect level
log	logarithm
m	meter(s)
MCL	maximum concentration level
mg	milligram(s)
mph	miles per hour
NOAEL	no-observed-adverse-effect level
OCDD	octachlorodibenzo-p-dioxin
OCDF	octachlorodibenzofuran
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxin
PCDF	polychlorinated dibenzofuran
PeCDD	pentachlorodibenzo-p-dioxin
PeCDF	pentachlorodibenzofuran
POL	petroleum, oils, and lubricants
PRG	preliminary remediation goal
SVOC	semivolatile organic compound
TCDD	tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofuran

List of Abbreviations/Acronyms (Continued)

TEF	toxicity equivalency factor
TEQ	toxicity equivalency
TPH	total petroleum hydrocarbon
UCL	upper confidence limit
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound
WHO	World Health Organization
°	degree

1.0 Introduction

This screening level ecological risk assessment was performed to address the potential impact on biota from exposure to chemical contaminants associated with Installation Restoration Program (IRP) Site 39/Harmon Substation, located in the Harmon Annexes, Andersen Air Force Base (AFB), Guam. This document is in support of the Remediation Verification Report for the site. It specifically addresses potential risks to ecological receptors associated with soils from the site that have recently undergone polycyclic aromatic hydrocarbon (PAH) and polychlorinated biphenyl (PCB) remediation. No assessment has been previously performed to address potential ecological risks at this site. Therefore, the intent of this assessment was to focus on potential risks to biota which may utilize the site either at present or in the future based on soil sampling data collected during and after site remediation. Most species at the site are introduced, non-native species, that infrequently utilize this highly disturbed site. The potential exists, however, for habitat conditions to improve in the future followed by greater utilization by wildlife within the area.

The ecological risk assessment methodology used in this assessment generally follows U.S. Environmental Protection Agency (EPA) ecological risk assessment guidance (EPA, 1992; EPA, 1997; EPA, 1998a) and that recommended by EPA Region 9 (Callahan, 1998). The Guam EPA does not currently have its own ecological risk guidance (Richman, 1999). Both conservative and realistic assumptions were used in the evaluation of potential risk to biota that may use the site either at present or in the future. This assessment contains a Problem Formulation section that provides the introduction to the risk evaluation process. Components addressed within the Problem Formulation section include a discussion of the environmental setting, site history, selection of constituents of potential ecological concern (COPECs), a discussion of fate and transport potential, potential ecological receptors, complete exposure pathways, and assessment and measurement endpoints.

Problem Formulation is followed by the evaluation of exposure, toxicity, and predicted risks. The characterization of exposure and toxicity are components of the Analysis Section of the risk assessment. The Risk Characterization section contains discussions of the uncertainty and ecological significance associated with the assessment of ecological risk for the site. The ecological risk evaluation process concludes with a Scientific/Management Decision Point that provides a recommendation of efforts that should follow this screening level ecological risk assessment. Figure 1 illustrates the ecological risk assessment methodology used in this report

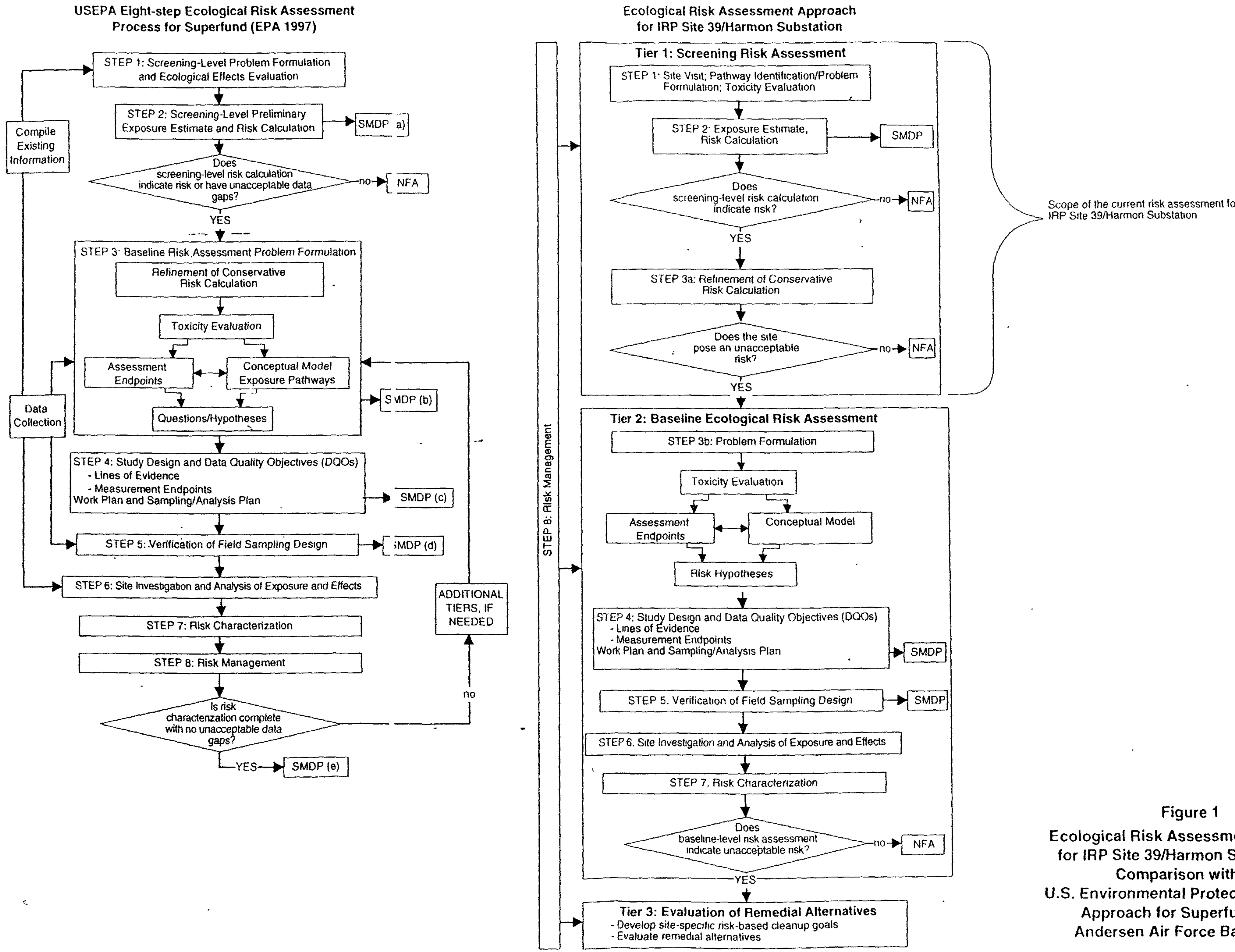

Figure 1
Ecological Risk Assessment Approach for IRP Site 39/Harmon Substation in Comparison with the U.S. Environmental Protection Agency's Approach for Superfund Sites, Andersen Air Force Base, Guam

as it relates to that presented in the Superfund Guidance for Ecological Risk Assessment (EPA, 1997). The scope of this risk assessment is limited to the Tier 1 screening level assessment.

2.0 Problem Formulation

Problem Formulation is the first step of the ecological risk assessment process. This step includes a discussion of the physical and ecological characteristics of the site, selection of COPECs, potential fate and transport mechanisms, selection of ecological receptors, exposure pathways, and ecologically relevant assessment and measurement endpoints. As discussed in Section 2.8, the overall management goal of this assessment is to ensure the integrity of the biological community within the terrestrial habitats of IRP Site 39/Harmon Substation. The Problem Formulation step basically sets the stage for the evaluation of exposure and estimation of risk which are discussed in Sections 3 and 4, respectively.

2.1 Physical Setting

IRP Site 39/Harmon Substation is a 600-by-600-foot (approximately 8-acre) tract of vacant land located within the Harmon Annexes section of Andersen AFB. Figure 2 presents a map of the site in relation to the entire base and the island of Guam. Photographs of the site are presented in Attachment 1. The following information on the physical characteristics of IRP Site 39/Harmon Substation is based on information from various internal reports. The primary resources utilized were the "Agency Draft Site Characterization Summary Report for IRP Site 39/Harmon Substation" (EA, January 1998a) and the "Integrated Natural Resources Management Plan for Andersen Air Force Base, Guam" (USFWS, 1995). The physical characteristics of the site and surrounding area are included in this report so that potential receptors and potential exposure pathways for contaminants can be evaluated. Additional information associated with the physical setting of the site is presented in the Remediation Verification Report.

2.1.1 Climate

Guam lies at 13°27' north latitude, approximately 900 miles north of the equator. Guam's climate is almost uniformly warm and humid year-round (USFWS, 1995). Temperatures on Guam generally range from 72 degrees Fahrenheit (°F) to 91°F on a daily basis, with cooler temperatures during the dry season. Relative humidity is between 65-75 percent in the afternoon rising to 85-100 percent at night. There are generally two distinct climatic seasons on Guam. Rainfall is heaviest from July through November, with January through May considered the dry season. December and June are considered transitional months. Mean annual rainfall varies considerably among years, averaging 86 inches (in.). Approximately 20-25 percent falls in the dry season and 63-66 percent in the wet season with the remainder in the transitional months. Severe droughts and intense downpours can be expected on Guam. Large rain events associated

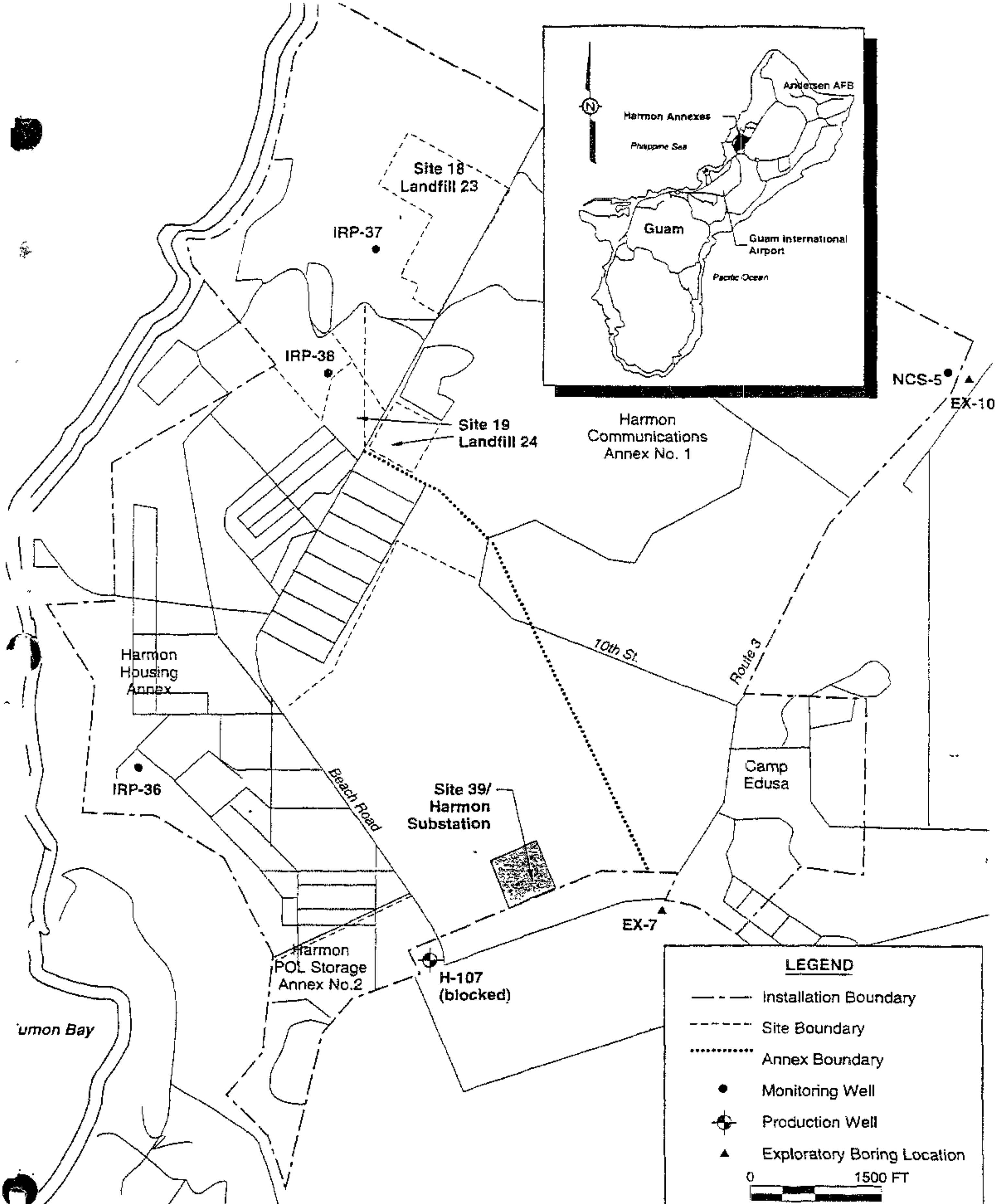

Figure 2

Location Map, IRP Site 39/Harmon Substation, Harmon Annexes, Andersen Air Force Base, Guam

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with typhoons are not uncommon with as much as 24.9 in. of precipitation for a 24-hour period (Ward et al., 1965). The period of greatest drought hazard is February through April.

Winds are typically from the east at less than 10 miles per hour (mph) but are variable in late summer. Typhoons (winds from 75-150 mph) or supertyphoons (maximum surface winds over 150 mph) can hit Guam any time, but are more likely to occur during the rainy season with the highest frequency of occurrence from July through September. Wind damage, flooding, and high surf conditions can be associated with these storms.

2.1.2 Geology

The island of Guam has two distinct physiographic provinces, the Northern Limestone Plateau and the Southern Volcanics. The Adelup Fault separates these two provinces. South of the fault, the island is composed almost entirely of volcanics, and north of the fault the island is composed almost entirely (excluding portions of Mt. Santa Rose) of limestone with karst topography (Marianas or Barrigada Formations).

