Part A-
HWCA PERMIT APPLICATION
FOR JOHNSTON ATOLL FACILITY

RCRA SUBTITLE C ACTIVITIES FORMS

OMB# 2050-0024; Expires 05/31/2020

United States Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal (Select only one.)

☐	Obtaining or updating an EPA ID number for an on-going regulated activity that will continue for a period of time. (Includes HSM activity)
☐	Submitting as a component of the Hazardous Waste Report for _____ (Reporting Year)
	☐ Site was a TSD facility and/or generator of > 1,000 kg of hazardous waste, > 1 kg of acute hazardous waste, or > 100 kg of acute hazardous waste spill cleanup in **one or more months of the reporting year** (or State equivalent LQG regulations)
☐	Notifying that regulated activity is no longer occurring at this Site
☐	Obtaining or updating an EPA ID number for conducting Electronic Manifest Broker activities
☑	Submitting a new or revised Part A Form

2. Site EPA ID Number

T	T	9	5	7	0	0	9	0	0	0	2

3. Site Name

Johnston Atoll

4. Site Location Address

Street Address **N/A**		
City, Town, or Village **Johnston Island**		County **N/A**
State **N/A**	Country **N/A**	Zip Code **N/A**

5. Site Mailing Address

☐ Same as Location Address

Street Address **10471 20th Street, Suite 265**		
City, Town, or Village **JBER-Elmendorf**		
State **Alaska**	Country **USA**	Zip Code **99506**

6. Site Land Type

☐ Private ☐ County ☐ District ☑ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

7. North American Industry Classification System (NAICS) Code(s) for the Site (at least 5-digit codes)

A. (Primary) **924120**	C.
B.	D.

8. Site Contact Information

☐ Same as Location Address

First Name **Stephen**	MI **M**	Last Name **Krause**
Title **AFCEC Project Manager**		
Street Address **10471 20th Street, Suite 348**		
City, Town, or Village **JBER-Elmendorf**		
State **Alaska**	Country **USA**	Zip Code **99506**
Email **stephen.krause.2@us.af.mil**		
Phone **(907) 552-1526**	Ext **N/A**	Fax **N/A**

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner

☐ Same as Location Address

Full Name Commander, PACAF Regional Support Center	Date Became Owner (mm/dd/yyyy) 10/1/2010

Owner Type

☐ Private ☐ County ☐ District ☑ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

Street Address 10471 20th Street, Suite 265		
City, Town, or Village JBER-Elmendorf		
State Alaska	Country **USA**	Zip Code 99506
Email PRSC.CCE@us.af.mil		
Phone	Ext	Fax
Comments		

B. Name of Site's Legal Operator

☐ Same as Location Address

Full Name Commander, PACAF Regional Support Center	Date Became Operator (mm/dd/yyyy) 10/1/2010

Operator Type

☐ Private ☐ County ☐ District ☑ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

Street Address **10471 20th Street, Suite 265**		
City, Town, or Village **JBER-Elmendorf**		
State **Alaska**	Country **USA**	Zip Code **99506**
Email PRSC.CCE@us.af.mil		
Phone	Ext	Fax
Comments		

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

☐Y ☑N	1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c	
☐	a. LQG	-Generates, in any calendar month (includes quantities imported by importer site) 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste; or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.
☐	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.
☐	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.
If "Yes" above, indicate other generator activities in 2 and 3, as applicable.		
☐Y ☑N	2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section.	
☐Y ☑N	3. Mixed Waste (hazardous and radioactive) Generator	
☐Y ☑N	4. Treater, Storer or Disposer of Hazardous Waste—Note: A hazardous waste Part B permit is required for these activities.	
☐Y ☑N	5. Receives Hazardous Waste from Off-site	
☐Y ☑N	6. Recycler of Hazardous Waste	
☐	a. Recycler who stores prior to recycling	
☐	b. Recycler who does not store prior to recycling	
☐Y ☑N	7. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.	
☐	a. Small Quantity On-site Burner Exemption	
☐	b. Smelting, Melting, and Refining Furnace Exemption	

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

11. Additional Regulated Waste Activities (NOTE: Refer to your State regulations to determine if a separate permit is required.)

A. Other Waste Activities

☐ Y ☑ N	1. Transporter of Hazardous Waste—If "Yes", mark all that apply.
☐	a. Transporter
☐	b. Transfer Facility (at your site)
☐ Y ☑ N	2. Underground Injection Control
☐ Y ☑ N	3. United States Importer of Hazardous Waste
☐ Y ☑ N	4. Recognized Trader—If "Yes", mark all that apply.
☐	a. Importer
☐	b. Exporter
☐ Y ☑ N	5. Importer/Exporter of Spent Lead-Acid Batteries (SLABs) under 40 CFR 266 Subpart G—If "Yes", mark all that apply.
☐	a. Importer
☐	b. Exporter

B. Universal Waste Activities

☐ Y ☑ N	1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) - If "Yes" mark all that apply. Note: Refer to your State regulations to determine what is regulated.
☐	a. Batteries
☐	b. Pesticides
☐	c. Mercury containing equipment
☐	d. Lamps
☐	e. Other (specify) _____
☐	f. Other (specify) _____
☐	g. Other (specify) _____
☐ Y ☑ N	2. Destination Facility for Universal Waste Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

☐ Y ☑ N	1. Used Oil Transporter—If "Yes", mark all that apply.
☐	a. Transporter
☐	b. Transfer Facility (at your site)
☐ Y ☑ N	2. Used Oil Processor and/or Re-refiner—If "Yes", mark all that apply.
☐	a. Processor
☐	b. Re-refiner
☐ Y ☑ N	3. Off-Specification Used Oil Burner
☐ Y ☑ N	4. Used Oil Fuel Marketer—If "Yes", mark all that apply.
☐	a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
☐	b. Marketer Who First Claims the Used Oil Meets the Specifications

12. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR 262 Subpart K.

☐ Y ☑ N	A. Opting into or currently operating under 40 CFR 262 Subpart K for the management of hazardous wastes in laboratories—If "Yes", mark all that apply. Note: See the item-by-item instructions for definitions of types of eligible academic entities.
☐	1. College or University
☐	2. Teaching Hospital that is owned by or has a formal written affiliation with a college or university
☐	3. Non-profit Institute that is owned by or has a formal written affiliation with a college or univer-
☐ Y ☑ N	B. Withdrawing from 40 CFR 262 Subpart K for the management of hazardous wastes in laboratories.

13. Episodic Generation

☐ Y ☑ N	Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category. If "Yes", you must fill out the Addendum for Episodic Generator.

14. LQG Consolidation of VSQG Hazardous Waste

☐ Y ☑ N	Are you an LQG notifying of consolidating VSQG Hazardous Waste Under the Control of the Same Person pursuant to 40 CFR 262.17(f)? If "Yes", you must fill out the Addendum for LQG Consolidation of VSQGs hazardous waste.

