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Record of Decision:

ANDERSEN AIR FORCE BASE
EPA ID: GU6571999519
OU 07
YIGO, GU
12/01/2003

THE UNITED STATES AIR FORCE
INSTALLATION RESTORATION PROGRAM

FINAL
RECORD OF DECISION
FOR
URUNAO DUMPSITES 1 AND 2
URUNAO OPERABLE UNIT

ANDERSEN AIR FORCE BASE, GUAM

December 2003

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6. AUTHOR(S)
Toraj Ghofrani, P.E. (EA Engineering, Science, & Technology, Inc.)

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Foster Wheeler Environmental Corporation
43 Union Blvd., Suite 1010, Lakewood, CO 80228-1829

EA Engineering, Science, & Technology, Inc.
P.O. Box 4355, Andersen AFB, Yigo, Guam 96929-4355

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13. ABSTRACT (Maximum 200 words)

This Record of Decision presents the rationale for selecting Excavation and Offsite Disposal as the preferred cleanup alternative for Urunao Dumpsites 1 and 2 located west of Northwest Field, Andersen Air Force Base, Guam. This Record of Decision summarizes the history, environmental background, extent of contamination, associated human health and ecological risks, evaluation of remedial alternatives, public involvement, and rationale for selecting the preferred remedy for the Urunao Operable Unit.

14. SUBJECT TERMS

- *Andersen AFB*
- *Remedial Investigation/Feasibility Study*
- *Public Involvement*
- *Human Health Risk Assessment*
- *Ecological Risk Assessment*
- *Excavation and Offsite Disposal*

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LIST OF ACCRONYMS AND ABBREVIATION

ADI	average daily intake
AFB	Air Force Base
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
amsl	above mean sea level
BCY	banked cubic yards
bgs	below ground surface
BTV	Background Threshold Value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environment 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
DDESB	Department of Defense Explosive Safety Board
DDESM	Department of Defense Explosive Safety Manual
DERP	Defense Environment Restoration Program
DOT	Department of Transportation
DSI	Detailed Site Inventory
EA	EA Engineering, Science, and Technology, Inc.
ESB	Environment Baseline Survey
ED	Exposure Duration
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESI	Expanded Source Investigation
ESD	Explanation of Significant Difference
EQ	Ecological Quotient
°F	degrees Fahrenheit
FFA	Federal Facility Agreement
FWENC	Foster Wheeler Environmental Corporation
GEPA	Guam Environmental Protection Agency

LIST OF ACCRONYMS AND ABBREVIATION (continued)

GovGuam	Government of Guam
GWA	Guam Waterworks Authority
HEAST	Health Effects Assessment Summary Table
HHRA	Human Health Risk Assessment
HI	Hazard Index
HSWA	Hazardous and Solid Waste Act of 1982
HQ	hazard quotient
IRP	Installation Restoration Program
IRIS	Integrated Risk Information System
LADI	lifetime average daily intake
LOAEL	Lowest Observed Adverse Effects Level
MCL	Maximum Contaminant Level
mgd	million gallons per day
mg/kg	milligrams per kilogram
mg/kg/day	Milligrams Per Kilogram Per Day
mg/kg-bw/day	Milligrams of Chemical Per Kilogram of Body Weight Per Day
μg/dL	Micrograms Per Deciliter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NGL	Northern Guam Lens
NOAEL	No Observed Adverse Effect Level
NRC	National Research Council
O&M	Operation and Maintenance
OE	Ordnance and Explosives
OU	Operable Unit
OSWER	Office of Solid Waste and Emergency Response
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PRG	Preliminary Remediation Goal
PST	Pacific Strike Team
RAB	Restoration Advisory Board
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act

RfDs	reference doses
RGO	Remedial Goal Objective
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RPM	Remedial Program Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
SF	Slope Factor
SVOC	semivolatile organic compound
TAT	Technical Assistant Team
TBC	To Be Considered
TCLP	Toxicity Characteristic Leaching Procedure
TEF	Toxicity Equivalence Factors
TEQ	Toxicity Equivalent Quotient
TRV	Toxicity Reference Volumes
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
USN	United States Navy
UXO	Unexploded Ordnance
VOC	volatile organic compound
WHO	World Health Organization
WWII	World War II

1. DECLARATION

1.1 Site Name and Location

Urunao Dumpsites 1 and 2 are located on private property west of the Andersen Air Force Base (AFB) Northwest Field in Guam. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number for Andersen AFB is GU6571999519. Prior to 1986, Urunao Dumpsites 1 and 2 were not included in any of the four Andersen AFB Installation Restoration Program (IRP) Operable Units (OUs). A fifth OU (Urunao OU) was established in October 1999 to include Urunao Dumpsites 1 and 2.

1.2 Statement of Basis and Purpose

This Record of Decision (ROD) is a legal technical document prepared for the Urunao OU. 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 human health and ecological risks, evaluation of remedial alternatives, public involvement, and the proposed *Excavation and Offsite Disposal* as the preferred alternative to clean up Urunao Dumpsites 1 and 2.

The United States Air Force (USAF), the United States Environmental Protection Agency (USEPA) Region IX, the Guam Environmental Protection Agency (GEPA), and affected property owners have all agreed that *Excavation and Offsite Disposal* is the preferred alternative to clean up Urunao Dumpsites 1 and 2. This ROD was prepared 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 Plan of 1990 (NCP).

1.3 Assessment of the Site

Constituents of concern (COCs) that were identified in surface and subsurface soils at Dumpsite 1 include antimony, arsenic, barium, cadmium, lead, manganese, and dioxins. These COCs pose risks to human health and the environment. Additionally, solid waste materials and deteriorated ordnance and explosives (OE) materials were observed at Dumpsite 1 that may pose safety risks to human health and the environment. COCs that were identified in surface and subsurface soils at Dumpsite 2 include benzo(a)pyrene, polychlorinated biphenyl (PCB) Arochlor-1254, antimony, lead, and manganese. These COCs pose potential risks to human health and the environment. Solid waste materials were also observed at Dumpsite 2 that may pose safety risks to human health and the environment.

The preferred *Excavation and Offsite Disposal* cleanup alternative presented in this ROD is a necessary response action to protect human health and the environment, including the underlying groundwater, at Urunao Dumpsites 1 and 2.

1.4 Description of the Selected Remedy

Urunao Dumpsites 1 and 2 are located on steep slopes, over the cliffline and outside the boundary of Andersen AFB. The Dumpsite 1 study area covers approximately 16.5 acres and the Dumpsite 2 study area covers approximately 6.2 acres. Near the end of 2001, an unpaved public access road was constructed within ½ mile of the northwestern portion of Dumpsite 2. Construction of this access road was integral in making the *Excavation and Off-Site Disposal* cleanup alternative feasible. This access road will be improved by the USAF for the purpose of the cleanup at Dumpsites 1 and 2.

Under the *Excavation and Off-Site Disposal* cleanup alternative, all solid waste debris and OE materials will be removed from the Dumpsite 1 prior to excavating and removing any remaining COC-impacted soils. Some deteriorated OE fragments will be burned at Dumpsite 1 using a steel burn pan. Ashes and slag remaining from the burn operation will be removed and disposed of properly, based on laboratory analyses. Other OE materials will be transported to the Andersen AFB Explosive Ordnance Disposal (EOD) facility for proper disposal. A screening of specific procedures and controls for handling OE materials will be included as part of the remedial design, including the handling of OE materials that may be deemed unsafe to remove from the site. All OE material handling will be in accordance with Department of Defense Explosive Safety Manual (DDESM) guidelines and in consultation with the Department of Defense Explosive Safety Board (DDESB). The OE material handling will also be coordinated with GEPA to meet any permit conditions for open burning and to minimize the effects associated with airborne material generated from the burning of OE materials. The remedial design will incorporate procedures that will include, but not be limited to, monitoring ambient atmospheric conditions to ensure that burns are only performed during optimal conditions.

After removing the solid waste debris and OE materials from Dumpsite 1, COC-impacted soils will be excavated and temporarily stockpiled onsite. Composite samples of stockpiled soil will be collected and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) parameters to determine whether the COC-impacted soil is considered hazardous waste for disposal purposes. All COC-impacted soils with concentrations exceeding the cleanup standards, but not characterized as Resource Conservation and Recovery Act (RCRA) hazardous waste, will be transported to the Andersen AFB Landfill for disposal. Any COC-impacted soils with concentrations exceeding the cleanup standards that are also characterized as RCRA hazardous waste will be shipped to a USEPA-certified off-island hazardous waste disposal facility. Once the COC-impacted soils, OE materials, and solid waste materials are removed, the areas disturbed by the cleanup activities will be revegetated with native plants and trees. The cleanup of Dumpsite 2 is similar to Dumpsite 1, except that surface OE materials are not present at Dumpsite 2.

By selecting *Excavation and Off-Site Disposal* as the preferred cleanup alternative, all solid waste debris, OE materials, and COC-impacted soils will be removed from Dumpsites 1 and 2, allowing for unlimited use and unrestricted exposure for the future use of the land.

1.5 Statutory Determination

The preferred *Excavation and Offsite Disposal* cleanup alternative meets the CERCLA statutory requirements, and to extent practicable the NCP, and site-specific experience gained in the Superfund program. The *Excavation and Offsite Disposal* cleanup alternative will also comply with Applicable or Relevant and Appropriate Requirements (ARARs), including the Maximum Contaminant Levels (MCLs) for groundwater, the Coastal Zone Management Act, the Endangered Species Act, RCRA Part 261 Subpart C Characteristics of Hazardous Waste, and CERCLA Removal Action regulations.

Using the preferred *Excavation and Offsite Disposal* cleanup alternative, the source of the solid waste debris, OE materials, and COC-impacted soils will be removed from Dumpsites 1 and 2, thereby eliminating the exposure pathways for human and ecological receptors. The *Excavation and Offsite Disposal* cleanup alternative is a permanent solution that eliminates the potential for offsite migration of contaminants or migration of contaminants from the subsurface to groundwater. Due to the steep slopes at Dumpsites 1 and 2, the implementation of the *Excavation and Offsite Disposal* cleanup alternative will be difficult. However, as compared with other remedial alternative capital and operation and maintenance (O&M) costs, the *Excavation and Offsite Disposal* cleanup alternative will be more cost effective in the long-term because the O&M costs will be eliminated.

A 5-year review of this ROD will be unnecessary because no residual COCs will remain at Dumpsites 1 and 2 at concentrations exceeding cleanup levels after implementation of the *Excavation and Offsite Disposal* cleanup alternative. In addition, this cleanup alternative will allow for unrestricted use of the land.

1.6 ROD Data Certification Checklist

The following information is included in the Decision Summary, Part 2 of this ROD, along with reference tables, figures, and section numbers.

- COCs and their respective concentrations for Dumpsites 1 and 2 are presented in Tables 2-6, 2-7, 2-8, and 2-9 and Figures 2-12 and 2-13.

- The baseline human health risks represented by each COC are presented in Tables 2-10 through 2-37; and the baseline ecological risks are presented in Tables 2-38 through 2-58 and Figures 2-5 and 2-11. The summary of site risks is presented in Section 2.7.

- The established cleanup levels for each COC are presented in Tables 2-59 and 2-60 and Figures 2-12 and 2-13.

- The principal threats from COC sources are discussed in Section 2.11.

- The current and reasonably anticipated future land use and current and potential future uses of groundwater in are presented in Section 2.6.

- The potential future land and groundwater uses that will be available at the dumpsites following implementation of the preferred remedial action are presented in Section 2.12.

- The estimated present-worth remedial costs, including the projected number of years over which the remedial cost was estimated, are presented in Tables 2-62 and 2-63 and in Sections 2.10 and 2.12.

- Key factors that led to selection of *Excavation and Offsite Disposal* as a preferred cleanup alternative are presented in Section 2.13.

Additional background information regarding the environmental investigation for Dumpsites 1 and 2 can be found in the Administrative Record files.

1.7 Authorizing Signatures and Supported Agency Acceptance of the Remedy

The following signature pages document that the USAF, USEPA Region IX, and GEPA supported acceptance of the *Excavation and Offsite Disposal* cleanup alternative for Urunao Dumpsites 1 and 2 (Urunao OU).

This signature page documents that the USAF supports acceptance of the *Excavation and Offsite Disposal* cleanup alternative for Urunao Dumpsites 1 and 2 (Urunao 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 *Excavation and Offsite Disposal* cleanup alternative for Urunao Dumpsites 1 and 2 (Urunao OU).

______________________________________ ________________

Joel Jones — Date

Acting Chief, Federal Facility and Site Cleanup Branch

U.S. Environmental Protection Agency, Region IX

This signature page documents that the GEPA supports acceptance of the *Excavation and Offsite Disposal* cleanup alternative for Urunao Dumpsites 1 and 2 (Urunao OU).

______________________________ ____________

Fred M. Castro Date
Administrator
Guam Environmental Protection Agency

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2. DECISION SUMMARY

The decision summary presents an overview of the site description, environmental characteristics, history, public involvement, nature and extent of contamination, associated human health and ecological risks, remedial alternatives, and rationale for selecting the preferred remedy in light of statutory requirements.

2.1 Site Name, Location, and Description

This decision summary was prepared for the Urunao OU comprised of *Urunao Dumpsites 1* and *2*, which are on private property west of Andersen AFB, Guam. Guam is the largest of the Mariana Islands and is located in the western Pacific Ocean between 13°15′ and 13°39′ north latitude and 144°37' and 144°57' east longitude, approximately halfway between Japan and New Guinea (Figure 2-1). The island has an area of nearly 209 square miles and is approximately 30 miles long and 4 to 8 miles wide. Andersen AFB is located in the northern half of the island, on a broad undulating limestone plateau overlying a volcanic core. The base is bounded on the east, north, and west by cliffs rising approximately 500 feet above mean sea level (amsl).

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 speeds ranging between 4 and 12 miles per hour throughout the year. These winds are strongest during the dry season, when they average 15 to 25 miles per hour. During the wet season, the trade winds are still dominant, but less frequent, and blow from any direction at 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 good at all times because the prevailing winds bring clean air from the ocean.

Andersen AFB consists of several parcels of land in the northern half of the island (Figure 2-2). The main portion of base property consists of the Main Base and Northwest Field, and is approximately 8 miles wide, 2 to 4 miles long, and 24.5 square miles in area. The active base operations are located at the Main Base. Northwest Field has been generally inactive since the mid-1950s. Northwest Field, a 2,130-acre property located in the northernmost portion of Guam, is bounded by the Rota Channel to the north, the Philippine Sea to the west, and the Main Base and Pacific Ocean to the east (Figure 2-3).

Urunao Dumpsites 1 and 2 are located on private property west of Northwest Field, approximately 3,700 feet south of Urunao Point (Figure 2-3). Dumpsite 1 is located about 200 feet west of Route 3A and Dumpsite 2 is located north of Dumpsite 1 and about 400 feet west of Route 3A. Both sites lie on a steep slope outside the boundary of Andersen AFB.

The Urunao OU was established in October 1999 to help expedite the cleanup and ultimate disposition of the properties. Funding for the cleanup of Urunao Dumpsites 1 and 2 is provided under the USAF IRP and enforcement program. The USAF is the lead agency, with USEPA Region IX and GEPA serving as support agencies. The Urunao OU is included in the National Superfund electronic database under CERCLIS identification number GU6571999519.

2.2 Site History and Enforcement Activities

2.2.1 History of Urunao Dumpsites 1 and 2

The history of Dumpsites 1 and 2 can be traced to World War II (WWII). On 8 January 1945, following the reoccupation of Guam, construction activities began at Northwest Field and North Field (currently the Main Base). Northwest Field was used by the bomb and air support units of the Air Force 19th Bombardment Wing between June 1945 and May 1946. In October 1946, these operations at Northwest Field were discontinued. During the 1950s and 1960s, Northwest Field was used infrequently for Air Force field training missions, but was generally inactive. On 11 November 1962, Typhoon Karen destroyed all onsite records. In the aftermath of Typhoon Karen several military installations were abandoned and several others were rebuilt at Northwest Field.

In 1965, the runways at Northwest Field were repaired for emergency operation during the Vietnam War, but were never used by heavy bombers. The currently active Air Force Satellite Control Facility began operations at Northwest Field in 1965. A Radar Bomb Scoring facility began operations at Northwest Field in July 1973 but was destroyed during Typhoon Omar in August 1992.

During and shortly after WWII, the general Urunao dumpsite area was referred to as an over-the-cliff dump (USAF, 1988). Based on accounts by former USAF personnel, wastes were dumped at the top of Dumpsites 1 and 2, pushed over the cliff, and covered with fill material or burned using napalm (Photo 2-1). There are no documented accounts of waste disposal practices, duration, volume, or the types of disposed materials.

A records search was initiated in 1983 as part of the IRP investigation to identify potential sites of concern at Andersen AFB. Twenty sites were identified as IRP sites of concern, including Urunao Dumpsites 1 and 2. In August 1984, GEPA requested that USEPA Region IX assess the Urunao dumpsites for remedial action and subsequent appropriation of funding under CERCLA Superfund (USAF, 1988). In November 1984, USEPA Region IX referred a request to the United States Army Corps of Engineers (USACE) to include the Urunao dumpsites in the Defense Environmental Restoration Program (DERP). In March 1985, USEPA Region IX designated the Coast Guard Pacific Strike Team (PST) and Technical Assistance Team (TAT) to visit and evaluate the dumpsites. They were accompanied by a United States Navy (USN) EOD expert. After a walk-through and an aerial survey, the PST and TAT reported finding no evidence of hazardous waste and concluded that only solid waste and OE-related materials were present at Dumpsites 1 and 2. The USN EOD staff did not consider the OE materials at the dumpsites a threat because of their deteriorated condition (USAF, 1989).

In April 1988, an Environmental Impact Statement (EIS) (USAF, 1988) was prepared for the dumpsites in accordance with the National Environmental Policy Act (NEPA). The NEPA EIS included the following alternatives for cleanup of Urunao Dumpsites 1 and 2:

- Complete removal of solid waste materials and OE materials using a crane
- Minimum surface clearance of large solid waste materials and OE materials using helicopters
- Minimum surface clearance of OE materials only using helicopters
- No action
- Real property interest acquisition

Other remedial options were not considered because of difficulty accessing the dumpsites.

In March 1989, the USAF rejected the first three cleanup alternatives because they included detonation of OE materials in place. The USAF concluded that the detonation of OE materials could potentially cause adverse environmental impact to the limestone forest and native species near the dumpsites. Additionally, important archaeological sites were documented near the shoreline, below the dumpsites, that may have been vulnerable to detonation effects. The USAF issued a ROD under NEPA to acquire the property, fence it, and leave it intact (USAF, 1989). According to comments obtained from community members during two public meetings held in November 1987 and January 1988, some property owners favored the construction of a permanent road to access the dumpsites for complete cleanup (USAF, 1988).

In 1993, the Federal Facility Agreement (FFA) required that the USAF perform an Expanded Source Investigation (ESI) for solid waste management units and areas of concern (AOCs), including Urunao Dumpsites 1 and 2 (USAF, 1996). As a result of the ESI, GEPA and Andersen AFB IRP and EOD staff visited the Urunao dumpsites accompanied by property owners. The site visit confirmed the presence of debris that had been previously identified at the dumpsites, including housing/construction debris (pots, pans, scrap metal, and rusted containers), heavy machinery (tires, aircraft parts, and vehicle parts), and OE materials (AN-M50 series incendiary bomblets and M-89 and M-90 target identification bombs). Additionally, deteriorated 55-gallon drums and mounds of deteriorated metal were identified at the dumpsites (USAF, 1996).

At the conclusion of the ESI, soil sampling was recommended for characterization of the Urunao dumpsites. Consequently, in April 1997 a work plan was developed to conduct an Environmental Baseline Survey (EBS) that included a detailed site inventory (DSI) and surface soil sampling and analysis. The purpose of the EBS was to evaluate the potential presence of hazardous wastes at the dumpsites. The EBS fieldwork was conducted between April and June 1997, with additional confirmatory sampling conducted during February and September 1998. Upon completion of the EBS report, Dumpsites 1 and 2 were assigned to Category 6 in accordance with USAF Instruction 32-7066. Category 6 is assigned to sites where contaminants are present at concentrations exceeding action levels, but the required remedial action has either not yet been selected or has not yet been implemented (USAF, 1994).

Even though numerous surface soil samples were collected during the EBS, the number of samples was not sufficient to evaluate potential risks to human and ecological receptors. Consequently, additional surface soil, subsurface soil, and groundwater (seep) samples were collected and analyzed during the Remedial Investigation/Feasibility Study (RI/FS) to further characterize the nature and extent of contaminants at the dumpsites and complete human health and ecological risk assessments. The RI/FS report for Urunao Dumpsites 1 and 2 was completed in October 2002 [Foster Wheeler Environmental Corporation (FWENC)/EA Engineering, Science, and Technology, Inc. (EA), 2002]. Copies of the RI/FS report and other reports prepared for the Urunao OU are available in the Administrative Record and Information Repository (Section 2.3).

2.2.2 Enforcement Activities at Urunao Dumpsites 1 and 2

The enforcement activities for Andersen AFB were initiated when the USAF entered into a FFA with USEPA Region IX and GEPA. The FFA, finalized on 30 March 1993, established a framework for performing detailed environmental investigations at Andersen AFB. The FFA was based on applicable environmental laws including CERCLA, HSWA, SARA, and the NCP.

Under Executive Order 12316, issued on 14 August 1981, the Department of Defense designed the 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, 1996).

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.

2.3 Community Participation

In August 1992, 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.

In addition to RAB meetings, in 1993 Andersen AFB prepared a brochure to respond to community concerns and inform the public about Andersen AFB's IRP investigations (ICF Technology, 1993). A complete summary of the history and status of community involvement in 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 Urunao 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
APO AP 96543-4007
Telephone: (671) 366-4692 or 5071
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: Arlene Cohen

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

A notice of availability for the Urunao 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.

On 24 March 2003, the Proposed Plan for Urunao Dumpsites 1 and 2 was released to the public for a review and comment, with a public comment period between 31 March and 30 April 2003. A public meeting was held at the Guam Hilton Hotel in Tumon Bay on 10 April 2003, where the Proposed Plan was presented and representatives from USEPA Region IX, GEPA, affected property owners, and USAF responded to public comments. The results of the public meeting and responses to public comments are presented in Part 3 of this ROD.

2.4 Scope and Role of the Operable Unit or Response Action

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

- Expedite the completion of environmental activities
- 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 the Government of Guam (GovGuam)
- Provide a screening mechanism for evaluating newly or tentatively identified sites for inclusion in the RI/FS

All environmental investigations at Urunao Dumpsites 1 and 2 were performed under the Urunao OU. The Urunao OU addresses potential contamination in the surface soil, subsurface soil, or groundwater beneath Dumpsites 1 and 2. The affected property owners have requested an expedited cleanup of Dumpsites 1 and 2, and the USAF, USEPA Region IX, and GEPA will cooperate to approve the Urunao OU ROD and secure the appropriate cleanup funds. As the lead agency, the USAF will seek funding for the cleanup under the both the IRP and enforcement programs.

2.5 Site Characteristics

2.5.1 Urunao Dumpsites 1 and 2 Overview

The study areas for Dumpsite 1 and Dumpsite 2 cover approximately 16.5 and 6.2 acres, respectively. The combined study area (22.7 acres) comprises approximately 5 percent of the total Urunao properties (approximately 431 acres). The lower limits of the dumpsites are approximately 1,000 feet from the shoreline. Near the end of 2001, an unpaved public access road was constructed within ½ mile of the northwestern portion of Urunao Dumpsite 2.

Urunao Dumpsites 1 and 2 are located on the northwest plateau and slope where elevations range from approximately 475 feet amsl along the upper plateau cliffline to approximately 100 feet amsl at the base of the slope. Both of the dumpsites contain two distinctive areas (Figure 2-4). Areas between the upper plateau cliffline and the intermediate cliffline have steep, rugged slopes (more than 60 percent) with nearly vertical drops. These steep areas comprise approximately 10 acres (7.1 and 2.9 acres at Dumpsites 1 and 2, respectively). Areas below the intermediate cliffline and extending to the dumpsite toes are gently sloping to nearly flat. These flat regions comprise approximately 12.7 acres (9.4 and 3.3 acres at Dumpsites 1 and 2, respectively).

Soil at both of the dumpsites is scarce, consisting of a 2- to 3-inch-thick layer scattered over porous limestone bedrock. No rivers or streams are present at the dumpsites and all precipitation, except that portion lost to evapotranspiration, contributes to the groundwater lens.

For the most part, the vegetation on the cliffline adhere to the porous limestone bedrock and soil is scarce. The dumpsites are not fenced and can be readily accessed from the top and bottom of the cliff, although access from the top is more difficult. After the 1997 EBS was completed the USAF posted warning signs to alert the public to the potential dangers posed by both of the dumpsites (Photo 2-2). These signs were later damaged by typhoons. There is evidence of trails established along the cliffline that indicate occasional use of the site by poachers and hikers.

The ecological habitat at the Urunao dumpsites is primarily limestone forest. The Fire tree *(Serianthes nelsonii),* Ufa *(Heritiera longipetiolata*), Mariana crow *(Corvus Kubaryi)*, and Mariana fruit bat *(Pteropus mariannus)* are four endangered species that have been observed on the northwest plateau of Guam. However, no endangered plants or species have been observed at Urunao Dumpsites 1 and 2.

Archeological sites were documented near Dumpsites 1 and 2 during previous investigations (USAF, 1988). The Urunao Beach Complex and the Falcona Beach Complex have been identified as archeological areas in the northwestern portion of Guam (Ogden, 1996). The Falcona Beach Complex covers approximately 4.3 acres and lies approximately 1,000 feet downgradient (west) of Dumpsites 1 and 2. The Falcona Beach Complex is identified as Pre-Magellan (pre-historic) and is in good condition. The area has been identified as a culturally valuable archeological site and was listed on the Guam Register of Historic Sites in July 1974 (Reinman, 1977). The site is on private land and is recommended for reserve status by GovGuam.

There are no monitoring wells within a 1/2-mile radius of the dumpsites. Monitoring wells IRP-43 and IRP-44 are located upgradient, within a 1-mile radius of Dumpsites 1 and 2 (Figure 2-3). The depth to groundwater beneath the lower, flat portion of the dumpsites is approximately 40 to 100 feet below ground surface (bgs). At the upper cliffline, groundwater is approximately 475 feet bgs. Based on the historical groundwater elevation data in the area, the prevailing groundwater flow direction is to the west, toward the Philippine Sea (Figure 2-3). Both of the dumpsites are located downgradient of aquifer recharge zones and will not impact current or future groundwater production wells within the recharge zones. The freshwater lens is relatively thin beneath the site and becomes even thinner and more brackish as it approaches the nearby Philippine Sea.

2.5.2 Sampling History for Urunao Dumpsites 1 and 2

The steep, rugged slopes at the dumpsites limited field activities to a detailed site inventory, soil sampling, and seep sampling. The DSI and the initial soil sampling were conducted during the 1997-1998 EBS fieldwork. All EBS procedures and laboratory analyses were conducted in accordance with the approved Basewide Quality Assurance Project Plan (QAPP); consequently, all data collected during the EBS were usable for the RI/FS. The RI/FS field activities at the Urunao dumpsites commenced in January 2001 and continued through May 2001 and included surface and subsurface soil sampling and freshwater seep sampling.

During the DSI, the physical characteristics of the dumpsites and areas containing surface debris were visually described and documented. To facilitate the DSI, a series of trails were cut on a 100-foot orthogonal grid to provide spatial reference for locating debris observed during the inventory. All surface features and debris were given a relative position using a measuring tape and were referenced to the established grid system. In addition to the DSI, an ecological (flora and fauna) survey was conducted to identify ecological habitats, receptors, and exposure pathways.

All surface soil samples were discrete (grab) samples collected from 0 to 6 inches bgs. In areas where surficial solid waste was covering the ground surface, surface samples were collected following the removal of the solid waste. If insufficient soil cover was present, the sample location was relocated to a nearby downgradient site where sufficient soil was present. Surface soil samples were generally analyzed for:

- Semivolatile organic compounds (SVOCs)—USEPA Method SW8270C
- Polycyclic aromatic hydrocarbons (PAHs)—USEPA Method SW8310
- Organochlorine pesticides (OCPs——USEPA Method SW8081A
- Polychlorinated biphenyls (PCBs)—USEPA Method SW8082
- Target Analyte List (TAL) metals—USEPA Methods SW6010B/SW7000
- Dioxins—USEPA Method SW8290 (where evidence of burning was identified in the area of the sample location)
- Explosives—USEPA Method SW8330 (where evidence of OE material was identified in the area of the sample location)

Surface soil samples were not analyzed for volatile organic compounds (VOCs) because geologic and meteorlogic conditions on Guam induce volatilization and infiltration thereby limiting the potential presence of VOCs in surface soil samples.

Due to the potential presence of OE materials at the Urunao dumpsites, all subsurface sample locations were screened using a magnetometer. In areas where solid waste covered the ground surface, discreet subsurface soil samples were collected following removal of the solid waste. If insufficient soil cover was present, subsurface soil samples were not collected. All subsurface soil samples were collected at a minimum depth of 2 feet bgs using a hand auger. Subsurface soil samples were analyzed for:

- VOCs—USEPA Method SW8260B
- SVOCs—USEPA Method SW8270C

- PAHs—USEPA Method SW8310
- OCPs—USEPA Method SW8081A
- PCBs—USEPA Method SW8082
- TAL metals—USEPA Methods SW6010B/SW7000
- Dioxins—USEPA Method SW8290 (where evidence of burning was identified in the area of the sample location)
- Explosives—USEPA Method SW8330 (where evidence of OE material was identified in the area of the sample location)

There are no groundwater monitoring wells at Urunao Dumpsites 1 and 2. Groundwater samples were collected from freshwater seeps downgradient of the dumpsites. Site reconnaissance was performed along Falcona Beach (Photo 2-3) to identify the locations of freshwater seeps. The freshwater seep samples were collected during the lowest daily tide as established by charts published by the University of Guam Marine Laboratory. The freshwater seep samples were analyzed for:

- VOCs—USEPA Method SW8260B
- SVOCs—USEPA Method SW8270C
- PAHs—USEPA Method SW8310
- OCPs—USEPA Method SW8081A
- PCBs—USEPA Method SW8082
- TAL metals—USEPA Methods SW6010B/SW7000

To evaluate the risks posed to receptors at the site, each laboratory-detected concentration of chemicals was compared to the 2000 Preliminary Remediation Goals (PRGs). PRGs have been developed by USEPA Region IX as regulatory limits to establish *screening* criteria for potentially contaminated Residential and/or Industrial sites (USEPA, 2000). If the concentration of chemicals exceeds the Residential or Industrial PRGs, those chemicals would be regarded as constituents of potential concern (COPCs).

In general, the Residential PRGs are established conservatively at lower concentrations as compared to Industrial PRGs because residential use is expected in relatively pristine environmental settings. Because some metals concentrations in soils naturally occur at high concentrations on Guam, background threshold values (BTVs) were established (ICF Technology, 1996 and EA, 2002). If any soil sample metal result exceeded the PRG, the result would then be compared with BTVs. The groundwater/seep analytical data were compared to the federal Safe Drinking Water Act's MCLs and PRGs, when applicable.

COPCs have potential to pose health risks to those who live in residential areas or work in Industrial areas, but those risks are not quantified until the human health risk assessment (HHRA) and ecological risk assessment (ERA) are conducted for each COPC. Once COPCs proved to pose risk to human or the environment based on HHRA and ERA, COPCs become constituents of concern (COCs).

2.5.3 Conceptual Site Model for Urunao Dumpsites 1 and 2

Conceptual Site Models (CSMs) are useful in assessing the fate and transport of COCs and evaluating potential exposure pathways relative to current and future receptors at a site.

The dumpsites are accessible from the top and bottom of the cliff, although the steep slope makes access easier from the bottom. There is evidence of trails established along the cliff that indicate occasional use by hunters and hikers. The base of the cliff at the sites has been made more accessible by the recent construction of a road to within ½ mile of Dumpsite 2..

The CSM for the HHRA at Dumpsites 1 and 2 is presented in Figure 2-5. As summarized in Table 2-1 and Figure 2-5, potential receptors at the dumpsites include occasional users/trespassers, commercial/utility workers, and residents. The occasional users/trespassers include hunters or hikers who may walk through the area as well as maintenance workers. Hunting of deer and wild pigs occurs in the area of Andersen AFB. Therefore, adults and children who consume deer and pig meat are also receptors at the site. However, risks associated with ingestion of deer and wild pig meat have been addressed on a base-wide basis and are presented in a separate report (EA, 1995). As a conservative assumption, and to serve as a baseline, risks to potential future residents were evaluated for Dumpsites 1 and 2.

Media of concern include surface soil, subsurface soil, and ambient air. Groundwater is not considered a medium of concern because the dumpsites are located at the edge of the freshwater lens and therefore groundwater at these sites is not a suitable source of potable water (Figure 2-5).

The exposure pathways that were considered for future resident adults and children are incidental ingestion of and dermal exposure to surface soils and inhalation of suspended surface soil particles. Although unlikely, it is assumed that residents could be exposed to subsurface soils, which could be disturbed during digging or excavation activities and brought to the surface. Therefore, as a conservative measure, residents were also evaluated for incidental ingestion of, dermal contact with, and inhalation of subsurface soil particles. The exposure pathways that were considered for current and future occasional users/trespassers are incidental ingestion of, dermal contact with, and inhalation of suspended surface soil particles (Figure 2-5).

2.5.4 Suspected Contamination Sources at Urunao Dumpsites 1 and 2

Based on the DSI, the debris at Dumpsite 1 was mostly surficial solid waste material and deteriorated OE. The areas of concentrated metal debris and OE materials are depicted in Figure 2-6. The OE at Dumpsite 1 included scattered M-89 and M-90 target identification bombs, an abandoned 1,500-pound bomb, and deteriorated AN-M50 series incendiary bomblets. The exact locations and numbers of the unexploded M-89 and M-90 target identification bombs and deteriorated AN-M50 series incendiary bomblets could not be determined because some were partially buried. As shown in Figure 2-6, there are two areas where surficial solid waste and OE were burned using napalm. As compared with Dumpsite 1, only a few (less than five) isolated deteriorated AN-M50 series incendiary bomblets were scattered around Dumpsite 2 (Figure 2-7).

Other debris at Dumpsites 1 and 2 was similar and included aircraft and auto tires, scattered aircraft parts, deteriorated cube-shaped metal containers, deteriorated 55-gallon drums, sheet metal, pipes, wires, cables, auto parts, small metal containers, empty compressed gas cylinders, glass bottles, food cans, soda cans, engine parts, concrete slabs, and household trash. Most of the surface debris found at Dumpsites 1 and 2 was scattered around the intermediate cliffline, with the exception of the tires. Because of their round shape, the tires advanced further downslope and are concentrated at the toe of the sites (Figures 2-6 and 2-7). The location of the tires is significant because they define the extent of the waste boundary. In many areas at Dumpsite 1, more than 4 feet of deteriorated metal debris covers the cliffline surface. These areas are unstable and could collapse when stepped on, creating unsafe and physically hazardous conditions.

Based on the DSI results, there was no evidence of stained soil or stressed vegetation at Dumpsites 1 and 2. Similarly, there was no evidence of spills at the dumpsites. All containers, including the 55-gallon drums that were observed at Dumpsites 1 and 2, were deteriorated and empty. No specific debris material, container, or deteriorated drum scattered around the dumpsites could therefore be identified as the suspected source of contamination.

2.5.5 Urunao Dumpsites 1 and 2 COPCs

A total of 92 (including 11 duplicate) discrete surface and subsurface soil samples were collected at Urunao Dumpsites 1 and 2 during four separate field events. Soil samples were collected at Dumpsite 1 during four sampling events conducted in June 1997, February 1998, September 1998, and January 2001. Soil samples were collected at Dumpsite 2 during three sampling events conducted in May 1997, September 1998, and January 2001.

A total of 50 (including 5 duplicate) surface soil samples were collected at Dumpsite 1 (Tables 2-2 and 2-3). Based on laboratory results, hexachlorobenzene, dibenz(a,h)anthracene, 4,4’-DDT, PCBs (Aroclor-1254 and Aroclor-1260), antimony, arsenic, barium, copper, iron, lead, manganese, and dioxins were identified as COPCs in surface soil at Dumpsite 1 (Figures 2-8 and 2-9). The above-listed chemicals were considered COPCs because they exceeded the USEPA-established Residential PRGs and/or BTVs. Subsurface soil samples were difficult to collect at Dumpsite 1 due to the shallow soil depth (typically less than 2 feet bgs) and the amount of metallic debris. Only three (including one duplicate) subsurface soil samples were collected from Dumpsite 1. Based on analytical results, antimony, barium, cadmium, iron, lead, and dioxins were identified as COPCs in subsurface soil at Dumpsite 1 (Figures 2-8 and 2-9). No explosive compounds were detected in any of the surface or subsurface soil samples collected from Dumpsite 1.

A total of 31 (including 5 duplicate) surface soil samples were collected at Dumpsite 2 (Table 2-4). Based on analytical results dieldrin, benzo(a)pyrene, PCBs (Aroclor-1254 and Aroclor-1260), antimony, iron, lead, and manganese were detected at concentrations exceeding Residential PRGs and/or BTVs and, therefore, were identified as COPCs in surface soil at Dumpsite 2. Subsurface soil samples were also difficult to collect at Dumpsite 2 and only seven subsurface soil samples were collected at depths ranging between 2 and 2.9 feet bgs. Based on analytical results, benzo(a)pyrene, dibenz(a,h)anthracene, antimony, iron, lead, and manganese were identified as COPCs in subsurface soil at Dumpsite 2 (Figure 2-10).

After identifying freshwater seeps along Falcona Beach, three (including one duplicate) seep samples were collected approximately 1,000 feet downgradient from Dumpsites 1 and 2 (Photo 2-3). These samples were collected during the lowest daily tide of the month. As presented Table 2-5, no COPCs were detected at concentrations exceeding their respective MCLs.

2.6 Current and Potential Future Site and Resource Uses

Both Dumpsites 1 and 2 are located on currently inactive private property surrounded by other undeveloped private properties. The area in the vicinity of the dumpsites is sparsely populated. The nearest populated areas are the Machananao Subdivision (Potts Junction) in Dededo and the village of Yigo. Both are located south of the site. As of 2000, the populations of the nearby villages of Yigo and Dededo totaled approximately 62,000, which is approximately 40 percent of the island's population (United States Census Bureau, 2001). Dispersed, low-density populations characterize the area between these villages and Andersen AFB. The population on Andersen AFB is variable. In 2000, 1,721 active duty military personnel and 1,588 civilians were employed at Andersen AFB (Andersen AFB, 2000).

An unpaved public access road was constructed within ½ mile of the northwestern portion of Dumpsite 2 for future development of the coastal properties (Figure 2-3). Residential development in this coastal area is expected in the near future, including the Dumpsites 1 and 2.

Guam is the most populated island in the Mariana Archipelago. The population of Guam was 154,805 during the year 2000 census, an increase of 16 percent from the total population in 1990 (United States Census Bureau, 2001). A variety of different ethnic groups inhabit Guam including Chamorro (38 percent) and Filipino (23 percent). The total military population on Guam is about 13,000 or about 8 percent of the total population (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. Services (23 percent of the total workforce), Retail Trade (19 percent of the total workforce), and Construction (11 percent of the total workforce) dominate employment in the private sector. Agriculture accounts for less than 1 percent of the total workforce (Guam Department of Commerce, 1999).

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, with a projected water demand of 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). Since the mid-1990s, Guam's dependence on groundwater as a drinking source has increased to approximately 80 percent (GEPA, 1997). According to the Water and Environmental Research Institute of the Western Pacific (WERI), 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 USN maintains 13.

Currently, there are no production wells near Urunao Dumpsites 1 and 2. The dumpsites are located downgradient of the aquifer recharge zones and will not impact current or future groundwater production wells within the aquifer recharge zones. The freshwater lens is relatively thin beneath the site, and becomes even thinner and more brackish as it approaches the nearby Philippine Sea. The thinness of the lens downgradient of the sites limits its usefulness as a source of potable water. In addition, GovGuam (fall 2002) is in the process of extending the public water system to the coastal properties, precluding the need for private supply wells.

2.7 Summary of Site Risks

A HHRA and an ERA were performed for Dumpsites 1 and 2 to evaluate whether the COPCs in surface and subsurface soils (presented in Section 2.5.4) pose risks to human health or the environment. The HHRA and ERA identify the COPCs, exposure concentrations, exposure duration, and exposure pathways and estimate the risks the dumpsites poses to human health and the environment if no action were taken. COPCs that are determined to pose unacceptable risks to human health or the environment are designated as COCs. However, because a comprehensive HHRA and ERA have already been presented in Urunao Dumpsites 1 and 2 RI/FS (FWENC/EA, 2002), and according to USEPA Guidance (USEPA, 1999), the HHRA and ERA that are referenced in the following sections are presented in terms of COCs, only.

2.7.1 Baseline HHRA for Urunao Dumpsites 1 and 2

The purpose of the HHRA was to assess risks associated with current and potential future human exposures to COCs in environmental media at or in the vicinity of Dumpsites 1 and 2. The HHRA methodology involves a four-step process: (1) hazard identification, (2) toxicity assessment, (3) exposure assessment, and (4) risk characterization.

2.7.1.1 Identification of Urunao COCs for HHRA at Dumpsites 1 and 2

The range of detected concentrations (maximum and minimum) and the frequency of detection for each COC identified in surface and subsurface soils at Dumpsites 1 and 2 are summarized in Tables 2-6, 2-7, 2-8, and 2-9 using the format presented in Risk Assessment Guidance for Superfund (RAGS) Part D (USEPA, 1998a).

The exposure point concentration (EPC) for each COC is a statistically derived concentration based on the soil sample results that is used to calculate the risk associated with each COC. The EPCs for COCs in surface and subsurface soils for Dumpsites 1 and 2 are presented in Tables 2-10, 2-11, 2-12, and 2-13.

For the reasonable maximum exposure (RME) scenario, the EPC for each COC is estimated using the arithmetic mean and the upper 95th percentile upper confidence limit of the mean (95UCLM). The 95UCLM represents a high value for an EPC so there is 95 percent confidence that all other values will be below the 95UCLM value. The 95UCLM is used as the EPC in the exposure assessment for the RME assumptions. However, if the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration value is used as the EPC and is listed in the table instead of the 95UCLM value. The arithmetic mean concentration is used as the central tendency (CT) EPC value using average exposure assumptions.

2.7.1.2 Exposure Assessment for HHRA at Urunao Dumpsites 1 and 2

An exposure assessment is conducted to estimate the magnitude of actual and/or potential human exposures. In the exposure assessment, average and maximum estimates of potential exposure are developed in accordance with USEPA guidance for both current and potential future land-use assumptions. Current maximum exposure estimates are used to determine whether a potential health hazard exists based on current conditions. Future maximum potential exposure estimates are used to provide an understanding of potential future exposures and health hazards and include a qualitative estimate of the likelihood of such exposures occurring.

Current and future occasional adult users and trespassers can access the dumpsites, and so these target groups are identified as potentially exposed populations. Current and future land use may also include exposure to recreational hunters and hikers. Because of the steep slopes at Dumpsites 1 and 2, residential exposures are unlikely to occur at the sites in the future. However, at the request of USEPA Region IX, future onsite resident adults and children were evaluated as exposed populations as a conservative measure.

As illustrated in the CSM (Figure 2-5), COCs at Dumpsites 1 and 2 may be adsorbed onto surface soil particles or infiltrate into subsurface limestone. Some COCs may also be released into the air as a result of disturbance of impacted soils, by wind, and other climatic factors. Therefore, the media of concern include surface soil, subsurface soil, and air as environmental transport media for the release of chemicals present at Dumpsites 1 and 2. Groundwater is not considered a medium of concern in this HHRA because the site is located at the edge of the freshwater lens and is not a suitable source of potable water.

The following human exposure pathways were identified for evaluation at Urunao Dumpsites 1 and 2:

- Incidental ingestion of surface soil during residential activities (such as gardening)
- Incidental ingestion of surface soil during trespassing activities
- Dermal contact with surface soil during residential activities
- Dermal contact with surface soil during trespassing activities
- Incidental ingestion of subsurface soil during residential activities
- Dermal contact with subsurface soil during residential activities
- Inhalation of suspended surface soil particles during residential activities
- Inhalation of suspended surface soil particles during trespassing activities
- Inhalation of suspended subsurface soil particles during residential activities

The final step in the exposure assessment is to estimate COC intakes for each of the pathways considered in the assessment. In this exposure assessment, two different measures of intake are provided depending on the nature of the effect being evaluated. When evaluating longer-term exposures to chemicals that produce adverse non-carcinogenic effects, intakes are averaged over the period of exposure (i.e., the averaging time) (USEPA, 1989). This measure of intake is referred to as the average daily intake (ADI) and is a less-than-lifetime exposure. For chemicals that produce carcinogenic effects, intakes are averaged over an entire lifetime and are referred to as the lifetime average daily intake (LADI) (USEPA, 1989).

The detailed exposure duration, exposure time, incidental ingestion rates of contaminated soil, inhalation rates of contaminated dust, and dermal exposure assumptions for resident adults, resident children, occasional users (workers), and trespassers under RME and CT scenarios are presented in Table B1 of Appendix B.

2.7.1.3 Toxicity Assessment for HHRA at Urunao Dumpsites 1 and 2

The toxicity assessment considers the types of potential adverse health affects associated with exposures to COCs. The toxicity assessment relies on existing toxicity information developed based on dose-response for specific COCs. Using this dose-response relationship, specific toxicity values are derived by USEPA that can be used to estimate the incidence of potentially adverse effects occurring in humans at different exposure levels. The USEPA-derived toxicity values for COCs are called reference doses (RfDs) for non-carcinogens and slope factors (SFs) for potential carcinogens.

The toxicity values used for COCs at Dumpsites 1 and 2 are summarized in Tables 2-14, 2-15, 2-16, and 2-17. The USEPA Integrated Risk Information System (IRIS) database was used for RfDs of non-carcinogenic COCs. If RfDs for COCs were not available from IRIS, the USEPA health effects assessment summary tables (HEAST) were used as a secondary data source. If RfDs for COCs were not available from IRIS or HEAST for one route of exposure but existed for another route, the existing value was examined for technical applicability to the alternate route and subsequently used, if appropriate. As presented in Tables 2-14 and 2-15, the primary non-carcinogenic target organs for antimony, cadmium, and manganese are blood, kidney, and nervous system.

Unlike non-carcinogens, carcinogens are generally assumed to have no threshold, that is, there is presumed to be no level of exposure below which carcinogenic effects will not manifest themselves. This "non-threshold" concept supports the idea that there are small, finite probabilities of inducing a carcinogenic response associated with every level of exposure to a potential carcinogen. The primary carcinogenic target organs for arsenic, lead, and benzo(a)pyrene are skin and lung (Tables 2-16 and 2-17). As presented in Tables 2-16 and 2-17, the weight-of-evidence classification system assigns a letter or alphanumeric (A through E) to each potential carcinogen that reflects an assessment of its potential to be a human carcinogen:

- A = a known human carcinogen
- B1 = a probable human carcinogen, based on sufficient animal data and limited human data
- B2 = a probable human carcinogen based on sufficient animal data and inadequate or no human data
- C = a possible human carcinogen
- D = not classifiable as to human carcinogenicity
- E = evidence of noncarcinogenicity for humans

Only compounds that have a weight-of-evidence classification of C or above are considered to have carcinogenic potential in this risk assessment.

Additionally, there are no toxicity values available for lead and dioxins. According to the USEPA, lead is classified as a B2-probable human carcinogen. However, there is no USEPA value for use as a slope factor in quantifying cancer risks. In the absence of any USEPA-published toxicity values for lead, it is currently not possible to perform a quantitative risk estimate for lead exposures using standard USEPA methodology. The current USEPA guidance sets forth an interim soil cleanup level for total lead at 400 milligrams per kilogram (mg/kg) (USEPA, 1989), which is considered "protective for direct contact at residential settings." Infants and young children are the populations most vulnerable to effects from exposure to lead.

There are no USEPA-published toxicity concentrations for dioxins. Several of the dioxin constituents have been shown to cause toxic effects to humans. Because of the complexity of the dioxin constituents, the evaluation of human health risks from exposures to these mixtures is very difficult. The concept of Toxicity Equivalence Factors (TEFs) was developed to deal with this problem. The TEF concept is based on the evidence that dioxin-like compounds share a common mechanism of action. As a result of this process, TEFs for human intake were derived for 17 dioxin constituents that can be used to estimate risks from exposure to dioxins (World Health Organization [WHO], 1997).

2.7.1.4 HHRA Characterization for Urunao Dumpsites 1 and 2

The potential human health risks associated with exposures to non-carcinogenic COCs at Dumpsites 1 and 2 were estimated by comparing ADIs with established RfDs, as per USEPA guidance (USEPA, 1989). A hazard quotient (HQ) was derived for each COC, as shown in the equation below:

$$HQ = \frac{ADI}{RfD}$$

where: HQ = Hazard quotient; ratio of average daily intake level to acceptable daily intake level (unitless)
ADI = Estimated average daily intake (mg/kg/day)
RfD = Reference dose (mg/kg/day)

If the average daily intake exceeds the RfD, the HQ will exceed 1.0 and there may be concern that potential adverse systemic health effects will be observed in the exposed populations. If the ADI does not exceed the RfD, the HQ will not exceed 1.0 and there may be no concern that potential adverse systemic health effects will be observed in the exposed populations. However, if the sum of several HQs exceeds 1.0, and the COCs affect the same target organ, there may be concern that potential adverse systemic health effects will be observed in the exposed populations. In general, the greater the HQ values above 1.0, the greater the level of concern. However, the HQ does not represent a statistical probability that an adverse health effect will occur.

For consideration of exposures to more than one chemical causing systemic toxicity via several different pathways, the individual HQs are summed to provide an overall Hazard Index (HI). If the HI is less than 1.0, then no adverse health effects are likely to be associated with exposures at the site. However, if the total HI is greater than 1.0, separate endpoint-specific HIs may be calculated based on the toxic endpoint of concern or target organ (e.g., HQs for neurotoxins are summed separately from HQs for renal toxins). Only if an endpoint-specific HI is greater than 1.0 is there reason for concern about potential health effects for that endpoint.

Carcinogenic risk was estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen at the site. The numerical estimate of excess lifetime cancer risk was calculated by multiplying the LADI by the risk per unit dose (the slope factor), as shown in the following equation:

$$Risk = LADI \times SF$$

where: Risk = The unitless probability of an exposed individual developing cancer
LADI = Lifetime average daily intake (mg/kg/day)
SF = Cancer slope factor $(mg/kg/day)^{-1}$

Because the slope factor is the statistical 95th percentile upper-bound confidence limit on the dose-response slope, this method provides a conservative, upper-bound estimate of risk.

Cancer risks were estimated for current and future occasional users and trespassers and for potential future residents. It should be noted that the interpretation of the significance of the cancer risk estimate is based on the appropriate public policy. The NCP (CFR Part 300) states, "...For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}." That is, the USEPA generally accepts the risk range for site-related exposures to be between 10^{-4} for industrial areas and 10^{-6} for residential areas. The 10^{-4} means that a risk posed by a contaminant at a site is considered unacceptable if the contaminant causes cancer in more than 1 person out of 10,000 population. The 10^{-6} means that a risk posed by a contaminant at a site is considered unacceptable if the contaminant causes cancer in more than 1 person out of 1,000,000 population.

2.7.1.4.1 HHRA Results for Surface Soil Exposures at Dumpsite 1

Potential health risks from exposure to surface soil at Dumpsite 1 were assessed for each COC, exposure pathway, and potential receptor population using RME or CT scenarios and the results are discussed in detail in the following sections. The detailed exposure and risk calculations are presented in Table B2 of Appendix B.

Future Resident Adults

The cancer and non-cancer risk assessment results for future resident adult exposure to surface soil under the RME and CT scenarios at Dumpsite 1 are presented in Tables 2-18 and 2-19. Exposure to COCs in surface soil and ambient air among potential future resident adults resulted in a HI that exceeded USEPA's risk target of 1.0. Using the RME scenario, the total HI was 3.9 for future resident adults. Using CT parameters, the HI was 0.6. Antimony had a HI exceeding 1.0.

Cumulative cancer risks across all pathways were within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} for potential future residents. Under RME conditions, the cumulative cancer risk was 9.4×10^{-5}. Under CT conditions, cumulative risk was 4.8×10^{-6}. Dioxins and arsenic had cumulative risks exceeding USEPA's risk goal of 10^{-6}.

Future Resident Children

The cancer and non-cancer risk assessment results for future resident child exposure to surface soil under the RME and CT scenarios at Dumpsite 1 are presented in Tables 2-20 and 2-21. Exposure to COCs in surface soil and ambient air among potential future resident children resulted in a HI that exceeded USEPA's risk target of 1.0. Based on the RME scenario, the target

HI was 31 for future resident children. Exposures of future resident children to COCs in surface soil and ambient air at Dumpsite 1, under CT conditions, resulted in a HI of 5.0. Antimony, arsenic, and manganese had cumulative HIs exceeding 1.0.

Cumulative cancer risks across all pathways were within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} for potential future residents (adults and children).

Occasional Users/Trespassers

The cancer and non-cancer risk assessment results for occasional user/trespasser exposure to COCs in surface soil under the RME and CT scenarios are presented in Tables 2-22 and 2-23. The results at Dumpsite 1 indicate no concern for adverse non-carcinogenic effects among current and future occasional users/trespassers under the specified exposure conditions. Using RME assumptions, the total HI was 0.2 for current and future occasional users/trespassers, which is below the USEPA risk target of 1.0. Using CT parameters, the HI was 0.04, indicating no concern for adverse health effects.

Excess lifetime cancer risks to occasional users/trespassers resulting from exposure to COCs in surface soil and ambient air at Dumpsite 1 were within USEPA's risk range of 10^{-6} to 10^{-4}. The total excess lifetime cancer risk was 7.8×10^{-6} under RME and 2.7×10^{-7} under CT conditions. Arsenic and dioxins were the only COCs with cumulative risks exceeding 10^{-6}.

2.7.1.4.2 HHRA Results for Subsurface Soil Exposures at Dumpsite 1

Potential health risks from exposure to subsurface soil at Dumpsite 1 were assessed for each COC, exposure pathway, and potential receptor population using RME or CT scenarios and the results are discussed in detail in the following sections. The detail exposure and risk calculations are presented in Table B2 of Appendix B.

Future Resident Adults

The cancer and non-cancer risk assessment results for future resident adult exposure to subsurface soil under the RME and CT scenarios at Dumpsite 1 are presented in Tables 2-24 and 2-25. Exposure to COCs in subsurface soil and ambient air among potential future resident adults resulted in a HI of 1.0 under RME conditions and HI of 0.1 under CT conditions. There were no COCs or target organs with HIs exceeding 1.0; therefore, there are no concerns for adverse non-cancer health effects for future resident adults exposed to subsurface soil at Dumpsite 1.

Excess lifetime cancer risks to potential future residents (adults and children) from exposure to COCs in subsurface soil were within USEPA's acceptable risk range of 10^{-6} to 10^{-4}. The total excess lifetime cancer risk was 1.5×10^{-5} under RME conditions and 1.1×10^{-6} under CT conditions. Dioxins were the only COC with cumulative risks exceeding USEPA's risk goal of 10^{-6}.

Future Resident Children

The cancer and non-cancer risk assessment results for future resident child exposure to subsurface soil under the RME and CT scenarios at Dumpsite 1 are presented in Tables 2-26 and 2-27. Exposures to COCs in subsurface soil and ambient air among potential future resident children resulted in an estimated HI of 8.5 under RME conditions, and HI of 1.2 under CT conditions. Antimony, barium, and cadmium had HIs exceeding 1.0.

Cumulative cancer risks across all pathways were within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} for potential future residents (adults and children).

2.7.1.4.3 HHRA Results for Surface Soil Exposures at Dumpsite 2

Potential health risks from exposure to surface soil at Dumpsite 2 were assessed for each COC, exposure pathway, and potential receptor population using RME or CT scenarios and the results are discussed in detail in the following sections. The detail exposure and risk calculations are presented in Table B2 of Appendix B.

Future Resident Adults

The cancer and non-cancer risk assessment results for future resident adult exposure to surface soil under the RME and CT scenarios at Dumpsite 2 are presented in Tables 2-28 and 2-29. Exposure to COCs in surface soil and ambient air among potential future resident adults resulted in a HI that exceeded USEPA's risk target of 1.0. Using the RME scenario, the estimated HI was 2.3 for future resident adults. Using CT parameters, the estimated HI was 0.3. Manganese was the only COC with a HI exceeding 1.0.

Cumulative cancer risks across all pathways were within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} for potential future residents (adults and children). Under RME conditions the cumulative cancer risk was 4.1×10^{-6}. Under CT conditions, cumulative risk was 1.6×10^{-7}. The COCs with cumulative risks exceeding USEPA's risk goal of 10^{-6} were benzo(a)pyrene and Aroclor-1254.

Future Resident Children

The cancer and non-cancer risk assessment results for future resident child exposure to surface soil under RME and CT scenarios at Dumpsite 2 are presented in Tables 2-30 and 2-31. Exposure to COCs in surface soil and ambient air among potential future resident children, under the specified exposure conditions, resulted in a HI that exceeded 1.0. Under RME conditions the estimated HI was 15.4 and under CT conditions the HI was 1.9. The only COCs with cumulative HIs exceeding 1.0 were antimony and manganese.

Cumulative cancer risks across all pathways were within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} for potential future residents (adults and children).

Occasional Users/Trespassers

The cancer and non-cancer risk assessment results for occasional user/trespasser exposure to surface soil under the RME and CT scenarios at Dumpsite 2 are presented in Tables 2-32 and 2-33. Exposure to COCs in surface soil and ambient air among current and future occasional users/trespassers, under RME scenario, resulted in an estimated HI of 0.1, which is below the USEPA risk target of 1.0. Using CT parameters, the HI was 0.01, indicating no concern for adverse health effects.

Excess lifetime cancer risks for occasional users/trespassers resulting from exposures to COCs in surface soil and ambient air at Dumpsite 2 were less than USEPA's risk range of 10^{-6} to 10^{-4}. The total excess lifetime cancer risk was $5.2x10^{-7}$ under RME conditions and 1.6×10^{-8} under CT conditions.

2.7.1.4.4 HHRA Results for Subsurface Soil Exposures at Dumpsite 2

Potential health risks from exposure to subsurface soil at Dumpsite 2 were assessed for each COC, exposure pathway, and potential receptor population using RME or CT scenarios and the results are discussed in detail in the following sections. The detail exposure and risk calculations are presented in Table B2 of Appendix B.

Future Resident Adults

The cancer and non-cancer risk assessment results for future resident adult exposure to subsurface soil under the RME and CT scenarios at Dumpsite 2 are presented in Tables 2-34 and 2-35. Exposure to COCs in subsurface soil and ambient air among potential future resident adults resulted in an estimated HI of 3.9 under RME conditions and HI of 0.3 under CT conditions. Manganese was the only COC with a HI exceeding 1.0.

Excess lifetime cancer risks to potential future residents (adults and children) from exposure to COCs in subsurface soil were within USEPA's acceptable risk range of 10^{-6} to 10^{-4}. The total excess lifetime cancer risk was $2.5x10^{-6}$ under RME conditions and $6.1x10^{-8}$ under CT conditions. Benzo(a)pyrene was the only COC with cumulative risks exceeding USEPA's risk goal of 10^{-6}.

Future Resident Children

The cancer and non-cancer risk assessment results for future resident child exposure to subsurface soil under RME and CT scenarios at Dumpsite 2 are presented in Tables 2-36 and 2-37. Exposures to COCs in subsurface soil and ambient air among potential future resident children resulted in an estimated HI of 23 under RME conditions, and HI of 2.0 under CT conditions. Antimony and manganese had HIs exceeding 1.0.

Cumulative cancer risks across all pathways were within the USEPA's acceptable risk range of 10^{-6} to 10^{-4} for potential future residents (adults and children).

2.7.1.4.5 HHRA Results for Lead in Surface and Subsurface Soils at Urunao Dumpsites 1 and 2

Lead was detected in surface soil samples at Dumpsite 1 at concentrations exceeding the screening level of 400 mg/kg (Residential PRG). The mean lead concentration was 1,410 mg/kg and the maximum measured concentration of lead in surface soils at Dumpsite 1 was 25,200 mg/kg.

Based on LEAD99D model outputs, children exposed to lead in surface soil under the hypothetical residential exposure scenario described in this chapter are predicted to have a mean blood lead level of:

- 14.1 micrograms per deciliter (µg/dL), with approximately 73 percent of the exposed children's blood lead levels above the level of concern (10 µg/dL) at Dumpsite 1.

Lead was detected in surface soil samples at Dumpsite 2 at concentrations exceeding the screening level of 400 mg/kg. The mean lead concentration was 4,210 mg/kg and the maximum measured concentration of lead in surface soil at Dumpsite 2 was 53,400 mg/kg.

Based on LEAD99D model outputs, children exposed to lead in surface soil under the hypothetical residential exposure scenario described in this chapter are predicted to have a mean blood lead level of:

- 77.6 µg/dL, with approximately 100 percent of the exposed children's blood lead levels above the level of concern (10 µg/dL) at Dumpsite 2.

Lead was also detected in Dumpsite 1 subsurface soil at concentrations exceeding the screening level of 400 mg/kg. The mean soil lead concentration in subsurface soil was 1,430 mg/kg and the maximum detected concentration was 2,830 mg/kg.

- 14.2 µg/dL, with more than 75 percent of the exposed children's blood lead levels above the level of concern (10 µg/dL).

Similarly, lead was detected in Dumpsite 2 subsurface soil at concentrations exceeding the residential soil lead screening level of 400 mg/kg. The mean soil lead concentration in subsurface soil was 320 mg/kg and the maximum detected concentration was 1,020 mg/kg. Based on the LEAD99D model outputs, the population of children potentially exposed to Dumpsite 2 subsurface soil lead under residential exposure conditions are predicted to have a mean blood lead level of:

- 5.1 µg/dL, with more than 93 percent of the exposed children's blood lead levels below the level of concern (10 µg/dL).

The predicted mean blood lead concentrations for resident children hypothetically exposed to surface and subsurface soils at Dumpsite 1 and surface soils at Dumpsite 2 exceeded the 10 µg/dL "level of concern" when all data were included in the mean lead concentration. However the predicted mean blood lead concentration for resident children hypothetically exposed to subsurface soils at Dumpsite 2 did not exceed the 10 µg/dL "level of concern" when all data were included in the mean lead concentration. Therefore, under a future scenario whereby children could be exposed to subsurface soil at Dumpsite 2, under residential conditions, there are no concerns for potential adverse health effects for resident children.

2.7.1.5 HHRA Uncertainties for Urunao Dumpsites 1 and 2

The different types of uncertainty involved in the HHRA process are discussed briefly in the following sections.

2.7.1.5.1 Sampling and Analysis Uncertainties

The sampling plan may pose a potential significant impact on the results obtained in calculating human health risk at a site. Field samples are collected at areas that are expected to be contaminated (biased sampling), and as a result the exposure point concentration used in calculating risk exposure and risk is likely to overestimate the actual concentration encountered at the site from random exposure across the site. This sampling bias will result in an overestimate of exposure and risk at a site. The soil sampling at Dumpsites 1 and 2 incorporated a combination of random and biased samples. As the majority of soil samples collected at Dumpsites 1 and 2 are biased toward potentially contaminated areas, the measured concentrations and calculated health risk is potentially over-estimated.

2.7.1.5.2 Chemical Fate and Transport Modeling Uncertainties

The models used to estimate chemical concentrations associated with particulates in air at Dumpsites 1 and 2 are consistent with those recommended by USEPA (1996b). However, due to uncertainties in modeling methodologies, USEPA-recommended models are likely to overestimate actual concentrations at the site. Thus, use of models is likely to result in overestimates of health risks at Dumpsites 1 and 2.

There are numerous uncertainties associated with the toxicity assessment. These are generally due to the unavailability of data to thoroughly calculate the toxicity of COCs. These uncertainties are described in more detail in the following sections.

The majority of toxicological information comes from experiments with laboratory animals. Experimental animal data have been relied on by regulatory agencies to assess the hazards of human chemical exposures. Interspecies differences in chemical absorption, metabolism, excretion, and toxic response are not well understood; therefore, conservative assumptions are applied to animal data when extrapolating to humans. These probably result in an overestimation of toxicity.

Differences in individual human susceptibilities to the effects of chemical exposures may be caused by such variables as genetic factors (e.g., glucose-6-phosphate dehydrogenase deficiency), lifestyle (e.g., cigarette smoking and alcohol consumption), age, hormonal status (e.g., pregnancy), and disease. To take into account the diversity of human populations and their differing susceptibilities to chemically induced injury or disease, a safety factor is used. USEPA uses a factor between 1 and 10. This uncertainty may lead to overestimates of human health effects at given doses.

When experimental data available on one route of administration are different from the actual route of exposure that is of interest, route-to-route extrapolation must be performed before the risk can be assessed. Several criteria must be satisfied before route-to-route extrapolation can be undertaken. The most critical assumption is that a chemical injures the same organ(s) regardless of route, even though the injury can vary in degree. Another assumption is that the behavior of a substance in the body is similar by all routes of contact. This may not be the case when, for example, materials absorbed via the gastrointestinal tract pass through the liver prior to reaching the systemic circulation, whereas by inhalation the same chemical will reach other organs before the liver. However, when data are limited these extrapolations are made, and may result in overestimates of human toxicity.

2.7.1.5.3 Carcinogenic Effects Uncertainties

The majority of toxicological information for carcinogenic assessments comes from experiments with laboratory animals. There is uncertainty about whether animal carcinogens are also carcinogenic in humans. While many chemical substances are carcinogenic in one or more animal species, only a very small number of chemical substances are known to be human carcinogens. The fact that some chemicals are carcinogenic in some animal species but not in others raises the possibility that not all animal carcinogens are human carcinogens. Regulatory agencies assume that humans are as sensitive to carcinogens as the most sensitive animal species. This policy decision, designed to prevent underestimation of risk, introduces the potential to overestimate carcinogenic risk.

Typical cancer bioassays provide limited low-dose data on responses in experimental animals for chemicals being assessed for carcinogenic or chronic effects. The usual dose regime involves three dose groups per assay. The first dose group is given the highest dose that can be tolerated, the second is exposed to one-half that dose, and the third group is unexposed (control group) (National Research Council [NRC], 1983). Because this dosing method does not reflect how animals would react to much lower doses of a chemical, a dose-response assessment normally requires extrapolation from high to low doses using mathematical modeling. A mechanistic model assumes that there is no threshold for carcinogenic effects and *any* exposure to a carcinogen results in an incremental risk of cancer. This is in contrast to a statistical model that assumes that each individual in a population has a threshold below which cancer will not occur, and the range of thresholds in a population is distributed as a probability function or an enhancement model. An enhancement model modifies the mechanistic model by incorporating experimental data on the behavior of the chemical in the body (along with data on the mechanisms of carcinogenesis) that incorporates to varying degrees information about physiologic processes in the body (NRC, 1983).

A central problem with the low-dose extrapolation models is that they all too often fit the data from animal bioassays equally well, and it is not possible to determine their validity based on goodness of fit. Several models may fit experimental data equally well, but they may not all be equally plausible biologically. The dose-response curves derived from different models diverge substantially in the dose range of interest (NRC, 1983). Therefore, low-dose extrapolation is more than a curve-fitting process, and considerations of biological plausibility of the models must be taken into account before choosing the best model for a particular set of data.

2.7.1.5.4 Uncertainties Analysis of Exposure Assessment

An analysis of uncertainties is an important aspect of the exposure assessment. It provides the risk assessor and reviewer with information relevant to the individual uncertainties associated with exposure factor assumptions and their potential impact on the final assessment.

Soil ingestion rates for children are based on studies performed by Binder et al. (1986) and Clausing et al. (1987). Methods used in both studies involved the measurement of trace elements that are poorly absorbed by the gut, in soils and the feces of children. Both were short-term studies, and as they were not based on average long-term exposures, they represent an overestimate of exposure. More recent published data have shown that the average soil ingestion rate for 2-year-old children is less than 100 mg/day (Calabrese, et.al, 1989; Davis et. al., 1990). Furthermore, USEPA soil ingestion rates for children ages 1–6 years are based on ingestion rates for children at age 18 months and are applied through age 6 years (USEPA, 1989). This is very unlikely because children over 2 years old do not ingest at the same rate as an 18-month old. Additionally, a conservative estimate of 1.0 was used for the fraction ingested, which assumes that all soil ingested (for residential exposures) is ingested at the residence. This assumes that no activities take place elsewhere. Taken together these suggest that intakes for this pathway are overestimated.

USEPA assumes residential exposure duration (ED) for adults is 30 years, which represents the USEPA-derived 90th percentile upper limit for time spent at one residence. The average (50th percentile) time spent at one residence is 7 years. These values are recommended in the Superfund Guidance Manual (USEPA, 1989). Soil ingestion for children age 1 to 6 is assumed to continue for the entire 6-year time frame.

Although we have made the assumption that occasional users/trespassers on the island of Guam will be exposed to subsurface soils containing hazardous waste for 40 days/year for 25 years, this is very unlikely. It does not seem feasible that housing developments are built on land above landfills to make it possible for occasional users/trespassers to be exposed to this extent. Therefore, it is highly likely that the RME risk estimates presented in this report significantly overestimate the potential human health risks.

2.7.1.5.5 Uncertainties in Risk Characterization

Uncertainties in the risk characterization can stem from the inherent uncertainties in the data evaluation, the exposure assessment process, including any modeling of exposure point concentrations in secondary media from primary media, and the toxicity assessment process. The individual uncertainties in these respective processes were addressed in previous sections.

Uncertainties associated with the probability of adverse impacts to human health can also be evaluated by examining the relative risk estimated for CT and upper-bound RME scenarios. This type of simple probability analysis is often useful to risk managers who must balance baseline risk estimates with the expected costs and benefits of remedial activities.

2.7.2 Baseline ERA for Urunao Dumpsites 1 and 2

The purpose of the ERA was to determine the likelihood that adverse ecological effects may occur as a result of exposure to COCs. In addition to the DSI, an ecological (flora and fauna) survey was conducted at Dumpsites 1 and 2 and the results are presented in Tables 2-38, 2-39, 2-40, and 2-41. The flora for both of the dumpsites include mixed herbaceous and limestone forest habitat that covers approximately 75 percent of both the dumpsites.

In the mixed herbaceous type, a mixture of grasses, vines, herbs (up to 3 feet tall), and trees (10-foot to 30-foot tall) dominated the habitat. The dominant grass at the site was *Poaceae* sp., the dominant vine was bitter melon (*Momordica charantia*), and the dominant herb was false verbena (*Sida* sp.). The shrubs Indian mulberry (*Morinda citrifolia*) and limeberry (*Triphasia trifolia*) dominated the 3-foot to 10-foot stratum. The banyan tree (*Ficus prolixa*) and tangantangan (*Leucaena luecocephala*) dominated the 10-foot to 30-foot stratum. Tangantangan also dominated the 3-foot to 10-foot middle stratum.

Limestone forest habitat was a mixture of grasses, vines, and herbs; shrubs and small trees; and larger trees (10-foot to 30-foot tall). Two vines (*Convolulace* sp. and *Mikania scandens*) were observed on the cliffside, in addition to the epiphytic herbs, birds nest fern (*Asplenium nidus*), *Polypodium punctatum*, and *Pyrrosia lanceolata.* Larger trees including papaya (*Carica papaya*), cycad (*Cycas circinalis*), banyan (*Ficus prolixa*), and fagot (*Neisosperma oppositifolia*) were observed at both of the dumpsites. Papaya and cycad trees dominated the limestone forest habitat on the side of the cliff. The flat, toe-of-cliff area contained the dominant vines bitter melon (*Momordica charantia*) and wild passion flower (*Passiflora suberosa*), as well as birds nest fern (*Asplenium nidus*) and the fern *Polypodium punctatum*. Small trees included mapunyao (*Aglaia mariannensis*), papaya (*Carica papaya*), cycad (*Cycas circinalis*), and *Pandanus tectorius*. Larger trees included mapunyao (*Aglaia mariannensis*), papaya (*Carica papaya*), cycad (*Cycas circinalis*), banyan (*Ficus prolixa*), and fagot tree (*Neisosperma oppositifolia*). The dominant tree at both of the dumpsites was the banyan.

The fauna of both of the dumpsites include Sambar deer (*Cervus mariannus*), feral pigs (*Sus scrofa*), marine toad (*Bufo marinus*), white-tailed tropicbird, numerous spiders and insects, beetles, flies, mosquitoes, grasshoppers, crickets, praying mantis, ants, wasps, bees, blue-banded king crow butterflies, and black citrus swallowtail butterflies. Several reptiles, including the curious skink (*Carlia fusca*), gecko (*Gehyra mutilata*), blue-tailed skink (*Emoia caeruleocauda*), and monitor lizard (*Varanus indicus*) were observed at both of the dumpsites. In addition, the brown tree snake (*Bioga irregularis*) was observed in the grassland area at the top of the cliff.

Based on flora and fauna of Dumpsites 1 and 2, the CSM for the ERA at Dumpsites 1 and 2 is presented in Figure 2-11. As presented in Figure 2-11, the CSM is based on simple direct contact and food-web models. The secondary source of COC exposure is surface soil. This exposure may occur through direct contact with or ingestion of surface soil, or by ingestion of plant or animal tissue that has been exposed to surface soil. Exposure pathways and routes include:

! Direct Contact with Surface Soil—This exposure route is important for uptake of COCs by plants and for soil invertebrates. Most vertebrates, when foraging, may have the potential to be exposed to COCs via dermal contact. However, the dermal exposure pathway is not believed to be important for birds, mammals, or reptiles because of the lack of contact with exposed soils.

! Ingestion of Food (i.e., plants and biota that have taken up constituents from soil)—Terrestrial herbivores and predators that forage in the terrestrial habitats may ingest plants or animal prey that have bioaccumulated COCs from surface soils.

! Incidental Ingestion of Surface Soils—Herbivores and predators that forage in the terrestrial habitats may incidentally ingest some surface soil with their food or during other activities such as grooming.

On the basis of this evaluation, there are complete exposure pathways to surface soil in ecological habitats potentially impacted by releases of COCs. From this environmental medium, some COCs could bioconcentrate in plants and prey animals that may be eaten by other consumers. There is a potential for COC releases by infiltration to the subsurface soils and to groundwater; however, there are no complete pathways for ecological receptors to subsurface soil or groundwater. Groundwater at the dumpsites is hundreds of feet below the surface; thus, there is no potential for contact with ecological receptors. Ecological receptors are exposed to soils within the root zone, which typically is no more than 18 inches below the surface. There is minimal subsurface soil at both of the dumpsites before encountering the limestone bedrock. Consequently, subsurface soil exposure was not considered a viable exposure pathway to ecological receptors (Figure 2-11).

The selection of assessment endpoints must be based on the fundamental knowledge of the local ecology. Assessment endpoints typically relate to an effect on a population or community. Survival of Mariana fruit bats is an example of a population level assessment endpoint. Community level assessment endpoints could include the primary productivity of the limestone forest habitat. Examples of endpoints representing guilds of species are useful in that they convey information beyond the indicator species identified in the endpoint itself. An assessment endpoint involving a community index may provide more information about a site than an analysis of one species. Consequently, it is important to note that confirmation of the deleterious effects at the community level is an inherent confirmation that population level effects are occurring (Hartwell, 1997).