The Harmon Annexes are situated on a limestone plateau with surficial karstic features. The surface geology consists of the Pliocene/Pleistocene-aged Mariana Limestone. The Mariana Limestone consists of four facies: (1) reefal facies comprised of massive corals which grew in situ (especially common to the cliff line) with cavernous and vuggy porosity; (2) detrital facies comprised of coarse to fine grain reefal detritus deposited lagoonal setting; (3) molluscan facies comprised of a fine grain detritus, with abundant casts and molds of mollusks and pelecypods, deposited in a lagoonal setting and (4) fore-reef facies comprised of well bedded friable to indurated white foraminiferal limestone deposited as fore-reef sand (Tracey et al., 1964).

The Miocene-aged Barrigada Limestone lies beneath the Mariana Limestone (approximately 300 to 400 feet [ft.] below ground surface [bgs]). It is the principal water bearing unit underlying the northern half of Guam, and it is highly permeable and porous with numerous voids, fissures, and solution openings. The Barrigada Limestone consists of a well-lithified to friable medium to coarse grain foraminiferal limestone (Tracey et al., 1964).

The Eocene/Oligocene-aged Alutom Formation unconformably underlies the Barrigada Limestone (approximately 600 to 800 ft. bgs) and consists of well bedded fine to coarse grain volcanic and volcaniclastic rocks (Tracey et al., 1964).

2.1.3 Topography and Surface Water

The Harmon Annexes are located on an undulating limestone plateau with sinkholes and other karstic features. Due to the high permeability of the limestone, streams and surface waters do not exist. The nearest surface water body is the Philippine Sea, which is more than 1 mile west of the site. Topography at IRP Site 39/Harmon Substation is hummocky with man-made basins and mounds. The surface elevation ranges from 269 to 240 ft. above mean sea level. The overall gradient is slight (less than 3 percent) and slopes toward the north. The topography on the eastern portion of the site is undulating man-made mounds and depressions. The permeability and porosity of the limestone in this area is very high, and as a result, no rivers or streams are present.

2.1.4 Soil

Guam has five major types of soils including laterite (volcanic soils); riverine mud; coral rock; coral sand; and argillaceous soils (mixtures of coral and laterite soils) (USFWS, 1995). At Andersen AFB, the substrate is primarily limestone. A thin layer of soil (approximately 4-10 in.) covers the northern limestone. Soils at Andersen AFB are rapidly drained, well aerated, highly alkaline, and high in calcium.

In the area of IRP Site 39/Harmon Substation, the undisturbed soil is a Guam cobbly clay loam. The loam is well drained and overlies porous limestone. Typically 5 to 10 percent of the surface is covered by gravels and cobbles (Young, 1988). The A horizon is characterized by a dark reddish clay loam about 6 in. thick. The B horizon is a dusky red gravelly clay loam about 6 in. thick. The C horizon or limestone bedrock, is often found at a range of 6 to 16 in. bgs. The soil is neutral to mildly alkaline, and permeability of the soil is moderately rapid. However, the soil at the site has been reworked and appears to be urban fill. In many areas, there is evidence that organic material such as plants and wood were burned. There is very little (if any) undisturbed Guam cobbly clay loam at the site.

2.1.5 Groundwater

Groundwater in the Harmon Annexes and other portions of northern Guam occur as a freshwater lens lying above seawater, the two separated by a layer of brackish water. All precipitation, except that portion lost to evapotranspiration, contributes to the groundwater. The recharge to the aquifer by precipitation is estimated to average 0.77 million gallons/day/km^2 (Mink, 1976).

Groundwater in the Harmon Annexes has been monitored for contaminants as part of the IRP. There are three groundwater monitoring wells (IRP-36, -37, and –38) and two public supply wells (H-1 and NCS-5) sampled biannually for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals. None of the wells are located on the site and the closest well, IRP-35, is located approximately 4,100 ft. northwest of the site. Historical groundwater analytical results from the five wells have reported carbon disulfide and chloroform, which were attributed to laboratory contamination (the carbon disulfide was demonstrated to be the result of leaching from gloves used at the laboratory). Chromium and nickel concentrations were detected above their maximum contaminant level (MCL). These are suspected to be the result of corrosion of stainless steel screen and piston pumps. Trichloroethene was detected in a sample from H-1 at a concentration less than its MCL. The most recent sample collected from H-1 in April 1997, did not have detectable concentrations of VOCs, SVOCs, or pesticides.

2.1.6 Land use

The property surrounding the Harmon Substation site is either for industrial use (including the substation) or is unused and moderately vegetated. The property is accessible to the public, but there is no residential use adjacent to the site. With the exception of the electric substation, and the petroleum, oils and lubricants (POL) and electrical right of ways, the surrounding properties are not developed and not utilized for recreation. The Micronesia Mall is located across Marine Drive, 800 ft. south of the site.

2.2 Ecological Setting

The habitat at IRP Site 39/Harmon Substation is highly disturbed, with close to one-third of the site currently unvegetated as a result of remediation activities. Three types of disturbance communities are generally recognized as developing on disturbed ground on Guam. These are the Mixed Shrub Forest, the Mixed Herbaceous Vegetation, and the Elephant Grass (*Pennisetum purpureum*) Grassland (ICF Kaiser, 1996). The current vegetation on the site is probably best described as Mixed Herbaceous Vegetation. Vegetation cover on the site is of low to moderate density, consisting of low-lying vines, sword grass, short grass, ferns and small trees. Part of the site has maintained grass and is used as a right of way for overhead electric conduit. Animals encountered at the IRP Site 39/Harmon Substation include monitor lizards (*Varanus indicus*), island gecko (*Gehyra oceanic*), Pacific slender-toed gecko (*Nactus pelagicus*), Micronesian gecko (*Perochirus ateles*), Slevin's skink (*Emoia slevinis*), moth skink (*Lipinia noctua*), and brown tree snakes (*Boiga irregularis*). Although future succession of the plant community at the site is largely dependent upon future use or disturbance of the site and surrounding lands, it is not expected to revert to a native vegetation climax community.

There are several threatened and endangered species on Guam; however, no federally endangered or threatened species or habitats of concern are associated with IRP Site 39 (Hirsh, 1997; ICF, 1994). Table 1 lists the Federal and Guam Endangered species found on Andersen AFB.

2.3 Site History

Historical aerial photographs and Air Force personnel interviews indicate the site was operated in the 1950s for the disposal of household and office wastes. Specific information on disposal practices and historical land use at the site is scant, though materials found at the site indicate it was used for surface disposal and "landfilling" of construction-related wastes (debris and metal containers), and electrical components. Excavation activities in 1989 related to a POL line provide some of the earliest details on the types of waste disposed of at IRP Site 39 (OHM, March 1998). Other, more specific information on the nature and extent of potential contaminants is available from investigation activities performed during 1997 (EA, January 1998b) and subsequent remediation and sampling activities performed during 1998. The information available from these sources is detailed below. Additional information regarding site history is presented in the Remediation Verification Report.

2.3.1 1989 POL Excavation

The POL excavation activities along the northern edge of the site, as reported in an Action Memorandum (OHM, March 1998), uncovered "several containers." Subsequent soil sampling and analysis for PCBs revealed no detectable levels in the area. No other information was available for this excavation, nor does it appear that other types of sampling occurred at this time.

2.3.2 1997 Investigation

The investigation and sampling activities detailed within the following subsections became the "drivers" for additional sampling activities. This section summarizes the findings from the 1997 investigation. Section 2.3.3 presents a summary of remediation and sampling activities at the site following this investigation.

2.3.2.1 Site Reconnaissance

Site reconnaissance revealed that the site had been extensively excavated and graded as a landfill and small borrow area. The following types of items were discovered on the site: 5-gallon pails, 30- and 55-gallon steel drums (sometimes up to 5 layers of stacked drums), asphalt/tar seeps,

Table 1

List of Federal and Guam Endangered Species Found on Andersen Air Force Base[a]

Common Name	Scientific Name	Status[b]	Potential Presence IRP Site 39[c]
Mammals			
Little Mariana Fruit Bat	*Pteropus tokudae*	Endangered[d]	No
Mariana Fruit Bat	*Pteropus m. marianas*	Endangered	No
Birds			
Vanikoro Swiftlet	*Aerodramas vanikorensis bartschi*	Endangered	No
Mariana Common Moorhen	*Gallinola chloropuz guami*	Endangered	No
Guam Broadbill or Flycatcher	*Myiagra freycineti*	Endangered[d]	No
Mariana Crow	*Corvus kubaryi*	Endangered	No
Guam Micronesian Kingfisher	*Halcyon c. cinnamomna*	Endangered[e]	No
Guam Rail	*Rallus owstoni*	Endangered[e]	No
Guam Bridled White-eye	*Zosterops c. conspicillata*	Endangered[d]	Unlikely
White-throated Ground Dove	*Gallicolumba x. xanthonura*	Guam Endangered[d]	Unlikely
Mariana Fruit Dove	*Ptilinopus roseicapilla*	Guam Endangered[d]	No
Micronesian Starling	*Alponis opaca guami*	Guam Endangered	Unlikely
Rufous-fronted Fantail	*Rhipidura rufifrons uraniae*	Guam Endangered[d]	No
Cardinal Honeyeater	*Myzomela cardinalis saffordi*	Guam Endangered[d]	No
Trees			
Hayun-lago	*Serianthes nelsonii*	Endangered	No
Ufa-halomtano	*Heritiera longipetiolata*	Guam Endangered	No
Reptiles			
Green Sea Turtle	*Chelonia mydas*	Threatened	No
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Endangered	No
Leatherback Sea Turtle	*Dermochelys cariacea*	Endangered	No

[a] Source of information specific to Andersen Air Force Base is USAF (1995).
[b] Information on status was obtained from Virginia Tech (1998).
[c] Information on the potential for a species to occur at a site was based on habitat information presented in Virginia Tech (1998) and Pratt, et al. (1989).
[d] Presumed extinct on Guam.
[e] In captive breeding programs. (No longer found in wild).

electrical power components (including utility power poles), steel piping, nails, ash, an oil/water separator containing liquid and sludge, and a stormwater outfall.

2.3.2.2 Geophysical Survey and Excavated Test Trenches and Pits

A geophysical survey indicated magnetic anomalies at the site and these areas (21) were excavated with test trenches. Other test trenches and pits were excavated to determine the extent of fill areas. The survey, in combination with the test trenches and pits excavated during the investigation uncovered similar materials as observed in the reconnaissance: buried drums, 5-gallon buckets, construction debris, and tar and asphalt. Some of the drums contained asphalt tar, while others were empty or their contents listed as "unknown." There are an "indeterminate number" of drums at the site. The fill areas appear to be limited to the northern portion of the site, which was used as a landfill and surface disposal area, and a portion of the west-central area of the site. Soil sampling (Section 1.2.4) was concentrated in these fill areas and around the stormwater outfall.

2.3.2.3 Soil Gas Survey

Soil gas sampling for the presence of VOCs was performed at 33 grid node locations and suspected fill areas or mounds at approximately 4 ft. bgs. No target analytes were detected (see Basewide Sampling and Analysis Plan, Appendix A, Table A-1 for a list of target analytes). A passive soil gas sampler was installed slightly north and west of the center of the site and allowed to record soil gas concentrations at approximately four feet bgs for 18 days. No VOCs were detected during this survey, either.

2.3.2.4 Soil Sampling

Thirty-four surface and subsurface soil samples (0.25 – 10 ft. bgs) were collected at the site for SVOCs, metals, and total organic compounds. The subsurface soil samples were also analyzed for VOCs. Additionally, some of the 34 samples were selected for dioxin analysis. Surface samples were biased to fill areas and depressions. Subsurface samples were collected from the bottom of test trench excavations.

Samples from the fill areas indicated that PAHs and manganese were present above either EPA Region 9 Preliminary Remediation Goals (PRGs) or site-specific metals Background Threshold Values (BTVs). Dioxin concentrations exceeding PRGs were found adjacent to the stormwater outfall and in a sample of buried ash. Direct sampling of the oil/water separator indicated the presence of petroleum hydrocarbons, pesticides, and lead. Although no Resource Conservation and Recovery Act (RCRA) listed wastes were discovered during the sampling, the unknown contents of many of the drums precludes the assumption that no RCRA listed wastes are present at the site.

Metals. One sample contained a level of manganese which exceeded the BTV of 3,150 milligrams per kilogram (mg/kg). Mercury concentrations in five samples were detected in the range of 0.28-0.62 mg/kg, but were later qualified as "estimated values" due to the presence of mercury in the equipment blank.

SVOCs. SVOCs (particularly PAHs) were detected in ten samples, five of which exceeded PRGs. The following lists include all detected SVOC compounds not qualified as "estimated values":

- Fluoranthene
- Pyrene
- Benzo(a)anthracene
- Chrysene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Benzo(a)pyrene
- Ideno(1,2,3-cd)pyrene
- Dibenz(a,h)anthracene

Dioxins. Dioxins were detected in 14 of the 26 samples analyzed for dioxins. These "hits" were in the area designated as the landfill and in the stormwater outfall basin. The following three dioxins were identified: 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (HpCDD), 1,2,3,4,6,7,8,9-octachlorodibenzo-p-dioxin (OCDD), and 1,2,3,4,6,7,8-heptachloro-dibenzofuran (HpCDF).

2.3.2.5 Sludge and Water Sampling

These samples were taken from the sediment (sludge) and water in a buried vessel believed to be an oil/water separator or a septic tank. A listing of detected metals, VOCs, SVOCs, pesticides, and PCBs is included below. Additionally, one water sample had a detectable level of total petroleum hydrocarbon (TPH)-diesel.

Metals. Copper, lead, and mercury were detected above the BTVs in one or both of the sludge samples. Iron and manganese were detected above secondary maximum concentration levels in two of three water samples.

VOCs/SVOCs. Detectable levels of the following analytes were found in one sludge sample: 1,2,4-trimethylbenzene, 1,4-dichlorobenzene, and napthalene. Information for this same sludge sample listed a detectable amount of 1,4-dichlorobenzene as an SVOC. One of the water samples contained detectable levels of toluene.