15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) OR Entire Facility (required)

☐ Y ☑ N	LQG Site Closure of a Central Accumulation Area (CAA) or Entire Facility.
	A. ☐ Central Accumulation Area (CAA) ☐ Entire Facility
	B. Expected closure date: _____ mm/dd/yyyy
	C. Requesting new closure date: _____ mm/dd/yyyy
	D. Date closed : _____ mm/dd/yyyy ☐ 1. In compliance with the closure performance standards 40 CFR 262.17(a)(8) ☐ 2. Not in compliance with the closure performance standards 40 CFR 262.17(a)(8)

16. Notification of Hazardous Secondary Material (HSM) Activity

☐ Y ☑ N	A. Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 260.30, 40 CFR 261.4(a)(23), (24), or (27)? If "Yes", you must fill out the Addendum to the Site Identification Form for Managing Hazardous Secondary Material.
☐ Y ☑ N	B. Are you notifying under 40 CFR 260.43(a)(4)(iii) that the product of your recycling process has levels of hazardous constituents that are not comparable to or unable to be compared to a legitimate product or intermediate but that the recycling is still legitimate? If "Yes", you may provide explanation in Comments section. You must also document that your recycling is still legitimate and maintain that documentation on site.

17. Electronic Manifest Broker

☐ Y ☑ N	Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?

18. Comments (include item number for each comment)

The Johnston Atoll Permit is for the continuation of corrective actions at Air Force solid waste
management units and areas of concern only. The Permit is not for hazardous waste treatment,
storage, or disposal operations. Therefore, waste codes and activities listed on the following forms
are not applicable:
NOTIFICATION OF HAZARDOUS SECONDARY MATERIAL ACTIVITY
EPISODIC GENERATOR
LQG CONSOLIDATION OF VSQG HAZARDOUS WASTE
HAZARDOUS WASTE REPORT _____ (reporting cycle) **WASTE GENERATION AND MANAGEMENT (GM) FORM**
HAZARDOUS WASTE REPORT _____ (reporting year) **WASTE RECEIVED FROM OFF-SITE (WR) FORM**
HAZARDOUS WASTE REPORT **OFF-SITE IDENTIFICATION (OI) FORM**
SECTIONS 3-7 and 9-10 of the HAZARDOUS WASTE PERMIT PART A FORM

19. Certification I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40 CFR 270.10(b) and 270.11).**

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
	09/13/2018
Printed Name (First, Middle Initial Last) **DANIEL W. LEMON, Col, USAF**	Title **Commander, PRSC**
Email **PRSC.CCE@us.af.mil**	

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last)	Title
Email	

ADDENDUM TO THE SITE IDENTIFICATION FORM: NOTIFICATION OF HAZARDOUS SECONDARY MATERIAL ACTIVITY

ONLY fill out this form if:

- You are located in a State that allows you to manage excluded hazardous secondary material (HSM) under 40 CFR 261.2(30), 261.4(a)(23), (24), or (27) (or state equivalent; See https://www.epa.gov/epawaste/hazard/dsw/statespf.htm for a list of eligible states; AND
- You are or will be managing excluded HSM in compliance with 40 CFR 260.30, 261.4(a)(23), (24), or (27) (or state equivalent) or have stopped managing excluded HSM in compliance with the exclusion(s) and do not expect to manage any amount of excluded HSM under the exclusion(s) for at least one year. Do not include any information regarding your hazardous waste activities in this section. Note: If your facility was granted a solid waste variance under 40 CFR 260.30 prior to July 13, 2015, your management of HSM under 40 CFR 260.30 is grandfathered under the previous regulations and you are not required to notify for the HSM management activity excluded under 40 CFR 260.30.

1. Reason for Notification (Include dates where requested)

☐ Facility will begin managing excluded HSM as of _____ (mm/dd/yyyy).

☐ Facility is still managing excluded HSM/re-notifying as required by March 1 of each even-numbered year.

☐ Facility has stopped managing excluded HSM as of _____ (mm/dd/yyyy) and is notifying as required.

2. Description of Excluded HSM Activity. Please list the appropriate codes (see Code List section of the instructions) and quantities, in short tons, to describe your excluded HSM activity ONLY (do not include any information regarding your hazardous wastes). Use additional pages if more space is needed.

A. Facility Code	B. Waste Code(s) for HSM	C. Estimate Short Tons of excluded HSM to be managed annually	D. Actual Short Tons of excluded HSM that was managed during the most recent odd-numbered year	E. Land-based Unit Code

ADDENDUM TO THE SITE IDENTIFICATION FORM: EPISODIC GENERATOR

ONLY fill out this form if:

- You are an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more then 60 days, that moves the generator to a higher generator category pursuant to 40 CFR 262 Subpart L. Note: Only one planned and one unplanned episodic event are allowed within one year; otherwise, you must follow the requirements of the higher generator category. Use additional pages if more space is needed.

Episodic Event	
1. Planned ☐ Excess chemical inventory removal ☐ Tank cleanouts ☐ Short-term construction or demolition ☐ Equipment maintenance during plant shutdowns ☐ Other _____	2. Unplanned ☐ Accidental spills ☐ Production process upsets ☐ Product recalls ☐ "Acts of nature" (Tornado, hurricane, flood, etc.) ☐ Other _____
3. Emergency Contact Phone	4. Emergency Contact Name
5. Beginning Date _____ (mm/dd/yyyy)	6. End Date _____ (mm/dd/yyyy)

Waste 1

7. Waste Description				8. Estimated Quantity (in pounds)	
9. Federal and/or State Hazardous Waste Codes					

Waste 2

7. Waste Description				8. Estimated Quantity (in pounds)	
9. Federal and/or State Hazardous Waste Codes					

Waste 3

7. Waste Description				8. Estimated Quantity (in pounds)	
9. Federal and/or State Hazardous Waste Codes					

ADDENDUM TO THE SITE IDENTIFICATION FORM: LQG CONSOLIDATION OF VSQG HAZARDOUS WASTE

ONLY fill out this form if:

- You are an LQG receiving hazardous waste from VSQGs under the control of the same person. Use additional pages if more space is needed.

VSQG 1		
1. EPA ID Number (if assigned)	2. Name	
3. Street Address		
4. City, Town, or Village	5. State	6. Zip Code
7. Contact Phone Number	8. Contact Name	
9. Email		

VSQG 2		
1. EPA ID Number (if assigned)	2. Name	
3. Street Address		
4. City, Town, or Village	5. State	6. Zip Code
7. Contact Phone Number	8. Contact Name	
9. Email		

VSQG 3		
1. EPA ID Number (if assigned)	2. Name	
3. Street Address		
4. City, Town, or Village	5. State	6. Zip Code
7. Contact Phone Number	8. Contact Name	
9. Email		

United States Environmental Protection Agency
HAZARDOUS WASTE REPORT _____ (reporting cycle)
WASTE GENERATION AND MANAGEMENT (GM) FORM

1. **Waste Characteristics**

A. Waste Description						
B. EPA Hazardous Waste Code(s)						
C. State Hazardous Waste Code(s)						

D. Source Code		Management Method Code (Source Code G25 only)	
E. Form Code		F. Waste Minimization Code	
G. Quantity	UOM	Density	☐ lbs/gal ☐ sg

2. **On-site Generation and Management of Hazardous Waste**

☐ Y ☐ N	Was any of this waste that was generated at this facility treated, disposed, and/or recycled on-site? If yes, continue to On-site Process System 1.