Based on ecological survey at Dumpsites 1 and 2, as presented in Table 2-42, the following receptors are considered for ERA:

- Soil-invertebrate communities (i.e., earthworm) and plant communities
- Native terrestrial birds represented by the Mariana crow and the yellow bittern
- Mariana fruit bat

For the purposes of this ERA, it is assumed that no future actions are expected at the Urunao dumpsites that would change the potential use of the area by ecological receptors. The ERA methodology involves a four-step process: (1) identification of potential COCs, (2) exposure assessment, (3) toxicity assessment, and (4) risk characterization.

2.7.2.1 Identification of COCs for ERA at Urunao Dumpsites 1 and 2

To identify COCs for the ERA at Urunao Dumpsites 1 and 2, the maximum detected concentration for each chemical in surface soil was compared to the higher of (1) conservative toxicologically based screening criteria or (2) background threshold concentrations for the base for inorganic constituents (ICF Technology, 1998). A constituent was excluded as a COC if the maximum detected concentration at Dumpsites 1 or 2 was lower than the screening value, or the constituent was an essential nutrient.

The results of COC screening are shown in Tables 2-43 and 2-44 for Dumpsites 1 and 2, respectively. The screening values were based on conservative threshold of ecological risk as recommended by the Dutch National Institute of Public Health and Environmental Protection (Dutch, 1994, 1995, and 1997).

2.7.2.2 Exposure Assessment for ERA at Urunao Dumpsites 1 and 2

Exposure refers to the degree of contact between ecological receptors at a site and the COCs. Based on the CSM described in Section 2.7.2 of this ROD, it is assumed that ecological receptors at Urunao Dumpsites 1 and 2 are exposed to COCs in surface soil either through direct contact, via dietary food web, or both.

The exposure concentrations were estimated statistically to present the most appropriate representative concentration of COCs at both of the dumpsites, as shown in Tables 2-45 and 2-46. The data for each COC were tested for normality or lognormality using the Shapiro-Wilks W-test (Shapiro and Wilks, 1965). If the data fit neither or both the normal and lognormal distribution according to the Shapiro-Wilks test, a lognormal distribution was assumed consistent with USEPA guidance (USEPA, 1992). For data fitting a normal distribution, the arithmetic mean was considered to be the most appropriate representative concentration. If the data fit a lognormal distribution, or a lognormal distribution was assumed because the data fit neither type of distribution, the lognormal mean of the constituent data was used as the representative concentration consistent with USEPA guidance. The lognormal mean is defined as (Gilbert, 1987):

$$LognormalMean = \exp(\bar{y} + \sigma_y^2/2)$$

where: $\bar{y}$ = the sample geometric mean

σ_y^2 = the variance of the log distribution

The following assumptions are made for arriving at each COC exposure concentration:

! COCs are assumed to be 100 percent bioavailable. That is, whether by direct contact or via food-web ingestion, all of the COCs are available for absorption and expression of toxic effects, which is highly unlikely considering the soil chemistry at the dumpsites.

! The area use factor for the Mariana crow, yellow bittern, and Mariana fruit bat receptors is assumed to be 1.0. This means that 100 percent of the Mariana crow, yellow bittern, and Mariana fruit bat food comes from Dumpsites 1 or 2.

2.7.2.3 Toxicity Assessment for ERA at Urunao Dumpsites 1 and 2

Toxicity assessment is based on studies that determine the lowest concentrations of contaminants that may cause adverse effects on ecological receptors. In this ERA, toxicity assessments were completed for soil-invertebrate communities (earthworm), plant communities, native terrestrial birds represented by the Mariana crow and the yellow bittern, and Mariana fruit bat relative to COCs in surface soils at both of the dumpsites.

Earthworms

The toxicity reference values (TRVs) for earthworms are presented in Table 2-47 along with reference documents. Many of the earthworm TRVs are from LOAEL (Lowest Observed Adverse Effects Level) chronic effects data based on laboratory studies of earthworms (ICF Technology, 1998). In the absence of sufficient data, NOAEL (No Observed Adverse Effects Level) data were used for chronic effects to derive earthworm TRVs.

Plants

Risks to plants, as with invertebrates, are expressed relative to concentrations observed in soil. Plant toxicity data were based on growth effects from Ecological Soil Screening Levels, as presented in Table 2-48, along with reference documents.

Native Terrestrial Birds and Mariana Fruit Bat

Food-web risks for avian species and the Mariana fruit bat are expressed relative to a dose of chemical (mg/kg-bw/day) taken up by the organism from food and soil. USEPA (1997b) guidance specifies that a screening ecotoxicity value should be "equivalent to a documented or best conservatively estimated chronic NOAEL." Literature-reported wildlife NOAEL and LOAEL TRVs were used as TRVs for food-web risks (Tables 2-49 and 2-50).

2.7.2.4 ERA Characterization for Urunao Dumpsites 1 and 2

The ERA was characterized based on calculation of a HQ or an Ecological Quotient (EQ):

Ecological Quotient = Representative Concentration / TRV

Hazard Quotient = Representative Dose / Toxicity Reference Value

The *Representative Concentrations or Representative Doses* are the exposure concentrations presented in Tables 2- 45 and 2-46. The TRVs are presented in Tables 2-47, 2-48, 2-49, and 2-50. If the representative soil concentration is less than the TRV, then the HQ or EQ will be less than 1.0. In this circumstance, no adverse ecological risk is expected for the exposed ecological receptors. If the representative soil concentration is greater than the TRV, then the HQ or EQ will be greater than 1.0, and adverse ecological risk is expected for the exposed ecological receptors. A summary of the ERA results for Dumpsites 1 and 2 is presented in the following sections of this ROD.

2.7.2.4.1 ERA Results for Dumpsite 1

As presented in Table 2-51, only beryllium, copper, and zinc had EQs greater than 1.0 that posed risk to earthworms at Dumpsite 1. Similarly, antimony, barium, copper, lead, manganese, mercury, nickel, selenium, silver, and zinc had EQs greater than 1.0 that posed risk to plants at Dumpsite 1 (Table 2-51). Only lead had HQs greater than 1.0 that posed risk to Mariana crows and yellow bitterns (Tables 2-52 and 2-53), and antimony, arsenic, and thallium had HQs greater than 1.0 and that posed risk to Mariana fruit bats at Dumpsite 1 (Table 2-54).

2.7.2.4.2 ERA Results for Dumpsite 2

As presented in Table 2-55, only copper and zinc had EQs greater than 1.0 that posed risk to earthworms at Dumpsite 2. Similarly, antimony, copper, lead, manganese, mercury, thallium, and zinc had EQs greater than 1.0 that posed risk to plants at Dumpsite 2 (Table 2-55). Only lead had HQs greater than 1.0 that posed risk to Mariana crows and yellow bitterns (Tables 2-56 and 2-57), and antimony and thallium had HQs greater than 1.0 and that posed risk to Mariana fruit bats at Dumpsite 2 (Table 2-58).

2.7.2.4.3 ERA Uncertainties for Urunao Dumpsites 1 and 2

Ecological risk characterization includes analysis of uncertainty. Uncertainty is distinguished from variability and arises from lack of knowledge about factors associated with the study. Sources of uncertainty include the process of selecting COCs, assumptions made in establishing the CSM, the adequacy of ecological characterization of the site, estimates of toxicity to receptors, and selection of model parameters. There are a number of factors that contribute to uncertainty in the ecological risk characterization for Urunao Dumpsites 1 and 2.

2.7.2.4.3.1 Uncertainties for Non-Random Sampling

While ecological receptors are likely to be found anywhere at Dumpsites 1 and 2, environmental media at known or suspected waste sites are typically sampled in a non-random fashion. That is, sampling points are chosen to best characterize known or suspected areas of contamination. Peripheral and nearby areas are under-sampled, if at all, and thus the average exposure of ecological receptors is biased high and exposure concentrations used in the risk assessment are conservative. This is an example of sampling to characterize suspected areas of contamination, even though this area represents a small proportion of the entire Dumpsites 1 and 2.

2.7.2.4.3.2 Uncertainties for COC Selection

COCs for this ERA were selected by comparison of maximum concentrations for all measured analytes with conservative, toxicologically based concentrations expected to represent no adverse effect levels. In addition, because the geology of Andersen AFB is unique and represented by highly weathered limestone, reference background concentrations of metals were also used to identify COCs. The use of conservative toxicity values relative to maximum concentrations represents a very conservative screening process. Because plants and animals at Andersen AFB have acclimated to high metal concentrations, the use of representative background concentrations represents a more realistic COC selection mechanism.

2.7.2.4.3.3 Uncertainties for Receptor of Concern Selection

Selection of appropriate receptors of concern in this ERA was performed using different criteria than are typically used. Because of the concern for the extirpation of native animals and plants on the island, any species that were introduced to the island and are thus not native species were not considered to be receptors of concern. Alternatively, native species found at the site were identified as receptors of concern. The native blue-tailed skink, while observed on the site, was not selected as a receptor of concern due to the lack of appropriate toxicological values. It is expected that in the event of acceptable risk being found for identified receptors of concern, the insectivorous blue-tailed skink would also have acceptable risk; however, this is an assumption with unknown uncertainty.

2.7.2.4.3.4 Uncertainties for Exposure Pathway

Inhalation and dermal exposure to terrestrial receptors were not quantified because doses from these pathways are very small relative to food and incidental soil ingestion. While this may underestimate the total dose to the ROC, the underestimate would be in the fraction of a percent of total dose, and is thus not of importance. In addition, ingestion of surface water was not considered in this risk assessment. There are very few, if any, natural surface water bodies at

Andersen AFB because the ground is very porous, and any water that falls on the surface rapidly infiltrates into the ground. Groundwater at the Urunao dumpsites is relatively deep, from 100 to 500 feet bgs, and is thus not accessible to ecological receptors. The ecological receptors on Guam have adapted to this characteristic by obtaining most of their water from the food that they consume, which accounts for the large number of fruit eaters on Guam.

2.7.2.4.3.5 Uncertainties for Exposure Assumptions

A number of assumptions were made to estimate doses of metals to the terrestrial receptor of concern. Some of these assumptions were conservative, adding to the potential overestimate of risk, while some exposure assumptions have an unknown effect on the uncertainty of this risk assessment.

Because there is little information available for the bird receptors, certain food-web model components are uncertain. For example, the assignment of feeding fractions for the yellow bittern (100 percent reptile) and the 2 percent incidental soil ingestion are based on best professional judgment in the absence of species- and site-specific data. Similarly, the use of the available tissue concentration data for monitor lizard and papaya as a surrogate for the various food items eaten by the receptor of concern adds uncertainty. These food items were collected or hunted at Andersen AFB, but not at the dumpsites. It has been assumed that concentrations of these food items at the dumpsites are the same as those found at the base. How this assumption relates to uncertainty is not known, as risks may be either over- or underestimated.

COCs were assumed to be 100 percent bioavailable. The assumption that COCs are 100 percent bioavailable is highly unlikely based on soil chemistry. Elements such as lead and zinc are common constituents of soil and crustal materials. In the solid soil matrix, most of these elements are not bioavailable, and are thus not taken up into organisms exposed to these soils. The environmental behavior (and thus the bioavailability) of metals in environmental soils is complex and not well understood.

A conservative assumption made for the Mariana fruit bat, Mariana crow, and the yellow bittern was that the foraging range for them was 100 percent at Dumpsites 1 and 2 with respect to incidental soil exposure, and over the entire Andersen AFB for tissue concentrations. The assumption of 100 percent soil exposure from the site is very conservative, as all of these receptors have a wide foraging range.

Exposure and subsequent risk to earthworms and plants were represented by mean values instead of upper-level exposures such as the maximum concentration or upper confidence limit of the mean. This was done because ecological risk (as long as the receptor is not a threatened and endangered species) is based on the population level rather than individual level risks as is performed in a human health risk assessment. Thus, while some individuals may be impacted by exposure to a COC in an ERA, risks are acceptable as long as the population of receptors is not impacted. An example of this may be represented by impaired reproduction of a field mouse due to exposure to a given COC. As long as the other mice in that field population can compensate for the impacted individual, ecological risks are acceptable. Consequently, the use of mean concentrations rather than upper limit estimates is more representative of population exposure than individual exposure.

2.7.2.4.3.6 Uncertainties for TRVs

Toxicological data used in the risk characterization represent significant uncertainty. Because there are no known data on the effects of chemical constituents on the Mariana crow, yellow bittern, or Mariana fruit bat, toxicological data for surrogate species were used, and this adds uncertainty. This uncertainty is to some extent controlled by choosing the lowest available screening values, consistent with USEPA guidance to be consistently conservative in selecting literature values.

In several instances, TRVs were not available for various receptors of concern. This included earthworms (antimony and thallium) and avian receptors (antimony and beryllium). Given the absence of appropriate TRVs, it is not possible to eliminate the potential risk from these COCs.

2.7.2.4.3.7 Uncertainties for Cumulative Hazard Indices

While not evaluated for this ERA, it is known that two or more chemicals can interact with each other, resulting in skewed toxicity. These interactions can be additive (risks from the two chemicals should be summed), synergistic (the presence of the second chemical increases the effect of the first chemical), or antagonistic (the presence of the second chemical reduces the effect of the first chemical). The presence of multiple contaminants in soils results in an infinite variety of combinations and permutations of these interactions. No real guidance exists for this type of assessment within the ERA process, and the state-of-the-science does not suggest that cumulative hazard indices be calculated. However, this is mentioned as a source of uncertainty within this risk assessment.

2.7.2.4.3.8 Uncertainties for Population Level Effects

The goal of an ERA is to protect the populations of organisms living on or near the site of concern. When the potential or observed presence of threatened and endangered species is found, such as the Mariana crow or Mariana fruit bat at Dumpsites 1 and 2, these receptors deserve a special level of protection, protecting each individual organism. However, for most organisms, the protection of the populations remains the goal. Toxic endpoints used for plants tend to be individual, such as reduced weight or shoot length. Toxic endpoints for earthworms, mammals, and birds are those that could have an impact on the population, such as reproduction. In addition, for this ERA, concentrations of metals in soil were represented by lognormal means, which are more reflective of what the populations of organisms are likely to be exposed to at the site.

2.8 Remedial Action Objectives

The Remedial Action Objectives (RAOs) are medium-specific or OU-specific remediation goals for protecting the human health and the environment.

Based on HHRA results at Dumpsite 1, antimony, arsenic, lead, manganese, and dioxins were determined to be surface soil COCs, and antimony, barium, cadmium, lead, and dioxins were determined to be subsurface soil COCs. Similarly based on HHRA results at Dumpsite 2, benzo(a)pyrene, Aroclor-1254, antimony, lead, and manganese were determined to be surface soil COCs, and benzo(a)pyrene, antimony, and manganese were determined to be subsurface soil COCs. Even under the average exposure conditions of CT scenarios, the future resident adult and the future resident child would be under health risk from the carcinogenic and non-carcinogenic effects of some COCs in surface and subsurface soils at Dumpsites 1 and 2. However, under the maximum exposure conditions of RME scenarios, the future resident adult, future resident child, and current and future occasional users/trespassers would all be under health risk from the carcinogenic and non-carcinogenic effects of some COCs in surface and subsurface soils at Dumpsites 1 and 2. Tables 2-59 and 2-60 along with Figures 2-12 and 2-13 are presented to show the spatial distribution of COC-impacted soils at Dumpsites 1 and 2.

Because of the potential for dermal, ingestion, and inhalation exposures to the COC-impacted surface and subsurface soils at Dumpsites 1 and 2, there would be a potential irreversible adverse health effect on people who may come into prolong contact with soil at Dumpsites 1 and 2. The adverse health effect may include cancer or damage to blood (such as from exposure to antimony and lead), nervous system (such as from exposure to manganese), or kidney (such as from exposure to cadmium). Even though the vicinity of Urunao Dumpsites 1 and 2 is sparsely populated, an access road was constructed within ½ mile of Dumpsite 2 for future development of the coastal properties. There is evidence of trails at the sites indicating that the dumpsites are accessible by hunters and hikers. Therefore, the RAOs are to:

- Eliminate the human and ecological exposure pathways by either remediating or removing the COC-impacted surface and subsurface soils at Dumpsites 1 and 2.

- Remove all solid waste debris and OE materials that pose safety risk to human health and the environment at Dumpsites 1 and 2.

- Allow for unlimited use and unrestricted exposure for the future development of the dumpsites.

- Protect the groundwater quality underlying the dumpsites and allow for unlimited use and unrestricted exposure for future development of the dumpsites.

Remedial Goal Objectives (RGOs) have been established for Dumpsites 1 and 2 based on the HHRA results, as follows:

- Cleanup standards of 290 mg/kg and 63 mg/kg were established for antimony in surface soil and subsurface soil, respectively, based on an RGO for a HI of 1.0 (surface soil) and on the BTV (subsurface soil).

- A cleanup standard of 62 mg/kg was established for arsenic in surface soil based on the BTV.

- A cleanup standard of 5,400 mg/kg was established for barium in subsurface soil based on the Residential PRG.

- A cleanup standard of 72 mg/kg was established for cadmium in subsurface soil based on an RGO for a HI of 1.0.

- A cleanup standard of 400 mg/kg was established for lead in surface and subsurface soils based on the Residential PRG.

- A cleanup standard of 5,500 mg/kg was established for manganese in surface soil based on the BTV.

- Cleanup standards of 9.13 x 10^{-6} mg/kg and 9.43 x 10^{-6} mg/kg were established for dioxin in surface soil and subsurface soil, respectively, based on RGOs for a 10^{-6} risk level.

The RGOs are used to estimate the volume of contaminants that need to be addressed by the appropriate remedial action. The RGOs presented in Tables 2-59 and 2-60 are proposed as cleanup standards for each COC so that concentrations below cleanup standards pose no risk to either human health or the environment. Based on the proposed cleanup standards, approximately 370 banked cubic yards (BCY) of COC-impacted surface soil and 35 BCY of COC-impacted subsurface soil are recommended for cleanup at Dumpsite 1 (Table 2-59). Additionally, solid waste debris and OE materials at the Urunao Dumpsite 1 that are mixed with the COC-impacted soils need to be removed. Subsequently, 26,700 BCY of solid waste materials and 10 BCY of OE materials are proposed for cleanup (Table 2-59).

Similarly, based on proposed cleanup standards, approximately 280 BCY of COC-impacted surface soil and 140 BCY of COC-impacted subsurface soil are recommended for cleanup at Dumpsite 2 (Table 2-60). Additionally, solid waste debris at the Urunao Dumpsite 2 that is mixed with the COC-impacted soils need to be removed. Subsequently, 15,500 BCY of solid waste materials are proposed for cleanup (Table 2-60).

Based on ERA results, most COCs at Dumpsite 1 are either located in the *"Areas of Concentrated Deteriorated Metal and OE Materials"* (Figure 2-12), or they are co-located with the same sample locations that resulted in COCs as determined by HHRA. Because the COCs are already proposed for cleanup, only the *"Areas of Concentrated Deteriorated Metal and OE Materials"* area has been added for cleanup to protect the environment at Dumpsite 1. Likewise, most COCs at Dumpsite 2 are either located in the *"Sword Grass Area"* (Figure 2-13), or they are co-located with the same sample locations that resulted in COCs as determined by HHRA. The *"Sword Grass Area"* is therefore added for cleanup to protect the environment at Dumpsite 2.

Both of the dumpsites are located downgradient of aquifer recharge zones and will not impact current or future groundwater production wells within the recharge zones. The freshwater lens is relatively thin beneath the site, and becomes even thinner and more brackish as it approaches the nearby Philippine Sea. Based on analytical results from seep samples collected downgradient from Dumpsites 1 and 2, the groundwater quality has not been negatively impacted by the presence of COCs, solid waste materials, and OE materials at Dumpsites 1 and 2. The cleanup of the soils to the proposed RGOs will serve as additional insurance to the future quality of the nearby groundwater.

2.9 Description of Alternatives

Using the USEPA guidelines for screening the remediation technologies, 34 *In-Situ* and *Ex-Situ* cleanup alternatives were screened for selecting feasible cleanup alternatives suitable for Urunao Dumpsites 1 and 2 (EA/FWENC, 2001). Solid waste material and OE cleanup was also included in the process of screening cleanup technologies. However, most of the 34 cleanup alternatives were not feasible for treating the COCs or reducing the safety risk associated with the OE materials because of one or more of the following factors:

- Physical and chemical properties of the COCs
- Location of solid waste and OE materials
- Unique environmental setting of Urunao Dumpsites 1 and 2

For instance, with the exception of benzo(a)pyrene and dioxins, the major COCs at Dumpsites 1 and 2 were metals. Most *In-Situ* and *Ex-Situ* biological cleanup alternatives (i.e., bioventing, enhanced bioremediation, composting, and landfarming) are ineffective in remediating metals to levels that would not pose a risk to human health or the environment. Cleanup alternatives such as vapor extraction systems, soil flushing, and solar denitrification are not designed to treat metals and therefore, are not feasible at Dumpsites 1 and 2. In addition, cleanup alternatives such as natural attenuation, may take more than a decade to effectively treat COCs and would therefore, limit the use of the property. Subsequently, the three alternatives listed below were selected for further detailed analysis:

- Alternative 1—*Excavation and Offsite Disposal*

- Alternative 2—*Institutional Control and Property Acquisition*

- Alternative 3—*No Action* (considered as a cleanup alternative as mandated by the USEPA regulation, Office of Solid Waste and Emergency Response (OSWER) directive).

These cleanup alternatives are further described below.

2.9.1 Description of *Excavation and Offsite Disposal* Alternative

The *Excavation and Off-Site Disposal* cleanup alternative has been made possible, in part, due to the current unpaved public access road constructed within ½ mile of the northwestern portion of the Urunao dumpsites. Under the *Excavation and OffSite Disposal* cleanup alternative, all solid waste debris and OE materials will be segregated and removed from Dumpsite 1 prior to excavating and removing any remaining COC-impacted soils. All OE material removal and disposal will be done under the supervision of a team of experienced, certified OE technicians. After securing a burning permit from GEPA, some deteriorated OE fragments (incendiary bomblets) will be burned at Dumpsite 1 using a steel burn pan. Any ashes and slag from the burn operation will be removed and disposed of properly, based on analytical data. Other OE materials will be transported to the Andersen AFB EOD facility for proper disposal, after the OE materials are certified by Andersen AFB EOD personnel as safe for transportation.

Once the OE materials are segregated and removed from Dumpsite 1, the remaining solid waste debris and COC-impacted soils will be excavated and temporarily stockpiled onsite. Composite samples of stockpiled soil will be collected and analyzed for Toxicity Characteristic Leaching Procedure (TCLP) parameters to determine whether the COC-impacted soils are considered hazardous waste for disposal purposes. All COC-impacted soils with concentrations exceeding the cleanup standards but not characterized as Resource Conservation and Recovery Act (RCRA) hazardous waste will be transported to the Andersen AFB Landfill for disposal. Any COC-impacted soils with concentrations exceeding the cleanup standards that are also characterized as RCRA hazardous waste will be shipped to a USEPA-certified off-island hazardous waste disposal facility, using Department of Transportation (DOT) standards and a DOT-certified transporter. All recyclable solid waste debris will be recycled and any non-recyclable debris will be transported to the Andersen AFB Landfill for disposal.

Once the solid waste debris is removed from Dumpsite 2, any remaining COC-impacted subsurface soils will be excavated and temporarily stockpiled at the site. Composite samples of stockpiled soil will be collected and analyzed for TCLP parameters to determine whether they should be disposed of as hazardous waste. All COC-impacted soils with concentrations exceeding the cleanup standards but not characterized as RCRA hazardous waste will be transported to the Andersen AFB Landfill for disposal. Any COC-impacted soils with concentrations exceeding the cleanup standards that are also characterized as RCRA hazardous waste will be shipped to a USEPA-certified off-island hazardous waste disposal facility, using DOT standards and a DOT-certified transporter. Some native vegetation will be destroyed during the excavation and removal activities at both of the dumpsites. Once the COC-impacted soils, OE, and solid waste materials are removed, the areas disturbed by the cleanup activities will be revegetated with native plants and trees.

The *Excavation and Off-Site Disposal* cleanup alternative at Dumpsite 2 will be similar to Dumpsite 1, with the exception of OE materials. Based on DSI, little to no OE materials are expected at Dumpsite 2. However, should OE materials be found in subsurface soils (i.e., *Sword Grass Area*), the OE materials will be managed in a manner similar to Dumpsite 1, described above.

Using *Excavation and Off-Site Disposal* all estimated 825 BCY of COC-impacted surface and subsurface soils and 42,200 BCY of solid waste materials (Tables 2-59 and 2-60) at Dumpsites 1 and 2, plus approximately 10 BCY of OE materials from Dumpsite 1, will be removed from the dumpsites. Through the use of soil confirmation samples, no residual contamination will remain at the dumpsites to pose any risk to human health or the environment, including safety risk.

There will be no need for long-term O&M of the remedial system or for use of long-term monitoring requirement. No deed restrictions will be required, allowing for unlimited use and unrestricted exposure for future development of the dumpsites.

Under this alternative, the existing road will be improved to accommodate the heavy equipment that has to be used in conjunction with the *Excavation and Off-Site Disposal* activities. Solid waste materials, OE materials, and COC-impacted soils will have to be stockpiled at the dumpsites temporarily, until the analytical results are obtained to determine how the stockpiled soil should be handled. All stockpile locations will be kept within the boundary of Dumpsites 1 and 2 and away from other properties. All remedial working areas will be fenced to limit access to the dumpsites. Signs will be posted on the perimeter of Dumpsites 1 and 2 to keep occasional users and trespassers out of the dumpsites. All *Excavation and Off-Site Disposal* activities will be communicated with the potential property owners that may be affected by this remedial alternative. Should any of the remedial *Excavation and Off-Site Disposal* activities impact the future neighboring residents of the dumpsites, arrangements will be made in advance to provide relief and safeguard the residents.

Implementation of the *Excavation and Off-Site Disposal* alternative is expected to cost approximately $12,000,000 and take about 2 years to achieve the RAOs.

2.9.2 Description of *Institutional Control and Property Acquisition* Alternative

The *Institutional Control and Property Acquisition* alternative would control exposure of potential receptors to COCs by restricting access to the site by occasional users and trespassers. Institutional controls would consist of acquiring the 16.5-acre Dumpsite 1 and the 6.2-acre Dumpsite 2 and installing a chain-link fence around the dumpsites to prevent access to the site and exposure to COC-impacted areas and OE materials. Signs will be posted on the fence to warn occasional users and trespassers not to enter the area due to physical and chemical hazards at the dumpsites.

Under the *Institutional Control and Property Acquisition* alternative, all estimated 825 BCY of COC-impacted surface and subsurface soils and 42,200 BCY of solid waste materials at Dumpsites 1 and 2, plus approximately 10 BCY of OE materials at Dumpsite 1, will remain at the dumpsites. Therefore, the solid waste debris, OE materials, and COC-impacted soils will continue to pose risk, including safety risk, to human health or the environment. The small quantity of subsurface soil excavated during the site fencing will be tested for hazardous waste characteristics, ignitability, reactivity, corrosivity, and TCLP parameters to determine appropriate disposal options. Soil with concentrations of COCs exceeding RGOs, but not characterized as RCRA hazardous waste, will be sent to the Andersen AFB Landfill for disposal. Soil characterized as RCRA hazardous waste would be shipped to an off-island hazardous waste disposal facility. Some vegetation will be impacted during the installation of the perimeter fence, but the impacted vegetation is expected to recover soon after the completion of fence installation. There will be long-term O&M with regard to fence and posting signs. Additionally, there will also be long-term term monitoring requirements regarding the COC-impacted soils and OE materials. Consequently, deed restrictions will be required, limiting and restricting future exposure to the dumpsites.

Implementation of the *Institutional Control and Property Acquisition* alternative is expected to cost approximately $12,640,000 and take about 3 years to achieve part of the RAOs.

2.9.3 Description of *No Action* Alternative

The *No Action* alternative represents a true no action scenario. The NCP and CERCLA, as amended, require the evaluation of a *No Action* alternative as a baseline for comparison.

Under this alternative, no control or active treatment of the site soils would be performed. All estimated 825 BCY of COC-impacted surface and subsurface soils and 42,200 BCY of solid waste materials at Dumpsites 1 and 2, plus approximately 10 BCY of OE materials at Dumpsite 1, will remain at the dumpsites. Therefore, the solid waste debris, OE materials, and COC- impacted soils will continue to pose risk, including safety risk, to human health or the environment. As a result, deed restrictions will be required, limiting and restricting future exposure of the dumpsites.

There are no costs and timeframe for the implementation of the *No Action* alternative and the RAOs will not be achieved.

2.10 Comparative Analysis of Alternatives

Evaluation criteria for comparison of cleanup alternatives are based on CERCLA statutory requirements, earlier program initiatives promulgated in the 20 November 1985 NCP, and site-specific experience gained in the Superfund program. A total of nine criteria are developed for comparing the merits of each cleanup alternative as follows:

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Short-Term Effectiveness
- Long-Term Effectiveness and Permanence
- Reduction of Mobility, Toxicity, or Volume Through Treatment
- Implementability
- Territorial (Guam) Acceptance
- Community Acceptance
- Cost

The first two criteria are threshold factors that must be met by each alternative. The next four criteria are the primary balancing factors upon which the comparison of remedial alternatives is based. The next two criteria are modifying factors and are applied to ensure that the final cleanup alternative would meet public acceptance. The final step is a cost analysis for a few feasible cleanup alternatives before presenting the final cleanup alternative for public review and comment.

The above-mentioned nine criteria will be presented each in the following sections and a comparison of all three alternatives will be made in decreasing order from the most to least advantageous alternative.

2.10.1 Overall Protection of Human Health and the Environment

This threshold factor provides an overall assessment of human health and environmental protection based on how specific site remedial alternatives would achieve protection over time, how site risks associated with each COC would be reduced, and how each COC source would be eliminated, reduced, or controlled.

The *Excavation and Offsite Disposal* alternative adequately meets the criteria for overall protection of human health and the environment both short term and long term from unacceptable risks posed by COCs. By excavating and removing the COC-impacted soil and the solid waste and OE materials, the source would be removed and all exposure pathways identified in the risk assessment, direct dermal contact, incidental ingestion of soil, and inhalation of soil particulates, would be controlled for both human and ecological receptors.

The *Institutional Control and Property Acquisition* alternative would be protective of residents and occasional users/trespassers by reducing the exposure time (average daily dose) from the identified COC-exposure pathways as well as minimizing risk of exposure to the OE materials. This alternative, however, would not remove or reduce the volume of soil exceeding RGOs.

The *No Action* alternative would not adequately meet the criteria for overall protection of human health and the environment, both short term and long term, from unacceptable risks posed by COCs and OE materials.

2.10.2 Compliance with ARARs

This threshold factor evaluates a remedial alternative's compliance with the federal and territorial (Guam) ARARs as defined in CERCLA Section 121 (Table 2-61). The list of Urunao dumpsites ARARs was derived from the list of ARARs and To Be Considered (TBC) criteria contained in the approved *Operable Unit 4 Work Plan* (ICF Technology, 1994). The applicable ARARs are those legally enforceable federal and territorial (Guam) requirements that specifically address hazardous substances, pollutants, removal actions, locations, or other circumstances found at the impacted areas. The ARARs include MCLs for groundwater, Coastal Zone Management Act, and RCRA Part 261 Subpart C Characteristics of Hazardous Waste.

The *Excavation and Offsite Disposal* alternative meets all of the respective ARARs.

The *Institutional Control and Property Acquisition* alternative would also meet the criteria of protecting human health and the environment by eliminating the exposure pathways.

The *No Action* alternative would not meet the ARARs with regard to protection of human health and the environment, both short and long term (Table 2-61).

2.10.3 Short-Term Effectiveness

This factor addresses the impact of the remedial action during the construction and start-up phase. Factors evaluated include protection of workers during the remedial actions, environmental impacts resulting from the implementation of the remedial action, and the time required to implement the proposed remedial alternative at the site.

This criterion is not applicable because the *No Action* alternative would not require active remediation. There would be no risk to workers implementing controls for this alternative.

The *Institutional Control and Property Acquisition* alternative would require minimal excavation to install fence posts for a chain-link fence. Workers may have slight exposure to OE materials and COCs from incidental inhalation or ingestion of dust particles during excavation activities (fence posts), though these activities should be minimal as the fence will be constructed outside of the impacted area. Workers should wear protective clothing (disposable chemical resistant gloves, safety glasses, and possibly dust particulates filter masks) to prevent exposure. Dust suppression techniques would be applied if the soil is dry.

During the construction phase of the *Excavation and Offsite Disposal* alternative, there is a potential for COC exposure as well as a safety risk from the OE materials to the construction workers. With regard to COCs, workers may be exposed to COCs by incidental inhalation of soil particulates. Although the short-term exposure period would not likely exceed acceptable risk levels, engineering controls such as dust suppression would be implemented to control dust emissions, or when necessary, workers would be protected against dust emission by wearing dust particulate masks. Additionally, standard work clothing and gloves would be used to prevent dermal contact and incidental ingestion of COC-impacted soils. Furthermore, standard practices such as washing hands and face, and no eating or smoking at the site would be implemented to minimize the risk of incidental ingestion of soil. All OE material removal and disposal will be done under the supervision of a team of experienced, certified OE technicians.

2.10.4 Long-Term Effectiveness and Permanence

This factor addresses the effectiveness of each remedial alternative over the life of the remedial action. It also assesses the results of the remedial action in terms of the risk remaining after the response objectives have been met. Particularly, the effectiveness of the controls is applied to manage the risk posed by the residual COCs in the impacted areas at the site.

Once the COC-impacted soils and solid waste and OE materials are excavated and removed under the *Excavation and Offsite Disposal* alternative, the dumpsites will not pose a risk to human and ecological receptors. Under this alternative, the COCs at Dumpsites 1 and 2 would be removed and therefore would not be able to migrate from the subsurface soil to groundwater. This alternative also eliminates the solid waste and OE materials at the dumpsites. Some native vegetation will be destroyed during the excavation and removal activities at both of the dumpsites. Once the COC-impacted soils, OE, and solid waste materials are removed, the areas disturbed by the cleanup activities will be revegetated with native plants and trees. As such, O&M and long-term monitoring of the remedial system would not be necessary. With the recent construction of an access road on the north side of the dumpsites, the vicinity of the dumpsites may be soon be developed for residential or commercial use. This alternative provides no restriction for further development of the dumpsites and their vicinity.

The *Institutional Control and Property Acquisition* alternative would not reduce the volume or treat the COCs at the site. Therefore, there would be residual risks from untreated COC-impacted areas at the dumpsites. As long as the COCs remain in the surface and subsurface soils, there would be no complete exposure pathway. The COCs would not be highly mobile and would unlikely migrate to groundwater. Some vegetation will be impacted during the installation of the perimeter fence, but the impacted vegetation is expected to recover soon after the completion of fence installation. There would be some uncertainty for preventing exposure to COCs in soil for this alternative, as excavation without the proper Air Force authority could occur. Safety risks associated with the OE materials also would not be reduced. The chain-link fence would have to be maintained for as long as the institutional controls remain in effect.

The *No Action* alternative would not be effective for addressing human receptor risk of exposure to COCs or the safety risk from OE materials. There would be no controls for this alternative to manage the risks posed by the COCs in soil or the OE materials.

2.10.5 Reduction of Mobility, Toxicity, or Volume Through Treatment

This factor assesses how each alternative would reduce the principle threats of the total mass of COCs, to provide irreversible reduction in COC mobility, and/or to reduce the total volume of impacted media. Factors of this criterion that are evaluated include the treatment process, the amount of COCs destroyed or treated, the degree of reduction in toxicity, mobility, or volume expected, and the type and quantity of untreated COC residuals.

The *Excavation and Offsite Disposal* alternative eliminates the source of COCs and the solid waste and OE materials at the dumpsites. This alternative eliminates potential risks to human health or the environment at a site, but this alternative will not reduce the mobility, toxicity, or volume of contaminants. Under the *Excavation and Offsite Disposal* alternative, the contaminants are simply relocated from one location to another. However, some RCRA hazardous COC-impacted soils may be treated, if necessary, to reduce the mobility of contaminants prior to disposal.

The *Institutional Control and Property Acquisition* alternative would not reduce the toxicity, mobility, or volume of waste through treatment. The alternative would reduce the risk of exposure by reducing the average daily dose of COCs for human receptors at the site.

The *No Action* alternative would not reduce the toxicity, mobility, or volume of soil exceeding RGOs. No treatment, removal, or cover would be proposed using this alternative.

2.10.6 Implementability.

This factor assesses the technical and administrative feasibility of implementing a remedial action and the availability of various services and materials required during implementation. Factors of technical feasibility include construction and operational difficulties, reliability of technology, ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of the remedy.

The *No Action* alternative is a proven and accepted remedial alternative under the appropriate site conditions. The administrative feasibility to implement the *No Action* alternative is relatively simple, as there would be no direct costs associated with the alternative. However, the technical feasibility of *No Action* is difficult as the COCs and the OE materials at the site pose a potential risk to human health and risk management control would be necessary for the COCs and the OE materials.

The *Institutional Control and Property Acquisition* alternative is a proven remedial alternative that would be accepted under the appropriate site conditions. The administrative feasibility to implement the alternative would be relatively simple, as there would be very little coordination of resources and materials associated with the alternative. However, the technical feasibility of this alternative would be difficult as the COCs and the OE materials at the site pose a risk to human health and the site controls could be difficult to implement. Periodic site review would be necessary to determine if the alternative is effective and to evaluate future remedial technologies that may be applicable for the site.

The *Excavation and Offsite Disposal* alternative is a proven and effective technology for RCRA and CERCLA sites. The technology is feasible to implement. The difficulties with this alternative include the mixed volume of COC-impacted soils and OE materials that need to be excavated selectively from steep, highly vegetated terrain and then transported offsite for disposal. The volumes of COCs and solid waste material waste that require removal have been estimated in this report for purposes of comparison. As the site is located in extremely rough terrain, it is highly likely that the quantity of soil that needs to be removed may expand as the work effort gets underway and confirmatory samples are collected. The exact volumes will directly impact the cost of cleanup. Some excavated soil would have to be stockpiled onsite and covered pending analytical results. Multiple mobilizations may be required to transport any soil determined to be hazardous off-island for disposal. Excavation, transportation, and revegetation equipment are readily available on the island. Off-island hazardous waste shipping is available however, also expensive.

2.10.7 Territorial (Guam) Acceptance

This factor accounts for the technical and administrative issues concerning the territory of Guam regarding each of the remedial alternatives. This factor includes the remedial actions that the territory would support, oppose, or would be concerned about. The Territorial Acceptance was evaluated based on comments received from GEPA's representatives during Remedial Project Managers Meetings (RPMs) regarding IRP sites at Andersen AFB.

This ROD will be reviewed and approved by the USEPA and GEPA. In accordance with NCP regulations, this ROD report will be made available to the public for a 30-day review and comment period. A notification of availability to review the draft final report will be published in the local newspaper, the *Pacific Daily News.* All comments from USEPA and GEPA will be addressed and the ROD will be revised accordingly. The date of availability for review will be presented in the *Pacific Daily News.* Responses may be submitted to GEPA or forwarded to Andersen AFB. This applies to *Excavation and Offsite Disposal* and *Institutional Control and Property Acquisition.* However, for the *No Action* alternative, a Cleanup Action memorandum or work plan would not be required.

2.10.8 Community Acceptance

This factor accounts for the issues and concerns the property owner and the public may have regarding each of the remedial actions. The factors included the remedial actions that the property owner or the community would support, oppose, or would be concerned about. The Community Acceptance was evaluated based on comments received from the community representatives during RAB meetings regarding IRP sites at Andersen AFB.

The existing property owners will be consulted before the final cleanup alternative is selected for Urunao Dumpsites 1 and 2. All comments from the community members and the property owners will be addressed during the public review period before this cleanup alternative is finalized.

2.10.9 Cost

This factor assesses the projected cost for the final list of alternatives at the conclusion of the cleanup alternatives screening process. All cost will be in present worth. Present worth analysis allows remedial actions to be compared on the basis of a single cost representing an amount that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life. When applicable, a required operating performance period of 30 years will be used in calculating the present worth of the final cleanup alternatives. The remedial costs included capital costs and annual O&M costs. Capital costs consist of both direct and indirect costs. Direct costs include expenditures for the equipment, labor, and materials necessary to install removal actions. Indirect costs include expenditures for engineering, financial, and other services required when installing a remedial alternative at a site. Annual O&M costs include auxiliary monitoring, materials and energy required to install remedial actions, disposal of residue, purchased services, administrative costs, insurance, taxes, license costs, maintenance reserve and contingency funds, rehabilitation costs, and costs for periodic site reviews.

There would be no direct costs associated with the *No Action* alternative. However, the possibility of lawsuits as a result of this alternative cannot be discounted. This could produce legal action for which the costs cannot be determined.

The total *Excavation and Offsite Disposal* costs (including the OE cleanup cost) are estimated at $12,000,000 (Table 2-62).

The *Institutional Control and Property Acquisition* alternative has associated capital costs for implementing institutional controls and periodic review estimated at $12,640,000 (Table 2-62). It is noted that an undeveloped land value of $15/square foot was assumed for acquisition costs of the properties. This is compared to a fully developed land value of $70/sf in Tumon Bay.

2.11 Principal Threat Posed by Waste

According to USEPA guidelines, treatment alternatives must be used to address the principal threats posed by any site whenever practicable. In general, the principal threats include:

- Liquid source material, such as waste contained in drums, lagoons or tanks, and free product in the subsurface containing COCs

- Mobile source material, such as surface soil or subsurface soil containing high concentrations of COCs that are mobile due to wind entrainment, volatilization, surface runoff, or subsurface transport

- Highly-toxic source materials, such as buried drums containing non-liquid wastes, buried tanks containing non-liquid wastes, or soils containing significant concentrations of highly toxic materials (USEPA, 1999)

Waste that is generally considered as a non-principal threat may include:

- Non-mobile contaminated source material of low to moderate toxicity, such as surface soil containing COCs that generally are relatively immobile in air and groundwater in the specific environmental setting

- Low toxicity source materials, such as surface soil and subsurface soil with concentrations of COCs not greatly above reference dose levels or that present an excess cancer risk near acceptable risk range (USEPA, 1999).

As presented in Section 2.5.4 of this ROD, there was no evidence of stained soil or stressed vegetation at Dumpsites 1 and 2. Similarly, there was no evidence of leaks or spills at the dumpsites. All containers, including 55-gallon drums that were observed at Dumpsites 1 and 2, were deteriorated and empty. Therefore, there was no specific debris material, container, or deteriorated drum scattered around Dumpsites 1 and 2 that could be identified as the suspected source of contamination.

The COC-impacted surface and subsurface soils at Dumpsites 1 and 2 are a non-principal threat because:

- The major COCs are metals that are relatively immobile in the alkaline conditions of the limestone formations at the dumpsites.

- For the most part, the COCs have low toxicity and do not exceed RGOs (Figures 2-12 and 2-13).

- The dumpsites are not currently a residential area.

Nevertheless the human health risks and environmental risks associated with COC-impacted soils, in conjunction with the physical risks posed by the OE materials and solid waste materials, justify a remedial action to protect human health and the environment. As such, the *Excavation and Offsite Disposal* alternative was selected to remove the non-principal threats associated with COC-impacted soils, solid waste materials, and OE materials at Dumpsites 1 and 2. Removing the non-principal threats eliminates the exposure pathway that poses health and safety risk to human or ecological receptors. Andersen AFB has assembled several bilingual (English and Chamorro) signs to warn the public against accessing dumpsites due to the presence of COC-impacted soils, solid waste materials, and OE materials. The posting of the signs is pending the approval of the property owners.

2.12 Selected Remedy

In a meeting with the USAF, USEPA Region IX, GEPA, and affected property owners, the affected property owners have agreed that *Excavation and Offsite Disposal* is the preferred alternative to clean up Urunao Dumpsites 1 and 2. The cleanup of Urunao Dumpsites 1 and 2 is currently scheduled for 2006. The affected property owners have requested to expedite the cleanup of the dumpsites. Under the Urunao OU, the USAF and support agencies (the USEPA Region IX and GEPA) are expediting the approval process of this ROD to help secure the appropriate cleanup funds prior to 2006.

2.12.1 Summary of the Rationale for the Selected Remedy

The major rationale for selecting the *Excavation and Offsite Disposal* as a remedial alternative for Dumpsites 1 and 2 is that the USAF, USEPA Region IX, GEPA, and affected property owners have all agreed that the *Excavation and Offsite Disposal* is the best option to restore the property.

As presented in Section 2.10 of this ROD, the *Excavation and Offsite Disposal* alternative has major advantages over the *Institutional Control and Property Acquisition* alternative and the *No Action* alternative. The *Excavation and Off-Site Disposal* alternative:

- Removes the non-principal threats of all COC-impacted soils, solid waste materials, and OE materials from the dumpsites

- Provides a permanent solution to the non-principal threats by leaving no residual contamination at the dumpsites, thereby eliminating the need for O&M and long-term monitoring program

- Relieves the property from any deed restrictions and allows for unlimited use and unrestricted exposure for future development of the dumpsites

2.12.2 Detail Description of the Selected Remedy

The implementation of the *Excavation and Off-Site Disposal* alternative can be summarized in the following phases:

- Phase 1—Site Preparation, mobilization, and surveying

- Phase 2—Surface OE clearance, surface removal, and off-site disposal of COC-impacted soils, solid waste materials, and OE materials

- Phase 3—Excavation and subsurface removal and off-site disposal of COC-impacted soils, solid waste materials, and OE materials

- Phase 4—Confirmation sampling, revegetation, and demobilization

The presence of the OE materials on the surface at Dumpsite 1, the potential presence of OE materials in the subsurface at both of the dumpsites, and the mixing of OE materials with the solid waste materials and COC-impacted soils presents a safety concern for any intrusive work at the dumpsites. As such, the majority of cleanup removal actions will be done under the supervision of a team of experienced and certified Unexploded Ordnance (UXO) personnel. The remedial design will include a field survey, conducted by a UXO specialist, to identify/verify the various ordnance types at the dumpsites. In addition, the UXO specialist will research each ordnance type and provide a detailed characterization for the purpose of establishing safe handling and disposal procedures.

Prior to mobilization at the dumpsites, the existing access road will be improved to handle the traffic of heavy equipment. During the first phase of the cleanup, all equipment and material will be mobilized and staged at the site. The perimeter of both of the dumpsites will controlled by a temporary construction fence to prevent access to the dumpsites. All staging areas will be at the base of the slope within the flat areas of the dumpsites, and when possible, positioned away from any developed areas in vicinity of both of the dumpsites. The staging area will include:

- Decontamination Area. This area of approximately 50-feet by 50-feet will be used to decontaminate the heavy equipment. This area will be lined and all decontamination water will be contained and tested for proper disposal.

- Debris Handling Area. This approximately 200-ft by 200-foot lined area will be cleared of vegetation. All materials removed from the dumpsites will be brought to this location to segregate the OE materials from the solid waste materials and the COC-impacted soils.

- Burn Pan Area. The burn pan is commonly used to reduce the volume of incendiary bomblets into a smaller volume of solid waste slag material by burning onsite. The burn pan is typically steel plate approximately 12-foot by 12-foot and 18-inch deep.

- Stockpile Area. This approximately 300-foot by 200-foot lined area will be used to stockpile COC-impacted soils and solid waste materials before transporting offsite for disposal.

After the site preparation, the following major equipment will be mobilized to the site:

- Office trailers
- Generators
- Chainsaws
- Geophysical instruments and associated data logger to detect subsurface metallic objects
- Surveying Global Positioning System (GPS) instruments
- Metal enclosed storage containers
- Field trucks
- Yarder, a system of cable and bucket used to move heavy debris on slopes
- Power screens with various mesh size to segregate debris
- Trackhoes
- Backhoes
- Loaders
- Dump trucks
- Steam and water truck

Once the heavy equipment is mobilized at the dumpsites, the UXO teams will escort the surveyors to clear the vegetation using chainsaws and establish a 100-foot by 100-foot grid at each dumpsite using GPS. The UXO personnel will perform surface clearance ahead of the surveyors along the grid lines using geophysical instrumentation.

Using the established grid lines, the surface OE materials will be cleared from the surface of Dumpsite 1 by the UXO team during the second phase of the cleanup. The surface clearance of OE materials will be conducted from the bottom to the top of the cliff in such a way as to minimize release of solid waste debris. The yarder (cable and bucket system) will be utilized to remove materials from the face of the cliff. For the most part, smaller OE materials can be handled manually and placed in the bucket for removal. For oversized OE material (too large to be lifted), the bucket can be removed and attachment cables added to attach to heavier objects for lowering down the hillside.

Once the mixture of OE materials, solid waste materials, and COC-impacted soils are received at the debris handling area, the solid waste and OE materials are separated from the COC-impacted soils using power screens. The OE materials will be stored in metal enclosed containers prior to offsite disposal while the solid waste materials and COC-impacted soils will be temporarily stockpiled at the site. Periodically, when it is safe, all incendiary bomblets will be placed in the burn pan for burning using dunnage. A composite sample of the burned residue/ashes will be collected and sent to a USEPA-approved laboratory for reactivity, ignitability, corrosivity, and TCLP analyses to determine proper disposal options. All waste materials determined to be RCRA hazardous based on TCLP analysis will be shipped to an off-island hazardous waste disposal facility using a DOT-certified transporter. The non-hazardous materials will be transported to the Andersen AFB landfill. Other OE materials will be transported to the Andersen AFB EOD facility for proper disposal, when the OE materials are certified by Andersen AFB EOD personnel as safe for transportation. Other than yarder, all other surface removal activities will be performed using backhoes, loaders, and dump trucks. Decontamination of equipment will be performed using steam and a water truck in the decontamination pad area.

Similarly, composite samples will be collected from the COC-impacted soils and analyzed for reactivity, ignitability, corrosivity, and TCLP parameters to determine if the stockpile should be transported to the Andersen AFB landfill or to an off-island hazardous waste disposal facility. All non-RCRA hazardous COC-impacted soils will be transported to the Andersen AFB landfill and all RCRA hazardous COC-impacted soils will be shipped to an off-island hazardous waste disposal facility using a DOT-certified transporter. Triple super phosphate may be used to treat some contaminants and reduce the volume of the off-island hazardous waste disposal, whenever possible.

The solid waste materials will be separated into recyclable and non-recyclable debris. All recyclable debris will be transported offsite to a recycling facility. All non-recyclable debris will be transported to the Andersen AFB landfill for proper disposal.

During the third phase of the cleanup, the subsurface excavation will be performed using trackhoes and the yarder. The yarder will be utilized to remove materials from the steep hillside. Prior to excavation, the UXO team will conduct subsurface clearance of all OE materials by hand. Once the materials are excavated, they will be handled similar to surface removal of OE materials, solid waste materials, and COC-impacted soils, as previously described.

At the conclusion of the cleanup activities when all OE materials, solid waste materials, and COC-impacted soils are removed from the dumpsites and properly disposed offsite, confirmatory surface and subsurface soil samples will be collected from both of the dumpsites. The confirmatory samples will include the staging area, the stockpile area, the burn pan area, and the decontamination pad area. All confirmatory samples will be sent to a USEPA-approved laboratory and analyzed for explosives; benzene, toluene, ethylbenzene, and xylenes; TCLP; PAHs; metals; and dioxins using USEPA Methods SW8330, SW8260, SW1311, SW6010/7000 series, and SW8290, respectively. Based on sample results, any staging material with concentrations of COCs exceeding the RGOs, but not characterized by TCLP analysis as RCRA hazardous, will be sent to the Andersen AFB Landfill for disposal. Any staging materials that are characterized as RCRA hazardous waste will be shipped to an off-island hazardous waste disposal facility using a DOT-certified transporter.

Based on clean confirmatory samples, the areas disturbed by the cleanup activities will be revegetated with native plants and trees.

2.12.3 Summary of the Estimated Remedy Costs

A summary of the *Excavation and Offsite Disposal* alternative cost estimate is presented in Table 2-60. Implementation of the *Excavation and Offsite Disposal* alternative is estimated to cost about $12,000,000. This is an order-of-magnitude engineering cost estimate that is expected to be within + 50 to –30 percent of the actual project cost. The cost information presented in Table 2-60 is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record, in an Explanation of Significant Difference (ESD), or a ROD amendment.

The mobilization and demobilization costs are included in the Phases 2 and 3 (Table 2-63). There are no additional costs associated with O&M or long-term monitoring program for the *Excavation and Offsite Disposal* alternative, with the exception of limited monitoring to ensure a successful revegetation. Therefore, there was no need for OSWER policy of 7 percent discount rate and the total cost as presented in Table 2-63, is the present worth value.

2.12.4 Expected Outcome of the Selected Remedy

Currently, the majority of Urunao properties are undeveloped. However, since the end of 2001, an unpaved public access road was constructed within ½ mile of the northwestern portion of Dumpsite 2. Since 2001, the area along the access road has undergone rapid development. The affected property owners, in the vicinity of Dumpsites 1 and 2, have requested the Air Force expedite the cleanup of the dumpsites so that the dumpsite properties can be developed. The *Excavation and Offsite Disposal* alternative meets the objectives of all parties, the USAF, USEPA Region IX, GEPA, and affected property owners.

Using the *Excavation and Offsite Disposal* alternative, the RAOs will be achieved and the dumpsites will be clear of non-principal threats from OE materials, solid waste materials, and COC-impacted soils within 2 years. This will allow for unlimited use and unrestricted exposure for the future development of the dumpsites. The full recovery of revegetation may extend beyond the completion of the *Excavation and Offsite Disposal* cleanup. Nevertheless, the environmental restoration of the Urunao Dumpsites 1 and 2 will enhance the value of the dumpsite properties and neighboring properties.

2.13 Statutory Determination

According to USEPA guidelines (USEPA, 1999), the lead agency must select remedies that are protective of human health and the environment, comply with ARARs, are cost effective, and utilize permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. Additionally, a preference is given for remedies that permanently and significantly reduce the volume, toxicity, or mobility of hazardous waste materials. The following sections discuss how the *Excavation and Offsite Disposal* alternative meets these statutory requirements and explains the 5-year review requirement for the *Excavation and Offsite Disposal* alternative.

2.13.1 Protection of Human Health and the Environment

The *Excavation and Offsite Disposal* alternative meets the criteria for overall protection of human health and the environment both short term and long term from unacceptable risks posed by COCs. By excavating and removing the COC-impacted soils and the solid waste and OE materials, the source of the non-principal threats would be removed from the dumpsites. Consequently, all exposure pathways identified in the risk assessment, direct dermal contact, incidental ingestion of soil, and inhalation of soil particulates, would be removed for both human and ecological receptors.

2.13.2 Compliance with ARARs

As presented in Table 2-64, the *Excavation and Offsite Disposal* alternative meets all of the respective ARARs. With respect to natural habitat, some vegetation and trees will be impacted by the *Excavation and Offsite Disposal* alternative. However, the revegetation plan at the end of the cleanup project is expected to restore and improve the ecological habitat at the site.

Some archeological sites were documented near Dumpsites 1 and 2 (USAF, 1988). The Urunao Beach Complex and the Falcona Beach Complex have been identified as archeological areas on the northwestern portion of Guam (Ogden, 1996). The area has been identified as a culturally valuable archeological site and was listed on the Guam Register of Historic Sites in July 1974 (Reinman, 1977). The Falcona Beach Complex lies approximately 1,000 feet west of Dumpsites 1 and 2. No archeological site has been identified at Dumpsites 1 and 2. However, should any archeological objects be discovered during the excavation, the excavation activities will be terminated and the integrity of the archeological objects will be preserved. The excavation activities will not be continued at the dumpsites until an archaeological survey can determine that it would be safe to continue cleanup activities. All archeological efforts will be coordinated with the Guam's historical preservation authorities.

2.13.3 Cost Effectiveness

According to USEPA guidelines (USEPA, 1999), a remedy is cost effective if the cost is proportional to its overall effectiveness in protecting human health and the environment.

Even though the *Excavation and Offsite Disposal* alternative cost per acre of the Urunao Dumpsites 1 and 2 is significantly high (about half a million dollars per acre) due to the steep slope at the dumpsites, the remedy is cost effective. The *Excavation and Offsite Disposal* alternative permanently protects human health and the environment at both of the dumpsites.

The high cost of $12,000,000 for the *Excavation and Offsite Disposal* alternative is also cost effective when compared with even higher cost of the *Institutional Control and Property Acquisition* alternative of $12,640,000. There are long-term savings associated with the *Excavation and Offsite Disposal* alternative. Under the *Excavation and Offsite Disposal* alternative, the source of non-principal threats will be removed from the dumpsites, thereby eliminating any additional cost associated with O&M, or a long-term monitoring program.

2.13.4 Utilization of Permanent Solution

Under the *Excavation and Offsite Disposal* alternative, all OE materials, solid waste materials, and COC-impacted soils will be permanently removed from the dumpsites, leaving no residual contamination at the dumpsites and permanently protecting human health and the environment.

2.13.5 Preference for Treatment as a Principal Element

Under normal circumstance the *Excavation and Offsite Disposal* alternative will not be considered as preferred technology because the COCs are not treated to reduce the mobility, toxicity, or volume of contaminants. Under the *Excavation and Offsite Disposal* alternative, the COCs are simply relocated from the dumpsite to either Andersen AFB landfill or to an off-island hazardous waste disposal facility.

However, when comparing the total volume of the COC-impacted soils at both of the dumpsites (825 BCY) to the total volume of solid waste materials at both of the dumpsites (42,200 BCY), the volume of COC-impacted soils is only a fraction (2 percent) of the volume of the solid waste materials. Therefore, even if not treated, the volume of the COC-impacted soils is not significant compared to the Andersen landfill capacity, or the capacity of an off-island hazardous waste disposal facility. Should the volume of COC-impacted soil be of concern when excavating subsurface soils, the COC-impacted soils may be treated by Triple Super Phosphate, which has been used successfully to treat immobilized metals in soils. With the exception of benzo(a)pyrene, the remaining COCs in surface and subsurface soils of both of the dumpsites are metals.

Some solid waste materials at the dumpsites are made of aluminum (i.e., large metal containers and airplane body parts) and are still in a good condition for recycling. Any recyclable solid waste material will be recycled to decrease the volume of waste. Additionally, even though the OE materials are a safety concern, the volume of OE at Dumpsite 1 is insignificant (10 BCY) when compared to the volume of COC-impacted soils or the volume of solid waste materials. By burning the majority of OE materials, the volume of OE materials are also reduced under the *Excavation and Offsite Disposal* alternative.

Therefore, the advantages of the *Excavation and Offsite Disposal* alternative in dealing with the OE materials, solid waste materials, and COC-impacted soils at the dumpsites far exceeds the disadvantage of this alternative in not treating the COC-impacted soils.

2.13.6 Five-Year Review Requirement

According to the USEPA guidelines (USEPA, 1999), a 5-year review of this ROD will be unnecessary because no residual contaminants will be left at Dumpsites 1 and 2 after implementing the *Excavation and Offsite Disposal* cleanup alternative.

2.14 Documentation of Significant Changes

On 24 March 2003, the Proposed Plan for the Urunao Dumpsites 1 and 2 was released to the public for review and comments, with a public comment period extending from 31 March to 30 April 2003. A public meeting was held in the Guam Hilton Hotel on Tumon Bay on 10 April 2003 to present the Proposed Plan to affected property owners and the public.

The same *Excavation and Offsite Disposal* alternative that is presented in this ROD was also presented in Proposed Plan and the public meeting as preferred alternative. The USAF, USEPA Region IX, GEPA, and affected property owners have agreed that *Excavation and Offsite Disposal* is the preferred alternative to clean up Urunao Dumpsites 1 and 2. Therefore, there are no significant changes to the remedy as originally identified in the March 2003 Proposed Plan.

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TABLE 2-1. POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS FOR HUMAN HEALTH RISK ASSESSMENT AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	OnSite/ OffSite	Type Of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Soil	Surface Soil	Urunao Dumpsites 1 and 2	Trespasser/Occasional User	Adult	Ingestion	Onsite	Quant	Trespasser may visit the area.
						Dermal	Onsite	Quant	Trespasser may visit the area.
				Commercial Worker	Adult	Ingestion	Onsite	None	No workers are present at site.
						Dermal	Onsite	None	No workers are present at site.
		Air	Urunao Dumpsites 1 and 2	Trespasser/Occasional User	Adult	Inhalation	Onsite	Quant	Trespasser may visit the area.
				Commercial Worker	Adult	Inhalation	Onsite	None	No workers are present at site.
		Animal tissue	Wild Deer Meat	Hunter	Adult	Ingestion	Onsite	Quant	Risks are evaluated on a facility-wide basis.
					Child	Ingestion	Onsite	Quant	Risks are evaluated on a facility-wide basis.
		Animal tissue	Wild Pig Meat	Hunter	Adult	Ingestion	Onsite	Quant	Risks are evaluated on a facility-wide basis.
					Child	Ingestion	Onsite	Quant	Risks are evaluated on a facility-wide basis.
	Subsurface Soil	Subsurface Soil	Urunao Dumpsites 1 and 2	Utility Worker	Adult	Ingestion	Onsite	None	No utilities are present at site.
						Dermal	Onsite	None	No utilities are present at site.
		Air	Urunao Dumpsites 1 and 2	Utility Worker	Adult	Inhalation	Onsite	None	No utilities are present at site.
Future	Surface Soil	Surface Soil	Urunao Dumpsites 1 and 2	Resident	Adult	Ingestion	Onsite	Quant	Future use of site assumes residential exposures.
						Dermal	Onsite	Quant	Future use of site assumes residential exposures.
					Child	Ingestion	Onsite	Quant	Future use of site assumes residential exposures.
						Dermal	Onsite	Quant	Future use of site assumes residential exposures.
				Trespasser/Occasional User	Adult	Ingestion	Onsite	Quant	Future use of site assumes residential exposures.
						Dermal	Onsite	Quant	Future use of site assumes residential exposures.
					Child	Ingestion	Onsite	Quant	Future use of site assumes residential exposures.
						Dermal	Onsite	Quant	Future use of site assumes residential exposures.
		Air	Urunao Dumpsites 1 and 2	Resident	Adult	Inhalation	Onsite	Quant	Future use of site assumes residential exposures.
					Child	Inhalation	Onsite	Quant	Future use of site assumes residential exposures.
				Trespasser/Occasional User	Adult	Inhalation	Onsite	Quant	Future use of site assumes residential exposures.
					Child	Inhalation	Onsite	Quant	Future use of site assumes residential exposures.
	Subsurface Soil	Subsurface Soil	Urunao Dumpsites 1 and 2	Resident	Adult	Ingestion	Onsite	Quant	Future use of site assumes residential exposures.
						Dermal	Onsite	Quant	Future use of site assumes residential exposures.
					Child	Ingestion	Onsite	Quant	Future use of site assumes residential exposures.
						Dermal	Onsite	Quant	Future use of site assumes residential exposures.
				Construction Worker	Adult	Ingestion	Onsite	None	Workers are evaluated as future worst case scenario.
						Dermal	Onsite	None	Workers are evaluated as future worst case scenario.
		Air	Urunao Dumpsites 1 and 2	Resident	Adult	Inhalation	Onsite	Quant	Future use of site assumes residential exposures.
					Child	Inhalation	Onsite	Quant	Future use of site assumes residential exposures.
				Construction Worker	Adult	Inhalation	Onsite	None	Workers are evaluated as future worst case scenario.

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TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis			26 Jun 1997 Sample Identification			
						06UBS009	06UBS010	06UBS011	06UBS012
			BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	Sample Depth (feet)			
						0.25 - .05	0.08 - 0.33	0.17 - 0.33	0.17 - 0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	<500	<490	<400	<470
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	<500	<490	<400	<470
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	<500	<490	<400	250 J
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	<500	<490	<400	<470
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	<91	<88	<72	<86
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	<500	<490	<400	<470
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	---	---	---	---
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	<2.3	<2.2	<1.8	<2.1
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	<18	<17	<14	<17
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	<4.5	<4.4	<3.6	<4.3
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	<2.3	<2.2	<1.8	<2.1
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	<4.5	<4.4	<3.6	<4.3
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	<4.5	<4.4	<3.6	5.4 P
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	<2.3	<2.2	<1.8	<2.1
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	<2.3	<2.2	<1.8	<2.1
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	<2.3	<2.2	<1.8	<2.1
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	<2.3	<2.2	<1.8	<2.1
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	<2.3	<2.2	4.6 P	<2.1
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	<4.5	<4.4	<3.6	<4.3
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	<4.5	<4.4	<3.6	<4.3
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	<4.5	<4.4	<3.6	<4.3
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	<4.5	<4.4	<3.6	<4.3
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	139,000	59,100	15,200	9,260
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	4.6 BN	6.1 BN	37.4 N	<2.4 N
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	16.8	7.8	26.7	2 B
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	113	475	**7,750**	110
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	3.5	1.4	<0.02	0.16
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	13.7	16.2	11.4	2.6
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	53,200	164,000	129,000	237,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	315	203	302	38.8
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	37	19.9	32.8	2.7
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	29.9	73.5	786	19
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	106,000	62,700	**244,000**	8,370
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	57.5 E	70.9 E	**2,150 E**	20.1 E
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	1,260	2,290	26,500	2,920
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	**7,290**	5,360	1,140	1,430
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.2 B	0.68 B	6.6	0.36 B
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	117	76.8	227	8.6
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	103	215	69.5	488
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	1.7 N*	3.2 N*	16.6 N*	1.1 N*
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	<0.58	3.2	9.8	5.1
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	316	390	241	536
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	1.2	0.86 W	<0.12	0.29 W
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	31.1	8.4	<0.35	2
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	194	1330	8630	65.8
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	<0.34	<0.33	0.29	<0.32

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions; ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	26-Jun-97: 06UBS013	14 Sep 1998 Sample Identification: 06UBS031	06UBS032	06UBS033
					Sample Depth (feet)	0.08 - 0.33	0.17 - 0.33	0.17 - 0.33	0.17 - 0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	<460	---	---	---
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	<460	---	---	---
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	<460	---	---	---
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	<460	---	---	---
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	<85	---	---	---
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	<460	---	---	---
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	---	---	---	---
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	<2.1	---	---	---
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	<16	<2.0	<1.7	<1.7
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	<4.2	<3.9	<3.3	<3.3
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	<2.1	<2.0	<1.7	<1.7
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	<4.2	<3.9	<3.3	<3.3
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	<4.2	<3.9	<3.3	<3.3
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	<2.1	<3.9	<3.3	<3.3
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	<2.1	<2.0	<1.7	<1.7
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	<2.1	<2.0	<1.7	<1.7
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	<2.1	---	---	---
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	<2.1	<2.0	<1.7	<1.7
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	<4.2	<20	<17	<17
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	380 E	<3.9	<3.3	<3.3
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	1,300 D	<3.9	<3.3	<3.3
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	**3,600 D**	<3.9	<3.3	<3.3
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	11,000	---	---	---
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	**8,520 N**	---	---	---
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	**173**	---	---	---
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	475	---	---	2,410
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	0.08 B	---	---	---
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	9.5	---	---	---
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	6,970	---	---	---
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	88	---	---	---
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	22.1	---	---	---
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	2,620	---	---	---
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	**195,000**	**163,000**	**467,000**	**390,000**
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	315 E	---	---	---
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	4,620	---	---	---
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	977	---	---	---
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.33 B	---	---	---
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	101	---	---	---
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	212	---	---	---
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	3.3 N*	---	---	---
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	<0.55	---	---	---
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	182	---	---	---
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	<0.14	---	---	---
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	<0.41	---	---	---
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	5100	---	---	---
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	<0.31	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions; ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	14 Sep 1998 Sample Identification: 06UBS034	06UBS035	06UBS036	06UBS037
					Sample Depth (feet)	0.17 - 0.33	0.17 - 0.25	0.00 - 0.17	0.17 - 0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	---	---	---	---
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	---	---	---	---
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	---	---	---	---
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	---	---	---	---
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	---	---	---	---
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	---	---	---	---
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	---	---	---	---
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	---	---	---	---
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	---	---	---	---
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	---	---	---	---
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	---	---	---	---
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	---	---	---	---
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	---	---	---	---
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	---	---	---	---
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	---	---	---	---
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	---	---	---	---
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	---	---	---	---
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	---	---	---	---
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	4,030	732	---	---
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	---	---	---	---
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	---	---	---	---
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	---	---	---	---
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	---	---	---	---
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	---	---	---	---
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	**333,000**	71,000	---	---
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	---	---	---	---
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	---	---	1,640	4,040
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	---	---	---	---
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	---	---	---	---
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	---	---	---	---
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	---	---	---	---
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	---	---	---	---
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	---	---	---	---
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	---	---	---	---
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions; ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	14 Sep 1998 Sample Identification: 06UBS038	06UBS039	06UBS039DUP	15 Jan 2001: 06UBS054
					Sample Depth (feet)	0.00 - 0.25	0.17 - 0.25	0.17 - 0.25	0.08 - 0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	1,600,000 nc	6,200,000 nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	7,300,000 nc	28,000,000 nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	8,900 ca	21,000 ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	< 660
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	431
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	35,000 ca	180,000 ca	---	---	---	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	6,100,000 nc	88,000,000 nc	---	---	---	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	300 ca	1,500 ca	---	---	---	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	22,000,000 nc	100,000,000 max	---	---	---	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	0.6 J
SW8310	BENZO(A)PYRENE	µg/kg	N/A	62 ca	290 ca	---	---	---	0.52 J
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	< 2.0
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	6,200 ca	29,000 ca	---	---	---	0.52 J
SW8310	CHRYSENE	µg/kg	N/A	62,000 ca	290,000 ca	---	---	---	< 5.0
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	62 ca	290 ca	---	---	---	< 2.0
SW8310	FLUORANTHENE	µg/kg	N/A	2,300,000 nc	30,000,000 nc	---	---	---	1.2 J
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	1.24 J
SW8310	PYRENE	µg/kg	N/A	2,300,000 nc	54,000,000 nc	---	---	---	0.66 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	90 ca	590 ca	---	---	---	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	370,000 nc	5,300,000 nc	---	---	---	< 3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	30 ca	150 ca	---	---	---	< 3.0
SW8081	ENDRIN	µg/kg	N/A	18,000 nc	260,000 nc	---	---	---	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	440 ca	2,900 ca	---	---	---	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	110 ca	550 ca	---	---	---	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	53 ca	270 ca	---	---	---	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	310,000 nc	4,400,000 nc	---	---	---	< 15
SW8081	4,4'-DDD	µg/kg	N/A	2,400 ca	17,000 ca	---	---	---	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	1,700 ca	12,000 ca	---	---	---	< 3.0
SW8081	4,4'-DDT	µg/kg	N/A	1,700 ca	12,000 ca	---	---	---	< 3.0
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	220 ca	1,000 ca	---	---	---	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	220 ca	1,000 ca	---	---	---	12.8 J
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	---	---	---	71,100
SW6010	ANTIMONY	mg/kg	**63**	31 nc	820 nc	---	---	---	1.2 B
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	---	---	---	18.6
SW6010	BARIUM	mg/kg	335	5,400 nc	100,000 max	---	---	---	210
SW6010	BERYLLIUM	mg/kg	3.34	150 nc	2,200 ca	---	---	---	2
SW6010	CADMIUM	mg/kg	6.5	37 nc	810 nc	---	---	---	16.8
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	126,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	---	---	---	202
SW6010	COBALT	mg/kg	29	4,700 nc	100,000 max	---	---	---	17.3
SW6010	COPPER	mg/kg	72.2	2,900 nc	76,000 nc	---	---	---	56.3
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	---	---	---	58,500
SW6010	LEAD	mg/kg	166	400 nc	750 nc	---	---	---	60.5
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	2,460
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	32,000 nc	5,310	**5,720**	3,570	5,020
SW7471	MERCURY	mg/kg	0.28	23 nc	610 nc	---	---	---	0.2 B
SW6010	NICKEL	mg/kg	242.4	1,600 nc	41,000 nc	---	---	---	68.1
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	396
SW7740	SELENIUM	mg/kg	N/A	390 nc	10,000 nc	---	---	---	1.5 B
SW6010	SILVER	mg/kg	14.9	390 nc	10,000 nc	---	---	---	< 5
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	243
SW7841	THALLIUM	mg/kg	1.42	5 nc	130 nc	---	---	---	1.5
SW6010	VANADIUM	mg/kg	206	550 nc	14,000 nc	---	---	---	25.2
SW6010	ZINC	mg/kg	111	23,000 nc	100,000 max	---	---	---	403
SW9012	CYANIDE	mg/kg	N/A	11 nc	35 nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions; ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	15 Jan 2001 Sample Identification: 06UBS055 (Sample Depth 0.08 - 0.33 feet)	06UBS056 (0.08 - 0.25)	06UBS057 (0.08 - 0.33)	06UBS058 (0.08 - 0.50)
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	< 660	< 660	< 660	< 660
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 660
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 660	< 660	< 660	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	< 660	< 660	< 660	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	< 5.0	< 5.0	< 5.0	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	0.69 J	0.71 J	0.53 J	0.45 J
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	0.48 J	0.44 J	0.4 J	0.33 J
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	< 2.0	< 2.0	< 2.0	< 2.0
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	0.45 J	0.47 J	0.51 J	0.41 J
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	1.48 J	1.23 J	0.8 J	< 5.0
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	< 2.0	< 2.0	< 2.0	1.15 J
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	1.18 J	< 7.0	< 7.0	< 7.0
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	1.36 J	1.03 J	1.15 J	1.37 J
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	0.57 J	0.66 J	0.44 J	8.48 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 3.0	< 3.0	< 3.0	<3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 15	1.8 J	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	< 30	< 30	< 30	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	< 30	< 30	< 30	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	114,000	110,000	73,900	134,000
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	0.9 B	1 B	0.9 B	1.2 B
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	48.9	47.1	15.7	15.5
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	170	111	68.7	88 B
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	3.4	3.2	2	4
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	16.6	17.4	15.5	12.6
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	56,300	61,200	165,000	62,600
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	249	256	165	444
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	31 B	33.8 B	16.3	22.7 B
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	35.1 B	31.5 B	19.8	30.3 B
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	84,900	81,500	43,800	96,100
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	90.8	81.4	71.7	100
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	2,740	2,850	2,300	1,750
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	**6,560**	**7,060**	3,600	1,170
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.12	0.16	0.26	0.52
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	106 B	120 B	70.1	120 B
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1000	< 1000	234	< 1000
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	1.3 B	1.1 B	1.1 B	1.1 B
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	< 50	< 50	< 5	< 50
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1000	< 1000	156	< 1000
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	2.3	1.4	1.3	0.98
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	33 B	32.2 B	15.5	41.9 B
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	187	167	60.8	80.8
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions;ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis			15 Jan 2001		16 Jan 2001	
						06UBS059	06UBS060	06UBS062	06UBS063
			BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	Sample Depth (feet)			
						0.08 - 0.33	0.08 - 0.50	0.08 - 0.25	0.25 - 0.50
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	1,600,000 nc	6,200,000 nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	7,300,000 nc	28,000,000 nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	8,900 ca	21,000 ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	620 ca	2,900 ca	< 660	< 690	< 660	< 660
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 690	< 660	< 660
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	35,000 ca	180,000 ca	< 660	< 690	< 660	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	6,100,000 nc	88,000,000 nc	< 660	< 690	< 660	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	300 ca	1,500 ca	< 120	< 130	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 690	< 660	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	22,000,000 nc	100,000,000 max	< 5.0	< 5.2	4.86 J	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	620 ca	2,900 ca	0.45 J	0.96 J	11.39	0.82 J
SW8310	BENZO(A)PYRENE	µg/kg	N/A	62 ca	290 ca	0.33 J	0.53 J	23.21 P	0.72 J
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	620 ca	2,900 ca	< 2.0	< 2.1	28.88	1.47 J
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	6,200 ca	29,000 ca	< 2.0	0.56 J	6.85	0.59 J
SW8310	CHRYSENE	µg/kg	N/A	62,000 ca	290,000 ca	< 5.0	1.43 J	21.88	1.1 J
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	62 ca	290 ca	< 2.0	< 2.1	7.68 P	< 2.0
SW8310	FLUORANTHENE	µg/kg	N/A	2,300,000 nc	30,000,000 nc	< 7.0	1.22 J	21.79 P	1.24 J
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	620 ca	2,900 ca	< 2.0	1.42 J	57.01	1.86 J
SW8310	PYRENE	µg/kg	N/A	2,300,000 nc	54,000,000 nc	0.47 J	0.63 J	26.87	0.77 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	90 ca	590 ca	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	370,000 nc	5,300,000 nc	< 3.0	< 3.1	3.33	< 3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	30 ca	150 ca	< 3.0	< 3.1	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	18,000 nc	260,000 nc	< 3.0	< 3.1	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 3.1	1.22 J	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	440 ca	2,900 ca	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	110 ca	550 ca	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	53 ca	270 ca	< 1.5	< 1.6	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	310,000 nc	4,400,000 nc	< 15	< 16	6.4 J	< 15
SW8081	4,4'-DDD	µg/kg	N/A	2,400 ca	17,000 ca	< 3.0	< 3.1	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	1,700 ca	12,000 ca	< 3.0	< 3.1	1.91 J	< 3.0
SW8081	4,4'-DDT	µg/kg	N/A	1,700 ca	12,000 ca	< 3.0	< 3.1	1.19 J	< 3.0
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	220 ca	1,000 ca	< 30	< 31	98.5	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	220 ca	1,000 ca	< 30	< 31	58	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	88,900	50,500	9,400	19,400
SW6010	ANTIMONY	mg/kg	**63**	31 nc	820 nc	1.3 B	0.9 B	22.4 B	1.2 B
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	24.3	3.9	15.5	6.1
SW6010	BARIUM	mg/kg	335	5,400 nc	100,000 max	279	280	3,820	190
SW6010	BERYLLIUM	mg/kg	3.34	150 nc	2,200 ca	2.5	1.4	< 1.0	0.65
SW6010	CADMIUM	mg/kg	6.5	37 nc	810 nc	27.8	17.8	13	10.2
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	96,800	---	61,000	243,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	209	123	214	104
SW6010	COBALT	mg/kg	29	4,700 nc	100,000 max	26.7	12.9	33.1 B	6.5
SW6010	COPPER	mg/kg	72.2	2,900 nc	76,000 nc	78.6	56.8	913	49.5
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	65,500	37,300	**384,000**	24,000
SW6010	LEAD	mg/kg	166	400 nc	750 nc	81	45	51.3 B	80.2
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	1,960	2,070	6,280	2,150
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	32,000 nc	**8,010**	2,370	2,020	1,050
SW7471	MERCURY	mg/kg	0.28	23 nc	610 nc	0.25	0.38	0.31	0.45
SW6010	NICKEL	mg/kg	242.4	1,600 nc	41,000 nc	99.4	55.4	325	29.3
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	245	337	< 1000	301
SW7740	SELENIUM	mg/kg	N/A	390 nc	10,000 nc	1.6 B	0.93 B	< 2.5	< 2.5
SW6010	SILVER	mg/kg	14.9	390 nc	10,000 nc	< 5	< 5	262	4.2 B
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	145	245	< 1000	194
SW7841	THALLIUM	mg/kg	1.42	5 nc	130 nc	1.8	0.93	< 0.2	0.37
SW6010	VANADIUM	mg/kg	206	550 nc	14,000 nc	19.6	11.5	< 100	13.6
SW6010	ZINC	mg/kg	111	23,000 nc	100,000 max	366	312	5470	64.6
SW9012	CYANIDE	mg/kg	N/A	11 nc	35 nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions;ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis			16 Jan 2001		18 Jan 2001	
			BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	06UBS064	06UBS063DUP	06UBS066	06UBS067
						Sample Depth (feet)			
						0.08 - 0.25	0.25 - 0.50	0.08 - 0.33	0.08 - 0.25
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	< 660	< 660	< 660	< 670
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	340	< 660	< 660	< 670
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 660	< 660	< 660	< 670
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	< 660	< 660	< 660	< 670
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	**713**	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 670
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	< 50	< 5.0	< 5.0	< 5.1
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	4.1 J	0.75 J	< 2.0	4.81
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	21.7 P	0.49 J	0.43 J	0.62 J
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	20.5	< 2.0	< 2.0	< 2.0
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	8.2 J	0.52 J	0.46 J	0.52 J
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	21.7 J	1.16 J	< 5.0	2.05 J
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	**167.2**	< 2.0	< 2.0	< 2.0
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	< 70	< 7.0	1.05 J	1.8 J
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	314.3	1.37 J	1.25 J	1.55 J
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	5.2 J	0.58 J	0.48 J	< 9.2
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	2.48 J	< 3.0	< 3.0	< 3.1
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 3.0	< 3.0	< 3.1
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 3.0	< 3.1
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	3.26	< 3.0	< 3.0	< 3.1
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 15	< 15	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	< 3.0	< 3.0	< 3.1
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	1.69 J	< 3.0	< 3.0	< 3.1
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	2.5 J	< 3.0	< 3.0	< 3.1
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	< 30	< 30	5.5 J	< 31
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	71.6	< 30	< 30	< 31
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	21,100	22,200	28,300	38,600
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	9.2 B	0.9 B	1.1 B	0.9 B
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	8.3	4.7	2.4	3.7
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	1,810	195	744	880
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	< 1.0	0.67	0.81	1
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	13.1	9.9	11.4 N	13.9 N
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	136,000	263,000	232,000	188,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	178	117	70.4	164
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	27.2 B	6.7	8.4 N	10.4 N
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	411	108	95.7	137
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	**194,000**	22,400	24,600	41,000
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	245	37.2	34.1	30.9
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	4,980	2,430	2,150	3,230
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	4,410	1,060	2,900	3,140
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.23	0.43	0.37	0.41
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	144 B	36.9	34.3 E	45.3 E
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1000	293	153 N	454 N
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	< 2.5	< 2.5	0.64 BN	0.99 BN
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	3.7 B	3.9 B	0.3 BN	0.4 BN
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1000	208	254	249
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	0.54	< 0.2	0.72	1
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	4.8 B	13.8	5.2 BN	11 N
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	733	73.5	73.9	117
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions;ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002).