Pesticides/PCBs. The following pesticides/PCBs were detected in one or more of the sludge samples and one of the water samples:

- alpha-BHC
- alpha-chlordane
- gamma-chlordane
- 4,4'-DDE
- 4,4'-DDD
- 4,4'-DDT
- dieldrin
- endrin
- endrin aldehyde
- enosulfan II

2.3.3 Post-1997 Excavation and Sampling History

The field reconnaissance and sampling of 1997 provided target areas and contaminants for remediation activities conducted during 1998 and 1999. Table 2 details these activities. The following seven areas of the site were remediated: A6, C2, E6, the stormwater outfall, the oil/water separator location, the buried drum area, and the miscellaneous container area. Additionally, a site-wide sampling and analysis effort was completed to determine dioxin concentrations.

Remediation efforts at a given location were typically followed by the sampling of both the soil piles created during the excavation process (if any) and the in-place soils. Remediation continued until the sampling indicated that soil concentrations no longer exceeded the PRGs or BTVs set for the contaminants being removed. Thus, it can be expected that later sampling dates have lower levels of contaminants than those determined during earlier sampling efforts.

The oil/water separator excavation was backfilled using approximately 1,000 cubic yards of clean import fill and 100 cubic yards of soil that was removed during the excavation of the empty 55-gallon drums and piping situated immediately north of the oil/water separator. The 100 cubic yards of soil was characterized by sample number HAS39S278. This sample had

Table 2

Summary of Excavation and Sampling Activities at IRP Site 39/Harmon Substation, 1998 and 1999

Date(s)	Sample Location	Sample Analyte(s)	Number of Samples[a,b]	Samples Reported As	Memo Information[c]
Site Wide Surface Soil Sampling					
7/16-7/17/98	Regular Grid Locations Across the Site	Dioxins	5 (lab)	EPA TEQ	OHM 9/11/98 and 2/11/99
8/4-8/7/98		Dioxins	15 (lab)	WHO TEQs	
12/7/98		Dioxins	7 (lab)	WHO TEQs	
PAH Hot Spot at C2					
5/19/98	Grid Node C2	PAHs/PCBs	7 (lab) 22 (field)	Various PAHs and PCBs (lab) Total PAHs and PCBs (field)	OHM 10/23/98
9/98		Excavation of PAH contaminated area			
9/11/98		Post-excavation confirmation	10 (lab) 10 (field)	Various PAHs (lab) Total PAHs (field)	
PAH Hot Spot at A6					
6/22/98	Grid Node A6	PAHs/PCBs	6 (lab)	Total PAH and PCB	OHM 10/26/98a
9/98		Excavation of PAH/PCB contaminated area			
9/14/98		Post-excavation confirmation	2 (lab) 2 (field)	Various PAHs (lab) Total PAHs (field)	
PAH Hot Spot at Stormwater Outfall					
4/28/98	Grid Cell Bounded by Nodes A2, A3, B2, and B3	Dioxins	5 (lab) 20 (field)	Total TEQ, WHO TEQs and RGS Screen (lab) RGS Screen (field)	OHM 10/26/98b
5/29/98		PAHs/PCBs	5 (lab) 18 (field)	Total TEQ, WHO TEQs (lab) Total PAHs and PCBs (field)	
8/98		Excavation of contaminated area			
9/1 and 9/3/98		Post-excavation confirmation	4 (lab)	Various PAHs	
PAH Hot Spot at E6					
7/98	Grid Node E6	PAHs/PCBs	6 (field)	Total PAHs and Total PCBs	OHM 10/26/98c
8/98		Excavation of contaminated area			
8/14/98		Post-excavation confirmation	3 (lab)	Various PAHs	
Oil/Water Separator Confirmation					
7/6/98	1[st] Confirmation Event	TRPH, PCBs, Lead	21 (lab and field)	Total TRPH, Various and Total PCBs, and Total Lead (lab) Total PCBs (field)	OHM 11/19/98
9/2/98	2[nd] Confirmation Event	PCBs, Pesticides, PAHs, Lead	22	Various PCBs, Pesticides, PAHs, and Total Lead	
10/5/98	3[rd] Confirmation Event	PCBs, Pesticides, PAHs, Lead	11	Various PCBs, Pesticides and PAHs	
10/21/98	4[th] Confirmation Event	Pesticides	1	Various Pesticides	

Table 2 *(Continued)*

Summary of Excavation and Sampling Activities at IRP Site 39/Harmon Substation, 1998 and 1999

Date(s)	Sample Location	Sample Analyte(s)	Number of Samples[a,b]	Samples Reported As	Memo Information[c]
Buned Drum Area Remediation					
8/28/98	Confirmation Sampling (1st Confirmation Event)	PAHs/PCBs	16 (lab and field)	Various PAHs and PCBs (lab) Total PAHs (field)	
		Dioxins	8 (lab)	WHO TEQs	
9/25/98	Potholes Screening	PAHs	21 (field)	Total PAHs	
10/6-10/8/98	Excavation Walls Screening	PAHs	3 (lab and field) 24 (field)	Various PAHs (lab) Total PAHs (field)	OHM 12/4/98
10/20/98	Excavation Floor Confirmation Sampling (2nd Confirmation Event)	PAHs	10 (field and lab)	Various PAHs (lab) Total PAHs (field)	
12/28/98	3rd Confirmation Event	PAHs	8 (lab)	Various PAHs	OHM 1/16/99
1/26 and 1/28/99	Test Pit Investigation	PAHs	60 (lab)	Various PAHs	OHM 2/24/99
4/21/99	4th Confirmation Event	PAHs	16 (lab)	Various PAHs	No memo issued
5/5 and 5/6/99	5th Confirmation Event	PAHs	8 (lab)	Various PAHs	
Miscellaneous Container Area					
11/5/98	Segments 1 and 2 Confirmation Sampling	PAHs	5 (lab) 5 (field)	Various PAHs (lab) Total PAHs (field)	
		Dioxins	1 (lab)	WHO TEQs	
	Segments 1 and 2 Soil Stockpiles	PAHs	4 (lab) 4 (field)	Various PAHs (lab) Total PAHs (field)	OHM 12/7/98
		Dioxins	1 (lab)	WHO TEQs	
11/6/98	Segment 1 Screening	PAH	8 (field)	Total PAHs	
12/15 and 12/21/98	Segments 3 and 4, Confirmation Sampling	VOCs, SVOCs, Pesticides, PAHs/PCBs	5 (lab)	Various Analytes	
12/21/98		Dioxins	1 (lab)	WHO TEQs	OHM 1/22/99
12/15 and 12/21/98	Segments 3 and 4, Soil Stockpiles	VOCs, SVOCs, Pesticides, PAHs/PCBs	5 (lab)	Various Analytes	
12/21/98		Dioxins	1 (lab)	WHO TEQs	
4/13/99	Power Pole Area, Soil Stockpiles	VOCs, SVOCs, Pesticides, PAHs/PCBs	1 (lab)	Various Analytes	No memo issued

[a]Duplicates included in the count.
[b]Laboratory analyses and in-field screening tests are indicated as "lab" and "field", respectively.
[c]The memo being referenced can be found in the References (Section 1.5).

detections of gamma-chlordane; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT; and Aroclor-1260. Assuming an approximate 10:1 mixing of the clean fill with the on-site fill, the average concentrations of these constituents within the backfill soil are all less than the average concentrations for all other soil samples from IRP Site 39 used to evaluate ecological risk (evaluating the Aroclors as total PCB concentration). Because of the rehandling of these soils, sample HAS39S278 was not included in the sample database used to evaluate ecological risk.

2.3.4 Data Validation

Data used in this assessment were only from those samples relevant to the conditions of the site following past removal activities. Data validation is an after-the-fact, independent, systematic process of evaluating data. The validation process for data from Site 39/Harmon Substation was divided into two phases. The first phase considered field data to verify the completeness, accuracy, and representativeness of field sampling. The second phase dealt with analytical chemical validation. The important field data reviewed in the validation process were:

- Field logbooks
- Specific field forms for sample collection and handling
- Analytical Request/Chain-of-custody
- Field instrument calibrations
- Field personnel training
- Variances and surveillance of field activities.

The primary analytical data and parameters reviewed in the validation process were:

- Organic constituent analyses:
  - Holding times and preservation
  - Gas chromatography or high performance liquid chromatography performance
  - Initial and continuing instrument calibration
  - Surrogate recoveries
  - Internal standards
  - Method blanks
  - Laboratory control samples
  - Matrix spikes and matrix spike duplicates
  - Compound quantitation and identification
  - Field duplicate precision
- Inorganic constituent analyses:
  - Holding times and preservation
  - Instrument performance checks

- Initial and continuing calibrations
- Matrix spike and matrix spike duplicate evaluations
- Inductively coupled plasma serial dilution and interference checks
- Laboratory control sample checks
- Duplicate sample analysis
- Compound quantitation and identification
- Field duplicate precision

A subset of the data was validated by a third party (Jacobs Engineering, Engineers and Constructors, Sacramento, California). The remaining sample data were validated by Contractor chemists assigned to the project experienced in data validations protocols. Detailed data quality assessment reports are available for all data packages containing data used for risk assessment purposes.

All post-remediation environmental sampling data were evaluated for suitability for use in the risk assessment. Analytical results for chemicals were reported using Air Force Center for Environmental Excellence and Contract Laboratory Program data qualifiers. Chemicals flagged with a "U" qualifier were considered to be not detected, or detected at a concentration below the normal, random "noise" of the analytical instrument. Estimated quantitative results such as those identified by a "J" qualifier are used in the assessment. The "J" qualifier describes an estimated value when a compound is present (spectral identification criteria are met), but at values less than the contract-required quantitation limit, or when quality control samples suggest that the sample results may be in error (e.g., when spike samples are outside of required limits or when holding times are just outside limits). Data with a "UJ" qualifier were treated as not detected for the purposes of data evaluation and risk assessment. If validation of the data reveals that samples must be rejected (assigned an "R" qualifier), the rejected data were not used for the risk assessment.

2.4 Constituents of Potential Ecological Concern

Confirmatory sampling (summarized in Table 2) was conducted in 1998 and 1999 to address residual contamination in soil following the removal of PAH and PCB "hot spots" and other remediation actions. These samples formed the basis for this risk assessment. Samples were selected for inclusion in this assessment based on depth. The soil depth considered in this assessment is 0 to 5 ft. bgs, which is expected to be the depth interval where the potential for exposure to plants and wildlife is the greatest. When only composite boring samples encompassing this depth interval were available for a given area, these data were also used in the identification of COPECs and determination of exposure concentrations. The COPECs

Table 3

Soil Sampling Results and Exposure Point Concentrations for Constituents of Potential Ecological Concern Andersen Air Force Base, Guam

Constituent	n[a]	Frequency of Detection[b]	Maximum Concentration[c]	95-percent UCL Concentration[c,d]
Inorganics				
Lead	11	91	5.65E+1	4.41E+1
Volatile and Semivolatile Organics				
Acetone	7	43	3.70E-2	2.84E-2
Anthracene	53	11	2.94E-2	3.92E-3
Benzo(a)anthracene	54	41	4.88E+0	2.84E-1
Benzo(a)pyrene	53	42	8.75E-2	2.21E-2
Benzo(b)fluoranthene	53	49	1.26E-1	3.23E-2
Benzo(k)fluoranthene	53	38	4.11E-2	1.40E-2
Chrysene	53	38	4.11E-2	1.40E-2
Dibenzo(a,h,)anthracene	52	2	4.80E-2	9.11E-3
Fluoranthene	60	30	1.99E-1	1.24E+0
Indeno(1,2,3-cd)pyrene	53	38	2.07E-1	3.42E-2
Methylene chloride	7	100	1.23E-2	9.49E-3
Phenanthrene	7	14	6.90E+0	4.41E+0
Pyrene	60	35	1.39E+1	9.89E-1
Pesticides				
gamma-Chlordane	18	17	1.90E-3	9.97E-4
4,4'-DDD	18	50	2.09E-2	9.78E-3
4,4'-DDE	18	89	1.35E+0	3.42E-1
4,4'-DDT	18	89	8.22E-2	3.99E-2
Dieldrin	18	28	8.50E-3	4.28E-3
Endrin aldehyde	18	6	5.00E-3	2.45E-3
Heptachlor epoxide	18	17	4.95E-3	1.59E-3
Polychlorinated Biphenyls				
Aroclor-1254	22	14	2.08E-1	4.61E-2
Dioxins/Furans				
2,3,7,8-TCDD	41	37	1.80E-6	5.30E-7
2,3,7,8-TCDF	41	71	9.70E-6	2.04E-6
1,2,3,7,8-PeCDD	41	66	3.67E-5	4.85E-6
1,2,3,7,8-PeCDF	41	56	4.35E-5	4.83E-6
2,3,4,7,8-PeCDF	41	59	4.47E-5	5.28E-6
1,2,3,4,7,8-HxCDD	41	73	1.46E-4	1.54E-5
1,2,3,4,7,8-HxCDF	41	100	2.68E-4	3.44E-5
1,2,3,6,7,8-HxCDD	41	98	1.91E-3	1.64E-4
1,2,3,6,7,8-HxCDF	41	98	1.46E-4	1.78E-5
1,2,3,7,8,9-HxCDD	41	93	2.92E-4	3.45E-5
1,2,3,7,8,9-HxCDF	41	49	3.52E-5	4.67E-6
2,3,4,6,7,8-HxCDF	41	100	4.29E-4	4.53E-5
1,2,3,4,6,7,8-HpCDD	41	100	6.30E-2	5.27E-3
1,2,3,4,6,7,8-HpCDF	41	100	3.88E-2	3.24E-3
1,2,3,4,7,8,9-HpCDF	36	69	1.54E-4	1.84E-5
OCDD	34	100	5.85E-1	5.82E-2
OCDF	34	100	3.01E-1	2.74E-2

Table 3 *(Concluded)*

Soil Sampling Results and Exposure Point Concentrations for Constituents of Potential Ecological Concern Andersen Air Force Base, Guam

[a]Number of samples used to determine exposure point concentrations for ecological receptors.

[b]In percent.

[c]In milligrams per kilogram soil.

[d]Nondetections were included at one half the reported detection limit.

UCL = Upper confidence limit of the mean.

Pesticides:

- DDD = 1,1-dichloro-2,2-bis(p-chlorophenyl)ethane.
- DDE = 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene.
- DDT = 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane.