Process System 1	Management Method Code	Quantity
Process System 2	Management Method Code	Quantity

3. **Off-site Shipment of Hazardous Waste**

☐ Y ☐ N	A. Was any of this waste that was generated at this facility shipped off-site for treatment, disposal, or recycling? If yes, continue to Site 1.

Site 1		
B. EPA ID of facility to which waste was shipped	C. Management Method Code	D. Total Quantity Shipped
Site 2		
B. EPA ID of facility to which waste was shipped	C. Management Method Code	D. Total Quantity Shipped
Site 3		
B. EPA ID of facility to which waste was shipped	C. Management Method Code	D. Total Quantity Shipped

4. **Comments**

United States Environmental Protection Agency
HAZARDOUS WASTE REPORT _____ (reporting year)
WASTE RECEIVED FROM OFF-SITE (WR) FORM

1. Waste 1

A. Waste Description						
B. EPA Hazardous Waste Code(s)						
C. State Hazardous Waste Code(s)						
D. EPA ID Number		E. Form Code		F. Management Code		
G. Quantity	UOM	Density		☐ lbs/gal ☐ sg		

2. Waste 2

A. Waste Description:						
B. EPA Hazardous Waste Code(s)						
C. State Hazardous Waste Code(s)						
D. EPA ID Number		E. Form Code		F. Management Code		
G. Quantity	UOM	Density		☐ lbs/gal ☐ sg		

3. Waste 3

A. Waste Description:						
B. EPA Hazardous Waste Code(s)						
C. State Hazardous Waste Code(s)						
D. EPA ID Number		E. Form Code		F. Management Code		
G. Quantity	UOM	Density		☐ lbs/gal ☐ sg		

4. Comments

United States Environmental Protection Agency
HAZARDOUS WASTE REPORT
OFF-SITE IDENTIFICATION (OI) FORM

1. Site 1

A. EPA ID Number of Off-site Installation or Transporter			
B. Name of Off-site Installation or Transporter			
C. Handler Type (mark all that apply) ☐ Generator	☐ Transporter	☐ Receiving Facility	
D. Address of Off-site Installation			
Street Address			
City, Town, or Village			
State	Zip Code	Country	

2. Site 2

A. EPA ID Number of Off-site Installation or Transporter			
B. Name of Off-site Installation or Transporter			
C. Handler Type (mark all that apply) ☐ Generator	☐ Transporter	☐ Receiving Facility	
D. Address of Off-site Installation			
Street Address			
City, Town, or Village			
State	Zip Code	Country	

3. Site 3

A. EPA ID Number of Off-site Installation or Transporter			
B. Name of Off-site Installation or Transporter			
C. Handler Type (mark all that apply) ☐ Generator	☐ Transporter	☐ Receiving Facility	
D. Address of Off-site Installation			
Street Address			
City, Town, or Village			
State	Zip Code	Country	

4. **Comments**

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT PART A FORM

1. Facility Permit Contact

First Name	**Stephen**	MI		Last Name	**Krause**
Title	**Project Manager**				
Email	**stephen.krause.2@us.af.mil**				
Phone	**(907) 552-1526**	Ext	**N/A**	Fax	**N/A**

2. Facility Permit Contact Mailing Address

Street Address	**10471 20th Street, Suite 348**				
City, Town, or Village	**JBER-Elmendorf**				
State	**Alaska**	Country	USA	Zip Code	99506

3. Facility Existence Date (mm/dd/yyyy)

4. Other Environmental Permits

A. Permit Type	B. Permit Number	C. Description

5. Nature of Business

6. Process Codes and Design Capacities

Line Number		A. Process Code			B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
					(1) Amount	(2) Unit of Measure		

7. Description of Hazardous Wastes (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.		A. EPA Hazardous Waste No.				B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes								
								(1) Process Codes								(2) Process Description (if code is not entered in 7.D1))

8. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

9. Facility Drawing

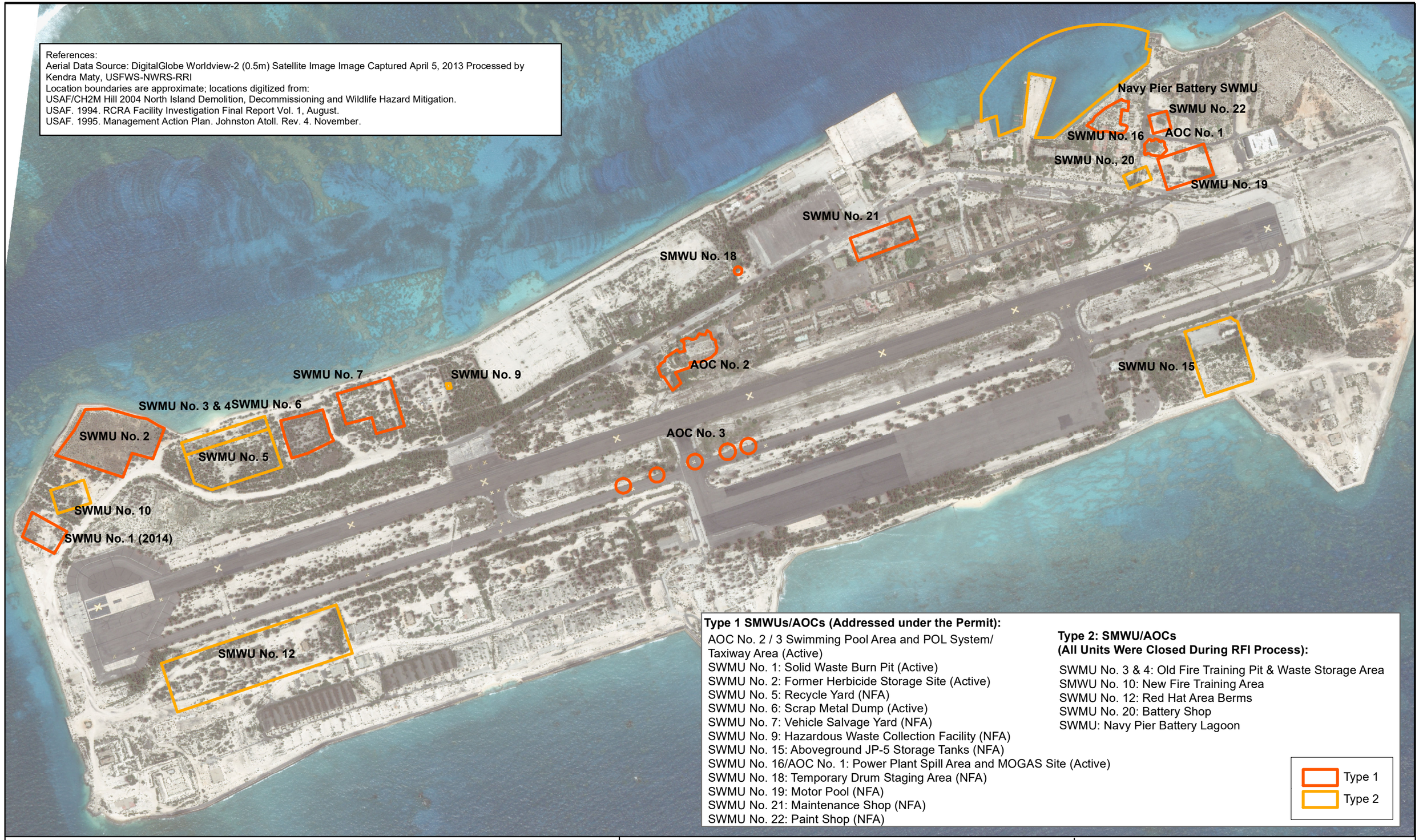
All existing facilities must include a scale drawing of the facility. See instructions for more detail.

10. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas. See instructions for more detail.

11. Comments

References:
Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image Image Captured April 5, 2013 Processed by Kendra Maty, USFWS-NWRS-RRI
Location boundaries are approximate; locations digitized from:
USAF/CH2M Hill 2004 North Island Demolition, Decommissioning and Wildlife Hazard Mitigation.
USAF. 1994. RCRA Facility Investigation Final Report Vol. 1, August.
USAF. 1995. Management Action Plan. Johnston Atoll. Rev. 4. November.



Type 1 SMWUs/AOCs (Addressed under the Permit):

AOC No. 2 / 3 Swimming Pool Area and POL System/ Taxiway Area (Active)
SWMU No. 1: Solid Waste Burn Pit (Active)
SWMU No. 2: Former Herbicide Storage Site (Active)
SWMU No. 5: Recycle Yard (NFA)
SWMU No. 6: Scrap Metal Dump (Active)
SWMU No. 7: Vehicle Salvage Yard (NFA)
SWMU No. 9: Hazardous Waste Collection Facility (NFA)
SWMU No. 15: Aboveground JP-5 Storage Tanks (NFA)
SWMU No. 16/AOC No. 1: Power Plant Spill Area and MOGAS Site (Active)
SWMU No. 18: Temporary Drum Staging Area (NFA)
SWMU No. 19: Motor Pool (NFA)
SWMU No. 21: Maintenance Shop (NFA)
SWMU No. 22: Paint Shop (NFA)

Type 2: SMWU/AOCs
(All Units Were Closed During RFI Process):

SWMU No. 3 & 4: Old Fire Training Pit & Waste Storage Area
SMWU No. 10: New Fire Training Area
SWMU No. 12: Red Hat Area Berms
SWMU No. 20: Battery Shop
SWMU: Navy Pier Battery Lagoon

Type 1
Type 2

N

AOC: Area of Concern
CAP: Corrective Action Plan
MOGAS: motor gasoline
NFA: No Further Action
RCRA: Resource Conservation and Recovery Act

250 500 1,000 Feet

PART A APPLICATION FOR HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ISLAND FACILITY EPA ID TT9 570 090 002

Figure 1
Active and Closed SMWU and AOC Locations at Johnston Island Facility

Table 1: Active and Closed Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at Johnston Island Facility				
SWMUs and AOCs	**Type [1]**	**Status**	**Reference Document(s)**	**Other Notes**
SWMU No. 1: Solid Waste Burn Pit	1	Active	2004 HWCA Permit (Modification 1)	
SWMU No. 2: Former Herbicide Storage Site	1	Active	2004 HWCA Permit (Modification 1)	
SWMU No. 6: Scrap Metal Dump	1	Active	2004 HWCA Permit (Modification 1)	
SWMU No. 16: Power Plant Spill Area (managed with AOC No. 1)	1	Active	2004 HWCA Permit (Modification 1)	
AOC No. 1: Motor Gas (MOGAS) Site (managed with SWMU No. 16)	1	Active	2004 HWCA Permit (Modification 1)	
AOC No. 2 / No. 3 Swimming Pool Area and POL System/ Taxiway Area	1	Active	2004 HWCA Permit (Modification 1)	
SWMU No. 5: Recycle Yard	1	Approved for NFA	EPA Notice of Approval (26 July 2016 Letter)	
SWMU No. 9: Hazardous Waste Collection Facility	1	Approved for NFA	EPA Notice of Approval (26 July 2016 Letter)	
SWMU No. 15: Aboveground JP-5 Storage Tanks	1	Approved for NFA	EPA Notice of Approval (26 July 2016 Letter)	
SWMU No. 7: Vehicle Salvage Yard	1	NFA	Johnston Atoll Statement of Basis (3 March 2004) AR-179; 2002 HWCA Permit	
SWMU No. 18: Temporary Drum Staging Area (Approx.)	1	NFA	Johnston Atoll Statement of Basis (3 March 2004) AR-179; 2002 HWCA Permit	
SWMU No. 19: Motor Pool	1	NFA	Johnston Atoll Statement of Basis (3 March 2004) AR-179; 2002 HWCA Permit	
SWMU No. 21: Maintenance Shop	1	NFA	Johnston Atoll Statement of Basis (3 March 2004) AR-179; 2002 HWCA Permit	
SWMU No. 22: Paint Shop	1	NFA	Johnston Atoll Statement of Basis (3 March 2004) AR-179; 2002 HWCA Permit	
SWMU No. 3 & 4: Old Fire Training Pit and Waste Storage Area	2	NFA	RFI Report; 2002 HWCA Permit Comments	EPA's approval of NFA is also referenced in 2002 HWCA Permit RTC (FWS Comment #2)
SMWU No. 10: New Fire Training Area	2	NFA	RFI Report; 2002 HWCA Permit Comments	EPA's approval of NFA is also referenced in 2002 HWCA Permit RTC (FWS Comment #2)
SWMU No. 12: Red Hat Area Berms [2]	2	NFA	RFI Report; EPA Letter (12 Jan 1994)	EPA's approval of NFA is also referenced in 2002 HWCA Permit RTC (FWS Comment #2)
SWMU No. 20: Battery Shop	2	NFA	RFI Report; Decision Document (1 March 1995) AR-74	NFA justified in RFI following 'Hot Spot' removal which was completed with data provided in DD.
SWMU: Navy Pier Battery Lagoon	2	NFA	RFI Report	NFA justified in RFI Report

Notes:

[1] "Type" 1 or 2 refers to the differentiation between those SWMU or AOC units currently or previously managed or closed under the Corrective Action process under the Permit (Type 1) and those units managed and closed during the RFI process (Type 2), as shown on Figure 1 of Part A of the Permit application.

[2] The Red Hat Area Berms are different than the RHSA Bunkers, which were closed under EPA Permit Identification No. TT0-570-090-001, and are proposed for evaluation under the SWMU Assessment process.

THE UNITED STATES AIR FORCE

FINAL
NARRATIVE

HAZARDOUS WASTE CORRECTIVE ACTION
PERMIT RENEWAL APPLICATION
FOR
JOHNSTON ATOLL FACILITY
EPA ID TT9 570 090 002

Contract Number: FA8903-16-D-0046

Order Number: FA8903-17-F-0238

July 2018

This page intentionally left blank.

TABLE OF CONTENTS

Page

LIST OF TABLES

*Asterix indicate tables that are imbedded in the text. All other tables are analytical results and are located together, following the Narrative text.