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

			Screening Basis			18 Jan 2001 Sample Identification			
						06UBS068	06UBS071	06UBS072	06UBS073
						Sample Depth (feet)			
Analytical Method	Analyte	Units	BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	0.08 - 0.33	0.08 - 0.58	0.08 - 0.42	0.08 - 0.25
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	< 660	< 660	76 J	< 660
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 660
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 660	< 660	< 660	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	< 660	< 660	64.6 J	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	< 5.0	0.7 J	4.61 J	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	18.48	3.54	35.31	4.01 P
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	1.18 J	7.36 P	38.01	5.74 P
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	1.92 J	15.47 P	50.34	7.54
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	0.69 J	4.65	21.97	3.74
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	3.79 J	13.06 P	42.94	7.13
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	< 2.0	3.69 P	10.45 P	3.4 P
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	1.5 J	6.59 J	92.67	6.92 J
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	< 2.0	< 2.0	97.45	12.82
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	1.05 J	6.08 J	66.37	7.56 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 1.5	< 7.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	9.3	< 7.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 3.0	< 3.0	29.7	< 3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 7.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 3.0	< 15	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 15	1.18 J
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 3.0	8.8 J	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	0.3 J	< 1.5	< 7.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	2.66	< 1.5	< 7.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 7.5	0.48 J
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 7.6	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 15	< 75	1.2 J
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	< 3.0	< 15	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	0.62 J	65.93 D	343 D	4.04
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	< 3.0	35.58 D	1307 D	9.97
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	13.2 J	< 30	**972.8**	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	5.9 J	177.5	**382.8**	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	7,200	23,400	30,400	115,000
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	4.6 B	49.4 B	**175 B**	11.7 B
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	6.6	21.6	17.7	24.7
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	865	3,390	2,150	323
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	< 1.0	< 1.0	< 1.0	3.4
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	4.9 BN	10.1 N	29.3 N	11.1 N
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	124,000	196,000	143,000	70,200
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	122	217	348	695
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	8.5 BN	14.2 BN	13.4 BN	19.1 BN
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	983	1,910	**5,120**	102
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	**130,000**	105,000	79,200	94,300
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	109	**1,320**	**25,200**	308
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	3,200	13,800	8,460	2,210
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	1,370	1,520	1,550	3,290
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.1	0.07	0.3	0.77
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	59.3 BE	256 E	101 BE	109 BE
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1000	< 1000	< 1000	< 1000
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	0.77 BN	< 2.5	0.35 BN	< 2.5
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	3.3 BN	8.3 BN	19.4 BN	< 50
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	343 B	< 1000	< 1000	< 1000
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	0.16 B	0.11 B	0.2	0.82
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	< 100	24 BN	22.4 BN	109 N
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	108	2000	2960	165
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions;ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-2. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

						18 Jan 2001	16 Jan 2001	18 Jan 2001 Sample Identification	
			Screening Basis			06UBS074	06UBS061	06UBS069	06UBS069DUP
						Sample Depth (feet)			
Analytical Method	Analyte	Units	BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	0.08 - 0.25	2.0 - 2.2	2.0 - 2.2	2.0 - 2.2
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	< 20	< 21	< 21
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	< 12	< 13	< 13
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	< 6.1	< 6.4	< 6.3
SEMIVOLATILE ORGANIC COMPOUND									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	< 660	< 660	< 660	< 670
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	50.2 J	< 670
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 660	< 660	< 660	< 670
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	< 660	< 660	< 660	< 670
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	87.2 J	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 670
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**100,000,000** max	< 5.0	< 5.0	< 5.0	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	5.19	< 2.0	2.16	2.43
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	8.34 P	0.36 J	11.11 P	6.5 P
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	9.93	< 2.0	14.38	9.54
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	4.38	0.46 J	5.39	3.79
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	5.96	0.93 J	8.13 P	5.67
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	3.92 P	< 2.0	12.45 P	9.75 P
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	5.7 J	1.14 J	3.75 J	3.61 J
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	20.79 P	1.36 J	110.12	85.87
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	6.33 J	0.55 J	3.51 J	3.3 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 3.0	< 3.0	0.65 J	1.01 J
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 15	<15	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	< 3.0	< 3.0	8.59	9.32
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	< 3.0	< 3.0	2.29 J	3.19
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	< 30	< 30	< 30	18 J
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	**261.2**	< 30	23.5 J	13.8 J
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	44,100	8,140	42,500	50,400
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	6.4 B	5.3 B	**119 B**	**84.1 B**
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	11.7	1.3 B	12.5	22.7
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	88.6	1,350	**8,090**	**5,720**
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	1.2	0.24	< 1.0	< 1.0
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	2.9 N	7.7	**41.5 N**	**118 N**
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	218,000	313,000	53,400	64,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	190	26.6	387	405
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	5.6 N	4.5 B	19.5 BN	20.4 BN
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	37.7	1,130	2,540	2,320
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	27,000	5,760	**200,000**	**174,000**
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	399	20.8	**2,830**	**2,260**
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	2,050	2,840	31,600	30,300
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	1,270	2,090	2,320	2,380
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.13	0.13	0.03 B	0.02 B
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	25 E	15.2	203 E	221 E
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	126 N	107	< 1000	< 1000
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	0.39 BN	0.5 B	< 2.5	0.45 BN
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	< 5	0.4 B	7.4 BN	6.5 BN
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	118	331	< 1000	< 1000
SW7841	THALLIUM	mg/kg	1.42	**5** nc	**130** nc	0.46	0.45	0.29	0.18 B
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	28.9 N	3.4 B	22.9 BN	27.9 BN
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	61.6	57.6	2520	4240
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions;ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

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TABLE 2-3. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR DIOXINS AND EXPLOSIVES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analytes	Units	Screening Basis			11 February 1998 Sample Identification									13 September 1998 Sample Identification					
						06UBS014			06UBS015			06UBS015DUP			06UBS017			06UBS018		
						Sample Depth (feet)														
			WHO TEFs	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	0.17-0.33			0.17-0.33			0.17-0.33			0.17-0.33			0.17-0.33		
						Conc		TEQ	Conc		TEQ	Conc		TEQ	Conc		TEQ	Conc		TEQ
SW8290	2,3,7,8-TCDD	ng/kg	1	**3.90 ca**	**27.33 ca**	0.33	J	0.33	0.35	J	0.35	0.72	J	0.72	<0.6		0.30	0.66	J	0.66
SW8290	1,2,3,7,8-PeCDD	ng/kg	1			1.2	J	1.2	1.1	J	1.1	9.8		9.8	3.3		3.3	3.6	J	3.6
SW8290	1,2,3,4,7,8-HxCDD	ng/kg	0.1			2.2	J	0.22	2.1	J	0.21	44.9		4.49	4.1	J	0.41	6.4		0.64
SW8290	1,2,3,6,7,8-HxCDD	ng/kg	0.1			8.5		0.85	8.3		0.83	367		36.7	12.3		1.23	33.5		3.35
SW8290	1,2,3,7,8,9-HxCDD	ng/kg	0.1			7.4		0.74	7.3		0.73	148		14.8	10.3		1.03	24.2		2.42
SW8290	1,2,3,4,6,7,8-HpCDD	ng/kg	0.01			251		2.51	238		2.38	15,420	E	154.2	255		2.55	1,450		14.5
SW8290	1,2,3,4,6,7,8,9-OCDD	ng/kg	0.0001			2,190		0.219	1,820		0.182	65,920	E	6.592	1,280		0.128	14,710	J	1.471
	TOTAL PCDD (TEQ)			N/A	N/A			6.07			5.78			227.30			8.95			26.64
SW8290	2,3,7,8-TCDF	ng/kg	0.1			1.2		0.12	1.5		0.15	5.6		0.56	3.8		0.38	0.7		0.07
SW8290	1,2,3,7,8-PeCDF	ng/kg	0.05			0.64	J	0.032	0.61	J	0.0305	3	J	0.15	2.5	J	0.125	0.42	J	0.021
SW8290	2,3,4,7,8-PeCDF	ng/kg	0.5			0.72	J	0.36	0.52	J	0.26	5.1		2.55	3.3	J	1.65	0.54	J	0.27
SW8290	1,2,3,4,7,8-HxCDF	ng/kg	0.1			2.8	J	0.28	2.4	J	0.24	27.6		2.76	8		0.8	2.8	J	0.28
SW8290	1,2,3,6,7,8-HxCDF	ng/kg	0.1			1.1	J	0.11	0.98	J	0.098	17.7		1.77	5.1		0.51	2	J	0.2
SW8290	2,3,4,6,7,8-HxCDF	ng/kg	0.1			3	J	0.3	2.8	J	0.28	52.5		5.25	12.2		1.22	5.5		0.55
SW8290	1,2,3,7,8,9-HxCDF	ng/kg	0.1			1.3	XJ	0.13	0.95	J	0.095	5.3	X	0.53	<1.9		0.095	<0.1		0.005
SW8290	1,2,3,4,6,7,8-HpCDF	ng/kg	0.01			91.4		0.914	97.4		0.974	1,550		15.5	597		5.97	317		3.17
SW8290	1,2,3,4,7,8,9-HpCDF	ng/kg	0.01			1.8	J	0.018	1.6	J	0.016	54.4		0.544	3.2	J	0.032	10		0.1
SW8290	1,2,3,4,6,7,8,9-OCDF	ng/kg	0.0001			215		0.0215	190		0.019	5,320		0.532	177		0.0177	953		0.0953
	TOTAL PCDF (TEQ)			N/A	N/A			2.29			2.16			30.15			10.80			4.76
	TOTAL TEQs (WHO)	ng/kg	38	**3.90 ca**	**27.33 ca**			**8.35**			**7.94**			**257.45**			**19.75**			**31.40**
SW8290	TOTAL TCDD	ng/kg	N/A			1.9			2.5			16.6			6.9			2.4		
SW8290	TOTAL PeCDD	ng/kg	N/A			5.8			3.3			288			16.7			18.4		
SW8290	TOTAL HxCDD	ng/kg	N/A			65.5			70.3			4,140			130			269		
SW8290	TOTAL HpCDD	ng/kg	N/A			407			394			26,740			510			2620		
SW8290	TOTAL TCDF	ng/kg	N/A			4.9			4.8			66.7			35.9			4.5		
SW8290	TOTAL PeCDF	ng/kg	N/A			14.7			13.6			180			86.6			9.7		
SW8290	TOTAL HxCDF	ng/kg	N/A			84.9			97			1,690			431			228		
SW8290	TOTAL HpCDF	ng/kg	N/A			210			217			4,820			890			1140		
SW8330	EXPLOSIVES	mg/kg	N/A			--		--	--		--	--		--	--		--	--		--

Note: WHO = World Health Organization, 1998 Symposium in Stockholm;
TEQ = Toxicity Equivalence Quotient; PRG = Preliminary Remediation Goal;
TEF = Toxicity Equivalence Factor; N/A = Not Applicable; -- = Not analyzed for;
ng/kg = nanograms per kilogram; mg/kg = milligrams per kilogram.
USEPA IX = U.S. Environment Protection Agency, Region IX; ca = carcinogen

Qualifiers: J = Estimated Value; E = Estimated value based on matrix interferences;
X = Total diphenylether includes > 10% of the total polychlorodibenzofuran.
Bold = Concentrations equal or exceed the Residential PRGs.
Bold and Shaded = Concentrations equal or exceed the industrial PRGs.

TABLE 2-3. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR DIOXINS AND EXPLOSIVES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

						13 September 1998 Sample Identification														
						06UBS019			06UBS020			06UBS020DUP			06UBS022			06UBS023		
			Screening Basis			Sample Depth (feet)														
			WHO TEFs	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	0.17-0.33			0.17-0.33			0.17-0.33			0.17-0.33			0.17-0.33		
Analytical Method	Analytes	Units				Conc		TEQ	Conc		TEQ	Conc		TEQ	Conc		TEQ	Conc		TEQ
SW8290	2,3,7,8-TCDD	ng/kg	1	**3.90 ca**	**27.33 ca**	0.77	J	0.77	2.6		2.6	2.5	J	2.5	<0.6		0.3	<1		0.5
SW8290	1,2,3,7,8-PeCDD	ng/kg	1			5.3		5.3	10.5		10.5	11.1		11.1	<0.5		0.25	<0.9		0.45
SW8290	1,2,3,4,7,8-HxCDD	ng/kg	0.1			8.4		0.84	12.4		1.24	12.5		1.25	<0.8		0.04	0.8	J	0.08
SW8290	1,2,3,6,7,8-HxCDD	ng/kg	0.1			26.1		2.61	37.4		3.74	40.1		4.01	0.88	J	0.088	4.5	J	0.45
SW8290	1,2,3,7,8,9-HxCDD	ng/kg	0.1			21.6		2.16	31.1		3.11	39.6		3.96	1.3	J	0.13	2.5	J	0.25
SW8290	1,2,3,4,6,7,8-HpCDD	ng/kg	0.01			1030		10.3	776		7.76	856		8.56	18.1		0.181	112		1.12
SW8290	1,2,3,4,6,7,8,9-OCDD	ng/kg	0.0001			13870	E	1.387	5,200	E	0.52	6030	E	0.603	87.2		0.00872	1010		0.101
	TOTAL PCDD (TEQ)			N/A	N/A			23.37			29.47			31.98			1.00			2.95
SW8290	2,3,7,8-TCDF	ng/kg	0.1			14.7		1.47	10.2		1.02	9.9		0.99	<0.4		0.02	<0.7		0.035
SW8290	1,2,3,7,8-PeCDF	ng/kg	0.05			8.7		0.435	2.6	J	0.13	1.9	J	0.095	<0.5		0.0125	<0.8		0.02
SW8290	2,3,4,7,8-PeCDF	ng/kg	0.5			8.7		4.35	3.7	J	1.85	3.9	J	1.95	<0.5		0.125	0.68	J	0.34
SW8290	1,2,3,4,7,8-HxCDF	ng/kg	0.1			11.9		1.19	8.1		0.81	8.2	J	0.82	<0.5		0.025	1.3	J	0.13
SW8290	1,2,3,6,7,8-HxCDF	ng/kg	0.1			5.8		0.58	6.3		0.63	10.5		1.05	<0.5		0.025	0.92	J	0.092
SW8290	2,3,4,6,7,8-HxCDF	ng/kg	0.1			8.6		0.86	11		1.1	17.3	J	1.73	<0.6		0.03	2.1	J	0.21
SW8290	1,2,3,7,8,9-HxCDF	ng/kg	0.1			0.47	J	0.047	<0.2		0.01	<2.6		0.13	<0.6		0.03	<0.9		0.045
SW8290	1,2,3,4,6,7,8-HpCDF	ng/kg	0.01			227		2.27	312		3.12	373		3.73	5.6		0.056	54.1		0.541
SW8290	1,2,3,4,7,8,9-HpCDF	ng/kg	0.01			4.8	J	0.048	6.6		0.066	<3.8		0.019	<0.9		0.0045	1.3	J	0.013
SW8290	1,2,3,4,6,7,8,9-OCDF	ng/kg	0.0001			483		0.0483	350		0.035	449		0.0449	8.2	J	0.00082	90.5		0.00905
	TOTAL PCDF (TEQ)			N/A	N/A			11.30			8.77			10.56			0.33			1.44
	TOTAL TEQs (WHO)	ng/kg	38	**3.90 ca**	**27.33 ca**			**34.67**			**38.24**			**42.54**			1.33			**4.39**
SW8290	TOTAL TCDD	ng/kg	N/A			19.7			16.7			9.6			<0.6			<1		
SW8290	TOTAL PeCDD	ng/kg	N/A			55.3			57.2			67.7			<0.5			1.4		
SW8290	TOTAL HxCDD	ng/kg	N/A			286			445			396			<0.7			27.2		
SW8290	TOTAL HpCDD	ng/kg	N/A			2210			1670			1780			<0.8			194		
SW8290	TOTAL TCDF	ng/kg	N/A			129			70			35.8			0.59			<0.7		
SW8290	TOTAL PeCDF	ng/kg	N/A			93			67.4			59.3			<0.5			1.8		
SW8290	TOTAL HxCDF	ng/kg	N/A			208			319			323			2.2			42.8		
SW8290	TOTAL HpCDF	ng/kg	N/A			661			635			730			11.5			127		
SW8330	EXPLOSIVES	mg/kg	N/A			--		--	--		--	--		--	--		--	--		--

Note: WHO = World Health Organization, 1998 Symposium in Stockholm;
TEQ = Toxicity Equivalence Quotient; PRG = Preliminary Remediation Goal;
TEF = Toxicity Equivalence Factor; N/A = Not Applicable; -- = Not analyzed for;
ng/kg = nanograms per kilogram; mg/kg = milligrams per kilogram.
USEPA IX = U.S. Environment Protection Agency, Region IX; ca = carcinogen

Qualifiers: J = Estimated Value; E = Estimated value based on matrix interferences;
X = Total diphenylether includes > 10% of the total polychlorodibenzofuran.
Bold = Concentrations equal or exceed the Residential PRGs.
Bold and Shaded = Concentrations equal or exceed the industrial PRGs.

TABLE 2-3. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR DIOXINS AND EXPLOSIVES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analytes	Units	Screening Basis			13 September 1998 Sample Identification														
						06UBS024			06UBS025			06UBS026			06UBS027			06UBS028		
						Sample Depth (feet)														
						0.17-0.33			0.17-0.33			0.17-0.33			0.17-0.33			0.17-0.33		
			WHO TEFs	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	Conc		TEQ	Conc		TEQ	Conc		TEQ	Conc		TEQ	Conc		TEQ
SW8290	2,3,7,8-TCDD	ng/kg	1	**3.90 ca**	**27.33 ca**	<0.4		0.2	<0.6		0.3	0.16	J	0.16	<0.4		0.2	<0.2		0.1
SW8290	1,2,3,7,8-PeCDD	ng/kg	1			0.83		0.83	<0.5		0.25	0.36	J	0.36	<0.4		0.2	<0.2		0.1
SW8290	1,2,3,4,7,8-HxCDD	ng/kg	0.1			1.9	J	0.19	<0.8		0.04	0.49	J	0.049	<0.3		0.015	<0.5		0.025
SW8290	1,2,3,6,7,8-HxCDD	ng/kg	0.1			8.9	J	0.89	<0.8		0.04	1.2	J	0.12	1.7	J	0.17	<0.5		0.025
SW8290	1,2,3,7,8,9-HxCDD	ng/kg	0.1			6		0.6	3.1	J	0.31	2.7	J	0.27	5.9		0.59	<0.5		0.025
SW8290	1,2,3,4,6,7,8-HpCDD	ng/kg	0.01			261		2.61	51.5		0.515	21.1		0.211	23.8		0.238	8.5		0.085
SW8290	1,2,3,4,6,7,8,9-OCDD	ng/kg	0.0001			1550		0.155	275		0.0275	90		0.009	82.3		0.00823	30.6		0.00306
	TOTAL PCDD (TEQ)			N/A	N/A			5.48			1.48			1.18			1.42			0.36
SW8290	2,3,7,8-TCDF	ng/kg	0.1			2.5		0.25	<0.4		0.02	0.48	J	0.048	<0.2		0.01	0.18	J	0.018
SW8290	1,2,3,7,8-PeCDF	ng/kg	0.05			0.88		0.044	<0.5		0.0125	0.3	J	0.015	0.5	J	0.025	<0.2		0.005
SW8290	2,3,4,7,8-PeCDF	ng/kg	0.5			0.99		0.495	<0.5		0.125	0.25	J	0.125	0.4	J	0.2	<0.2		0.05
SW8290	1,2,3,4,7,8-HxCDF	ng/kg	0.1			3.4	J	0.34	<0.5		0.025	0.94	J	0.094	1.8	J	0.18	<0.3		0.015
SW8290	1,2,3,6,7,8-HxCDF	ng/kg	0.1			1.7		0.17	<0.5		0.025	0.43	J	0.043	0.98	J	0.098	<0.3		0.015
SW8290	2,3,4,6,7,8-HxCDF	ng/kg	0.1			5		0.5	<0.6		0.03	0.82	J	0.082	0.93	J	0.093	<0.3		0.015
SW8290	1,2,3,7,8,9-HxCDF	ng/kg	0.1			<0.7		0.035	<0.7		0.035	<0.1		0.005	<0.2		0.01	<0.4		0.02
SW8290	1,2,3,4,6,7,8-HpCDF	ng/kg	0.01			330		3.3	9.5		0.095	12.9		0.129	11.9		0.119	4.4	J	0.044
SW8290	1,2,3,4,7,8,9-HpCDF	ng/kg	0.01			1.6	J	0.016	<0.9		0.0045	0.28	J	0.0028	0.38	J	0.0038	<0.3		0.0015
SW8290	1,2,3,4,6,7,8,9-OCDF	ng/kg	0.0001			167		0.0167	13		0.0013	4.9	J	0.00049	6.8	J	0.00068	4.2	J	0.00042
	TOTAL PCDF (TEQ)			N/A	N/A			5.17			0.37			0.54			0.74			0.18
	TOTAL TEQs (WHO)	ng/kg	38	**3.90 ca**	**27.33 ca**			**10.64**			1.86			1.72			2.16			0.55
SW8290	TOTAL TCDD	ng/kg	N/A			1.7			<0.6			0.38			0.88			<0.2		
SW8290	TOTAL PeCDD	ng/kg	N/A			4.1			<0.5			0.31			4.5			<0.2		
SW8290	TOTAL HxCDD	ng/kg	N/A			58.8			5.9			16.4			32.1			6		
SW8290	TOTAL HpCDD	ng/kg	N/A			434			88.1			43.9			61.7			16.4		
SW8290	TOTAL TCDF	ng/kg	N/A			8.8			<0.4			1.6			0.38			0.52		
SW8290	TOTAL PeCDF	ng/kg	N/A			24.3			1.9			1.7			0.5			<0.2		
SW8290	TOTAL HxCDF	ng/kg	N/A			241			6			12.3			8.4			3.6		
SW8290	TOTAL HpCDF	ng/kg	N/A			508			19.4			19.1			12.3			4.4		
SW8330	EXPLOSIVES	mg/kg	N/A			--		--	--		--	--		--	--		--	--		--

Note: WHO = World Health Organization, 1998 Symposium in Stockholm;
TEQ = Toxicity Equivalence Quotient; PRG = Preliminary Remediation Goal;
TEF = Toxicity Equivalence Factor; N/A = Not Applicable; -- = Not analyzed for;
ng/kg = nanograms per kilogram; mg/kg = milligrams per kilogram.
USEPA IX = U.S. Environment Protection Agency, Region IX; ca = carcinogen

Qualifiers: J = Estimated Value; E = Estimated value based on matrix interferences;
X = Total diphenylether includes > 10% of the total polychlorodibenzofuran.
Bold = Concentrations equal or exceed the Residential PRGs.
Bold and Shaded = Concentrations equal or exceed the industrial PRGs.

TABLE 2-3. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR DIOXINS AND EXPLOSIVES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analytes	Units	WHO TEFs	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	06UBS029 Conc	06UBS029 TEQ	06UBS029DUP Conc	06UBS029DUP TEQ	06UBS058 Conc	06UBS058 TEQ	06UBS059 Conc	06UBS059 TEQ	06UBS060 Conc	06UBS060 TEQ
			Screening Basis			13 September 1998 Sample Identification				15 Jan 2001 Sample Identification					
						Sample Depth (feet)									
						0.17-0.33		0.17-0.33		0.08 - 0.50		0.08 - 0.33		0.08 - 0.50	
SW8290	2,3,7,8-TCDD	ng/kg	1	**3.90 ca**	**27.33 ca**	<0.2	0.1	<0.1	0.05	< 0.24	0.12	< 0.22	0.11	< 0.25	0.125
SW8290	1,2,3,7,8-PeCDD	ng/kg	1			<0.2	0.1	<0.2	0.1	< 0.3	0.15	< 0.39	0.195	< 0.44	0.22
SW8290	1,2,3,4,7,8-HxCDD	ng/kg	0.1			<0.2	0.01	<0.3	0.015	< 0.2	0.01	< 0.24	0.012	< 0.25	0.0125
SW8290	1,2,3,6,7,8-HxCDD	ng/kg	0.1			<0.2	0.01	<0.3	0.015	< 0.2	0.01	< 0.44	0.022	< 0.78	0.039
SW8290	1,2,3,7,8,9-HxCDD	ng/kg	0.1			<0.2	0.01	1.3 J	0.13	< 0.46	0.023	< 1.8	0.09	< 2.4	0.12
SW8290	1,2,3,4,6,7,8-HpCDD	ng/kg	0.01			12.8	0.128	11.8	0.118	< 2.6	0.013	9.7	0.097	13	0.13
SW8290	1,2,3,4,6,7,8,9-OCDD	ng/kg	0.0001			68.3	0.00683	67.1	0.00671	45	0.0045	110	0.011	72	0.0072
	TOTAL PCDD (TEQ)			N/A	N/A		0.36		0.43		0.33		0.54		0.65
SW8290	2,3,7,8-TCDF	ng/kg	0.1			<0.2	0.01	0.26 J	0.026	< 0.36	0.018	< 0.26	0.013	< 0.25	0.0125
SW8290	1,2,3,7,8-PeCDF	ng/kg	0.05			<0.2	0.005	<0.1	0.0025	< 0.24	0.006	< 0.26	0.0065	< 0.29	0.00725
SW8290	2,3,4,7,8-PeCDF	ng/kg	0.5			<0.2	0.05	<0.1	0.025	< 0.24	0.06	< 0.24	0.06	< 0.27	0.0675
SW8290	1,2,3,4,7,8-HxCDF	ng/kg	0.1			<0.1	0.01	0.55 J	0.055	< 0.32	0.016	< 0.22	0.011	< 0.71	0.0355
SW8290	1,2,3,6,7,8-HxCDF	ng/kg	0.1			<0.1	0.01	0.29 J	0.029	< 0.14	0.007	< 0.17	0.0085	< 0.32	0.016
SW8290	2,3,4,6,7,8-HxCDF	ng/kg	0.1			<0.2	0.01	0.48 J	0.048	< 0.15	0.0075	< 0.28	0.014	< 0.38	0.019
SW8290	1,2,3,7,8,9-HxCDF	ng/kg	0.1			<0.2	0.01	<0.2	0.01	< 0.17	0.0085	< 0.22	0.011	< 0.23	0.0115
SW8290	1,2,3,4,6,7,8-HpCDF	ng/kg	0.01			12.2	0.122	10.8	0.108	< 0.8	0.004	< 4.5	0.0225	5.6 J	0.056
SW8290	1,2,3,4,7,8,9-HpCDF	ng/kg	0.01			<0.3	0.0015	<0.3	0.0015	< 0.13	0.00065	< 0.16	0.0008	< 0.17	0.00085
SW8290	1,2,3,4,6,7,8,9-OCDF	ng/kg	0.0001			9.3 J	0.00093	19	0.0019	< 1	0.00005	< 6.2	0.00031	< 3.1	0.000155
	TOTAL PCDF (TEQ)			N/A	N/A		0.23		0.31		0.13		0.15		0.23
	TOTAL TEQs (WHO)	ng/kg	38	**3.90 ca**	**27.33 ca**		0.59		0.74		0.46		0.68		0.88
SW8290	TOTAL TCDD	ng/kg	N/A			0.56		0.48		2.9		4.2		5.8	
SW8290	TOTAL PeCDD	ng/kg	N/A			<0.2		<0.2		< 0.3		< 0.39		< 0.44	
SW8290	TOTAL HxCDD	ng/kg	N/A			6.2		6.2		< 1.6		< 2.2		< 4	
SW8290	TOTAL HpCDD	ng/kg	N/A			27.4		24		5.7		22		27	
SW8290	TOTAL TCDF	ng/kg	N/A			<0.1		0.16		< 0.36		< 0.26		< 0.36	
SW8290	TOTAL PeCDF	ng/kg	N/A			<0.2		0.81 J		< 0.39		< 0.26		< 0.59	
SW8290	TOTAL HxCDF	ng/kg	N/A			8.1		7.1		< 0.49		< 1.3		< 1.6	
SW8290	TOTAL HpCDF	ng/kg	N/A			20.2		18.5		< 0.8		< 4.5		5.6	
SW8330	EXPLOSIVES	mg/kg	N/A			--	--	--	--	ND	--	--	--	--	--

Note: WHO = World Health Organization, 1998 Symposium in Stockholm;
TEQ = Toxicity Equivalence Quotient; PRG = Preliminary Remediation Goal;
TEF = Toxicity Equivalence Factor; N/A = Not Applicable; -- = Not analyzed for;
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Qualifiers: J = Estimated Value; E = Estimated value based on matrix interferences;
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TABLE 2-3. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR DIOXINS AND EXPLOSIVES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analytes	Units	Screening Basis: WHO TEFs	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	16 Jan 2001 Sample Identification: 06UBS064, Sample Depth (feet): 0.08 - 0.25, Conc	06UBS064 TEQ	06UBS062, 0.08 - 0.25, Conc	06UBS062 TEQ	06UBS063, 0.25 - 0.50, Conc	06UBS063 TEQ	06UBS063 DUP, 0.25 - 0.50, Conc	06UBS063 DUP TEQ
SW8290	2,3,7,8-TCDD	ng/kg	1	**3.90 ca**	**27.33 ca**	1.1 J	1.1	**4.9**	**4.9**	< 0.17	0.085	< 0.24	0.12
SW8290	1,2,3,7,8-PeCDD	ng/kg	1			3.9 J	3.9	18	18	< 0.39	0.195	< 0.61	0.305
SW8290	1,2,3,4,7,8-HxCDD	ng/kg	0.1			3.7 J	0.37	16	1.6	< 0.92	0.046	< 0.71	0.0355
SW8290	1,2,3,6,7,8-HxCDD	ng/kg	0.1			17	1.7	50	5	4.5 J	0.45	4.7 J	0.47
SW8290	1,2,3,7,8,9-HxCDD	ng/kg	0.1			15	1.5	37	3.7	9.7	0.97	9.6	0.96
SW8290	1,2,3,4,6,7,8-HpCDD	ng/kg	0.01			400	4	700	7	180	1.8	170	1.7
SW8290	1,2,3,4,6,7,8,9-OCDD	ng/kg	0.0001			3100	0.31	4600 E	0.46	2000	0.2	1900	0.19
	TOTAL PCDD (TEQ)			N/A	N/A		12.88		40.66		3.75		3.78
SW8290	2,3,7,8-TCDF	ng/kg	0.1			2.3	0.23	67	6.7	< 0.64	0.032	< 0.55	0.0275
SW8290	1,2,3,7,8-PeCDF	ng/kg	0.05					50	2.5	< 0.74	0.0185	< 0.3	0.0075
SW8290	2,3,4,7,8-PeCDF	ng/kg	0.5					58	29	< 1	0.25	< 0.32	0.08
SW8290	1,2,3,4,7,8-HxCDF	ng/kg	0.1			4.6 J	0.46	46	4.6	4 J	0.4	< 1.2	0.06
SW8290	1,2,3,6,7,8-HxCDF	ng/kg	0.1			5.2 J	0.52	47	4.7	< 1.6	0.08	< 1.1	0.055
SW8290	2,3,4,6,7,8-HxCDF	ng/kg	0.1			4.7 J	0.47	60	6	< 3	0.15	< 1.4	0.07
SW8290	1,2,3,7,8,9-HxCDF	ng/kg	0.1					3.2 J	0.32	< 0.76	0.038	< 0.25	0.0125
SW8290	1,2,3,4,6,7,8-HpCDF	ng/kg	0.01			170	1.7	550	5.5	57	0.57	45	0.45
SW8290	1,2,3,4,7,8,9-HpCDF	ng/kg	0.01			4.5 J	0.045	22	0.22	< 2.1	0.0105	< 1.4	0.007
SW8290	1,2,3,4,6,7,8,9-OCDF	ng/kg	0.0001			280	0.028	320	0.032	110	0.011	86	0.0086
	TOTAL PCDF (TEQ)			N/A	N/A		3.45		59.57		1.56		0.78
	TOTAL TEQs (WHO)	ng/kg	38	**3.90 ca**	**27.33 ca**		**16.33**		**100.23**		**5.31**		**4.56**
SW8290	TOTAL TCDD	ng/kg	N/A			8.6		95		3.3		2.5	
SW8290	TOTAL PeCDD	ng/kg	N/A			7		120		< 1.3		< 0.86	
SW8290	TOTAL HxCDD	ng/kg	N/A			110		410		36		34	
SW8290	TOTAL HpCDD	ng/kg	N/A			730		1300		320		310	
SW8290	TOTAL TCDF	ng/kg	N/A			20		910		1.7		0.88	
SW8290	TOTAL PeCDF	ng/kg	N/A			12		660		< 2.6		< 1.1	
SW8290	TOTAL HxCDF	ng/kg	N/A			100		640		39		26	
SW8290	TOTAL HpCDF	ng/kg	N/A			390		940		130		110	
SW8330	EXPLOSIVES	mg/kg	N/A			ND	--	ND	--	ND	--	ND	--

Note: WHO = World Health Organization, 1998 Symposium in Stockholm;
TEQ = Toxicity Equivalence Quotient; PRG = Preliminary Remediation Goal;
TEF = Toxicity Equivalence Factor; N/A = Not Applicable; -- = Not analyzed for;
ng/kg = nanograms per kilogram; mg/kg = milligrams per kilogram.
USEPA IX = U.S. Environment Protection Agency, Region IX; ca = carcinogen

Qualifiers: J = Estimated Value; E = Estimated value based on matrix interferences;
X = Total diphenylether includes > 10% of the total polychlorodibenzofuran.
Bold = Concentrations equal or exceed the Residential PRGs.
Bold and Shaded = Concentrations equal or exceed the industrial PRGs.

TABLE 2-3. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR DIOXINS AND EXPLOSIVES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analytical Method	Analytes	Units	Screening Basis			16 Jan 2001 Sample Identification		18 Jan 2001 Sample Identification						
						06UBS061		06UBS069		06UBS069 DUP		06UBS072		06UBS055
						Sample Depth (feet)								
			WHO TEFs	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	2.00 - 2.20		2.00 - 2.20		2.00 - 2.20		0.08 - 0.42		0.08 - 0.42
						Conc	TEQ	Conc	TEQ	Conc	TEQ	Conc	TEQ	
SW8290	2,3,7,8-TCDD	ng/kg	1	**3.90 ca**	**27.33 ca**	< 0.17	0.085	**4.1**	**4.1**	**5.2**	**5.2**	**17**	**17**	--
SW8290	1,2,3,7,8-PeCDD	ng/kg	1			< 0.32	0.16	24	24	28	28	89	89	--
SW8290	1,2,3,4,7,8-HxCDD	ng/kg	0.1			< 0.53	0.0265	38	3.8	38	3.8	89	8.9	--
SW8290	1,2,3,6,7,8-HxCDD	ng/kg	0.1			< 0.93	0.0465	190	19	200	20	200	20	--
SW8290	1,2,3,7,8,9-HxCDD	ng/kg	0.1			< 1.9	0.095	120	12	120	12	150	15	--
SW8290	1,2,3,4,6,7,8-HpCDD	ng/kg	0.01			17	0.17	4700 E	47	5000 E	50	2100	21	--
SW8290	1,2,3,4,6,7,8,9-OCDD	ng/kg	0.0001			82	0.0082	23000 E	2.3	24000 E	2.4	11000 E	1.1	--
	TOTAL PCDD (TEQ)			N/A	N/A		0.59		112.20		121.40		172.00	
SW8290	2,3,7,8-TCDF	ng/kg	0.1			< 0.53	0.0265	19	1.9	24	2.4	410	41	--
SW8290	1,2,3,7,8-PeCDF	ng/kg	0.05			< 0.63	0.01575	6.8	0.34	8.5	0.425	210	10.5	--
SW8290	2,3,4,7,8-PeCDF	ng/kg	0.5			< 0.71	0.1775	9.7	4.85	11	5.5	330	165	--
SW8290	1,2,3,4,7,8-HxCDF	ng/kg	0.1			< 1.9	0.095	17	1.7	18	1.8	290	29	--
SW8290	1,2,3,6,7,8-HxCDF	ng/kg	0.1			< 1.1	0.055	14	1.4	15	1.5	280	28	--
SW8290	2,3,4,6,7,8-HxCDF	ng/kg	0.1			< 1.1	0.055	23	2.3	24	2.4	390	39	--
SW8290	1,2,3,7,8,9-HxCDF	ng/kg	0.1			< 0.25	0.0125	< 0.53	0.0265	< 0.74	0.037	13	1.3	--
SW8290	1,2,3,4,6,7,8-HpCDF	ng/kg	0.01			21	0.21	710	7.1	800	8	2600 E	26	--
SW8290	1,2,3,4,7,8,9-HpCDF	ng/kg	0.01			< 1	0.005	35	0.35	36	0.36	110	1.1	--
SW8290	1,2,3,4,6,7,8,9-OCDF	ng/kg	0.0001			13	0.0013	1600	0.16	1600	0.16	1300	0.13	--
	TOTAL PCDF (TEQ)			N/A	N/A		0.65		20.13		22.58		341.03	
	TOTAL TEQs (WHO)	ng/kg	38	**3.90 ca**	**27.33 ca**		1.24		**132.33**		**143.98**		**513.03**	
SW8290	TOTAL TCDD	ng/kg	N/A			2.7		40		35		1100		--
SW8290	TOTAL PeCDD	ng/kg	N/A			< 0.32		130		130		2200		--
SW8290	TOTAL HxCDD	ng/kg	N/A			3.1		1100		1100		3500		--
SW8290	TOTAL HpCDD	ng/kg	N/A			30		7400		8000		4100		--
SW8290	TOTAL TCDF	ng/kg	N/A			2.9		87		110		4000		--
SW8290	TOTAL PeCDF	ng/kg	N/A			< 1.6		92		110		3800		--
SW8290	TOTAL HxCDF	ng/kg	N/A			7.2		540		640		3500		--
SW8290	TOTAL HpCDF	ng/kg	N/A			33		2200		2500		4400		--
SW8330	EXPLOSIVES	mg/kg	N/A			ND	--	ND	--	ND	--	ND	--	ND

Note: WHO = World Health Organization, 1998 Symposium in Stockholm;
TEQ = Toxicity Equivalence Quotient; PRG = Preliminary Remediation Goal;
TEF = Toxicity Equivalence Factor; N/A = Not Applicable; -- = Not analyzed for;
ng/kg = nanograms per kilogram; mg/kg = milligrams per kilogram.
USEPA IX = U.S. Environment Protection Agency, Region IX; ca = carcinogen

Qualifiers: J = Estimated Value; E = Estimated value based on matrix interferences;
X = Total diphenylether includes > 10% of the total polychlorodibenzofuran.
Bold = Concentrations equal or exceed the Residential PRGs.
Bold and Shaded = Concentrations equal or exceed the industrial PRGs.

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

			Screening Basis					28 May 1997 Sample Identification			
								06UBS002	06UBS003	06UBS003DUP	06UBS005
				2000 USEPA IX		2000 USEPA IX		Sample Depth (feet)			
Analytical Method	Analyte	Units	BTV	Residential PRG		Industrial PRG		0.00-0.33	0.00-0.33	0.00-0.33	0.00-0.17
VOLATILE ORGANIC COMPOUNDS											
SW8260	ACETONE	µg/kg	N/A	**1,600,000**	nc	**6,200,000**	nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000**	nc	**28,000,000**	nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900**	ca	**21,000**	ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS											
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620**	ca	**2900**	ca	<490	<510	<490	<380
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A	N/A	N/A	N/A	<490	<510	<490	<380
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000**	ca	**180,000**	ca	<490	<510	<490	<380
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000**	nc	**88,000,000**	nc	<490	<510	<510	<380
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300**	ca	**1,500**	ca	<90	<92	<92	<70
SW8270	PHENANTHRENE	µg/kg	N/A	N/A	N/A	N/A	N/A	<490	<510	<490	<380
POLYCYCLIC AROMATIC HYDROCARBONS											
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000**	nc	**#########**	max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620**	ca	**2,900**	ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62**	ca	**290**	ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620**	ca	**2,900**	ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200**	ca	**29,000**	ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000**	ca	**290,000**	ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62**	ca	**290**	ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000**	nc	**30,000,000**	nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620**	ca	**2,900**	ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000**	nc	**54,000,000**	nc	---	---	---	---
PESTICIDES/PCBs											
SW8081	ALPHA BHC	µg/kg	N/A	**90**	ca	**590**	ca	<2.2	<2.3	<2.2	<1.7
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A	N/A	N/A	N/A	<2.2	2.9 P	2.3 P	<1.7
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000**	nc	**5,300,000**	nc	<2.2	5.9 PJ	<2.2 J	<1.7
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000**	nc	**5,300,000**	nc	<4.5	<4.6	<4.5	<3.5
SW8081	DELTA BHC	µg/kg	N/A	N/A	N/A	N/A	N/A	<2.2	3.8 P	4 P	3.2 P
SW8081	DIELDRIN	µg/kg	N/A	**30**	ca	**150**	ca	<4.5	<4.6	<4.5	<3.5
SW8081	ENDRIN	µg/kg	N/A	**18,000**	nc	**260,000**	nc	5.1	<4.6	<4.5	<3.5
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A	N/A	N/A	N/A	<4.5	<4.6	<4.5	<3.5
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440**	ca	**2,900**	ca	<2.2	3.9	4.1	<1.7
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A	N/A	N/A	N/A	<2.2	<2.3	<2.2	<1.7
SW8081	HEPTACHLOR	µg/kg	N/A	**110**	ca	**550**	ca	<2.2	<2.3	<2.2	<1.7
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53**	ca	**270**	ca	<2.2	<2.3	<2.2	<1.7
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000**	nc	**4,400,000**	nc	<22	<23	<23	<17
SW8081	4,4'-DDD	µg/kg	N/A	**2,400**	ca	**17,000**	ca	<4.5	<4.6	<4.5	<3.5
SW8081	4,4'-DDE	µg/kg	N/A	**1,700**	ca	**12,000**	ca	<4.5	<4.6	<4.5	<3.5
SW8081	4,4'-DDT	µg/kg	N/A	**1,700**	ca	**12,000**	ca	<4.5	<4.6	<4.5	<3.5
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220**	ca	**1,000**	ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220**	ca	**1,000**	ca	---	---	---	---
INORGANICS											
SW6010	ALUMINUM	mg/kg	**173,500**	76,000	nc	100,000	max	106,000	30,600	43,300	85,500
SW6010	ANTIMONY	mg/kg	**63**	31	nc	**820**	nc	5.1 BN	2.3 BN	2.1 BN	3.3 BN
SW6010	ARSENIC	mg/kg	**62**	0.39	ca	2.7	ca	11.9	3.8	5.3	9.9
SW6010	BARIUM	mg/kg	335	**5,400**	nc	**100,000**	max	111	53.6	74.8	121
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**2,200**	ca	2.6	0.71	1	1.9
SW6010	CADMIUM	mg/kg	6.5	**37**	nc	**810**	nc	17.5	11.8	15.8	29.8
SW6010	CALCIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	73,000	298,000 J	175,000 J	161,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210	ca	450	ca	192	57.1	83.8	135
SW6010	COBALT	mg/kg	29	**4,700**	nc	**100,000**	max	27.2	10.1	14.3	24.1
SW6010	COPPER	mg/kg	72.2	**2,900**	nc	**76,000**	nc	24.8	15.2	20.1	26.4
SW6010	IRON	mg/kg	**116,495**	23,000	nc	100,000	max	82,100	23,500	33,900	63,800
SW6010	LEAD	mg/kg	166	**400**	nc	**750**	nc	52.7 E	16.5 E	23.5 E	36.9 E
SW6010	MAGNESIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	1,970	3,290 J	1,840 J	1,080
SW6010	MANGANESE **	mg/kg	**5,500**	1,800	nc	**32,000**	nc	**9,350**	**6,670**	**9,080**	**7,920**
SW7471	MERCURY	mg/kg	0.28	**23**	nc	**610**	nc	0.36 B	1	0.82	0.36 B
SW6010	NICKEL	mg/kg	242.4	**1,600**	nc	**41,000**	nc	90.7	37	52.6	78.2
SW6010	POTASSIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	336	239	377	256
SW7740	SELENIUM	mg/kg	N/A	**390**	nc	**10,000**	nc	2.8	2.5	3.3	1.8
SW6010	SILVER	mg/kg	14.9	**390**	nc	**10,000**	nc	<0.58	6.7 B	3.8 B	1.9 B
SW6010	SODIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	221	408	446	368
SW7841	THALLIUM	mg/kg	1.42	**5.2**	nc	**130**	nc	2.5 NS	2.6 NS	2.7 NS	2.4 NS
SW6010	VANADIUM	mg/kg	206	**550**	nc	**14,000**	nc	21	5.2 BJ	8.8 BJ	19.2
SW6010	ZINC	mg/kg	111	**23,000**	nc	**100,000**	max	175 E	357 E	452 E	402 E
SW9012	CYANIDE	mg/kg	N/A	**11**	nc	**35**	nc	<0.33	<0.33	<0.32	<0.25

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

						28 May 1997 Sample Identification			15 Sep 1998
			Screening Basis			06UBS006	06UBS007	06UBS008	06UBS041
						Sample Depth (feet)			
Analytical Method	Analyte	Units	BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	0.00-0.17	0.00-0.17	0.00-0.33	0.17-0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	1,600,000 nc	6,200,000 nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	7,300,000 nc	28,000,000 nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	8,900 ca	21,000 ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	620 ca	2900 ca	<410	130	<450	---
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	<410	<350	<450	---
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	35,000 ca	180,000 ca	<410	<350	<450	---
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	6,100,000 nc	88,000,000 nc	<410	<350	<450	---
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	300 ca	1,500 ca	<74	<65	<82	---
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	<410	<350	<450	---
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	22,000,000 nc	######### max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	62 ca	290 ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	6,200 ca	29,000 ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	62,000 ca	290,000 ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	62 ca	290 ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	2,300,000 nc	30,000,000 nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	620 ca	2,900 ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	2,300,000 nc	54,000,000 nc	---	---	---	---
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	90 ca	590 ca	<1.9	<1.6	<2.1	---
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	6.1 P	<1.6	<2.1	---
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	370,000 nc	5,300,000 nc	<1.9	<1.6	<2.1	---
SW8081	BETA ENDOSULFAN	µg/kg	N/A	370,000 nc	5,300,000 nc	5.7	70 DP	<4.1	---
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	<1.9	2.3 P	<2.1	---
SW8081	DIELDRIN	µg/kg	N/A	30 ca	150 ca	<3.7	**41** EP	<4.1	---
SW8081	ENDRIN	µg/kg	N/A	18,000 nc	260,000 nc	6 P	<3.2	6.1 P	---
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	<3.7	<3.2	<4.1	---
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	440 ca	2,900 ca	<1.9	<1.6	<2.1	---
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	<1.9	17 EP	<2.1	---
SW8081	HEPTACHLOR	µg/kg	N/A	110 ca	550 ca	<1.9	<1.6	<2.1	---
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	53 ca	270 ca	5.1	22 EP	<2.1	---
SW8081	METHOXYCHLOR	µg/kg	N/A	310,000 nc	4,400,000 nc	<19	<16	<21	---
SW8081	4,4'-DDD	µg/kg	N/A	2,400 ca	17,000 ca	<3.7	140 DP	<4.1	---
SW8081	4,4'-DDE	µg/kg	N/A	1,700 ca	12,000 ca	5.9 P	1,100 D	6.2 P	---
SW8081	4,4'-DDT	µg/kg	N/A	1,700 ca	12,000 ca	<3.7	800 DP	<4.1	---
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	220 ca	1,000 ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	220 ca	1,000 ca	---	---	---	---
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	---	73,200	129,000	---
SW6010	ANTIMONY	mg/kg	**63**	31 nc	820 nc	---	24.8 N	3 BN	---
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	---	17	6.8	---
SW6010	BARIUM	mg/kg	335	5,400 nc	100,000 max	---	90.9	44.9	---
SW6010	BERYLLIUM	mg/kg	3.34	150 nc	2,200 ca	---	1.6	0.69	---
SW6010	CADMIUM	mg/kg	6.5	37 nc	810 nc	---	5.6	5.5	---
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	151,000	326,000	---
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	---	472	86.2	---
SW6010	COBALT	mg/kg	29	4,700 nc	100,000 max	---	13.9	5.5 B	---
SW6010	COPPER	mg/kg	72.2	2,900 nc	76,000 nc	---	194	15.5	---
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	---	71,100	110,000	---
SW6010	LEAD	mg/kg	166	400 nc	750 nc	---	257 E	77.4 E	---
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	2,140	2,390	---
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	32,000 nc	---	1,950	**7,100**	1,990
SW7471	MERCURY	mg/kg	0.28	23 nc	610 nc	---	2.2	0.61 B	---
SW6010	NICKEL	mg/kg	242.4	1,600 nc	41,000 nc	---	93.8	24.6	---
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	180	784	---
SW7740	SELENIUM	mg/kg	N/A	390 nc	10,000 nc	---	<0.40	1.1	---
SW6010	SILVER	mg/kg	14.9	390 nc	10,000 nc	---	1.8 B	<0.54	---
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	171	341	---
SW7841	THALLIUM	mg/kg	1.42	5.2 nc	130 nc	---	0.16 NW	0.34 NW	---
SW6010	VANADIUM	mg/kg	206	550 nc	14,000 nc	---	61.7	8.6 B	---
SW6010	ZINC	mg/kg	111	23,000 nc	100,000 max	---	892 E	109 E	---
SW9012	CYANIDE	mg/kg	N/A	11 nc	35 nc	<0.27	<0.24	0.76	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG		Screening Basis: 2000 USEPA IX Industrial PRG		15 Sep 1998 Sample Identification: 06UBS042	06UBS043	06UBS044	06UBS045
								Sample Depth (feet): 0.17-0.33	0.17-0.33	0.17-0.33	0.17-0.33
VOLATILE ORGANIC COMPOUNDS											
SW8260	ACETONE	µg/kg	N/A	**1,600,000**	nc	**6,200,000**	nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000**	nc	**28,000,000**	nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900**	ca	**21,000**	ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS											
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620**	ca	**2900**	ca	---	---	---	---
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000**	ca	**180,000**	ca	---	---	---	---
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000**	nc	**88,000,000**	nc	---	---	---	---
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300**	ca	**1,500**	ca	---	---	---	---
SW8270	PHENANTHRENE	µg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
POLYCYCLIC AROMATIC HYDROCARBONS											
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000**	nc	**#########**	max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620**	ca	**2,900**	ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62**	ca	**290**	ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620**	ca	**2,900**	ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200**	ca	**29,000**	ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000**	ca	**290,000**	ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62**	ca	**290**	ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000**	nc	**30,000,000**	nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620**	ca	**2,900**	ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000**	nc	**54,000,000**	nc	---	---	---	---
PESTICIDES/PCBs											
SW8081	ALPHA BHC	µg/kg	N/A	**90**	ca	**590**	ca	---	---	---	---
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000**	nc	**5,300,000**	nc	---	---	---	---
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000**	nc	**5,300,000**	nc	---	---	---	---
SW8081	DELTA BHC	µg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW8081	DIELDRIN	µg/kg	N/A	**30**	ca	**150**	ca	---	---	---	---
SW8081	ENDRIN	µg/kg	N/A	**18,000**	nc	**260,000**	nc	---	---	---	---
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440**	ca	**2,900**	ca	---	---	---	---
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW8081	HEPTACHLOR	µg/kg	N/A	**110**	ca	**550**	ca	---	---	---	---
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53**	ca	**270**	ca	---	---	---	---
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000**	nc	**4,400,000**	nc	---	---	---	---
SW8081	4,4'-DDD	µg/kg	N/A	**2,400**	ca	**17,000**	ca	---	---	---	---
SW8081	4,4'-DDE	µg/kg	N/A	**1,700**	ca	**12,000**	ca	---	---	---	---
SW8081	4,4'-DDT	µg/kg	N/A	**1,700**	ca	**12,000**	ca	---	---	---	---
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220**	ca	**1,000**	ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220**	ca	**1,000**	ca	---	---	---	---
INORGANICS											
SW6010	ALUMINUM	mg/kg	**173,500**	76,000	nc	100,000	max	---	---	---	---
SW6010	ANTIMONY	mg/kg	**63**	31	nc	**820**	nc	---	---	---	---
SW6010	ARSENIC	mg/kg	**62**	0.39	ca	2.7	ca	---	---	---	---
SW6010	BARIUM	mg/kg	335	**5,400**	nc	**100,000**	max	---	---	---	---
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**2,200**	ca	---	---	---	---
SW6010	CADMIUM	mg/kg	6.5	**37**	nc	**810**	nc	---	---	---	---
SW6010	CALCIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210	ca	450	ca	---	---	---	---
SW6010	COBALT	mg/kg	29	**4,700**	nc	**100,000**	max	---	---	---	---
SW6010	COPPER	mg/kg	72.2	**2,900**	nc	**76,000**	nc	---	---	---	---
SW6010	IRON	mg/kg	**116,495**	23,000	nc	100,000	max	---	---	---	---
SW6010	LEAD	mg/kg	166	**400**	nc	**750**	nc	---	---	---	---
SW6010	MAGNESIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW6010	MANGANESE **	mg/kg	**5,500**	1,800	nc	**32,000**	nc	1,550	1,950	1,110	1,120
SW7471	MERCURY	mg/kg	0.28	**23**	nc	**610**	nc	---	---	---	---
SW6010	NICKEL	mg/kg	242.4	**1,600**	nc	**41,000**	nc	---	---	---	---
SW6010	POTASSIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW7740	SELENIUM	mg/kg	N/A	**390**	nc	**10,000**	nc	---	---	---	---
SW6010	SILVER	mg/kg	14.9	**390**	nc	**10,000**	nc	---	---	---	---
SW6010	SODIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	---	---	---	---
SW7841	THALLIUM	mg/kg	1.42	**5.2**	nc	**130**	nc	---	---	---	---
SW6010	VANADIUM	mg/kg	206	**550**	nc	**14,000**	nc	---	---	---	---
SW6010	ZINC	mg/kg	111	**23,000**	nc	**100,000**	max	---	---	---	---
SW9012	CYANIDE	mg/kg	N/A	**11**	nc	**35**	nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis			15 Sep 1998 Sample Identification			
						06UBS046	06UBS047	06UBS048	06UBS049
			BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	Sample Depth (feet)			
						0.17-0.33	0.17-0.33	0.17-0.33	0.17-0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2900** ca	---	---	---	---
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	---	---	---	---
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	---	---	---	---
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	---	---	---	---
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**#########** max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	---	---	---	---
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	---	---	---	---
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	---	---	---	---
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	---	---	---	---
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	---	---	---	---
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	---	---	---	---
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	---	---	---	---
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	---	---	---	---
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	---	---	---	---
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	---	---	---	---
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	---	---	---	---
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	---	---	---	---
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	---	---	---	---
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	---	---	---	---
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	---	---	---	---
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	---	---	---	---
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	---	---	---	---
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	---	---	---	---
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	---	---	---	---
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	---	---	---	---
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	---	---	---	---
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	---	---	---	---
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	---	---	---	---
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	---	---	---	---
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	4,480	5,470	4,260	**9,400**
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	---	---	---	---
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	---	---	---	---
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	---	---	---	---
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	---	---	---	---
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW7841	THALLIUM	mg/kg	1.42	**5.2** nc	**130** nc	---	---	---	---
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	---	---	---	---
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	---	---	---	---
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	15 Sep 1998 Sample Identification: 06UBS050	06UBS050DUP	06UBS052	06UBS052DUP
					Sample Depth (feet)	0.17-0.33	0.17-0.33	0.17-0.33	0.17-0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2900** ca	---	---	---	---
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	---	---	---	---
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	---	---	---	---
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	---	---	---	---
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**#########** max	---	---	---	---
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	---	---	---	---
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	---	---	---	---
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	---	---	---	---
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	---	---	---	---
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	---	---	---	---
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	---	---	---	---
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	---	---	---	---
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	---	---	---	---
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	---	---	---	---
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	---	---	---	---
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	---	---	---	---
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	---	---	---	---
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	---	---	---	---
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	---	---	---	---
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	---	---	---	---
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	---	---	---	---
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	---	---	---	---
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	---	---	---	---
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	---	---	---	---
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	---	---	---	---
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	---	---	---	---
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	---	---	---	---
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	---	---	---	---
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	---	---	---	---
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	---	---	---	---
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	---	---	---	---
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	---	---	---	---
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	---	---	---	---
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	---	---	---	---
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	---	---	---	---
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	3,760	3,800	**9,330**	**10,100**
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	---	---	---	---
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	---	---	---	---
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	---	---	---	---
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	---	---	---	---
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	---	---	---	---
SW7841	THALLIUM	mg/kg	1.42	**5.2** nc	**130** nc	---	---	---	---
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	---	---	---	---
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	---	---	---	---
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	22 Jan 2001 Sample Identification: 06UBS075	06UBS076	06UBS078	06UBS079
					Sample Depth (feet)	0.08 - 0.33	0.08 - 0.33	0.08 - 0.33	0.08 - 0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2900** ca	< 650	< 650	< 660	47 J
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	< 650	< 650	< 660	< 660
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 650	< 650	< 660	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	184 J	< 650	< 660	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 650	< 650	< 660	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**#########** max	< 10	< 5.0	< 5.0	1.72 J
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	2.93 J	0.73 J	1.89 J	6.38
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	1.14 J	1.41 J	0.64 J	15.32
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	6.56 P	1.93 J	< 2.0	30.45
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	2.35 J	0.95 J	0.52 J	9.42
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	7.2 J	1.75 J	1.77 J	17.31 P
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	< 4.0	1.58 J	< 2.0	5.63 P
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	4.2 J	1.33 J	1.03 J	14.51
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	< 4.0	< 2.0	< 2.0	64.76
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	2.8 J	0.76 J	0.45 J	12.19
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	3.47	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	29.62	< 3.0	< 3.0	25.36
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	3.07	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	2.84	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 15	< 15	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	3.11	66.03 D	< 3.0	501.7 D
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	< 3.0	30.67	< 3.0	136.2 D
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	**880.2** D	< 30	11.9 J	**704.5** D
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	**294.4** D	35.6	< 30	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	66,800	105,000	88,400	72,500
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	6.6 B	3.9 B	1.6 B	29.7 B
SW6010	ARSENIC	mg/kg	**62**	0.39 ca	2.7 ca	19.9	26.7	15.9	17.1
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	288	84.5 B	36.2 B	333
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	2.1	3.4	3	1.8
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	10.6	7.3	12.1	24.4
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	29,300	52,200	46,200	190,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	575	733	521	413
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	9.3 B	11.9 B	24.4 B	13
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	334	455	27.9 B	299
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	**157,000**	**118,000**	90,600	47,700
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	265	194	52.3	**1,410**
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	1,400	1,540	3,460	2,350
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	784	1,530	4,970	1,800
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.56	0.73	1.5	1.3
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	73.8 BN	74.9 BN	115 BN	92.8 N
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	838 BN	< 1000	1,270 N	139 N
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	< 2.5	0.6 BN	< 2.5	0.4 BN
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	< 50	< 50	< 50	2.6 BN
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1000	< 1000	< 1000	112
SW7841	THALLIUM	mg/kg	1.42	**5.2** nc	**130** nc	1.5	1.6	2	0.81
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	83.1 B	92.3 B	78.8 B	52.9
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	912	161	49.8	1,110
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis: BTV	Screening Basis: 2000 USEPA IX Residential PRG	Screening Basis: 2000 USEPA IX Industrial PRG	23 Jan 2001 Sample Identification: 06UBS081, Sample Depth (feet): 0.08 - 0.25	06UBS085, 0.08 - 0.25	06UBS087, 0.08 - 0.33	06UBS087DUP, 0.08 - 0.33
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	---
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	---
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	---
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2900** ca	560 J	< 660	< 660	< 660
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	258	< 660	< 660	55.2 J
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	2,450	< 660	< 660	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	387 J	< 660	< 660	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**#########** max	10.7 J	< 5.0	< 10	< 10
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	168.7	0.77 J	1.34 J	1.27 J
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	**253.5**	0.83 J	1.36 J	0.83 J
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	344.4	1.53 J	2.22 J	2.22 J
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	142.5	0.47 J	< 4.1	< 4.1
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	188.6	1.8 J	< 10	< 10
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	48 P	1.6 J	< 4.1	< 4.1
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	193.3	1.27 J	< 14	< 14
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	554.6 P	3.88 P	< 4.1	< 4.1
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	119.8 P	0.67 J	1 J	1 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	6.48	< 3.0	< 3.0	< 3.1
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 3.0	< 3.0	< 3.1
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 3.0	< 3.1
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 3.0	< 3.0	< 3.1
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	8 J	< 15	< 15	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	2.33 J	< 3.0	< 3.0	< 3.1
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	480.9 D	< 3.0	< 3.0	< 3.1
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	122.6 D	< 3.0	< 3.0	< 3.1
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	160.4	< 30	< 30	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	53	< 30	< 30	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	90,400	64,200	91,400	102,000
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	**85.3 B**	0.5 B	0.8 B	1.2 B
SW6010	ARSENIC	mg/kg	**62**	0..39 ca	2.7 ca	10.6	5.2	19.3	29.5
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	218	85.8	124	125
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	2.5	1.8	3	3.2
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	18.2	28	16.7	17.4
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	104,000	162,000	57,000	42,200
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	645	153	327	394
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	16.8 B	16.1	28.2 B	26.5 B
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	604	24.6	22.4 B	25.3 B
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	97,900	38,700	77,800	91,200
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	**813**	33.9	**525**	**509**
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	1,630	2,280	2,840	2,950
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	2,270	4,520	4,590	4,700
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.29	0.64	0.59	0.6
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	154 N	65.7 N	109 BN	119 BN
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	1,070 N	366 N	870 BN	945 BN
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	< 2.5	0.87 BN	0.36 BN	0.69 BN
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	< 50	< 5	< 50	< 50
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1,000	389	< 1,000	< 1,000
SW7841	THALLIUM	mg/kg	1.42	**5.2** nc	**130** nc	1.1	1.8	2.2	2.6
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	81.8 B	17.1	32.3 B	43.1 B
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	2,040	561	76.4	79
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis			31 Jan 2001 Sample Identification			
						06UBS089	06UBS091	06UBS091DUP	06UBS077
			BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	Sample Depth (feet)			
						0.08 - 0.33	0.08 - 0.25	0.08 - 0.25	2.0 - 2.2
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	---	---	---	< 16
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	---	---	---	< 9.7
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	---	---	---	< 4.9
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2900** ca	< 660	92.4 J	246 J	< 650
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	272	< 660	90.1 J	< 650
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 660	180 J	< 660	< 650
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	< 660	< 660	< 660	< 650
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	61.2 J	< 650
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**#########** max	< 25	1.7 J	3 J	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	11	50.66	30.22	< 2.0
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	28.5 P	59.51	45.6	< 2.0
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	29.1	68.7	48.91	< 2.0
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	9 J	30.28	21.63	< 2.0
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	26.6 P	60.9	38.2	< 5.0
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	48.2 P	16.12	17.62	< 2.0
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	11.7 J	75.4	42.9	1.01 J
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	275.5 P	151.71 P	139.58 P	1.2 J
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	17.5 J	68.3	40.8	0.44 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 7.5	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 7.5	< 1.5	< 1.5
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 1.5	< 7.6	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	4.88	32.5	18.81	< 3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 7.5	1.51	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 15	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 15	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	< 15	< 3.0	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 7.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 7.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 7.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 7.6	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 75	< 15	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	12.8 J	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	327 D	749.9 D	235.6 D	7.64
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	99.4 D	423.7 D	123.4 D	4.05
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	156	**709.2** D	**523.3** D	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	95.7	97	94	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	68,500	51,900	62,400	127,000
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	**186 B**	20.4 B	28.3 B	1.7 B
SW6010	ARSENIC	mg/kg	**62**	0..39 ca	2.7 ca	8.7	13.1	6.4	25.9
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	131	206	223	33 B
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	2.1	1.4	1.7	4.7
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	27.4	19	22.2	10.2
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	134,000	126,000	162,000	9,400
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	394	324	454	809
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	20.1 B	16.8 B	16.3 B	22 B
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	2460	296	319	34.2 B
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	106,000	96,900	113,000	116,000
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	**53,400**	**754**	**1,760**	86.2
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	2,540	1,490	2,020	1,050
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	2,510	1,530	1,790	3,520
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.22	1.1	1.2	1.8
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	89 B	111 B	130 B	144 BN
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1,000	< 1,000	< 1,000	< 1,000
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	0.72 B	0.47 B	< 2.5	< 2.5
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	6.6 B	4.6 B	9.6 B	< 50
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	< 1,000	< 1,000	< 1,000	< 1,000
SW7841	THALLIUM	mg/kg	1.42	**5.2** nc	**130** nc	0.51	0.5	0.43	1.6
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	50.3 B	42.8 B	60.6 B	90.5 B
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	1,140	805	1270	150
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analytical Method	Analyte	Units	Screening Basis			22 Jan 2001	23 Jan 2001 Sample Identification		
						06UBS080	06UBS082	06UBS083	06UBS084
			BTV	2000 USEPA IX Residential PRG	2000 USEPA IX Industrial PRG	Sample Depth (feet)			
						2.0 - 2.5	2.2 - 2.3	2.0 - 2.3	2.0 - 2.3
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000** nc	**6,200,000** nc	< 17	< 17	< 17	< 17
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000** nc	**28,000,000** nc	< 10	< 10	< 10	< 10
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900** ca	**21,000** ca	< 5.0	< 5.0	< 5.0	< 5.0
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2900** ca	< 660	< 660	< 660	< 650
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	65.6 J	< 660	< 650
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000** ca	**180,000** ca	< 660	61.7 J	< 660	< 650
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000** nc	**88,000,000** nc	< 660	< 660	< 660	< 650
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300** ca	**1,500** ca	< 120	< 120	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A N/A	N/A N/A	< 660	< 660	< 660	< 650
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000** nc	**#########** max	< 5.0	< 50	< 5.0	< 5.0
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620** ca	**2,900** ca	< 2.0	6.6 J	< 2.0	< 2.0
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62** ca	**290** ca	< 2.0	12 J	< 2.0	< 2.0
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620** ca	**2,900** ca	< 2.0	23.1 P	< 2.0	< 2.0
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200** ca	**29,000** ca	< 2.0	10.1 J	< 2.0	< 2.0
SW8310	CHRYSENE	µg/kg	N/A	**62,000** ca	**290,000** ca	1.02 J	46.7 J	0.91 J	0.82 J
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62** ca	**290** ca	< 2.0	< 20	< 2.0	< 2.0
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000** nc	**30,000,000** nc	< 7.0	14.7 J	< 7.0	< 7.0
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620** ca	**2,900** ca	1.94 J	< 20	< 2.0	< 2.0
SW8310	PYRENE	µg/kg	N/A	**2,300,000** nc	**54,000,000** nc	0.49 J	9.2 J	0.44 J	0.39 J
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90** ca	**590** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000** nc	**5,300,000** nc	3.29	6.85	< 3.0	< 3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30** ca	**150** ca	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000** nc	**260,000** nc	< 3.0	< 3.0	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A N/A	N/A N/A	< 3.0	8.1 DJ	< 3.0	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440** ca	**2,900** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A N/A	N/A N/A	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110** ca	**550** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53** ca	**270** ca	< 1.5	< 1.5	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000** nc	**4,400,000** nc	< 15	< 15	< 15	< 15
SW8081	4,4'-DDD	µg/kg	N/A	**2,400** ca	**17,000** ca	< 3.0	4.18	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700** ca	**12,000** ca	15.36	198.5 D	0.4 J	< 3.0
SW8081	4,4'-DDT	µg/kg	N/A	**1,700** ca	**12,000** ca	1.98 J	212.4 D	0.79 J	< 3.0
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220** ca	**1,000** ca	79	191.2	< 30	< 30
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220** ca	**1,000** ca	< 30	64.3	< 30	< 30
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000 nc	100,000 max	83,300	67,800	113,000	6,140
SW6010	ANTIMONY	mg/kg	**63**	31 nc	**820** nc	40.6 B	**257 B**	0.7 B	< 15
SW6010	ARSENIC	mg/kg	**62**	0..39 ca	2.7 ca	7.5	20.1	11.9	0.69 B
SW6010	BARIUM	mg/kg	335	**5,400** nc	**100,000** max	135	154	142	8 B
SW6010	BERYLLIUM	mg/kg	3.34	**150** nc	**2,200** ca	2.4	2	3.3	0.19
SW6010	CADMIUM	mg/kg	6.5	**37** nc	**810** nc	7.4	14.1	33.9	1.7
SW6010	CALCIUM	mg/kg	N/A	N/A N/A	N/A N/A	201,000	116,000	114,000	366,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210 ca	450 ca	497	445	184	12.5
SW6010	COBALT	mg/kg	29	**4,700** nc	**100,000** max	15.1	23.1 B	32.7 B	1.6 B
SW6010	COPPER	mg/kg	72.2	**2,900** nc	**76,000** nc	493	1260	42 B	2.8 B
SW6010	IRON	mg/kg	**116,495**	23,000 nc	100,000 max	69,200	**153,000**	75,400	3,690
SW6010	LEAD	mg/kg	166	**400** nc	**750** nc	**695**	**1,020**	53.3	2.9 B
SW6010	MAGNESIUM	mg/kg	N/A	N/A N/A	N/A N/A	2,850	2,060	1,210	3,700
SW6010	MANGANESE **	mg/kg	**5,500**	1,800 nc	**32,000** nc	2,240	1,990	**6,420**	296
SW7471	MERCURY	mg/kg	0.28	**23** nc	**610** nc	0.19	0.2	0.66	0.08
SW6010	NICKEL	mg/kg	242.4	**1,600** nc	**41,000** nc	116 N	152 N	124 BN	5.3 BN
SW6010	POTASSIUM	mg/kg	N/A	N/A N/A	N/A N/A	81.5 BN	< 1,000	889 BN	81.8 BN
SW7740	SELENIUM	mg/kg	N/A	**390** nc	**10,000** nc	< 2.5	< 2.5	0.37 BN	< 2.5
SW6010	SILVER	mg/kg	14.9	**390** nc	**10,000** nc	< 5	< 50	< 50	< 5
SW6010	SODIUM	mg/kg	N/A	N/A N/A	N/A N/A	116	< 1,000	< 1,000	80 B
SW7841	THALLIUM	mg/kg	1.42	**5.2** nc	**130** nc	0.84	0.84	1.9	0.17 B
SW6010	VANADIUM	mg/kg	206	**550** nc	**14,000** nc	89.3	58.2 B	29.8 B	2 B
SW6010	ZINC	mg/kg	111	**23,000** nc	**100,000** max	247	2,200	297	11.3
SW9012	CYANIDE	mg/kg	N/A	**11** nc	**35** nc	---	---	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.