Dioxins and furans:

- TC = Tetrachloro-.
- PeC = Pentachloro-.
- HxC = Hexachloro-.
- HpC = Heptachloro-.
- DD = dibenzo-p-dioxin.
- DF = dibenzofiuran.

identified for IRP Site 39/Harmon Substation are presented in Table 3. All detected organic analytes were included as COPECs. These consist of VOCs, SVOCs (all being PAHs), organochlorine pesticides, PCBs, and polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs). Lead (total) was the only inorganic analyte included in the confirmatory sample analyses and was included as a COPEC. Table 3 also lists the maximum measured concentrations from the samples evaluated for ecological risk and the 95-percent upper confidence limits (UCL) for the COPECs. The maximum concentration was used as the most conservative exposure point concentration, while the 95-percent UCL was used secondarily as a conservative estimate of the mean exposure concentration for the site. For statistical calculations, the nondetections were included at one half the reported detection limits.

2.5 *Fate and Transport Potential*

The potential fate and transport of chemicals in surface and subsurface soils from IRP Site 39/Harmon Substation to other locations and media is of key significance in addressing potential exposure to ecological receptors at the site. As illustrated in the conceptual site model (Figure 3), surface water runoff is insignificant, infiltration/percolation into groundwater is expected to be insignificant at the site. No surface water bodies are adjacent to the site, therefore, transport to aquatic habitats is not expected to occur. Direct contact with contaminated soil is expected to be the major route of transfer of contaminants from environmental media to biota. Biota exposed to COPECs at the site may serve as a food source to higher trophic level organisms. This constitutes contaminant transport through the food web.

2.6 *Ecological Receptors*

Ecological receptors in this evaluation were restricted to those species that use or have the potential to use the site either now or in the future. Because soils from the site contain compounds that can biomagnify through the food-chain, such as chlorinated pesticides, PCBs, dioxins, and furans, upper trophic level receptors were considered of greatest concern in this assessment. A generalized food web for the site is presented in Figure 4. The receptors, or groups of organisms selected, represent various levels of the trophic structure within the terrestrial habitat of IRP Site 39/Harmon Substation. As recommended by EPA (1997), trophic level position is emphasized to a greater extent than specific species in the selection of ecological receptors. Although specific species are used for exposure modeling purposes, the intent is to ensure protection of various species within a given trophic level. Emphasis is placed on indigenous/endemic species and special status species in the selection of trophic levels and receptor species. Because of the variety of plants at the site and the limited amount of phytotoxicity data available in the open literature, a generic terrestrial plant will be used to represent the plant species at the site. Wildlife receptors used to represent the major trophic levels at the site were:

- Musk shrew (*Suncus murinus*)—insectivorous small mammal
- Norway rat (*Rattus norvegicus*)—omnivorous small mammal
- Feral dog (*Canis familiaris*)—predatory mammal
- Mangrove monitor lizard (*Varanus indicus*)—predatory reptile
- Micronesian starling (*Aplonis opaca*)—insectivorous bird

Musk Shrew. The musk shrew is found in Asia, as well as on Guam (McCoid et al., 1994). Not much is known about this particular species of shrew. Information about North American shrews, however, indicates the following about their life habits. They are small mammals that have high metabolic rates and can consume approximately their body weight in food each day (about 0.03 kg in the case of the musk shrew) (EPA, 1993; Silva and Downing, 1995). Most species are primarily vermivorous (consume earthworms) and insectivorous (consume insects), but some also eat small birds and mammals. Common food items of the shrew include earthworms, slugs, snails, and insects. Less common are plants, fungi, millipedes, centipedes, and arachnids. Shrews occupy a variety of habitats, including arid chaparral, open fields, woodlots, marshy wetlands, and forest streams. Some species burrow underground while others nest in tree stumps, logs, rocks, or debris piles (Burt and Grossenheider, 1976).

The musk shrew was selected as a receptor species because of its small size, high metabolic rate, terrestrial nature, and insectivorous diet. The small size of the shrew makes it likely that individuals of this species will have home ranges that are smaller than the Harmon Substation site (i.e., less than about 8 acres). Their high metabolic rates, and the consequently high food consumption rate, result in higher potential exposures to COPECs for shrews on the site. These exposures through food ingestion are further emphasized in this species by its insectivorous diet and, because it is terrestrial, by its expected high rate of incidental soil ingestion. The musk shrew is used to represent insectivorous mammals in the potential food web at IRP Site 39 and is used as a potential prey item for predators.

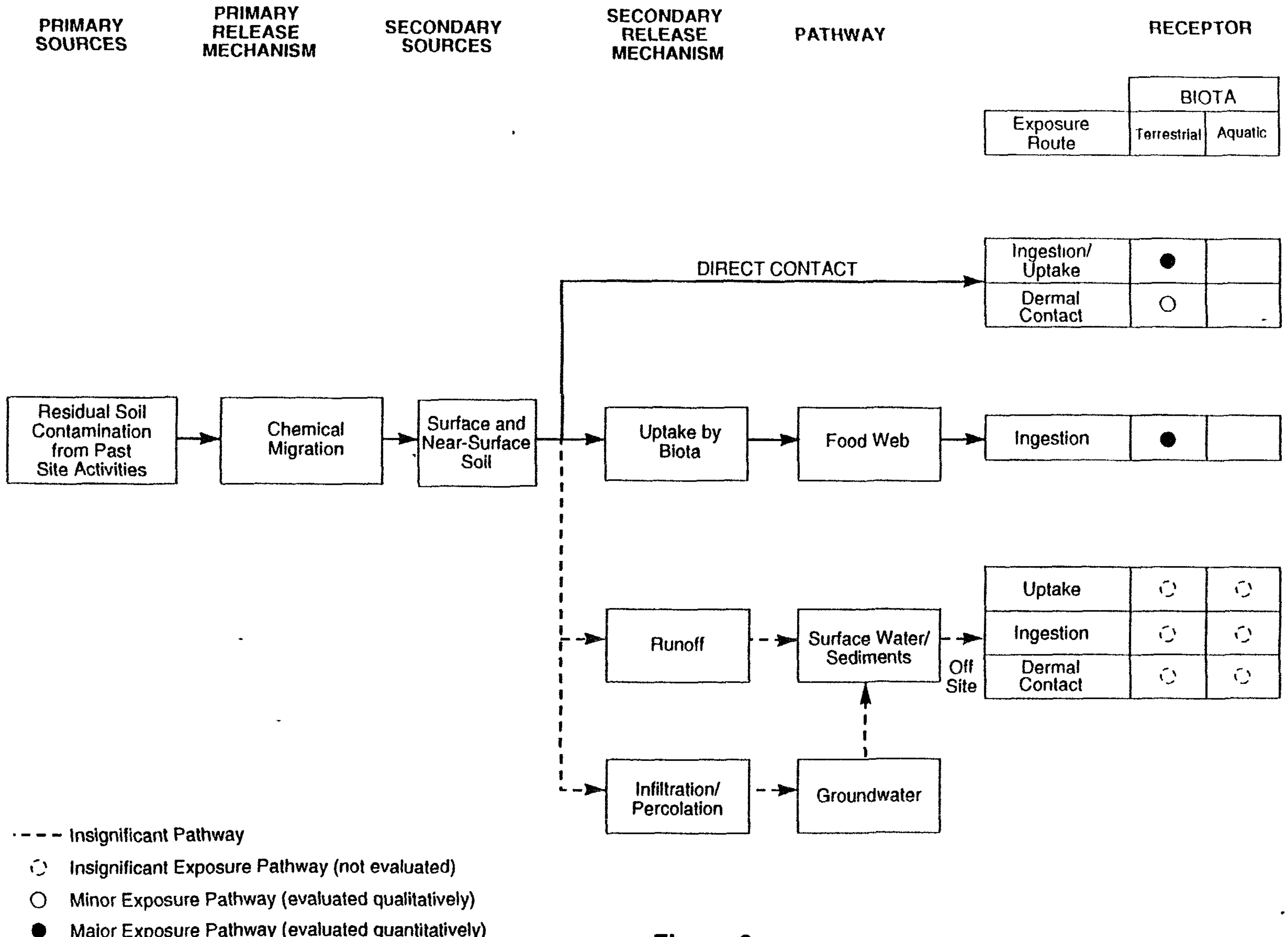

Figure 3

Conceptual Model for Terrestrial Habitat of IRP Site 39/Harmon Substation, Andersen Air Force Base, Guam

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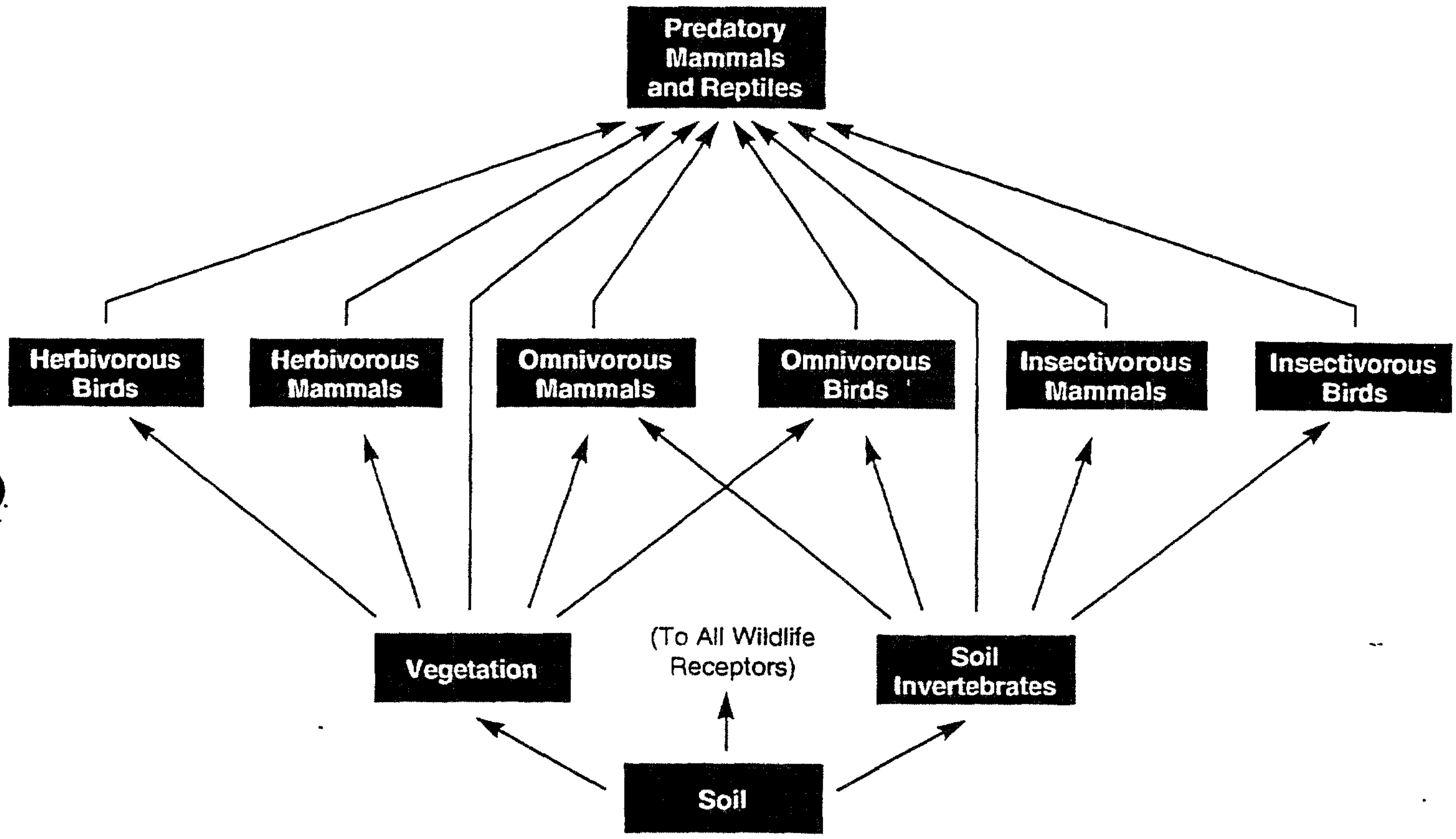

Figure 4
Generalized Food Web for the Terrestrial Habitat at
IRP Site 39/Harmon Substation, Anderson Air Force Base, Guam

Norway Rat. The Norway rat is common throughout the world in sewers and coastal wharfs. It flourishes in areas of commerce and urban human settlement. It is a relatively large rodent weighing about 0.25 kg and reaching 0.40 meter (m) in length. Most Norway rats are grayish-brown but it is also familiar as the white laboratory rat. Norway rats are poor climbers and seldom frequent trees. They nest in burrows less than two feet deep (Van Riper and Van Riper, 1982).

The Norway rat was selected as a receptor species to represent omnivorous mammals in the food web, which are likely to comprise a larger fraction of the diet of the predators at the site than are shrews. Like the shrew, the size of the Norway rat makes it likely that individuals of this species will have home ranges that are smaller than the Harmon Substation site. Their broader dietary habits and lower food requirements (per unit of body weight) provides a contrasting exposure scenario to that of the shrew for this site. This species represents potential risks to other species of rodents (particularly rats) that may inhabit the site.

Feral Dog. Feral dogs are domestic canines that have known little or no human contact. Not much is known about their activities on Guam. They range freely on other Pacific islands, sometimes in packs. These animals can be ferocious and on rare occasions have been known to attack humans. Feral packs tend to associate in areas where human settlements are established, such as at the edge of towns and cities (Van Riper and Van Riper, 1982). On Guam, feral dogs are said to have reached substantial densities. It has been estimated that the population reached 30,000 at one time. Prey items include herbivorous ungulates, such as pigs, sheep, and possibly even cattle where those are available. Other prey can include birds, domestic fowl, deer, rodents, and monitor lizards (McCoid et al., 1994; Van Riper and Van Riper, 1982). Body weight and size for Guam's feral dogs are unknown. Those on Hawaii are small, probably weighing about 12 kg.

The feral dog was selected to represent the larger, mammalian predators in the food web at this site. Other such species include feral cats and (to some extent) feral pigs. These species have been introduced into the ecosystems of Guam and have probably been detrimental to the native species. Of these, only the feral pig is considered of economic value because it is hunted on the island. The feral dog, however, was selected to represent this trophic guild because its smaller size and more carnivorous diet will conservatively represent the exposures to the feral pig. Little is known of the numbers and importance of feral cats on Guam.