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

Air Force	U.S. Air Force
AOC	Area of Concern
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CCMS	Comprehensive Corrective Measures Study
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation
COC	contaminant of concern
CRDA	Construction Rubble Debris Area
DNA	Defense Nuclear Agency
EA	EA Engineering, Science, and Technology, Inc., Public Benefit Corporation
EBS	Environmental Baseline Survey
EPA	U.S. Environmental Protection Agency
EPH	extractable petroleum hydrocarbons
HO	Herbicide Orange (Agent Orange)
HWCA	Hazardous Waste Corrective Action
JACADS	Johnston Atoll Chemical Agent Disposal System
JP-5	Jet Propulsion Fuel, Grade 5
LBP	lead-based paint
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MMDA	Mixed Metals Debris Area
NFA	No Further Action
No.	number
NWTPH	Northwest Total Petroleum Hydrocarbon
PACAF	Pacific Air Forces
PAH	polycyclic aromatic hydrocarbon
PBC	Public Benefit Corporation
PCB	polychlorinated biphenyl
PRIMNM	Pacific Remote Islands Marine National Monument
RHSA	Red Hat Storage Area
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SWMU	Solid Waste Management Unit
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ	toxicity equivalent
TPH	total petroleum hydrocarbons
USAF	U.S. Air Force (Air Force) (*used in references*)
USFWS	United States Fish and Wildlife Service
VPH	volatile petroleum hydrocarbons
VSI	visual site inspection

This page intentionally left blank.

EXECUTIVE SUMMARY

The U.S. Air Force (Air Force) is proposing a Class 2 permit renewal and revision of Module I (General Permit Conditions), Module II (General Facility Conditions), and Module III (Corrective Action for Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) Identification Number (No.) TT9-570-090-002 (the Permit) issued by the EPA on 30 April 2002, and effective 30 May 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective 30 July 2004 (EPA 2004). A Permit Application package consists of Parts A and B. Part A of the application is EPA Form 8700-23 and is submitted in association with Part B. This Document and its parts are the submittal for Part B of the Permit Renewal Package and provide the EPA with the information and components required to facilitate proposed permit actions.

Part B of the Permit Renewal Package includes this Narrative to discuss the changes proposed under the Class 2 Permit Renewal Addendum. This Narrative contains proposed revisions to the existing (2004) Permit language concerning the corrective action at Johnston Atoll. The proposed changes address primarily the following: changes (additions, reductions, or other modifications) to corrective action requirements in the Permit performance criteria for four Solid Waste Management Units (SWMUs) Nos. 1, 2, 6, and 16 and three Areas of Concern (AOCs) Nos. 1, 2, and 3; officially designating "No Further Action" (NFA) status for three SWMUs (SWMU Nos. 5, 9. 15); summarize current conditions at the Facility, and present general modifications to schedule, assessment, and long-term monitoring and maintenance activities included in the Permit. Additionally, this application resolves the outstanding obligation(s) for Remote Monitoring requirements for SWMU No. 6 under the performance criteria and contingency planning sections of the Permit; and proposes Permit inclusion and decision logics for seven Construction Rubble Debris Area (CRDA) units located on Johnston Island and the outer islands into the Permit's SWMU Assessment Process. These changes are shown throughout Modules I, II, and III of the Permit and are discussed by Module throughout the Narrative and supportive documents.

Module I of the Permit addresses General Permit Conditions and remains mostly unchanged. General Permit Conditions includes the effect of the Permit, Permit actions, severability, and definitions. Duties and requirements; signatory requirement; reports, notifications, and submissions to the EPA Division Director; and procedures for assessing confidentiality of information are also included in these conditions. The primary changes in Module I include the removal of language regarding the approval for thermal treatment activities for the treatment of contaminated soils that were conducted and completed at the Facility in the early 2000's. As the previously approved thermal treatment activities have been completed, and no additional treatment is proposed under this permit application, if new treatment activities are required or proposed to be conducted at the Facility in the future, a Permit Modification and/or temporary authorization will be submitted for approval. That modification would include specific language for the process prior to implementing the action. Other changes to Module I are updates to the contact information for the EPA and correction of typographical errors.

Module II of the Permit addresses General Facility Conditions. These conditions include the design and operation of the facility including security, location standards, inspections, waste

analysis, contingency planning, and personnel training requirements. The Permittee proposes to remove the language in Module II relevant to the thermal treatment activities, including the associated references to the Corrective Measures Implementation Plan, which is the specific document that addresses the contingency plan and closure requirements for the completed thermal treatment activities previously conducted at the Facility. Performance testing requirements for thermal treatment and performance standards for emissions from thermal treatment activities are proposed for removal from Module II of the Permit based on completion of corrective actions, specifically the completion of treatment-based performance criteria, at SWMU No. 2 and SWMU No. 16/AOC No. 1.

Additionally, text has been included or removed from Module I and II sections to reflect that the Facility is not able to meet some of the regulatory requirements that are exclusively reliant upon or seemingly intended to be used for Facilities with on-site staffing and Hazardous Waste generation/management or treatment activities. As part of the modification to Module II, a new Table has been added to the Contingency Planning Section II.J that provides the site-specific remote monitoring and response requirements for SWMU No. 6 under different scenarios where remote monitoring indicates there is no release, potential release, or catastrophic release of solid waste incinerator ash material into the environment. This Module II incorporation of site-specific remote monitoring is in addition to the SWMU No. 6 remote monitoring requirements added to the Corrective Action Section of the Permit (Permit Performance Criteria Table III.3).

Module III of the Permit addresses outstanding corrective actions required for SWMUs and AOCs identified in the 1994 RCRA Facility Investigation (RFI), and newly identified releases of contaminants of concern (COCs) from identified SWMUs, and assessments for units not included in the RFI (through the SWMU Assessment process).

A majority of the information included in this Permit Renewal Addendum addresses changes to Module III for existing SWMUs, and addresses communicated concerns and outstanding performance criteria requirements regarding SWMUs. Additionally, under Module III, language regarding seven units being evaluated through the SWMU Assessment process has been included. Six of these units are the CRDAs which were not included or specifically excluded during the RFI process, and the remaining CRDA is the Red Hat Storage Area (RHSA) Bunkers. The SWMU Assessment process is being initiated for the RHSA Bunkers CRDA because the EPA would like the Air Force to locate decision documents/records that verify the clean-closed status was Approved for this specific unit and there is no evidence contradicting that status (RHSA Bunkers were managed under Permit TT9-570-090-001). These seven CRDAs are being evaluated under the SWMU Assessment process outlined under Section III.D of the 2004 Permit and as listed in Table III.2a of this application. If one or more of the CRDAs are determined to be a SWMU(s) requiring Corrective Action, a Permit modification will be required to incorporate it/them into the Permit's Corrective Action authority.

Module III proposed changes include:

- Updates to the schedule of compliance (Table III.1),
- New Module III table (Table III.2a),
- Change to Table III.2 to 'Table III.2b SWMUs and AOCs Under the Corrective Action Process',

(*Continued 'Module III proposed changes':*)

- Modifications to performance criteria listed in Table III.3 for four SWMUs and three AOCs based on historical and current site conditions,
- A change to No Further Action (NFA) status in accordance with Permit Condition III.O.1 for three SWMUs (SWMU Nos. 5, 9, and 15) where corrective measures have been completed,
- Inclusion of seven units under the Permit through the SWMU Assessment process (Permit Section III.D).