** = Recalculated BTV (EA, 2002)

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

TABLE 2-4. SURFACE AND SUBSURFACE SOIL DETECTED ANALYTICAL RESULTS FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

								23 Jan 2001	31 Jan 2001
			Screening Basis					06UBS086	06UBS090
								Sample Depth (feet)	
Analytical Method	Analyte	Units	BTV	2000 USEPA IX Residential PRG		2000 USEPA IX Industrial PRG		2.0 - 2.3	2.7 - 2.9
VOLATILE ORGANIC COMPOUNDS									
SW8260	ACETONE	µg/kg	N/A	**1,600,000**	nc	**6,200,000**	nc	< 17	102
SW8260	METHYL ETHYL KETONE (2-BUTANONE)	µg/kg	N/A	**7,300,000**	nc	**28,000,000**	nc	< 10	57.5
SW8260	METHYLENE CHLORIDE	µg/kg	N/A	**8,900**	ca	**21,000**	ca	< 5.0	1.2 J
SEMIVOLATILE ORGANIC COMPOUNDS									
SW8270	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620**	ca	**2900**	ca	< 660	< 660
SW8270	BENZO(G,H,I)PERYLENE	µg/kg	N/A	N/A	N/A	N/A	N/A	< 660	< 660
SW8270	BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	N/A	**35,000**	ca	**180,000**	ca	< 660	< 660
SW8270	DI-N-BUTYL PHTHALATE	µg/kg	N/A	**6,100,000**	nc	**88,000,000**	nc	< 660	< 660
SW8270	HEXACHLOROBENZENE	µg/kg	N/A	**300**	ca	**1,500**	ca	< 120	< 120
SW8270	PHENANTHRENE	µg/kg	N/A	N/A	N/A	N/A	N/A	< 660	< 660
POLYCYCLIC AROMATIC HYDROCARBONS									
SW8310	ANTHRACENE	µg/kg	N/A	**22,000,000**	nc	**#########**	max	< 5.0	14.6 J
SW8310	BENZO(A)ANTHRACENE	µg/kg	N/A	**620**	ca	**2,900**	ca	0.5 J	234.82
SW8310	BENZO(A)PYRENE	µg/kg	N/A	**62**	ca	**290**	ca	0.34 J	**278.09**
SW8310	BENZO(B)FLUORANTHENE	µg/kg	N/A	**620**	ca	**2,900**	ca	< 2.0	261.84
SW8310	BENZO(K)FLUORANTHENE	µg/kg	N/A	**6,200**	ca	**29,000**	ca	0.45 J	141.57
SW8310	CHRYSENE	µg/kg	N/A	**62,000**	ca	**290,000**	ca	0.97 J	235.7
SW8310	DIBENZ(A,H)ANTHRACENE	µg/kg	N/A	**62**	ca	**290**	ca	< 2.0	**65.75**
SW8310	FLUORANTHENE	µg/kg	N/A	**2,300,000**	nc	**30,000,000**	nc	1.15 J	251.7
SW8310	INDENO(1,2,3-C,D)PYRENE	µg/kg	N/A	**620**	ca	**2,900**	ca	1.29 J	432.58
SW8310	PYRENE	µg/kg	N/A	**2,300,000**	nc	**54,000,000**	nc	0.56 J	219.5
PESTICIDES/PCBs									
SW8081	ALPHA BHC	µg/kg	N/A	**90**	ca	**590**	ca	< 1.5	< 1.5
SW8081	ALPHA-CHLORDANE	µg/kg	N/A	N/A	N/A	N/A	N/A	< 1.5	< 1.5
SW8081	ALPHA ENDOSULFAN	µg/kg	N/A	**370,000**	nc	**5,300,000**	nc	< 1.5	< 1.5
SW8081	BETA ENDOSULFAN	µg/kg	N/A	**370,000**	nc	**5,300,000**	nc	< 3.0	< 3.0
SW8081	DELTA BHC	µg/kg	N/A	N/A	N/A	N/A	N/A	< 1.5	< 1.5
SW8081	DIELDRIN	µg/kg	N/A	**30**	ca	**150**	ca	< 3.0	< 3.0
SW8081	ENDRIN	µg/kg	N/A	**18,000**	nc	**260,000**	nc	< 3.0	< 3.0
SW8081	ENDRIN ALDEHYDE	µg/kg	N/A	N/A	N/A	N/A	N/A	< 3.0	< 3.0
SW8081	GAMMA BHC (LINDANE)	µg/kg	N/A	**440**	ca	**2,900**	ca	< 1.5	< 1.5
SW8081	GAMMA-CHLORDANE	µg/kg	N/A	N/A	N/A	N/A	N/A	< 1.5	< 1.5
SW8081	HEPTACHLOR	µg/kg	N/A	**110**	ca	**550**	ca	< 1.5	< 1.5
SW8081	HEPTACHLOR EPOXIDE	µg/kg	N/A	**53**	ca	**270**	ca	< 1.5	< 1.5
SW8081	METHOXYCHLOR	µg/kg	N/A	**310,000**	nc	**4,400,000**	nc	< 15	1.3 J
SW8081	4,4'-DDD	µg/kg	N/A	**2,400**	ca	**17,000**	ca	< 3.0	< 3.0
SW8081	4,4'-DDE	µg/kg	N/A	**1,700**	ca	**12,000**	ca	< 3.0	4.33
SW8081	4,4'-DDT	µg/kg	N/A	**1,700**	ca	**12,000**	ca	< 3.0	2.34 J
SW8082	PCB-1254 (AROCHLOR 1254)	µg/kg	N/A	**220**	ca	**1,000**	ca	< 30	8.4 J
SW8082	PCB-1260 (AROCHLOR 1260)	µg/kg	N/A	**220**	ca	**1,000**	ca	< 30	7.4 J
INORGANICS									
SW6010	ALUMINUM	mg/kg	**173,500**	76,000	nc	100,000	max	71,700	32,500
SW6010	ANTIMONY	mg/kg	**63**	31	nc	**820**	nc	0.4 B	13.4 B
SW6010	ARSENIC	mg/kg	**62**	0..39	ca	2.7	ca	6.5	7.9
SW6010	BARIUM	mg/kg	335	**5,400**	nc	**100,000**	max	141	224
SW6010	BERYLLIUM	mg/kg	3.34	**150**	nc	**2,200**	ca	2	0.98
SW6010	CADMIUM	mg/kg	6.5	**37**	nc	**810**	nc	34.5	11.3
SW6010	CALCIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	177,000	201,000
SW6010	CHROMIUM, TOTAL	mg/kg	**1,080**	210	ca	450	ca	86.1	189
SW6010	COBALT	mg/kg	29	**4,700**	nc	**100,000**	max	24.5	11
SW6010	COPPER	mg/kg	72.2	**2,900**	nc	**76,000**	nc	37.3	109
SW6010	IRON	mg/kg	**116,495**	23,000	nc	100,000	max	42,700	45,100
SW6010	LEAD	mg/kg	166	**400**	nc	**750**	nc	38.9	345
SW6010	MAGNESIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	914	1,850
SW6010	MANGANESE **	mg/kg	**5,500**	1,800	nc	**32,000**	nc	**11,900**	3,670
SW7471	MERCURY	mg/kg	0.28	**23**	nc	**610**	nc	1.3	0.61
SW6010	NICKEL	mg/kg	242.4	**1,600**	nc	**41,000**	nc	86.1 N	78.7
SW6010	POTASSIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	351 N	193
SW7740	SELENIUM	mg/kg	N/A	**390**	nc	**10,000**	nc	0.42 BN	0.35 B
SW6010	SILVER	mg/kg	14.9	**390**	nc	**10,000**	nc	< 5	1.1 B
SW6010	SODIUM	mg/kg	N/A	N/A	N/A	N/A	N/A	347	354
SW7841	THALLIUM	mg/kg	1.42	**5.2**	nc	**130**	nc	2.1	1.1
SW6010	VANADIUM	mg/kg	206	**550**	nc	**14,000**	nc	18.3	21.9
SW6010	ZINC	mg/kg	111	**23,000**	nc	**100,000**	max	935	325
SW9012	CYANIDE	mg/kg	N/A	**11**	nc	**35**	nc	---	---

NOTES: USEPA IX = U.S. Environmental Protection Agency, Region IX; BTV = Background Threshold Value; PRG = Preliminary Remediation Goal; E = Reported value estimated due to interference (Inorganics), Result exceeds calibration range (Organics); P = >25% difference for both GC columns; N = Spiked sample recovery outside control limits; * = Duplicate analysis outside control limit; B = Value < Contract-Required Detection Limit, but > the Instrument Detection Limit; W = Post-digestion spiked sample recovery outside control limits; J = Reported value estimated due to concentration < sample quantitation limit; D = Reported value from analysis involving dilution; S = Reported value determined by Method of Standard Additions.ca = cancer PRG; nc = non-carcinogen; N/A = Not Applicable; 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.
** = Recalculated BTV (EA, 2002)

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

TABLE 2-5. GROUNDWATER SEEP SAMPLE RESULTS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

				Sample Identification	02GB1L49B	02GB2L50B	02GB3L51B
				Sample Date	5/9/2001	5/9/2001	5/9/2001
				Sample Location	Seep #1	Duplicate of L49B	Seep #2
			2000 Tapwater				
Method	Analyte	Units	PRGs	MCL			
VOLATILE ORGANIC COMPOUNDS							
SW8260	Bromomethane	µg/L	8.66 nc	N/A	0.6 R	0.7 R	0.9 R
SW8260	Chloromethane	µg/L	1.51 ca	N/A	4.2	5.1	6.6
SW8260	Acetone	µg/L	608 nc	N/A	1.2 F	1.4 F	1.2 F
SEMIVOLATILE ORGANIC COMPOUNDS							
SW8270	Bis(2-ethylhexyl)phthalate	µg/L	4.80 ca	N/A	2.6 F	16.8	<10
POLYCYCLIC AROMATIC HYDROCARBONS							
SW8310		µg/L		N/A	ND	ND	ND
PESTICIDES AND PCBs							
SW8081/8082		µg/L			ND	ND	ND
INORGANICS							
SW6010	Aluminum	µg/L	36,499 nc	50 sec	15.2 F	<500	<500
SW6010/7060	Arsenic	µg/L	0.045 ca	50	0.9 F	<5	<5
SW6010	Barium	µg/L	2,555 nc	2,000	2.0 F	2.0 F	2.6 F
SW6010	Calcium	µg/L	N/A	N/A	105,000	104,000	111,000
SW6010	Copper	µg/L	1,356 nc	1,300	<50	2.0 F	<50
SW6010	Iron	µg/L	10,950 nc	300 sec	8.6 F	8.6 F	7.0 F
SW6010/7421	Lead	µg/L	N/A	15	1.5 F	1.4 F	1.6 F
SW6010	Magnesium	µg/L	N/A	N/A	62,100	61,800	97,300
SW6010	Potassium	µg/L	N/A	N/A	19,500	19,400	30,800
SW6010	Sodium	µg/L	N/A	N/A	522,000	517,000	799,000
SW6010	Vanadium	µg/L	255 nc	N/A	1.9 F	4.1 F	3.2 F
SW6010	Zinc	µg/L	10,950 nc	5,000 sec	<20	<20	2.4 F

Notes:

MCL = USEPA SDWA Maximum Contaminant Level
PGR = USEPA Region IX, Preliminary Remediation Goal for Tapwater
F = Final
R = Result rejected
sec = secondary standard

ca = cancer PRG
nc = non-carcinogen
PCB = polychlorinated biphenyl
µg/L = micrograms per liter
N/A = Not Applicable

TABLE 2-6. COCs IN SURFACE SOIL AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsite 1

CAS Number	Constituent of Concern	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COC Flag	Rationale for Contaminant Deletion or Selection (5)
DIOXINS/FURANS																
	TCDD-TEQ	4.58E-07		5.13E-04		mg/kg	06UBS072	21/21		5.13E-04	N/A	3.9E-06 C	N/A	N/A	Yes	ASL
INORGANICS																
7440-36-0	ANTIMONY	0.9	B	8520	N	mg/kg	06UBS013	21/22	2 - 1500	8520	63	3.1E+00 N	N/A	N/A	Yes	ASL
7440-38-2	ARSENIC	2	B	173		mg/kg	06UBS013	22/22	0.24 - 3.8	173	62	3.9E-01 C	N/A	N/A	Yes	ASL
7439-92-1	LEAD	20.1	E	25200		mg/kg	06UBS072	22/22	3.1 - 2500	25200	166	4.0E+02	N/A	N/A	Yes	ASL
7439-96-5	MANGANESE	977		8010		mg/kg	06UBS059	26/26	0.24 - 20	8010	5500	1.8E+02 N	N/A	N/A	Yes	ASL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background Threshold Values (BTV)
(4) Screening Toxicity Value - Taken from USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, November 2000. For non-carcinogens, value shown is equal to 1/10 the Residential PRG. For carcinogens the value shown is equal to the Residential PRG.
(5) Rationale Codes

Selection Reason: Above Screening Toxicity and Background Levels (ASL)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Toxicity Level (BSL)
Below Background Level (BBL)

Definitions:
N/A = Not Applicable
ND = No Data
mg/kg = milligrams per kilogram
COC = Constituent of Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Non-Carcinogenic
U = Analyte was not detected at sample quantitation limit
D = Analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL
B = Value less than contract-required detection limit

This Table presents the list of contaminants in surface soil that pose risk to human health. The maximum and minimum detected concentrations are presented here along with frequency of detection. For instance ANTIMONY was detected 21 times out of 22 surface soil samples that were collected at Dumpsite 1. The Table also shows the regulatory limits (Screening Toxicity Value) of the contaminants and the background concentrations (Background Value) of the same contaminants in the nearby sites. Additionally, the Table presents the concentration of contaminants (Concentration Used for Screening) that was used to compare each contaminant against the regulatory limits and the background concentrations.

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TABLE 2-7. COCs IN SUBSURFACE SOIL AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao Dumpsite 1

CAS Number	Constituent of Concern	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COC Flag	Rationale for Contaminant Deletion or Selection (5)
DIOXINS/FURANS																
	TCDD-TEQ	1.24E-06		1.32E-04		mg/kg	06UBS069	2/2		1.32E-04	N/A	3.9E-06 C	N/A	N/A	Yes	ASL
INORGANICS																
7440-36-0	ANTIMONY	5.3	B	119	B	mg/kg	06UBS069	2/2	75 - 1500	119	63	3.1E+00 N	N/A	N/A	Yes	ASL
7440-39-3	BARIUM	1350		8090		mg/kg	06UBS069	2/2	10 - 100	8090	335	5.4E+02 N	N/A	N/A	Yes	ASL
7440-43-9	CADMIUM	7.7		118	N	mg/kg	06UBS069	2/2	0.5 - 5	118	6.5	3.7E+00 N	8.0E+00	SSL	Yes	ASL
7439-92-1	LEAD	20.8		2830		mg/kg	06UBS069	2/2	5 - 250	2830	166	4.0E+02	N/A	N/A	Yes	ASL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background Threshold Values (BTV)
(4) Screening Toxicity Value - Taken from USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, November 2000. For non-carcinogens, value shown is equal to 1/10 the Residential PRG. For carcinogens the value shown is equal to the Residential PRG.
(5) Rationale Codes

Selection Reason: Above Screening Toxicity and Background Levels (ASL)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Toxicity Level (BSL)
Below Background Level (BBL)

Definitions:
N/A = Not Applicable
ND = No Data
mg/kg = milligrams per kilogram
COC = Constituent of Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Non-Carcinogenic
U = Analyte was not detected at sample quantitation limit
D = Analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL
B = Value less than contract-required detection limit

This Table presents the list of contaminants in subsurface soil that pose risk to human health. The maximum and minimum detected concentrations are presented here along with frequency of detection. For instance ANTIMONY was detected 2 times out of 2 subsurface soil samples that were collected at Dumpsite 1. The Table also shows the regulatory limits (Screening Toxicity Value) of the contaminants and the background concentrations (Background Value) of the same contaminants in the nearby sites. Additionally, the Table presents the concentration of contaminants (Concentration Used for Screening) that was used to compare each contaminant against the regulatory limits and the background concentrations.

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TABLE 2-8. COCs IN SURFACE SOIL AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsite 2

CAS Number	Constituent of Concern	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COC Flag	Rationale for Contaminant Deletion or Selection (5)
INORGANICS																
7440-36-0	ANTIMONY	0.5	B	186	B	mg/kg	06UBS089	14/14	0.2 - 1500	186	63	3.1E+00 N	N/A	N/A	Yes	ASL
7439-92-1	LEAD	23.5	E	53400		mg/kg	06UBS089	14/14	0.2 - 500	53400	166	4.0E+02	N/A	N/A	Yes	ASL
7439-96-5	MANGANESE	784		10100		mg/kg	06UBS052	25/25	0.22 - 87.4	10100	5500	1.8E+02 N	N/A	N/A	Yes	ASL
PAHs																
50-32-8	BENZO[A] PYRENE	0.00064	J	0.2535		mg/kg	06UBS081	9/15	0.002 - 0.06	0.2535	N/A	6.2E-02 C	8.0E+00	SSL	Yes	ASL
PCBs																
11097-69-1	AROCLOR-1254	0.0119	J	0.8802	D	mg/kg	06UBS075	6/9	0.03 - 0.15	0.8802	N/A	2.2E-01 C	N/A	N/A	Yes	ASL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background Threshold Values (BTV)
(4) Screening Toxicity Value - Taken from USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, November 2000. For non-carcinogens, value shown is equal to 1/10 the Residential PRG. For carcinogens the value shown is equal to the Residential PRG.
(5) Rationale Codes

Selection Reason: Above Screening Toxicity and Background Levels (ASL)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Toxicity Level (BSL)
Below Background Level (BBL)

Definitions:
N/A = Not Applicable
ND = No Data
mg/kg = milligrams per kilogram
COC = Constituent of Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Non-Carcinogenic
U = Analyte was not detected at sample quantitation limit
D = Analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL
B = Value less than contract-required detection limit

This Table presents the list of contaminants in surface soil that pose risk to human health. The maximum and minimum detected concentrations are presented here along with frequency of detection. For instance ANTIMONY was detected 14 times out of 14 surface soil samples that were collected at Dumpsite 2. The Table also shows the regulatory limits (Screening Toxicity Value) of the contaminants and the background concentrations (Background Value) of the same contaminants in the nearby sites. Additionally, the Table presents the concentration of contaminants (Concentration Used for Screening) that was used to compare each contaminant against the regulatory limits and the background concentrations.

TABLE 2-9. COCs IN SUBSURFACE SOIL AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao Dumpsite 2

CAS Number	Constituent of Concern	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (2)	Background Value (3)	Screening Toxicity Value (4)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COC Flag	Rationale for Contaminant Deletion or Selection (5)
INORGANICS																
7440-36-0	ANTIMONY	0.4	B	257	B	mg/kg	06UBS082	6/7	15 - 3000	257	63	3.1E+00 N	N/A	N/A	Yes	ASL
7439-96-5	MANGANESE	296		11900		mg/kg	06UBS086	7/7	2 - 20	11900	5500	1.8E+02 N	N/A	N/A	Yes	ASL
PAHs																
50-32-8	BENZO[A]PYRENE	0.00034	J	0.27809		mg/kg	06UBS090	3/7	0.002 - 0.02	0.27809	N/A	6.2E-02 C	8.0E+00	SSL	Yes	ASL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background Threshold Values (BTV)
(4) Screening Toxicity Value - Taken from USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, November 2000. For non-carcinogens, value shown is equal to 1/10 the Residential PRG. For carcinogens the value shown is equal to the Residential PRG.
(5) Rationale Codes
Selection Reason: Above Screening Toxicity and Background Levels (ASL)
Deletion Reason: Essential Nutrient (NUT)
Below Screening Toxicity Level (BSL)
Below Background Level (BBL)

Definitions:
N/A = Not Applicable
ND = No Data
mg/kg = milligrams per kilogram
COC = Constituent of Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Non-Carcinogenic
U = Analyte was not detected at sample quantitation limit
D = Analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL
B = Value less than contract-required detection limit

This Table presents the list of contaminants in surface soil that pose risk to human health. The maximum and minimum detected concentrations are presented here along with frequency of detection. For instance ANTIMONY was detected 6 times out of 7subsurface soil samples that were collected at Dumpsite 2. The Table also shows the regulatory limits (Screening Toxicity Value) of the contaminants and the background concentrations (Background Value) of the same contaminants in the nearby sites. Additionally, the Table presents the concentration of contaminants (Concentration Used for Screening) that was used to compare each contaminant against the regulatory limits and the background concentrations.

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TABLE 2-10. SURFACE SOIL EXPOSURE POINT CONCENTRATION SUMMARY FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsite 1

Constituent of Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
DIOXINS/FURANS												
TCDD-TEQ	mg/kg	5.03E-05	N/A	5.13E-04		mg/kg	4.20E-04	95% UCL-T	W - Test (1)	5.03E-05	Mean	Regional Guidance
INORGANICS												
ANTIMONY	mg/kg	4.03E+02	N/A	8.52E+03	N	mg/kg	6.45E+02	95% UCL-T	W - Test (1)	4.03E+02	Mean	Regional Guidance
ARSENIC	mg/kg	2.36E+01	N/A	1.73E+02		mg/kg	4.19E+01	95% UCL-T	W - Test (1)	2.36E+01	Mean	Regional Guidance
LEAD	mg/kg	1.41E+03	N/A	2.52E+04		mg/kg	1.91E+03	95% UCL-T	W - Test (1)	1.41E+03	Mean	Regional Guidance
MANGANESE	mg/kg	3.43E+03	N/A	8.01E+03		mg/kg	4.71E+03	95% UCL-T	W - Test (1)	3.43E+03	Mean	Regional Guidance

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Normal Data (Mean).

(1) Shapiro-Wilks W-Test indicates data are log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(3) Shapiro-Wilks W-Test indicates data are normally distributed.

Definitions:

N/A = Not Applicable
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
mg/kg = milligrams per kilogram
COC = Constituent of Concern

U = Analyte was not detected at sample quantitation limit
D = analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) analysis is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL

This Table presents the list of contaminants and the concentrations that were used to estimate the exposure and risk from each contaminant in the surface soil at Dumpsite 1. The Reasonable Maximum Exposure scenario estimates the health risk posed by each contaminant at maximum concentration. The Central Tendency scenario estimates the health risk of each contaminant at average concentration. The 95UCLM represent a high value for EPC so that with 95 percent confidence one can be sure that all other values are below that 95UCLM value.

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TABLE 2-11. SUBSURFACE SOIL EXPOSURE POINT CONCENTRATION SUMMARY FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao Dumpsite 1

Constituent of Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
DIOXINS/FURANS												
TCDD-TEQ	mg/kg	6.68E-05	N/A	1.32E-04		mg/kg	1.32E-04	Max	Insignificant Population	6.68E-05	Mean	Regional Guidance
INORGANICS												
ANTIMONY	mg/kg	6.22E+01	N/A	1.19E+02	B	mg/kg	1.19E+02	Max	Insignificant Population	6.22E+01	Mean	Regional Guidance
BARIUM	mg/kg	4.72E+03	N/A	8.09E+03		mg/kg	8.09E+03	Max	Insignificant Population	4.72E+03	Mean	Regional Guidance
CADMIUM	mg/kg	6.29E+01	N/A	1.18E+02	N	mg/kg	1.18E+02	Max	Insignificant Population	6.29E+01	Mean	Regional Guidance
LEAD	mg/kg	1.43E+03	N/A	2.83E+03		mg/kg	2.83E+03	Max	Insignificant Population	1.43E+03	Mean	Regional Guidance

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Normal Data (Mean).

(1) Shapiro-Wilks W-Test indicates data are log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(3) Shapiro-Wilks W-Test indicates data are normally distributed.

Definitions:
N/A = Not Applicable
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
mg/kg = milligrams per kilogram
COC = Constituent of Concern

U = Analyte was not detected at sample quantitation limit
D = analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) analysis is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL

This Table presents the list of contaminants and the concentrations that were used to estimate the exposure and risk from each contaminant in the subsurface soil at Dumpsite 1. The Reasonable Maximum Exposure scenario estimates the health risk posed by each contaminant at maximum concentration. The Central Tendency scenario estimates the health risk of each contaminant at average concentration. The 95UCLM represent a high value for EPC so that with 95 percent confidence one can be sure that all other values are below that 95UCLM value.

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TABLE 2-12. SURFACE SOIL EXPOSURE POINT CONCENTRATION SUMMARY FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsite 2

Constituent of Concern	Units	Arithmetic Mean	95% UCL of Normal data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS												
ANTIMONY	mg/kg	2.73E+01	N/A	1.86E+02	B	mg/kg	1.86E+02	Max	W - Test (2)	2.73E+01	Mean	Regional Guidance
LEAD	mg/kg	4.21E+03	N/A	5.34E+04		mg/kg	3.86E+04	95% UCL-T	W - Test (1)	4.21E+03	Mean	Regional Guidance
MANGANESE	mg/kg	4.22E+03	N/A	1.01E+04		mg/kg	6.13E+03	95% UCL-T	W - Test (1)	4.22E+03	Mean	Regional Guidance
PAHs												
BENZO[A]PYRENE	mg/kg	3.46E-02	N/A	2.54E-01		mg/kg	2.54E-01	Max	W - Test (2)	3.46E-02	Mean	Regional Guidance
PCBs												
AROCLOR-1254	mg/kg	2.96E-01	N/A	8.80E-01	D	mg/kg	8.80E-01	Max	W - Test (2)	2.96E-01	Mean	Regional Guidance

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Normal Data (Mean).

(1) Shapiro-Wilks W-Test indicates data are log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(3) Shapiro-Wilks W-Test indicates data are normally distributed.

Definitions:

N/A = Not Applicable
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
mg/kg = milligrams per kilogram
COC = Constituent of Concern

U = Analyte was not detected at sample quantitation limit
D = analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) analysis is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL

This Table presents the list of contaminants and the concentrations that were used to estimate the exposure and risk from each contaminante in the surface soil at Dumpsite 2. The Reasonable Maximum Exposure scenario estimates the health risk posed by each contaminant at maximum concentration. The Central Tendency scenario estimates the health risk of each contaminant at average concentration. The 95UCLM represent a high value for EPC so that with 95 percent confidence one can be sure that all other values are below that 95UCLM value.

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TABLE 2-13. SUBSURFACE SOIL EXPOSURE POINT CONCENTRATION SUMMARY FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao Dumpsite 2

Constituent of Concern	Units	Arithmetic Mean	95% UCL of Normal data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
INORGANICS												
ANTIMONY	mg/kg	4.59E+01	N/A	2.57E+02	B	mg/kg	2.57E+02	Max	W - Test (2)	4.59E+01	Mean	Regional Guidance
MANGANESE	mg/kg	4.29E+03	N/A	1.19E+04		mg/kg	1.19E+04	Max	W - Test (2)	4.29E+03	Mean	Regional Guidance
PAHs												
BENZO[A]PYRENE	mg/kg	4.21E-02	N/A	2.78E-01		mg/kg	2.78E-01	Max	W - Test (2)	4.21E-02	Mean	Regional Guidance

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Normal Data (Mean).

(1) Shapiro-Wilks W-Test indicates data are log-normally distributed.
(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(3) Shapiro-Wilks W-Test indicates data are normally distributed.

Definitions:
N/A = Not Applicable
EPC = Exposure Point Concentration
UCL = Upper Confidence Limit
mg/kg = milligrams per kilogram
COC = Constituent of Concern

U = Analyte was not detected at sample quantitation limit
D = analyte was identified in an analysis involving dilution
N = Presumptive evidence of compound
E = Reported value was estimated due to matrix interferences)
S = Reported concentration was determined by the Method of Standard Additions
W = Post-digestion spike for furnace atomic absorption (AA) analysis is out of control limits
J = Reported value estimated because analyte was detected at a concentration below the SQL

This Table presents the list of contaminants and the concentrations that were used to estimate the exposure and risk from each contaminant in the subsurface soil at Dumpsite 2. The Reasonable Maximum Exposure scenario estimates the health risk posed by each contaminant at maximum concentration. The Central Tendency scenario estimates the health risk of each contaminant at average concentration. The 95UCLM represent a high value for EPC so that with 95 percent confidence one can be sure that all other values are below that 95UCLM value.

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TABLE 2-14. NON-CANCER TOXICITY DATA -- ORAL/DERMAL, URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Constituent of Concern	Chronic/ Subchronic	Oral Rfd Value	Oral RfD Units	Oral to Dermal Adjustment Factor	Adjusted Dermal RfD	Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
DIOXINS/FURANS										
TCDD-TEQ	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INORGANICS										
ANTIMONY	chronic	0.0004	mg/kg/day	1	0.0004	mg/kg/day	blood	1000/1	IRIS	1/01
ARSENIC	chronic	0.0003	mg/kg/day	1	0.0003	mg/kg/day	N/A	N/A	IRIS	1/01
BARIUM	chronic	0.07	mg/kg/day	1	0.07	mg/kg/day	N/A	3/1	IRIS	1/01
CADMIUM	chronic	0.001	mg/kg/day	0.05	0.00005	mg/kg/day	kidney	10/1	IRIS	1/01
LEAD	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	chronic	0.024	mg/kg/day	1	0.024	mg/kg/day	Nervous System	1/1	Region IX	10/01/00
PAHs										
BENZO[A]PYRENE	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCBs										
AROCLOR-1254	chronic	0.00002	mg/kg/day	1	0.00002	mg/kg/day	N/A	N/A	IRIS	1/01

Definitions:
N/A = Not Applicable
RfD = Reference Dose
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables

mg/kg = milligrams per kilogram

This Table provides non-carcinogenic risk information which is relevant to COCs in soil. There are no lead RfDs for oral or dermal route of exposure. In the absence of any USEPA-published toxicity values for lead, it is currently not possible to perform a quantitative risk estimate for lead exposures using standard USEPA methodology. The current USEPA guidance sets forth an interim soil cleanup level for total lead at 400 parts per million (ppm) (USEPA, 1989b), which is considered "protective for direct contact at residential settings." Also at this time, RfDs are not available for the dermal route of exposure. Thus, the chronic dermal RfDs used in this HHRA have been extrapolated from the oral RfDs. In some cases, an adjustment factor is applied dependent on how well the COC is absorbed via the oral route. Adjustments are particularly important for COCs with less than 50% absorption via the ingestion route. However, in most cases, adjustment was not necessary for COCs evaluated in this HHRA. Therefore, the same oral RfDs were used for dermal RfDs.

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TABLE 2-15. NON-CANCER TOXICITY DATA -- INHALATION, URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Constituent of Concern	Chronic/ Subchronic	Value Inhalation RfD	Units	Adjusted Inhalation RfD	Units	Primary Target Organ	Combined Uncertainty/ Modifying factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
DIOXINS/FURANS									
TCDD-TEQ	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
INORGANICS									
ANTIMONY	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BARIUM	chronic	N/A	mg/kg/day	0.00014	mg/kg/day	N/A	N/A	HEAST Alternative	5/01/95
CADMIUM	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LEAD	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	chronic	N/A	mg/kg/day	0.000014	mg/kg/day	Nervous System	1000/1	Region IX	10/01/00
PAHs									
BENZO[A]PYRENE	chronic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCBs									
AROCLOR-1254	chronic	N/A	mg/kg/day	0.00002	mg/kg/day	N/A	N/A	Region IX	10/1/2000

Definitions:
N/A = Not Applicable
RfD = Reference Dose
RfD = Reference Concentration
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
mg/kg = milligrams per kilogram

This Table provides non-carcinogenic risk information which is relevant to COCs in soil. There are no lead RfDs for inhalation route of exposure. In the absence of any USEPA-published toxicity values for lead, it is currently not possible to perform a quantitative risk estimate for lead exposures using standard USEPA methodology. The current USEPA guidance sets forth an interim soil cleanup level for total lead at 400 parts per million (ppm) (USEPA, 1989b), which is considered "protective for direct contact at residential settings." Also at this time there are no inhalation RfDs available for antimony, arsenic, cadmium, and benzo(a)pyrene.

TABLE 2-16. CANCER TOXICITY DATA -- ORAL/DERMAL, URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Constituent Of Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
DIOXINS/FURANS							
TCDD-TEQ	150,000	1	150,000	1/mg/kg/day	B2/Respiratory and liver	HEAST	5/01/95
INORGANICS							
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	1.5	1	1.5	1/mg/kg/day	A/skin	IRIS	1/01
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LEAD	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAHs							
BENZO[A]PYRENE	7.3	1	7.3	1/mg/kg/day	B2/forestomach	IRIS	1/01
PCBs							
AROCLOR-1254	2	1	2	1/mg/kg/day	N/A	IRIS	1/01

Definitions: N/A = Not Applicable
IRIS = Integrated Risk Information System
mg/kg = milligrams per kilogram
NCEA = National Center for Environment Assessment

This Table provides carcinogenic risk information which is relevant to COCs in soil. There are no lead RfDs for oral or dermal route of exposure. In the absence of any USEPA-published toxicity values for lead, it is currently not possible to perform a quantitative risk estimate for lead exposures using standard USEPA methodology. The current USEPA guidance sets forth an interim soil cleanup level for total lead at 400 parts per million (ppm) (USEPA, 1989b), which is considered "protective for direct contact at residential settings." Also at this time, RfDs are no available for the dermal route of exposure. Thus, the chronic dermal RfDs used in this HHRA have been extrapolated from the oral values. However, no adjustment was not necessary for COCs evaluated in this HHRA. Therefore, the same oral RfDs were used for dermal RfDs.

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TABLE 2-17. CANCER TOXICITY DATA -- INHALATION, URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Constituent of Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
DIOXINS/FURANS								
TCDD-TEQ	N/A	1/mg/kg/day	N/A	150,000	1/mg/kg/day	B2/Respiratory and liver	HEAST	5/01/95
INORGANICS								
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	N/A	1/mg/kg/day	N/A	15.1	1/mg/kg/day	A/lung	IRIS	1/01
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	N/A	1/mg/kg/day	N/A	6.3	1/mg/kg/day	B1/lung	IRIS	1/01
LEAD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAHs								
BENZO[A]PYRENE	N/A	1/mg/kg/day	N/A	3.1	1/mg/kg/day	B2/lung	NCEA	7/01/93
PCBs								
AROCLOR-1254	N/A	1/mg/kg/day	N/A	2	1/mg/kg/day	N/A	IRIS	1/01

Definitions N/A = Not Applicable
IRIS = Integrated Risk Information System
mg/kg = milligrams per kilogram
NCEA = National Center for Environment Assessment

This Table provides carcinogenic risk information which is relevant to COCs in soil. There are no lead RfDs for inhalation route of exposure. In the absence of any USEPA-published toxicity values for lead, it is currently not possible to perform a quantitative risk estimate for lead exposures using standard USEPA methodology. The current USEPA guidance sets forth an interim soil cleanup level for total lead at 400 parts per million (ppm) (USEPA, 1989b), which is considered "protective for direct contact at residential settings." Also at this time there are no inhalation RfDs available for antimony, barium, and manganese.

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TABLE 2-18. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 1	**TCDD-TEQ**	**4.2E-05**	**--**	**4.0E-06**	**4.6E-05**	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	**ANTIMONY**	**blood**	**2.2E+00**	**--**	**--**	**2.2E+00**
			ARSENIC	**4.2E-05**	**–**	**4.0E-06**	**4.6E-05**	ARSENIC		1.9E-01	--	2.3E-02	2.13E-01
			BARIUM	--	--	--	--	BARIUM		6.7E-02	--	--	6.7E-02
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.2E-02	–	1.7E-03	2.37E-02
			COPPER	--	--	--	--	COPPER	GI System	8.6E-02	--	--	8.6E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	2.7E-01	--	--	2.7E-01
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		3.5E-03	--	--	3.5E-03
			NICKEL	--	--	--	--	NICKEL		1.1E-02	--	--	1.1E-02
			SILVER	--	--	--	--	SILVER		2.0E-02	--	--	2.0E-02
			THALLIUM	--	--	--	--	THALLIUM		1.8E-02	--	--	1.8E-02
			ZINC	--	--	--	--	ZINC		2.0E-02	--	--	2.0E-02
			DIBENZ[A,H]ANTHRACENE	3.9E-07	--	1.6E-07	5.5E-07	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	1.2E-07	--	5.1E-08	1.71E-07	AROCLOR-1254		5.9E-03	--	3.3E-03	9.2E-03
			AROCLOR-1260	1.9E-07	--	8.5E-08	2.75E-07	AROCLOR-1260		--	--	--	--
			DDT	8.0E-08	--	7.6E-09	8.76E-08	DDT	liver	9.6E-04	--	1.2E-04	1.08E-03
			HEXACHLOROBENZENE	1.0E-07	--	3.2E-08	1.32E-07	HEXACHLOROBENZENE		1.6E-04	--	6.4E-05	2.24E-04
			(Total)	8.49E-05	--	8.34E-06	9.32E-05	(Total)		2.91E+00	--	2.82E-02	2.94E+00
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	3.8E-08	--	3.8E-08	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			ARSENIC	--	3.8E-07	--	3.8E-07	ARSENIC		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	6.2E-02	--	6.2E-02
			CADMIUM	--	6.0E-08	--	6.0E-08	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	8.5E-01	--	8.5E-01
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		--	2.2E-05	--	2.2E-05
			NICKEL	--	--	--	--	NICKEL		--	--	--	--
			SILVER	--	--	--	--	SILVER		--	--	--	--
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	1.5E-10	--	1.5E-10	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	1.0E-10	--	1.0E-10	AROCLOR-1254		--	1.1E-05	--	1.1E-05
			AROCLOR-1260	--	1.7E-10	--	1.7E-10	AROCLOR-1260		--	--	--	--
			DDT	--	7.2E-11	--	7.2E-11	DDT		--	--	--	--
			HEXACHLOROBENZENE	--	9.1E-11	--	9.1E-11	HEXACHLOROBENZENE		--	3.0E-07	--	3.0E-07
			(Total)	--	4.79E-07	--	4.79E-07	(Total)		--	9.12E-01	--	9.12E-01

(1) Carcinogenic Risks are combined for both Resident Adult and Child

Total Risk Across Medium **9.4E-05**

Total Hazard Index Across All Media and All Exposure Routes **3.9**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	2.2E+00
Total kidney HI =	2.37E-02
Total GI System HI =	8.6E-02
Total nervous system HI =	1.12E+00
Total liver HI =	1.08E-03

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TABLE 2-19. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 1	TCDD-TEQ	7.6E-07	--	7.2E-08	8.32E-07	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY	blood	3.4E-01	--	--	3.4E-01
			ARSENIC	**3.5E-06**	--	**3.4E-07**	**3.84E-06**	ARSENIC		2.7E-02	--	5.7E-03	3.27E-02
			BARIUM	--	--	--	--	BARIUM		6.5E-03	--	--	6.5E-03
			CADMIUM	--	--	--	--	CADMIUM	kidney	4.6E-03	--	6.5E-04	5.25E-03
			COPPER	--	--	--	--	COPPER	GI System	5.7E-03	--	--	5.7E-03
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	4.9E-02	--	--	4.9E-02
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		6.8E-04	--	--	6.8E-04
			NICKEL	--	--	--	--	NICKEL		1.8E-03	--	--	1.8E-03
			SILVER	--	--	--	--	SILVER		1.3E-03	--	--	1.3E-03
			THALLIUM	--	--	--	--	THALLIUM		3.5E-03	--	--	3.5E-03
			ZINC	--	--	--	--	ZINC		1.5E-03	--	--	1.5E-03
			DIBENZ[A,H]ANTHRACENE	1.4E-08	--	5.7E-09	1.97E-08	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	1.5E-08	--	6.7E-09	2.17E-08	AROCLOR-1254		1.3E-03	--	1.3E-03	2.6E-03
			AROCLOR-1260	1.3E-08	--	5.9E-09	1.89E-08	AROCLOR-1260		--	--	--	--
			DDT	7.7E-09	--	7.3E-10	8.43E-09	DDT	liver	1.6E-04	--	3.3E-05	1.93E-04
			HEXACHLOROBENZENE	1.4E-08	--	4.4E-09	1.84E-08	HEXACHLOROBENZENE		3.7E-05	--	2.6E-05	6.3E-05
			(Total)	4.3237E-06	--	4.35E-07	4.76E-06	(Total)		4.43E-01	--	7.71E-03	4.51E-01
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	3.4E-10	--	3.4E-10	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			ARSENIC	--	1.6E-08	--	1.6E-08	ARSENIC		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	4.3E-03	--	4.3E-03
			CADMIUM	--	3.9E-09	--	3.9E-09	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.1E-01	--	1.1E-01
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		--	3.2E-06	--	3.2E-06
			NICKEL	--	--	--	--	NICKEL		--	--	--	--
			SILVER	--	--	--	--	SILVER		--	--	--	--
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	2.7E-12	--	2.7E-12	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	6.8E-12	--	6.8E-12	AROCLOR-1254		--	1.7E-06	--	1.7E-06
			AROCLOR-1260	--	6.0E-12	--	6.0E-12	AROCLOR-1260		--	--	--	--
			DDT	--	3.5E-12	--	3.5E-12	DDT		--	--	--	--
			HEXACHLOROBENZENE	--	6.2E-12	--	6.2E-12	HEXACHLOROBENZENE		--	4.9E-08	--	4.9E-08
			(Total)	--	2.0265E-08	--	2.03E-08	(Total)		--	1.14E-01	--	1.14E-01

(1) Carcinogenic Risks are combined for both Resident Adult and Child

Total Risk Across Medium: **4.8E-06**

Total Hazard Index Across All Media and All Exposure Routes: **0.6**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	3.4E-01
Total kidney HI =	5.25E-03
Total GI System HI =	5.7E-03
Total nervous system HI =	1.59E-01
Total liver HI =	1.93E-04

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TABLE 2-20. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	**ANTIMONY**	**blood**	**2.1E+01**	--	--	**2.1E+01**
			ARSENIC	--	--	--	--	**ARSENIC**		**1.8E+00**	--	**2.3E-01**	**2.03E+00**
			BARIUM	--	--	--	--	BARIUM		6.3E-01	--	--	6.3E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.0E-01	--	1.8E-02	2.18E-01
			COPPER	--	--	--	--	COPPER	GI System	8.1E-01	--	--	8.1E-01
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	**2.5E+00**	--	--	**2.5E+00**
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		3.2E-02	--	--	3.2E-02
			NICKEL	--	--	--	--	NICKEL		1.1E-01	--	--	1.1E-01
			SILVER	--	--	--	--	SILVER		1.9E-01	--	--	1.9E-01
			THALLIUM	--	--	--	--	THALLIUM		1.7E-01	--	--	1.7E-01
			ZINC	--	--	--	--	ZINC		1.9E-01	--	--	1.9E-01
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		5.5E-02	--	3.4E-02	8.9E-02
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DDT	--	--	--	--	DDT	liver	9.0E-03	--	1.2E-03	1.02E-02
			HEXACHLOROBENZENE	--	--	--	--	HEXACHLOROBENZENE		1.5E-03	--	6.5E-04	2.15E-03
			(Total)	--	--	--	--	(Total)		2.77E+01	--	2.84E-01	2.80E+01
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			ARSENIC	--	--	--	--	ARSENIC		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	2.2E-01	--	2.2E-01
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	--	**3.0E+00**	--	**3.0E+00**
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		--	7.9E-05	--	7.9E-05
			NICKEL	--	--	--	--	NICKEL		--	--	--	--
			SILVER	--	--	--	--	SILVER		--	--	--	--
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		--	3.8E-05	--	3.8E-05
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DDT	--	--	--	--	DDT		--	--	--	--
			HEXACHLOROBENZENE	--	--	--	--	HEXACHLOROBENZENE		--	1.0E-06	--	1.0E-06
			(Total)	--	--	--	--	(Total)		--	3.22E+00	--	3.22E+00

(1) Carcinogenic Risks are combined for both Resident Adult and Child

Total Risk Across Medium: --

Total Hazard Index Across All Media and All Exposure Routes: **31**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	2.1E+01
Total kidney HI =	2.18E-01
Total GI System HI =	8.1E-01
Total nervous system HI =	5.50E+00

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TABLE 2-21. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD- TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	**ANTIMONY**	**blood**	**3.2E+00**	--	--	**3.2E+00**
			ARSENIC	--	--	--	--	ARSENIC		2.5E-01	--	2.9E-02	2.79E-01
			BARIUM	--	--	--	--	BARIUM		6.0E-02	--	--	6.0E-02
			CADMIUM	--	--	--	--	CADMIUM	kidney	4.3E-02	--	3.3E-03	4.63E-02
			COPPER	--	--	--	--	COPPER	GI System	5.4E-02	--	--	5.4E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	4.6E-01	--	--	4.6E-01
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		6.4E-03	--	--	6.4E-03
			NICKEL	--	--	--	--	NICKEL		1.7E-02	--	--	1.7E-02
			SILVER	--	--	--	--	SILVER		1.3E-02	--	--	1.3E-02
			THALLIUM	--	--	--	--	THALLIUM		3.2E-02	--	--	3.2E-02
			ZINC	--	--	--	--	ZINC		1.4E-02	--	--	1.4E-02
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		1.2E-02	--	6.5E-03	1.85E-02
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DDT	--	--	--	--	DDT	liver	1.4E-03	--	1.7E-04	1.57E-03
			HEXACHLOROBENZENE	--	--	--	--	HEXACHLOROBENZENE		3.4E-04	--	1.3E-04	4.7E-04
			(Total)	--	--	--	--	(Total)		4.16E+00	--	3.91E-02	4.20E+00
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			ARSENIC	--	--	--	--	ARSENIC		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	2.8E-02	--	2.8E-02
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	7.3E-01	--	7.3E-01
			MERCURY(INORGANIC)	--	--	--	--	MERCURY(INORGANIC)		--	2.1E-05	--	2.1E-05
			NICKEL	--	--	--	--	NICKEL		--	--	--	--
			SILVER	--	--	--	--	SILVER		--	--	--	--
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		--	1.1E-05	--	1.1E-05
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DDT	---	--	--	--	DDT		--	--	--	--
			HEXACHLOROBENZENE	--	--	--	--	HEXACHLOROBENZENE		--	3.2E-07	--	3.2E-07
			(Total)	--	--	--	--	(Total)		--	7.58E-01	--	7.58E-01

(1) Carcinogenic Risks are combined for both Resident Adult and Child

Total Risk Across Medium: --

Total Hazard Index Across All Media and All Exposure Routes: **5.0**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greater than 10^{-4}, than COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	3.2E+00
Total kidney HI =	4.63E-02
Total GI System HI =	5.4E-02
Total nervous system HI =	1.19E+00
Total liver HI =	1.57E-03

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TABLE 2-22. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR CURRENT/FUTURE OCCASIONAL USER/TRESPASSER UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe:Current/ Future
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 1	**TCDD-TEQ**	**2.7E-06**	--	**1.1E-06**	**3.8E-06**	TCDD- TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY	blood	1.6E-01	--	--	1.6E-01
			ARSENIC	**2.7E-06**	--	**1.1E-06**	**3.8E-06**	ARSENIC		1.4E-02	--	5.6E-03	1.96E-02
			BARIUM	--	--	--	--	BARIUM		5.0E-03	--	--	5.0E-03
			CADMIUM	--	--	--	--	CADMIUM	kidney	1.6E-03	--	4.3E-04	2.03E-03
			COPPER	--	--	--	--	COPPER	GI System	6.4E-03	--	--	6.4E-03
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	2.0E-02	--	--	2.0E-02
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		2.6E-04	--	--	2.6E-04
			NICKEL	--	--	--	--	NICKEL		8.5E-04	--	--	8.5E-04
			SILVER	--	--	--	--	SILVER		1.5E-03	--	--	1.5E-03
			THALLIUM	--	--	--	--	THALLIUM		1.3E-03	--	--	1.3E-03
			ZINC	--	--	--	--	ZINC		1.5E-03	--	--	1.5E-03
			DIBENZ[A,H]ANTHRACENE	2.5E-08	--	4.3E-08	6.8E-08	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	7.5E-09	--	1.4E-08	2.15E-08	AROCLOR-1254		4.4E-04	--	8.1E-04	1.25E-03
			AROCLOR-1260	1.3E-08	--	2.3E-08	3.6E-08	AROCLOR-1260		--	--	--	--
			DDT	5.2E-09	--	2.1E-09	7.3E-09	DDT	liver	7.1E-05	--	2.8E-05	9.9E-05
			HEXACHLOROBENZENE	6.6E-09	--	8.7E-09	1.53E-08	HEXACHLOROBENZENE		1.2E-05	--	1.6E-05	2.8E-05
			(Total)	5.46E-06	--	2.29E-06	7.75E-06	(Total)		2.13E-01	--	6.88E-03	2.20E-01
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	8.5E-10	--	8.5E-10	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			ARSENIC	--	8.5E-09	--	8.5E-09	ARSENIC		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	7.7E-04	--	7.7E-04
			CADMIUM	--	1.4E-09	--	1.4E-09	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.1E-02	--	1.1E-02
			MERCURY(INORGANIC)	--	--	--	--	MERCURY(INORGANIC)		--	2.8E-07	--	2.8E-07
			NICKEL	--	--	--	--	NICKEL		--	--	--	--
			SILVER	--	--	--	--	SILVER		--	--	--	--
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	3.3E-12	--	3.3E-12	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	2.3E-12	--	2.3E-12	AROCLOR-1254		--	1.4E-07	--	1.4E-07
			AROCLOR-1260	--	3.9E-12	--	3.9E-12	AROCLOR-1260		--	--	--	--
			DDT	---	1.6E-12	--	1.6E-12	DDT		--	--	--	--
			HEXACHLOROBENZENE	--	2.0E-12	--	2.0E-12	HEXACHLOROBENZENE		--	3.7E-09	--	3.7E-09
			(Total)	--	1.08E-08	--	1.08E-08	(Total)		--	1.18E-02	--	1.18E-02
(1) Carcinogenic Risks are combined for both Resident Adult and Child					Total Risk Across Medium		**7.8E-06**	Total Hazard Index Across All Media and All Exposure Routes					**0.2**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greater than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	1.6E-01
Total kidney HI =	2.03E-03
Total GI System HI =	6.4E-03
Total nervous system HI =	3.10E-02
Total liver HI =	9.9E-05

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TABLE 2-23. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR CURRENT/FUTURE OCCASIONAL USER/TRESPASSER UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe:Current/ Future
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 1	TCDD-TEQ	2.5E-08	--	2.0E-08	4.5E-08	TCDD- TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY	blood	2.6E-02	--	--	2.6E-02
			ARSENIC	1.2E-07	--	9.2E-08	2.12E-07	ARSENIC		2.0E-03	--	1.6E-03	3.6E-03
			BARIUM	--	--	--	--	BARIUM		4.8E-04	--	--	4.8E-04
			CADMIUM	--	--	--	--	CADMIUM	kidney	3.4E-04	--	1.8E-04	5.2E-04
			COPPER	--	--	--	--	COPPER	GI System	4.3E-04	--	--	4.3E-04
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	3.6E-03	--	--	3.6E-03
			MERCURY (INORGANIC)	--	--	--	--	MERCURY (INORGANIC)		5.1E-05	--	--	5.1E-05
			NICKEL	--	--	--	--	NICKEL		1.3E-04	--	--	1.3E-04
			SILVER	--	--	--	--	SILVER		1.0E-04	--	--	1.0E-04
			THALLIUM	--	--	--	--	THALLIUM		2.6E-04	--	--	2.6E-04
			ZINC	--	--	--	--	ZINC		1.1E-04	--	--	1.1E-04
			DIBENZ[A,H]ANTHRACENE	4.5E-10	--	1.6E-09	2.05E-09	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	4.9E-10	--	1.8E-09	2.29E-09	AROCLOR-1254		9.6E-05	--	3.6E-04	4.56E-04
			AROCLOR-1260	4.3E-10	--	1.6E-09	2.03E-09	AROCLOR-1260		--	--	--	--
			DDT	2.5E-10	--	2.0E-10	4.5E-10	DDT	liver	1.2E-05	--	9.1E-06	2.11E-05
			HEXACHLOROBENZENE	4.5E-10	--	1.2E-09	1.65E-09	HEXACHLOROBENZENE		2.7E-06	--	7.2E-06	9.9E-06
			(Total)	1.4707E-07	--	1.18E-07	2.65E-07	(Total)		3.36E-02	--	2.16E-03	3.58E-02
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	5.5E-12	--	5.5E-12	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			ARSENIC	--	2.6E-10	--	2.6E-10	ARSENIC		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	5.4E-05	--	5.4E-05
			CADMIUM	--	6.2E-11	--	6.2E-11	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.4E-03	--	1.4E-03
			MERCURY(INORGANIC)	--	--	--	--	MERCURY(INORGANIC)		--	4.0E-08	--	4.0E-08
			NICKEL	--	--	--	--	NICKEL		--	--	--	--
			SILVER	--	--	--	--	SILVER		--	--	--	--
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	4.3E-14	--	4.3E-14	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			AROCLOR-1254	--	1.1E-13	--	1.1E-13	AROCLOR-1254		--	2.1E-08	--	2.1E-08
			AROCLOR-1260	--	9.6E-14	--	9.6E-14	AROCLOR-1260		--	--	--	--
			DDT	---	5.6E-14	--	5.6E-14	DDT		--	--	--	--
			HEXACHLOROBENZENE	--	1.0E-13	--	1.0E-13	HEXACHLOROBENZENE		--	6.1E-10	--	6.1E-10
			(Total)	--	3.2791E-10	--	3.28E-10	(Total)		--	1.45E-03	--	1.45E-03

(1) Carcinogenic Risks are combined for both Resident Adult and Child

Total Risk Across Medium **2.7E-07**

Total Hazard Index Across All Media and All Exposure Routes **0.04**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	2.6E-02
Total kidney HI =	5.2E-04
Total GI System HI =	4.3E-04
Total nervous system HI =	5.00E-03
Total liver HI =	2.11E-05

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TABLE 2-24. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 1	**TCDD-TEQ**	**1.3E-05**	--	**1.3E-06**	**1.43E-05**	TCDD- TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY	blood	4.1E-01	--	--	4.1E-01
			BARIUM	--	--	--	--	BARIUM		1.6E-01	--	--	1.6E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	1.6E-01	--	1.3E-02	1.73E-01
			COPPER	--	--	--	--	COPPER	GI System	9.4E-02	--	--	9.4E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		1.9E-02	--	--	1.9E-02
			(Total)	1.3E-05	--	1.3E-06	1.43E-05	(Total)		8.43E-01	--	1.3E-02	8.56E-01
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	1.2E-08	--	1.2E-08	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	1.5E-01	--	1.5E-01
			CADMIUM	--	4.5E-07	--	4.5E-07	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			(Total)	--	4.62E-07	--	4.62E-07	(Total)		--	1.5E-01	--	1.5E-01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	**1.5E-05**	Total Hazard Index Across All Media and All Exposure Routes					**1.0**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	4.1E-01
Total kidney HI =	1.73E-01
Total GI System HI =	9.4E-02

TABLE 2-25. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1] Ingestion	Carcinogenic Risk Inhalation	Carcinogenic Risk Dermal	Carcinogenic Risk Exposure Routes Total	Constituent of Concern	Non-Carcinogenic Hazard Quotient Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 1	**TCDD-TEQ**	**1.0E-06**	--	**9.6E-08**	**1.1E-06**	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY	blood	5.3E-02	--	--	5.3E-02
			BARIUM	--	--	--	--	BARIUM		2.3E-02	--	--	2.3E-02
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.2E-02	--	3.0E-03	2.5E-02
			COPPER	--	--	--	--	COPPER	GI System	1.7E-02	--	--	1.7E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		2.5E-03	--	--	2.5E-03
			(Total)	1.0E-06	--	9.6E-08	1.10E-06	(Total)		1.18E-01	--	3.0E-03	1.21E-01
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	4.5E-10	--	4.5E-10	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	1.5E-02	--	1.5E-02
			CADMIUM	--	1.8E-08	--	1.8E-08	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			(Total)	--	1.845E-08	--	1.85E-08	(Total)		--	1.5E-02	--	1.5E-02

(1) Carcinogenic Risks are combined for both Resident Adult and Child

Total Risk Across Medium: **1.1E-06**

Total Hazard Index Across All Media and All Exposure Routes: **0.1**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6} , then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	5.3E-02
Total kidney HI =	2.5E-02
Total GI System HI =	1.7E-02

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Table 2-26. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	**ANTIMONY**	**blood**	**3.8E+00**	--	--	**3.8E+00**
			BARIUM	--	--	--	--	**BARIUM**		**1.5E+00**	--	--	**1.5E+00**
			CADMIUM	--	--	--	--	**CADMIUM**	**kidney**	**1.5E+00**	--	**1.3E-01**	**1.63E+00**
			COPPER	--	--	--	--	COPPER	GI System	8.8E-01	--	--	8.8E-01
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		1.8E-01	--	--	1.8E-01
			(Total)	--	--	--	--	(Total)		7.86E+00	--	1.3E-01	7.99E+00
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	5.2E-01	--	5.2E-01
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			(Total)	--	--	--	--	(Total)		--	5.2E-01	--	5.2E-01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	--	Total Hazard Index Across All Media and All Exposure Routes					**8.5**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6} , then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	3.8E+00
Total kidney HI =	1.63E+00
Total GI System HI =	8.8E-01

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TABLE 2-27. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY	blood	5.0E-01	--	--	5.0E-01
			BARIUM	--	--	--	--	BARIUM		2.2E-01	--	--	2.2E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.0E-01	--	1.5E-02	2.15E-01
			COPPER	--	--	--	--	COPPER	GI System	1.6E-01	--	--	1.6E-01
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		2.3E-02	--	--	2.3E-02
			(Total)	--	--	--	--	(Total)		1.10E+00	--	1.5E-02	1.12E+00
	Air	Urunao Dumpsite 1	TCDD-TEQ	--	--	--	--	TCDD-TEQ		--	--	--	--
			ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			BARIUM	--	--	--	--	BARIUM		--	1.0E-01	--	1.0E-01
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			ZINC	--	--	--	--	ZINC		--	--	--	--
			(Total)	--	--	--	--	(Total)		--	1.0E-01	--	1.0E-01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	--	Total Hazard Index Across All Media and All Exposure Routes					**1.2**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	5.0E-01
Total kidney HI =	2.15E-01
Total GI System HI =	1.6E-01

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TABLE 2-28. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Uranao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	6.4E-01	--	--	6.4E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.9E-02	--	2.3E-03	3.13E-02
			COPPER	--	--	--	--	COPPER	GI System	9.1E-02	--	--	9.1E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	3.5E-01	--	--	3.5E-01
			THALLIUM	--	--	--	--	THALLIUM		3.2E-02	--	--	3.2E-02
			BENZO[A]PYRENE	**1.2E-06**	**--**	**5.1E-07**	**1.71E-06**	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	**1.2E-06**	**--**	**5.2E-07**	**1.72E-06**	AROCLOR-1254		6.0E-02	--	3.4E-02	9.4E-02
			AROCLOR-1260	3.9E-07	--	1.7E-07	5.6E-07	AROCLOR-1260		--	--	--	--
			DIELDRIN	5.8E-08	--	1.8E-08	7.6E-08	DIELDRIN	liver	1.5E-04	--	5.9E-05	2.09E-04
			(Total)	2.85E-06	--	1.22E-06	4.07E-06	(Total)		1.20E+00	--	3.64E-02	1.24E+00
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	8.1E-08	--	8.1E-08	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	**--**	**1.1E+00**	**--**	**1.1E+00**
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	4.7E-10	--	4.7E-10	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	1.1E-09	--	1.1E-09	AROCLOR-1254		--	1.1E-04	--	1.1E-04
			AROCLOR-1260	--	3.6E-10	--	3.6E-10	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	5.2E-11	--	5.2E-11	DIELDRIN		--	2.8E-07	--	2.8E-07
			(Total)	--	8.30E-08	--	8.30E-08	(Total)		--	1.10E+00	--	1.10E+00
(1) Carcinogenic Risks are combined for both Resident Adult and						Total Risk Across Medium	**4.1E-06**	Total Hazard Index Across All Media and All Exposure Routes					**2.3**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	6.4E-01
Total kidney HI =	3.13E-02
Total GI System HI =	9.1E-02
Total nervous system HI =	1.45E+00
Total liver HI =	2.09E-04

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TABLE 2-29. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Uranao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	2.3E-02	--	--	2.3E-02
			CADMIUM	--	--	--	--	CADMIUM	kidney	5.9E-03	--	8.3E-04	6.73E-03
			COPPER	--	--	--	--	COPPER	GI System	3.2E-03	--	--	3.2E-03
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	6.0E-02	--	--	6.0E-02
			THALLIUM	--	--	--	--	THALLIUM		6.3E-03	--	--	6.3E-03
			BENZO[A]PYRENE	2.5E-08	--	1.0E-08	3.5E-08	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	6.0E-08	--	2.6E-08	8.6E-08	AROCLOR-1254		5.1E-03	--	5.0E-03	1.01E-02
			AROCLOR-1260	1.5E-08	--	6.5E-09	2.15E-08	AROCLOR-1260		--	--	--	--
			DIELDRIN	7.1E-09	--	2.2E-09	9.3E-09	DIELDRIN	liver	3.0E-05	--	2.1E-05	5.1E-05
			(Total)	1.071E-07	--	4.47E-08	1.52E-07	(Total)		1.04E-01	--	5.85E-03	1.09E-01
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	4.9E-09	--	4.9E-09	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.4E-01	--	1.4E-01
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	4.9E-12	--	4.9E-12	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	2.7E-11	--	2.7E-11	AROCLOR-1254		--	6.8E-06	--	6.8E-06
			AROCLOR-1260	--	6.6E-12	--	6.6E-12	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	3.2E-12	--	3.2E-12	DIELDRIN		--	4.1E-08	--	4.1E-08
			(Total)	--	4.9417E-09	--	4.94E-09	(Total)		--	1.40E-01	--	1.40E-01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	**1.6E-07**	Total Hazard Index Across All Media and All Exposure Routes					**0.2**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	2.3E-02
Total kidney HI =	6.73E-03
Total GI System HI =	3.2E-03
Total nervous system HI =	2.00E-01
Total liver HI =	5.1E-05

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TABLE 2-30. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	**ANTIMONY**	**blood**	**5.9E+00**	--	--	**5.9E+00**
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.7E-01	--	2.4E-02	2.94E-01
			COPPER	--	--	--	--	COPPER	GI System	8.5E-01	--	--	8.5E-01
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	**3.3E+00**	--	--	**3.3E+00**
			THALLIUM	--	--	--	--	THALLIUM		3.0E-01	--	--	3.0E-01
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		5.6E-01	--	3.4E-01	9.0E-01
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	--	--	--	DIELDRIN	liver	1.4E-03	--	6.0E-04	2.0E-03
			(Total)	--	--	--	--	(Total)		1.12E+01	--	3.65E-01	1.15E+01
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	--	**3.9E+00**	--	**3.9E+00**
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		--	3.9E-04	--	3.9E-04
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	--	--	--	DIELDRIN		--	9.7E-07	--	9.7E-07
			(Total)	--	--	--	--	(Total)		--	3.90E+00	--	3.90E+00
						Total Risk Across Medium	--		Total Hazard Index Across All Media and All Exposure Routes				15.4

(1) Carcinogenic Risks are combined for both Resident Adult and Child

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greater than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greater than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	5.9E+00
Total kidney HI =	2.94E-01
Total GI System HI =	8.5E-01
Total nervous system HI =	7.20E+00
Total liver HI =	2.0E-03

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TABLE 2-31. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	2.2E-01	--	--	2.2E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	5.5E-02	--	4.2E-03	5.92E-02
			COPPER	--	--	--	--	COPPER	GI System	3.0E-02	--	--	3.0E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	5.6E-01	--	--	5.6E-01
			THALLIUM	--	--	--	--	THALLIUM		5.9E-02	--	--	5.9E-02
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		4.7E-02	--	2.5E-02	7.2E-02
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	--	--	--	DIELDRIN	liver	2.8E-04	--	1.1E-04	3.9E-04
			(Total)	--	--	--	--	(Total)		9.71E-01	--	2.93E-02	1.00E+00
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	9.0E-01	--	9.0E-01
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	--	--	--	AROCLOR-1254		--	4.4E-05	--	4.4E-05
			AROCLOR-1260	--	--	--	--	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	--	--	--	DIELDRIN		--	2.6E-07	--	2.6E-07
			(Total)	--	--	--	--	(Total)		--	9.00E-01	--	9.00E-01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	--	Total Hazard Index Across All Media and All Exposure Routes					1.9

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greater than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greater than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	2.2E-01
Total kidney HI =	5.92E-02
Total GI System HI =	3.0E-02
Total nervous system HI =	1.46E+00
Total liver HI =	3.9E-04

TABLE 2-32. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR CURRENT/FUTURE OCCASIONAL USER/TRESPASSER UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	4.7E-02	--	--	4.7E-02
			CADMIUM	--	--	--	--	CADMIUM	kidney	2.2E-03	--	5.7E-04	2.77E-03
			COPPER	--	--	--	--	COPPER	GI System	6.8E-03	--	--	6.8E-03
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	2.6E-02	--	--	2.6E-02
			THALLIUM	--	--	--	--	THALLIUM		2.4E-03	--	--	2.4E-03
			BENZO[A]PYRENE	8.1E-08	--	1.4E-07	2.21E-07	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	7.7E-08	--	1.4E-07	2.17E-07	AROCLOR-1254		4.5E-03	--	8.3E-03	1.28E-02
			AROCLOR-1260	2.6E-08	--	4.7E-08	7.3E-08	AROCLOR-1260		--	--	--	--
			DIELDRIN	3.8E-09	--	5.0E-09	8.8E-09	DIELDRIN	liver	1.1E-05	--	1.5E-05	2.6E-05
			(Total)	1.88E-07	--	3.32E-07	5.20E-07	(Total)		8.89E-02	--	8.89E-03	9.78E-02
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	1.8E-09	--	1.8E-09	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.4E-02	--	1.4E-02
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	1.1E-11	--	1.1E-11	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	2.4E-11	--	2.4E-11	AROCLOR-1254		--	1.4E-06	--	1.4E-06
			AROCLOR-1260	--	7.9E-12	--	7.9E-12	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	1.2E-12	--	1.2E-12	DIELDRIN		--	3.4E-09	--	3.4E-09
			(Total)	--	1.84E-09	--	1.84E-09	(Total)		--	1.40E-02	--	1.40E-02
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	**5.2E-07**	Total Hazard Index Across All Media and All Exposure Routes					**0.1**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greater than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greater than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	4.7E-02
Total kidney HI =	2.77E-03
Total GI System HI =	6.8E-03
Total nervous system HI =	4.00E-02
Total liver HI =	2.6E-05

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TABLE 2-33. SUMMARY OF SURFACE SOIL HHRA RESULTS FOR CURRENT/FUTURE OCCASIONAL USER/TRESPASSER UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future

Receptor Population: Trespasser/Occasional User

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk: Ingestion	Carcinogenic Risk: Inhalation	Carcinogenic Risk: Dermal	Carcinogenic Risk: Exposure Routes Total	Constituent of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient: Ingestion	Non-Carcinogenic Hazard Quotient: Inhalation	Non-Carcinogenic Hazard Quotient: Dermal	Non-Carcinogenic Hazard Quotient: Exposure Routes Total
Surface Soil	Surface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	1.7E-03	--	--	1.7E-03
			CADMIUM	--	--	--	--	CADMIUM	kidney	4.4E-04	--	2.3E-04	6.7E-04
			COPPER	--	--	--	--	COPPER	GI System	2.4E-04	--	--	2.4E-04
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	4.5E-03	--	--	4.5E-03
			THALLIUM	--	--	--	--	THALLIUM		4.7E-04	--	--	4.7E-04
			BENZO[A]PYRENE	8.3E-10	--	2.8E-09	3.63E-09	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	1.9E-09	--	7.2E-09	9.1E-09	AROCLOR-1254		3.8E-04	--	1.4E-03	1.78E-03
			AROCLOR-1260	4.8E-10	--	1.8E-09	2.28E-09	AROCLOR-1260		--	--	--	--
			DIELDRIN	2.3E-10	--	6.1E-10	8.4E-10	DIELDRIN	liver	2.2E-06	--	5.9E-06	8.1E-06
			(Total)	3.44E-09	--	1.241E-08	1.59E-08	(Total)		7.73E-03	--	1.64E-03	9.37E-03
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	7.9E-11	--	7.9E-11	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.7E-03	--	1.7E-03
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	7.8E-14	--	7.8E-14	BENZO[A]PYRENE		--	--	--	--
			AROCLOR-1254	--	4.3E-13	--	4.3E-13	AROCLOR-1254		--	8.4E-08	--	8.4E-08
			AROCLOR-1260	--	1.1E-13	--	1.1E-13	AROCLOR-1260		--	--	--	--
			DIELDRIN	--	5.2E-14	--	5.2E-14	DIELDRIN		--	5.0E-10	--	5.0E-10
			(Total)	--	7.967E-11	--	7.97E-11	(Total)		--	1.70E-03	--	1.70E-03
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	**1.6E-08**	Total Hazard Index Across All Media and All Exposure Routes					**0.01**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	1.7E-03
Total kidney HI =	6.7E-04
Total GI System HI =	2.4E-04
Total nervous system HI=	6.20E-03
Total liver HI=	8.1E-06

TABLE 2-34. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	8.8E-01	--	--	8.8E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	4.7E-02	--	3.8E-03	5.08E-02
			COPPER	--	--	--	--	COPPER	GI System	4.7E-02	--	--	4.7E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	6.8E-01	--	--	6.8E-01
			THALLIUM	--	--	--	--	THALLIUM		2.9E-02	--	--	2.9E-02
			BENZO[A]PYRENE	**1.4E-06**	--	**5.6E-07**	**1.96E-06**	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	3.2E-07	--	1.3E-07	4.5E-07	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	1.72E-06	--	6.90E-07	2.41E-06	(Total)		1.68E+00	--	3.8E-03	1.69E+00
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	1.3E-07	--	1.3E-07	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	**--**	**2.2E+00**	**--**	**2.2E+00**
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	5.2E-10	--	5.2E-10	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	1.2E-10	--	1.2E-10	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	--	1.31E-07	--	1.31E-07	(Total)		--	2.2E+00	--	2.2E+00
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	**2.5E-06**		Total Hazard Index Across All Media and All Exposure Routes				**3.9**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	8.8E-01
Total kidney HI =	5.08E-02
Total GI System HI =	4.7E-02
nervous system HI =	2.88E+00

TABLE 2-35. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT ADULT UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	3.9E-02	--	--	3.9E-02
			CADMIUM	--	--	--	--	CADMIUM	kidney	5.5E-03	--	7.7E-04	6.27E-03
			COPPER	--	--	--	--	COPPER	GI System	2.6E-03	--	--	2.6E-03
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	6.1E-02	--	--	6.1E-02
			THALLIUM	--	--	--	--	THALLIUM		5.2E-03	--	--	5.2E-03
			BENZO[A]PYRENE	3.1E-08	--	1.3E-08	4.4E-08	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	8.5E-09	--	3.5E-09	1.2E-08	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	3.95E-08	--	1.65E-08	5.60E-08	(Total)		1.13E-01	--	7.7E-04	1.14E-01
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	4.6E-09	--	4.6E-09	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	1.4E-01	--	1.4E-01
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	5.9E-12	--	5.9E-12	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	1.6E-12	--	1.6E-12	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	--	4.608E-09	--	4.61E-09	(Total)		--	1.4E-01	--	1.4E–01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	**6.1E-08**	Total Hazard Index Across All Media and All Exposure Routes					**0.3**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater than 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greather than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greather than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	3.9E-02
Total kidney HI =	6.27E-03
Total GI System HI =	2.6E-03
nervous system HI =	2.01E-01

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TABLE 2-36. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER REASONABLE MAXIMUM EXPOSURE SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	**ANTIMONY**	**blood**	**8.2E+00**	**--**	**--**	**8.2E+00**
			CADMIUM	--	--	--	--	CADMIUM	kidney	4.4E-01	--	3.8E-02	4.78E-01
			COPPER	--	--	--	--	COPPER	GI System	4.4E-01	--	--	4.4E-01
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	**6.3E+00**	**--**	**--**	**6.3E+00**
			THALLIUM	--	--	--	--	THALLIUM		2.8E-01	--	--	2.8E-01
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	--	--	--	--	(Total)		1.57E+01	--	3.8E-02	1.57E+01
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	**MANGANESE**	**nervous system**	**--**	**7.6E+00**	**--**	**7.6E+00**
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	--	--	--	--	(Total)		--	7.6E+00	--	7.6E+00
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	--	Total Hazard Index Across All Media and All Exposure Routes					**23.3**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater that 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greater than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greater than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	8.2E+00
Total kidney HI =	4.78E-01
Total GI System HI =	4.4E-01
nervous system HI =	1.39E+01

TABLE 2-37. SUMMARY OF SUBSURFACE SOIL HHRA RESULTS FOR FUTURE RESIDENT CHILD UNDER CENTRAL TENDENCY SCENARIO, URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Constituent of Concern	Carcinogenic Risk [1]				Constituent of Concern	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil	Subsurface Soil	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY	blood	3.7E-01	--	--	3.7E-01
			CADMIUM	--	--	--	--	CADMIUM	kidney	5.2E-02	--	3.9E-03	5.59E-02
			COPPER	--	--	--	--	COPPER	GI System	2.4E-02	--	--	2.4E-02
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	5.7E-01	--	--	5.7E-01
			THALLIUM	--	--	--	--	THALLIUM		4.9E-02	--	--	4.9E-02
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	--	--	--	--	(Total)		1.07E+00	--	3.9E-03	1.07E+00
	Air	Urunao Dumpsite 2	ANTIMONY	--	--	--	--	ANTIMONY		--	--	--	--
			CADMIUM	--	--	--	--	CADMIUM		--	--	--	--
			COPPER	--	--	--	--	COPPER		--	--	--	--
			LEAD	--	--	--	--	LEAD		--	--	--	--
			MANGANESE	--	--	--	--	MANGANESE	nervous system	--	9.1E-01	--	9.1E-01
			THALLIUM	--	--	--	--	THALLIUM		--	--	--	--
			BENZO[A]PYRENE	--	--	--	--	BENZO[A]PYRENE		--	--	--	--
			DIBENZ[A,H]ANTHRACENE	--	--	--	--	DIBENZ[A,H]ANTHRACENE		--	--	--	--
			(Total)	--	--	--	--	(Total)		--	9.1E-01	--	9.1E-01
(1) Carcinogenic Risks are combined for both Resident Adult and Child						Total Risk Across Medium	--	Total Hazard Index Across All Media and All Exposure Routes					**2.0**

This Table presents the risk associated with exposure to cancer and non-cancer causing COCs. If the Hazard Index is less than 1.0, then COCs are not expected to cause any adverse health effects. If the Hazard Index is greater that 1.0, then COCs are expected to cause adverse health effects. Similarly, if the Risk is greater than 10^{-4}, then COCs are expected to cause cancer in more than 1 person out of 10,000 exposed population. If the Risk is greater than 10^{-6}, then COCs are expected to cause cancer in more than 1 person out of 1,000,000 exposed population. The USEPA generally accepts the risk range for site-related exposures to be less than 10^{-4} for industrial areas and less than 10^{-6} for residential areas.