Mangrove Monitor Lizard. There are about 40 species of monitor lizards in the world. Approximately two-thirds of them are from Australia and the other third is from Africa, the Middle East, tropical Asia and some Pacific Islands (RHR, 1998). Monitors range in size from about 0.5 to 3 m in length. They are diurnal and are most commonly found in aquatic habitats. Some monitors have been seen swimming in the ocean (Wildlife Associates, 1999). The mangrove monitor lizard, the only monitor species found on Guam, ranges geographically from extreme northeastern Australia, New Guinea, and the Solomon, Palau, Caroline, Marshall to the Mariana Islands (McCoid et al., 1994). Some authorities speculate that this species was introduced to Guam prehistorically, others estimate only 300 years ago. Evidence suggests that monitor populations have declined on Guam since the early 1960's (McCoid et al., 1994).

On Guam, the mangrove monitor lizard reaches 1.5 m in length. It is an omnivorous and opportunistic feeder. Documented prey items include insects, snails, rats, crabs, shrews, earthworms, slugs, skinks and geckos and their eggs, snakes, wild birds and their eggs, domestic fowl and their eggs, squid, toads, and the brown tree snake. The latter preys in turn on the mangrove monitor lizard (USAF, 1995; McCoid and Witteman, 1993; McCoid et al., 1994). Threats to the mangrove monitor lizard on Guam are believed to include the brown tree snake, poisonous toads, feral dogs, effects of urbanization, and the effects of introduced species, such as the declines in monitor's prey base caused by the introduced brown tree snake. It was selected as receptor in this risk assessment because it represents the largest terrestrial predator on the island that may predate European contact.

Micronesian starling. The Micronesian starling is a chunky, short-tailed black bird with a heavy, slightly curved bill. The subspecies *Aplonis opacus guami* is endemic to the Mariana Islands. This bird is not federally listed as threatened or endangered but is listed as endangered by the Government of Guam. It was once the most numerous land bird on the island, but is now found only in the housing areas at Andersen AFB and in the area to the south of the main base (USAF, 1995). The Micronesian starling feeds mainly on papaya fruit and seeds, but will also eat insects. It nests from January through June in the cavities of trees and rocky cliffs. Threats to its survival include the brown tree snake, rats, and monitor lizards.

The Micronesian starling was selected to represent insectivorous birds that may forage at IRP Site 39. Although its diet is more general, if not more herbivorous, than other possible choices, it was selected because it is native to Guam and is listed as endangered by the Government of Guam. In addition, it currently survives in and around urbanized areas of Andersen AFB and therefore, has a higher potential for occurring in the area of IRP Site 39 in the future if the populations can increase. Although the native yellow bittern (*Ixobrychus sinensis*) may also occur on site, use of the starling with similar food habits and smaller body weight make it a more conservative receptor for exposure/risk assessment purposes. Other native species that may fill similar roles are either highly limited in geographic range or possibly extinct. These include the Mariana crow (*Corvus kubaryi*), the Guam broadbill (*Myiagra freycineti*), and the rufous fantail (*Rhipidura rufifrons*). The Mariana crow was once common throughout Guam in forested areas and coconut plantations, but is now confined to the localized area of limestone cliff forests at Andersen AFB, with only about 50 individuals left (USAF, 1995). The Guam broadtail and rufous fantail may be extinct since none have been observed in recent years.

2.7 Exposure Pathways

Routes of exposure for the ecological receptors are illustrated in Figure 3. Possible routes of exposure include:

- Dermal
- Direct uptake by roots or through the shells of eggs
- Ingestion
- Inhalation

Ground nesting birds and lizards, small mammals, and rooting mammals, such as feral pigs, may be dermally exposed to COPECs in surface soil at the site. Dermal exposure to birds and small mammals is, however, expected to be limited because of their frequent grooming/preening activities. Reptiles periodically shed their outer skin, with the frequency of shedding dependent upon their growth rate. These provide mechanisms which are likely to reduce dermal exposure. In order to err on the side of conservatism, incidental ingestion of soil was conservatively overestimated in order to compensate for the absence of a quantitative evaluation of dermal exposure for these species.

Potential uptake through the shells of bird and reptile eggs is difficult to estimate because of the scarcity of data in this area. Researchers with the U.S. Geological Survey are currently investigating PCB uptake through turtle shells (e.g., Henry, 1998; Gale, 1999). Although these results have not yet been published, exposure to the developing embryo is much less than that expected to occur through biomagnification and subsequent transference from the gravid female to the egg (Gale, 1999). This route of exposure was not addressed in this screening assessment.

The more significant pathways are direct uptake and ingestion. Direct uptake of soil contaminants by plant roots is expected to occur at the site. Likewise, incidental ingestion of soil by wildlife receptors and exposure through the food web are also anticipated. Because standing water does not exist at the site, exposure via consumption of water will not be addressed in this assessment. In addition, exposure in wildlife through inhalation is also considered insignificant (Sample and Suter, 1994). Inhaled soil particles are likely to become trapped in the mucus lining of the nasal cavity and throat, which may lead to subsequent ingestion. Absorption of COPECs from soil particles directly through the lungs is also expected to be insignificant with respect to daily dietary intake of soil.

Potential exposure routes for each of the selected receptors and the means by which exposure will be addressed are presented below.

Dermal/Absorption Across Epidermis or Dermis

- Generic plant—Exposure is semi-quantitatively addressed through bioaccumulation factors obtained from the literature.
- Micronesian starling—Dermal exposure is addressed through the use of a conservative soil ingestion rate.
- Musk shrew—Dermal exposure is addressed through the use of a conservative soil ingestion rate.
- Norway rat—Dermal exposure is addressed through the use of a conservative soil ingestion rate.
- Feral dog—Dermal exposure is addressed through the use of a conservative soil ingestion rate.
- Monitor lizard —Exposure is qualitatively addressed based on exposure of the starling and dog to COPECs in the environment.

Oral Ingestion

- Micronesian starling—Exposure is quantitatively evaluated as ingestion of earthworms and incidental ingestion of soil from the site.
- Musk shrew—Exposure is quantitatively evaluated as ingestion of earthworms and incidental ingestion of soil from the site.
- Norway rat- Exposure is quantitatively evaluated as ingestion of plants and earthworms and incidental ingestion of soil from the site.

- Feral dog—Exposure is quantitatively evaluated as consumption of plants, shrews, and rats and incidental ingestion of soil from the site.
- Monitor lizard—Exposure is qualitatively addressed based on comparative exposures of the feral dog and Micronesian starling to COPECs in the environment.

2.8 *Ecological Endpoints*

The overall management goal for this effort is to ensure the integrity of the biological community within the terrestrial habitats of IRP Site 39/Harmon Substation. Specifically, the goal is to ensure protection of populations of biota that may use the site at present or in the future. If a potential exists for a protected species to utilize the site in the future, then protection at the individual level is also necessary. Although no protected species are currently found on the site (Table 1), future recovery and expansion of such species (e.g., the Micronesian starling) could change this situation. In this assessment, however, the probability of this happening in the foreseeable future is considered small.

Assessment and measurement endpoints associated with the overall management goal are presented in Table 4. Assessment endpoints focus on key components within the food webs and on indigenous/endemic and protected species. Estimation of risk to plant populations is assessed through direct comparison of soil concentrations with phytoxicity benchmark values. Potential impacts on wildlife in this screening assessment are addressed through exposure modeling and the estimation of risk through the comparison of exposure estimates to literature-obtained

Table 4

Ecological Endpoints
IRP Site 39/Harmon Substation,
Andersen Air Force Base, Guam

Management Goal	Assessment Endpoint	Measurement Endpoint
• Ensure the integrity of biological communities within the terrestrial habitats of the site.	• Toxicity of soil to plants.	• Comparison of surface soil chemistry data with phytotoxicity benchmark values.
	• Toxicity of soil to terrestrial wildlife.	• Quotient method. • Probability of wide-ranging receptors adversely impacted.

toxicity information. Potential impacts on the monitor lizard are assessed qualitatively using exposure and risk estimates for the feral dog and Micronesian starling as a conservative approximations of risk to the lizard. In all cases, the likelihood of exposure (e.g., with respect to degree or frequency of site use by the receptor) will also be used to evaluate potential risk to biota.

3.0 Analysis

The Analysis Phase of this evaluation process focuses on the estimation of exposure and the examination of toxicity data relevant to the COPECs and the ecological receptors of concern. These components are key to the evaluation of potential ecological risk. Because of the absence of site-specific biological monitoring data, exposure estimates in this assessment are based on conservative models, and all toxicity benchmarks are based on information obtained from the literature.

3.1 Exposure Characterization

The purpose of exposure characterization is to describe the contact or co-occurrence of biota at the site with the COPECs. This effort focuses on specific ecological receptors and addresses the potential for these receptors to be exposed to COPECs associated with IRP Site 39/Harmon Substation. Ecological receptors that best represent biota associated with the habitats under investigation were selected in Section 2.6. Components related to exposure, such as the identification of pathways and the presentation of a conceptual model (Figure 3) and food web (Figure 4), are also presented in Section 2.

As described in Section 2.6, ecological receptors in this assessment are exclusively terrestrial. Plants that are exposed to COPECs through direct contact with potentially contaminated media do not require exposure modeling. Potential risk to these organisms will be evaluated by direct comparison of soil concentrations to toxicity benchmark concentrations for that medium.

For the shrew, rat, starling, dog, and monitor lizard the primary route of exposure was assumed to occur through ingestion of potentially contaminated food (prey organisms) and soil from the site. Therefore, the potential rate of exposure to COPECs was estimated through the modeling of COPEC transfer through the food web and to the target receptor. The exposure models described in this section are based on the habitat-specific food web shown in Figure 4. These were used to estimate the potential daily intake of COPECs by each of the wildlife receptors. Conservatisms were incorporated into the exposure modeling to ensure that the estimated exposures are more likely to overestimate the actual exposure rather than to underestimate it. Receptor-specific exposure parameters are presented in Table 5.

Table 5

Exposure Factors for Ecological Receptors
IRP Site 39/Harmon Substation,
Andersen Air Force Base, Guam

Receptor Species	Class/Order	Trophic Level	Body Weight (kg)[a]	Food Intake Rate[b]	Incidental Soil Intake	Dietary Composition[c]
Micronesian starling (*Aplonis opaca*)	Aves/ Passeriformes	Insectivore	0.0834[d]	0.0171	10.4%[e]	Earthworms: 100%
Musk shrew (*Suncus murinus*)	Mammalia/ Insectivora	Insectivore	0.03[f]	0.0048[g]	13%[h]	Earthworms: 100%
Norway rat (*Rattus norvegicus*)	Mammalia/ Rodentia	Omnivore	0.250[i]	0.0140	2.4%[j]	Plants: 50% Earthworms: 50%
Feral dog (*Canis familiaris*)	Mammalia/ Carnivora	Carnivore	12.7[k]	0.555	2.8%[l]	Plants: 5% Earthworms: 5% Shrews: 10% Rats: 80%
Mangrove monitor lizard (*Varanus indicus*)	Reptilia/ Squamata, Sauria	Carnivore	2.2[m]	0.00499	4.5%[n]	Animal prey: 100%

[a]Body weights are in kilograms wet weight.
[b]In kilograms dry weight per day. Based on allometric equations from Nagy (1987), except where noted.
[c]Dietary composition of feral dog based on information for the red fox from EPA (1993) with earthworms representing all invertebrates, shrews substituted for birds, and rats representing all mammal prey. The dietary composition for the monitor lizard is based on the animal prey with the highest COPEC concentration. All other species-specific estimations are based on general dietary trends and conservative assumptions.
[d]From Dunning (1993); mean of both sexes.
[e]From Beyer et al. (1994) for American woodcocks.
[f]From Silva and Downing (1995); average of both sexes for Guam.
[g]Based on intake rate equal to body weight with a wet-weight to dry-weight conversion factor of 0.16 (EPA, 1993)
[h]From Talmage (1999).
[i]From Silva and Downing (1995); mean of both sexes for Malaysia and Singapore.
[j]From Beyer et al. (1994) for the meadow vole.
[k]From Sample et al. (1996). Standard weight for laboratory dog.
[l]From Beyer et al. (1994) for the red fox.
[m]From Dryden (1965).
[n]From Beyer et al. (1994) for the box turtle.

The potential daily intake of COPECs by each wildlife receptor (in milligrams per kilogram receptor body weight per day [mg/kg-d]) was estimated from the concentrations of COPECs in each of the ingested media (prey and soil) and the daily ingestion rate of each medium by the receptor. The potential rate of exposure to specific compounds was determined as the sum of the compound-specific ingestion rates from all media. Conservatisms were incorporated into the modeling to ensure that the estimated exposures are more likely to overestimate the actual potential exposure rather than to underestimate it. The following describes the methods utilized for the modeling of exposure for the wildlife receptors.

Exposure of the bird and mammals through ingestion pathways was modeled using the methods described in the EPA's "Wildlife Exposure Factors Handbook" (EPA, 1993). The basic model for estimating the daily intake of a COPEC per kilogram of body weight (i.e., the estimated daily dose of the COPEC) through the ingestion pathway is as follows:

$$D_{Rx} = \frac{\sum_{k=1}^{N} C_{kx} \cdot F_k \cdot I_k}{BW_R}$$

where:

D_{Rx}	=	the estimated daily dose (mg/kg-day) of COPECs x in wildlife receptor R
C_{kx}	=	the concentration of COPECs x in the kth food type, including soil as one of these types (in mg/kg dry weight for food and soil)
F_k	=	the fraction of the kth food type that is comes from the contaminated site (assumed to be 1.0)
I_k	=	the ingestion rate of the kth food type (kg dry weight/day for food and soil)
N	=	the number of food items in the wildlife diet (including soil)
BW_R	=	the body weight of wildlife R (kg wet weight)

When multiple food items were included in the diet, I_k was determined by multiplying the total food ingestion rate of the receptor by the fraction of the diet composed of food item k. In the case of soil, I_k was determined by multiplying the total food ingestion rate by the percent incidental soil ingestion.