Modifications to the Facility's site management approaches covered in Module III are abbreviated in Tables ES-1 and ES-2. Table ES-1 provides a list of specific proposed actions for SWMUs and AOCs and Table ES-2 provides the list of the seven units proposed to be evaluated under the SWMU Assessment process. The ES-1 and ES-2 tables are identical to the Permit Narrative Tables 1 and 2 (respectively) and are reiterative of the information proposed in Appendix A, Module III Table III.3.

To note, there are specific details proposed to be incorporated into the Permit for the Remote Monitoring performance criteria for SWMU No. 6 under this application. Because SWMU No. 6 has been of most recent interest, it has been presented and addressed before other SWMUs and AOCs in the Narrative text. The order the sites are discussed in the text are different than in the 2004 Permit (Appendix A).

Table ES-1 – Specific Proposed Actions for SWMUs and AOCs

SWMU or AOC (as identified in RFA)	Description
SWMU No. 6 Mixed Metal Debris Area and Stabilized Solid Waste Incinerator Ash Disposal Area	• Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify monitoring-based criteria: o Groundwater points of compliance include two existing monitoring wells and two new monitoring wells (install in 2020). COCs in groundwater are total and dissolved lead. Continue groundwater monitoring in accordance with groundwater monitoring work plan at a frequency of every five (5) years as long as stabilized ash is left in place at this unit. • Incorporate the media cleanup levels for COCs in groundwater of 0.015 mg/L for total and dissolved lead. • Modify management-based criteria: o Complete quarterly remote visual monitoring of SWMU and adjacent shoreline integrity or as frequently as required based on site conditions described in Table II.1 scenario. Inspect and maintain the integrity of the cap every five (5) years or as required based on Table II.1 scenario. o Conduct topographical, land, and groundwater elevation surveys for SWMU No. 6 during the next on-site event (2020). Identify boundaries and elevation of the SWMU based on survey data. Update predicted groundwater flow direction. o Install new warning signs every five (5) years restricting access and excavation within this SWMU. Warning signage shall be present and visible at all times. o Update and maintain Facility records; retain remote monitoring imagery for three (3) years.

SWMU or AOC (as identified in RFA)	Description
SWMU No. 1 Solid Waste Burn Pit	• Remove treatment-based performance criteria (completed) • Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify biomonitoring program: Add language on fishing prohibition and discontinue fish tissue monitoring; identify sediment sampling requirements. • Add language to management-based criteria for warning signs: Warning signage shall be present and visible at all times.
SWMU No. 2 Former Herbicide Orange Storage Area	• Remove treatment-based performance criteria (completed) • Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify biomonitoring program: Add language on fishing prohibition and discontinue fish tissue monitoring; identify sediment sampling requirements. • Add language to management-based criteria for warning signs: Warning signage shall be present and visible at all times.
SWMU No. 5 (NFA)	• Remove treatment-based performance criteria (completed) • Remove SWMU from Table III.3
SWMU No. 9 (NFA)	• Remove assessment-based performance criteria (completed) • Remove from Table III.3
SWMU No. 15 (NFA)	• Remove assessment-based and monitoring-based performance criteria (completed) • Remove from Table III.3
SWMU No. 16/ AOC No. 1 Power Plant Spill Area/ Motor Gas (MOGAS) Area;	• Remove treatment-based performance criteria (completed) • Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify monitoring-based criteria: o Reduce the number of groundwater points of compliance o Update analytical suite for groundwater sampling o Modify biomonitoring program: Add language on fishing prohibition and discontinue fish tissue monitoring; identify sediment sampling requirements. • Add language to management-based criteria for warning signs: Warning signage shall be present and visible at all times.
AOC No. 2 / No. 3 Swimming Pool Area and POL System/ Taxiway Area	• Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify monitoring-based criteria: o Reduce the number of groundwater points of compliance o Update analytical suite for groundwater sampling

Table ES-2 – Johnston Atoll Facility CRDAs Requiring SWMU Assessment

Unit	Description
Red Hat Storage Area (RHSA) Bunkers CRDA (Johnston Island)	• Perform the SWMU Assessment Process as outlined in the Permit, Permit Narrative, and the Decision Logic Diagram; • Based on SWMU Assessment results and the Decision Logic Diagram, determine requirements for the site; and • As appropriate: o Submit a Permit modification for any units that are determined to require inclusion into the Corrective Action Process under the Permit; or. o The Air Force prepares official documentation for EPA approval to specifically exclude the Unit from the Corrective Action Process (with or without conditions).
Johnston Island Primary CRDA	
Johnston Island Swimming Pool CRDA	
East Island CRDA	
Sand Island CRDA	
North Island CRDA (Northern)	
North Island CRDA (Southern)	

This page intentionally left blank.

PERMIT RENEWAL PACKAGE NARRATIVE

1. PROPOSED ACTION

The U.S. Air Force (Air Force) provides this Class 2 permit renewal addendum for the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action (HWCA) Permit for the Johnston Atoll Facility (Figure 1), issued by and under U.S. Environmental Protection Agency (EPA) Identification Number (No.) TT9-570-090-002 (the Permit) on 30 April 2002, and effective 30 May 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective 30 July 2004 (EPA 2004). If approved, the modifications proposed would become effective during 2019, as Modification No. 2 of the TT9-570-090-002 Permit.

The Permit renewal addendum includes the HWCA permit application Parts A and B, as follows:

- Part A of the HWCA Permit application contains the EPA Form and supportive attachments. Part A is submitted in conjunction with the Part B of the Permit application. Part A supportive attachments include a map and associated table of the defined solid waste management units (SWMUs) or areas of concern (AOCs) that have ever been involved with the Permit through the RCRA Facility Investigation (RFI) or the corrective action program and are designated as "active" or "closed" sites. To note, "active sites" are those units identified in the proposed Table III.2b, closed sites are those with NFA status, or that were closed under the RFI (Raytheon Services Nevada. 1994b).

  To note, the Part A map and associated table do not include units under the SWMU Assessment Process (outlined in Permit Section III.D) until the unit is determined to be a SWMU with Corrective Action Performance Criteria.

- Part B of the HWCA Permit application contains this Narrative as a discussion of the proposed revisions to the existing (2004) Permit Modules (I, II, and III) concerning corrective action at Johnston Atoll. Part B provides all documentation justifying or supporting proposed modifications either fully within the Narrative or as supplemented by an Appendix.

The purpose of this permit renewal addendum is to propose and justify revisions to Module I (General Permit Conditions), Module II (General Facility Conditions), and Module III (Corrective Action for Solid Waste Management Units) of the Permit. Under this Narrative, the Air Force proposes modified language for SWMUs and AOCs in the Permit and proposes to include seven Construction Rubble Debris Area (CRDA) units as requiring SWMU Assessment. The modified language for the Permit Modules is presented as Appendix A, which presents all changes to Modules I, II, and III in tracked changes ("redline"). Appendix A also includes a version of the Modules with all redline changes accepted to show what the Modules would read "as proposed." This Permit Renewal Addendum Package provides the EPA with information and components required to facilitate proposed permit actions.