Total blood HI =	3.7E-01
Total kidney HI =	5.59E-02
Total GI System HI =	2.4E-02
Total nervous system HI =	1.48E+00

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TABLE 2-38. VEGETATION SURVEY OF URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Latin Name	Common Name English (Chamorro)	Percent Cover		
		(0 to 3 ft)	(3 to 10 ft)	(10 to 30+ ft)
Mixed Herbaceous				
Grass				
Poaceae sp.	grasses	2%		
Vines				
Jasminum marianum		1%		
Momordica charantia	bitter mellon	10%		
Passiflora suberosa	wild passion flower	1%		
Epiphytes				
Polypodium punctatum	fern	<1%		
Pyrrosia lanceolata		<1%		
Herbs				
Bidens pilosa	beggar's tick	1%		
Chromolaena odorata	eupatorium	1%		
Sida sp.	false verbena	85%		
Shrubs				
Morinda citrifolia	Indian mulberry (lada)		1%	
Triphasia trifolia	limeberry (lemondichina)		1%	
Trees				
Ficus prolixa	banyan (nunu)			2%
Leucaena leucocephala	(tangantangan)		5%	10%
Lower Limestone Forest (Base of Slope)				
Vines				
Convolulace sp.		1%		
Mikania scandens		<1%		
Epiphytes				
Asplenium nidus	bird nest fern	2%		
Polypodium punctatum	fern	5%		
Pyrrosia lanceolata		1%		
Trees				
Aglaia mariannensis	(mapunyao, fischil liyoos)		2%	2% (6-8 in. DBH)
Carica papaya	papaya	10%	10%	20% (6-12 in. DBH)
Cycas circinalis	cycad (fadang, federico)	5%	25%	10%
Ficus prolixa	banyan (nunu)			10%
Ficus tinctoria	Dyer's fig (hoda)		1%	
Hibiscus tiliaceus	sea-hibiscus (pago)	1%	2%	
Intsia bijuga	(ifit, ifil)			2%
Neisosperma oppositifolia	(fagot)	1%	1%	5%
Pandanus tectorius	(kafu, fatsao)	5%	5%	
Dead Trees/Snags		<1%		
Upper Limestone Forest (Side of Slope)				
Vines				
Flagellaria indica	false rattan (bejeco halum-tano)	1%		
Jasminum marianum		1%		
Mikania scandens		1%		
Momordica charantia	bitter mellon	2%		
Passiflora suberosa	wild passion flower	2%		

TABLE 2-38. VEGETATION SURVEY OF URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Latin Name	Common Name English (Chamorro)	Percent Cover		
		(0 to 3 ft)	(3 to 10 ft)	(10 to 30+ ft)
Epiphytes				
Asplenium nidus	bird nest fern	2%		
Polypodium punctatum	fern	5%		
Pyrrosia lanceolata		1%		
Herbs				
Bidens pilosa	beggar's tick	1%		
Chromolaena odorata	eupatorium	1%		
Trees				
Aglaia mariannensis	(mapunyao, fischil liyoos)		2%	2% (6-8 in. DBH)
Carica papaya	papaya	5%	5%	5% (4-8 in. DBH)
Cycas circinalis	cycad (fadang, federico)	5%	25%	5%
Ficus prolixa	banyan (nunu)			10%
Ficus tinctoria	Dyer's fig (hoda)		1%	
Hibiscus tiliaceus	sea-hibiscus (pago)	1%	5%	
Neisosperma oppositifolia	(fagot)		1%	3%
Pandanus tectorius	(kafu, fatsao)	5%	10%	
Dead Trees/Snags		1%		

(%) Percent coverage are estimates
DBH = Diameter at Breast Height, expressed in inches
in. = inches
ft. = feet

TABLE 2-39. WILDLIFE OCCURRING OR POTENTIALLY OCCURRING AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Taxon	Latin Name	Common Name English (Chamorro)	Observation
Mixed Herbaceous			
Invertebrates			
Annelida		earthworms	observed
Arachnid		spiders	observed
	Argipe sp.	garden spider	observed
	Cyrtophora mollucensis	tent spider	observed
Coleoptera		beetles	observed
Diptera		flies, mosquitoes	observed
Gastropoda		land snail	observed
Homoptera		leafhoppers	observed
Hymenoptera		wasps, bees, ants	observed
Lepidoptera		moths, butterflies	observed
	Euploea leucostictos	blue banded king crow butterfly	observed
	Papilio polytes	black citrus swallowtail butterfly	observed
Nymphalidae	*Hypolimnas octocula*		nonconfirmed observance
Odonata		dragonflies	observed
Orthoptera		grasshoppers, crickets, praying mantis	observed
Reptiles			
Colubridae	*Bioga irregularis*	brown tree snake (kolepbla)	observed on to of cliff
Gekkonidae	*Gehyra mutilata*	gecko (bualiek)	observed
Scincidae	*Carlia fusca*	curious skink	observed
	Emoia caeruleocauda	blue-tailed skink	observed
Varnidae	*Varanus indicus*	monitor lizard (hilitai)	observed nearby
Amphibians			
Bufonidae	*Bufo marinus*	marine toad (kairo)	observed
Mammals			
Cervidae	*Cervus mariannus*	Sambar deer (benado)	observed tracks/scat
Suidae	*Sus scrofa*	feral pig (babui)	observed tracks/scat
Birds			
Phaethonidae	*Phaethon lepturus*	white-tailed tropicbird	observed nearby
Crustaceans			
Paguridae	*Birgus latro*	coconut crab (Ayuyu)	observed signs
Lower Limestone Forest (Base of Slope)			
Invertebrates			
Annelida		earthworms	observed
Arachnid		spiders	observed
	Argipe sp.	garden spider	observed
	Cyrtophora mollucensis	tent spider	observed
Coleoptera		beetles	observed
Diptera		flies, mosquitoes	observed
Gastropoda		land snail	observed
Homoptera		leafhoppers	observed
Hymenoptera		wasps, bees, ants	observed
Lepidoptera		moths, butterflies	observed
	Euploea leucostictos	blue banded king crow butterfly	observed
	Papilio polytes	black citrus swallowtail butterfly	observed
Odonata		dragonflies	observed
Orthoptera		grasshoppers, crickets, praying mantis	observed
Reptiles			
Colubridae	*Bioga irregularis*	brown tree snake (kolepbla)	observed on top of cliff
Gekkonidae	*Gehyra mutilata*	gecko (gualiek)	observed
Scincidae	*Carlia fusca*	curious skink	observed
	Emoia caeruleocauda	blue-tailed skink	observed
Varnidae	*Varanus indicus*	monitor lizard (hilitai)	observed nearby

TABLE 2-39. WILDLIFE OCCURRING OR POTENTIALLY OCCURRING AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Taxon	Latin Name	Common Name English (Chamorro)	Observation
Lower Limestone Forest (Base of Slope)			
Amphibians			
Bufonidae	*Bufo marinus*	marine toad (kairo)	observed
Mammals			
Cervidae	*Cervus mariannus*	Sambar deer (benado)	observed tracks/scat
Suidae	*Sus scrofa*	feral pig (babui)	observed tracks/scat
Birds			
Phaethonidae	*Phaethon lepturus*	white-tailed tropicbird	observed nearby
Crustaceans			
Paguridae	*Birgus latro*	coconut crab (ayuyu)	observed signs
Upper Limestone Forest (Side of Slope)			
Invertebrates			
Arachnid		spiders	observed
	Argipe sp.	garden spider	observed
	Cyrtophora mollucensis	tent spider	observed
Coleoptera		beetles	observed
Diptera		flies, mosquitoes	observed
Gastropoda		land snail	observed
Homoptera		leafhoppers	observed
Hymenoptera		wasps, bees, ants	observed
Lepidoptera		moths, butterflies	observed
	Papilio polytes	black citrus swallowtail butterfly	observed
Odonata		dragonflies	observed
Orthoptera		grasshoppers, crickets, praying mantis	observed
Reptiles			
Colubridae	*Bioga irregularis*	brown tree snake (kolepbla)	observed on top of cliff
Gekkonidae	*Gehyra mutilata*	gecko (gualiek)	observed
Scincidae	*Carlia fusca*	curious skink	observed
	Emoia caeruleocauda	blue-tailed skink	observed
Varnidae	*Varanus indicus*	monitor lizard (hilitai)	observed nearby
Mammals			
Cervidae	*Cervus mariannus*	Sambar deer (benado)	observed tracks/scat
Suidae	*Sus scrofa*	feral pig (babui)	observed tracks/scat
Birds			
Phaethonidae	*Phaethon lepturus*	white-tailed tropicbird	observed nearby

TABLE 2-40. VEGETATION SURVEY OF URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Latin Name	Common Name English (Chamorro)	Percent Cover		
		(0 to 3 ft)	(3 to 10 ft)	(10 to 30+ ft)
Limestone Forest				
Vines				
Flagellaria indica	false rattan (bejeco halum-tano)	1%		
Epiphytes				
Asplenium nidus	bird nest fern	10%		
Asplenium polyodon	fern	5%		
Ophioglossum pendulum		1%		
Pyrrosia lanceolata	fern	5%		
Herbs				
Chromolaena odorata	eupatorium	10%	1%	
Polypodium scolopendria	fern	5%		
Shrubs				
Triphasia trifolia	limeberry (lemondichina)		10%	10% (4 in. DBH)
Trees				
Aidia cochinchinensis	sumac		1%	
Carica papaya	papaya		5%	2% (8-10 in. DBH)
Cycas circinalis	cycad (fadang, federico)		2%	5% (12-14 in. DBH)
Ficus prolixa	banyan (nunu)			20%
Guamia mariannae	(paipai)		60%	5%
Intsia bijuga	(ifit, ifil)			1% (30 in. DBH)
Merrilliodendron megacarpum	(faniok)		5%	
Pandanus dubius	screw pine (pahong)	1%	2%	
Pandanus tectorius	(kafu, fatsao)		5%	5% (10 in. DBH)
Dead Trees/Snags				
Mixed Herbaceous				
Grass				
Pennisetum polystacion	small foxtail		10%	
Poaceae sp.	grasses	1%	2%	
Vines				
Convolulace sp.	morning glory	10%		
Mikania scandens		15%		
Momordica charantia	bitter mellon	10%		
Passiflora suberosa	wild passion flower	10%		
Herbs				
Bidens pilosa	beggar’s tick	5%	10%	
Chromolaena odorata	eupatorium		30%	
Nephrolepis hirsutula	fern	1%		
Stachytarpheta sp.		50%		
Shrubs				
Morinda citrifolia	Indian mulberry (lada)		1%	
Triphasia trifolia	limeberry (lemondichina)		1%	

(%) Percent coverage are estimates
DBH = Diameter at Breast Height, expressed in inches
in. = inches
ft = feet

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TABLE 2-41. WILDLIFE OCCURRING OR POTENTIALLY OCCURRING AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Taxon	Latin Name	Common Name English (Chamorro)	Observation
Limestone Forest			
Invertebrates			
Arachnid		spiders	observed
	Cyrtophora mollucensis	Tent Spider	observed
Diptera		flies, mosquitoes	observed
Hymenoptera		wasps, bees, ants	observed
Lepidoptera		moths, butterflies	observed
	Euploea leucostictos	blue banded king crow butterfly	observed
	Papilio polytes	black citrus swallowtail butterfly	observed
Orthoptera		grasshoppers, crickets, praying mantis	observed
Reptiles			
Gekkonidae	*Gehyra mutilata*	gecko (bualiek)	observed
Scincidae	*Carlia fusca*	curious skink	observed
	Emoia caeruleocauda	blue-tailed skink	observed
Amphibians			
Bufonidae	*Bufo marinus*	marine toad (kairo)	observed
Mammals			
Cervidae	*Cervis mariannus*	Sambar deer (benado)	observed tracks
Suidae	*Sus scrofa*	feral pig (babui)	observed tracks
Crustaceans			
Paguridae	*Birgus latro*	coconut crab (ayuyu)	observed
	Coenobita sp.	hermit crab (duk'duk)	observed
Mixed Herbaceous			
Invertebrates			
Arachnid		spiders	observed
	Cyrtophora mollucensis	tent spider	observed
Coleoptera		beetles	observed
Diptera		flies, mosquitoes	observed
Homoptera		leafhoppers	observed
Hymenoptera		wasps, bees, ants	observed
Lepidoptera		moths, butterflies	observed
	Euploea leucostictos	blue banded king crow butterfly	observed
	Papilio polytes	black citrus swallowtail butterfly	observed
Odonata		dragonflies	observed
Orthoptera		grasshoppers, crickets, praying mantis	observed
Reptiles			
Gekkonidae	*Gehyra mutilata*	gecko (gualiek)	observed
Scincidae	*Carlia fusca*	curious skink	observed
	Emoia caeruleocauda	blue-tailed skink	observed
Varnidae	*Varanus indicus*	monitor lizard (hilitai)	observed
Mammals			
Cervidae	*Cervus mariannus*	Samber deer (benado)	tracks/skat
Suidae	*Sus scrofa*	feral pig (babui)	tracks/skat
Birds			
Phaetonidae	*Phaethon lepturus*	white-tailed tropicbird	observed

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TABLE 2-42. ECOLOGICAL RISK ASSESSMENT ENDPOINTS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Assessment Endpoint	Null Hypothesis	Measurement Endpoint	Specifics of Assessment
Ecological health of terrestrial invertebrate communities	Soils are not exhibiting a detrimental effect on invertebrate population survival and growth.	Evaluation of soil chemistry with respect to soil invertebrate toxicity values	• Comparison of soil concentrations to soil invertebrate toxicity values.
Ecological health of terrestrial plant communities	Soils are not exhibiting a detrimental effect on population plant survival and growth.	Evaluation of soil chemistry with respect to vegetation toxicity values	• Comparison of soil concentrations to vegetation toxicity values.
Long-term health and reproductive capacity of omnivorous avian species (Mariana crow)	Ingestion of COC in prey does not have a negative impact on growth, survival, and reproductive success of the species.	Evaluation of dose in prey based on surface soil, fruit, and reptile data in dietary exposure models	• The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs). • Fruit and reptile dose approximated using measured concentrations and other appropriate exposure assumptions.
Long-term health and reproductive capacity of carnivorous avian species (yellow bittern)	Ingestion of COC in prey does not have a negative impact on growth, survival, and reproductive success of the species.	Evaluation of dose in prey based on surface soil and reptile data in dietary exposure models	• The risk associated with the calculated dose will be evaluated by comparison to TRVs. • Reptile dose approximated using measured concentrations and other appropriate exposure assumptions.
Long-term health and reproductive capacity of threatened and endangered fruitivorous mammalian species (Mariana fruit bat)	Ingestion of COC in food does not have a negative impact on growth, survival, and reproductive success of individual organisms.	Evaluation of dose in prey based on surface soil and fruit data in dietary exposure models	• The risk associated with the calculated dose will be evaluated by comparison to TRVs. • Fruit dose approximated using measured concentrations and other appropriate exposure assumptions.

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TABLE 2-43. ECOLOGICAL COCs FOR URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analyte	Ecological Screening Value (mg/kg)	Range of Detections	Frequency of Detection	Samples Greater Than Screen	Outliers That Exceed Bulk of Samples	COC	Rationale For Selection
Antimony	**63**	**0.9 - 8520**	**21/22**	**2/22**	**Yes**	**Yes**	**ASL**
Arsenic	**62**	**2 - 173**	**22/22**	**1/22**	**Yes**	**Yes**	**ASL**
Barium	**335**	**68.7 - 7750**	**27/27**	**14/27**	**No**	**Yes**	**ASL**
Beryllium	**3.4**	**0.08 - 4**	**16/22**	**2/22**	**No**	**Yes**	**ASL**
Copper	**72**	**19 - 5120**	**22/22**	**13/22**	**Yes**	**Yes**	**ASL**
Lead	**166**	**20.1 - 25200**	**22/22**	**7/22**	**Yes**	**Yes**	**ASL**
Manganese	**5500**	**977 - 8010**	**26/26**	**2/22**	**No**	**Yes**	**ASL**
Nickel	**243**	**8.6 - 325**	**22/22**	**2/22**	**No**	**Yes**	**ASL**
Selenium	**3.3**	**0.35 - 16.6**	**17/22**	**1/22**	**Yes**	**Yes**	**ASL**
Silver	**21**	**0.3 - 262**	**11/22**	**1/22**	**Yes**	**Yes**	**ASL**
Thallium	**1.4**	**0.11 - 2.3**	**19/22**	**4/22**	**No**	**Yes**	**ASL**
Zinc	**130**	**60.8 - 8630**	**22/22**	**14/22**	**Yes**	**Yes**	**ASL**

NA = Not applicable
NUT = Nutrient
COC = Constituent of Concern
Bold = Chemicals that screen as COCs

ASL = Above Screening Level
BSL = Below Screening Level
NSV = No Screening Value

This Table presents the list of contaminants that may pose risk to the environment. The maximum and minimum detected concentrations are presented as Range of Detection along with frequency of detection. For instance ANTIMONY was detected 21 times out of 22 soil samples that were collected at Dumpsite 1. The Table also shows the conservative screening values (Ecological Screening Value) that were used for risk analysis.

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TABLE 2-44. ECOLOGICAL COCs FOR URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analyte	Ecological Screening Value (mg/kg)	Range of Detections	Frequency of Detection	Samples Greater Than Screen	Outliers That Exceed Bulk of Samples	COC	Rationale For Selection
Antimony	**63**	**0.5 - 186**	**14/14**	**2/14**	**No**	**Yes**	**ASL**
Copper	**72**	**15.5 - 2460**	**14/14**	**7/14**	**Yes**	**Yes**	**ASL**
Lead	**166**	**23.5 - 53400**	**14/14**	**8/14**	**Yes**	**Yes**	**ASL**
Manganese	**7100**	**784 - 10100**	**25/25**	**8/25**	**No**	**Yes**	**ASL**
Mercury (inorganic)	**2.2**	**0.22 - 2.2**	**14/14**	**1/14**	**No**	**Yes**	**ASL**
Thallium	**1.4**	**0.16 - 2.7**	**14/14**	**8/14**	**No**	**Yes**	**ASL**
Zinc	**130**	**49.8 - 2040**	**14/14**	**11/14**	**No**	**Yes**	**ASL**

NA = Not applicable

NUT = Nutrient

COC = Constituent of Concern

Bold = Chemicals that screen as COCs

ASL = Above Screening Level

BSL = Below Screening Level

NSV = No Screening Value

This Table presents the list of contaminants that may pose risk to the environment. The maximum and minimum detected concentrations are presented as Range of Detection along with frequency of detection. For instance ANTIMONY was detected 14 times out of 14 soil samples that were collected at Dumpsite 2. The Table also shows the conservative screening values (Ecological Screening Value) that were used for risk analysis.

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TABLE 2-45. SURFACE SOIL EXPOSURE CONCENTRATIONS OF COCs AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analyte	N	Normal Distribution: Shapiro-Wilks Statistic (W_x)	Normal Distribution: p_x (1)	Log Normal Distribution: Shapiro-Wilks Statistic (W_y)	Log Normal Distribution: p_y (1)	Distribution (2)	Exposure Concentration (mg/kg) (3)
INORGANICS							
Antimony	22	0.232	<0.001	0.777	<0.001	Assumed Lognormal	68.8
Arsenic	22	0.521	<0.001	0.968	0.674	Lognormal	23.1
Barium	27	0.706	<0.001	0.931	0.072	Lognormal	1,456
Beryllium	22	0.878	0.011	0.853	0.004	Assumed Lognormal	2.35
Copper	22	0.563	<0.001	0.891	0.020	Assumed Lognormal	612
Lead	22	0.272	<0.001	0.825	0.001	Assumed Lognormal	548
Manganese	26	0.891	0.010	0.920	0.046	Assumed Lognormal	3,504
Nickel	22	0.852	0.004	0.949	0.297	Lognormal	111
Selenium	22	0.384	<0.001	0.831	0.002	Assumed Lognormal	1.74
Silver	22	0.344	<0.001	0.931	0.129	Lognormal	19.1
Thallium	22	0.920	0.077	0.919	0.071	Assumed Lognormal	0.96
Zinc	22	0.617	<0.001	0.881	0.013	Assumed Lognormal	1,301

N Total number of samples analyzed.
W_x Shapiro-Wilk statistic for un-transformed data (*X*).
W_y Shapiro-Wilk statistic for the log-transformed data ($Y = \ln X$).
(1) If $p<0.05$, the data do not fit the specific distribution.
(2) If the data fit neither a normal nor lognormal distribution, the data was assumed to fit the lognormal distribution.
(3) Mean exposure concentration is the arithmetic mean for normally distributed analytes, or the lognormal mean $\exp(\bar{y} + \sigma_y^2/2)$ for lognormally distributed analytes.

This Table presents the list of contaminants and the concentrations that were used to estimate the ecological exposure and risk from each contaminant in the surface soil at Dumpsite 1. The exposure concentrations were estimated, statistically, to present the most appropriate representative concentration of COCs at Dumpsite 1.

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TABLE 2-46. SURFACE SOIL EXPOSURE CONCENTRATIONS OF COCs AT
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analyte	*N*	Normal Distribution		Log Normal Distribution		Distribution (2)	Exposure Concentration (mg/kg) (3)
		Shapiro-Wilks Statistic (W_x)	p_x (1)	Shapiro-Wilks Statistic (W_y)	p_y (1)		
INORGANICS							
Antimony	14	0.577	<0.001	0.955	0.636	Lognormal	30.8
Copper	14	0.544	<0.001	0.857	0.028	Assumed Lognormal	402
Lead	14	0.325	<0.001	0.893	0.090	Lognormal	2,282
Manganese	25	0.870	0.004	0.942	0.163	Lognormal	4,344
Mercury	14	0.883	0.064	0.976	0.943	Lognormal	0.84
Thallium	14	0.921	0.226	0.884	0.067	Lognormal	1.64
Zinc	14	0.895	0.096	0.931	0.311	Lognormal	803

N Total number of samples analyzed.
W_x Shapiro-Wilk statistic for un-transformed data (*X*).
W_y Shapiro-Wilk statistic for the log-transformed data ($Y = \ln X$).
(1) If p<0.05, the data do not fit the specific distribution.
(2) If the data fit neither a normal nor lognormal distribution, the data was assumed to fit the lognormal distribution.
(3) Mean exposure concentration is the arithmetic mean for normally distributed analytes, or the lognormal mean $\exp(\bar{y} + \sigma_y^2/2)$ for lognormally distributed analytes

This Table presents the list of contaminants and the concentrations that were used to estimate the ecological exposure and risk from each contaminant in the surface soil at Dumpsite 1. The exposure concentrations were estimated, statistically, to present the most appropriate representative concentration of COCs at Dumpsite 2.

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TABLE 2-47. TOXICITY REFERENCE VALUES FOR EARTHWORMS AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

COC	Toxicity ReferenceValue (mg/kg)	Toxicity Endpoint Type	Source
INORGANICS			
Beryllium	**2**	**NOAEL**	**ICF (1998)**
Copper	**61**	**Maximum Allowable Toxicant Concentration/EC_{10}**	**USEPA (2000c)**
Zinc	**120**	**Maximum Allowable Toxicant Concentration/EC_{10}**	**USEPA (2000c)**

(a) Based on pentachlorobenzene earthworm protection

This Table provides ecological risk information (Toxicity Reference Value) for soil-invertebrate communities as represented by earthworm relevant to COCs in soil. Many of the TRVs are from LOAEL (Lowest Observed Adverse Effects Level) chronic effects data from laboratory studies. In the absence of sufficient data, NOAEL (No Observed Adverse Effects Level) was used for TRVs.

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TABLE 2-48. TOXICITY REFERENCE VALUES FOR PLANTS AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM (From Efroymson et al., 1997b unless noted otherwise)

COC	Toxicity Reference Value (mg/kg)	Toxicity Endpoint Type	ORNL Rated Confidence in Value
INORGANICS			
Antimony	5	Secondary reference, no specified toxic effect	Low
Barium	500	Single study, two species, shoot weight	Low
Copper	100	Leaf and stem weights, two studies	Low
Lead	50	Seventeen studies, multiple endpoints and species	Moderate
Manganese	500	Single study on bush beans, stem weight	Low
Mercury	0.3	Secondary reference, no specified toxic effect	Low
Nickel	30	Fourteen studies, but lowest test found toxicity	Low
Selenium	1	Fourteen studies, but lowest test found toxicity	Low
Silver	2	Secondary reference, no specified toxic effect	Low
Thallium	1	Secondary reference, no specified toxic effect	Low
Zinc (a)	190	Growth, multiple species	NA

(a) Based on plant EcoSSL from USEPA (2000c)
NA = Not Applicable

This Table provides ecological risk information (Toxicity Reference Value) for plants relevant to COCs in soil.

TABLE 2-49. NOAEL TOXICITY REFERENCE VALUES USED FOR MARIANA CROW, YELLOW BITTERN, AND MARIANA FRUIT BAT FOOD-WEB MODELING AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM (mg/kg-bw/day)

COC	Crow	Bittern	Bat	Comments
INORGANICS				
Antimony	**ND**	**ND**	**0.063**	**NOAEL for bat based on mouse exposed to antimony potassium tartrate in water with a longevity endpoint.**
Arsenic	**2.5**	**2.5**	**0.064**	**Avian NOAEL based on brown-headed cowbird exposed to copper acetoarsenite. Bat TRV based on mouse exposed to arsenite.**
Lead	**1.13**	**1.13**	**7.5**	**NOAEL for bat based on rat exposed to lead acetate. NOAEL for avian species based on quail NOAEL.**
Thallium	**0.42**	**0.42**	**0.0069**	**NOAEL for avian species based on golden eagle endpoint (muscular coordination) (Bean and Hudson, 1976), divided by 5 to account for intertaxon variability. NOAEL for bat based on rat exposed to thallium sulfate.**

HQ = Hazard Quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity Reference Values
Mg/kg = milligrams per kilogram
bw = body weight
ND = No Data

Source for TRVs unless otherwise noted: Sample et al. 1996. *Toxicological Benchmarks for Wildlife: 1996 Revision*. June.

This Table provides ecological risk information (Toxicity Reference Value) for Mariana crow, yellow bittern, and Mariana fruit bat relevant to COCs in soil.

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TABLE 2-50. LOAEL TOXICITY REFERENCE VALUES USED FOR MARIANA CROW, YELLOW BITTERN, AND MARIANA FRUIT BAT FOOD-WEB MODELING AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM (mg/kg-bw/day)

COPC	Crow	Bittern	Bat	Comments
INORGANICS				
Antimony	**ND**	**ND**	**0.63**	**LOAEL for bat based on mouse exposed to antimony potassium tartrate in water with a longevity endpoint.**
Arsenic	**7.4**	**7.4**	**0.64**	**Avian LOAEL based on brown-headed cowbird exposed to copper acetoarsenite. Bat TRV based on mouse exposed to arsenite.**
Lead	**11.3**	**11.3**	**75**	**LOAEL for bat based on rat exposed to lead acetate. LOAEL for avian species based on quail NOAEL.**
Thallium	**ND**	**ND**	**0.069**	**LOAEL for bat based on rat exposed to thallium sulfate.**

HQ = Hazard Quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilogram
bw = body weight
ND = No Data

Source for TRVs unless otherwise noted: Sample et al. 1996. *Toxicological Benchmarks for Wildlife: 1996 Revision*. June.

This Table provides ecological risk information (Toxicity Reference Value) for Mariana crow, yellow bittern, and Mariana fruit bat relevant to COCs in soil.

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TABLE 2-51. SUMMARY OF ERA RESULTS FOR EARTHWORMS AND PLANTS AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

COC	Representative Soil Concentration [1] (mg/kg)	Reference Toxicity Value [2] (mg/kg)	Ecological Quotient
EARTHWORMS			
Beryllium	2.35	2	**1.18**
Copper	612	61	**10.0**
Zinc	1,301	120	**10.8**
PLANTS			
Antimony	68.8	5	**13.8**
Barium	1,456	500	**2.91**
Copper	612	100	**6.12**
Lead	548	50	**11**
Manganese	3,504	500	**7.01**
Mercury	0.47	0.3	**1.57**
Nickel	111	30	**3.70**
Selenium	1.74	1	**1.74**
Silver	19.1	2	**9.55**
Zinc	1,301	190	**6.85**

Notes:
(1) These are representative Exposure Concentrations from Table 2-42.

(2) See Tables 2-44 and 2-45 for sources of earthworm and plant toxicity values.

This Table presents the ecological risk associated with exposure to COCs by earthworms and plants. If the Ecological Quotient is greater than 1.0, then COCs are expected to cause adverse effects on earthworms and plants.

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TABLE 2-52. SUMMARY OF ERA RESULTS FOR THE MARIANA CROWS AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analyte	Mean Soil [1] (mg/kg)	Mean Fruit [2] (mg/kg)	Mean Reptile [3] (mg/kg)	Soil Bioavailability [4]	Area Use Factor [4]	Dose Soil (mg/kg-bw/day)	Dose Fruit (mg/kg-bw/day)	Dose Reptile (mg/kg-bw/day)	Dose Total (mg/kg-bw/day)	TRV [5] NOAEL (mg/kg-bw/day)	TRV [5] LOAEL (mg/kg-bw/day)	HQ NOAEL	HQ LOAEL
Lead	548	0.0717	14.2	1	1	0.6560	0.0075	1.4910	2.1545	1.13	11.3	**1.91**	0.19

Additional model parameters [6]: diet soil fraction = 0.02; food ingestion rate = 0.21 kg/kg-bw/day;
% dry matter in fruit = 23 and reptiles = 34 (combined % dry mater in food = 28.5)

<u>Food web Model Calculations:</u>

Dose Soil = soil mean X soil bioavailability X area use factor X fraction soil X food ingestion rate X 0.285 combined fraction dry weight in food

Dose Fruit = fruit mean X area use factor X food ingestion rate X 0.5 fraction fruit in diet

Dose Reptile = reptile mean X area use factor X food ingestion rate X 0.5 fraction reptiles in diet

Dose Total = Dose Soil + Dose Reptile + Dose Fruit

Notes:

(1) Soil mean concentrations from Table 2-42

(2) Fruit mean concentrations from EA (1995)

(3) Reptile mean concentrations from EA (1995)

(4) Soil bioavailability and area use factor conservatively assumed to be 100%

(5) NOAEL and LOAEL TRVs from Sample et al. (1996) (Tables 2-46 and 2-47)

(6) Diet soil fraction, food ingestion rate, and % dry matter in reptile and fruit based on USEPA (1993)

ND = No data
NC = Not calculated
HQ = Hazard quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity reference values
mg/kg = milligrams per kilogram
bw = body weight
Bold = COCs with HQ that exceeds 1.0

This Table presents the ecological risk associated with exposure to COCs by Mariana Crows. If the Ecological Quotient (HQ) is greater than 1.0, then COCs are expected to cause adverse effects on Marian Crow.

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TABLE 2-53. SUMMARY OF ERA RESULTS FOR THE YELLOW BITTERNS AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

	Mean				Dose			TRV [4]			
	Soil [1]	Reptile [2]	Soil	Area Use	Soil	Reptile	Total	NOAEL	LOAEL	HQ	
Analyte	(mg/kg)	(mg/kg)	Bioavailability [3]	Factor [3]	mg/kg-bw/day					NOAEL	LOAEL
Lead	548	14.2	1	1	0.9689	3.6920	4.6609	1.13	11.3	**4.12**	0.41

Additional model parameters [5]: diet soil fraction = 0.02; food ingestion rate = 0.26 kg/kg-bw/day;
% dry matter in reptiles = 34

<u>Food web Model Calculations:</u>

Dose Soil = soil mean X soil bioavailability X area use factor X fraction soil X food ingestion rate X 0.34 fraction dry weight in food

Dose Reptile = reptile mean X area use factor X food ingestion rate

Dose Total = Dose Soil + Dose Reptile

Notes:

(1) Soil mean concentrations from Table 2-42

(2) Reptile mean concentrations from EA (1995)

(3) Soil bioavailability and area use factor conservatively assumed to be 100%

(4) NOAEL and LOAEL TRVs from Sample et al. (1996) (Tables 2-46 and 2-47)

(5) Diet soil fraction, food ingestion rate, and % dry matter in reptile based on USEPA (1993)

ND = No data
NC = Not calculated
HQ = Hazard quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity reference values
mg/kg = milligrams per kilogram
bw = body weight
Bold = COCs with HQ that exceeds 1.0

This Table presents the ecological risk associated with exposure to COCs by Yellow Bitterns. If the Ecological Quotient (HQ) is greater than 1.0, then COCs are expected to cause adverse effects on Marian Crow.

TABLE 2-54. SUMMARY OF ERA RESULTS FOR THE MARIANA FRUIT BATS AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Analyte	Mean Soil[1] (mg/kg)	Mean Fruit[2] (mg/kg)	Soil Bioavailability[3]	Area Use Factor[3]	Dose Soil (mg/kg-bw/day)	Dose Fruit (mg/kg-bw/day)	Dose Total (mg/kg-bw/day)	TRV[4] NOAEL (mg/kg-bw/day)	TRV[4] LOAEL (mg/kg-bw/day)	HQ NOAEL	HQ LOAEL
Antimony	68.8	0.04	1	1	0.1582	0.0200	0.1782	0.063	0.63	**2.83**	0.28
Arsenic	23.1	0.055	1	1	0.0531	0.0275	0.0806	0.063	0.63	**1.28**	0.13
Thallium	0.96	0.09	1	1	0.0022	0.0450	0.0472	0.0069	0.069	**6.84**	0.68

Additional model parameters[5]: diet soil fraction = 0.02 mg/kg-bw/day; food ingestion rate = 0.5 kg/kg-bw/day;
% dry matter in fruit = 23

Foodweb Model Calculations:

Dose Soil = soil mean X soil bioavailability X area use factor X fraction soil X food ingestion rate X 0.23 fraction dry weight in food (fruit)

Dose Fruit = fruit mean X area use factor X food ingestion rate

Dose Total = Dose Soil + Dose Fruit

Notes:

(1) Soil mean concentrations from Table 2-42
(2) Fruit mean concentrations from EA (1995)
(3) Soil bioavailability and area use factor conservatively assumed to be 100%
(4) NOAEL and LOAEL TRVs calculated allometrically (Sample et al., 1996) (Tables 2-46 and 2-47)
(5) Diet soil fraction, food ingestion rate, and % dry matter in fruit based on USEPA (1993)

ND = No data
NC = Not calculated
HQ = Hazard Quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilogram
bw = body weight
Bold = COCs with HQ that exceeds 1.0

This Table presents the ecological risk associated with exposure to COCs by Mariana Fruit Bats. If the Ecological Quotient (HQ) is greater than 1.0, then COCs are expected to cause adverse effects on Marian Crow.

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TABLE 2-55. SUMMARY OF ERA RESULTS FOR EARTHWORMS AND PLANTS AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

COC	Representative Soil Concentration (1) (mg/kg)	Reference Toxicity Value (2) (mg/kg)	Ecological Quotient
EARTHWORMS			
Copper	402	61	**6.59**
Zinc	803	120	**6.69**
PLANTS			
Antimony	30.8	5	**6.16**
Copper	402	100	**4.02**
Lead	2,282	50	**45.6**
Manganese	4,344	500	**8.7**
Mercury	0.84	0.3	**2.80**
Thallium	1.64	1	**1.64**
Zinc	803	190	**4.23**

Notes:
(1) These are representative Exposure Concentrations from Table 2-43.
(2) See Tables 2-44 and 2-45 for sources of earthworm and plant toxicity values.

This Table presents the ecological risk associated with exposure to COCs by earthworm and plants. If the Ecological Quotient is greater than 1.0, then COCs are expected to cause adverse effects on earthworms and plants.

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TABLE 2-56. SUMMARY OF ERA RESULTS FOR THE MARIANA CROWS AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analyte	Mean			Soil	Area Use	Dose				TRV [5]		HQ	
	Soil [1] (mg/kg)	Fruit [2] (mg/kg)	Reptile [3] (mg/kg)	Bioavailability [4]	Factor [4]	Soil	Fruit	Reptile	Total	NOAEL	LOAEL		
						mg/kg-bw/day						NOAEL	LOAEL
Lead	2,282	0.0717	14.2	1	1	2.7316	0.0075	1.4910	4.2301	1.13	11.3	**3.74**	0.37

Additional model parameters [6]: diet soil fraction = 0.02; food ingestion rate = 0.21 kg/kg-bw/day;
% dry matter in fruit = 23 and reptiles = 34 (combined % dry matter in food = 28.5)

<u>Food web Model Calculations:</u>

Dose Soil = soil mean X soil bioavailability X area use factor X fraction soil X food ingestion rate X 0.285 combined fraction dry weight in food

Dose Fruit = fruit mean X area use factor X food ingestion rate X 0.5 fraction fruit in diet

Dose Reptile = reptile mean X area use factor X food ingestion rate X 0.5 fraction reptiles in diet

Dose Total = Dose Soil + Dose Reptile + Dose Fruit

Notes:
(1) Soil mean concentrations from Table 2-43
(2) Fruit mean concentrations from EA (1995)
(3) Reptile mean concentrations from EA (1995)
(4) Soil bioavailability and area use factor conservatively assumed to be 100%
(5) NOAEL and LOAEL TRVs from Sample et al. (1996) (Tables 2-46 and 2-47)
(6) Diet soil fraction, food ingestion rate, and % dry matter in reptiles and fruit based on USEPA (1993)

ND = No data
NC = Not calculated
HQ = Hazard Quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilogram
bw = body weight
Bold = COCs with HQ that exceeds 1.0

This Table presents the ecological risk associated with exposure to COCs by Mariana Crows. If the Ecological Quotient (HQ) is greater than 1.0, then COCs are expected to cause adverse effects on Marian Crow.

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TABLE 2-57. SUMMARY OF ERA RESULTS FOR THE YELLOW BITTERNS AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Analyte	Mean		Soil	Area Use	Dose			TRV [4]		HQ	
	Soil [1] (mg/kg)	Reptile [2] (mg/kg)	Bioavailability [3]	Factor [3]	Soil	Reptile	Total	NOAEL	LOAEL		
					mg/kg-bw/day					NOAEL	LOAEL
Lead	2,282	14.2	1	1	4.0346	3.6920	7.7266	1.13	11.3	**6.84**	0.68

Additional model parameters [5]: diet soil fraction = 0.02; food ingestion rate = 0.26 kg/kg-bw/day;
% dry matter in reptiles = 34

Food web Model Calculations:

Dose Soil = soil mean X soil bioavailability X area use factor X fraction soil X food ingestion rate X 0.34 fraction dry weight in food

Dose Reptile = reptile mean X area use factor X food ingestion rate

Dose Total = Dose Soil + Dose Reptile

Notes:

(1) Soil mean concentrations from Table 2-43

(2) Reptile mean concentrations from EA (1995)

(3) Soil bioavailability and area use factor conservatively assumed to be 100%

(4) NOAEL and LOAEL TRVs from Sample et al. (1996) (Tables 2-46 and 2-47)

(5) Diet soil fraction, food ingestion rate, and % dry matter in reptile based on USEPA (1993)

ND = No data
NC = Not calculated
HQ = Hazard Quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilogram
bw = body weight
Bold = COCs with HQ that exceeds 1.0

This Table presents the ecological risk associated with exposure to COCs by Yellow Bitterns. If the Ecological Quotient (HQ) is greater than 1.0, then COCs are expected to cause adverse effects on Marian Crow.

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TABLE 2-58. SUMMARY OF ERA RESULTS FOR THE MARIANA FRUIT BATS AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

	Mean				Dose			TRV (4)		HQ	
	Soil (1)	Fruit (2)	Soil	Area Use	Soil	Fruit	Total	NOAEL	LOAEL		
Analyte	(mg/kg)	(mg/kg)	Bioavailability (3)	Factor (3)	mg/kg-bw/day					NOAEL	LOAEL
Antimony	30.8	0.04	1	1	0.0708	0.0200	0.0908	0.063	0.63	**1.44**	0.14
Thallium	1.64	0.09	1	1	0.0038	0.0450	0.0488	0.0069	0.069	**7.07**	0.71

Additional model parameters (5): diet soil fraction = 0.02 mg/kg-bw/day; food ingestion rate = 0.5 kg/kg-bw/day;
% dry matter in fruit = 23

Foodweb Model Calculations:

Dose Soil = soil mean X soil bioavailability X area use factor X fraction soil X food ingestion rate X 0.23 fraction dry weight in food (fruit)

Dose Fruit = fruit mean X area use factor X food ingestion rate

Dose Total = Dose Soil + Dose Fruit

Notes:

(1) Soil mean concentrations from Table 2-43
(2) Fruit mean concentrations from EA (1995)
(3) Soil bioavailability and area use factor conservatively assumed to be 100%
(4) NOAEL and LOAEL TRVs calculated allometrically (Sample et al., 1996) (Tables 2-46 and 2-47)
(5) Diet soil fraction, food ingestion rate, and % dry matter in fruit based on EPA (1993)

ND = No data
NC = Not calculated
HQ = Hazard Quotient
NOAEL = No observed adverse effects level
LOAEL = Lowest observed adverse effects level
TRV = Toxicity Reference Values
mg/kg = milligrams per kilogram
bw = body weight
Bold = COCs with HQ that exceeds 1.0

This Table presents the ecological risk associated with exposure to COCs by Mariana Fruit Bats. If the Ecological Quotient (HQ) is greater than 1.0, then COCs are expected to cause adverse effects on Marian Crow.

TABLE 2-59. SUMMARY OF CLEANUP STANDARDS AND CLEANUP VOLUMES AT URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Cleanup Matrix	COC	Basis for RGO	RGO (mg/kg)	PRG Resident (mg/kg)	BTV (mg/kg)	Cleanup Standard (mg/kg)	Cleanup Sample Locations	Estimated COC Cleanup Area (SQ FT)	Estimated COC Cleanup Volume (BCY)	Estimated Soild Waste Volume (BCY)	Estimated OE Volume (BCY)	Estimated Total COC, Solid Waste and OE Volume (BCY)
	antimony	Non-cancer Risk for Child at Risk Level HI = 1	31	31	63	**63**	AAFB06UBS013					
	arsenic	Cancer Risk for Child at Risk Level = 10^{-6}	0.9	0.39	62	**62**	AAFB06UBS013					
	lead	N/A	N/A	400	N/A	**400**	AAFB06UBS011, AAFB06UBS071, and AAFB06UBS072					
SURFACE SOIL	manganese	Non-cancer Risk for Child at Risk Level HI = 1	856	1,800	5,500	**5,500**	AAFB06UBS009, AAFB06UBS039, AAFB06UBS055, AAFB06UBS056, and AAFB06UBS059	**5,050**	**370**			
	dioxins	Cancer Risk for Child at Risk Level = 10^{-6}	9.1E-06	3.9E-06	N/A	**9.1E-06**	AAFB06UBS015DUP, AAFB06UBS017, AAFB06UBS018, AAFB06UBS019, AAFB06UBS020, AAFB06UBS024, AAFB06UBS062, AAFB06UBS064, and AAFB06UBS072			**26,700**	**10**	
	antimony	Non-cancer Risk for Child at Risk Level HI = 1	31	31	63	**63**						
	barium	Non-cancer Risk for Child at Risk Level HI = 1	5,393	5,400	335	**5,400**						
SUBSURFACE SOIL	cadmium	Non-cancer Risk for Child at Risk Level HI = 1	72	37	7	**72**	AAFB06UBS069	**320**	**35**			
	lead	N/A	N/A	400	N/A	**400**						
	dioxins	Cancer Risk for Child at Risk Level = 10^{-6}	9.4E-06	3.9E-06	N/A	**9.4E-06**						
							Subtotal (BCY)	**5,370**	**405**	**26,700**	**10**	**27,115**

Notes:
COC = constituent of concern; RGO = remedial goal objective; BTV = background threshold value; PRG = 2000 USEPA Region IX Preliminary Remediation Goal; SQ FT = square feet; mg/kg = milligrams per kilogram; N/A = not applicable; BCY = banked cubic yard; OE = Ordnance Explosive

Surface cleanup volumes are estimated based on upper 2-foot-thick, 20-foot-diameter area around the COC-impacted soil samples.
Subsurface cleanup volumes are estimated based on 3-foot-thick bgs, 20-foot-diameter area around COC-impacted soil samples.

The purpose of the Cleanup Standard is to control risks posed by direct contact with contaminated soil and to minimize migration of contaminants to groundwater.

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TABLE 2-60. SUMMARY OF CLEANUP STANDARDS AND CLEANUP VOLUMES AT URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Cleanup Matrix	COC	Basis for RGO	RGO (mg/kg)	PRG Resident (mg/kg)	BTV (mg/kg)	Cleanup Standard (mg/kg)	Cleanup Sample Locations	Estimated COC Cleanup Area (SQ FT)	Estimated COC Cleanup Volume (BCY)	Estimated Soild Waste Volume (BCY)	Estimated OE Volume (BCY)	Estimated Total COC, Solid Waste and OE Volume (BCY)
SURFACE SOIL	benzo(a)pyrene	Cancer Risk for Child at Risk Level = 10^{-6}	0.15	0.062	N/A	**0.15**	AAFB06UBS08 and AAFB06UBS090	3,800	280	15,500	0	
	Aroclor-1254	Cancer Risk for Child at Risk Level = 10^{-6}	0.53	0.22	N/A	**0.53**	AAFB06UBS075, AAFB06UBS079, and AAFB06UBS091					
	antimony	Non-cancer Risk for Child at Risk Level HI = 1	32	31	63	**63**	AAFB06UBS081 and AAFB06UBS089					
	lead	N/A	N/A	400	N/A	**400**	AAFB06UBS079, AAFB06UBS081, AAFB06UBS087, AAFB06UBS089, and AAFB06UBS091					
	manganese	Non-cancer Risk for Child at Risk Level HI = 1	851	1,800	5,500	**5,500**	AAFB06UBS002, AAFB06UBS003, AAFB06UBS005, AAFB06UBS008, AAFB06UBS049, and AAFB06UBS052,					
SUBSURFACE SOIL	benzo(a)pyrene	Cancer Risk for Child at Risk Level = 10^{-6}	0.15	0.062	N/A	**0.15**	AAFB06UBS090	1,260	140			
	antimony	Non-cancer Risk for Child at Risk Level HI = 1	31	31	63	**63**	AAFB06UBS082					
	manganese	Non-cancer Risk for Child at Risk Level HI = 1	850	1,800	5,500	**5,500**	AAFB06UBS083 and AAFB06UBS086					
							Subtotal (BCY)	**5,060**	**420**	**15,500**	**0**	**15,920**

Notes:
COC = constituent of concern; RGO = remedial goal objective; BTV = background threshold value; PRG = 2000 USEPA Region IX Preliminary Remediation Goal; SQ FT = square feet; mg/kg = milligrams per kilogram; N/A = not applicable; BCY = cubic yard; OE = Ordnance Explosive

Surface cleanup volumes are estimated based on upper 2-foot-thick, 20-foot-diameter area around the COC-impacted soil samples.
Subsurface cleanup volumes are estimated based on 3-foot-thick bgs, 20-foot-diameter area around COC-impacted soil samples.

The purpose of the Cleanup Standard is to control risks posed by direct contact with contaminated soil and to minimize migration of contaminants to groundwater.

TABLE 2-61. SUMMARY OF PERTINENT ARARs FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Act or Authority	Requirement	Requirement's Impact on Cleanup Alternatives
Federal Chemical-Specific ARARs (No Territorial Chemical-Specific ARARs have been identified)		
Safe Drinking Water Act for Groundwater using Maximum Contaminant Level (MCLs) 40CFR 141.61 (a) 42 U.S.C., Ch. 6A, § 300[f]-300[j]-26	Establishes standards for groundwater quality as a source of potable water.	Impacts any stockpile leachates that may be generated as a results of excavation and find its way to groundwater.
Resource Conservation and Recovery Act (RCRA). These regulations also take effect through Guam's authorized RCRA program. Part 261.3 (Definition of hazardous waste) Part 261.24 (Toxicity characteristic) Part 262.11 (Hazardous Waste Determination)	Pursuant to the "contained-in" policy, contaminated media must be managed as hazardous waste if the waste contains a listed hazardous waste.	Relates to COC-impacted soils that may exceed Toxicity Characteristic Leaching Procedure (TCLP) parameters. The on-site accumulation of such COC-impacted soils should be in accordance with substantive provisions of RCRA regarding hazardous waste accumulation. Such COC-impacted soils should be shipped to a USEPA-certified off-island hazardous waste disposal facility, using Department of Transportation (DOT) standards and a DOT-certified transporter.
Federal and Territorial Location-Specific ARARs		
Federal: Coastal Zone Management Act of 1972. These regulations also take effect through Guam's Coastal Zone Management program. Public Law 92-583, 16 U.S.C. 1451-1456	Guam Coastal Zone Management Program pursuant to Section 312 of the Coastal Zone Management provides for the protection and management of coastal waters and shorelines in Guam	Impacts all wastes that may be excavated and removed from the site. Also impacts all heavy equipment. All heavy equipment should be well maintained and all decontamination should be done in a contained area to avoid generating any runoff that can impact surface water at storm detention ponds.
Territorial: Historical Preservation Act 21 Guam Code Annotated, Chapter 76	Regulates the historical objects and sites on Guam. Archaeological sites have been documented near Dumpsites 1 and 2, but no historical objects or sites are currently known to exist at Dumpsites 1 and 2.	Impacts any intrusive cleanup alternatives such as excavation and removal.

TABLE 2-61. SUMMARY OF PERTINENT ARARs FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Act or Authority	Requirement	Requirement's Impact on Cleanup Alternatives
Federal and Territorial Action-Specific ARARs		
Federal: Insecticide, Fungicide, and Rodenticide Act (FIFRA) 7 U.S.C. Section 136 et seq and 40 CFR Parts 150-189	Regulates sale, use, storage and disposal of pesticides.	Impacts any revegetation work that may be required the use and storage of pesticides.
Federal: RCRA Subtitle C. These regulations take effect through Guam's authorized RCRA program. 40 CFR Part 264	Design and operating standards for containers and tanks used to store hazards waste at CERCLA sites. Specification of site closure requirements. Any RCRA air emissions standards	Impacts the handling of any excavated soils and hazardous waste that may exceed Toxicity Characteristic Leaching Procedure (TCLP) parameters. Relates to a clean closure of site after all solid waste debris, OE materials and COC-impacted soils have been removed from the site. Impacts any potential fugitive emissions from open burning of wastes, including OE materials.
Federal: Toxic Substances Control Act (TSCA). These regulations take effect through Guam's authorized RCRA program. 40 CFR 761.61	Bulk PCB remediation wastes, such as PCB contaminated soil, may be sent off-site for decontamination or disposal in accordance with TSCA, provided that the remediation waste is either dewatered on-site or transported off-site in containers meeting the requirement of the DOT Hazardous Materials Regulations at 49 CFR parts 171 through 180. Bulk PCB remediation wastes with a PCB concentration of less than 50 mg/kg may be disposed of according to the requirements of TSCA 761.61(a)(5)(v)(A).	Impacts the transportation and handling of PCB-impacted soils. Also impacts the decontamination of heavy equipment to ensure that all decon-water are contained and no runoff can impact surface water.
Territorial: Guam Air Pollution Control Standards and Regulations - Section 1103.4 Fugitive Dust	Guam's Air Pollution Control Standards and Regulations, promulgated under the authority of Chapter 49, Title 10 of the Guam Code Annotated (GCA), also known as the Air Pollution Control Act (P.L. 10-74) - Section 1103.4(a)(1)	Impacts potential fugitive dust emissions from dump trucks that may drive on unpaved roads.

TABLE 2-61. SUMMARY OF PERTINENT ARARs FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Act or Authority	Requirement	Requirement's Impact on Cleanup Alternatives
Territorial: Solid Waste Management and Litter Control Act - Prohibited Hazardous Waste Activities 10 Guam Code Annotated (GCA), Chapter 51 - Section 51110 –51111	Any standards with regard to protection of groundwater	Impacts disposal of materials at the Andersen AFB landfill.
Guam Water Pollution Control Act 10 Guam Code Annotated, Chapter 47	Protects groundwater and waters of the territory	Impacts any stockpile leachates that may be generated as a results of excavation and find its way to groundwater.

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TABLE 2-62. COMPARISON OF SCREENED CLEANUP ALTERNATIVES FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM.

Cleanup Alternative	Cleanup Alternative Description *	Cleanup Matrix	Overall Protection of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Reduction of Mobility, Toxicity or Volume Through Treatment	Long-Term Effectiveness and Permanence	Implementability	Territory (Guam) Acceptance	Community Acceptance	Cost in Present Worth ($)‡	Cleanup Time in Years *
Alternative 1 - ***Excavation and Offsite Disposal***												
Dumpsite 1	All COC-impacted soils, solid waste materials, and EO materials will be removed from Dumpsite 1. The removed materials will either be transported to Anderson AFB landfill or to permitted offsite treatment and disposal facilities for proper disposal.	COC-impacted Soil	Yes	Yes	Yes	Yes	Yes	Yes	**	**	$ 100,000	1+
		Solid Waste Materials	Yes	N/A	Yes	Yes	Yes	Yes	**	**	$ 6,290,000	N/A
		OE Waste Materials	Yes	N/A	Yes	Yes	Yes	Yes	**	**	$ 1,850,000	N/A
										Subtotal Excavation and Offsite Disposal Alternative Cost for Dumpsite 1	**$ 8,240,000**	
Dumpsite 2	All COC-impacted soils and solid waste materials will be removed from Dumpsite 1. The removed materials will either be transported to Andersen AFB landfill or to permitted offsite treatment and disposal facilities for proper disposal.	COC-impacted Soil	Yes	Yes	Yes	Yes	Yes	Yes	**	**	$ 100,000	1+
		Solid Waste Materials	Yes	N/A	Yes	Yes	Yes	Yes	**	**	$ 3,650,000	N/A
										Subtotal Excavation and Offsite Disposal Alternative Cost for Dumpsite 2	**$ 3,750,000**	
										Total Excavation and Offsite Disposal Alternative Cost for Dumpsites 1 and 2	**$ 12,000,000**	
Alternative 2 - ***Institutional Control and Property Acquision***												
Dumpsite 1 †	The 16.5-acre Dumpsite 1 will be acquired and a perimeter chain-link fence will be installed to prevent access to the site and limit the exposure to COC-impacted areas and OE materials.	COC-impacted Soil	Partially	Partially	Yes	No	Partially	Yes	**	**	$ 9,160,000	2+
		Solid Waste Materials	No	N/A	Yes	No	No	Yes	**	**		N/A
		OE Waste Materials	No	N/A	No	No	No	No	**	**	N/A	N/A
										Subtotal Institutional Control and Property Acquisition Alternative Cost for Dumpsite 1	**$ 9,160,000**	
Dumpsite 2 †	The 6.2-acre Dumpsite 2 will be acquired and a perimeter chain-link fence will be installed to prevent access to the site and limit the exposure to COC-impacted areas.	COC-impacted Soil	Partially	Partially	Yes	No	Partially	Yes	**	**	$ 3,480,000	1+
		Solid Waste Materials	No	N/A	Yes	No	No	Yes	**	**		N/A
										Subtotal Institutional Control and Property Acquisition Alternative Cost for Dumpsite 2	**$ 3,480,000**	
										Total Institutional Control and Property Acquisition Alternative Cost for Dumpsites 1 and 2	**$ 12,640,000**	
Alternative 3 - ***No Action***												
Dumpsite 1	Nothing will be done at the site. All COC-impacted soils, solid waste materials, and EO materials will be remained at Dumpsite 1.	COC-impacted Soil	No	No	Yes	No	No	Yes	**	**	N/A	N/A
		Solid Waste Materials	No	N/A	Yes	No	No	Yes	**	**	N/A	N/A
		OE Waste Materials	No	N/A	No	No	No	No	**	**	N/A	N/A
Dumpsite 2	Nothing will be done at the site. All COC-impacted soils, solid waste materials, and EO materials will be remained at Dumpsite 2.	COC-impacted Soil	No	No	Yes	No	No	Yes	**	**	N/A	N/A
		Solid Watse Materials	No	N/A	Yes	No	No	Yes	**	**	N/A	N/A
										There are no costs associated with the No Action alternative	N/A	

Notes: N/A = Not Applicable, or Not Available

‡ Cost for excavation/transportation per cubic yard assumed same for COC-impacted soil and solid waste materials.

EO = Explosive Ordnance COC = Constituent of Concern

** = Territory (Guam) and Community Acceptance will be provided after the completion of this RI/FS report.

* = Federal Remediation Technologies Roundtable, Remediation Technologies Screening Matrix and Reference Guide, Version 3 (www.frtr.gov).

† Costs for fencing/control is common for COCs and solid waste and is therefore not seperated.

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TABLE 2-63. COST ESTIMATE FOR EXCAVATION AND OFFSITE DISPOSAL CLEANUP AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

				Phase1		Phase 2 and 3		Phase 4					
		Workplan Based on Remedial Design		Surveying/Grid Preparation and Road Improvements		Surface and Subsurface Cleanup & Disposal		Confirmation Sampling and Revegetation		Verification Report		TOTAL	
	Task Duration	3 weeks		2 weeks		30 weeks		4 weeks		4 weeks		42 weeks	
LABOR	**Hourly Rate**	**Hrs**	**Cost**	**Hrs**	**Cost**	**Hrs**	**Cost**	**Hrs**	**Cost**	**Hrs**	**Cost**	**Hrs**	**Cost**
Program Manager	$196.00	6	$1,176.00	4	$784.00	60	$11,760.00	8	$1,568.00	8	$1,568.00	86	$16,856.00
Project Manager	$155.00	120	$18,600.00	80	$12,400.00	900	$139,500.00	80	$12,400.00	160	$24,800.00	1,340	$207,700.00
UXO Operations Manager	$116.00	30	$3,480.00	40	$4,640.00	600	$69,600.00	0	$0.00	40	$4,640.00	710	$82,360.00
Senior UXO Supervisor	$100.00	120	$12,000.00	100	$10,000.00	1,500	$150,000.00	0	$0.00	0	$0.00	1,720	$172,000.00
UXO Safety Officer	$86.00	0	$0.00	100	$8,600.00	1,500	$129,000.00	0	$0.00	0	$0.00	1,600	$137,600.00
UXO QC Manager	$86.00	0	$0.00	100	$8,600.00	1,500	$129,000.00	0	$0.00	0	$0.00	1,600	$137,600.00
UXO Supervisor	$75.00	0	$0.00	200	$15,000.00	7,500	$562,500.00	0	$0.00	0	$0.00	7,700	$577,500.00
UXO Technician II	$68.00	0	$0.00	200	$13,600.00	30,000	$2,040,000.00	0	$0.00	0	$0.00	30,200	$2,053,600.00
Emergency Medical Technician	$50.00	0	$0.00	100	$5,000.00	1,500	$75,000.00	0	$0.00	0	$0.00	1,600	$80,000.00
Geophysical Data Manager	$134.00	0	$0.00	40	$5,360.00	240	$32,160.00	0	$0.00	0	$0.00	280	$37,520.00
Senior Level Geophysicist	$105.00	60	$6,300.00	0	$0.00	240	$25,200.00	0	$0.00	0	$0.00	300	$31,500.00
Jr Level Geophysicist	$73.00	0	$0.00	0	$0.00	240	$17,520.00	0	$0.00	0	$0.00	240	$17,520.00
Sr Level UXO Health & Safety	$134.00	30	$4,020.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	30	$4,020.00
Sr Level UXO QC Health & Safety	$90.00	30	$2,700.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	30	$2,700.00
Sr Level Non-UXO Health & Safety	$134.00	30	$4,020.00	0	$0.00	0	$0.00	0	$0.00	0	$0.00	30	$4,020.00
Senior Level Chemist	$134.00	90	$12,060.00	4	$536.00	280	$37,520.00	8	$1,072.00	120	$16,080.00	502	$67,268.00
Sr Geologist	$99.38	60	$5,962.80	0	$0.00	145	$14,410.10	20	$1,987.60	80	$7,950.40	305	$30,310.90
Sr Engineer	$117.15	120	$14,058.00	80	$9,372.00	870	$101,920.50	60	$7,029.00	160	$18,744.00	1,290	$151,123.50
Mid Level Chemist	$93.37	90	$8,403.30	0	$0.00	350	$32,679.50	100	$9,337.00	160	$14,939.20	700	$65,359.00
Mid level Geologist	$69.72	90	$6,274.80	100	$6,972.00	350	$24,402.00	100	$6,972.00	160	$11,155.20	800	$55,776.00
Jr Level Geologist	$51.72	60	$3,103.20	100	$5,172.00	350	$18,102.00	100	$5,172.00	160	$8,275.20	770	$39,824.40
Technical Editor	$82.00	80	$6,560.00	0	$0.00	0	$0.00	0	$0.00	80	$6,560.00	160	$13,120.00
Quality Assurance	$82.00	40	$3,280.00	0	$0.00	0	$0.00	0	$0.00	80	$6,560.00	120	$9,840.00
Project Administrator	$54.00	40	$2,160.00	0	$0.00	0	$0.00	0	$0.00	80	$4,320.00	120	$6,480.00
Clerk	$47.00	20	$940.00	0	$0.00	0	$0.00	0	$0.00	40	$1,880.00	60	$2,820.00
Word Processor	$47.00	80	$3,760.00	0	$0.00	0	$0.00	0	$0.00	80	$3,760.00	160	$7,520.00
Subtotal Labor			$118,858.10		$106,036.00		$3,610,274.10		$45,537.60		$131,232.00		$4,011,937.80
Guam (hrs) Tax on Labor		360	$1,273.57	1,080	$3,292.64	45,900	$132,212.96	360	$1,140.40	640	$2,124.54	48,340	$140,044.12
Total Labor		1,196	$120,131.67	1,248	$109,328.64	48,125	$3,742,487.06	476	$46,678.00	1,408	$133,356.54	52,453	$4,151,981.92
DIRECT SERVICES													
RoadImprovement			$0.00		$700,000.00		$0.00		$0.00		$0.00		$700,000.00
Direct Services Support Subcontractor			$0.00		$21,200.00		$1,109,695.00		$174,800.00		$0.00		$1,305,695.00
G&A on Support Subcontractor (11%)			$0.00		$2,332.00		$122,066.45		$19,228.00		$0.00		$143,626.45
Total Direct Services			$0.00		$723,532.00		$1,231,761.45		$194,028.00		$0.00		$2,149,321.45
OTHER DIRECT COSTS													
Laboratory / Data Validation Services			$0.00		$0.00		$0.00		$484,842.00		$0.00		$484,842.00
Supplies			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00
Equipment Usage			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00
Travel/Subsistence			$23,604.00		$100,874.00		$2,064,819.00		$31,472.00		$31,472.00		$2,252,241.00
Telecommunications			$1,065.00		$438.00		$23,535.00		$570.00		$570.00		$26,178.00
Postage/Shipping			$112.50		$18.75		$225.00		$7.50		$75.00		$438.75
Reproduction			$576.00		$9.60		$240.00		$9.60		$576.00		$1,411.20
Subtotal ODCs			$25,357.50		$101,340.35		$2,088,819.00		$516,901.10		$32,693.00		$2,765,110.95
G&A on ODCs (11%)			$2,789.33		$11,147.44		$229,770.09		$56,859.12		$3,596.23		$304,162.20
Guam Tax on ODCs			$944.16		$4,499.51		$92,743.56		$22,950.41		$0.00		$121,137.64
Total ODCs			$29,090.99		$116,987.30		$2,411,332.65		$596,710.63		$36,289.23		$3,190,410.80
Total Guam Tax			$2,217.73		$7,792.15		$224,956.52		$24,090.81		$2,124.54		$261,181.76
Fee on Subs and Expenses (10%)			$2,687.33		$83,272.71		$341,813.76		$76,664.78		$3,416.47		$507,855.05
SUBTOTAL COSTS			$151,909.98		$1,033,120.65		$7,727,394.92		$914,081.41		$173,062.24		$9,999,569.21
CONTINGENCY @ 20%			$30,382.00		$206,624.13		$1,545,478.98		$182,816.28		$34,612.45		$1,999,913.84
TOTAL COSTS IN 2002 DOLLARS			$182,291.98		$1,239,744.79		$9,272,873.91		$1,096,897.69		$207,674.69		$11,999,483.06

Note: Mobilization and Demobilization costs are included in Phases 2 and 3 work.

TOTAL PRESENT WORTH ROUNDED UP COST **$12,000,000.00**

This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

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TABLE 2-64. DESCRIPTION OF ARARs FOR EXCAVATION AND OFFSITE DISPOSAL ALTERNATIVE AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Chemical Specific

Authority	Citation	ARAR determination	Synopsis of requirement	Action to be taken to Attain Requirement
Federal: Safe Drinking Water Act (42 U.S.C., Ch. 6A, § 300[f]-300[j]-26)	40 CFR 141.61(a)	Relevant and appropriate	National primary drinking water standards are health-based standards as established by Maximum Contaminant Levels (MCLs) for public water systems. The NCP defines MCLs as relevant and appropriate for groundwater that is a potential source of drinking water. Groundwater might be a source of drinking water, but there are no current production wells in the area and the thinness of the freshwater lens may limit the potential usefulness of the groundwater as a potable source.	During implementation of the selected remedy, all stockpiles will be placed on a liner to prevent any impact to groundwater.
Federal: Resource Conservation and Recovery Act (RCRA). These regulations also take effect through Guam's authorized RCRA program.	For general reference: Part 261.3 (Definition of hazardous waste) Part 261.24 (Toxicity characteristic) Part 262.11 (Hazardous Waste Determination)	Relevant and appropriate	Pursuant to the "contained-in" policy, contaminated media must be managed as hazardous waste if the waste contains a listed hazardous waste.	COC-impacted soils which exceed Toxicity Characteristic Leaching Procedure (TCLP) parameters will be accumulated on-site in accordance with substantive provisions of RCRA regarding hazardous waste accumulation and will be shipped to a USEPA-certified off-island hazardous waste disposal facility, using Department of Transportation (DOT) standards and a DOT-certified transporter.
Territorial: No chemical specific territorial ARARs have been identified.				

TABLE 2-64. DESCRIPTION OF ARARs FOR EXCAVATION AND OFFSITE DISPOSAL ALTERNATIVE AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Location Specific

Authority	Citation	ARAR determination	Synopsis of Requirement	Action to be Taken to Attain Requirement
Federal: Coastal Zone Management Act of 1972	Public Law 92-583, 16 U.S.C. 1451-1456	Relevant and appropriate	Guam Coastal Zone Management Program pursuant to Section 312 of the Coastal Zone Management provides for the protection and management of coastal waters and shorelines in Guam	All wastes will be removed from the site, eliminating any potential for impacting the coastal zone on Guam. All heavy equipment will be well maintained and all decontamination will be done in a contained area to avoid generating any runoff that can impact surface water at storm detention ponds.
Territorial: Historical Preservation Act	21 Guam Code Annotated, Chapter 76	Applicable (if any historical objects are found during excavation)	Regulates the historical objects and sites on Guam. Archaeological sites have been documented near Dumpsites 1 and 2, but no historical objects or sites are currently known to exist at Dumpsites 1 and 2.	Detonation of OE materials in place will not occur because of potential damage to important archaeological sites near Dumpsites 1 and 2. Excavation activities will be stopped should any historical objects be found. An archeological survey will then be conducted at the excavation site to preserve any artifacts or historical objects.

Action Specific

Authority	Citation	ARAR determination	Synopsis of Requirement	Action to be Taken to Attain Requirement
Federal: Insecticide, Fungicide, and Rodenticide Act (FIFRA)	7 U.S.C. Section 136 et seq and 40 CFR Parts 150-189	Applicable (if pesticides needed during revegetation)	Regulates sale, use, storage and disposal of pesticides.	If pesticides are needed during revegetation, applicable requirements for use, storage & disposal of pesticides and their containers will be followed.

TABLE 2-64. DESCRIPTION OF ARARs FOR EXCAVATION AND OFFSITE DISPOSAL ALTERNATIVE AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Federal: RCRA Subtitle C. These regulations take effect through Guam's authorized RCRA program.	For general reference: 40 CFR Part 264	Relevant and Appropriate	Design and operating standards for containers and tanks used to store hazardous waste at CERCLA sites. Specification of site closure requirements. Any RCRA air emissions standards	COC-impacted soils which exceed Toxicity Characteristic Leaching Procedure (TCLP) parameters will be accumulated on-site in appropriate containers and in compliance with substantive provisions of RCRA. There will be a clean closure with all solid waste debris, OE materials and COC-impacted soils removed from the site. Potential fugitive emissions from burn pan will be monitored to prevent any impact to properties downgradient from the site.
Federal: Toxic Substances Control Act (TSCA)	40 CFR 761.61	Applicable	Bulk PCB remediation wastes, such as PCB contaminated soil, may be sent off-site for decontamination or disposal in accordance with TSCA, provided that the remediation waste is either dewatered on-site or transported off-site in containers meeting the requirement of the DOT Hazardous Materials Regulations at 49 CFR parts 171 through 180. Bulk PCB remediation wastes with a PCB concentration of less than 50 mg/kg may be disposed of according to the requirements of TSCA 761.61(a)(5)(v)(A).	PCB-impacted soils will be transported using DOT permitted contractors in accordance with TSCA.
Territorial: Solid Waste Management and Litter Control Act - Prohibited Hazardous Waste Activities	10 Guam Code Annotated (GCA), Chapter 51 - Section 51110 –51111	Applicable	Any standards with regard to protection of groundwater	Disposal of materials at the Andersen AFB landfill will comply with all substantive and procedural requirements.

TABLE 2-64. DESCRIPTION OF ARARs FOR EXCAVATION AND OFFSITE DISPOSAL ALTERNATIVE AT URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Territorial: Guam Air Pollution Control Standards and Regulations - Section 1103.4 Fugitive Dust	Guam's Air Pollution Control Standards and Regulations, promulgated under the authority of Chapter 49, Title 10 of the Guam Code Annotated (GCA), also known as the Air Pollution Control Act (P.L. 10-74) - Section 1103.4(a)(1)	Applicable	The federal Clean Air Act as amended requires local air pollution control districts to submit cleanup plans in areas polluted by particulate matter. Guam requires reasonable precautions to be taken with respect to the creation of visible fugitive dust.	Water spray will be used to suppress dust emission from dump trucks driving on unpaved roads.
Territorial: Water Pollution Control Act	10 Guam Code Annotated, Chapter 47	Relevant and Appropriate	Protects groundwater and waters of the territory	All stockpiles will be placed on a liner to prevent impact to groundwater and decontamination of heavy equipment will be done in a contained area to avoid generating any runoff that can impact surface water.

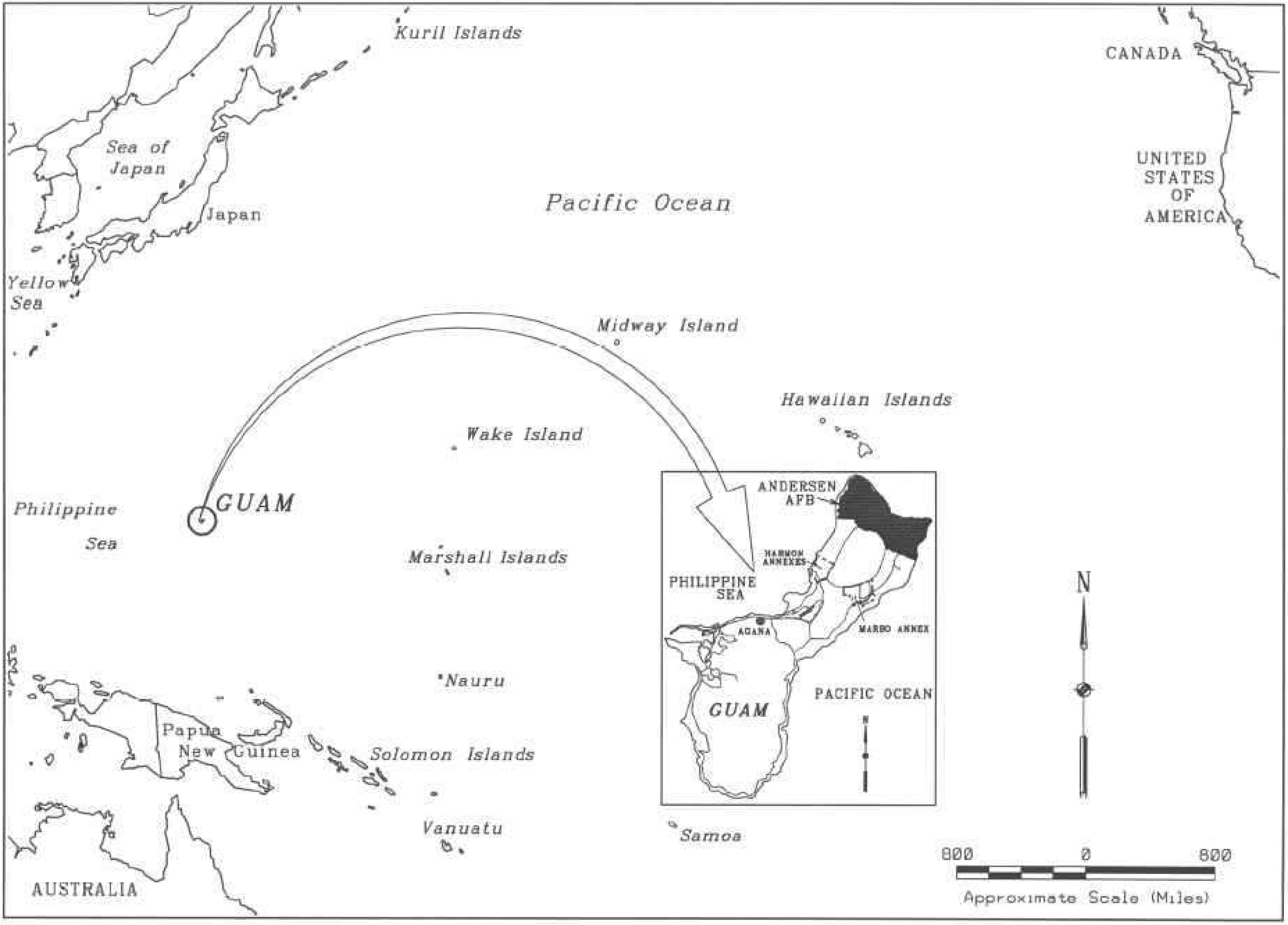


Figure 2-1. Location Map of Guam.