COPEC concentrations in plants, earthworms, shrews, and rats were modeled from the soil concentrations used as the exposure point concentrations (either the maximum soil concentration or the 95-percent UCL. These were generally modeled as linear relationships using transfer factors; however, some were derived using empirically-derived nonlinear uptake models. Table 6 presents the transfer factors for the linear models and Table 7 presents the parameters for the nonlinear models. For lead, the transfer factor for plants was from the National Council on Radiation Protection and Measurement (NCRP, 1989), while the concentrations in the earthworms and small mammals were based on nonlinear models (Sample et al., 1998a and 1998b). The transfer factors for the organic COPECs were principally derived from the logarithm (log) of the octanol/ water partion coefficient (K_{ow}), using the regression equation from Travis and Arms (1988) for the soil-to-plant transfer factor, the equation developed by Connell and Markwell (1990) for the soil-to-earthworm transfer factor, and the geometric mean regression equation derived from data presented in Garten and Trabalka (1983) for small mammals. The fraction of organic carbon in soil was conservatively estimated at 1.1 percent for the Connell and Markwell equation. Soil samples from Operable Unit 3 showed total organic carbon ranging from 1.1 to 12.2 percent (ICF Kaiser, 1996), with a mean of seven median values of 4.2 percent. A fraction of body fat was conservatively estimated at 25 percent for the estimation of whole-body COPEC concentrations in the shrew and rat. The soil-to-earthworm transfer factors for 4,4'-DDD; 4,4'-DDE; and 4,4'-DDT were set at 0.26 based on measured uptake reported by Beyer and Gish (1980). Dioxins and furans (as TCDD equivalent [see Section 3.2.2]) and PCB concentrations in earthworms and dioxins and furans (as TCDD equivalent) concentrations in small mammals were estimated using nonlinear models (Sample, et al., 1998a; Sample, et al., 1998b).

In this assessment, exposures were initially calculated under the conservative assumption that 100% of the animal's ingestion comes from the point of maximum COPEC concentration (F_k equal to 1.0). Ninety-five percent UCL values, as exposure point concentrations, were also used to provide a more realistic estimate of potential risk. The maximum and 95-percent UCL concentrations of the COPECs are presented in Table 3. In addition, the potential effects of foraging range and seasonal use on this conservative estimation are discussed in the uncertainty and ecological significance sections of the report.

3.2 Ecological Effects Evaluation

Toxicological information was obtained from several sources in order to assess potential ecological risk to biota at this site following exposure to the COPECs. Plant toxicity information was primarily extracted from Efroymson et al. (1997). Wildlife toxicity reference values were derived for birds and mammals using information presented in Sample et al. (1996) and other

Table 6

Transfer Factors for Constituents of Potential Ecological Concern at IRP Site 39, Harmon Substation Andersen Air Force Base, Guam

Constituent	log K_{ow}[a]	Soil-to-Plant Transfer Factor[b]	Soil-to-Earthworm Transfer Factor[c]	Small Mammal Uptake Factor[d]
Inorganic				
Lead	NA	9.00E-2	NL	NL
Volatile and Semivolatile Organics				
Acetone	-0.24	5.33E+1	1.13E+0	1.77E-6
Anthracene	4.45	1.04E-1	1.93E+0	2.13E-2
Benzo(a)anthracene	5.61	2.22E-2	2.21E+0	2.17E-1
Benzo(a)pyrene	6.11	1.14E-2	2.34E+0	5.91E-1
Benzo(b)fluoranthene	6.57	6.17E-3	2.47E+0	1.48E+0
Benzo(k)fluoranthene	6.84	4.31E-3	2.54E+0	2.55E+0
Chrysene	5.91	1.49E-2	2.28E+0	3.96E-1
Dibenzo(a,h,)anthracene	6.50	6.78E-3	2.45E+0	1.29E+0
Fluoranthene	4.90	5.70E-2	2.03E+0	5.24E-2
Indeno(1,2,3-cd)pyrene	6.58	6.09E-3	2.47E+0	1.51E+0
Methylene chloride	1.25	7.34E+0	1.34E+0	3.50E-5
Phenanthrene	4.57	8.84E-2	1.96E+0	2.70E-2
Pyrene	5.32	3.26E-2	2.13E+0	1.21E-1
Pesticides				
gamma-Chlordane	6.32	8.61E-3	2.40E+0	9.00E-1
4,4'-DDD	6.53	6.51E-3	2.60E-1[e]	1.37E+0
4,4'-DDE	6.53	6.51E-3	2.60E-1[e]	1.37E+0
4,4'-DDT	6.53	6.51E-3	2.60E-1[e]	1.37E+0
Dieldrin	5.37	3.05E-2	2.15E+0	1.34E-1
Endrin aldehyde	5.06	4.61E-2	2.07E+0	7.21E-2
Heptachlor epoxide	5.00	4.99E-2	2.06E+0	6.40E-2
Polychlorinated Biphenyls				
Aroclor-1254	6.04	1.25E-2	NL	5.14E-1
Dioxins/Furans				
TCDD	7.02	3.39E-3	NL	NL

[a]Logarithm of the octanol-water partition coefficient (used only with organic constituents).
[b]For organics, based on regression equation from Travis and Arms (1988). The value for lead from NCRP (1989).
[c]Calculated from the octanol-water partition coefficient based on the equation from Connell and Markwell (1990), except where noted.
[d]Based on regression of rodent uptake factors presented in Garten and Trabalka (1983) with octanol-water partition coefficient.
[e]From Beyer and Gish (1980).

NL indicates nonlinear uptake model used (see Table 7 for modeling parameters).

Table 7

Nonlinear Model Parameters for Modeling Constituents of Potential Ecological Concern in Earthworm and Mammal Tissues[a]
Andersen Air Force Base, Guam

Constituent	B_0	B_1
Earthworm models[b]		
Lead	-0.2180	0.807
PCB (Aroclor-1254)	1.410	1.361
TCDD	3.533	1.182
Musk shrew models[c]		
Lead	0.4819	0.4869
TCDD	0.8113	1.0993
Norway rat models[c]		
Lead	0.0761	0.4422
TCDD	0.8113	1.0993

[a]Models are of the form: ln [tissue concentration] = $B_0 + B_1$ ln [soil concentration], with concentrations expressed as mg/kg dry weight and ln is the natural logarithm.
[b]From Sample et al. (1998a).
[c]From Sample et al. (1998b).

literature sources and electronic databases (e.g., EPA, 1999). Much of the toxicological information used in ecological screening assessments has been summarized elsewhere (e.g., Eisler and Belisle, 1996; Eisler, 1986; Sample et al., 1996). This section addresses the specific toxicity-based reference values used in this assessment. The methodology used to derive benchmark values in the absence of published values is also presented.

3.2.1 Plant Toxicity Reference Values

Plant toxicity benchmarks are primarily based on the information provided in Efroymson et al. (1997) and (for PAHs) from Sims and Overcash (1983). The former are based on lowest-observed-adverse-effect-levels (LOAEL) using 20 percent reduction in growth as the endpoint and are limited to tests in soil, rather than tests using solutions. Although based on LOAELs, these benchmarks are considered conservative and appropriate to the screening level assessment. The endpoint is sublethal and reductions in plant growth may have no significant effects on the reproductive potential or the continued existence of a plant population. Futhermore, these benchmarks are primarily based on studies in which the chemical of interest is added freshly to a soil (in the case or inorganics, often as the most soluble salt) and is typically more bioavailable than the COPECs that have had a chance to bind with soil particles or are in a less soluble form. Toxicity values specific to plants are presented in Table 8.

3.2.2 *Wildlife Toxicity Reference Values*

As recommended by EPA (1997), no-observed-adverse-effects levels (NOAEL) for chronic oral exposure were used as benchmarks for toxic effects to wildlife (Table 8). NOAELs are defined as the maximum dosage tested that produced no effect that would be considered adverse to the long-term viability of the population. Therefore, the endpoints of particular interest in the underlying studies are those associated with reproductive health, development, and mortality. The methodology used to derive receptor-specific NOAELs is described below (Sample et al., 1996).

$$NOAEL_W = NOAEL_T \left(\frac{BW_T}{BW_W} \right)^s$$

where:

$NOAEL_W$	=	the no-observed-adverse-effect-level for the wildlife receptor species (mg/kg-day)
$NOAEL_T$	=	the no-observed-adverse-effect-level for the test species (mg/kg-day)
BW_T	=	the body weight of the test species (kg)
BW_W	=	the body weight of the wildlife receptor species (kg)
s	=	the class-specific scaling factor (s = 0.06 for mammals and –0.20 for birds [Sample and Arenal, 1999])

Toxicity studies were considered to be chronic if they are conducted over a period of 26 weeks (one half year) or more. Studies of lesser duration (i.e., 1 to 25 weeks) were considered subchronic, unless they specifically included reproductive effects as endpoints (Sample et al., 1996). When only subchronic oral NOAEL values were available, they were converted to chronic NOAEL values by applying an uncertainty factor of 0.1 (Sample et al., 1996).

In cases when only a chronic LOAEL value was available for test data, an uncertainty factor of 0.1 is used to convert it to the chronic NOAEL. If only a subchronic LOAEL was available, then an uncertainty factor of 0.01 is used to estimate the chronic NOAEL. This uncertainty factor is the product of two uncertainty factors of 0.1, one to convert the subchronic value to a chronic value and the other to convert the LOAEL to an NOAEL.

Table 8

Toxicity Benchmark Information for Constituents of Potential Ecological Concern at IRP Site 39, Harmon Substation Andersen Air Force Base, Guam

Constituent of Potential Ecological Concern	Plant Benchmark[a]	Mammalian NOAELs: Mammalian Test Species[b]	Mammalian NOAELs: Test Species NOAEL[b,c]	Mammalian NOAELs: Test Species Body Weight[b,d]	Avian NOAELs: Avian Test Species[b]	Avian NOAELs: Test Species NOAEL[b,c]	Avian NOAELs: Test Species Body Weight[b,d]
Inorganic							
Lead	50[e]	Rat	8.0	0.35	Japanese quail	1.13	0.15
Volatile and Semivolatile Organics							
Acetone	---[f]	Rat	10.0	0.35	---	---	---
Anthracene	18[g]	Mouse[h]	100[h]	0.03	---	---	---
Benzo(a)anthracene	18[g]	Mouse[i]	1.0[i]	0.03	---	---	---
Benzo(a)pyrene	18[g]	Mouse	1.0	0.03	---	---	---
Benzo(b)fluoranthene	18[g]	Mouse[i]	1.0[i]	0.03	---	---	---
Benzo(k)fluoranthene	18[g]	Mouse[i]	1.0[i]	0.03	---	---	---
Chrysene	18[g]	Mouse[i]	1.0[i]	0.03	---	---	---
Dibenzo(a,h)anthracene	18[g]	Mouse[i]	1.0[i]	1.06	---	---	---
Fluoranthene	18[g]	Mouse[h]	12.5[h]	0.03	---	---	---
Indeno(1,2,3-cd)pyrene	18[g]	Mouse[i]	1.0[i]	0.03	---	---	---
Methylene chloride	---	Rat	5.85	0.35	---	---	---
Phenanthrene	18[g]	Mouse[i]	1.0[i]	0.03	---	---	---
Pyrene	18[g]	Mouse[h]	7.5[h]	0.03	---	---	---
Pesticides							
gamma-Chlordane	---	Mouse	4.6	0.03	Red-winged blackbird	2.14	0.064
4,4'-DDD	---	Rat	0.8	0.35	Brown pelican	0.0028	3.5
4,4'-DDE	---	Rat	0.8	0.35	Brown pelican	0.0028	3.5
4,4'-DDT	---	Rat	0.8	0.35	Brown pelican	0.0028	3.5
Pesticides							
Dieldrin	---	Rat	0.02	0.35	Barn owl	0.077	0.466
Endrin aldehyde[j]	---	Mouse	0.092	0.03	Screech owl	0.01	0.181

Table 8 *(Continued)*

Toxicity Benchmark Information for Constituents of Potential Ecological Concern at IRP Site 39, Harmon Substation Andersen Air Force Base, Guam

Constituent of Potential Ecological Concern	Plant Benchmark[a]	Mammalian NOAELs			Avian NOAELs		
		Mammalian Test Species[b]	Test Species NOAEL[b,c]	Test Species Body Weight[b,d]	Avian Test Species[b]	Test Species NOAEL[b,c]	Test Species Body Weight[b,d]
Heptachlor epoxide[k]	---	Mink	0.1	1.0	---	---	---
Polychlorinated Biphenyls							
Aroclor 1254	40[e]	Oldfield mouse	0.068	0.014	Ring-necked pheasant	0.18	1.0
Dioxins/Furans							
2,3,7,8-TCDD	---	Rat	0.000001	0.35	Ring-necked pheasant	2.14	1.0

[a]In milligrams per kilogram soil.
[b]From Sample et al. (1996), except where noted.
[c]In milligrams per kilogram body weight per day.
[d]In kilograms.
[e]From Efroymson et al. (1997).
[f]--- designates insufficient toxicity data.
[g]From Sims and Overcash (1983).
[h]Based upon a toxicity information from EPA (1999).
[i]Insufficient toxicity data available for this compound. The NOAEL for benzo(a)pyrene is used as a default.
[j]Insufficient toxicity data available for this compound. The NOAEL for edrin is used as a default.
[k]Insufficient toxicity data available for this compound. The NOAEL for heptachlor is used as a default.

When possible, NOAELs for the wildlife receptor species were derived from test species that are taxonomically close to the target receptor. Therefore, bird NOAELs were derived from avian test species and mammal NOAELs were derived from mammalian test species. The chemical-specific NOAELs from toxicity studies that were used to derive toxicity reference values for the shrew, rat, dog, and starling are presented in Table 8.

Total dioxin-like toxicity for the wildlife receptors was based on the usage of wildlife toxicity equivalency factors (TEF) for PCDDs and PCDFs, as recommended by the World Health Organization (Van den Berg et al., 1998; EPA, 1998b). These TEFs are presented in Table 9. TEFs were multiplied by site-specific concentrations measured in soil and the summed toxicity equivalency (TEQ) used in the estimation of exposure. The toxicity values specific to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was used as the reference value is assessing the potential risk from exposure to all dioxins/furans.