For Modules I and II, this Permit Renewal Addendum removes language that is specific to the thermal treatment unit activities, which have been completed at SWMU No. 2 and SWMU No.

16/AOC No. 1. Under Module II, changes have been made to the Performance Testing Requirements (Section II.M), the Performance Standards (Section II.N), and the Requirements Prior To Restart (Section II.O). Additionally, text has been included or removed from several Module I and II sections to reflect that the Facility is not able to meet some of the regulatory requirements that are exclusively reliant upon or intended to be used for Facilities with on-site staffing and Hazardous Waste generation/management or treatment activities.

For purposes of this Permit, terms used herein shall have the same meaning as those in the effective regulations Title 40 of the Code of Federal Regulations (CFR) Parts 124, 260, 264, 266, 268, and 270, unless this Permit specifically provides otherwise; where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

For Module III, the Air Force is proposing to modify performance criteria listed in Module III (Corrective Action for SWMUs) of the 2004 Permit modification for six sites. Section 2 of the Narrative provides the summarized rationale and justification for the proposed modifications for the following SWMUs identified during the RCRA Facility Investigation (RFI) process:

- SWMU No. 6, Mixed Metals Debris Area (MMDA) and Solid Waste Incinerator Ash Disposal Unit (Figures 2, 3, and 4)
- SWMU No. 1, Solid Waste Burn Pit (Figures 2 and 3)
- SWMU No. 2, Former Herbicide Orange (HO) Storage Area (Figures 2 and 3)
- SWMU No. 16, Power Plant Spill Site and AOC No. 1, Motor Gasoline Area (hereafter referred to as SWMU No. 16/AOC No. 1) (Figures 2, 3, and 5)
- AOC No. 2, Swimming Pool Area and AOC No. 3, Taxiway Area (hereafter referred to as AOC Nos. 2 and 3) (Figures 2, 3, and 6).

Additionally, under Module III for SWMU No. 6, a Justification Statement (Appendix B) has been provided as a rationale of the changes to the Performance Criteria for SWMU No. 6 (Monitoring and Maintenance-based criteria).

Appendices C through E include the Justification Statements for each of the SWMUs/AOCs with Permit Modifications that change performance criteria or reduce future requirements based on attainment of performance criteria. Sites with associated Justification Statements are not proposed for No Further Action (NFA) (NFA is typically presented with a “Statement of Basis” document). A summary of the specific proposed actions for each SWMUs and AOCs is presented in Table 1. EPA will consider all comments received during a public involvement process prior to making the final decision on the proposed permit renewal.

To note, there is no Justification Statement document for AOC No. 2 and 3, because permit modification proposals for these units are minimal and sufficient details are presented within the Narrative text.

In addition to the changes outlined above, three sites included in the 2004 Permit Module III have been previously approved by the EPA for NFA, with the formal permit changes proposed to be incorporated using this application process. Section 2.3 of the Narrative provides the summarized rationale which is further supported in separate Statements of Basis documents for the following three sites:

- SWMU No. 5, Recycle Yard
- SWMU No. 9, Hazardous Waste Storage Area
- SWMU No. 15, Above Ground Jet Propulsion Fuel, Grade 5 (JP-5) Storage Tanks.

Locations of SWMU Nos. 5, 9, and 15 are shown on Figure 2 as well as the site Figures included in the Statement of Basis (SOB) documents provided in respective Appendices F, G, and H.

Appendix I provides the previously received EPA Notification of Approval for NFA for SWMUs No. 5, 9, and 15. To note, because these three sites were addressed under a previous permit renewal attempt and associated EPA SOB document submittal, and the EPA Notification of Approval is associated with that submittal and timeframe, the content of the SOB documents has not been updated.

Table 1 – Specific Proposed Actions for SWMUs and AOCs

SWMU or AOC (as identified in RFA)	**Description**
SWMU No. 6 Mixed Metal Debris Area and Stabilized Solid Waste Incinerator Ash Disposal Area	• Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify monitoring-based criteria: o Continue to monitor four (4) groundwater points of compliance (POCs). POCs include two existing monitoring wells and two new monitoring wells (install in 2020). COCs in groundwater are total and dissolved lead. Continue groundwater monitoring in accordance with groundwater monitoring work plan at a frequency of every five (5) years as long as stabilized ash is left in place at this unit. • Incorporate the media cleanup levels for COCs in groundwater of 0.015 mg/L for total and dissolved lead. • Modify management-based criteria: o Complete quarterly remote visual monitoring of SWMU and adjacent shoreline integrity or as frequently as required based on site conditions described in Table II.1 scenario. Inspect and maintain the integrity of the cap every five (5) years or as required based on Table II.1 scenario. o Conduct topographical, land, and groundwater elevation surveys for SWMU No. 6 during the next on-site event (2020). Identify boundaries and elevation of the SWMU based on survey data. Update predicted groundwater flow direction. o Install new warning signs every five (5) years restricting access and excavation within this SWMU. Warning signage shall be present and visible at all times. • Update and maintain Facility records; retain remote monitoring imagery for three (3) years.

Table 1 – Specific Proposed Actions for SWMUs and AOCs *(Continued)*

SWMU or AOC (as identified in RFA)	Description
SWMU No. 1 Solid Waste Burn Pit	• Remove treatment-based performance criteria (completed) • Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify biomonitoring program: Add language on fishing prohibition and discontinue fish tissue monitoring; identify sediment sampling requirements. • Add language to management-based criteria for warning signs: Warning signage shall be present and visible at all times.
SWMU No. 2 Former Herbicide Orange Storage Area	• Remove treatment-based performance criteria (completed) • Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify biomonitoring program: Add language on fishing prohibition and discontinue fish tissue monitoring; identify sediment sampling requirements. • Add language to management-based criteria for warning signs: Warning signage shall be present and visible at all times.
SWMU No. 5 (NFA)	• Remove treatment-based performance criteria (completed) • Remove SWMU from Table III.3
SWMU No. 9 (NFA)	• Remove assessment-based performance criteria (completed) • Remove from Table III.3
SWMU No. 15 (NFA)	• Remove assessment-based and monitoring-based performance criteria (completed) • Remove from Table III.3
SWMU No. 16/ AOC No. 1 Power Plant Spill Area/ Motor Gas (MOGAS) Area;	• Remove treatment-based performance criteria (completed) • Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify monitoring-based criteria: o Reduce the number of groundwater points of compliance o Update analytical suite for groundwater sampling o Modify biomonitoring program: Add language on fishing prohibition and discontinue fish tissue monitoring; identify sediment sampling requirements. • Add language to management-based criteria for warning signs: Warning signage shall be present and visible at all times.
AOC No. 2 / No. 3 Swimming Pool Area and POL System/ Taxiway Area	• Modify schedule requirements: Perform monitoring and management every five (5) years. • Modify monitoring-based criteria: o Reduce the number of groundwater points of compliance o Update analytical suite for groundwater sampling

Additionally, under Module III, language regarding seven units located on Johnston Island and the outer islands has been included in Section 4. Six CRDAs were not specifically identified in the RCRA Facility Assessment (RFA), and documentation that explicitly exempted them from the Permit is not thought to be available. One additional unit, the RHSA Bunkers, will also be included in the SWMU Assessment Process to determine if the site has not had activities with impacts since clean-closure was approved by the EPA under a separate HWCA Permit. Based on EPA's original request, these seven units are appropriate for inclusion under the Permit and will be evaluated under the SWMU Assessment Process outlined under Permit Section III.D. Table 2 provides the

summary of the units included in Section III.D of the Permit and the general pathway of the SWMU Assessment. The SWMU Assessment process is further discussed in Section 2.4, with the decision logic diagram (Figure 9).