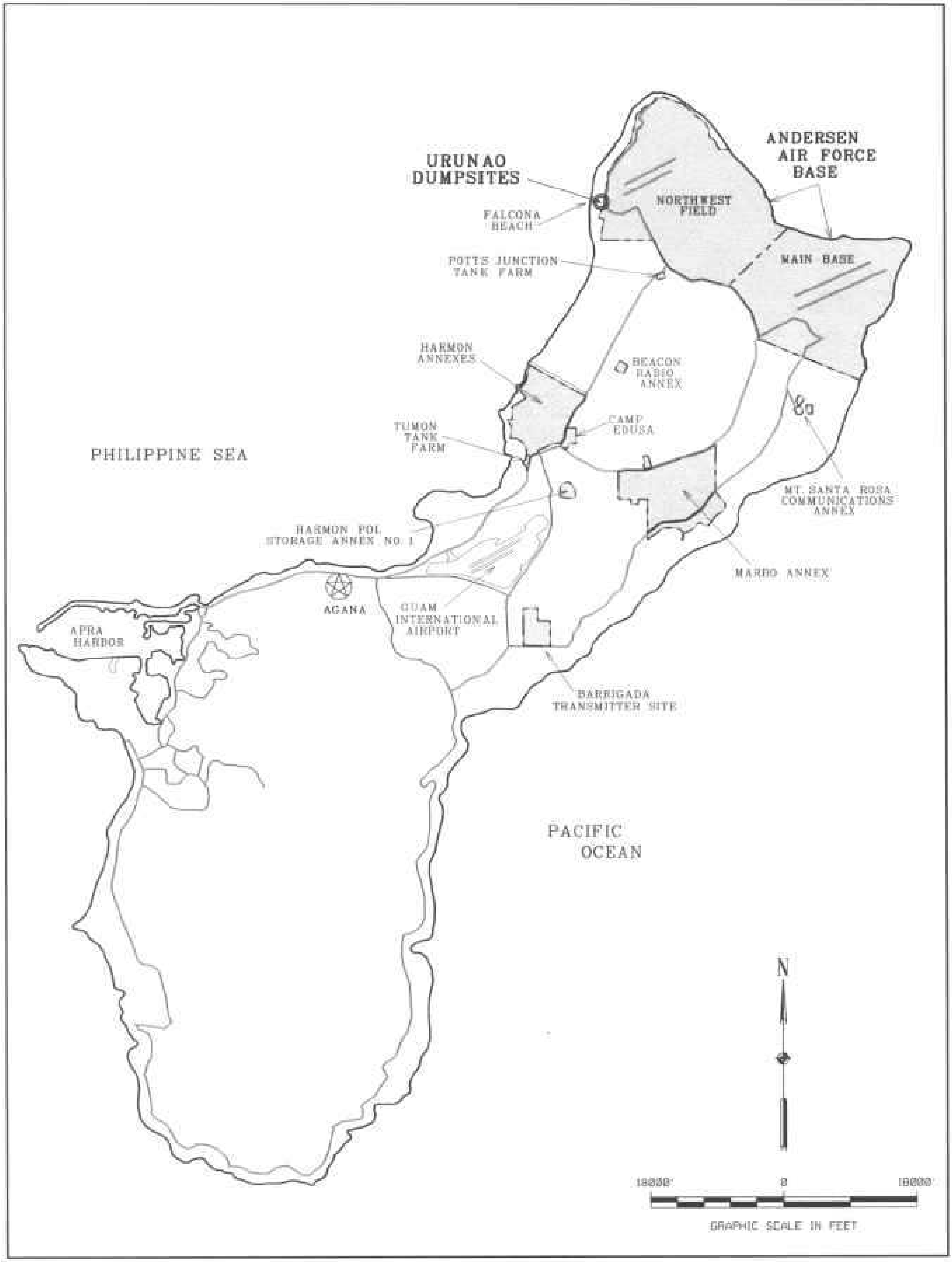


Figure 2-2. Location Map of Andersen Air Force Base on Guam.

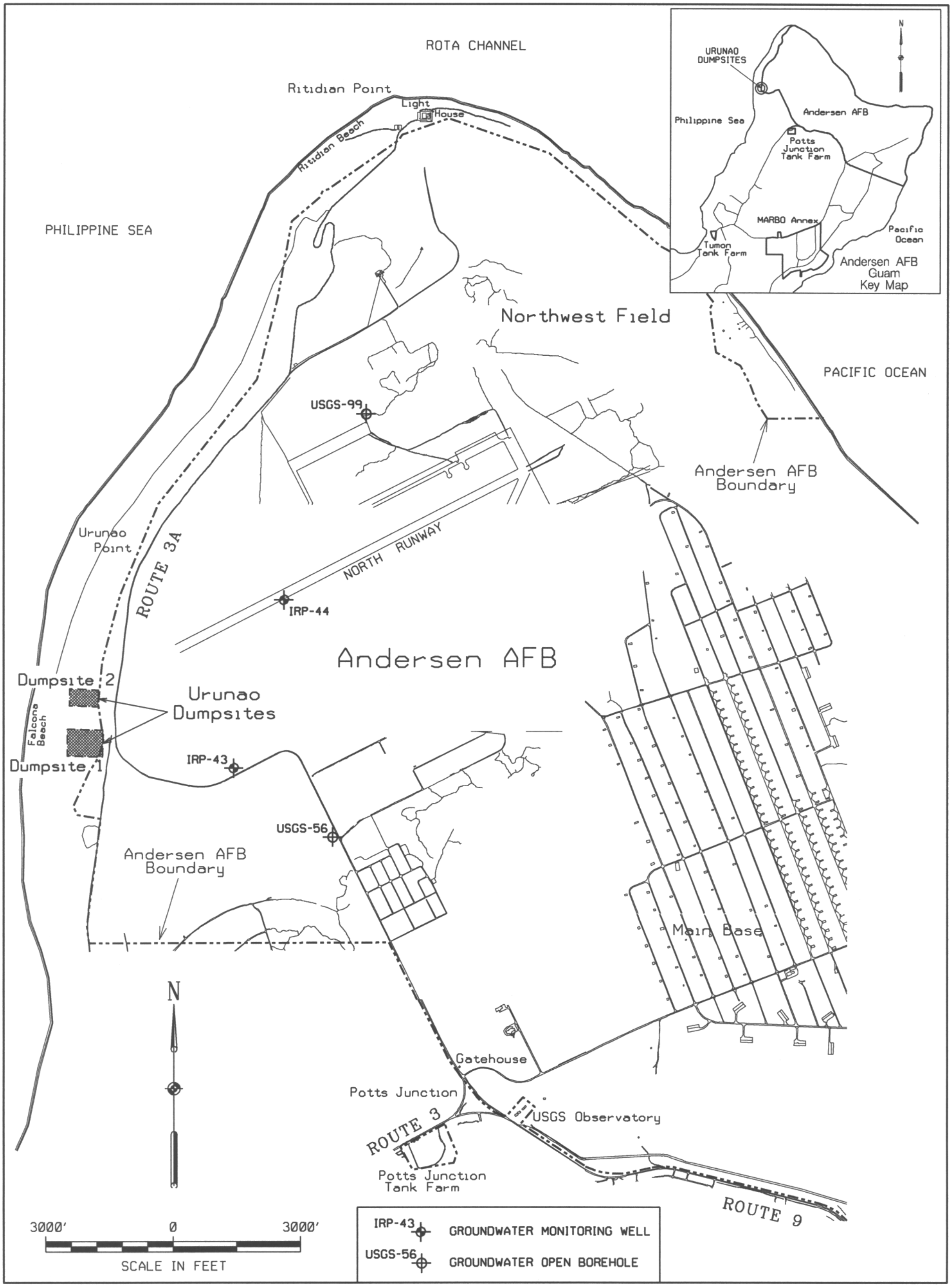


Figure 2-3. Location Map of Urunao Dumpsites 1 and 2 on Northwest Field.

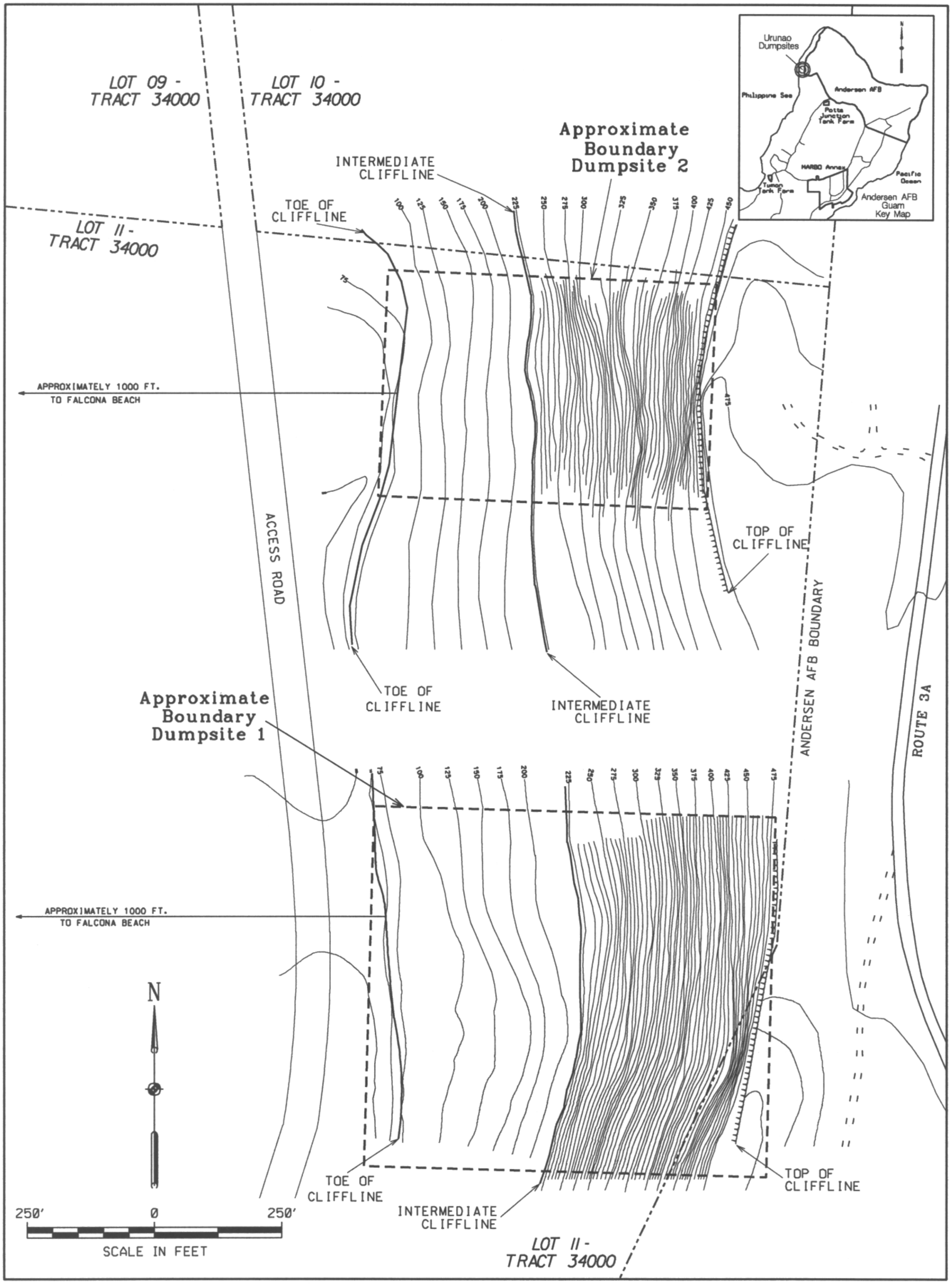
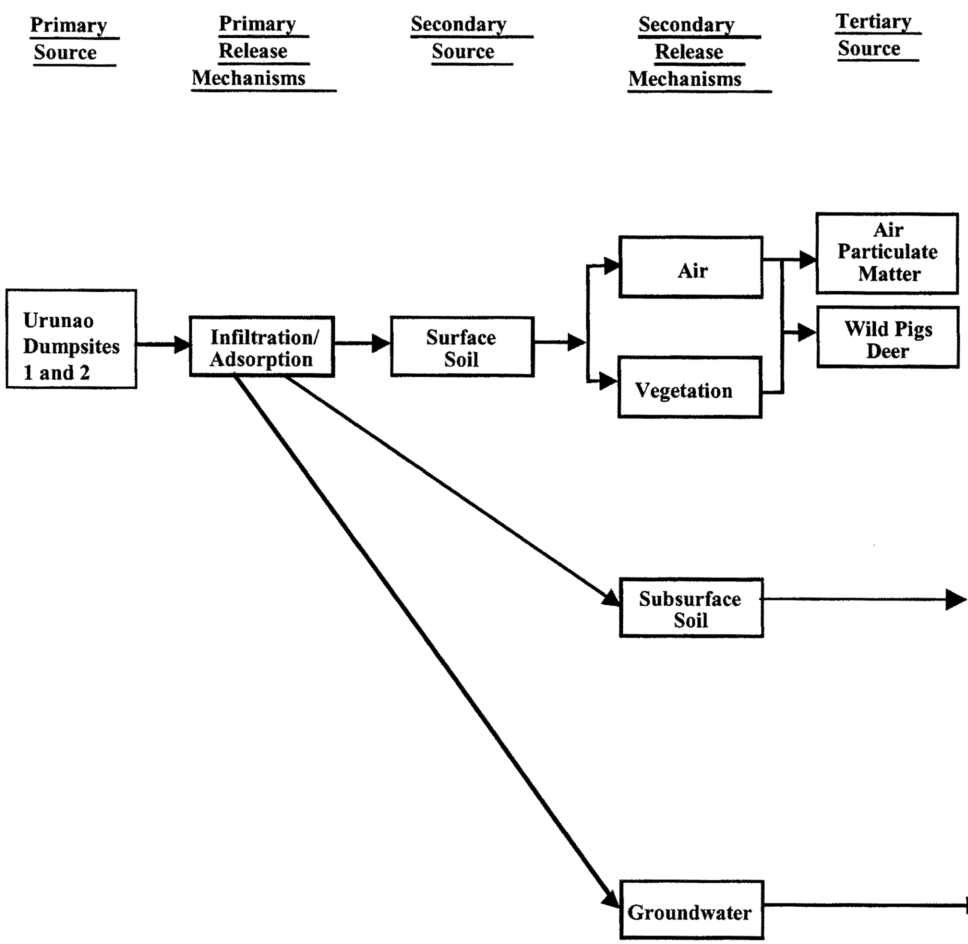


Figure 2-4. Boundaries of Urunao Dumpsites 1 and 2.



Potential Exposure Routes

Specific Receptors of Concern

	Current Residents (Adults, Children)	Future Residents (Adults, Children)	Trespasser/ Occasional User/ Hunter
Soil Ingestion	X	X	X
Dermal Contact with Soils	X	X	X
Inhalation of Air Particulates	X	X	
Ingestion of Deer, Pig			X

	Future Residents (Adult and Children)	Current Construction/ Utility Worker	Future Construction/ Utility Worker
Soil Ingestion	X	X	X
Dermal Contact with Soil	X	X	X
Inhalation of Air Particulates	X	X	X

Figure 2-5. Conceptual Site Model for Human Health Risk Assessment at Urunao Dumpsites 1 and 2, Andersen AFB, Guam.

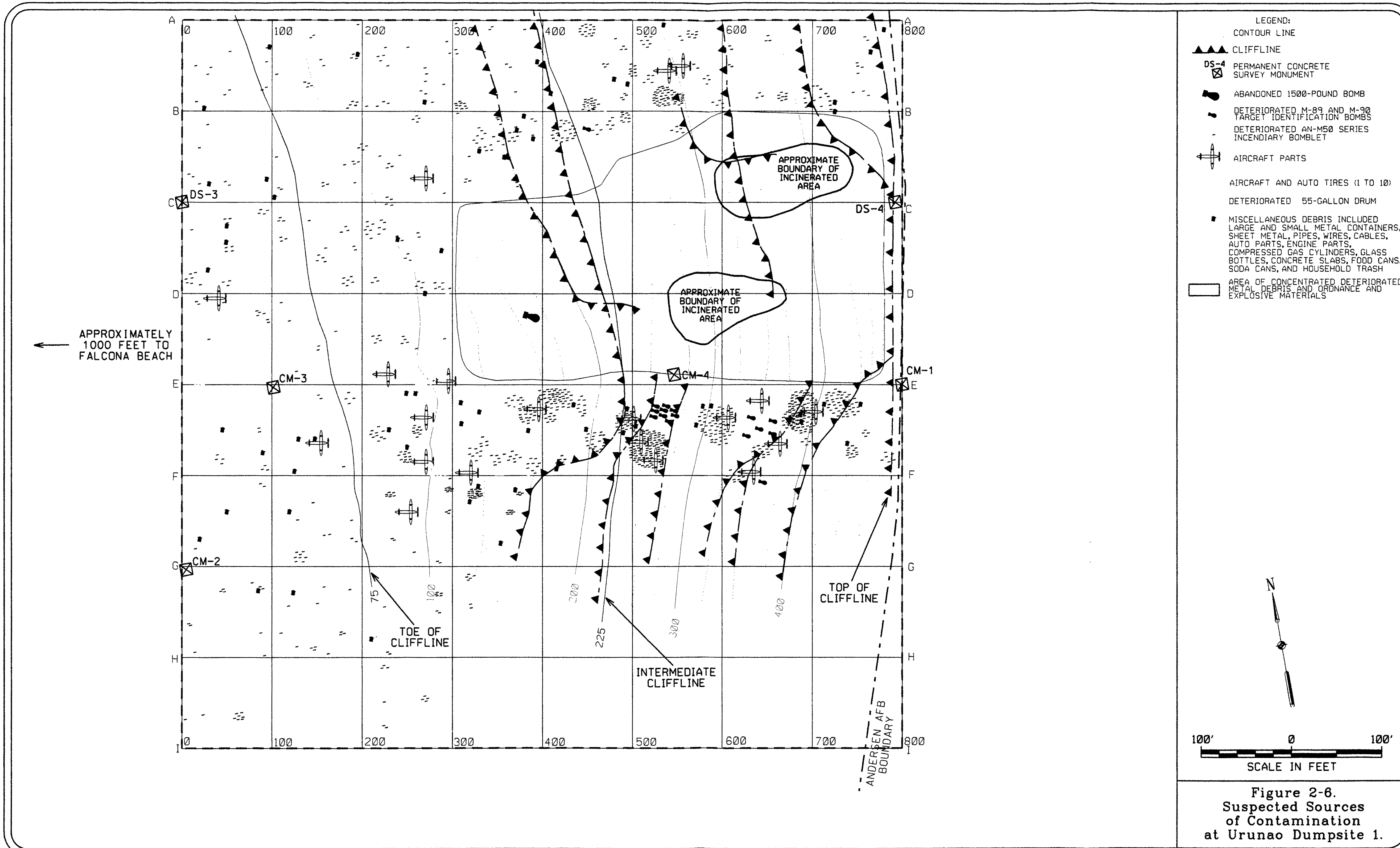


Figure 2-6.
Suspected Sources
of Contamination
at Urunao Dumpsite 1.

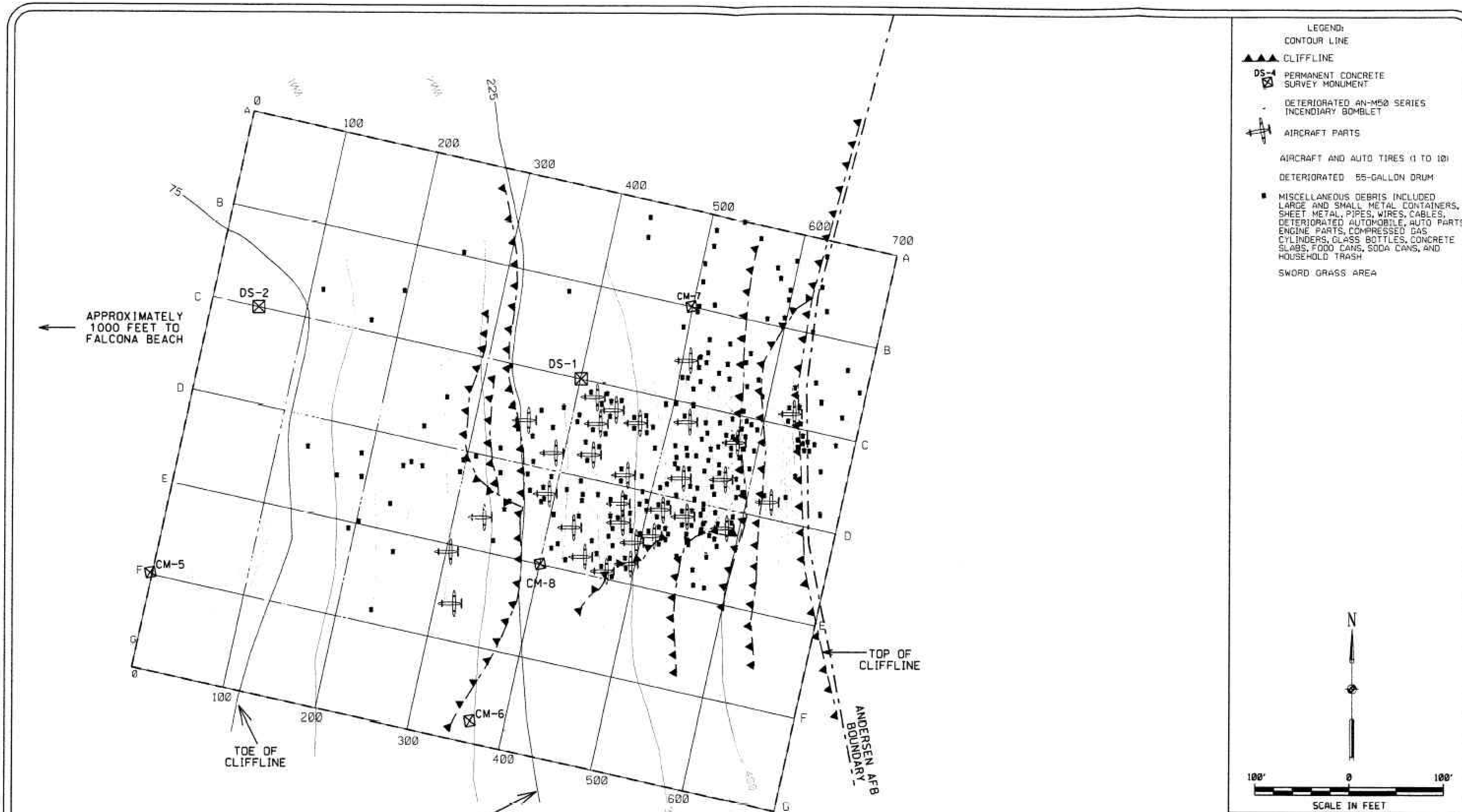


Figure 2-7.
Suspected Sources
of Contamination
at Urunao Dumpsite 2.

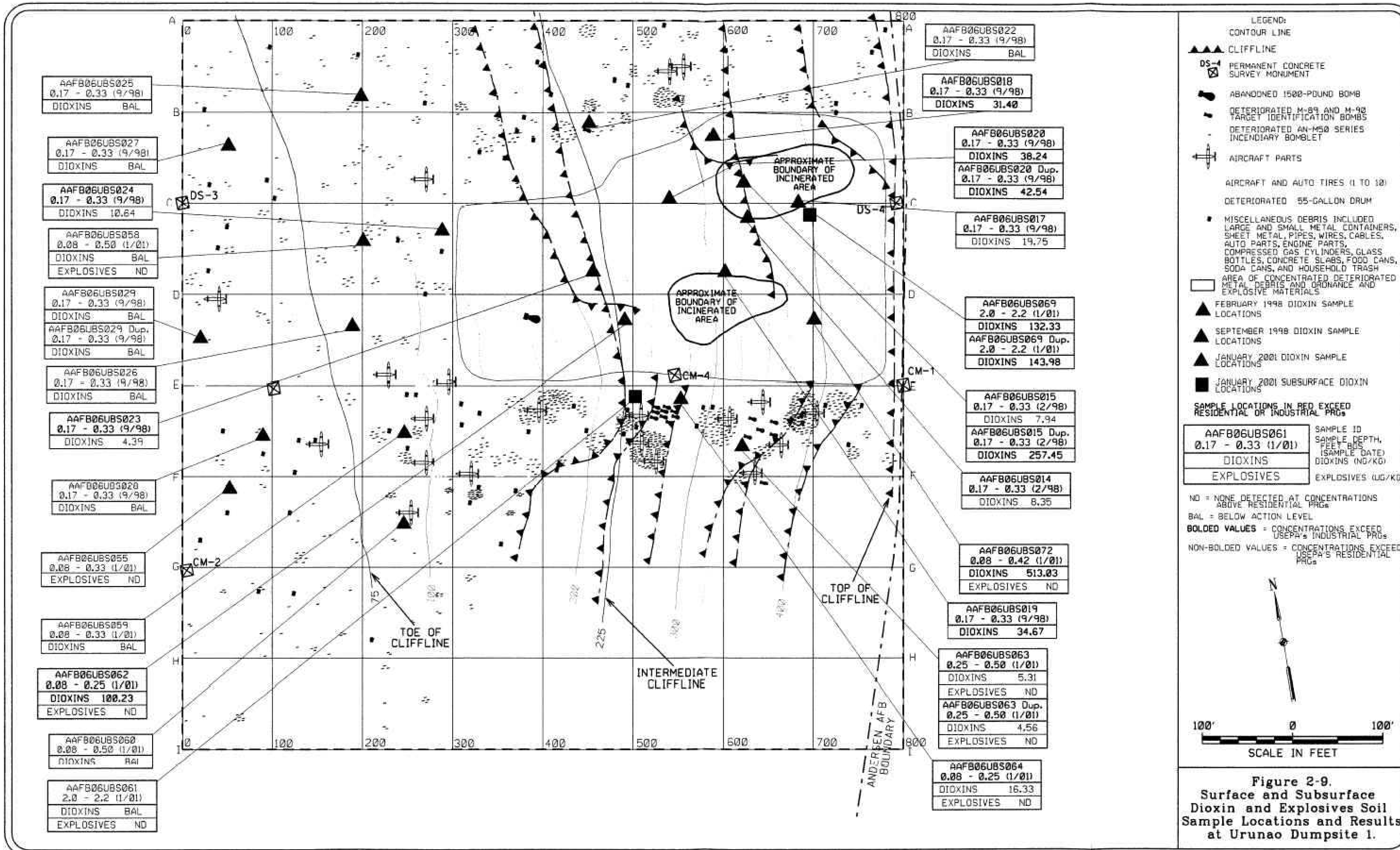


Figure 2-9. Surface and Subsurface Dioxin and Explosives Soil Sample Locations and Results at Urunao Dumpsite 1.

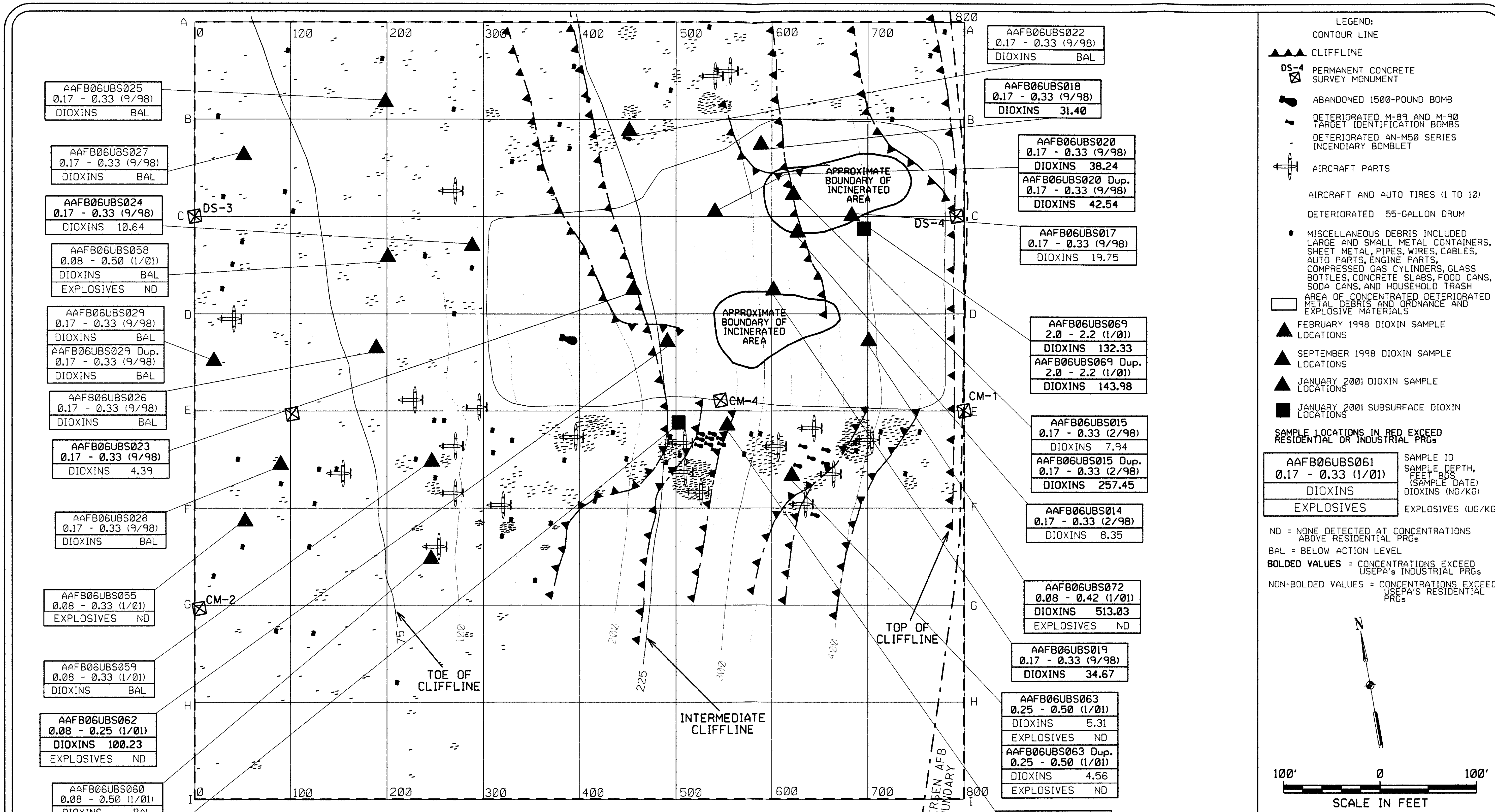


Figure 2-9. Surface and Subsurface Dioxin and Explosives Soil Sample Locations and Results at Urunao Dumpsite 1.

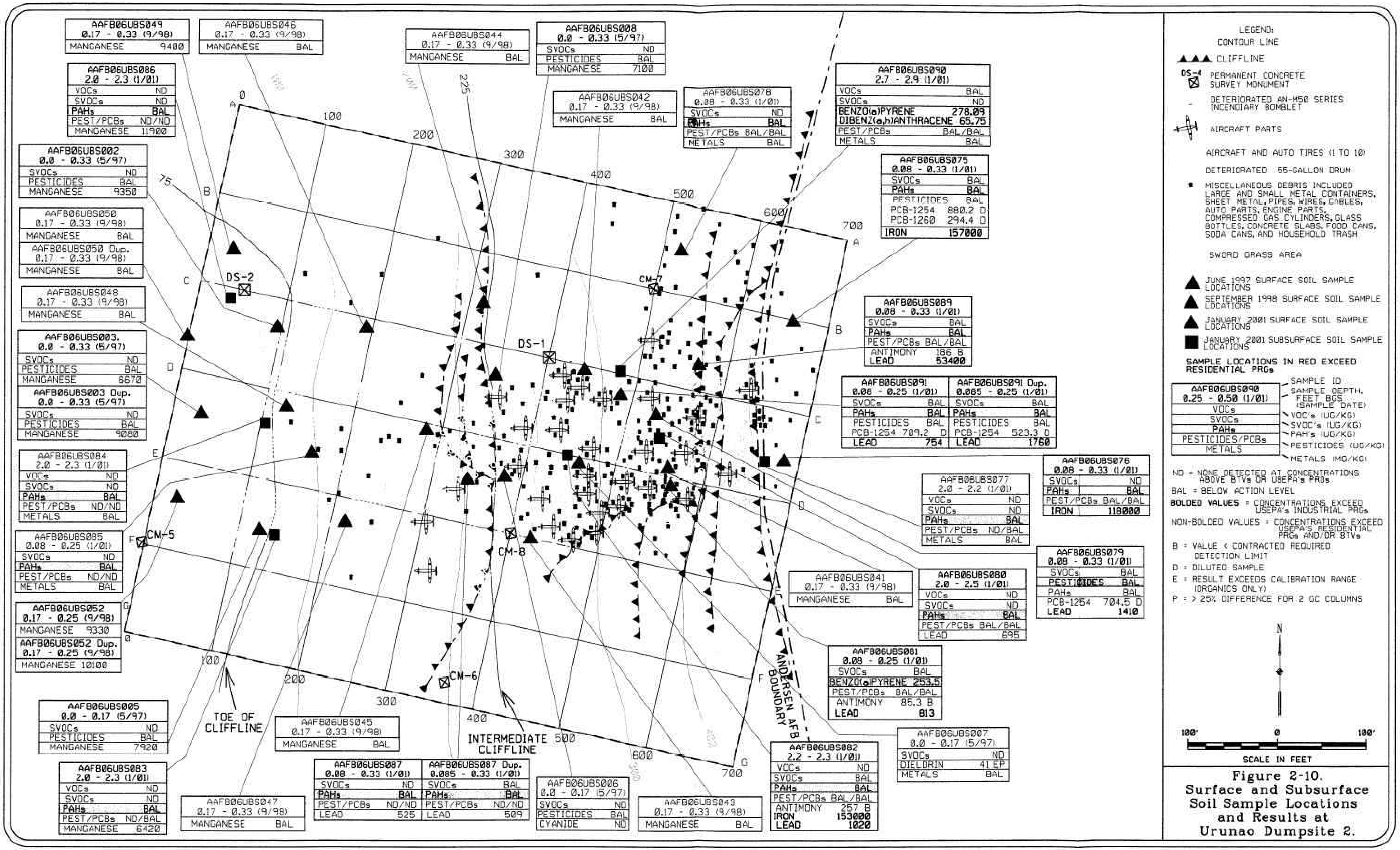


Figure 2-10. Surface and Subsurface Soil Sample Locations and Results at Urunao Dumpsite 2.

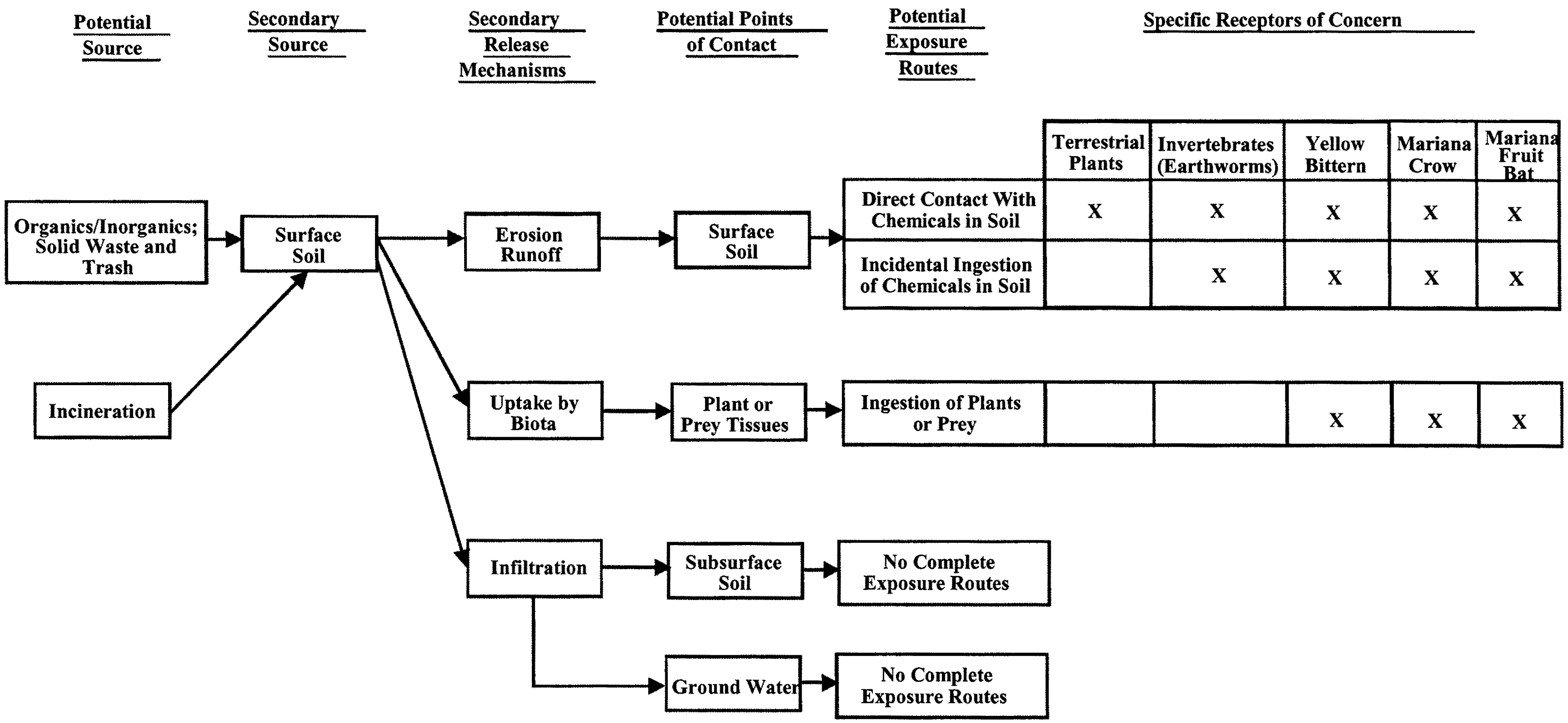


Figure 2-11. Conceptual Site Model for Ecological Risk Assessment at Urunao Dumpsites 1 and 2, Andersen AFB, Guam.

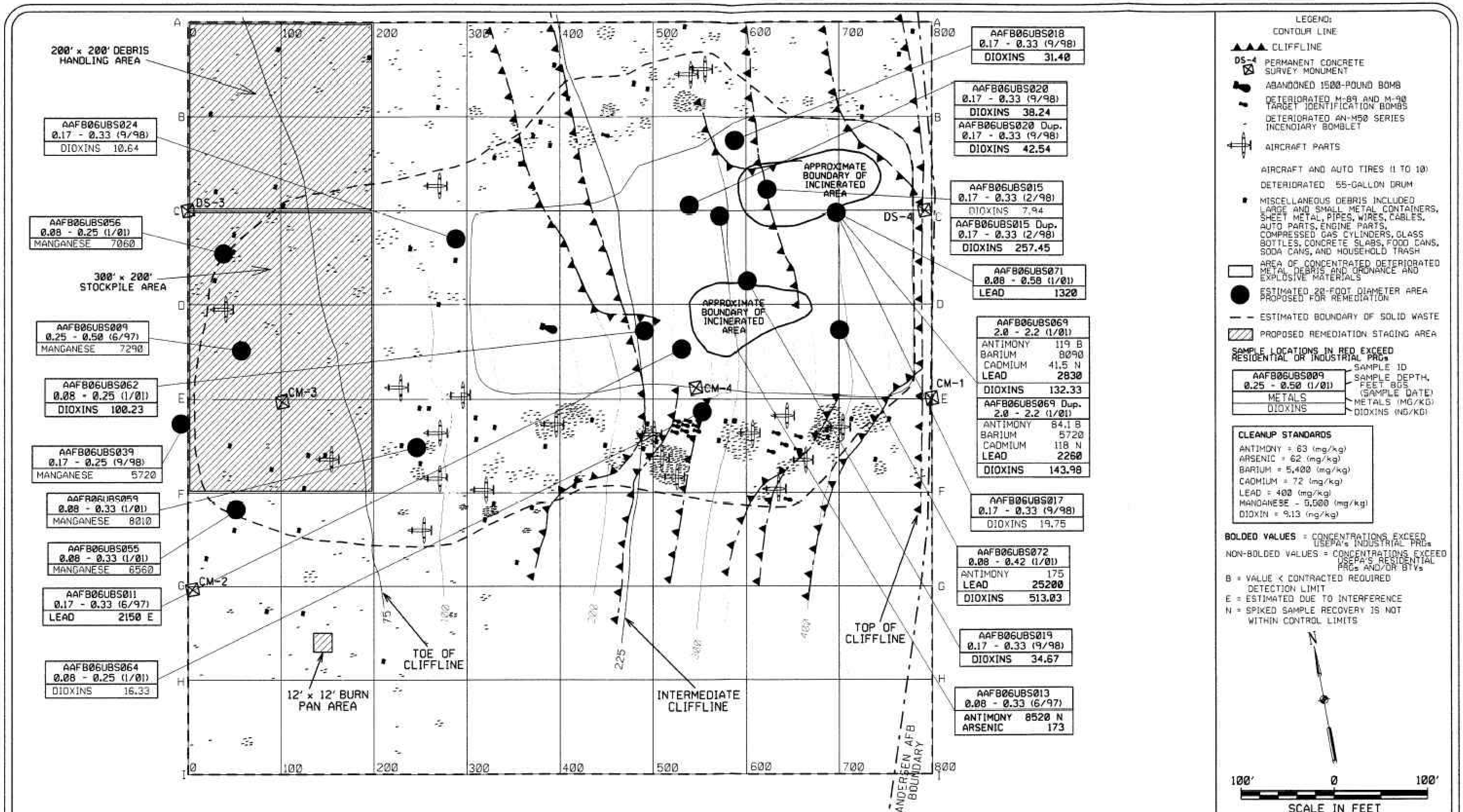


Figure 2-12. Proposed Remediation Sites at Urunao Dumpsite 1.

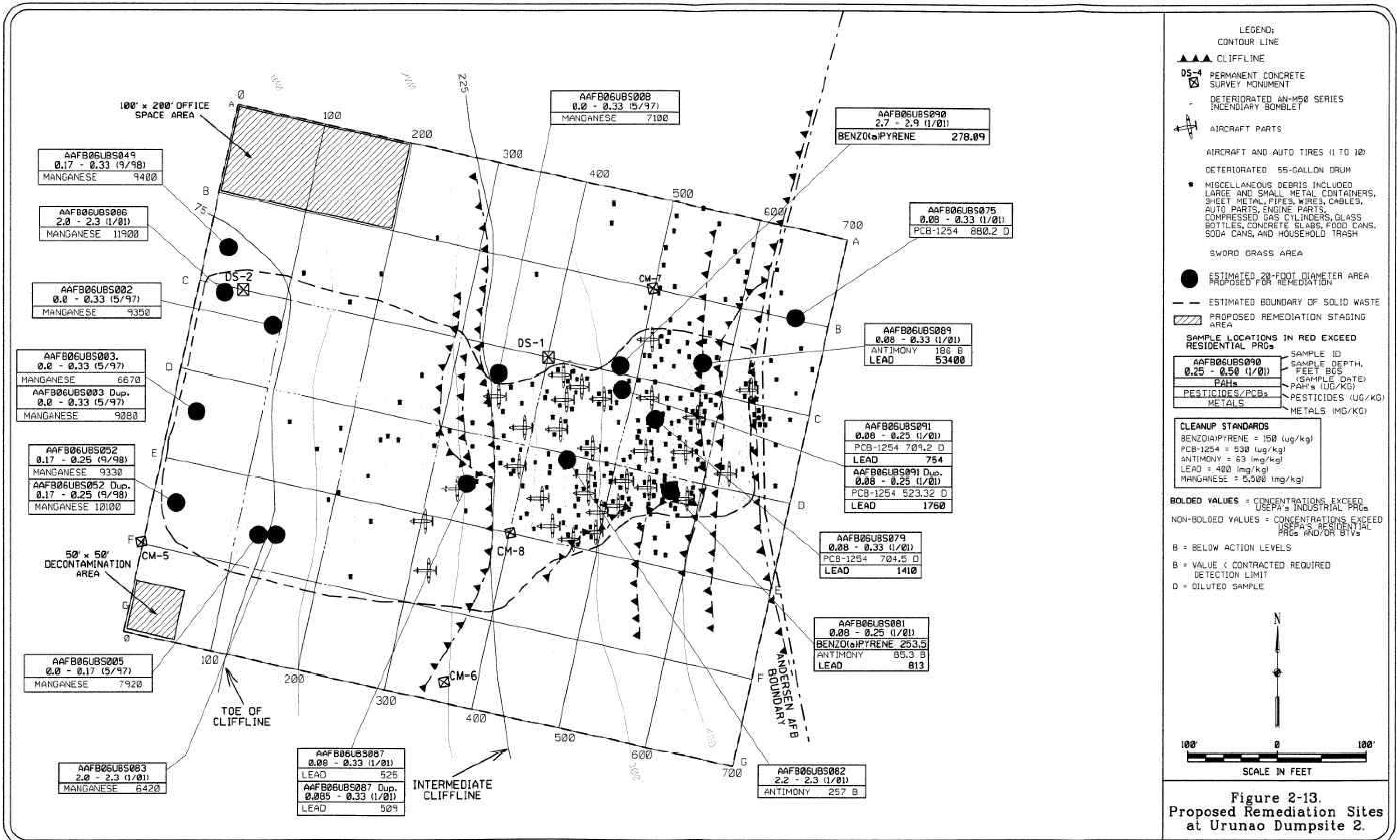


Figure 2-13.
Proposed Remediation Sites
at Urunao Dumpsite 2.

Photo 2-1. Late 1940s aerial photograph of Urunao Dumpsites 1 and 2.

Photo 2-2. Warning Sign Posted at Urunao Dumpsite 1 to Prevent Public Access.

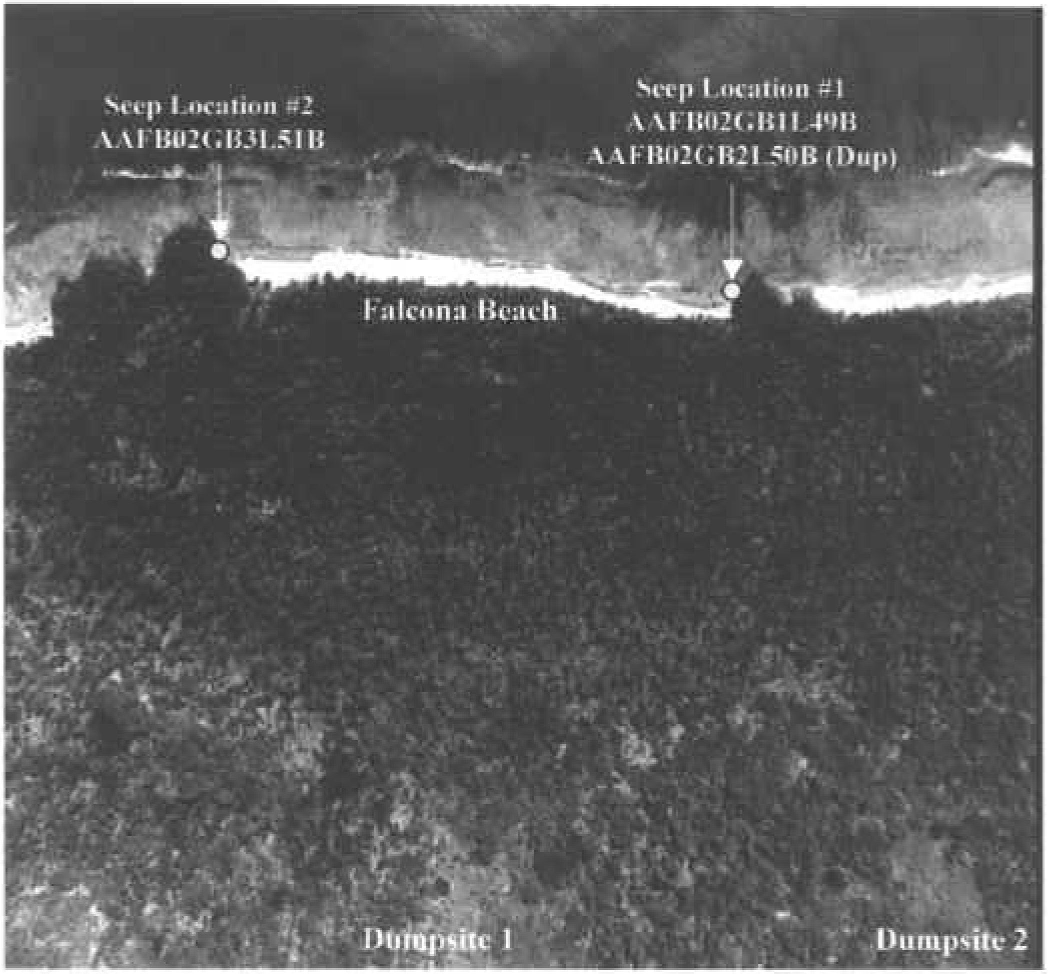


Photo 2-3. Location of Seep Samples Downgradient from Urunao Dumpsites 1 and 2 at Falcona Beach.

3. RESPONSIVENESS SUMMARY

The community response regarding the Urunao OU is an important part of this ROD because Urunao Dumpsites 1 and 2 are located on private property. In this section, a summary of public involvement and comments regarding the Urunao dumpsites is presented.

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

The RI/FS and Proposed Plan documents for the Urunao OU were released to the public for review and comment in October 2002 and March 2003, respectively. Andersen AFB published a notice of availability for the RI/FS and Proposed Plan documents in Guam's *Pacific Daily News* from 01 through 03 April 2003. The notice also included the dates of the public comment period from 31 March to 30 April 2003. A public meeting was held in the Guam Hilton Hotel on 10 April 2003 where the Proposed Plan for Urunao was presented and representatives from USEPA, GEPA, and Andersen AFB responded to the public's questions regarding the Proposed Plan. .

Upon completion of the public comment period, only one written question/comment was received from a property owner, which will be presented at the end of this section. A transcript of the public meeting and the questions/comments and responses generated at the meeting are presented on the following pages.

ANDERSEN AIR FORCE BASE URUNAO DUMPSITES 1 AND 2 PROPOSED PLAN PUBLIC MEETING MINUTES
10 April 2003

ATTENDEES

Board Members and Support

Col. B. Streett (AAFB) – Installation Co-chair
Mr. F. Castro – Co-chair
Dr. G. Denton – Mediator
Senator J. Brown – RAB Member
Ms. N. Wood – RAB Member
Mr. M. Gawel – RAB Member
Ms. L. Concepcion – RAB Member
Ms. M. Q. McDonald – RAB Member
Mr. E. Artero – RAB Member
Ms. J. Duwel – RAB Member
Ms. C. Sian-Denton – RAB Member
Mr. M. Ripperda – USEPA IRP Manager
Mr. W. Leon Guerrero – GEPA IRP Manager
Ms. G. O. Garces – GEPA
Lt. Col. T. Hagmaier – AAFB
Lt. Col. B. Arnold – AAFB
Lt. S. Small – AAFB
Lt. K. Melchor – AAFB
Ms. J. Poland – AAFB
Ms. Y. Bordallo – AAFB
Mr. J. Torres – AAFB
Mr. G. Ikehara – AAFB IRP Manager
Mr. D. Agar – AAFB
Mr. J. Sullivan – PACAF
Mr. M. Pankov – PACAF

Public

Mr. D. Calvo – Property Owner
Mr. T. Artero – Property Owner
Mr. B. Perez – Property Owner Mr. A. Sablan – Property Owner Mrs. A. Sablan – Property Owner
Mr. M. Artero – Property Owner
Senator L. Kasperbauer
Mr. C. Arnsfield – IT
Dr. J. Rosacker – BAH
Mr. P. Dusenbury – BAH
Mr. B Thomas – ASE
Mr. J. Lazzeri – EA
Mr. T. Ghofrani – EA
Mr. R. Shambach – EA
Mr. M. Price – EA
Mr. J. Morrell – EA
Ms. T. Taszarek – Foster Wheeler
Mr. P. Hannia – USACE
Ms. T. Hormillosa – UOG
Dr. J. Salas
Ms. J. Overturf

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

Introduction:

Mr. G. Ikehara introduced himself as the Installation Restoration Program (IRP) Manager with the Civil and Environmental Engineer Squadron at Andersen AFB. Before the Public Meeting for the Urunao OU, Mr. Ikehara asked the Restoration Advisory Board (RAB) members if they had any questions or comments about the former RAB meeting minutes. Some RAB members stated that the hard copies of the RAB minutes had every other page missing. Mr. Ikehara expressed regret for the inconvenience and stated that the RAB meeting minutes will be corrected, sent to all members, and finalized during the next RAB meeting.

Mr. Ikehara mentioned that the purpose of this Public Meeting was to present the Proposed cleanup alternative for Urunao Dumpsites 1 and 2. Next, Mr. Ikehara introduced Dr. G. Denton as the meeting mediator. Dr. Denton stated that during this portion of the program, the study, cleanup, and the Final Proposed Plan for the Urunao OU would be presented. Dr. Denton requested that everyone hold his or her questions and comments until the presentation was finished. Writing materials were provided to the public for note taking and/or recording
questions that might come up during the presentation. Additionally, post cards were provided to record written comments for esubmittal to Andersen AFB by 30 April 2003. Dr. Denton then introduced Mr. J. Torres to present the Proposed Plan for Uruano Dumpsites 1 and 2.

Urunao Dumpsites 1 and 2 Proposed Plan by Mr. J. Torres:

Mr. Torres stated that he is with the Civil and Environmental Engineer Squadron at Andersen AFB. Mr. J. Torres indicated that his PowerPoint presentation would describe the Proposed Plan for Urunao Dumpsites 1 and 2; provide the summary background of investigative and cleanup results; and present the preferred remedial alternatives. At the conclusion of his presentation the the forum would be opened for public comments.

The purpose of this Public Meeting was to inform the public about the Proposed Plan for Urunao Dumpsites 1 & 2 and solicit public questions/comments regarding the Proposed Plan that can be incorporated into the Record of Decision.

Urunao Dumpsites 1 and 2 are located in northwest portion of the island. Dumpsite 1 is approximately 16.5 acres and Dumpsite 2 is approximately 6.2 acres. There are no historical records of waste disposal practices at these dumpsites. During and shortly after World War II (WWII), the Urunao dumpsite area was referred to as an over-the-cliff dump. Based on accounts by former USAF personnel, wastes were dumped at the top of Dumpsites 1 and 2, pushed over the cliff, and covered with fill material or burned using napalm.

From the end of WWII to 1985, the Air Force did not perform any remedial action or remedial investigations at the dumpsites. In 1998, an Environmental Impact Statement (EIS) was prepared for the dumpsites (USAF, 1988) in accordance with the National Environmental Policy Act (NEPA). The NEPA EIS included the following alternatives for cleanup of Urunao Dumpsites 1 and 2:

- Complete removal of solid waste materials and Ordnance and Explosives (OE) materials using a crane
- Surface clearance of large solid waste materials and OE materials using helicopters
- Surface clearance of OE materials only using helicopters
- No cleanup by acquiring the real property of interest and fence them
- No action

In 1998, an Environmental Baseline Survey was conducted at both of the dumpsites that included a detailed site inventory and surface soil sampling and analysis. However, the number of samples collected was not sufficient to evaluate the potential risks posed to human and ecological receptors. Consequently, in 2001 the Urunao OU was established and additional surface soil, subsurface soil, and seep [groundwater] samples were collected and analyzed to further delineate the extent of contaminants, complete human health and ecological risk assessments, develop cleanup standards, and evaluate different cleanup alternatives under the Remedial Investigation/Feasibility Study (RI/FS). The next steps will be to complete a Remedial Design, execute the preferred cleanup alternative, and closeout the site.

Based on detailed site inventory at Dumpsite 1, most of the solid waste material included metal debris, tires, aircraft parts, household trash, incinerated area, and deteriorated OE materials. The solid waste material at Dumpsite 2 is similar to Dumpsite 1, with the exception of the incinerated area and deteriorated OE materials. Mr. Torres presented photographs of typical solid waste and OE materials and stated that most of the OE materials are deteriorated [phosphorous/]magnesium-based target identification bomblets. Mr. Torres added that the location of debris at the dumpsites are referenced to survey points and are shown in figures of the Proposes Plan handout.

Approximately 1,800 truck loads of solid waste debris is estimated for removal from both dumpsites. The chemicals of concern at Dumpsite 1 included antimony, arsenic, barium, Dumpsite 2 included benzo(a)pyrene, polychlorinated biphenyls (Arochlor-1254), antimony, lead, and manganese. As there are no monitoring wells at the Dumpsites 1 and 2, two freshwater seep samples were collected along Falcona Beach approximately 1,000 feet downgradient from the dumpsites during the lowest daily tide. The seep samples were analyzed for volatile organic compound, polycyclic aromatic hydrocarbon, semivolatile organic compound, pesticides, polychlorinated biphenyls, and metals and when the results were compared with the United States Environmental Protection Agency (USEPA) [water quality standards] Maximum Contaminant Levels (MCLs), and all results were below MCLs.

Thirty four cleanup alternatives were evaluated to select final preferred alternative. Alternatives that could not effectively deal with the combination of the two dumpsites' chemical of concerns, solid waste materials, and OE materials were eliminated. Alternatives that could not deal with the steep slope of the dumpsites were eliminated. Alternatives that could take many years before the cleanup is completed at the dumpsites were also eliminated. At the end of this process only three cleanup alternatives are left for further evaluation. Those three cleanup alternatives are the *Excavation and Offsite Disposal* alternative, *Institutional Control and Property Acquisition* alternative, and *No Action* alternative. The cost of the *Excavation and Offsite Disposal* cleanup alternative to remove all chemical of concern-impacted soil, all solid waste materials, and all OE materials was estimateds at approximately $12,000,000. The *Institutional Control and Property Acquisition* alternative to purchase the property was estimated at approximately $12,500,000. This alternative was not desirable because it leaves at contaminated soil, all solid waste materials, and all OE materials at the dumpsites. The least desirable alternative was *No Action* that would not cost anything. So the preferred alternative for Dumpsites 1 and 2 was the *Excavation and Offsite Disposal* cleanup alternative.

Under the *Excavation and Off-Site Disposal* cleanup alternative, using a 100-foot by 100-foot grid, all surface OE materials will be segregated from the solid waste materials. The OE materials will be stored in temporary magazines until there are sufficient OE materials [incendiary bomblets] for processing at the site, by burning or chemical treatment. Once the surface OE materials are segregated and removed from the site, the vegetation at the site will be cleared for subsurface excavation. Geophysical survey will be conducted prior to subsurface excavation to locate any OE materials. All impacted soil and solid waste materials will then be transported to the Andersen AFB Landfill for disposal, or will be shipped to a USEPA certified off-island hazardous waste disposal facility. Once all impacted soil, solid waste materials, and OE materials are removed from the dumpsites, confirmation samples will be collected to ensure that all contamination are removed from the dumpsites. Then all equipment will be demobilized and the dumpsites will be re-vegetated. The cleanup of Dumpsites 1 and 2 is going to be very difficult due to steep slope of more than 30 degrees. However, the newly constructed access road at the bottom of the dumpsites, has made the cleanup possible at the dumpsites.

After this public meeting comments from the public will be recorded during this meeting. Additional comments can be submitted in writing after this meeting through 30 April 2003. These comments will be included in the Record of Decision. The draft Record of Decision is scheduled for the regulators by 30 July 2003. The Final Record of Decision including the approval signatures of the United States Environmental Protection Agency, the Guam Environmental Protection Agency, and the Air Force is scheduled for December 2003. The remedial design of the preferred alternative is scheduled for completion in 2004, the cleanup funding is scheduled for 2006, and the actual cleanup is expected for completion post 2007.

Q/A:

1st Question by Mr. T. Artero: Shouldn't compensation to property owners for damages done at dumpsites be included parallel to the cleanup effort? Why should the compensation be dealt with using other means than the cleanup?

1st response by Col. B. Streett : We should note that for about 40 years nothing was done at the dumpsites. The efforts that we see now are as the result of the environmental conscience of the last decade or so. There is a different process for compensation claim that is not included in the Record of Decision process that I will ask our legal advisor to explain.

2nd and last response by Mr. M. Pankov: To initiate a compensation process, an Air Force Claim must be filled through Cap. Ibn Spicer 366-3174. Furthermore, I assure you that your concern regarding the compensation will be elevated to PACAF [Pacific Air Force] headquarters. Another mechanism to initiate the compensation process is the *Responsiveness* section of the Record of Decision that documents the very questions and concerns that you have expressed in this meeting.

2nd Question by Senator L. Kasperbauer: As it was mentioned during the presentation, due to the new access road, the area near Dumpsites 1 and 2 is developing fast. Will the potential future neighbors of Dumpsites 1 and 2 be affected by the cleanup effort? Will the existing access road be improved for the cleanup effort? And, finally, why doesn't the Air Force access the dumpsites from the top, using the Navy land to the south?

1st response by Mr. G. Ikehara: The cleanup cost includes the cost of the improving the access road since the access road will most definitely be impacted by the cleanup activities. The public safety is of major concern during the cleanup due to handling OE materials. Both of the dumpsites will be fenced off to prevent access to the site during the cleanup. There may be a situation where some of the neighbors have to be evacuated for short intervals to prevent any accident, or injuries. The accessibility from the south has been considered but due to the dumpsites' steep slope the access road from the south is not feasible.

2nd and last response by Col. B. Streett: It should be noted that, for the most part, the OE materials at the dumpsites are deteriorated phosphorous in nature [used for target identification at nights] and are incendiary in nature rather than explosive. Additionally, the road improvement will be part of the budget because approximately 1,600, or more, dump truck loads will be needed to remove the debris and cleanup the dumpsites.

3rd Question by Mr. T. Artero: Can we have a hard copy of the PowerPoint presentation?

1st and only response by Mr. J. Torres: Yes.

4th Question by Mr. F. Castro: What happens at the dumpsites between the design in 2003 and the actual cleanup in 2006? Are there any monitoring or contingency plans?

1st and only response by Mr. G. Ikehara: Actually, the Record of Decision is expected to be completed in 2003 followed by the remedial design that is expected to completed in 2004. The funding is anticipated in 2006 because of its significant amount.

5th Question by Mr. F. Castro: What kind action could be taken to accelerate the funding the cleanup, say by one fiscal year?

1st response by Mr. G. Ikehara: In order to expedite the funding some urgent action on the part of the U.S. Congress is needed to bring the funding closer to, say, fiscal year 2005. Should funding be available earlier than 2006, the cleanup will be moved earlier respectively.

2nd response by Mr. J. Sullivan: PACAF goes through several planning processes during year and each time we have the opportunity to move funding around. However, it is not until September of each year that we would know how much funding is available that can be move around for a project. Right now, 2006 is the fiscal year that we can be certain the funding will be available for the cleanup of the dumpsites. Nevertheless, we keep looking for opportunity to expedite the cleanup funding. One problem is the magnitude of the cleanup funding. It will take several projects to be completed under budget to fund a project like the Urunao dumpsites.

3rd and last response by Col. B. Streett: The Air Force has prepared its budget many years in advance. As we get closer to the actual fiscal year budget, it will be very difficult, if not impossible, to change the budget without congressional approval. Under very exceptional situations, such as natural disaster, congress may approve additional budget. To expedite the cleanup of the dumpsites with this magnitude, congressional approval is needed.

6th Question by Ms. J. Duwel: Mr. F. Castro asked a very good question that I do not think was answered. Are there any monitoring, or contingency plans between now and the actual cleanup in 2006?

1st and only response by Mr. G. Ikehara: The Air Force will continue monitoring at the site to limit the exposure pathways. The Air Force is in the process of securing the access to the dumpsites and posting warning signs to keep public out.

7th Question by Mr. F. Castro: I am asking this question of behalf of a property owner who wanted to know if there is another dumpsite about 200 yards north of the Urunao dumpsites? And if there is, how is does that dumpsite compare with the Urunao dumpsite.

1st and only response by Mr. G. Ikehara: Yes, Ritidian dumpsite is located north of the Urunao dumpsites and is currently scheduled for cleanup in 2004. Ritidian dumpsite is a much less complicated and costly cleanup site than the Urunao dumpsites. The majority of debris remain at the top of the cliff and very little of the debris has made it to the private property below the site. However, all concerns regarding the Ritidian cleanup will be addressed during the 2004 cleanup.

8th Question by Mr. M. Gawel: Has the native or endangered species been studied at the dumpsites? Has there been any object with cultural value at the dumpsites? And finally, what kind of chemicals are leaving the site toward the shoreline?

1st and only response by Mr. G. Ikehara: Whenever the Air Force is conducting environmental investigations at a site the natural species are considered to prevent any adverse effect on species. No endangered species have been identified at the Urunao dumpsites, most of the fruit bats have migrated to a more isolated area. In terms of cultural resources at the Urunao dumpsites, no artifact has been found at the dumpsites. However, if during the cleanup excavation any cultural artifacts are found, their integrity will be preserved. With regard to chemicals leaching from the dumpsites, seep samples were collected downgradient from the dumpsites [at Falcona Beach] and no contamination was detected in coastal water.

9th Question by Senator L. Kasperbauer: Because The Air Force is going to utilize the access road down below the site, can the property owners strike a deal to get their water from the Air Force, rather than GWA [Guam Water Authority]?

1st and the only response by Col. B. Streett: That is tough one. In 1999, the Air Force made a concession with GWA that even though the water that is delivered all the way to the Ritidian Point is the Air Force's water that is pumped from the Andy South, that water becomes GWA's pass the Det-Five. In exchange for that water, the Air Force will receive a credit on its sewage bill. Therefore, GWA has jurisdiction over the water use along the access road below the dumpsites.

10th Question by Senator L. Kasperbauer: I know I asked this earlier, but I am not sure if it was answered. At any time during the 13 months plus of the cleanup, who are impacted along the access road and how they have been compensated? Would water and power be available at the dumpsites during the cleanup work?

1st and only response by Mr. G. Ikehara: Some of these questions will be addressed during the remedial design phase of the project. Currently, we are in the process of identifying the property owners along the access road. We are going to minimize the impact to neighbors by widening the road and use dust suppression. Yes, water and power will be available at the site during the cleanup work.

11th Question by Mr. F. Castro: Is it premature to ask where the waste is going to be stockpiled during the cleanup action?

1st and only response by Mr. G. Ikehara: The cleanup strategy is to keep all stockpile staging areas within the boundary of the dumpsites. There will be a staging area to sort the solid waste and separate the solid waste from the OE materials.

12th Question by Mr. M. Gawel: Is the access road a private road requiring a right-of-way, or a public road?

1st and only response by Mr. M. Pankov: The Air Force is no way of answering with regard to legal status of the access road. That question is best asked of the property owners.

13th Question by Mr. (the name will be identified before the final Draft): Will the Air Force keep the families informed regarding the cleanup project?

1st and only response by Mr. G. Ikehara: We hope to continue our discussing with the family members to find out who is the most impacted and who is most interested in getting involved with process of the cleanup. The Air Force will continue informing the family members regarding the cleanup as part of the RAB, or through some face-to-face meeting. We need the families input.

14th Question by Mr. F. Castro: Regardless of the status of the access road, what mechanism will be used to get the permission for the use of the access road, a memorandum of understanding, or memorandum of agreement?

1st and only response by Mr. M. Pankov: After the remedial design a legal agreement will be drafted to secure the necessary access to the road.

15th Question by Mr. M. Artero: When we arrive at the end of the Record of Decision and the dumpsites cleanup are completed in accordance with the preferred alternative, who would be liable for any inadvertent residual contaminants that might be left at the dumpsites?

1st response by Mr. M. Pankov: Certainly, the plan is to do a thorough job during the cleanup work to remove all contaminants in an expeditious, economical, and most importantly safe manner. However, in an event of some unforeseen thing happen appropriate response will be taken at that time.

2nd and last response by Mr. Col. B. Streett: If any injury happens as result of some unforeseen waste that may have been left at the dumpsite, and we make every effort that would not happen, through a claim process the Air Force would respond appropriately.

16th Question by Ms. M. Artero: In follow up to Mr. Artero's question, what assurance will we have as a property owners that the USEPA and Guam EPA would not come after us for cleanup of contaminants that may have left in place inadvertently?

1st and last response by Mr. M. Ripperda: I represent the USEPA and Mr. W. Leon Guerrero represents the Guam EPA. We are the regulators who oversee the Air Force's cleanup action. Because this is the Air Force's contamination originally, under the law the Air Force is responsible for the contamination and in perpetuity and they can not give up the liability to the contamination. Once the cleanup is completed, the USEPA and GEPA will check the dumpsite and review the confirmation sample results to approve the completion of cleanup. But if something is found in the future, the Air Force will still be responsible for the cleanup.

17th Question by Ms. J. Overturf: I go to George Washington high school. Once the soil is removed from the dumpsites will the soil be replaced at the dumpsites?

1st and last response by Mr. G. Ikehara: Part of the remedial action involves the removal of contaminated soil from the dumpsites. However, due to the steep slope, there is not much soil at the dumpsites. Nevertheless, under the preferred alternative the dumpsites will be revegetated and if needed the soil would be replace at the dumpsites.

At the conclusion of the meeting, Mr. Ikehara reiterated that the Air Force welcomes all comments and questions and that any additional questions or comments could be sent to Andersen AFB.

Only one written comment was received during the public comment period from 31 March to 30 April 2003. The written comment is from Mr. T. Artero, a property owner, to Ms. M. Bordallo, Guam's Congresswoman in the United States House of Representatives. A copy of Mr. T. Artero is presented below.

Victor T. Artero
P.O. BOX 3874
Hagatna, GU 96932
Tel. 477-7687 --- e-mail: artero@ite.net

April 29, 2003

The Honorable Madeleine Z. Bordallo
Guam's Congresswoman
U.S. House of Representatives
427 Cannon HOB
Washington, D.C. 20515-5301

Dear Madam Congresswoman:

This letter is to apprise you, if you have not already been apprised, that the U.S. Air Force (USAF) is currently concluding the last facets of its Remedial Investigation/Feasibility Study for Urunao Dumpsites 1 and 2. The dumpsites are on private property (formerly Lot 10080 now Tract 34000) that belongs to the members of the Artero family.

After receiving input from landowners and the public at large, it appears that the USAF intend to cleanup its post World War II dumped wastes on our family land. However, we are not certain if the USAF intends to address all the issues we (the family) brought before them in regards to the cleanup and dumpsites. In this vein, we kindly ask that you intervene on our family's behalf to have the following issues resolved by the USAF:

1. That the cost of enhancing the public access roadway, i.e. the dirt/coral road running from the pavement's edge off Route 3A and on through Tract 34000, be incorporated as part of the cost of the cleanup activity, and

2. That the Artero family be compensated for the unauthorized (illegal) use of the family land as dumpsites on annual basis beginning 1949.

Your assistance on this matter will he greatly appreciated.

Sincerely,

VICTOR T. ARTERO
Antonio C. Artero family rep.

cc: Mr. Gregg Ikehara, Project Manager – Dumpsites Cleanup
Jesus (Vino) P. Artero – Pascual C. Artero family rep.
Pascual V.A. Sablan – Isabel Artero Sablan family rep.
Anthony M. Artero – Jose C. Artero family rep.
Edward C. Artero – Jesus C. Artero family rep.
Donald V. Calvo – Consuelo Artero Calvo rep.

Response to Comment 1. As presented in Section 2.9.1 of the ROD, as part of the USAF preferred alternative *Excavation and Off-Site Disposal*, the existing road will be improved to accommodate the heavy equipment traffic that will be needed for the *Excavation and Off-Site Disposal*. The road improvement is included in the $12,000,000 cost of the *Excavation and Off-Site Disposal* alternative, as presented in Table 2-63."

Response to Comment 2. As was mentioned during the 10 April 2003 public meeting, all compensation issues should be addressed by utilizing the Air Force claims process. The Air Force Point of Contact for such claims is Captain Ibn Spicer, who can be contacted at 366-3174.

4. REGULATORY COMMENTS AND AIR FORCE RESPONSES

In this section of the ROD, all USEPA and GEPA comments are presented in a tabular format along with the USAF responses. It should be noted that all reference figure, table, and section numbers in the comments refer to June 2003 Agency Draft ROD and November 2003 Agency Final Draft ROD. Some of these section and table numbers have been revised in this final December 2003 version of the ROD.

United States Environmental Protection Agency and Guam Environmental Protection Agency reviewed the Urunao Record of Decision submitted on 30 June 2003 and 04 November 2003. The Contractor's overall approach and results presented in this document appear to be adequate with the exceptions noted below.

USEPA COMMENTS ON JUNE 2003 DRAFT RECORD OF DECISION

ITEM	PAGE	SECTION Paragragh (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
1	General Comments	Section 2.9.1	The Draft Record of Decision (ROD) does not discuss the course of action that will be followed if Ordnance and Explosives (OE) materials encountered at the dumpsites are determined to be unsafe to move. The ROD mentions that OE materials "...will be transported to the Andersen AFB EOD facility for proper disposal, after the OE materials are certified by Andersen AFB EOD personnel as safe for transportation" (Section 2.9.1, Description of Excavation and Offsite Disposal Alternative). Procedures that are followed for ordnance deemed unsafe to move may impact the clean-up operation and perhaps even affect the stability of the cliffline dumpsites. Please revise the ROD to provide a brief discussion of the approaches that may be taken if OE materials are determined to be unsafe to move.	Yes. A brief discussion will be added to the ROD to discuss the general approach to handling OE materials that are deemed unsafe to move. As such, the following section will be added to Section 1.4: **"A screening of specific procedures and controls for handling OE materials will be included as part of the remedial design, including the handling of OE materials that may be deemed unsafe to remove from the site. All OE material handling will be in accordance with Department of Defense Explosive Safety Manual (DDESM) guidelines and in consultation with the Department of Defense Explosive Safety Board (DDESB). The OE material handling will also be coordinated with GEPA to meet any permit conditions for open burning and to minimize the effects associated with airborne material generated from the burning of OE materials. The remedial design will incorporate procedures that will include, but not be limited to, monitoring ambient atmospheric conditions to ensure that burns are only performed during optimal conditions."**

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2	General Comments	Table 2-2 Table 3-1, 3-2, and 3-3 Figures 2-8, 2-9, and 2-10	The Draft ROD includes a summary table of the groundwater seep sample results (Table 2-2), but does not include summary tables of the surface and subsurface soil sample results at Urunao Dumpsites 1 and 2. Summary tables (like those included as Table 3-1, 3-2, and 3-3 in the Remedial Investigation/Feasibility Study (RI/FS) for the site) should be included in the ROD to support the data included in Figures 2-8, 2-9, and 2-10.	Yes. RI/FS Tables 3-1, 3-2, and 3-3 will be added to ROD as Tables 2-2, 2-3, and 2-4. All subsequent table numbers in ROD will be revised accordingly.
3	Page 1-2	Section 1.4, Description of the Selected Remedy	This section states that “Some deteriorated OE fragments will be burned at Dumpsite 1 using a steel burn pan. Ashes and slag remaining from the burn operation will be removed and disposed of properly, based on laboratory analysis. Other OE materials will be transported to the Andersen AFB Explosives Ordnance Disposal (EOD) facility for proper disposal.” If the burning is being done as a method of decontaminating the “OE fragments” then it would very likely constitute an explosives operation per the Department of Defense Explosives Safety Manual (DoD 6055.9-STD). All explosives operations which are not considered emergency response (time critical removal action) normally require that the Department of Defense Explosives Safety Board (DDESB) approve/review an explosives safety site plan for the operation. (NOTE: As it is not known whether the OE items of concern are unfired, fired, or a combination thereof, sections of 40 CFR 266.202 & 203 are quoted here and the bolded sections should be noted as being of interest: **“40 CFR 266.202** **Definition of solid waste.** **(a) A military munition is not a solid waste when:** **(1) Used for its intended purpose, including:** **(i) Use in training military personnel or explosives and munitions emergency response specialists (including training in proper destruction of unused propellant or other munitions); or** **(ii) Use in research, development, testing, and evaluation of military munitions, weapons, or weapon systems; or** **(iii) Recovery, collection, and on-range destruction of unexploded**	Yes. Please see response to General Comment 1.