3.2.3 Reptilian Toxicity Data

Toxicological effects data for lizards and reptiles, in general, are very limited (Meyers-Schöne, in prep.). Available data are primarily limited to radiation dose and biomarker studies with little information on how such effects relate to survival or reproduction, key toxicity endpoints for the evaluation of potential population level effects. Most reptilian toxicity data is specific to turtles. Information relevant to the PCBs indicate that turtles are able to store high concentrations of chlorinated organics (e.g., PCBs and organochlorine pesticides) in fat tissues without apparent adverse effects (Bishop et al., 1995). This may be associated with lower amounts of liver microoxygenase activity in turtles than in mammals (Walker and Ronis, 1989). In addition, the toxicity of organophosphate pesticides to reptiles appears more similar to that of birds than mammals (Hall and Clark, 1982). Because of the scarcity of reptilian ecotoxicological data and the evidence that, in some cases, reptiles may be as or less sensitive to specific chemicals than birds and mammals, potential risks to the monitor lizard was qualitatively assessed using the risk results from the Micronesian starling and feral dog.

Table 9
TCDD Toxicity Equivalency Factors for the Birds and Mammals[a]

Dioxin/Furan	Mammalian TEF	Avian TEF
1,2,3,4,6,7,8-HpCDD	0.01	<0.001
1,2,3,4,6,7,8-HpCDF	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.01
1,2,3,4,7,8-HxCDD	0.1	0.05
1,2,3,4,7,8-HxCDF	0.1	0.1
1,2,3,6,7,8-HxCDD	0.1	0.01
1,2,3,6,7,8-HxCDF	0.1	0.1
1,2,3,7,8,9-HxCDD	0.01	0.01
1,2,3,7,8,9-HxCDF	0.1	0.1
1,2,3,7,8-PeCDD	1	1
1,2,3,7,8-PeCDF	0.05	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1
2,3,4,7,8-PeCDF	0.5	1
2,3,7,8-TCDD	1	1
2,3,7,8-TCDF	0.1	0.1
OCDD	0.0001	—
OCDF	0.0001	0.0001

[a]Toxicity equivalency factors from EPA (1998b) and Van den Berg (1998).
HpCDD = Heptachlorodibenzo-p-dioxin.
HpCDF = Heptachlorodibenzofuran.
HxCDD = Hexachlorodibenzo-p-dioxin.
HxCDF = Hexachlorodibenzofuran.
OCDD = Octachlorodibenzo-p-dioxin.
OCDF = Octachlorodibenzofuran.
PeCDD = Pentachlorodibenzo-p-dioxin.
PeCDF = Pentachlorodibenzofuran.
TCDD = Tetrachlorodibenzo-p-dioxin.
TCDF = Tetrachlorodibenzofuran.
TEF = Toxicity Equivalency Factor.

4.0 Risk Characterization

The assessment of potential risk is the culmination of the screening assessment. Risk characterization in this assessment is divided into a direct comparison of estimated exposures to toxicity-based benchmark screening values (the hazard quotient [HQ] assessment), an analysis of the uncertainties associated with the HQ predictions of risk, and a final evaluation of the ecological significance associated with the prediction of potential risk. The HQs are based on exposures estimated from both the maximum and 95-percent UCL soil concentrations.

4.1 Risk Estimation

Potential risks to a trophic level are inferred when exposure to a particular receptor species is in excess of the benchmark. Specific comparisons include the following:

- COPEC concentrations in soil samples compared to plant benchmark values (as HQs).
- HQs for wildlife
- Risk to the monitor lizard based on comparisons of exposures to those of the Micronesian starling and feral dog.

HQs were used to evaluate potential risks to plants, musk shrew, Norway rat, Micronesian starling, and feral dog. HQs are specific to a particular receptor for exposure to a particular COPEC. For the sword grass, the HQ is the ratio of the soil concentration to the plant toxicity benchmark concentration. For the wildlife receptors, the HQ is defined by:

$$HQ = \frac{Exposure}{Benchmark}$$

where:

HQ	=	the hazard quotient (unitless)
Exposure	=	the estimated dose of the COPEC for the receptor (in mg/kg-day)
Benchmark	=	the toxicological benchmark for the COPEC and receptor (in mg/kg-day)

The HQ is greater than 1.0 when the estimated exposure to a COPEC for a receptor exceeds the toxicological benchmark for that receptor. Because conservatism is employed to generally overestimate exposure and underestimate the toxicity threshold represented by the benchmark, HQ values greater than 1.0 do not necessarily indicate risk to the receptor; however, increasing magnitude of the HQ above 1.0 indicates an increasing potential that risk may exist. HQ values less than 1.0 were used to justify the exclusion of specific receptor/chemical pairs from further consideration.

4.2 Risk Results

Table 10 presents the HQs for the ecological receptors modeled at IRP Site 39/Harmon Substation based on exposure point concentrations represented by the maximum measured soil concentrations. Based on the maximum concentrations, HQs for the plant were slightly greater than 1 for lead and fluoranthene. Due to the lack of plant toxicity information, HQs for plant could not be determined for the VOCs (acetone and methylene chloride), pesticides, and dioxins/furans. In the musk shrew, HQs greater than 1 were found for benzo(a)anthracene, phenanthrene, Aroclor-1254, and TCDD, with the first three being less than 3 and the last being greater than 2,000. The Micronesian starling showed HQs greater than 1 for lead; 4,4'-DDD; 4,4'-DDE; 4,4'-DDT, and TCDD, although HQs for this receptor could not be determined for any of the VOCs, SVOCs, and heptachlor epoxide due to the lack of avian-specific toxicity data. The HQs for 4,4'-DDE and TCDD were relatively high (76 and 152, respectively) for this receptor. In the Norway rat and the feral dog, only the HQ for TCDD exceeded unity; however, the values for these HQs were 422 and 128, respectively. The COPECs that did not show HQs greater than unity when the exposures were based on the maximum measured soil concentrations were dropped from further consideration as potential ecological risk drivers in this assessment.

Table 11 presents the HQs for the ecological receptors modeled at IRP Site 39/Harmon Substation with the 95-percent UCL being used as the exposure point concentration. For these cases (limited to those COPECs that indicated potential risk based on the maximum soil concentrations), none of the HQs for plants exceed unity. HQs for phenanthrene and TCDD still exceed unity for the musk shrew, the former being less than 2, but the latter exceeding 100. In both the Norway rat and feral dog, only TCDD showed HQs greater than unity (24.3 and 8.5, respectively). With the exception of 4,4'-DDD, the Micronesian starling had HQs greater than 1 for the same COPECs as found with the exposures to the maximum concentrations; however, the HQs for TCDD and 4,4'-DDT were less than 10, and that for 4,4'-DDE was less than 20.

Table 10

Hazard Quotients Based on Exposures to Maximum Measured Soil Concentrations for Constituents of Potential Ecological Concern at IRP Site 39, Harmon Substation Andersen Air Force Base, Guam

Constituent	Plant	Musk Shrew	Norway Rat	Micronesian Starling	Feral Dog
Inorganics					
Lead	**1.13E+0**	4.87E-1	9.81E-2	**5.45E+0**	6.22E-2
Volatile and Semivolatile Organics					
Acetone	---	6.41E-4	5.52E-3	---	5.52E-4
Anthracene	1.63E-3	9.70E-5	1.94E-5	---	3.62E-6
Benzo(a)anthracene	2.71E-1	**1.82E+0**	3.53E-1	---	2.71E-1
Benzo(a)pyrene	4.86E-3	3.45E-2	6.65E-3	---	1.25E-2
Benzo(b)fluoranthene	7.00E-3	5.23E-2	1.01E-2	---	4.58E-2
Benzo(k)fluoranthene	2.28E-3	1.76E-2	3.39E-3	---	2.61E-2
Chrysene	2.28E-3	1.59E-2	3.06E-3	---	3.98E-3
Dibenzo(a,h,)anthracene	2.67E-3	1.98E-2	3.81E-3	---	1.51E-2
Fluoranthene	**1.11E+0**	5.51E-1	1.08E-1	---	3.01E-2
Indeno(1,2,3-cd)pyrene	1.15E-2	8.60E-2	1.66E-2	---	7.68E-2
Methylene chloride	---	4.26E-5	5.02E-5	---	5.27E-6
Phenanthrene	3.83E-1	**2.31E+0**	4.59E-1	---	9.32E-2
Pyrene	7.72E-1	6.72E-1	1.30E-1	---	6.30E-2
Pesticides					
gamma-Chlordane	---	1.67E-4	3.22E-5	4.31E-4	9.01E-5
4,4'-DDD	---	1.41E-3	2.25E-4	**1.18E+0**	1.01E-3
4,4'-DDE	---	9.09E-2	1.45E-2	**7.60E+2**	6.54E-2
4,4'-DDT	---	5.53E-3	8.86E-4	**4.62E+1**	3.98E-3
Dieldrin	---	1.34E-1	2.59E-2	7.19E-2	1.35E-2
Endrin aldehyde	---	1.91E-2	3.74E-3	2.60E-1	1.26E-3
Heptachlor epoxide	---	1.40E-2	2.75E-3	---	8.58E-4
Polychlorinated Biphenyls					
Aroclor-1254	5.20E-3	**1.26E+0**	2.42E-1	9.45E-1	3.99E-1
Dioxins/Furans					
TCDD equivalent	---	**2.14E+3**	**4.22E+2**	**1.52E+2**	**1.28E+2**

Bold indicates hazards quotients greater than 1.
--- indicates insufficient toxicity information to determine the hazard quotient.

Table 11

Hazard Quotients Based on Exposures to 95-Percent Upper Confidence Limit Soil Concentrations for Constituents of Potential Ecological Concern at IRP Site 39, Harmon Substation Andersen Air Force Base, Guam

Constituent	Plant	Musk Shrew	Norway Rat	Micronesian Starling	Feral Dog
Inorganics					
Lead	8.82E-1	3.94E-1	7.93E-2	**4.42E+0**	5.37E-2
Volatile and Semivolatile Organics					
Benzo(a)anthracene	1.58E-2	1.06E-1	2.05E-2	---	1.58E-2
Fluoranthene	6.89E-2	3.43E-2	6.74E-3	---	1.87E-3
Phenanthrene	2.45E-1	**1.47E+0**	2.93E-1	---	5.96E-2
Pesticides					
4,4'-DDD	---	6.58E-4	1.05E-4	5.50E-1	4.74E-4
4,4'-DDE	---	2.30E-2	3.68E-3	**1.92E+1**	1.66E-2
4,4'-DDT	---	2.69E-3	4.30E-4	**2.24E+0**	1.93E-3
Polychlorinated Biphenyls					
Aroclor-1254	1.15E-3	1.68E-1	3.18E-2	1.25E-1	8.63E-2
Dioxins/Furans					
TCDD equivalent	---	**1.24E+2**	**2.43E+1**	**9.41E+0**	**8.50E+0**

Bold indicates hazards quotients greater than 1.
--- indicates insufficient toxicity information to determine the hazard quotient.

Because of the lack of reptile-specific toxicity information, HQs for the mangrove monitor lizard could not be calculated. However, potential risk to this receptor was evaluated qualitatively by comparison of the exposure rates (in mg/kg-d) of the monitor with those of the Micronesian starling and feral dog. Table 12 presents these exposure rates. Based on the study by Dryden (1965), the mangrove monitor lizard has a diverse diet, including both invertebrates and vertebrates; however, plants were not recorded in the stomachs of these lizards except as detritus. Therefore, the monitor lizard's exposure was based on a diet consisting entirely of one animal prey type, either earthworms, musk shrews, or Norway rats. The prey type was determined by the maximum COPEC concentration among these prey types, thereby maximizing the estimated exposure in the monitor. As seen in Table 12, the estimated exposures in the mangrove monitor lizard are all less than those of the feral dog and Micronesian starling. In the latter case, they are typically one to two orders of magnitude less. These data indicate that unless reptiles are much more highly sensitive to the COPECs at IRP Site 39/Harmon Substation than are birds and mammals, risk to the monitor lizard is expected to be less than to the Micronesian starling and probably less than that to the dog.

Table 12

Comparison of Exposures in the Mangrove Monitor Lizard to Those in the Feral Dog and Micronesian Starling for Constituents of Potential Ecological Concern, IRP Site 39, Harmon Substation Andersen Air Force Base, Guam

Constituent	Micronesian Starling Exposure (mg/kg-d)	Feral Dog Exposure (mg/kg-d)	Mangrove Monitor Lizard Exposure (mg/kg-d)[a]
Inorganic			
Lead	5.48E+0	4.01E-1	5.30E-2
Volatile and Semivolatile Organics			
Acetone	9.32E-3	4.45E-3	9.81E-5
Anthracene	1.23E-2	2.52E-4	1.32E-4
Benzo(a)anthracene	2.31E+0	1.88E-1	2.49E-2
Benzo(a)pyrene	4.38E-2	8.71E-3	8.08E-4
Benzo(b)fluoranthene	6.64E-2	3.18E-2	3.05E-3
Benzo(k)fluoranthene	2.23E-2	1.82E-2	1.76E-3
Chrysene	2.01E-2	2.77E-3	2.50E-4
Dibenzo(a,h,)anthracene	2.51E-2	1.05E-2	1.00E-3
Fluoranthene	8.72E+0	2.61E-1	9.37E-2
Indeno(1,2,3-cd)pyrene	1.09E-1	5.34E-2	5.13E-3
Methylene chloride	3.63E-4	2.48E-5	3.85E-6
Phenanthrene	2.92E+0	6.49E-2	3.13E-2
Pyrene	6.38E+0	3.29E-1	6.86E-2
Pesticides			
gamma-Chlordane	9.73E-4	2.88E-4	2.72E-5
4,4'-DDD	1.10E-2	4.87E-3	4.66E-4
4,4'-DDE	7.08E-1	3.14E-1	3.01E-2
4,4'-DDT	4.31E-2	1.91E-2	1.83E-3
Dieldrin	3.92E-3	2.18E-4	4.22E-5
Endrin aldehyde	2.23E-3	8.06E-5	2.40E-5
Heptachlor epoxide	2.19E-3	7.37E-5	2.36E-5
Polychlorinated Biphenyls			
Aroclor-1254	1.04E-1	1.80E-2	1.66E-3
Dioxins/Furans			
TCDD equivalent	1.30E-3	1.03E-4	3.49E-5

[a]Based on 100 percent consumption of prey with maximum constituent concentration.