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			ordnance and munitions fragments during range clearance activities at active or inactive ranges. **However, "use for intended purpose" does not include the on-range disposal or burial of unexploded ordnance and contaminants when the burial is not a result of product use.** (2) An unused munition, or component thereof, is being repaired, reused, recycled, reclaimed, disassembled, reconfigured, or otherwise subjected to materials recovery activities, unless such activities involve use constituting disposal as defined in 40 CFR 261.2(c)(1), or burning for energy recovery as defined in 40 CFR 261.2(c)(2). **(b) An unused military munition is a solid waste when any of the following occurs:** **(1) The munition is abandoned by being disposed of, burned, detonated (except during intended use as specified in paragraph (a) of this section), incinerated, or treated prior to disposal;** or (2) The munition is removed from storage in a military magazine or other storage area for the purpose of being disposed of, burned, or incinerated, or treated prior to disposal, or **(3) The munition is deteriorated or damaged (e.g., the integrity of the munition is compromised by cracks, leaks, or other damage) to the point that it cannot be put into serviceable condition, and cannot reasonably be recycled or used for other purposes;** or (4) The munition has been declared a solid waste by an authorized military official. **(c) A used or fired military munition is a solid waste:** **(1) When transported off range or from the site of use, where the site of use is not a range, for the purposes of storage, reclamation, treatment, disposal, or treatment prior to disposal; or** **(2) If recovered, collected, and then disposed of by burial, or landfilling either on or off a range.** (d) For purposes of RCRA section 1004(27), a used or fired military munition	

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			is a solid waste, and, therefore, is potentially subject to RCRA corrective action authorities under sections 3004(u) and (v), and 3008(h), or imminent and substantial endangerment authorities under section 7003, if the munition lands off-range and is not promptly rendered safe and/or retrieved. Any imminent and substantial threats associated with any remaining material must be addressed. If remedial action is infeasible, the operator of the range must maintain a record of the event for as long as any threat remains. The record must include the type of munition and its location (to the extent the location is known). **40 CFR 266.203 Standards applicable to the transportation of solid waste military munitions.** **(a) *Criteria for hazardous waste regulation of waste non-chemical military munitions in transportation.* (1) Waste military munitions that are being transported and that exhibit a hazardous waste characteristic or are listed as hazardous waste under 40 CFR part 261, are listed or identified as a hazardous waste (and thus are subject to regulation under 40 CFR parts 260 through 270), unless all the following conditions are met:** **(i) The waste military munitions are not chemical agents or chemical munitions;** **(ii) The waste military munitions must be transported in accordance with the Department of Defense shipping controls applicable to the transport of military munitions;** **(iii) The waste military munitions must be transported from a military owned or operated installation to a military owned or operated treatment, storage, or disposal facility; and** **(iv) The transporter of the waste must provide oral notice to the Director within 24 hours from the time the transporter becomes aware of any loss or theft of the waste military munitions, or any failure to meet a condition of paragraph (a)(1) of this section that may endanger health or the environment. In addition, a written submission describing the circumstances shall be provided within 5 days from the time the transporter becomes aware of any loss or theft of the waste military**	

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
			munitions or any failure to meet a condition of paragraph (a)(1) of this section. (2) If any waste military munitions shipped under paragraph (a)(1) of this section are not received by the receiving facility within 45 days of the day the waste was shipped, the owner or operator of the receiving facility must report this non-receipt to the Director within 5 days. **(3) The exemption in paragraph (a)(1) of this section from regulation as hazardous waste shall apply only to the transportation of non-chemical waste military munitions. It does not affect the regulatory status of waste military munitions as hazardous wastes with regard to storage, treatment or disposal."** It would appear from the above that the munitions of concern constitute solid waste and could also be considered hazardous waste based on their reactivity. They do not qualify for the transportation exemption because they do not meet the criteria listed in 40 CFR 266.203(a)(iii). They fail this criteria because they are currently not located on a military owned or operated installation or facility. In addition, any burning operation performed involving OE materials must be assumed to be a decontamination of same. As such, a safety approval from the DDESB will be required and should be initiated. In addition, a determination should be made as to whether or not movement of the materials from a private site to an on-base facility will require the materials to be shipped as hazardous waste. If no explosives safety submission is deemed necessary, please so state and provide an explanation as to why one is not necessary. Also, please describe the regulatory requirements which will be implemented in the movement of the "Other OE materials" from a location off of the military reservation to a location on the facility for treatment (disposal). Please state whether or not these items will be considered solid waste, waste munitions, and/or hazardous waste and the basis for the classification thereof.	

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
4	Page 1-3	Section 1.6, ROD Data Certification Checklist	The first bulleted item in this section indicates that the Constituents of Concern (COCs) at the site and their respective concentrations are presented in Figures 2-8, 2-9, and 2-10. However, the COCs are not specifically identified on these figures. Instead, Figures 2-8, 2-9, and 2-10 appear to show the concentrations of those compounds that exceed the USEPA's industrial and residential Preliminary Remediation Goals (PRGs) and/or Background Threshold Values (BTVs). Some of these compounds may be COCs, but others are not considered COCs at the site, having been eliminated via the Human Health Risk Assessment (HHRA). For example, Figure 2-10 *Surface and Subsurface Soil Sample Locations and Results at Urunao Dumpsite 2* does not differentiate between the detected concentrations of benzo(a)pyrene and lead (both identified as COCs at Dumpsite 2 in Section 1, Page 1-1) and the detected concentrations of dibenzo(a,h)anthracene and iron (not identified as COCs). Please revise Figures 2-8, 2-9, and 2-10 to include only the COCs at the site.	Yes. The COCs are actually presented in Figures 2-12 and 2-13. Therefore, the first bulleted item will be altered to state that: **"COCs and their respective concentrations for Dumpsites 1 and 2 are presented in Tables 2-6, 2-7, 2-8, and 2-9 and Figures 2-12 and 2-13."** (The table numbers have been changed in response to General Comment 2.)
5	Page 1-3	Section 1.6, ROD Data Certification Checklist	The first bulleted item indicates that the COCs are presented in Tables 2-3 through 2-6; however, Section 2.7.1.1, Page 2-14 indicates that Constituents of Potential Concern (COPCs) are summarized in Tables 2-3 through 2-6. The constituents summarized in the tables appear to be COCs identified in surface and subsurface soils at the site, according to Section 1.3, Page 1-1. Therefore, the titles of Tables 2-3 through 2-6 appear to be mislabeled ("COPCs." vs. "COCs"). Please revise Tables 2-3 through 2-6 and any corresponding text to correct these apparent discrepancies.	Yes. The titles of Tables 2-6 through 2-9 will be changed to refer to COCs. (The table numbers have been changed in response to General Comment 2.)
6		Section 2.5.4, Suspected Contamination Sources at Urunao Dumpsites 1 and 2	This section includes a statement reading: "The OE at Dumpsite 1 include scattered M-89 and M-90 target identification bombs, an abandoned 1,500 pound bomb, and deteriorated AN-M50 series incendiary bomblets." Army Technical Manual TM 9-1900(Ammunition, General), dated June 18, 1945, states the following concerning the M89 and M90 Target Identification (TI) bombs: "The 250-pound target identification bombs M89, M90, and M98 illuminate and mark targets by the simultaneous ignition and tail ejection of their pyrotechnic candles at a height above ground determined by the selected setting on the mechanical time fuze. These candles fall to the ground and continue to burn for their prescribed time. Candles may be of the nondelay or exploding type." This would indicate that these bombs may (or may not) have a mechanical time fuze attached. If the fuze vanes do not have the safety wire	Yes. Please see response to General Comment 1. In addition, the following text will be added to Section 2.12.2 of the ROD: **"The remedial design will include a field survey, conducted by a UXO specialist, to identify/verify the various ordnance types at the dumpsites. In addition, the UXO specialist will research each ordnance type and provide a detailed characterization for the purpose of establishing safe handling and disposal procedures."**

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			present and have been rotated for an unspecified number of turns, the fuze may have a cocked striker in a hung position, which is extremely hazardous and should not be moved. If the fuze functions, the candles will likely be ejected and some of them may explode. No bomb of 1,500 pounds is listed as a type classified item of military ordnance in the documents available for review at this time. As it appears that no 1,500 pound bomb was a standard military item during the 1930-1950s timeframe, a misidentification of the item may have occurred. The AN-M50 series of incendiary bombs (according to U. S. Navy OP 1664, Explosive Ordnance, Volume 2, 1946) consists of the following: “Construction: The hexagonal body of magnesium alloy, weighing 1.25 pounds, has an iron nose plug. There are three vent holes below the primer cap assembly, to assist in initial burning. The hexagonal sheet-metal tail is secured to the body with three screws. Operation: The spring-loaded safety plunger is depressed by the adjacent bomb; upon release from the cluster, it jumps out, leaving a thin brass cross holding the striker, which breaks free on impact and ignites the primer. The thermate burns, igniting the magnesium alloy case. The total burning time is 9.5 to 10.5 minutes. Remarks: AN-M50XA1, (Army: limited standard; Navy: obsolescent) contains 170 grains of black powder in a steel capsule at the nose, replacing a portion of the thermate. The bomb burns approximately 1.5 minutes, until the black powder explodes, scattering burning magnesium over a wide radius. AN-M50A2, similar to AN-M50A1, is water-proofed around the primer cap and first fire charge. AN-M50XA2, similar to AN-M50XA1, has an explosive head consisting of a steel nose cap which houses three tetryl pellets, a detonator, and a delay fuse. The delay fuse is ignited and sets off the detonator, exploding the tetryl pellets and projecting fragments of steel and burning magnesium. AN-M50XA3 is identical to AN-M50XA2, except that the assembly around the primer cap and first fire charge is waterproofed.	

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			TYPE A and TYPE B- AN-M50XA2 and AN-M50XA3 each have a Type A and a Type B. Type A indicates that the delay from impact to explosion is two to four minutes; Type B indicates that the delay from impact to explosion is sixty to seventy seconds. AN-M50TA2 is identical to AN-M50A2, except that it contains a secret toxic agent, which does not affect the burning properties of the incendiary. Clusters carrying these bombs will have a green and a purple band painted around them. AN-M50TXA3 combines the toxic feature of the AN-M50TA2 with the H.E. feature of the AN-M50XA3. It is identical to the AN-M50TA2 as to appearance, except for a new longer, double-mortised steel nose, hollowed out to contain the explosive charge. Because of the extra length of the nose, the column of thermate is 1 1/8 inches shorter. The AN-M50TXA3 is produced according to only one design or type, which gives a delay on the explosion of the H.E. charge of from 1 1/2 to 6 minutes. A heat-sensitive detonator 2.556 inches long, which ignites at 300 degrees Celsius is housed in a hole drilled centrally through the upper part of the steel nose. A 1/16-inch steel disk is placed in the bottom of the filling cavity of the bomb body, thus covering the top of the hole in the nose and insulating the detonator from the heat of the burning bomb. The H.E. charge consists of tetryl pellets." As is noted above, the AN-M50 series incendiary bombs may contain low and/or high explosives which could function if the pyrotechnic filler is ignited. It should also be noted that some of the types may have contained a chemical agent filler of unspecified type. If the fuze on any of these items is missing the spring-loaded safety plunger (very likely), mishandling the item or dropping it on its nose may function the fuze and ignite the thermate (primarily Barium Nitrate, Iron Oxide and Aluminum powder) filler. This raises a concern as to whether or not all of the ordnance items may be safely removed from the site, or if some will have to be destroyed by detonation or some other means on the site. Please provide a description of the general process for dealing with items which cannot be safely moved. In addition, please review the identification of the 1,500 pound bomb to ensure that the nomenclature is correct. Also, please	

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			investigate and determine if the AN-M50TA2 or AN-M50TXA3 bombs were ever present at the facility.	
7	Page 2-12	Section 2.6, Current and Potential Future Site and Resource Uses,	The second paragraph of this section indicates that development of the coastal area in the vicinity of the site is anticipated in the near future, but it is unknown whether the site itself is expected to be developed. The anticipated use of the site in the reasonably anticipated future is not mentioned in this section, but future onsite resident adults and children, as well as future adult users and trespassers are included as target groups in the HHRA (Section 2.7.1.2, Page 2-14). Please revise the Draft ROD in Section 2.6 to include the future land use of the site itself, to the extent known or reasonably anticipated.	Yes. The second paragraph of Section 2.6 will be modified to state that: **"An unpaved public access road was constructed within ½ mile of the northwestern portion of Dumpsite 2 for future development of the coastal properties (Figure 2-3). Residential development in this coastal area is expected in the future, including the Dumpsites 1 and 2."**
8	Page 2-35	Section 2.8, Remedial Action Objectives	The first paragraph on Page 2-35 states that "Remedial Goal Objectives (RGOs) have been established for Dumpsites 1 and 2 based on the HHRA results", but further detail on the basis for the determination of the RGOs is not provided in the text of the Draft ROD. It may be useful to reference Section 6.1 of the RI/FS as well as Tables 2-56 and 2-57 of the Draft ROD to further clarify the basis for selecting RGOs for Dumpsites 1 and 2.	Yes. The first paragraph on Page 2-35 will be modified to state that: **"Remedial Goal Objectives (RGOs) have been established for Dumpsites 1 and 2 based on the HHRA results, as follows:** • Cleanup standards of 290 mg/kg and 63 mg/kg were established for antimony in surface soil and subsurface soil, respectively, based on an RGO for a HI of 1.0 (surface soil) and on the BTV (subsurface soil). • A cleanup standard of 62 mg/kg was established for arsenic in surface soil based on the BTV. • A cleanup standard of 5,400 mg/kg was established for barium in subsurface soil based on the Residential PRG. • A cleanup standard of 72 mg/kg was

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
				established for cadmium in subsurface soil based on an RGO for a HI of 1.0. • A cleanup standard of 400 mg/kg was established for lead in surface and subsurface soils based on the Residential PRG. • A cleanup standard of 5,500 mg/kg was established for manganese in surface soil based on the BTV. • Cleanup standards of 9.13 x 10^{-6} mg/kg and 9.43 x 10^{-6} mg/kg were established for dioxin in surface soil and subsurface soil, respectively, based on RGOs for a 10^{-6} risk level."
9	Page 2-42	Section 2.10.5, Reduction of Mobility, Toxicity, or Volume Through Treatment	In assessing how the *Excavation and Offsite Disposal* alternative reduces the mobility, toxicity, or volume of contaminants through treatment, this section only states that the "alternative eliminates the source of COCs and the solid waste and OE materials at the dumpsites." This section does not state whether the alternative will reduce the mobility, toxicity, or volume of COCs through treatment. Section 2.13.5, Page 2-51 later indicates that the alternative does not treat the COCs to reduce the mobility, toxicity, or volume of contaminants, and that the COCs are simply relocated from one location to another. However, if necessary, "COC-impacted soils may be treated by Triple Super Phosphate" to immobilize metals in soil. While the rationale for selecting this alternative may be understood (COC-impacted soils are only a fraction (2%) of the volume of solid waste materials), the information presented in Section 2.10.5, Page 2-42 and in other parts of the document (e.g., Table 2-59) should be consistent with the information provided in the later section of the document (Section 2.13.4, Page 2-51). Please revise Section 2.10.5 to indicate that the *Excavation and Offsite Disposal* alternative does not reduce the mobility, toxicity, or volume of contaminants through treatment. However,	Yes. The second paragraph of Section 2.10.5 will be modified to state that: **"The *Excavation and Offsite Disposal* alternative eliminates the source of COCs and the solid waste and OE materials at the dumpsites. This alternative eliminates potential risks to human health or the environment at a site, but this alternative will not reduce the mobility, toxicity, or volume of contaminants. Under the *Excavation and Offsite Disposal* alternative, the contaminants are simply relocated from one location to another. However, some RCRA hazardous COC-impacted soils may be treated, if necessary, to reduce the mobility of contaminants prior to disposal."**

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			also indicate that the RCRA hazardous COC-impacted soils may be treated, if necessary.	
10	Page 3-7	Section 3, Responsivenes s Summary	During the April 10, 2003 public meeting, the *1st and only response by Mr. G. Ikehara* indicated that the Air Force is in the process of securing access to Dumpsites 1 and 2 and posting warning signs to restrict access. Previous sections of the Draft ROD did not address the status of these activities. In order to properly respond to issues raised by a stakeholder, please revise the ROD to provide additional information on the completion or expected completion of these interim measures.	**Yes. The following paragraph will be added to the end of Section 2.11 of the ROD:** **"Andersen AFB has assembled several bilingual (English and Chamorro) signs to warn the public against accessing dumpsites due to the presence of COC-impacted soils, solid waste materials, and OE materials. The posting of the signs is pending the approval of the property owners."**
11	Page 3-9	Section 3, Responsivenes s Summary	The text on page 3-9 states that only one written comment was received during the Public Comment period. The comment is provided on Page 3-10. The ROD does not provide a response to the comment. Although it appears to be a complex comment, with portions perhaps depending on legal analysis, a response should be provided in the ROD to demonstrate responsiveness to the comment. Please revise the ROD to provide a response to the written question that was submitted during the Public Comment period.	Yes. The following paragraphs will be added to the end of Section 3.0 of the ROD in response to Mr. Voctor T. Artero's 29 April 2003 letter to the Guam's Congresswoman, the Honorable Madeleine Bordallo: **"Response to Comment 1. As presented in Section 2.9.1 of the ROD, as part of the USAF preferred alternative *Excavation and Off-Site Disposal*, the existing road will be improved to accommodate the heavy equipment traffic that will be needed for the *Excavation and Off-Site Disposal*. The road improvement is included in the $12,000,000 cost of the *Excavation and Off-Site Disposal* alternative, as presented in Table 2-63."** **"Response to Comment 2. As was mentioned during the 10 April 2003 public meeting, all compensation issues should be addressed by utilizing the Air Force claims process. The Air Force Point of Contact for such claims is Captain Ibn Spicer, who can be contacted at**

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				366-3174.”
12		Tables 2-40 to 2-44	It appears that Tables 2-40 to 2-44 are incorrectly referenced in the text (Page 2-28) as Tables 4-40 to 4-44. Additionally, there appears to be some discrepancy between the use of the terms “COPC” and “COC” throughout the Baseline Ecological Risk Assessment (ESA) summary (Section 2.7.2) and the corresponding tables. For example, the second paragraph of Section 2.7.22 indicates that COPC exposure concentrations are shown in Tables 4-42 and 4-43 (Tables 2-42 and 2-43), but Tables 2-42 and 2-43 report COC exposure concentrations. Please correct these apparent discrepancies throughout the Baseline ERA and the corresponding tables.	Yes. The table numbers of Tables 4-40 and 4-44 on page 2-28 will be changed to 2-40 and 2-44. Also, text referring to COPCs in Sections 2.7.2 and 2.7.2.2 will be revised to COCs.
13		Table 2-58	Table 2-58 identifies RCRA as a Federal Action-Specific ARAR. However, the description provided in the Table identifies specific portions of RCRA, suggesting that only those portions of RCRA (i.e., 40 CFR 261, 40 CFR 263, and Land Disposal Restrictions [LDR]) may be ARARs considered in the ROD. All aspect of RCRA must be considered ARARs and the current identification of only limited aspects of RCRA in Table 2-58 does not appear to be appropriate. If the intent listing 40 CFR 261, 40 CFR 263, and LDRs is to highlight certain aspects of RCRA that are pertinent to the cleanup of the dumpsites, Table 2-58 should be revised to clarify that the portions of RCRA listed are only examples of some of the most pertinent sections of RCRA. Additionally, the Military Munitions Rule may be included as another portion of RCRA that is pertinent to the cleanup activities that are proposed for the dumpsites.	Yes. Table 2-58 will be modified to state that: **“All aspects of the Resource Conservation and Recovery Act (RCRA) regulations, including the Military Munitions Rule and those rules pertinent to Identification of Hazardous Waste 40 CFR 261, Transport of Hazardous Waste 40 CFR 263, and for land disposal restrictions (LDRs) and landfills”**
14		Table 2-58	Table 2-58 does not include DOD 6055.9-STD, dated July 1, 1999, as an ARAR. This ARAR applies to the OE activities that are proposed in the ROD. Please revise the ROD to include DOD 6055.9-STD as an ARAR.	Yes. DOD 6055.9-STD will be added to Table 2-58 as an ARAR.

GEEPA COMMENTS ON JUNE 2003 DRAFT RECORD OF DECISION

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)	COMMENT	CONTRACTOR RESPONSE
1		Section 1.4	What does AAFB propose to implement to minimize/eliminate the potential for airborne substances as a result of burning of OE material?	The ROD does not stipulate specific measures to minimize/eliminate the potential for airborne substances as a result of burning OE material. The ROD will be revised to state: **"A remedial design will be conducted that will include a screening of specific procedures and controls, in accordance with DDESM guidelines and after consultation with the DDESB and GEPA, that can be implemented to minimize the effects from airborne material generated from burning of OE material. The remedial design will incorporate procedures that will include, but not be limited to, monitoring ambient atmospheric conditions to ensure that burns are only performed during optimal conditions."**
2	Page 1-7		Remove "Acting" from the signature page (for Fred Castro).	Yes. The word Acting will be removed from the signature page.
3	Page 2-1		Ensure that AAFB works closely with the historic preservation authorities to address archeological issues.	Yes. The following sentence will be added to the last paragraph of Section 2.13.2. **"All archeological efforts will be coordinated with the Guam's historical preservation authorities."**
4		List of Acronyms	"RME" is not addressed in the list of acronyms.	Yes. RME will be added to the list of acronyms.
5		Section 2.7.1.5.2	Ensure that AAFB secure applicable permits (e.g. Burning Permit) prior to initializing permit-dependent activities.	Yes. The first paragraph of Section 2.9.1 will be modified as follows: **"*The Excavation and Off-Site Disposal* cleanup alternative has been made possible, in part, due to the current unpaved public access road constructed within ½ mile of the northwestern portion of the Urunao**

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				dumpsites. Under the *Excavation and Off Site Disposal* cleanup alternative, all solid waste debris and OE materials will be segregated and removed from Dumpsite 1 prior to excavating and removing any remaining COC-impacted soils. All OE material removal and disposal will be done under the supervision of a team of experienced, certified OE technicians. After securing a burning permit from GEPA, some deteriorated OE fragments (incendiary bomblets) will be burned at Dumpsite 1 using a steel burn pan. Any ashes and slag from the burn operation will be removed and disposed of properly, based on analytical data. Other OE materials will be transported to the Andersen AFB EOD facility for proper disposal, after the OE materials are certified by Andersen AFB EOD personnel as safe for transportation.”

USEPA COMMENTS ON NOVEMBER 2003 DRAFT FINAL RECORD OF DECISION

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
1	General Comments	Section 1	Change the EPA signature page to Joel Jones, Acting Chief, Federal Facility and Site Cleanup Branch.	Yes. The EPA signature page will be modified to” **“Joel Jones, Acting Chief, Federal Facility and Site Cleanup Branch.”**
2		TOC	Correct the formatting on page iii of the Table of Contents.	Yes. Page iii formatting will be corrected.
3	On ARARs		PRGs and MOUs are not ARAR (they are not promulgated standards under state/federal law).	Yes. ARARs will be modified to omit reference to PRGs and MOUs.
4			OSHA and HMTA are not ARAR - we comply with OSHA standards and other non-environmental laws to the extent they are applicable, but they are not part of the ARAR process. (Note, however, that RCRA requirements for haz mat transport are ARAR.)	Yes. ARARs will be modified to omit reference to OSHA and HMTA.
5			ESA & 5 Guam Code Annotated, Chapter 63 are not ARAR since there are no endangered species on the site. Similarly, National Pollutant Discharge Elimination System (NPDES) regulates discharges and management practices associated with discharges to surface waters, but if there are no such discharges, the NPDES is not an ARAR. [IT IS APPROPRIATE TO INCLUDE NARRATIVE TEXT IN SECTION 2.13.2 NOTING THIS.]	Yes. ARARs will be modified to omit reference to ESA & 5 Guam Code Annotated, Chapter 63.
6			Clean Air NAAQSs are never ARAR, but may be used as guidelines to be considered (TBCs). Enforceable emissions standards may be ARAR.	Yes. ARARs will be modified to omit reference to Clean Air NAAQSs, but the Clean Air NAAQSs will be used as guidelines TBCs.

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
7		Tables 2-61 and 2-64	Please Edit Tables 2-61 and 2-64 as presented below.	Yes. Tables 2-61 and 2-64 will be modified as presented below.
1	Specific Comments	Section 1.5 First sentence	"The preferred *Excavation and Offsite Disposal* cleanup alternative meets the CERCLA statutory requirements and, to the extent practicable, the NCP." (Citation to the NCP should not be to the 1985 NCP)	Yes. The first sentence of Section 1.5 will be modified to state that: **"The preferred *Excavation and Offsite Disposal* cleanup alternative meets the CERCLA statutory requirements, and to extent practicable the NCP, and site-specific experience gained in the Superfund program. *The Excavation and Offsite Disposal* cleanup alternative will also comply with Applicable or Relevant and Appropriate Requirements (ARARs), including the Maximum Contaminant Levels (MCLs) for groundwater, the Coastal Zone Management Act, the Endangered Species Act, RCRA Part 261 Subpart C Characteristics of Hazardous Waste, and CERCLA Removal Action regulations."**
2		Section 2.1 First sentence, first phrase	"This decision summary was prepared for the *Urunao Operable Unit comprised of ,...."* (Site is a CERCLA term of art - we have one CERCLA site here, so the terminology may get confused)	Yes. The first sentence of Section 2.1 will be modified to state that: **"This decision summary was prepared for the Urunao OU comprised of *Urunao Dumpsites 1* and *2*, which are on private property west of Andersen AFB, Guam."**

ITEM	PAGE	SECTION, Paragraph (P), Sentence (S), Bullet (B)		CONTRACTOR RESPONSE
3		Section 2.4 (optional suggestions)	Would be appropriate to put the work for this OU in the broader AFB context (e.g. "The work at Anderson Air Force base is being performed in distinct operable units. Dumpsites 1 & 2 are being remediated as one operable unit.") Suggest deleting the sentence "The USAF, USEPA Region IX, GEPA and affected property owners will provide input for the preferred alternative to clean up the dumpsites."	Yes. Section 2.4 will be modified to state that: **"All environmental investigations at Urunao Dumpsites 1 and 2 were performed under the Urunao OU. The Urunao OU addresses potential contamination in the surface soil, subsurface soil, or groundwater beneath Dumpsites 1 and 2. The affected property owners have requested an expedited cleanup of Dumpsites 1 and 2, and the USAF, USEPA Region IX, and GEPA will cooperate to approve the Urunao OU ROD and secure the appropriate cleanup funds. As the lead agency, the USAF will seek funding for the cleanup under the both the IRP and enforcement programs."**
4		Section 2.10.2 Last sentence of first paragraph	Please delete reference to Endangered Species Act & CERCLA removal Action regs (these are not ARAR)	Yes. The last sentence of Section 2.10.2 will be modified to state that: **"The ARARs include MCLs for groundwater, Coastal Zone Management Act, and RCRA Part 261 Subpart C Characteristics of Hazardous Waste."**
5		Section 2.14	title should read 'documentation of significant *changes*'	Yes. The title of Section 2.14 will be changed to: **"Documentation of Significant Changes"**

TABLE 2-64
Chemical Specific

Authority	Citation	ARAR determination	Synopsis of requirement	Action to be taken to Attain Requirement
Federal: Safe Drinking Water Act (42 U.S.C., Ch. 6A, § 300[f]-300[j]-26)	40 CFR 141.61 (a)	Relevant and appropriate	National primary drinking water standards are health based standards (MCLs) for public water systems. The NCP defines MCLs as relevant and appropriate for groundwater that is a potential source of drinking water. Groundwater might be a source of drinking water, but there are no current production wells in the area and the thinness of the freshwater lens may limit the potential usefulness of the groundwater as a potable source.	During implementation of the selected remedy, all stockpiles will be placed on a liner to prevent any impact to groundwater.
Resource Conservation and Recovery Act) (RCRA)	These regulations take effect through Guam's authorized RCRA program.	Relevant and appropriate	Pursuant to the "contained-in" policy, contaminated media must be managed as	COC-impacted soils which exceed Toxicity Characteristic Leaching Procedure (TCLP)

	For reference purposes only, the federal RCRA regulations may be found at : Part 261.3 (Definition of hazardous waste) Part 261.24 (Toxicity characteristic) Part 262.11 (Hazardous Waste Determination)		hazardous waste if the waste contains a listed hazardous waste.	parameters will be accumulated on- site in accordance with substantive provisions of RCRA regarding hazardous waste accumulation and will be shipped to a USEPA-certified off-island hazardous waste disposal facility, using Department of Transportation (DOT) standards and a DOT-certified transporter.
Territorial:				
No chemical specific territorial ARARs have been identified.				

Location Specific

Authority	Citation	ARAR determination	Synopsis of Requirement	Action to be Taken to Attain Requirement
Federal:				
Coastal Zone Management Act of 1972	Public Law 92- 583, 16 U.S.C. 1451-1456	Relevant and appropriate	Guam Coastal Zone Management Program pursuant to Section 312 of the CZA provides	All wastes will be removed from the site, eliminating any potential for impacting the coastal zone on

			for the protection and management of coastal waters and shorelines in Guam	Guam. All heavy equipment will be well maintained and all decontamination will be done in a contained area to avoid generating any runoff that can impact surface water at storm detention ponds.
Territorial:				
	21 Guam Code Annotated, Chapter 76	Applicable (if any historical objects are found during excavation)	Regulates the historical objects and sites on Guam. Archaeological sites have been documented near Dumpsites 1 and 2, but no historical objects or sites are currently known to exist at Dumpsites 1 and 2.	Detonation of OE materials in place will not occur because of potential damage to important archaeological sites near Dumpsites 1 and 2. Excavation activities will be stopped should any historical objects be found. An archeological survey will then be conducted at the excavation site to preserve any artifacts or historical objects.

Action Specific

Authority	Citation	ARAR determination	Synopsis of Requirement	Action to be Taken to Attain Requirement
Federal: Federal Insecticide,	7 U.S.C. Section 136 et seq and 40	Applicable (if pesticides needed	Regulates sale, use, storage and	If pesticides are needed during

Fungicide, and Rodenticide Act (FIFRA)	CFR Parts 150- 189	during revegetation)	disposal of pesticides.	revegetation, applicable requirements for use, storage & disposal of pesticides and their containers will be followed.
RCRA Subtitle C	These regulations take effect through Guam's authorized RCRA program. For reference purposes only, the federal RCRA Subtitle C regulations may be found at 40 CFR Part 264	Relevant and Appropriate	Design and operating standards for containers and tanks used to store hazardous waste at CERCLA sites. Specification of site closure requirements. [RCRA air emissions standards?]	COC-impacted soils which exceed Toxicity Characteristic Leaching Procedure (TCLP) parameters will be accumulated on- site in appropriate containers and in compliance with substantive provisions of RCRA. There will be a clean closure with all solid waste debris, OE materials and COC-impacted soils removed from the site. [Emissions from burn pan?]

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Appendix A

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01-Dec-97	Final Quality Program Plan, Interim Remedial Actions, Main Base, MARBO, & Harmon OUs, Vol 1		398
01-Dec-97	Final Environmental Cleanup Plan, Interim Remedial Actions, Main Base, MARBO, & Harmon OUs, Vol 2		399
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	400
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	401
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	402
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	403
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	404
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	405
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	406
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	407
15-Dec-97	**Base Letter to USEPA Region IX Regarding Modification to QAPP to Incorporate Method SW 8290 for Analysis of Dioxin & Furans**	**Poland, D. Joan 36 CES/CEVR**	**408**
15-Dec-97	**Base Letter to GEPA Regarding Modification to QAPP to Incorporate Method SW 8290 for Analysis of Dioxins & Furfans**	**Poland, D. Joan 36 CES/CEVR**	**409**

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01-Jan-98	Final Bioventing & Vapor Extraction Pilot Study Work Plan FTA-2	EA Engineering	410
28-Jan-98	GEPA Fax to Base Regarding Comments on the Draft Bioventing & Vapor Extraction Pilot Work Study Plan for FTA-2	Wuerch, H. Victor GEPA	411
01-Feb-98	Base Letter to GEPA Requesting Adjustments to AF Permit	Hodges, William Colonel, USAF 36 ABW/CC	412
02-Feb-98	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Action Memorandum & Site Characterization Summary Report for Site 39/ Harmon Substation	Poland, D. Joan 36 CES/CEVR	413
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	414
11-Feb-98	USEPA Region IX Letter to Base Regarding Comments on the Draft Final MARBO Annex OU ROD	Ripperda, Mark USEPA Region IX	415
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	416
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	417
26-Feb-98	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Basewide Groundwater Summary Report	Ikehara, Gregg N. 36 CES/CEVR	418
01-Mar-98	Decision Summary, NFRAP, IRP Site 3/Waste Pile 3	ICF Technology	419
01-Mar-98	Site Characterization Report, Waste Piles 1, 2 & 3 Vol 1 - Text	ICF Technology	420
01-Mar-98	Site Characterization Report, Waste Piles 1, 2, & 3 Vol 2 - Appendices (2 of 2)	ICF Technology	421
01-Mar-98	Fact Sheet “Asphalt Recycling Operations”	36 CES/CEVR	422
04-Mar-98	RPM Meeting Minutes, 18 Feb 98	EA Engineering	423
23-Mar-98	**Base Letter to GEPA Regarding Modification of the Target Analyte List in the Basewide QAPP**	**Poland, D. Joan 36 CES/CEVR**	**424**
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**	**425**
24-Mar-98	Technical Document to Support NFRAP Declaration for IRP Site 3/Waste Pile 3	36 CES/CEVR	426
26-Mar-98	Base Letter to USEPA Region Redarding Approval for Addition of OHM Services Corp to the QAPP	Poland, D. Joan 36 CES/CEVR	427
26-Mar-98	Base Letter to GEPA Regarding Approval for Addition of OHM Services Corp to the QAPP	Poland, D. Joan 36 CES/CEVR	428
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	429
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	430
31-Mar-98	**USEPA Region IX Letter to Base Regarding Modification to the QAPP Target Analyte List**	**Ripperda, Mark USEPA Region IX**	**431**
31-Mar-98	**USEPA Region IX Letter to Base Regarding Modification to the QAPP**	**Ripperda, Mark USEPA Region IX**	**432**

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01-Apr-98	**Fact Sheet, " Anderson AFB Restoration Advisory Board (RAB)"**	**36 CES/CEVR**	**433**
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	434
16-Apr-98	RPM Meeting Minutes, 16 Apr 98	36 CES/CEVR	435
16-Apr-98	Technical Document to Support NFRAP Declaration for IRP Site 18/LF-23	36 CES/CEVR	436
30-Apr-98	Town Hall Meeting Minutes Regarding Landfill 7 Located in Base Housing	Miclat, Marriane 36 CES/CEVR	437
01-May-98	Final MARBO Annex OU Record of Decision	36 CES/CEVR	438
01-May-98	Base Letter to GPA Authorizing Installation of Power Connection for IRP Contractor OHM	Poland, D. Joan 36 CES/CEVR	439
15-Jun-98	RAB Meeting Minutes, 16 Apr 98	EA Engineering	440
15-Jun-98	US Dept of Interior to Base Regarding Concurrence of Base Finding for IRP Site 8/LFs 10A, 10C, & IRP Site 33/Drum Storage Area 2	DiRosa, Roger Refuge Manager GNWR	441
15-Jun-98	UOG Letter to Base Regarding Resignation of Dr. John Jensen from RAB & Nomination of Mr. John Jocson to RAB	Jenson, John W. Ph.D., UOG WERI Institute	442
01-Jul-98	Final Site Characterization Summary Report for IRP Site 39/Harmon Substation	EA Engineering	443
10-Jul-98	Press Release, "AAFB Conducts RAB Meeting"	36 CES/CEVR Pacific Daily News	444
21-Jul-98	RAB Meeting Minutes, 16 Jul 98	EA Engineering	445
01-Aug-98	Newsletter Article, "Air Force Recycling Effort Paves Island Roads"	Bureau of Planning Man, Land, & Sea	446
01-Aug-98	Final Groundwater Summary Report for AAFB	EA Engineering	447
01-Aug-98	Site Summary Report for FTA-2	Jacobs Engineering	448
01-Aug-98	Operation & Maintenance Plan, FTA-2, Soil Vapor Extraction System, AAFB	Jacobs Engineering	449
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	450
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	451
04-Sep-98	Base Letter to GEPA Regarding Transmittal of Copies of Updated Draft Community Relations Plan	Poland, D. Joan 36 CES/CEVR	452
04-Sep-98	Base Letter to GEPA Regarding Transmittal of Copies of Final MARBO Annex OU ROD	Poland, D. Joan 36 CES/CEVR	453
13-Oct-98	Base Letter to GEPA Regarding Transmittal of the Draft Decision Summary NFRAP for IRP Site 11/ LFs15A & 15B	Poland, D. Joan 36 CES/CEVR	454
13-Oct-98	Base Letter to USEPA Region IX Regarding Transmittal of Copies of Draft Decision Summary NFRAP for IRP Site 11/LFs15A & 15B	Poland, D. Joan 36 CES/CEVR	455
19-Oct-98	**USEPA Region IX Letter to Base Regarding Comments on the Draft Community Relations Plan**	**Ripperda, Mark USEPA Region IX**	**456**
01-Nov-98	Final Spring 1998 Groundwater Data Monitoring Report	EA Engineering	457
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	458

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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) MARBO Annex OU	Poland, D. Joan 36 CES/CEVR	459
11-Nov-98	News Release, "Notice of Availability, ROD for the MARBO IRP Sites"	36 CES/CEVR Pacific Daily News	460
12-Nov-98	News Release, "Notice of Availability, ROD for the MARBO IRP Sites"	36 CES/CEVR Pacific Daily News	461
13-Nov-98	News Release, "Notice of Availability, ROD for the MARBO IRP Sites"	36 CES/CEVR Pacific Daily News	462
23-Nov-98	Base Letter to GEPA Regarding Transmittal of the Draft EE/CA Site IRP 34/PCB Storage Area	Poland, D. Joan 36 CES/CEVR	463
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	464
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	465
01-Dec-98	Base Letter to USEPA Region IX Regarding Transmittal of the Draft EE/CA Site 10/LF-14	Poland, D. Joan 36 CES/CEVR	466
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	467
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	468
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	469
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	470
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	471
10-Dec-98	Base Letter to GEPA Regarding Transmittal of the Draft EE/CA for Site 16/LF-21	Poland, D. Joan 36 CES/CEVR	472
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	473
16-Dec-98	**Base Letter to GEPA Regarding Transmittal of Copies of the Final Community Relations Plan**	**Poland, D. Joan 36 CES/CEVR**	**474**
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**	**475**
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	476
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	477
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	478
06-Jan-99	RAB Meeting Minutes, 15 Oct 98	EA Engineering	479
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	480

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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	481
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	482
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	483
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	484
01-Feb-99	Final Decision Document NFRAP for IRP Site 11/ LFs-15A& 15B	EA Engineering	485
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	486
13-Feb-99	USEPA Region IX Letter to Base Regarding Comments on Draft EE/CA for Site 31/Chemical Storage Area 4	Ripperda, Mark USEPA Region IX	487
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	488
19-Feb-99	USEPA Region IX Letter to Base Regarding Concurrences of Sample Purge Field Change Request	Ripperda, Mark USEPA Region IX	489
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	490
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	491
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	492
19-Feb-99	GEPA Letter to Base Regarding Comments on the Draft EE/CA for Site 16/LF-21	Wuerch, H. Victor GEPA	493
01-Mar-99	**Final Basewide Quality Assurance Project Plan, Revision 2.0**	**EA Engineering**	**494**
08-Mar-99	Cover Letter & RAB Meeting Minutes, 21 Jan 99	EA Engineering	495
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	496
25-Mar-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft NFRAP for IRP Site 11/LFs 15A & 15B	Poland, D. Joan 36 CES/CEVR	497
01-Apr-99	Final NFRAP Decision Document for IRP Site 27/ Hazardous Waste Storage Area 1	EA Engineering	498
01-Apr-99	Final EE/CA for IRP Site 34/PCB Storage Area	EA Engineering	499
10-Apr-99	News Release, “Vacancy Announcement Anderson AFB Restoration Advisory Board Members”	36 CES/CEVR Pacific Daily News	500
11-Apr-99	News Release, “Vacancy Announcement Anderson AFB Restoration Advisory Board Members”	36 CES/CEVR Pacific Daily News	501
12-Apr-99	News Release, “Vacancy Announcement Anderson AFB Restoration Advisory Board Members”	36 CES/CEVR Pacific Daily News	502
15-Apr-99	RAB Meeting Minutes, 15 April 99	EA Engineering	503
20-Apr-99	News Article, “Officials Disagree on Wells”	SantoTomas, Jojo Pacific Daily News	504

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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	505
01-May-99	Final EE/CA for IRP Site 10/LF-14	EA Engineering	506
01-May-99	Final EE/CA Report for IRP Site 16/LF-21	EA Engineering	507
19-May-99	RPM Meeting Minutes, 19 May 99	EA Engineering	508
01-Jun-99	Decision Summary Report for IRP Site 33/Drum Storage Area 2	EA Engineering	509
01-Jun-99	Final EE/CA for IRP Site 31/Chemical Storage Area 4	EA Engineering	510
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	511
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	512
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	513
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	514
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	515
13-Jun-01	LF-14, PCB Storage Area, Chemical Storage Area 4, & LF-21"	36 CES/CEVR Pacific Daily News	516
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	517
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	518
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	519
01-Jul-99	Remidiation Verification Report, IRP Site 19/LF-24	IT Corporation	520
01-Jul-99	Remidiation Verification Report, IRP Site 39/Harmon Substation, Vol 1	IT Corporation	521
01-Jul-99	Remidiation Verification Report, IRP Site 39/Harmon Substation, Vol 2	IT Corporation	522
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	523
06-Jul-99	Base Letter to GEPA Regarding Transmittal of Copies of the Draft EE/CA Reports for IRP Site 21/LF-26 LF-26	Poland, D. Joan 36 CES/CEVR	524
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	525
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	526

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30-Jul-99	**Base Letter to GEPA Regarding Notification of a New Project Laboratory with Columbia Analytical Services**	**Ikehara, Gregg N. 36 CES/CEVR**	**527**
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**	**528**
30-Jul-99	Base Letter to GEPA 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	529
30-Jul-99	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Remediation Verification Reports for IRP Site 39/Harmon Substation, 19/LF-24, & AOCs 1,2,3,4,5,12, & 22 at Harmon Annex	Ikehara, Gregg N. 36 CES/CEVR	530
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	531
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	532
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	533
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	534
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	535
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	536
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	537
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	538
19-Aug-99	**Base Letter to GEPA Regarding Proposed Variance Request for Columbia Analytical Services Laboratory**	**Ikehara, Gregg N. 36 CES/CEVR**	**539**
19-Aug-99	**Base Letter to USEPA Region IX Regarding Proposed Variance Request for Columbia Analytical Services Laboratory**	**Ikehara, Gregg N. 36 CES/CEVR**	**540**
19-Aug-99	USEPA Region IX Letter to Base Regarding Approval of the Proposed Variance Request	Ripperda, Mark USEPA Region IX	541
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	542
19-Aug-99	USEPA Region IX Letter to Base Regarding Approval of the Remedial Verification Report for IRP Site 19/LF-24	Ripperda, Mark USEPA Region IX	543

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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	544
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	545
01-Sep-99	Final Decision Summary NFRAP for Site 21/LF-26	EA Engineering	546
09-Sep-99	Technical Document to Support NFRAP Declaration for IRP Site 21/LF-26	36 CES/CEVR	547
15-Sep-99	RPM Meeting Minutes, 9 Sep 99	EA Engineering	548
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	549
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	550
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	551
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	552
12-Oct-99	Base Letter to GEPA Regarding Transmittal of Copies of the Final Decision Summary for IRP Site 21/LF26	Ikehara, Gregg N. 36 CES/CEVR	553
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	554
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	555
13-Oct-99	GEPA Letter to Base Regarding Comments on Draft EE/CA Report for IRP Site 2/LF-2	Wuerch, H. Victor GEPA	556
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	557
22-Oct-99	GEPA Letter to Base Regarding Comments on Draft Decision Summary NFRAP for IRP Site 21/LF-26	Wuerch, H. Victor GEPA	558
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	559
22-Oct-99	Base Letter to GEPA Regarding Transmittal of Copies the Draft EE/CA for IRP Site 8/LF-10A, 10B, & 10C & 10C	Ikehara, Gregg N. 36 CES/CEVR	560
26-Oct-99	GEPA Letter to Base Regarding Comments on Draft EE/CA Report for IRP Site 5/LF-7	Wuerch, H. Victor GEPA	561
10-Dec-99	GEPA Letter to Base Regarding Comments on Draft EE/CA for IRP Site 26/FTA-2	Salas, Jesus T. GEPA	562
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	563
16-Dec-99	USEPA Region IX Letter to Base Regarding Comments on the Draft RI Report for Harmon Annex	Ripperda, Mark USEPA Region IX	564
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	565
01-Jan-00	Final EE/CA for IRP Site 5/LF-7	EA Engineering	566
01-JAn-00	Draft Proposed Plan, Harmon Annex OU	36 CES/CEVR	567

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
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	568
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	569
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	570
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	571
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	572
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	573
27-Jan-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft Proposed Plan for IRP Sites in the Harmon Annexes	Ikehara, Gregg N. 36 CES/CEVR	574
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	575
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	576
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	577
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	578
28-Jan-00	RAB Meeting Minutes, 21 Oct 99	EA Engineering	579
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	580
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	581
01-Feb-00	Final EE/CA for IRP Site 2/LF-2	EA Engineering	582
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	583
07-Feb-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final Decision Summary Document for IRP Site 1/LF1	Ikehara, Gregg N. 36 CES/CEVR	584
11-Feb-00	Base Letter to Mangilao Mayor Nonito Blas Regarding Termination of Mayor as a RAB Member	Schoeck, Edward Colonel, USAF 36 ABW/CV	585
11-Feb-00	Base Letter to RAB Members Regarding Quarterly RAB Meeting	Schoeck, Edward Colonel, USAF 36 ABW/CV	586
16-Feb-00	RPM Meeting Minutes, 16 Feb 00	EA Engineering	587
18-Feb-00	**News Article, "$6M for Cleanup"**	**Loerzel, Adrienne** **Pacific Daily News**	**588**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
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	589
28-Feb-00	**News Article, "GovGuam Seeks Quick End to Land-Return Issue"**	**Loerzel, Adrienne Pacific Daily News**	**590**
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	591
01-Mar-00	Final Groundwater Data Monitoring Transport Report, Fall 99, Marbo Annex	EA Engineering, Science, and Technology	592
01-Mar-00	**Final Groundwater Data Monitoring Report, Fall 99 Main Base Annex and Northwest Field Annex**	**EA Engineering, Science, and Technology**	**593**
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	594
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	595
22-Mar-00	RAB Meeting Minutes, 17 Feb 2000	EA Engineering, Science and Technology	596
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	597
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	598
01-Apr-00	Final Decision Summary Document, Site 1	EA Engineering, Science and Technology	599
26-Apr-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Draft NFRAP for Site 30/Waste Pile 4	Ikehara, Gregg N. 36 CES/CEVR	600
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	601
02-May-00	Base Letter to GEPA Regarding Transmittal of Copies of the Final Decision Summary Document of IRP Site 1/LF1	Ikehara, Gregg N. 36 CES/CEVR	602
02-May-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Final Decision Summary Document of IRP Site1/LF1	Ikehara, Gregg N. 36 CES/CEVR	603
02-May-00	RAB Meeting Minutes, 04 May 2000	EA Engineering	604
09-Jun-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site4/LF6	Ikehara, Gregg N. 36 CES/CEVR	605
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	606
22-Jun-00 01-Aug-00	RPM Meeting Minutes, 22 June 00 EE/CA, Final Report, Site 8	EA Engineering EA Engineering, Science and Technology	607
01-Aug-00	NFRAP, Final Decision Document, Site 4	EA Engineering, Science and Technology	608

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
03-Aug-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Decision Summary NFRAP for IRP Site 25/ Fire Training Area 1	Ikehara, Gregg N. 36 CES/CEVR	609
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	610
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	611
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	612
31-Aug-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Final Decision Summary NFRAP Report for for Site 4/LF6	Ikehara, Gregg N. 36 CES/CEVR	613
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	614
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	615
01-Sep-00	**Final Groundwater Monitoring Report, Spring 00, Marbo Annex, Northwest Field Annex**	**EA Engineering, Science and Technology**	**616**
01-Sep-00	RA, Quality Program Plan, Vol I of II, Main Base Annex, Marbo Annex, Site 2, 5, 24	IT Corp.	617
01-Sep-00	RA, Environmental Cleanup Plan, Vol II of II, Main Base Annex, Site 5	IT Corp.	618
07-Sep-00	**Newspaper Article, “Defense Bill May Include Call to Remove Unexploded Ordnance”**	**The Pacific Daily News**	**619**
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**	**620**
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**	**621**
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	622
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	623
18-Sep-00	**Newspaper Article, “Military Remnants Linger: Ordnance, Dumpsites Dot Island” Newspaper Article,**	**The Pacific Daily News The Pacific**	**624**

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
19-Sep-00	**"GEPA Creating Hazard Search: Local Agency Wants Own System to Investigate Potential Sites"**	**Daily News**	**625**
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	626
22-Sep-00	Base Letter to USEPA Region IX 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	627
01-Oct-00	Groundwater Monitoring Report, Spring, FY00, Maine Base Annex	EA Engineering, Science and Technology	628
01-Oct-00	Remediation Verification Report, Marbo Annex, Site 20	IT Corp.	629
01-Oct-00	Remediation Verification Report, Marbo Annex, Site 38	IT Corp.	630
01-Oct-00	ROD, Amendment, Marbo Annex, Site 24	36 CES/CEVR	631
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	632
03-Oct-00	Base Letter to GEPA Regarding Transmittal of Copies of the Draft Environmental Cleanup Plan for Site 5/LF 7 Newspaper Article,	Ikehara, Gregg N. 36 CES/CEVR The Pacific	633
15-Oct-00	"Notice of Availability: Amendment of ROD", Marbo Annex	Daily News	634
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	635
01-Nov-00	Asphalt Recovery Status Report, Site 35	IT Corp.	636
01-Nov-00	Asphalt Recovery Status Report, Site 29	IT Corp.	637
01-Nov-00	RI, Final Report, Harmon Annex	EA Engineering, Science and Technology	638
01-Nov-00	RA, Environmental Cleanup Plan, Vol II of II, Marbo Annex, Site 24	IT Corp.	639
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	640
01-Nov-00	Base Letter to USEPA Region IX Regarding Transmittal of Copies of the Spring 2000 Groundwater Monitoring Report for Mainbase Operable Units	Ikehara, Gregg N. 36 CES/CEVR	641
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	642

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
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	643
06-Nov-00	Base Letter to RAB Members Regarding Next Quarterly Meeting	Schoeck, Edward Colonel, USAF 36 ABW/CV	644
15-Nov-00	RPM Meeting Minutes, 15 November 00	EA Engineering	645
16-Nov-00	RAB Meeting Minutes, 16 Nov 00	EA Engineering	646
16-Nov-00	**GEPA Letter to Base Designating Walter Leon Guerrero as an EPA Representative**	**Salas, Jesus T. GEPA**	**647**
22-Nov-00	Base Letter to GEPA 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	648
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	649
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**	**650**
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	651
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**	**652**
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	653
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	654
01-Dec-00	**Final Management Action Plan (MAP)**	**EA Engineering, Science and Technology**	**655**
01-Dec-00	RA, Environmental Cleanup Plan, Vol II of II, Marbo Annex, Site 2	IT Corp.	656
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	657
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	658
13-Dec-00	**Base Letter to GEPA Regarding Variances for IRP IRP Basewide QAPP, 3/99 for AAFB**	**Ikehara, Gregg N. 36 CES/CEVR**	**659**
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**	**660**
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	661

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
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	662
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	663
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.	664
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	665
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.	666
16-Jan-01	Base Letter to RAB Members Regarding Quarterly RAB Meeting	Schoeck, Edward Colonel, USAF ABW,CV	667
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	668
23-Jan-01	**GEPA Letter Regarding Comments on the to the Sampling and Analysis Plan for Remedial Investigation/ Feasability Study (RI/FS) for Urunao Dumpsites 1 & 2**	**Salas, Jesus T. GEPA**	**669**
24-Jan-01	**News Article, “Private Firm to Remove Unexploded Ordnance”**	**Duenas, Joseph E. Guam Variety**	**670**
01-Feb-01	Asphalt Removal Status Report, Site 6	OHM Remediation Services Corp.	671
01-Feb-01	Fact Sheet, Final Proposed Plan, Harmon Annex	36 CES/CEVR	672
06-Feb-01	News Article, “Notice of Availability for Proposed Plan for the Harmon Annex Operable Unit”	36 CES/CEVR Pacific Daily News	673
07-Feb-01	News Article, “Notice of Availability for Proposed Plan for the Harmon Annex Operable Unit	36 CES/CEVR Pacific Daily News	674
08-Feb-01	News Article, “Notice of Availability for Proposed Plan for the Harmon Annex Operable Unit	36 CES/CEVR Pacific Daily News	675
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	676
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	677
13-Feb-01	Base Letter to RAB Members Regarding the Proposed Plan for the Harmon Annex Operable Unit	Ikehara, Gregg N. 36 CES/CEVR	678
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	679
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	680
21-Feb-01	RPM Meeting Minutes, 21 Feb 01	EA Engineering	681
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	682

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
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	683
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	684
21-Feb-01	Base Letter to GEPA Regarding Transmittal of Copies for the Revision for the ARAR's in the MARBO ROD Amendment	Ikehara, Gregg N. 36 CES/CEVR	685
22-Feb-01	Base Letter to USEPA Region IX Regarding Transmittal of the Revised MARBO ROD Amendment	Ikehara, Gregg N. 36 CES/CEVR	686
00-Feb-01	Final Quality Program Plan & Final Environmental Cleanup Plan for Site 24/Landfill 29 (CD-ROM)	Arnsfield, Chris IT Corporation	687
00-Feb-01	Final Quality Program Plan & Final Environmental Cleanup Plan for Site2/Landfill 2 (CD-ROM)	Arnsfield, Chris IT Corporation	688
00-Feb-01	Final Quality Program Plan & Final Environmental Cleanup Plan for Site 5/Landfill 7 (CD-ROM)	Arnsfield, Chris IT Corporation	689
01-Mar-01	**Final Groundwater Monitoring Report, Fall 2000**	**URS Corp.**	**690**
01-Mar-01	**RI/FS, Final SAP, Site 40**	**EA Engineering, Science and Technology**	**691**
16-Mar-01	Base Letter to EA Engineering Regarding Site 15/LF 20 Natural Resources Clearance	Poland, D. Joan 36 CES/CEVR	692
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**	**693**
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	694
01-Apr-01	ROD, Amendment, Marbo Annex, Site 24	36 CES/CEVR	695
09-Apr-01	GEPA Letter to Base Concerning Comments on Draft Proposed Plan, Harmon Annex GEPA Letter to Base	Salas, Jesus T Guam Environmental Protection Agency Salas, Jesus T	696
09-Apr-01	Concerning Approval of Remediation Verification Report, Marbo Annex, Site 20	Guam Environmental Protection Agency	697
09-Apr-01	GEPA Letter to Base Concerning Comments on Remediation Verification Report, Site 38	Salas, Jesus T Guam Environmental Protection Agency	698
09-Apr-01	GEPA Letter to Base Concerning Approval of Final Environmental Cleanup Plan, Marbo Annex, Site 24	Salas, Jesus T Guam Environmental Protection Agency	699
09-Apr-01	GEPA Letter to Base Concerning Comments on Final RI, Harmon Annex	Salas, Jesus T Guam Environmental Protection Agency	700

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
09-Apr-01	**GEPA Letter to Base Concerning Comments on Revisions to Analyte List**	**Salas, Jesus T Guam Environmental Protection Agency**	**701**
09-Apr-01	GEPA Letter to Base Concerning Comments on Final Environmental Cleanup Plan, Main Base Annex, Site 2	Salas, Jesus T Guam Environmental Protection Agency	702
19-Apr-01	Newspaper Article, “Andersen Landfill Waiting for Cleanup”	The Pacific Daily News	703
01-May-01	Fact Sheet, Landfill 7, Site 5	36 CES/CEVR	704
17-May-01	RPM Meeting Minutes, 17 May 2001	EA Engineering, Science and Technology	705
17-May-01	RPM Meeting Minutes, dtd 17 May 01	EA Engineering	706
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	707
01-Jun-01	RPM Meeting Minutes, 21 February 2001	EA Engineering, Science and Technology	708
01-Jun-01	RPM Meeting Minutes, 15 Nov 2000	EA Engineering, Science and Technology	709
14-Jun-01	Newspaper Article, “Notice to Residents of Capehart Housing”, Site 5	Tropic Topics Base Newspaper	710
10-Jul-01	GEPA Letter to Base Concerning Groundwater Monitoring, Marbo Annex	Salas, Jesus T Guam Environmental Protection Agency	711
27-Jul-01	Newspaper Article, “RAB Meeting Announcement”	The Pacific Daily News	712
31-Jul-01	RAB Meeting Minutes, 31 Jul 2001	EA Engineering, Science and Technology	713
01-Aug-01	NFRAP, Final Decision Document, Site 25	EA Engineering, Science and Technology	714
01-Aug-01	**Quality Program Plan, Vol I of II, Addendum, Northwest Field Annex, Main Base Annex**	**IT Corp.**	**715**
01-Aug-01	Environmental Cleanup Plan, Vol II of II, Northwest Field Annex, Site 16, 31	IT Corp.	716
01-Aug-01	EE/CA, Final Report, Site 36	URS Corp.	717
23-Aug-01	RPM Meeting Minutes, 23 August 2001	EA Engineering, Science and Technology	718

DOC. DATE	SUBJECT OR TITLE	AUTHOR or CORP. AUTHOR	FILE NUMBER
01-Sep-01	**Final Groundwater Monitoring Report, Spring 01**	**URS Corp.**	**719**
11-Sep-01	**Newspaper Article, “Field Work in Federal Audit of DOD Records Completed: Nationwide Audit on Military Sites Starts with Guam”**	**The Pacific Daily News**	**720**
01-Nov-01	Environmental Cleanup Plan, Vol II of II, Main Base Annex, Site 10, 34	IT Corp.	721
01-Dec-01	ROD, Final, Harmon Annex	EA Engineering, Science and Technology	722
02-Jan-02	SAP, Final Work Plan, Amendment, Site 6	EA Engineering, Science and Technology	723
05-Jul-02	**Administrative Record Index**	**LABAT-ANDERSON INCORPORATED**	**1**

Bolded/Shaded items indicate applicability to the Urunao Dumpsites 1 and 2 Record of Decision

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Appendix B

HHRA Detail Summary of Calculations
for
Urunao Dumpsites 1 and 2

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Ingestion	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * CR * EF * ED *CF/ (BW * AT)
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	CR (2)	Ingestion Rate	mg/day	100	USEPA, 1991	50	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	le-006	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	
Dermal	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * SA * AF * ABS * EF * ED * CF / (BW * AT)
	AF (2)	Adherence Factor	mg/cm^2	0.07	Regional Guidance	0.07	Regional Guidance	
	ABS	Dermal Absorption Factor	cm/hr	(1)	Regional Guidance	(1)	Regional Guidance	
	SA (2)	Surface Area for Contact	cm^2/event	5700	Regional Guidance	5000	Best Prof Judgment	
	EF	Exposure Frequency	event/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	le-006	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) ABS = TCDDs = 0.3; Cd = 0.001; PAHs = 0.13; PCBs = 0.14; DDT = 0.03; Dieldrin = 0.1; As = 0.03; SVOCs = 0.1

(2) For carcinogens adult/child residential exposure are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000

Soil Ingestion Rate = IFS_Adj = 114 mg/kg

Dermal Factor, Soils = SFS_Adj = 361 mg/kg

Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Inhalation	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * IR * ET * EF * ED / (BW * AT)
	IR (1)	Inhalation Rate	m^3/hr	0.83	Regional Guidance	0.63	Best Prof Judgment	
	ET	Exposure Time	hr/day	2	Regional Guidance	12	Best Prof Judgment	
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000

Soil Ingestion Rate = IFS_Adj = 114 mg/day

Dermal Factor, Soils = SFS_Adj = 361 mg/day

Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Ingestion	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * CR * EF * ED *CF/ (BW * AT)
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	6	USEPA, 1991	4	Best Prof Judgment	
	CR (2)	Ingestion Rate	mg/day	200	USEPA, 1991	100	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	15	USEPA, 1991	15	USEPA, 1991	
	AT-NC	Averaging Time - Non-cancer	days	2190	USEPA, 1989	1460	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	
Dermal	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * SA * AF * ABS * EF * ED * CF / (BW * AT)
	AF (2)	Adherence Factor	mg/cm^2	0.3	Regional Guidance	0.15	Best Prof Judgment	
	ABS	Dermal Absorption Factor	cm/hr	(1)	Regional Guidance	(1)	Regional Guidance	
	SA (2)	Surface Area for Contact	cm^2/event	2900	Regional Guidance	2544	Best Prof Judgment	
	EF	Exposure Fequency	event/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	6	USEPA, 1991	4	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	15	USEPA, 1991	15	USEPA, 1991	
	AT-NC	Averaging Time - Non-cancer	days	2190	USEPA, 1989	1460	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) ABS = TCDDs = 0.03 Cd = 0.001 DDT = 0.03 SVOCs = 0.1
Dieldrin = 0.1 PAHs = 0.13 PCBs = 0.14 As = 0.03

(2) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000

Soil Ingestion Rate = IFS_Adj = 114 mg/day
Dermal Factor, Soils = SFS_Adj = 361 mg/day
Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Inhalation	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * IR * ET * EF * ED/ (BW * AT)
	IR (1)	Inhalation Rate	m^3/hr	0.63	Regional Guidance	0.42	Best Prof Judgment	
	ET	Exposure Time	hr/day	24	Regional Guidance	24	Best Prof Judgment	
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	6	USEPA, 1991	4	Best Prof Judgment	
	BW	Body Weight	kg	15	USEPA, 1991	15	USEPA, 1991	
	AT-NC	Averaging Time - Non-cancer	days	2190	USEPA, 1989	1460	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000

Soil Ingestion Rate = IFS_Adj = 114 mg/day

Dermal Factor, Soils = SFS_Adj = 361 mg/day

Inhalation Rate = INH_Adj = 11 m^3/day/24 = 0.46 m^3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000

USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Ingestion	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * CR * EF * ED *CF / (BW * AT)
	EF	Exposure Frequency	day/yr	52	USEPA, 1991	26	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	CR	Ingestion Rate	mg/day	50	USEPA, 1991	25	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	
Dermal	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * SA * AF * ABS * EF * ED * CF / (BW * AT)
	AF	Adherence Factor	mg/cm^2	0.2	Regional Guidance	0.2	Regional Guidance	
	ABS	Dermal Absorption Factor	cm/hr	(1)	Regional Guidance	(1)	Regional Guidance	
	SA	Surface Area for Contact	cm^2/event	3300	Regional Guidance	3300	Best Prof Judgment	
	EF	Exposure Frequency	event/yr	52	USEPA, 1991	26	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) ABS = TCDDs = 0.03 As = 0.03 DDT = 0.03 PAHs = 0.13
Dieldrin = 0.1 Cd = 0.001 PCBs = 0.14 SVOCs = 0.1

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Inhalation	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * IR * ET * EF * ED / (BW * AT)
	IR	Inhalation Rate	m^3/hr	0.83	Regional Guidance	0.6	Best Prof Judgment	
	ET	Exposure Time	hr/day	2	Regional Guidance	1	Best Prof Judgment	
	EF	Ingestion Frequency	day/yr	52	USEPA, 1991	26	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Ingestion	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * CR * EF * ED * CF/ (BW * AT)
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	CR (2)	Ingestion Rate	mg/day	100	USEPA, 1991	50	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	
Dermal	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * SA * AF * ABS * EF * ED * CF / (BW * AT)
	AF (2)	Adherence Factor	mg/cm^2	0.07	Regional Guidance	0.07	Regional Guidance	
	ABS	Dermal Absorption Factor	cm/hr	(1)	Regional Guidance	(1)	Regional Guidance	
	SA (2)	Surface Area for Contact	cm^2/event	5700	Regional Guidance	5000	Best Prof Judgment	
	EF	Exposure Frequency	event/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) ABS = TCDDs = 0.03
Cd = 0.001
PAHs = 0.13

(2) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000
Soil Ingestion Rate = IFS_Adj = 114 mg/day
Dermal Factor, Soils = SFS_Adj = 361 mg/day
Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Source:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Inhalation	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * IR * ET * EF * ED / (BW * AT)
	IR (1)	Inhalation Rate	m^3/hr	0.83	Regional Guidance	0.6	Best Prof Judgment	
	ET	Exposure Time	hr/day	24	Regional Guidance	12	Best Prof Judgment	
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	30	USEPA, 1991	9	USEPA, 1989	
	BW	Body Weight	kg	70	USEPA, 1989	70	USEPA, 1989	
	AT-NC	Averaging Time - Non-cancer	days	10950	USEPA, 1989	3285	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000

Soil Ingestion Rate = IFS_Adj = 114 mg/day

Dermal Factor, Soils = SFS_Adj = 361 mg/day

Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000

USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Ingestion	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * CR * EF * ED *CF/ (BW * AT)
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	6	USEPA, 1991	4	Best Prof Judgment	
	CR (2)	Ingestion Rate	mg/day	200	USEPA, 1991	100	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	15	USEPA, 1991	15	USEPA, 1991	
	AT-NC	Averaging Time - Non-cancer	days	2190	USEPA, 1989	1460	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	
Dermal	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * SA * AF * ABS * EF * ED * CF / (BW * AT)
	AF (2)	Adherence Factor	mg/cm^2	0.3	Regional Guidance	0.15	Best Prof Judgment	
	ABS	Dermal Absorption Factor	cm/hr	(1)	Regional Guidance	(1)	Regional Guidance	
	SA (2)	Surface Area for Contact	cm^2/event	2900	Regional Guidance	2544	Best Prof Judgment	
	EF	Exposure Frequency	event/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	6	USEPA, 1991	4	Best Prof Judgment	
	CF	Conversion Factor	kg/mg	1e-006	USEPA, 1989	1e-006	USEPA, 1989	
	BW	Body Weight	kg	15	USEPA, 1991	15	USEPA, 1991	
	AT-NC	Averaging Time - Non-cancer	days	2190	USEPA, 1989	1460	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) ABS = TCDDs = 0.03
Cd = 0.001
PAHs = 0.13

(2) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000
Soil Ingestion Rate = IFS_Adj = 114 mg/day
Dermal Factor, Soils = SFS_Adj = 361 mg/day
Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000
USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.
USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B1. VALUES USED FOR DAILY INTAKE CALCULATIONS FOR URUNAO DUMPSITES 1 AND 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao Dumpsites 1 and 2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Preference	CT Value	CT Rationale/ Preference	Intake Equation/ Model Name
Inhalation	Conc	Chemical Concentration	mg/kg	Tables 2-12-15	Regional Guidance	Tables 2-12-15	Regional Guidance	Intake (mg/kg-day) = Conc * IR * ET * EF * ED / (BW * AT)
	IR (1)	Inhalation Rate	m^3/hr	0.63	Regional Guidance	0.4167	Best Prof Judgment	
	ET	Exposure Time	hr/day	24	Regional Guidance	24	Best Prof Judgment	
	EF	Exposure Frequency	day/yr	350	USEPA, 1991	175	Best Prof Judgment	
	ED	Exposure Duration	yr	6	USEPA, 1991	4	Best Prof Judgment	
	BW	Body Weight	kg	15	USEPA, 1991	15	USEPA, 1991	
	AT-NC	Averaging Time - Non-cancer	days	2190	USEPA, 1989	1460	USEPA, 1989	
	AT-C	Averaging Time - Cancer	days	25550	USEPA, 1989	25550	USEPA, 1989	

(1) For carcinogens adult/child residential are assessed using age adjusted factors, Region IX Preliminary Remediation Goals, November 2000

Soil Ingestion Rate = IFS_Adj = 114 mg/day

Dermal Factor, Soils = SFS_Adj = 361 mg/day

Inhalation Rate = INH_Adj = 11 m3/day / 24 = 0.46 m3/hr

Sources:

Regional Guidance: Region IX Preliminary Remediation Goals, November 2000

USEPA, 1989a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA, 1991a: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.7E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	1.4E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	3.4E-01
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	8.1E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.7E-02
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	4.5E-04	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	6.5E-03
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	4.6E-06	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	4.6E-03
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	2.1E-04	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	5.7E-03
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	4.8E-04	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	1.2E-03	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	4.9E-02
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	2.1E-07	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	6.8E-04
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	3.6E-05	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	1.8E-03
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	6.7E-06	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	1.3E-03
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	2.8E-07	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	3.5E-03
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	4.5E-04	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.5E-03
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	6.5E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	2.6E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.3E-03
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	2.3E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	7.8E-08	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	1.6E-04
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.9E-08	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	3.7E-05
	(Total)												4.43E-01
Dermal	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	3.6E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	1.7E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	5.7E-03
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	3.2E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	6.5E-04
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	--	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	--	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	--	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	5.9E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	2.5E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.3E-03
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	2.2E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	1.6E-08	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	3.3E-05
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.1E-08	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	2.6E-05
	(Total)												7.71E-03
												Total Hazard Index Across All Exposure Routes/Pathways	4.51E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT.CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	5.0E-05	mg/kg	4.7E-13	mg/m3	R	2.3E-14	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	3.7E-06	mg/m3	R	1.8E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ARSENIC	2.4E+01	mg/kg	2.2E-07	mg/m3	R	1.1E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	1.3E+03	mg/kg	1.2E-05	mg/m3	R	6.1E-07	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	4.3E-03
	CADMIUM	1.4E+01	mg/kg	1.3E-07	mg/m3	R	6.2E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	6.2E+02	mg/kg	5.8E-06	mg/m3	R	2.8E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	6.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.2E-05	mg/m3	R	1.6E-06	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.1E-01
	MERCURY (INORGANIC)	6.0E-01	mg/kg	5.6E-09	mg/m3	R	2.8E-10	mg/kg-d	8.6E-05	mg/kg-d	N/A	N/A	3.2E-06
	NICKEL	1.0E+02	mg/kg	9.7E-07	mg/m3	R	4.8E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	SILVER	2.0E+01	mg/kg	1.8E-07	mg/m3	R	9.0E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	THALLIUM	8.1E-01	mg/kg	7.5E-09	mg/m3	R	3.7E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	1.3E+03	mg/kg	1.2E-05	mg/m3	R	6.0E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.8E-10	mg/m3	R	8.7E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.0E-10	mg/m3	R	3.5E-11	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.7E-06
	AROCLOR-1260	6.6E-02	mg/kg	6.1E-10	mg/m3	R	3.0E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.1E-09	mg/m3	R	1.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.0E-10	mg/m3	R	3.9E-11	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	4.9E-08
	(Total)												1.14E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.14E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.6E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	1.3E-03	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	3.2E+00
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	7.5E-05	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.5E-01
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	4.2E-03	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	6.0E-02
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	4.3E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	4.3E-02
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	2.0E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	5.4E-02
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	4.5E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	1.1E-02	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	4.6E-01
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	1.9E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	6.4E-03
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	3.3E-04	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	1.7E-02
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	6.3E-05	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	1.3E-02
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	2.6E-06	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	3.2E-02
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	4.2E-03	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.4E-02
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	6.1E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	2.4E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.2E-02
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	2.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	7.2E-07	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	1.4E-03
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.7E-07	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	3.4E-04
	(Total)												4.16E+00
Dermal	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.8E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	8.6E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.9E-02
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	1.7E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.3E-03
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	--	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	--	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	--	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	3.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	1.3E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	6.5E-03
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	1.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	8.3E-08	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	1.7E-04
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	1.0E-07	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	1.3E-04
	(Total)												3.91E-02
												Total Hazard Index Across All Exposure Routes/Pathways	4.20E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUANO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	5.0E-05	mg/kg	4.7E-13	mg/m3	R	1.5E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	3.7E-06	mg/m3	R	1.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ARSENIC	2.4E+01	mg/kg	2.2E-07	mg/m3	R	7.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	1.3E+03	mg/kg	1.2E-05	mg/m3	R	3.9E-06	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	2.8E-02
	CADMIUM	1.4E+01	mg/kg	1.3E-07	mg/m3	R	4.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	6.2E+02	mg/kg	5.8E-06	mg/m3	R	1.8E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	4.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.2E-05	mg/m3	R	1.0E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	7.3E-01
	MERCURY (INORGANIC)	6.0E-01	mg/kg	5.6E-09	mg/m3	R	1.8E-09	mg/kg-d	8.6E-05	mg/kg-d	N/A	N/A	2.1E-05
	NICKEL	1.0E+02	mg/kg	9.7E-07	mg/m3	R	3.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	SILVER	2.0E+01	mg/kg	1.8E-07	mg/m3	R	5.8E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	THALLIUM	8.1E-01	mg/kg	7.5E-09	mg/m3	R	2.4E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	1.3E+03	mg/kg	1.2E-05	mg/m3	R	3.9E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.8E-10	mg/m3	R	5.7E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.0E-10	mg/m3	R	2.2E-10	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.1E-05
	AROCLOR-1260	6.6E-02	mg/kg	6.1E-10	mg/m3	R	2.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.1E-09	mg/m3	R	6.7E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.0E-10	mg/m3	R	2.6E-10	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	3.2E-07
	(Total)												7.58E-01
												Total Hazard Index Across All Exposure Routes/ Pathways	7.58E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.3E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	1.0E-05	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	2.6E-02
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	6.0E-07	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.0E-03
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	3.4E-05	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	4.8E-04
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	3.4E-07	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	3.4E-04
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	1.6E-05	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	4.3E-04
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	3.6E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	8.7E-05	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	3.6E-03
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	1.5E-08	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	5.1E-05
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	2.7E-06	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	1.3E-04
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	5.0E-07	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	1.0E-04
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	2.1E-08	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	2.6E-04
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	3.3E-05	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.1E-04
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	4.8E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	1.9E-09	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	9.6E-05
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	1.7E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	5.8E-09	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	1.2E-05
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.2E-09	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	2.7E-06
	(Total)												3.36E-02
Dermal	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.0E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	4.7E-07	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	1.6E-03
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	9.1E-09	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.8E-04
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	--	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	--	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	--	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	1.7E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	7.1E-09	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.6E-04
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	6.2E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	4.6E-09	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	9.1E-06
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	5.8E-09	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	7.2E-06
	(Total)												2.16E-03
	Total Hazard Index Across All Exposure Routes/Pathways												3.58E-02

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUANO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	5.0E-05	mg/kg	4.7E-13	mg/m3	R	2.9E-16	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	4.0E+02	mg/kg	3.7E-06	mg/m3	R	2.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ARSENIC	2.4E+01	mg/kg	2.2E-07	mg/m3	R	1.3E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	1.3E+03	mg/kg	1.2E-05	mg/m3	R	7.5E-09	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	5.4E-05
	CADMIUM	1.4E+01	mg/kg	1.3E-07	mg/m3	R	7.7E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	6.2E+02	mg/kg	5.8E-06	mg/m3	R	3.5E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	8.0E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	3.4E+03	mg/kg	3.2E-05	mg/m3	R	1.9E-08	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.4E-03
	MERCURY (INORGANIC)	6.0E-01	mg/kg	5.6E-09	mg/m3	R	3.4E-12	mg/kg-d	8.6E-05	mg/kg-d	N/A	N/A	4.0E-08
	NICKEL	1.0E+02	mg/kg	9.7E-07	mg/m3	R	6.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	SILVER	2.0E+01	mg/kg	1.8E-07	mg/m3	R	1.1E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	THALLIUM	8.1E-01	mg/kg	7.5E-09	mg/m3	R	4.6E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	1.3E+03	mg/kg	1.2E-05	mg/m3	R	7.4E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.8E-10	mg/m3	R	1.1E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	7.6E-02	mg/kg	7.0E-10	mg/m3	R	4.3E-13	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	2.1E-08
	AROCLOR-1260	6.6E-02	mg/kg	6.1E-10	mg/m3	R	3.7E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	2.3E-01	mg/kg	2.1E-09	mg/m3	R	1.3E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.0E-10	mg/m3	R	4.9E-13	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	6.1E-10
	(Total)												1.45E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.45E-03

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site 1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	6.7E-05	mg/kg	6.7E-05	mg/kg	M	2.3E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+01	mg/kg	6.2E+01	mg/kg	M	2.1E-05	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	5.3E-02
	BARIUM	4.7E+03	mg/kg	4.7E+03	mg/kg	M	1.6E-03	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	2.3E-02
	CADMIUM	6.3E+01	mg/kg	6.3E+01	mg/kg	M	2.2E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.2E-02
	COPPER	1.8E+03	mg/kg	1.8E+03	mg/kg	M	6.3E-04	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	1.7E-02
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	4.9E-04	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	2.1E+03	mg/kg	2.1E+03	mg/kg	M	7.4E-04	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	2.5E-03
	(Total)												1.18E-01
Dermal	TCDD-TEQ	6.7E-05	mg/kg	6.7E-05	mg/kg	M	4.8E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+01	mg/kg	6.2E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	BARIUM	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	6.3E+01	mg/kg	6.3E+01	mg/kg	M	1.5E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.0E-03
	COPPER	1.8E+03	mg/kg	1.8E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	2.1E+03	mg/kg	2.1E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	(Total)												3.0E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.21E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future Medium: Subsurface Soil Exposure Medium: Air Exposure Point: Urunao-Site 1 Receptor Population: Resident Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	6.7E-05	mg/kg	6.2E-13	mg/m3	R	3.1E-14	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+01	mg/kg	5.8E-07	mg/m3	R	2.9E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	4.7E+03	mg/kg	4.4E-05	mg/m3	R	2.2E-06	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	1.5E-02
	CADMIUM	6.3E+01	mg/kg	5.8E-07	mg/m3	R	2.9E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	1.8E+03	mg/kg	1.7E-05	mg/m3	R	8.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	6.5E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	2.1E+03	mg/kg	2.0E-05	mg/m3	R	9.9E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.5E-02
Total Hazard Index Across All Exposure Routes/Pathways													1.5E-02

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY,
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site 1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	6.7E-05	mg/kg	6.7E-05	mg/kg	M	2.1E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+01	mg/kg	6.2E+01	mg/kg	M	2.0E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	5.0E-01
	BARIUM	4.7E+03	mg/kg	4.7E+03	mg/kg	M	1.5E-02	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	2.2E-01
	CADMIUM	6.3E+01	mg/kg	6.3E+01	mg/kg	M	2.0E-04	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.0E-01
	COPPER	1.8E+03	mg/kg	1.8E+03	mg/kg	M	5.9E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	1.6E-01
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	4.6E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	2.1E+03	mg/kg	2.1E+03	mg/kg	M	6.9E-03	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	2.3E-02
	(Total)												1.10E+00
Dermal	TCDD-TEQ	6.7E-05	mg/kg	6.7E-05	mg/kg	M	2.4E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+01	mg/kg	6.2E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	BARIUM	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	6.3E+01	mg/kg	6.3E+01	mg/kg	M	7.7E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.5E-02
	COPPER	1.8E+03	mg/kg	1.8E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	2.1E+03	mg/kg	2.1E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	(Total)												1.5E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.12E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site 1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	6.7E-05	mg/kg	6.2E-13	mg/m3	R	2.0E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+01	mg/kg	5.8E-07	mg/m3	R	1.8E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	4.7E+03	mg/kg	4.4E-05	mg/m3	R	1.4E-05	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	1.0E-01
	CADMIUM	6.3E+01	mg/kg	5.8E-07	mg/m3	R	1.9E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	1.8E+03	mg/kg	1.7E-05	mg/m3	R	5.5E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	4.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	2.1E+03	mg/kg	2.0E-05	mg/m3	R	6.4E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.0E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	9.3E-06	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	2.3E-02
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	5.9E-06	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	5.9E-03
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	1.2E-04	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	3.2E-03
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.4E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.4E-03	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	6.0E-02
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	5.0E-07	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	6.3E-03
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	1.2E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	1.0E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	5.1E-03
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	2.5E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	1.5E-09	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.0E-05
	(Total)												1.04E-01
Dermal	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	4.1E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	8.3E-04
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	1.1E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	9.9E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	5.0E-03
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	2.5E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	1.1E-09	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.1E-05
	(Total)												5.85E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.09E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO SITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	2.7E+01	mg/kg	2.5E-07	mg/m3	R	1.3E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	1.7E+01	mg/kg	1.6E-07	mg/m3	R	7.9E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	3.4E+02	mg/kg	3.2E-06	mg/m3	R	1.6E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.9E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.9E-06	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.4E-01
	THALLIUM	1.5E+00	mg/kg	1.4E-08	mg/m3	R	6.7E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.2E-10	mg/m3	R	1.6E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	2.8E-09	mg/m3	R	1.4E-10	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	6.8E-06
	AROCLOR-1260	7.3E-02	mg/kg	6.8E-10	mg/m3	R	3.4E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.1E-11	mg/m3	R	2.0E-12	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	4.1E-08
	(Total)												1.40E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.40E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	8.7E-05	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	2.2E-01
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	5.5E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	5.5E-02
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	1.1E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	3.0E-02
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.3E-02	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.3E-02	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	5.6E-01
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	4.7E-06	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	5.9E-02
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	1.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	9.5E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	4.7E-02
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	2.3E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	1.4E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.8E-04
	(Total)												9.71E-01
Dermal	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	2.1E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	4.2E-03
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	5.5E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	5.1E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	2.5E-02
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	1.3E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	5.4E-09	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.1E-04
	(Total)												2.93E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.00E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	2.7E+01	mg/kg	2.5E-07	mg/m3	R	8.1E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	1.7E+01	mg/kg	1.6E-07	mg/m3	R	5.1E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	3.4E+02	mg/kg	3.2E-06	mg/m3	R	1.0E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.3E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.3E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	9.0E-01
	THALLIUM	1.5E+00	mg/kg	1.4E-08	mg/m3	R	4.4E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.2E-10	mg/m3	R	1.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	2.8E-09	mg/m3	R	8.8E-10	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	4.4E-05
	AROCLOR-1260	7.3E-02	mg/kg	6.8E-10	mg/m3	R	2.2E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.1E-11	mg/m3	R	1.3E-11	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.6E-07
	(Total)												9.00E-01
												Total Hazard Index Across All Exposure Routes/Pathways	9.00E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	6.9E-07	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	1.7E-03
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	4.4E-07	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	4.4E-04
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	8.8E-06	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	2.4E-04
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.1E-04	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.1E-04	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	4.5E-03
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	3.7E-08	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	4.7E-04
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	8.8E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	7.5E-09	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.8E-04
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	1.9E-09	mg/kg-d	N/A	mg/kg	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	1.1E-10	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.2E-06
	(Total)												7.73E-03
Dermal	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	1.2E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.3E-04
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	3.0E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	2.8E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.4E-03
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	6.9E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	3.0E-10	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	5.9E-06
	(Total)												1.64E-03
Total Hazard Index Across All Exposure Routes/Pathways													9.37E-03

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	2.7E+01	mg/kg	2.5E-07	mg/m3	R	1.5E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	1.7E+01	mg/kg	1.6E-07	mg/m3	R	9.8E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	3.4E+02	mg/kg	3.2E-06	mg/m3	R	2.0E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	4.2E+03	mg/kg	3.9E-05	mg/m3	R	2.4E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.2E+03	mg/kg	3.9E-05	mg/m3	R	2.4E-08	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.7E-03
	THALLIUM	1.5E+00	mg/kg	1.4E-08	mg/m3	R	8.3E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.2E-10	mg/m3	R	2.0E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	3.0E-01	mg/kg	2.8E-09	mg/m3	R	1.7E-12	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	8.4E-08
	AROCLOR-1260	7.3E-02	mg/kg	6.8E-10	mg/m3	R	4.2E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	4.4E-03	mg/kg	4.1E-11	mg/m3	R	2.5E-14	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	5.0E-10
	(Total)												1.70E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.70E-03

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	4.6E+01	mg/kg	4.6E+01	mg/kg	M	1.6E-05	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	3.9E-02
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	5.5E-06	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	5.5E-03
	COPPER	2.8E+02	mg/kg	2.8E+02	mg/kg	M	9.7E-05	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	2.6E-03
	LEAD	3.2E+02	mg/kg	3.2E+02	mg/kg	M	1.1E-04	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.3E+03	mg/kg	4.3E+03	mg/kg	M	1.5E-03	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	6.1E-02
	THALLIUM	1.2E+00	mg/kg	1.2E+00	mg/kg	M	4.2E-07	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	5.2E-03
	BENZO[A]PYRENE	4.2E-02	mg/kg	4.2E-02	mg/kg	M	1.4E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.2E-02	mg/kg	M	4.0E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.13E-01
Dermal	ANTIMONY	4.6E+01	mg/kg	4.6E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	3.9E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	7.7E-04
	COPPER	2.8E+02	mg/kg	2.8E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	3.2E+02	mg/kg	3.2E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.3E+03	mg/kg	4.3E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.2E+00	mg/kg	1.2E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	4.2E-02	mg/kg	M	1.3E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.2E-02	mg/kg	M	3.6E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												7.7E-04
	Total Hazard Index Across All Exposure Routes/Pathways												1.14E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	4.6E+01	mg/kg	4.3E-07	mg/m3	R	2.1E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	7.4E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.8E+02	mg/kg	2.6E-06	mg/m3	R	1.3E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	3.2E+02	mg/kg	3.0E-06	mg/m3	R	1.5E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.3E+03	mg/kg	4.0E-05	mg/m3	R	2.0E-06	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.4E-01
	THALLIUM	1.2E+00	mg/kg	1.1E-08	mg/m3	R	5.6E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	3.9E-10	mg/m3	R	1.9E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.1E-10	mg/m3	R	5.3E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.4E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.4E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	4.6E+01	mg/kg	4.6E+01	mg/kg	M	1.5E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	3.7E-01
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	5.2E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	5.2E-02
	COPPER	2.8E+02	mg/kg	2.8E+02	mg/kg	M	9.0E-04	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	2.4E-02
	LEAD	3.2E+02	mg/kg	3.2E+02	mg/kg	M	1.0E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.3E+03	mg/kg	4.3E+03	mg/kg	M	1.4E-02	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	5.7E-01
	THALLIUM	1.2E+00	mg/kg	1.2E+00	mg/kg	M	3.9E-06	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	4.9E-02
	BENZO[A]PYRENE	4.2E-02	mg/kg	4.2E-02	mg/kg	M	1.3E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.2E-02	mg/kg	M	3.7E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.07E+00
Dermal	ANTIMONY	4.6E+01	mg/kg	4.6E+01	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	2.0E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.9E-03
	COPPER	2.8E+02	mg/kg	2.8E+02	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	3.2E+02	mg/kg	3.2E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.3E+03	mg/kg	4.3E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.2E+00	mg/kg	1.2E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	4.2E-02	mg/kg	M	6.7E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.2E-02	mg/kg	M	1.8E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												3.9E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.07E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF NON-CANCER HAZARDS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surbsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	4.6E+01	mg/kg	4.3E-07	mg/m3	R	1.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	4.8E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.8E+02	mg/kg	2.6E-06	mg/m3	R	8.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	3.2E+02	mg/kg	3.0E-06	mg/m3	R	9.5E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.3E+03	mg/kg	4.0E-05	mg/m3	R	1.3E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	9.1E-01
	THALLIUM	1.2E+00	mg/kg	1.1E-08	mg/m3	R	3.6E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	3.9E-10	mg/m3	R	1.3E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.1E-10	mg/m3	R	3.4E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												9.1E-01
												Total Hazard Index Across All Exposure Route/Pathways	9.1E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	5.8E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	8.8E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	2.2E+00
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	5.7E-05	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	1.9E-01
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	4.7E-03	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	6.7E-02
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	2.2E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.2E-02
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	3.2E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	8.6E-02
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	2.6E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	6.5E-03	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	2.7E-01
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	1.0E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	3.5E-03
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	2.3E-04	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	1.1E-02
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	1.0E-04	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	2.0E-02
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	1.4E-06	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	1.8E-02
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	6.1E-03	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	2.0E-02
	DIBENZ[A,H]ANTHRACEN	7.9E-02	mg/kg	7.9E-02	mg/kg	M	1.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	1.2E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	5.9E-03
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	2.0E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	4.8E-07	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	9.6E-04
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	1.3E-07	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	1.6E-04
	(Total)												2.91E+00
Dermal	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	6.9E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	6.9E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.3E-02
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	8.7E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.7E-03
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	--	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	--	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	--	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACEN	7.9E-02	mg/kg	7.9E-02	mg/kg	M	5.6E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	6.6E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.3E-03
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	1.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	5.8E-08	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	1.2E-04
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	5.1E-08	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	6.4E-05
	(Total)												2.82E-02
												Total Hazard Index Across All Exposure Routes/Pathways	2.94E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer)Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	4.2E-04	mg/kg	3.9E-12	mg/m3	R	1.1E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.0E-06	mg/m3	R	1.6E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ARSENIC	4.2E+01	mg/kg	3.9E-07	mg/m3	R	1.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	3.4E+03	mg/kg	3.2E-05	mg/m3	R	8.7E-06	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	6.2E-02
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	4.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.3E+03	mg/kg	2.2E-05	mg/m3	R	5.9E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.9E+03	mg/kg	1.8E-05	mg/m3	R	4.8E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.4E-05	mg/m3	R	1.2E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	8.5E-01
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.0E-09	mg/m3	R	1.9E-09	mg/kg-d	8.6E-05	mg/kg-d	N/A	N/A	2.2E-05
	NICKEL	1.7E+02	mg/kg	1.6E-06	mg/m3	R	4.3E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	SILVER	7.4E+01	mg/kg	6.9E-07	mg/m3	R	1.9E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	THALLIUM	1.0E+00	mg/kg	9.7E-09	mg/m3	R	2.7E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.5E+03	mg/kg	4.1E-05	mg/m3	R	1.1E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACE	7.9E-02	mg/kg	7.4E-10	mg/m3	R	2.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.0E-10	mg/m3	R	2.2E-10	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.1E-05
	AROCLOR-1260	1.4E-01	mg/kg	1.3E-09	mg/m3	R	3.6E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.3E-09	mg/m3	R	8.9E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	HEXACHLOROBENZENE	9.4E-02	mg/kg	8.8E-10	mg/m3	R	2.4E-10	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	3.0E-07
	(Total)												9.12E-01
												Total Hazard Index Across All Exposure Route/Pathways	9.12E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	5.4E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	8.2E-03	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	2.1E+01
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	5.4E-04	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	1.8E+00
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	4.4E-02	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	6.3E-01
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	2.0E-04	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.0E-01
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	3.0E-02	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	8.1E-01
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	2.4E-02	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	6.0E-02	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	2.5E+00
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	9.7E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	3.2E-02
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	2.1E-03	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	1.1E-01
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	9.5E-04	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	1.9E-01
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	1.3E-05	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	1.7E-01
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	5.7E-02	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.9E-01
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	1.0E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	1.1E-06	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	5.5E-02
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	1.8E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	4.5E-06	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	9.0E-03
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	1.2E-06	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	1.5E-03
	(Total)												2.77E+01
Dermal	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	7.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	7.0E-05	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.3E-01
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	8.8E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.8E-02
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	--	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	--	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	--	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	5.7E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	6.7E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.4E-02
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	1.1E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	5.9E-07	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	1.2E-03
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	5.2E-07	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	6.5E-04
	(Total)												2.84E-01
	Total Hazard Index Across All Exposure Routes/Pathways												2.80E+01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	4.2E-04	mg/kg	3.9E-12	mg/m3	R	3.7E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.0E-06	mg/m3	R	5.8E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ARSENIC	4.2E+01	mg/kg	3.9E-07	mg/m3	R	3.7E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	3.4E+03	mg/kg	3.2E-05	mg/m3	R	3.1E-05	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	2.2E-01
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	1.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.3E+03	mg/kg	2.2E-05	mg/m3	R	2.1E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.9E+03	mg/kg	1.8E-05	mg/m3	R	1.7E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.4E-05	mg/m3	R	4.2E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	3.0E+00
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.0E-09	mg/m3	R	6.8E-09	mg/kg-d	8.6E-05	mg/kg-d	N/A	N/A	7.9E-05
	NICKEL	1.7E+02	mg/kg	1.6E-06	mg/m3	R	1.5E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	SILVER	7.4E+01	mg/kg	6.9E-07	mg/m3	R	6.6E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	THALLIUM	1.0E+00	mg/kg	9.7E-09	mg/m3	R	9.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.5E+03	mg/kg	4.1E-05	mg/m3	R	4.0E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACEN	7.9E-02	mg/kg	7.4E-10	mg/m3	R	7.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.0E-10	mg/m3	R	7.7E-10	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.8E-05
	AROCLOR-1260	1.4E-01	mg/kg	1.3E-09	mg/m3	R	1.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.3E-09	mg/m3	R	3.1E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	HEXACHLOROBENZENE	9.4E-02	mg/kg	8.8E-10	mg/m3	R	8.4E-10	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	1.0E-06
	(Total)												3.22E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.22E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	4.3E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	6.6E-05	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	1.6E-01
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	4.3E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	1.4E-02
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	3.5E-04	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	5.0E-03
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	1.6E-06	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	1.6E-03
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	2.4E-04	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	6.4E-03
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	1.9E-04	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	4.8E-04	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	2.0E-02
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	7.7E-08	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	2.6E-04
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	1.7E-05	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	8.5E-04
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	7.6E-06	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	1.5E-03
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	1.1E-07	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	1.3E-03
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	4.5E-04	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.5E-03
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	8.0E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	8.8E-09	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	4.4E-04
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	1.5E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	3.6E-08	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	7.1E-05
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	9.6E-09	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	1.2E-05
	(Total)												2.13E-01
Dermal	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	1.7E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.2E+02	mg/kg	6.4E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	1.7E-06	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	5.6E-03
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	2.1E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	4.3E-04
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	--	mg/kg-d	3.0E-04	mg/kg-d	N/A	N/A	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	--	mg/kg-d	2.0E-02	mg/kg-d	N/A	N/A	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	--	mg/kg-d	5.0E-03	mg/kg-d	N/A	N/A	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	1.4E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	1.6E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	8.1E-04
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	2.7E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	1.4E-08	mg/kg-d	5.0E-04	mg/kg-d	N/A	N/A	2.8E-05
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	1.3E-08	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	1.6E-05
	(Total)												6.88E-03
												Total Hazard Index Across All Exposure Routes/Pathways	2.20E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	4.2E-04	mg/kg	3.9E-12	mg/m3	R	1.3E-14	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	6.4E+02	mg/kg	6.0E-06	mg/m3	R	2.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ARSENIC	4.2E+01	mg/kg	3.9E-07	mg/m3	R	1.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	3.4E+03	mg/kg	3.2E-05	mg/m3	R	1.1E-07	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	7.7E-04
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	5.0E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.3E+03	mg/kg	2.2E-05	mg/m3	R	7.3E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.9E+03	mg/kg	1.8E-05	mg/m3	R	6.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	4.7E+03	mg/kg	4.4E-05	mg/m3	R	1.5E-07	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.1E-02
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.0E-09	mg/m3	R	2.4E-11	mg/kg-d	8.6E-05	mg/kg-d	N/A	N/A	2.8E-07
	NICKEL	1.7E+02	mg/kg	1.6E-06	mg/m3	R	5.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	SILVER	7.4E+01	mg/kg	6.9E-07	mg/m3	R	2.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	THALLIUM	1.0E+00	mg/kg	9.7E-09	mg/m3	R	3.3E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.5E+03	mg/kg	4.1E-05	mg/m3	R	1.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.4E-10	mg/m3	R	2.5E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.6E-02	mg/kg	8.0E-10	mg/m3	R	2.7E-12	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.4E-07
	AROCLOR-1260	1.4E-01	mg/kg	1.3E-09	mg/m3	R	4.5E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DDT	3.5E-01	mg/kg	3.3E-09	mg/m3	R	1.1E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	HEXACHLOROBENZENE	9.4E-02	mg/kg	8.8E-10	mg/m3	R	3.0E-12	mg/kg-d	8.0E-04	mg/kg-d	N/A	N/A	3.7E-09
	(Total)												1.18E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.18E-02

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	1.3E-04	mg/kg	1.3E-04	mg/kg	M	1.8E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	1.2E+02	mg/kg	1.2E+02	mg/kg	M	1.6E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	4.1E-01
	BARIUM	8.1E+03	mg/kg	8.1E+03	mg/kg	M	1.1E-02	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	1.6E-01
	CADMIUM	1.2E+02	mg/kg	1.2E+02	mg/kg	M	1.6E-04	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	1.6E-01
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	3.5E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	9.4E-02
	LEAD	2.8E+03	mg/kg	2.8E+03	mg/kg	M	3.9E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.2E+03	mg/kg	4.2E+03	mg/kg	M	5.8E-03	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.9E-02
	(Total)												8.43E-01
Dermal	TCDD-TEQ	1.3E-04	mg/kg	1.3E-04	mg/kg	M	2.2E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	1.2E+02	mg/kg	1.2E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	BARIUM	8.1E+03	mg/kg	8.1E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.2E+02	mg/kg	1.2E+02	mg/kg	M	6.4E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.3E-02
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	2.8E+03	mg/kg	2.8E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	(Total)												1.3E-02
												Total Hazard Index Across All Exposure Routes/Pathways	8.56E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	1.3E-04	mg/kg	1.2E-12	mg/m3	R	3.4E-13	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	1.2E+02	mg/kg	1.1E-06	mg/m3	R	3.0E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	8.1E+03	mg/kg	7.5E-05	mg/m3	R	2.1E-05	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	1.5E-01
	CADMIUM	1.2E+02	mg/kg	1.1E-06	mg/m3	R	3.0E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.5E+03	mg/kg	2.4E-05	mg/m3	R	6.4E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	2.8E+03	mg/kg	2.6E-05	mg/m3	R	7.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.1E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.5E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.5E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	TCDD-TEQ	1.3E-04	mg/kg	1.3E-04	mg/kg	M	1.7E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	1.2E+02	mg/kg	1.2E+02	mg/kg	M	1.5E-03	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	3.8E+00
	BARIUM	8.1E+03	mg/kg	8.1E+03	mg/kg	M	1.0E-01	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	1.5E+00
	CADMIUM	1.2E+02	mg/kg	1.2E+02	mg/kg	M	1.5E-03	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	1.5E+00
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	3.2E-02	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	8.8E-01
	LEAD	2.8E+03	mg/kg	2.8E+03	mg/kg	M	3.6E-02	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.2E+03	mg/kg	4.2E+03	mg/kg	M	5.4E-02	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	1.8E-01
	(Total)												7.86E+00
Dermal	TCDD-TEQ	1.3E-04	mg/kg	1.3E-04	mg/kg	M	2.2E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	1.2E+02	mg/kg	1.2E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	BARIUM	8.1E+03	mg/kg	8.1E+03	mg/kg	M	--	mg/kg-d	7.0E-02	mg/kg-d	N/A	N/A	--
	CADMIUM	1.2E+02	mg/kg	1.2E+02	mg/kg	M	6.6E-06	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.3E-01
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	2.8E+03	mg/kg	2.8E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	3.0E-01	mg/kg-d	N/A	N/A	--
	(Total)												1.3E-01
												Total Hazard Index Across All Exposure Routes/Pathways	7.99E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE, URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	TCDD-TEQ	1.3E-04	mg/kg	1.2E-12	mg/m3	R	1.2E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ANTIMONY	1.2E+02	mg/kg	1.1E-06	mg/m3	R	1.1E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BARIUM	8.1E+03	mg/kg	7.5E-05	mg/m3	R	7.2E-05	mg/kg-d	1.4E-04	mg/kg-d	N/A	N/A	5.2E-01
	CADMIUM	1.2E+02	mg/kg	1.1E-06	mg/m3	R	1.1E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.5E+03	mg/kg	2.4E-05	mg/m3	R	2.3E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	2.8E+03	mg/kg	2.6E-05	mg/m3	R	2.5E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	ZINC	4.2E+03	mg/kg	3.9E-05	mg/m3	R	3.8E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												5.2E-01
												Total Hazard Index Across All Exposure Routes/Pathways	5.2E-01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	2.5E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	6.4E-01
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	2.9E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.9E-02
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	3.4E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	9.1E-02
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	5.3E-02	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	8.4E-03	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	3.5E-01
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	2.6E-06	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	3.2E-02
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	3.5E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	1.2E-06	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	6.0E-02
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	4.0E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	7.4E-09	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.5E-04
	(Total)												1.20E+00
Dermal	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	1.2E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.3E-03
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	1.8E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	6.7E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.4E-02
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	2.3E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	3.0E-09	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	5.9E-05
	(Total)												3.64E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.24E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	1.9E+02	mg/kg	1.7E-06	mg/m3	R	4.7E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	2.1E+01	mg/kg	2.0E-07	mg/m3	R	5.4E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.5E+03	mg/kg	2.3E-05	mg/m3	R	6.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	3.9E+04	mg/kg	3.6E-04	mg/m3	R	9.8E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	1.1E+00
	MANGANESE	6.1E+03	mg/kg	5.7E-05	mg/m3	R	1.6E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	--
	THALLIUM	1.9E+00	mg/kg	1.8E-08	mg/m3	R	4.8E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.4E-09	mg/m3	R	6.4E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.2E-09	mg/m3	R	2.2E-09	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.1E-04
	AROCLOR-1260	2.9E-01	mg/kg	2.7E-09	mg/m3	R	7.5E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.0E-11	mg/m3	R	1.4E-11	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.8E-07
	(Total)												1.10E+00
												Total Hazard Index Across All Exposure Routes/Pathways	1.10E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	2.4E-03	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	5.9E+00
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	2.7E-04	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.7E-01
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	3.1E-02	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	8.5E-01
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	4.9E-01	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	7.8E-02	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	3.3E+00
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	2.4E-05	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	3.0E-01
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	3.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	1.1E-05	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	5.6E-01
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	3.8E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	6.9E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.4E-03
	(Total)												1.12E+01
Dermal	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	1.2E-06	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	2.4E-02
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	1.8E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	6.9E-06	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.4E-01
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	2.3E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	3.0E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	6.0E-04
	(Total)												3.65E-01
												Total Hazard Index Across All Exposure Routes/Pathways	1.15E+01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	1.9E+02	mg/kg	1.7E-06	mg/m3	R	1.7E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	2.1E+01	mg/kg	2.0E-07	mg/m3	R	1.9E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.5E+03	mg/kg	2.3E-05	mg/m3	R	2.2E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	3.9E+04	mg/kg	3.6E-04	mg/m3	R	3.4E-04	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	5.7E-05	mg/m3	R	5.5E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	3.9E+00
	THALLIUM	1.9E+00	mg/kg	1.8E-08	mg/m3	R	1.7E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.4E-09	mg/m3	R	2.3E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.2E-09	mg/m3	R	7.9E-09	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	3.9E-04
	AROCLOR-1260	2.9E-01	mg/kg	2.7E-09	mg/m3	R	2.6E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.0E-11	mg/m3	R	4.8E-11	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	9.7E-07
	(Total)												3.90E+00
												Total Hazard Index Across All Exposure Routes/Pathways	3.90E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	1.9E-05	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	4.7E-02
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	2.2E-06	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	2.2E-03
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	2.5E-04	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	6.8E-03
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	3.9E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	6.2E-04	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	2.6E-02
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	1.9E-07	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	2.4E-03
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	2.6E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	9.0E-08	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	4.5E-03
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	3.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	5.5E-10	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.1E-05
	(Total)												8.89E-02
Dermal	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	2.8E-08	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	5.7E-04
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	4.4E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	1.7E-07	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	8.3E-03
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	5.5E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	7.3E-10	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	1.5E-05
	(Total)												8.89E-03
												Total Hazard Index Across All Exposure Routes/Pathways	9.78E-02

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	1.9E+02	mg/kg	1.7E-06	mg/m3	R	5.8E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	2.1E+01	mg/kg	2.0E-07	mg/m3	R	6.7E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	2.5E+03	mg/kg	2.3E-05	mg/m3	R	7.7E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	3.9E+04	mg/kg	3.6E-04	mg/m3	R	1.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	6.1E+03	mg/kg	5.7E-05	mg/m3	R	1.9E-07	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	1.4E-02
	THALLIUM	1.9E+00	mg/kg	1.8E-08	mg/m3	R	5.9E-11	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.4E-09	mg/m3	R	8.0E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	AROCLOR-1254	8.8E-01	mg/kg	8.2E-09	mg/m3	R	2.8E-11	mg/kg-d	2.0E-05	mg/kg-d	N/A	N/A	1.4E-06
	AROCLOR-1260	2.9E-01	mg/kg	2.7E-09	mg/m3	R	9.3E-12	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIELDRIN	5.4E-03	mg/kg	5.0E-11	mg/m3	R	1.7E-13	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.4E-09
	(Total)												1.40E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.40E-02

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	2.6E+02	mg/kg	2.6E+02	mg/kg	M	3.5E-04	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	8.8E-01
	CADMIUM	3.5E+01	mg/kg	3.5E+01	mg/kg	M	4.7E-05	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	4.7E-02
	COPPER	1.3E+03	mg/kg	1.3E+03	mg/kg	M	1.7E-03	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	4.7E-02
	LEAD	1.0E+03	mg/kg	1.0E+03	mg/kg	M	1.4E-03	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	1.2E+04	mg/kg	1.2E+04	mg/kg	M	1.6E-02	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	6.8E-01
	THALLIUM	1.7E+00	mg/kg	1.7E+00	mg/kg	M	2.4E-06	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	2.9E-02
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.8E-01	mg/kg	M	3.8E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.6E-02	mg/kg	M	9.0E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.68E+00
Dermal	ANTIMONY	2.6E+02	mg/kg	2.6E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	3.5E+01	mg/kg	3.5E+01	mg/kg	M	1.9E-07	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.8E-03
	COPPER	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.0E+03	mg/kg	1.0E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	1.2E+04	mg/kg	1.2E+04	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.7E+00	mg/kg	1.7E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.8E-01	mg/kg	M	2.0E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.6E-02	mg/kg	M	4.7E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												3.8E-03
												Total Hazard Index Across All Exposure Routes/Pathways	1.69E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	2.6E+02	mg/kg	2.4E-06	mg/m3	R	6.5E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	3.5E+01	mg/kg	3.2E-07	mg/m3	R	8.8E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	1.3E+03	mg/kg	1.2E-05	mg/m3	R	3.2E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.0E+03	mg/kg	9.5E-06	mg/m3	R	2.6E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	1.2E+04	mg/kg	1.1E-04	mg/m3	R	3.0E-05	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	2.2E+00
	THALLIUM	1.7E+00	mg/kg	1.6E-08	mg/m3	R	4.4E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.6E-09	mg/m3	R	7.1E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.1E-10	mg/m3	R	1.7E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												2.2E+00
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	ANTIMONY	2.6E+02	mg/kg	2.6E+02	mg/kg	M	3.3E-03	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	8.2E+00
	CADMIUM	3.5E+01	mg/kg	3.5E+01	mg/kg	M	4.4E-04	mg/kg-d	1.0E-03	mg/kg-d	N/A	N/A	4.4E-01
	COPPER	1.3E+03	mg/kg	1.3E+03	mg/kg	M	1.6E-02	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	4.4E-01
	LEAD	1.0E+03	mg/kg	1.0E+03	mg/kg	M	1.3E-02	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	1.2E+04	mg/kg	1.2E+04	mg/kg	M	1.5E-01	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	6.3E+00
	THALLIUM	1.7E+00	mg/kg	1.7E+00	mg/kg	M	2.2E-05	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	2.8E-01
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.8E-01	mg/kg	M	3.6E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.6E-02	mg/kg	M	8.4E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												1.57E+01
Dermal	ANTIMONY	2.6E+02	mg/kg	2.6E+02	mg/kg	M	--	mg/kg-d	4.0E-04	mg/kg-d	N/A	N/A	--
	CADMIUM	3.5E+01	mg/kg	3.5E+01	mg/kg	M	1.9E-06	mg/kg-d	5.0E-05	mg/kg-d	N/A	N/A	3.8E-02
	COPPER	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	3.7E-02	mg/kg-d	N/A	N/A	--
	LEAD	1.0E+03	mg/kg	1.0E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	1.2E+04	mg/kg	1.2E+04	mg/kg	M	--	mg/kg-d	2.4E-02	mg/kg-d	N/A	N/A	--
	THALLIUM	1.7E+00	mg/kg	1.7E+00	mg/kg	M	--	mg/kg-d	8.0E-05	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.8E-01	mg/kg	M	2.0E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.6E-02	mg/kg	M	4.8E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												3.8E-02
												Total Hazard Index Across All Exposure Routes/Pathways	1.57E+01

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF NON-CANCER HAZARDS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	ANTIMONY	2.6E+02	mg/kg	2.4E-06	mg/m3	R	2.3E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	CADMIUM	3.5E+01	mg/kg	3.2E-07	mg/m3	R	3.1E-07	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	COPPER	1.3E+03	mg/kg	1.2E-05	mg/m3	R	1.1E-05	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	LEAD	1.0E+03	mg/kg	9.5E-06	mg/m3	R	9.1E-06	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	MANGANESE	1.2E+04	mg/kg	1.1E-04	mg/m3	R	1.1E-04	mg/kg-d	1.4E-05	mg/kg-d	N/A	N/A	7.6E+00
	THALLIUM	1.7E+00	mg/kg	1.6E-08	mg/m3	R	1.5E-08	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.6E-09	mg/m3	R	2.5E-09	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.1E-10	mg/m3	R	5.9E-10	mg/kg-d	N/A	mg/kg-d	N/A	N/A	--
	(Total)												7.6E+00

Total hazard Index Across All Exposure Routes/Pathways: 7.6E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	5.0E-12	mg/kg-d	1.5E+05	mg/kg-d	7.6E-07
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	4.0E-05	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	2.4E-06	mg/kg-d	1.5E+00	mg/kg-d	3.5E-06
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	1.3E-04	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	1.4E-06	mg/kg-d	N/A	mg/kg-d	--
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	6.2E-05	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	1.4E-04	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	3.4E-04	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	6.0E-08	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	1.1E-05	mg/kg-d	N/A	mg/kg-d	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	2.0E-06	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	8.1E-08	mg/kg-d	N/A	mg/kg-d	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	1.3E-04	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	1.9E-09	mg/kg-d	7.3E+00	mg/kg-d	1.4E-08
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	7.6E-09	mg/kg-d	2.0E+00	mg/kg-d	1.5E-08
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	6.6E-09	mg/kg-d	2.0E+00	mg/kg-d	1.3E-08
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	2.3E-08	mg/kg-d	3.4E-01	mg/kg-d	7.7E-09
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	8.6E-09	mg/kg-d	1.6E+00	mg/kg-d	1.4E-08
	(Total)										4.32E-06
Dermal	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	4.8E-13	mg/kg-d	1.5E+05	mg/kg-d	7.2E-08
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	2.2E-07	mg/kg-d	1.5E+00	mg/kg-d	3.4E-07
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	4.3E-09	mg/kg-d	N/A	mg/kg-d	--
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	7.9E-10	mg/kg-d	7.3E+00	mg/kg-d	5.7E-09
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	3.4E-09	mg/kg-d	2.0E+00	mg/kg-d	6.7E-09
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	2.9E-09	mg/kg-d	2.0E+00	mg/kg-d	5.9E-09
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	2.2E-09	mg/kg-d	3.4E-01	mg/kg-d	7.3E-10
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.7E-09	mg/kg-d	1.6E+00	mg/kg-d	4.4E-09
	(Total)										4.35E-07
										Total Risk Across All Exposure Routes/Pathways	4.76E-06

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	TCDD-TEQ	5.0E-05	mg/kg	4.7E-13	mg/m3	R	2.3E-15	mg/kg-d	1.5E+05	mg/kg-d	3.4E-10
	ANTIMONY	4.0E+02	mg/kg	3.7E-06	mg/m3	R	1.8E-08	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	2.4E+01	mg/kg	2.2E-07	mg/m3	R	1.1E-09	mg/kg-d	1.5E+01	mg/kg-d	1.6E-08
	BARIUM	1.3E+03	mg/kg	1.2E-05	mg/m3	R	6.0E-08	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.4E+01	mg/kg	1.3E-07	mg/m3	R	6.1E-10	mg/kg-d	6.3E+00	mg/kg-d	3.9E-09
	COPPER	6.2E+02	mg/kg	5.8E-06	mg/m3	R	2.8E-08	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	6.4E-08	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	3.4E+03	mg/kg	3.2E-05	mg/m3	R	1.6E-07	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	5.6E-09	mg/m3	R	2.7E-11	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.0E+02	mg/kg	9.7E-07	mg/m3	R	4.7E-09	mg/kg-d	N/A	mg/kg-d	--
	SILVER	2.0E+01	mg/kg	1.8E-07	mg/m3	R	8.9E-10	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	8.1E-01	mg/kg	7.5E-09	mg/m3	R	3.7E-11	mg/kg-d	N/A	mg/kg-d	--
	ZINC	1.3E+03	mg/kg	1.2E-05	mg/m3	R	5.9E-08	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.8E-10	mg/m3	R	8.6E-13	mg/kg-d	3.1E+00	mg/kg-d	2.7E-12
	AROCLOR-1254	7.6E-02	mg/kg	7.0E-10	mg/m3	R	3.4E-12	mg/kg-d	2.0E+00	mg/kg-d	6.8E-12
	AROCLOR-1260	6.6E-02	mg/kg	6.1E-10	mg/m3	R	3.0E-12	mg/kg-d	2.0E+00	mg/kg-d	6.0E-12
	DDT	2.3E-01	mg/kg	2.1E-09	mg/m3	R	1.0E-11	mg/kg-d	3.4E-01	mg/kg-d	3.5E-12
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.0E-10	mg/m3	R	3.9E-12	mg/kg-d	1.6E+00	mg/kg-d	6.2E-12
	(Total)										2.03E-08
										Total Risk Across All Exposure Routes/Pathways	2.03E-08

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.6E-13	mg/kg-d	1.5E+05	mg/kg-d	2.5E-08
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	1.3E-06	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	7.7E-08	mg/kg-d	1.5E+00	mg/kg-d	1.2E-07
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	4.3E-06	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	4.4E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	2.0E-06	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	4.6E-06	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	1.1E-05	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	2.0E-09	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	3.4E-07	mg/kg-d	N/A	mg/kg-d	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	6.4E-08	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	2.6E-09	mg/kg-d	N/A	mg/kg-d	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	4.3E-06	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	6.2E-11	mg/kg-d	7.3E+00	mg/kg-d	4.5E-10
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	2.5E-10	mg/kg-d	2.0E+00	mg/kg-d	4.9E-10
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	2.2E-10	mg/kg-d	2.0E+00	mg/kg-d	4.3E-10
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	7.4E-10	mg/kg-d	3.4E-01	mg/kg-d	2.5E-10
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.8E-10	mg/kg-d	1.6E+00	mg/kg-d	4.5E-10
	(Total)										1.47E-07
Dermal	TCDD-TEQ	5.0E-05	mg/kg	5.0E-05	mg/kg	M	1.3E-13	mg/kg-d	1.5E+05	mg/kg-d	2.0E-08
	ANTIMONY	4.0E+02	mg/kg	4.0E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	2.4E+01	mg/kg	2.4E+01	mg/kg	M	6.1E-08	mg/kg-d	1.5E+00	mg/kg-d	9.2E-08
	BARIUM	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.4E+01	mg/kg	1.4E+01	mg/kg	M	1.2E-09	mg/kg-d	N/A	mg/kg-d	--
	COPPER	6.2E+02	mg/kg	6.2E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	6.0E-01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.0E+02	mg/kg	1.0E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	SILVER	2.0E+01	mg/kg	2.0E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	8.1E-01	mg/kg	8.1E-01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ZINC	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.9E-02	mg/kg	M	2.1E-10	mg/kg-d	7.3E+00	mg/kg-d	1.6E-09
	AROCLOR-1254	7.6E-02	mg/kg	7.6E-02	mg/kg	M	9.1E-10	mg/kg-d	2.0E+00	mg/kg-d	1.8E-09
	AROCLOR-1260	6.6E-02	mg/kg	6.6E-02	mg/kg	M	8.0E-10	mg/kg-d	2.0E+00	mg/kg-d	1.6E-09
	DDT	2.3E-01	mg/kg	2.3E-01	mg/kg	M	5.9E-10	mg/kg-d	3.4E-01	mg/kg-d	2.0E-10
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.6E-02	mg/kg	M	7.4E-10	mg/kg-d	1.6E+00	mg/kg-d	1.2E-09
	(Total)										1.18E-07
										Total Risk Across All Exposure Routes/Pathways	2.65E-07

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	TCDD-TEQ	5.0E-05	mg/kg	4.7E-13	mg/m3	R	3.7E-17	mg/kg-d	1.5E+05	mg/kg-d	5.5E-12
	ANTIMONY	4.0E+02	mg/kg	3.7E-06	mg/m3	R	2.9E-10	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	2.4E+01	mg/kg	2.2E-07	mg/m3	R	1.7E-11	mg/kg-d	1.5E+01	mg/kg-d	2.6E-10
	BARIUM	1.3E+03	mg/kg	1.2E-05	mg/m3	R	9.6E-10	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.4E+01	mg/kg	1.3E-07	mg/m3	R	9.9E-12	mg/kg-d	6.3E+00	mg/kg-d	6.2E-11
	COPPER	6.2E+02	mg/kg	5.8E-06	mg/m3	R	4.5E-10	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	1.0E-09	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	3.4E+03	mg/kg	3.2E-05	mg/m3	R	2.5E-09	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	6.0E-01	mg/kg	5.6E-09	mg/m3	R	4.4E-13	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.0E+02	mg/kg	9.7E-07	mg/m3	R	7.7E-11	mg/kg-d	N/A	mg/kg-d	--
	SILVER	2.0E+01	mg/kg	1.8E-07	mg/m3	R	1.4E-11	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	8.1E-01	mg/kg	7.5E-09	mg/m3	R	5.9E-13	mg/kg-d	N/A	mg/kg-d	--
	ZINC	1.3E+03	mg/kg	1.2E-05	mg/m3	R	9.5E-10	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	1.9E-02	mg/kg	1.8E-10	mg/m3	R	1.4E-14	mg/kg-d	3.1E+00	mg/kg-d	4.3E-14
	AROCLOR-1254	7.6E-02	mg/kg	7.0E-10	mg/m3	R	5.5E-14	mg/kg-d	2.0E+00	mg/kg-d	1.1E-13
	AROCLOR-1260	6.6E-02	mg/kg	6.1E-10	mg/m3	R	4.8E-14	mg/kg-d	2.0E+00	mg/kg-d	9.6E-14
	DDT	2.3E-01	mg/kg	2.1E-09	mg/m3	R	1.7E-13	mg/kg-d	3.4E-01	mg/kg-d	5.6E-14
	HEXACHLOROBENZENE	8.6E-02	mg/kg	8.0E-10	mg/m3	R	6.3E-14	mg/kg-d	1.6E+00	mg/kg-d	1.0E-13
	(Total)										3.28E-10
										Total Risk Across All Exposure Routes/Pathways	3.28E-10

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	TCDD-TEQ	6.7E-05	mg/kg	6.7E-05	mg/kg	M	6.7E-12	mg/kg-d	1.5E+05	mg/kg-d	1.0E-06
	ANTIMONY	6.2E+01	mg/kg	6.2E+01	mg/kg	M	6.2E-06	mg/kg-d	N/A	mg/kg-d	--
	BARIUM	4.7E+03	mg/kg	4.7E+03	mg/kg	M	4.7E-04	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	6.3E+01	mg/kg	6.3E+01	mg/kg	M	6.3E-06	mg/kg-d	N/A	mg/kg-d	--
	COPPER	1.8E+03	mg/kg	1.8E+03	mg/kg	M	1.8E-04	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	1.4E-04	mg/kg-d	N/A	mg/kg-d	--
	ZINC	2.1E+03	mg/kg	2.1E+03	mg/kg	M	2.2E-04	mg/kg-d	N/A	mg/kg-d	--
	(Total)										1.0E-06
Dermal	TCDD-TEQ	6.7E-05	mg/kg	6.7E-05	mg/kg	M	6.4E-13	mg/kg-d	1.5E+05	mg/kg-d	9.6E-08
	ANTIMONY	6.2E+01	mg/kg	6.2E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BARIUM	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	6.3E+01	mg/kg	6.3E+01	mg/kg	M	2.0E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	1.8E+03	mg/kg	1.8E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ZINC	2.1E+03	mg/kg	2.1E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	(Total)										9.6E-08
										Total Risk Across All Exposure Routes/Pathways	1.10E-06

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	TCDD-TEQ	6.7E-05	mg/kg	6.2E-13	mg/m3	R	3.0E-15	mg/kg-d	1.5E+05	mg/kg-d	4.5E-10
	ANTIMONY	6.2E+01	mg/kg	5.8E-07	mg/m3	R	2.8E-09	mg/kg-d	N/A	mg/kg-d	--
	BARIUM	4.7E+03	mg/kg	4.4E-05	mg/m3	R	2.1E-07	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	6.3E+01	mg/kg	5.8E-07	mg/m3	R	2.8E-09	mg/kg-d	6.3E+00	mg/kg-d	1.8E-08
	COPPER	1.8E+03	mg/kg	1.7E-05	mg/m3	R	8.3E-08	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.4E+03	mg/kg	1.3E-05	mg/m3	R	6.4E-08	mg/kg-d	N/A	mg/kg-d	--
	ZINC	2.1E+03	mg/kg	2.0E-05	mg/m3	R	9.7E-08	mg/kg-d	N/A	mg/kg-d	--
	(Total)										1.85E-08
										Total Risk Across All Exposure Routes/Pathways	1.85E-08

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	2.7E-06	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	1.7E-06	mg/kg-d	N/A	mg/kg-d	--
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	3.5E-05	mg/kg-d	N/A	mg/kg-d	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	4.2E-04	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	4.2E-04	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	1.5E-07	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	3.5E-09	mg/kg-d	7.3E+00	mg/kg-d	2.5E-08
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	3.0E-08	mg/kg-d	2.0E+00	mg/kg-d	6.0E-08
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	7.3E-09	mg/kg-d	2.0E+00	mg/kg-d	1.5E-08
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	4.4E-10	mg/kg-d	1.6E+01	mg/kg-d	7.1E-09
	(Total)										1.07E-07
Dermal	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	5.5E-09	mg/kg-d	N/A	mg/kg-d	--
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	1.4E-09	mg/kg-d	7.3E+00	mg/kg-d	1.0E-08
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	1.3E-08	mg/kg-d	2.0E+00	mg/kg-d	2.6E-08
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	3.3E-09	mg/kg-d	2.0E+00	mg/kg-d	6.5E-09
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	1.4E-10	mg/kg-d	1.6E+01	mg/kg-d	2.2E-09
	(Total)										4.47E-08
										Total Risk Across All Exposure Routes/Pathways	1.52E-07

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	ANTIMONY	2.7E+01	mg/kg	2.5E-07	mg/m3	R	1.2E-09	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.7E+01	mg/kg	1.6E-07	mg/m3	R	7.8E-10	mg/kg-d	6.3E+00	mg/kg-d	4.9E-09
	COPPER	3.4E+02	mg/kg	3.2E-06	mg/m3	R	1.6E-08	mg/kg-d	N/A	mg/kg-d	--
	LEAD	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.9E-07	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.2E+03	mg/kg	3.9E-05	mg/m3	R	1.9E-07	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.5E+00	mg/kg	1.4E-08	mg/m3	R	6.6E-11	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.2E-10	mg/m3	R	1.6E-12	mg/kg-d	3.1E+00	mg/kg-d	4.9E-12
	AROCLOR-1254	3.0E-01	mg/kg	2.8E-09	mg/m3	R	1.3E-11	mg/kg-d	2.0E+00	mg/kg-d	2.7E-11
	AROCLOR-1260	7.3E-02	mg/kg	6.8E-10	mg/m3	R	3.3E-12	mg/kg-d	2.0E+00	mg/kg-d	6.6E-12
	DIELDRIN	4.4E-03	mg/kg	4.1E-11	mg/m3	R	2.0E-13	mg/kg-d	1.6E+01	mg/kg-d	3.2E-12
	(Total)										4.94E-09
										Total Risk Across All Exposure Routes/Pathways	4.94E-09

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	8.9E-08	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	5.6E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	1.1E-06	mg/kg-d	N/A	mg/kg-d	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.4E-05	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	1.4E-05	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	4.8E-09	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.5E-02	mg/kg	M	1.1E-10	mg/kg-d	7.3E+00	mg/kg-d	8.3E-10
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	9.7E-10	mg/kg-d	2.0E+00	mg/kg-d	1.9E-09
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	2.4E-10	mg/kg-d	2.0E+00	mg/kg-d	4.8E-10
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	1.4E-11	mg/kg-d	1.6E+01	mg/kg-d	2.3E-10
	(Total)										3.44E-09
Dermal	ANTIMONY	2.7E+01	mg/kg	2.7E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.7E+01	mg/kg	1.7E+01	mg/kg	M	1.5E-09	mg/kg-d	N/A	mg/kg-d	--
	COPPER	3.4E+02	mg/kg	3.4E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.5E+00	mg/kg	1.5E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	3.5E+02	mg/kg	3.5E-02	mg/kg	M	3.9E-10	mg/kg-d	7.3E+00	mg/kg-d	2.8E-09
	AROCLOR-1254	3.0E-01	mg/kg	3.0E-01	mg/kg	M	3.6E-09	mg/kg-d	2.0E+00	mg/kg-d	7.2E-09
	AROCLOR-1260	7.3E-02	mg/kg	7.3E-02	mg/kg	M	8.9E-10	mg/kg-d	2.0E+00	mg/kg-d	1.8E-09
	DIELDRIN	4.4E-03	mg/kg	4.4E-03	mg/kg	M	3.8E-11	mg/kg-d	1.6E+01	mg/kg-d	6.1E-10
	(Total)										1.24E-08
										Total Risk Across All Exposure Routes/Pathways	1.59E-08

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future Medium: Surface Soil Exposure Medium: Air Exposure Point: Urunao-Site2 Receptor Population: Trespasser/Occasional User Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	ANTIMONY	2.7E+01	mg/kg	2.5E-07	mg/m3	R	2.0E-11	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.7E+01	mg/kg	1.6E-07	mg/m3	R	1.3E-11	mg/kg-d	6.3E+00	mg/kg-d	7.9E-11
	COPPER	3.4E+02	mg/kg	3.2E-06	mg/m3	R	2.5E-10	mg/kg-d	N/A	mg/kg-d	--
	LEAD	4.2E+03	mg/kg	3.9E-05	mg/m3	R	3.1E-09	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.2E+03	mg/kg	3.9E-05	mg/m3	R	3.1E-09	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.5E+00	mg/kg	1.4E-08	mg/m3	R	1.1E-12	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	3.5E-02	mg/kg	3.2E-10	mg/m3	R	2.5E-14	mg/kg-d	3.1E+00	mg/kg-d	7.8E-14
	AROCLOR-1254	3.0E-01	mg/kg	2.8E-09	mg/m3	R	2.2E-13	mg/kg-d	2.0E+00	mg/kg-d	4.3E-13
	AROCLOR-1260	7.3E-02	mg/kg	6.8E-10	mg/m3	R	5.3E-14	mg/kg-d	2.0E+00	mg/kg-d	1.1E-13
	DIELDRIN	4.4E-03	mg/kg	4.1E-11	mg/m3	R	3.2E-15	mg/kg-d	1.6E+01	mg/kg-d	5.2E-14
	(Total)										7.97E-11
										Total Risk Across All Exposure Routes/Pathways	7.97E-11

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ANTIMONY	4.6E+01	mg/kg	4.6E+01	mg/kg	M	4.6E-06	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	1.6E-06	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.8E+02	mg/kg	2.8E+02	mg/kg	M	2.8E-05	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.2E+02	mg/kg	3.2E+02	mg/kg	M	3.2E-05	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.3E+03	mg/kg	4.3E+03	mg/kg	M	4.3E-04	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.2E+00	mg/kg	1.2E+00	mg/kg	M	1.2E-07	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	4.2E-02	mg/kg	M	4.2E-09	mg/kg-d	7.3E+00	mg/kg-d	3.1E-08
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.2E-02	mg/kg	M	1.2E-09	mg/kg-d	7.3E+00	mg/kg-d	8.5E-09
	(Total)										3.95E-08
Dermal	ANTIMONY	4.6E+01	mg/kg	4.6E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	5.1E-09	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.8E+02	mg/kg	2.8E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.2E+02	mg/kg	3.2E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.3E+03	mg/kg	4.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.2E+00	mg/kg	1.2E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	4.2E-02	mg/kg	M	1.7E-09	mg/kg-d	7.3E+00	mg/kg-d	1.3E-08
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.2E-02	mg/kg	M	4.8E-10	mg/kg-d	7.3E+00	mg/kg-d	3.5E-09
	(Total)										1.65E-08
										Total Risk Across All Exposure Routes/Pathways	5.60E-08

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2CT. CALCULATION OF CANCER RISKS CENTRAL TENDENCY
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	ANTIMONY	4.6E+01	mg/kg	4.3E-07	mg/m3	R	2.1E-09	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	7.3E-10	mg/kg-d	6.3E+00	mg/kg-d	4.6E-09
	COPPER	2.8E+02	mg/kg	2.6E-06	mg/m3	R	1.3E-08	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.2E+02	mg/kg	3.0E-06	mg/m3	R	1.4E-08	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.3E+03	mg/kg	4.0E-05	mg/m3	R	1.9E-07	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.2E+00	mg/kg	1.1E-08	mg/m3	R	5.5E-11	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	4.2E-02	mg/kg	3.9E-10	mg/m3	R	1.9E-12	mg/kg-d	3.1E+00	mg/kg-d	5.9E-12
	DIBENZ[A,H]ANTHRACENE	1.2E-02	mg/kg	1.1E-10	mg/m3	R	5.2E-13	mg/kg-d	3.1E+00	mg/kg-d	1.6E-12
	(Total)										4.61E-09
										Total Risk Across All Exposure Routes/Pathways	4.61E-09

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	2.8E-10	mg/kg-d	1.5E+05	mg/kg-d	4.2E-05
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	4.3E-04	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	2.8E-05	mg/kg-d	1.5E+00	mg/kg-d	4.2E-05
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	2.3E-03	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	1.1E-05	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	1.6E-03	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	1.3E-03	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	3.2E-03	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	5.1E-07	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	1.1E-04	mg/kg-d	N/A	mg/kg-d	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	5.0E-05	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	7.0E-07	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	3.0E-03	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	5.3E-08	mg/kg-d	7.3E+00	mg/kg-d	3.9E-07
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	5.8E-08	mg/kg-d	2.0E+00	mg/kg-d	1.2E-07
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	9.6E-08	mg/kg-d	2.0E+00	mg/kg-d	1.9E-07
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	2.3E-07	mg/kg-d	3.4E-01	mg/kg-d	8.0E-08
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	6.3E-08	mg/kg-d	1.6E+00	mg/kg-d	1.0E-07
	(Total)										8.49E-05
Dermal	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	2.7E-11	mg/kg-d	1.5E+05	mg/kg-d	4.0E-06
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	2.7E-06	mg/kg-d	1.5E+00	mg/kg-d	4.0E-06
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	3.4E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	2.2E-08	mg/kg-d	7.3E+00	mg/kg-d	1.6E-07
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	2.6E-08	mg/kg-d	2.0E+00	mg/kg-d	5.1E-08
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	4.3E-08	mg/kg-d	2.0E+00	mg/kg-d	8.5E-08
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	2.2E-08	mg/kg-d	3.4E-01	mg/kg-d	7.6E-09
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	2.0E-08	mg/kg-d	1.6E+00	mg/kg-d	3.2E-08
	(Total)										8.34E-06
										Total Risk Across All Exposure Routes/Pathways	9.32E-05

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	TCDD-TEQ	4.2E-04	mg/kg	3.9E-12	mg/m3	R	2.5E-13	mg/kg-d	1.5E+05	mg/kg-d	3.8E-08
	ANTIMONY	6.4E+02	mg/kg	6.0E-06	mg/m3	R	3.9E-07	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	4.2E+01	mg/kg	3.9E-07	mg/m3	R	2.5E-08	mg/kg-d	1.5E+01	mg/kg-d	3.8E-07
	BARIUM	3.4E+03	mg/kg	3.2E-05	mg/m3	R	2.1E-06	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	9.6E-09	mg/kg-d	6.3E+00	mg/kg-d	6.0E-08
	COPPER	2.3E+03	mg/kg	2.2E-05	mg/m3	R	1.4E-06	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.9E+03	mg/kg	1.8E-05	mg/m3	R	1.1E-06	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.7E+03	mg/kg	4.4E-05	mg/m3	R	2.8E-06	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.0E-09	mg/m3	R	4.6E-10	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.7E+02	mg/kg	1.6E-06	mg/m3	R	1.0E-07	mg/kg-d	N/A	mg/kg-d	--
	SILVER	7.4E+01	mg/kg	6.9E-07	mg/m3	R	4.5E-08	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.0E+00	mg/kg	9.7E-09	mg/m3	R	6.3E-10	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.5E+03	mg/kg	4.1E-05	mg/m3	R	2.7E-06	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.4E-10	mg/m3	R	4.8E-11	mg/kg-d	3.1E+00	mg/kg-d	1.5E-10
	AROCLOR-1254	8.6E-02	mg/kg	8.0E-10	mg/m3	R	5.2E-11	mg/kg-d	2.0E+00	mg/kg-d	1.0E-10
	AROCLOR-1260	1.4E-01	mg/kg	1.3E-09	mg/m3	R	8.7E-11	mg/kg-d	2.0E+00	mg/kg-d	1.7E-10
	DDT	3.5E-01	mg/kg	3.3E-09	mg/m3	R	2.1E-10	mg/kg-d	3.4E-01	mg/kg-d	7.2E-11
	HEXACHLOROBENZENE	9.4E-02	mg/kg	8.8E-10	mg/m3	R	5.7E-11	mg/kg-d	1.6E+00	mg/kg-d	9.1E-11
	(Total)										4.79E-07
										Total Risk Across All Exposure Routes/Pathways	4.79E-07

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	1.8E-11	mg/kg-d	1.5E+05	mg/kg-d	2.7E-06
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	2.8E-05	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	1.8E-06	mg/kg-d	1.5E+00	mg/kg-d	2.7E-06
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	1.5E-04	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	6.9E-07	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	1.0E-04	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	8.3E-05	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	2.1E-04	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	3.3E-08	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	7.3E-06	mg/kg-d	N/A	mg/kg-d	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	3.2E-06	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	4.6E-08	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	1.9E-04	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	3.4E-09	mg/kg-d	7.3E+00	mg/kg-d	2.5E-08
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	3.8E-09	mg/kg-d	2.0E+00	mg/kg-d	7.5E-09
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	6.3E-09	mg/kg-d	2.0E+00	mg/kg-d	1.3E-08
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	1.5E-08	mg/kg-d	3.4E-01	mg/kg-d	5.2E-09
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	4.1E-09	mg/kg-d	1.6E+00	mg/kg-d	6.6E-09
	(Total)										5.46E-06
Dermal	TCDD-TEQ	4.2E-04	mg/kg	4.2E-04	mg/kg	M	7.2E-12	mg/kg-d	1.5E+05	mg/kg-d	1.1E-06
	ANTIMONY	6.4E+02	mg/kg	6.4E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	4.2E+01	mg/kg	4.2E+01	mg/kg	M	7.2E-07	mg/kg-d	1.5E+00	mg/kg-d	1.1E-06
	BARIUM	3.4E+03	mg/kg	3.4E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.6E+01	mg/kg	M	9.2E-09	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.3E+03	mg/kg	2.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.9E+03	mg/kg	1.9E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.7E+03	mg/kg	4.7E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.6E-01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.7E+02	mg/kg	1.7E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	SILVER	7.4E+01	mg/kg	7.4E+01	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.0E+00	mg/kg	1.0E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.5E+03	mg/kg	4.5E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.9E-02	mg/kg	M	5.9E-09	mg/kg-d	7.3E+00	mg/kg-d	4.3E-08
	AROCLOR-1254	8.6E-02	mg/kg	8.6E-02	mg/kg	M	6.9E-09	mg/kg-d	2.0E+00	mg/kg-d	1.4E-08
	AROCLOR-1260	1.4E-01	mg/kg	1.4E-01	mg/kg	M	1.2E-08	mg/kg-d	2.0E+00	mg/kg-d	2.3E-08
	DDT	3.5E-01	mg/kg	3.5E-01	mg/kg	M	6.1E-09	mg/kg-d	3.4E-01	mg/kg-d	2.1E-09
	HEXACHLOROBENZENE	9.4E-02	mg/kg	9.4E-02	mg/kg	M	5.4E-09	mg/kg-d	1.6E+00	mg/kg-d	8.7E-09
	(Total)										2.29E-06
										Total Risk Across All Exposure Routes/Pathways	7.75E-06

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	TCDD-TEQ	4.2E-04	mg/kg	3.9E-12	mg/m3	R	5.7E-15	mg/kg-d	1.5E+05	mg/kg-d	8.5E-10
	ANTIMONY	6.4E+02	mg/kg	6.0E-06	mg/m3	R	8.7E-09	mg/kg-d	N/A	mg/kg-d	--
	ARSENIC	4.2E+01	mg/kg	3.9E-07	mg/m3	R	5.6E-10	mg/kg-d	1.5E+01	mg/kg-d	8.5E-09
	BARIUM	3.4E+03	mg/kg	3.2E-05	mg/m3	R	4.6E-08	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.6E+01	mg/kg	1.5E-07	mg/m3	R	2.1E-10	mg/kg-d	6.3E+00	mg/kg-d	1.4E-09
	COPPER	2.3E+03	mg/kg	2.2E-05	mg/m3	R	3.1E-08	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.9E+03	mg/kg	1.8E-05	mg/m3	R	2.6E-08	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	4.7E+03	mg/kg	4.4E-05	mg/m3	R	6.3E-08	mg/kg-d	N/A	mg/kg-d	--
	MERCURY (INORGANIC)	7.6E-01	mg/kg	7.0E-09	mg/m3	R	1.0E-11	mg/kg-d	N/A	mg/kg-d	--
	NICKEL	1.7E+02	mg/kg	1.6E-06	mg/m3	R	2.3E-09	mg/kg-d	N/A	mg/kg-d	--
	SILVER	7.4E+01	mg/kg	6.9E-07	mg/m3	R	1.0E-09	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.0E+00	mg/kg	9.7E-09	mg/m3	R	1.4E-11	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.5E+03	mg/kg	4.1E-05	mg/m3	R	6.0E-08	mg/kg-d	N/A	mg/kg-d	--
	DIBENZ[A,H]ANTHRACENE	7.9E-02	mg/kg	7.4E-10	mg/m3	R	1.1E-12	mg/kg-d	3.1E+00	mg/kg-d	3.3E-12
	AROCLOR-1254	8.6E-02	mg/kg	8.0E-10	mg/m3	R	1.2E-12	mg/kg-d	2.0E+00	mg/kg-d	2.3E-12
	AROCLOR-1260	1.4E-01	mg/kg	1.3E-09	mg/m3	R	1.9E-12	mg/kg-d	2.0E+00	mg/kg-d	3.9E-12
	DDT	3.5E-01	mg/kg	3.3E-09	mg/m3	R	4.7E-12	mg/kg-d	3.4E-01	mg/kg-d	1.6E-12
	HEXACHLOROBENZENE	9.4E-02	mg/kg	8.8E-10	mg/m3	R	1.3E-12	mg/kg-d	1.6E+00	mg/kg-d	2.0E-12
	(Total)										1.08E-08
										Total Risk Across All Exposure Routes/Pathways	1.08E-08

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	TCDD-TEQ	1.3E-04	mg/kg	1.3E-04	mg/kg	M	8.9E-11	mg/kg-d	1.5E+05	mg/kg-d	1.3E-05
	ANTIMONY	1.2E+02	mg/kg	1.2E+02	mg/kg	M	8.0E-05	mg/kg-d	N/A	mg/kg-d	--
	BARIUM	8.1E+03	mg/kg	8.1E+03	mg/kg	M	5.4E-03	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.2E+02	mg/kg	1.2E+02	mg/kg	M	7.9E-05	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	1.7E-03	mg/kg-d	N/A	mg/kg-d	--
	LEAD	2.8E+03	mg/kg	2.8E+03	mg/kg	M	1.9E-03	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.2E+03	mg/kg	4.2E+03	mg/kg	M	2.8E-03	mg/kg-d	N/A	mg/kg-d	--
	(Total)										1.3E-05
Dermal	TCDD-TEQ	1.3E-04	mg/kg	1.3E-04	mg/kg	M	8.4E-12	mg/kg-d	1.5E+05	mg/kg-d	1.3E-06
	ANTIMONY	1.2E+02	mg/kg	1.2E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BARIUM	8.1E+03	mg/kg	8.1E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.2E+02	mg/kg	1.2E+02	mg/kg	M	2.5E-07	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	2.8E+03	mg/kg	2.8E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.2E+03	mg/kg	4.2E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	(Total)										1.3E-06
										Total Risk Across All Exposure Routes/Pathways	1.43E-05

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 1, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site1
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	TCDD-TEQ	1.3E-04	mg/kg	1.2E-12	mg/m3	R	8.0E-14	mg/kg-d	1.5E+05	mg/kg-d	1.2E-08
	ANTIMONY	1.2E+02	mg/kg	1.1E-06	mg/m3	R	7.2E-08	mg/kg-d	N/A	mg/kg-d	--
	BARIUM	8.1E+03	mg/kg	7.5E-05	mg/m3	R	4.9E-06	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	1.2E+02	mg/kg	1.1E-06	mg/m3	R	7.1E-08	mg/kg-d	6.3E+00	mg/kg-d	4.5E-07
	COPPER	2.5E+03	mg/kg	2.4E-05	mg/m3	R	1.5E-06	mg/kg-d	N/A	mg/kg-d	--
	LEAD	2.8E+03	mg/kg	2.6E-05	mg/m3	R	1.7E-06	mg/kg-d	N/A	mg/kg-d	--
	ZINC	4.2E+03	mg/kg	3.9E-05	mg/m3	R	2.6E-06	mg/kg-d	N/A	mg/kg-d	--
	(Total)										4.62E-07
										Total Risk Across All Exposure Routes/Pathways	4.62E-07

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	1.2E-04	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	1.4E-05	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	1.6E-03	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	2.6E-02	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	4.1E-03	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	1.3E-06	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	1.7E-07	mg/kg-d	7.3E+00	mg/kg-d	1.2E-06
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	5.9E-07	mg/kg-d	2.0E+00	mg/kg-d	1.2E-06
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	2.0E-07	mg/kg-d	2.0E+00	mg/kg-d	3.9E-07
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	3.6E-09	mg/kg-d	1.6E+01	mg/kg-d	5.8E-08
	(Total)										2.85E-06
Dermal	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	4.5E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	7.0E-08	mg/kg-d	7.3E+00	mg/kg-d	5.1E-07
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	2.6E-07	mg/kg-d	2.0E+00	mg/kg-d	5.2E-07
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	8.7E-08	mg/kg-d	2.0E+00	mg/kg-d	1.7E-07
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	1.1E-09	mg/kg-d	1.6E+01	mg/kg-d	1.8E-08
	(Total)										1.22E-06
									Total Risk Across All Exposure Routes/Pathways		4.07E-06

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	ANTIMONY	1.9E+02	mg/kg	1.7E-06	mg/m3	R	1.1E-07	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	2.1E+01	mg/kg	2.0E-07	mg/m3	R	1.3E-08	mg/kg-d	6.3E+00	mg/kg-d	8.1E-08
	COPPER	2.5E+03	mg/kg	2.3E-05	mg/m3	R	1.5E-06	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.9E+04	mg/kg	3.6E-04	mg/m3	R	2.3E-05	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	6.1E+03	mg/kg	5.7E-05	mg/m3	R	3.7E-06	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.9E+00	mg/kg	1.8E-08	mg/m3	R	1.1E-09	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.4E-09	mg/m3	R	1.5E-10	mg/kg-d	3.1E+00	mg/kg-d	4.7E-10
	AROCLOR-1254	8.8E-01	mg/kg	8.2E-09	mg/m3	R	5.3E-10	mg/kg-d	2.0E+00	mg/kg-d	1.1E-09
	AROCLOR-1260	2.9E-01	mg/kg	2.7E-09	mg/m3	R	1.8E-10	mg/kg-d	2.0E+00	mg/kg-d	3.6E-10
	DIELDRIN	5.4E-03	mg/kg	5.0E-11	mg/m3	R	3.3E-12	mg/kg-d	1.6E+01	mg/kg-d	5.2E-11
	(Total)										8.30E-08
										Total Risk Across All Exposure Routes/Pathways	8.30E-08

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	8.1E-06	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	9.2E-07	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	1.1E-04	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	1.7E-03	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	2.7E-04	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	8.3E-08	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	1.1E-08	mg/kg-d	7.3E+00	mg/kg-d	8.1E-08
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	3.8E-08	mg/kg-d	2.0E+00	mg/kg-d	7.7E-08
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	1.3E-08	mg/kg-d	2.0E+00	mg/kg-d	2.6E-08
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	2.4E-10	mg/kg-d	1.6E+01	mg/kg-d	3.8E-09
	(Total)										1.88E-07
Dermal	ANTIMONY	1.9E+02	mg/kg	1.9E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	2.1E+01	mg/kg	2.1E+01	mg/kg	M	1.2E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	2.5E+03	mg/kg	2.5E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.9E+04	mg/kg	3.9E+04	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	6.1E+03	mg/kg	6.1E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.9E+00	mg/kg	1.9E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.5E-01	mg/kg	M	1.9E-08	mg/kg-d	7.3E+00	mg/kg-d	1.4E-07
	AROCLOR-1254	8.8E-01	mg/kg	8.8E-01	mg/kg	M	7.1E-08	mg/kg-d	2.0E+00	mg/kg-d	1.4E-07
	AROCLOR-1260	2.9E-01	mg/kg	2.9E-01	mg/kg	M	2.4E-08	mg/kg-d	2.0E+00	mg/kg-d	4.7E-08
	DIELDRIN	5.4E-03	mg/kg	5.4E-03	mg/kg	M	3.1E-10	mg/kg-d	1.6E+01	mg/kg-d	5.0E-09
	(Total)										3.32E-07
										Total Risk Across All Exposure Routes/Pathways	5.20E-07

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Trespasser/Occasional User
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	ANTIMONY	1.9E+02	mg/kg	1.7E-06	mg/m3	R	2.5E-09	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	2.1E+01	mg/kg	2.0E-07	mg/m3	R	2.9E-10	mg/kg-d	6.3E+00	mg/kg-d	1.8E-09
	COPPER	2.5E+03	mg/kg	2.3E-05	mg/m3	R	3.3E-08	mg/kg-d	N/A	mg/kg-d	--
	LEAD	3.9E+04	mg/kg	3.6E-04	mg/m3	R	5.2E-07	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	6.1E+03	mg/kg	5.7E-05	mg/m3	R	8.3E-08	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.9E+00	mg/kg	1.8E-08	mg/m3	R	2.5E-11	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.5E-01	mg/kg	2.4E-09	mg/m3	R	3.4E-12	mg/kg-d	3.1E+00	mg/kg-d	1.1E-11
	AROCLOR-1254	8.8E-01	mg/kg	8.2E-09	mg/m3	R	1.2E-11	mg/kg-d	2.0E+00	mg/kg-d	2.4E-11
	AROCLOR-1260	2.9E-01	mg/kg	2.7E-09	mg/m3	R	4.0E-12	mg/kg-d	2.0E+00	mg/kg-d	7.9E-12
	DIELDRIN	5.4E-03	mg/kg	5.0E-11	mg/m3	R	7.3E-14	mg/kg-d	1.6E+01	mg/kg-d	1.2E-12
	(Total)										1.84E-09
										Total Risk Across All Exposure Routes/Pathways	1.84E-09

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation [1]	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	ANTIMONY	2.6E+02	mg/kg	2.6E+02	mg/kg	M	1.7E-04	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	3.5E+01	mg/kg	3.5E+01	mg/kg	M	2.3E-05	mg/kg-d	N/A	mg/kg-d	--
	COPPER	1.3E+03	mg/kg	1.3E+03	mg/kg	M	8.4E-04	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.0E+03	mg/kg	1.0E+03	mg/kg	M	6.8E-04	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	1.2E+04	mg/kg	1.2E+04	mg/kg	M	8.0E-03	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.7E+00	mg/kg	1.7E+00	mg/kg	M	1.2E-06	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.8E-01	mg/kg	M	1.9E-07	mg/kg-d	7.3E+00	mg/kg-d	1.4E-06
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.6E-02	mg/kg	M	4.4E-08	mg/kg-d	7.3E+00	mg/kg-d	3.2E-07
	(Total)										1.72E-06
Dermal	ANTIMONY	2.6E+02	mg/kg	2.6E+02	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	3.5E+01	mg/kg	3.5E+01	mg/kg	M	7.3E-08	mg/kg-d	N/A	mg/kg-d	--
	COPPER	1.3E+03	mg/kg	1.3E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.0E+03	mg/kg	1.0E+03	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	1.2E+04	mg/kg	1.2E+04	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.7E+00	mg/kg	1.7E+00	mg/kg	M	--	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.8E+01	mg/kg	2.8E-01	mg/kg	M	7.7E-08	mg/kg-d	7.3E+00	mg/kg-d	5.6E-07
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.6E-02	mg/kg	M	1.8E-08	mg/kg-d	7.3E+00	mg/kg-d	1.3E-07
	(Total)										6.90E-07
										Total Risk Across All Exposure Routes/Pathways	2.41E-06

(1) Medium-Specific (M) or Route-Specific (R) EPC

TABLE B2RME. CALCULATION OF CANCER RISKS REASONABLE MAXIMUM EXPOSURE
URUNAO DUMPSITE 2, ANDERSEN AFB, GUAM

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Urunao-Site2
Receptor Population: Resident
Receptor Age: Adult/Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	ANTIMONY	2.6E+02	mg/kg	2.4E-06	mg/m3	R	1.5E-07	mg/kg-d	N/A	mg/kg-d	--
	CADMIUM	3.5E+01	mg/kg	3.2E-07	mg/m3	R	2.1E-08	mg/kg-d	6.3E+00	mg/kg-d	1.3E-07
	COPPER	1.3E+03	mg/kg	1.2E-05	mg/m3	R	7.6E-07	mg/kg-d	N/A	mg/kg-d	--
	LEAD	1.0E+03	mg/kg	9.5E-06	mg/m3	R	6.2E-07	mg/kg-d	N/A	mg/kg-d	--
	MANGANESE	1.2E+04	mg/kg	1.1E-04	mg/m3	R	7.2E-06	mg/kg-d	N/A	mg/kg-d	--
	THALLIUM	1.7E+00	mg/kg	1.6E-08	mg/m3	R	1.0E-09	mg/kg-d	N/A	mg/kg-d	--
	BENZO[A]PYRENE	2.8E-01	mg/kg	2.6E-09	mg/m3	R	1.7E-10	mg/kg-d	3.1E+00	mg/kg-d	5.2E-10
	DIBENZ[A,H]ANTHRACENE	6.6E-02	mg/kg	6.1E-10	mg/m3	R	4.0E-11	mg/kg-d	3.1E+00	mg/kg-d	1.2E-10
	(Total)										1.31E-07
										Total Risk Across All Exposure Routes/Pathways	1.31E-07

(1) Medium-Specific (M) or Route-Specific (R) EPC