4.3 Uncertainty Analysis

A wide variety of factors contribute to the uncertainty associated with this ecological risk evaluation. Uncertainty is inherent in all aspects of the risk process, including the selection of indicator species, the estimation of exposure in these selected receptors, the characterization of potential ecological effects related to this exposure, and the final evaluation of risk to these receptors. For this assessment, conservatism was incorporated at many points in the process to provide assurance that these uncertainties do not lead to an underestimation of the actual risk to the ecological receptors at a site. Conservatisms, therefore, are more likely to lead to an overestimation of the actual risk posed by the COPECs at a site. This is especially true when multiple conservatisms are used, resulting in a multiplicative effect on the overestimation of risk. For this reason, the interpretation of the risk results of this evaluation must be made in light of the potential effects of the conservatisms used in obtaining the risk result. The purpose of this evaluation is to identify whether COPECs can be eliminated from further consideration based on a high probability that the HQs exceeding unity in Table 11 can be attributed to conservative assumptions used in the estimation of exposure and/or the determination of the toxicity benchmark rather than indicating actual risk to ecological receptors.

A general area of uncertainty for all HQs in this assessment is the bioavailability of the COPECs at the site. In general, toxicity tests are performed using chemical amendments to food or soil that are highly available to the test organism. It is conservatively assumed in this assessment that the COPECs in the soil at IRP Site 39/Harmon Substation are as available as those in the test organisms used to determine the toxicity benchmark. Under field conditions, however, depth, age, and soil characteristics will affect bioavailability, generally making the COPECs less available to receptors than in the laboratory conditions. The potential effects of other uncertainties on specific HQ results are further discussed below.

The 95-percent UCL of phenanthrene in the soil at IRP Site 39/Harmon Substation resulted in an HQ of 1.47 for the musk shrew. A principal source of uncertainty in this HQ is that phenanthrene-specific toxicity information could not be found; therefore, the toxicity benchmark is conservatively based on the NOAEL of benzo(a)pyrene, which is relatively highly toxic to wildlife. Other conservatisms incorporated in this HQ are the use 100 percent earthworm ingestion for the shrew, the use of the low-range total organic carbon content in the soil (which maximizes the soil-to-earthworm transfer factor), and the use of the 95-percent UCL of the soil concentrations as the exposure point concentration, which is approximately 1.8-times higher than the calculated mean soil concentration of phenanthrene. These factors, in combination, are sufficient to indicate that the probably of risk to the musk shrew and other insectivorous small mammals from exposure to phenanthrene at IRP Site 39/Harmon Substation is negligible.

The 95-percent UCL of lead in the soil at IRP Site 39/Harmon Substation resulted in an HQ of 4.42 for the Micronesian starling. A principal source of uncertainty in this HQ is the use of the most conservative NOAEL as the toxicity benchmark for this receptor. The NOAEL is based on a study that used Japanese quail (*Coturnix japonica*) which found the LOAEL to be 11.3 mg/kg-d) and the NOAEL (corresponding to the next lower dose tested, using increments of 10x) to be 1.13 mg/kg-d (Sample et al., 1996). Another study, using American kestrels (*Falco sparverius*) found a NOAEL of 3.85 mg/kg-d (Sample et al., 1996). Neither of these test species is more closely related to the Micronesian starling than the other. Using the NOAEL from the American kestrel, the HQ for the starling would be 1.26. Another conservatism incorporated in this HQ is the use 100 percent earthworm ingestion for the starling (which does eat a variety of food types, including plant material). The estimated concentration of lead in earthworms (at the 95 percent UCL soil concentration) is about 4 times greater than that in plants, indicating that a more realistic dietary mix for this receptor will further reduce its estimated exposure. These factors are sufficient to indicate that the probably of risk to the Micronesian starling and other insectivorous birds from exposure to lead at IRP Site 39/Harmon substation is negligible.

The 95-percent UCLs for 4,4'-DDE and 4,4'-DDT in the soil at IRP Site 39/Harmon Substation also resulted in an HQ greater than unity for the Micronesian starling. The principal source of uncertainty in these HQs is the use of the most conservative NOAEL as the toxicity benchmark for this receptor. The NOAEL is based on a field study of brown pelican (*Pelecanus occidentalis*) reproduction success as related to DDT concentrations in fish. This study found a NOAEL of 0.0028 mg/kg-d (Sample et al., 1996); however, other potentially toxic constituents were also present in these fish. A controlled study using American kestrels found a LOAEL of 0.87 mg/kg-d (Peakall et al., 1973), from which a NOAEL of 0.087 mg/kg-d has been estimated (EPA, 1995). Neither of these test species is more closely related to the Micronesian starling than the other. The less conservative toxicity benchmark results in HQs for 4,4'-DDE and 4,4'-DDT of 0.321 and 0.0374, respectively. Therefore, actual risk to the Micronesian starling (and other insectivorous birds) from exposure to these two compounds is dubious. Furthermore, as with lead, the concentrations of 4,4'-DDE and 4,4'-DDT in earthworms are about 40-times greater than the concentrations in plants. Therefore, a more realistic dietary mix for this species will significantly reduce the predicted exposure.

The 95-percent UCLs for the dioxins and furans (as TCDD equivalent) in the soil at IRP Site 39/Harmon Substation resulted in HQs greater than unity for all ecological receptors for which toxicity information was available (excludes sword grass and the mangrove monitor lizard). The HQs ranged from 8.5 (for the feral dog) to 124 (for the musk shrew). One source of uncertainty for these HQs is the use of TEQs to evaluate all dioxins and furans on the basis of an estimated equivalence to TCDD. The TEFs upon which the TEQs are based are essentially "order-of-magnitude"-level approximations of relative toxicity and therefore may lead to significant overestimations or underestimations of risk. The use of TEQs to estimate risk for total dioxins and furans also assumes that the toxic effects are additive for the included compounds (Van den Berg et al., 1998).

Another source of uncertainty in these HQs is the derivation of the toxicity benchmark values for TCDD (upon which the final HQ is based). For this assessment, the toxicity benchmarks for TCDD in both mammals and birds are based upon studies which there was a 10-fold difference between the LOAEL concentration and the NOAEL concentration. Because the NOAEL-based HQs for the Micronesian starling and feral dog were less than 10, the HQs for the LOAEL would be less than unity for these receptors and related receptors.

Other sources of uncertainty in the TCDD HQs include receptor diets that emphasize animal prey over plants and the use of 95-percent UCLs to calculate the exposure point concentrations rather than the means. For TCDD, concentrations in earthworms are estimated to be 767-times those in plants. Therefore, the dietary mix can significantly affect the exposure estimation. If the calculated means of the samples are used to determine the exposure point concentration (as TCDD-equivalent), the HQs for the shrew, rat, starling, and dog are 45.9, 8.99, 3.75, and 3.31, respectively. One sample (HAS39S155), which was included in the database for this assessment, had questionably high concentrations for PCDDs and PCDFs. Resampling of this location did not confirm these high concentrations (OHM, February 11, 1999). Excluding this sample (but retaining the resample data) reduces the means for the PCDDs and PCDFs such that the HQs for the shrew, rat, starling, and dog are 15.6, 3.04, 1.81, and 1.19, respectively. Although the combined effects of these factors make the possibility for the existence of actual risk to the Micronesian starling, the feral dog, and (probably) the Norway rat from exposure to dioxins and furans dubious, they may not be sufficient to eliminate the possible existence of risk to the musk shrew. This is also true for other species contained within the trophic levels that these animals represent.

4.4 Ecological Significance

This section involves the examination of the conservatism assumptions incorporated into the prediction of risk as they relate to the biological and ecological factors associated with the receptors within the context of the existing site conditions. Aspects that are addressed include the following:

- Foraging range/home range
- Seasonal use patterns
- Habitat quality
- Population level impacts
- Community level impacts

IRP Site 39/Harmon Substation is approximately 8 acres in area, and is highly disturbed due to past site use, remediation, and surrounding land use. The results of this risk assessment indicate that continued colonization of the site by plants will not be inhibited by residual chemicals in the soil. In fact, future succession of the plant community is largely dependent upon future use and/or disturbance of the site and surrounding areas. Based on current conditions, the site is not expected to revert to a native vegetation climax community. Exposures in all wildlife receptors were estimated based on the assumptions that the foraging range of the receptor equaled the size of the site (i.e., the home range factor equaled 1), that no differences in use exist between seasons (i.e., the seasonal use factor equals 1), and that the COPECs at this site are 100 percent bioavailable. The size and remoteness of Guam, and the generally nonseasonal character of its climate indicate that the assumption of nonseasonal use of the site by the wildlife receptors valid.

Also, as stated earlier, the assumption of a home range factor of 1 is probably valid for the musk shrew and Norway rat. Most birds of the size of the Micronesian starling have home ranges greater than 8 acres (Schoener, 1968), although such species as the American robin (*Turdus migratorius*) and western meadowlark (*Sturnella neglecta*), which are about the size of the Micronesian starling, can have territorial ranges less than 8 acres. Therefore, it is likely that the assumption of a home range factor of 1 for the starling results in an overestimation of the expected exposure to these or similarly sized birds, especially given the poor quality of the habitat at this site; however, this assumption cannot be ruled out as an extreme case. Similarly, the range of a large mangrove monitor lizard probably exceeds the size of the site. However, based on the relationship between body size and home range in lizards found by Turner et al. (1969), monitors of about 200 grams or less could have home ranges smaller than this site. Wild canids, such as coyotes (*Canis latrans*) (to use as a model for the feral dog) have home ranges of 6 square miles (approximately 4,000 acres) or more (Lindstedt et al., 1986). Therefore, the assumption of a home range use factor of 1 for this species and similar species will lead to large overestimations of exposure.

Whether the current habitat conditions allow for these wildlife receptors or similar species to be present on the site is not known. The site is of poor habitat quality and its use by wildlife will be inhibited by these conditions and by surrounding development and land use. The results of this assessment assume the site could support a sufficient food-base of earthworms to allow insectivorous mammals, birds, and reptiles to be completely supported by the habitat on the site. Based on the current site conditions, this assumption is highly conservative. Furthermore, the toxicity benchmarks used in this assessment are based on effects to individuals. For both TCDD and 4,4'-DDT and its metabolites, the endpoints of these benchmarks are reduced reproduction. Because of the small size of the site and its location in disturbed habitat, it is unlikely that the few individuals that may be affected by exposures at this site will significantly affect local population size or the local biological community. Although the Micronesian starling is listed as endangered, and therefore, risks to individuals is of concern, it does not currently occur on the site. Under current conditions, therefore, risks to this species are considered negligible.

4.5 Scientific/Management Decision Point

Once HQs are calculated and comparisons are made against screening criteria, the evaluation of ecological risk is examined to determine the reasonableness of the risk prediction. A risk management decision is made based on potential risk and the remedial options currently being considered. Possible risk management decisions, according to EPA (1997), are as follows:

- There is adequate information to conclude that the ecological risks are negligible and the ecological risk evaluation supports no further investigation or remediation
- There are sufficient lines of evidence to document potential or actual adverse ecological effects. Thus, additional data collection and a revision of the risk assessment or remediation may be warranted
- There is insufficient information to make an ecological screening decision, and site-specific data needs should be re-evaluated and additional data should be collected

Each of the listed decisions are evaluated and a recommendation made based exclusively on information obtained through the ecological risk assessment itself.

The results of this screening level assessment indicate no inorganics, volatile organic compounds, PAHs, or PCBs present significant risk to terrestrial receptors at this site. Potential risks to insectivorous birds from exposures to 4,4'-DDT and 4,4'-DDE were initially identified under the most conservative modeling conditions; however, the evaluation of uncertainties associated with these predictions makes such predictions of risk dubious. The screening level assessment identified potential risk to all wildlife receptors from exposures to dioxins and furans. Factors associated with uncertainties and ecological significance support the conclusions that these risk predictions for the Micronesian starling and feral dog (and thereby indirectly predicted for the mangrove monitor lizard) are overestimations and that the actual risks are negligible. This may also be true for the Norway rat, but the musk shrew, if present on the site, may be adversely affected by dioxins and furans. Because the site is small and highly disturbed, and is not located in important natural habitat, and because neither the Norway rat nor the musk shrew represent ecologically significant receptor species or trophic levels (all other small mammals, except for a few species of bats, are considered pest-species on Guam), it is concluded that the overall ecological risks at this site are negligible and that there is adequate information to conclude that no further investigation or remediation are required.

5.0 Summary

This screening level ecological risk assessment was performed in accordance with federal and regional EPA guidance on ecological risk assessment (EPA, 1992; EPA, 1997; EPA, 1998a; Callahan, 1998). Both conservative and realistic assumptions were used in the evaluation of potential risk to biota that may use the site either at present or in the future. Ecological receptors selected to represent key trophic levels at the site were a generic plant, musk shrew, Norway rat, feral dog, Micronesian starling, and the mangrove monitor lizard. Emphasis in this assessment was on the protection of upper trophic levels species. The results of this screening level assessment indicate no inorganic analytes (limited to lead), volatile organic compounds, PAHs, or PCBs present significant risk to terrestrial receptors at this site.

Potential risks to insectivorous birds from exposures to 4,4'-DDE and 4,4'-DDT were initially identified under the most conservative modeling conditions; however, the evaluation of uncertainties associated with these predictions makes such predictions of risk dubious and the actual risk is probably negligible. The screening level assessment identified potential risk to all wildlife receptors from exposures to dioxins and furans. Factors associated with uncertainties and ecological significance support the conclusions that these risk predictions for the insectivorous bird and predatory mammal (and thereby indirectly predicted for the predatory reptile) are overestimations and that the actual risks to these receptors are negligible. This may also be true for the omnivorous small mammal, but the predicted risk to the insectivorous small mammal was relatively high, and if this species is present on the site, it may be adversely affected by exposure to dioxins and furans through a diet high in earthworms. However, because the site is small (approximately 8 acres), highly disturbed, and is not located in important natural habitat, and because the small mammals do not represent ecologically significant or protected species, it is concluded that the overall ecological risks at this site are negligible and that there is adequate information to conclude that no further investigation or remediation are required.

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