Table 2 – Johnston Island Facility CRDAs Requiring SWMU Assessment

CRDA	Description
Johnston Island RHSA Bunkers	• Perform the SWMU Assessment Process as outlined in the Permit, Permit Narrative, and the Decision Logic Diagram; • Based on SWMU Assessment results and the Decision Logic Diagram, determine requirements for the site; and • Proceed as appropriate: o Submit a Permit modification for any units that are determined to require inclusion into the Corrective Action Process under the Permit; or o EPA provides the Air Force official documentation specifically excluding the Unit from the Corrective Action Process as it currently exists.
Johnston Island Primary CRDA	
Johnston Island Swimming Pool CRDA	
East Island CRDA	
Sand Island CRDA	
North Island CRDA (Northern)	
North Island CRDA (Southern)	

1.1 Brief Facility Background and History

Johnston Atoll is located in the Pacific Ocean about 717 nautical miles west-southwest of Hawaii (Figure 1). Johnston Island is the largest of four islands in the atoll complex. The other three islands are Sand Island, a natural islet, and North (Akau) and East (Hikina) Islands, which are manmade. Johnston Atoll is an unincorporated territory of the United States and is one of the oldest and most remote atolls in the world. The atoll consists of approximately 50 square miles of shallow coral reef surrounding four islands. Johnston Island itself is relatively flat, has a maximum elevation of 8 feet above mean sea level; to date, Johnston Island has been expanded by incremental dredging operations from its original 60 acres to approximately 600 acres. Johnston Island now measures approximately 2 miles long and ½-mile wide. The only access to the atoll currently is via ocean vessel.

As the only shallow water and dry land area in millions of square miles of ocean, Johnston Atoll is an oasis for reef and bird life. This includes coral and coralline algae, about 300 species of reef fish, threatened green sea turtles, and seabirds such as the great frigatebird, red-footed booby, red-tailed tropicbird, sooty tern, and others. Johnston Atoll is also considered habitat for the endangered Hawaiian Monk Seal.

Johnston Atoll was discovered in the late 1700s and, beginning in 1856, was used for guano mining. In 1926, Executive Order 4467 reserved and set aside Johnston Island and Sand Island as a federal refuge and breeding grounds for native birds managed by the United States Department of Agriculture. Management of the federal refuge was transferred to the United States Department of the Interior in 1939.

Johnston Atoll's military history began before World War II (1934), and the atoll was shelled in late 1941. From the late 1950s into the early 1960s, Johnston Atoll was used as a base for atmospheric nuclear testing. In the mid-1970s, surplus HO, also known as "Agent Orange", from Vietnam was stored on Johnston Island prior to being destroyed. Chemical weapons were stored

on Johnston Island beginning in 1970. In 1990 Johnston Island became home to the world's first chemical weapons incinerator, the Johnston Atoll Chemical Agent Disposal System (JACADS). The destruction of chemical weapons stored on Johnston Island was completed in November 2000. The JACADS facility and associated areas were subject to a separate Hazardous Waste Permit and Closure Plan (EPA 2003).

With the termination of the Air Force mission at Johnston Atoll, the facility and runway were closed in June 2004. The U.S. Air Force has conducted permit-required groundwater monitoring in 2003, 2004, 2006, 2008, 2013, and 2015 and biomonitoring in 2003, 2008, 2013, and 2015.

Biomonitoring has included fish tissue monitoring, which was intended to determine if the concentrations of contaminants in fish were acceptable for human consumption. With four sampling rounds, there is sufficient data collected for fish tissue. The data indicate that fish are not acceptable for human consumption, and a fishing prohibition should be continued as a control measure for SWMU Nos. 1, 2, and 16/AOC No. 1. Biomonitoring has also included sediment sampling which will continue to be used as an indicator for a change in conditions, and an indication of a release into the marine system. Sediment sampling should continue to be used as a monitoring mechanism and is proposed to be used as a driver for reinitiating fish tissue monitoring, in accordance with the discussion provided in Section 2.2.1.

On January 6, 2009, Presidential Proclamation 8336 included Johnston Atoll in the Pacific Remote Islands Marine National Monument (PRIMNM). The waters to 12 nautical miles around the atoll became part of the PRIMNM and were also established as Johnston Atoll National Wildlife Refuge by Department of the Interior Secretary's Order 3284 dated January 16, 2009. All of the islands in the atoll are considered part of the newly expanded Johnston Atoll National Wildlife Refuge; the Unites States Fish and Wildlife Service (USFWS) is authorized to manage it as a unit of the National Wildlife Refuge System.

1.2 Permit History

In November 1980, the Defense Nuclear Agency (DNA) received a RCRA Permit from EPA for activities and management of the waste materials related to cleanup of the HO area. EPA Identification No. TT0-570-090-001 was assigned to DNA for storage and treatment of these wastes. In August 1985, the U.S. Army received a RCRA Permit for the operation of the JACADS. EPA Identification No. TT0-570-090-001 (the same number assigned to DNA in 1980) was assigned to the U.S. Army for operation of JACADS and the associated Red Hat Storage Areas. In 1989 the U.S. Army and DNA both submitted Part A modification proposals for their respective Permits and requested that EPA assign separate Permit numbers.

In 1990, EPA approved that request, and divided Johnston Atoll RCRA waste activities into two areas of responsibility: Permit TT0-570-090-001 was held by the U.S. Army and covered all waste storage associated with JACADS activities. Permit TT0-570-090-002 was held by DNA and covered all other waste storage activities on Johnston Atoll. In 1990 the DNA and U.S. Air Force (Pacific Air Forces or PACAF) jointly signed the Permit Renewal application. Permit activities under TT0-570-090-001 were eventually completed with the EPA certifying that the JACADS Facility which included all JACADS and Red Hat Storage Areas, had been properly cleaned and closed in an EPA letter to the US Army Chemical Materials Agency dated 18 August 2009.

In 1992, the PACAF/DNA Permit (TT0-570-090-002) was renewed by EPA and covered storage of wastes as well as 15 SWMUs requiring corrective action investigations (Figure 2). Many of the required investigations were conducted under the RFI process and are complete. Figure 2 shows all SWMUs that were included under the Corrective Action Process of Permit No. TT0-570-090-002 authority (Type 1) and those SWMUs that were not included in the 2004 Permit, but were addressed during the RFI process (and closed at that time) (Type 2). In 2001 PACAF and the Defense Threat Reduction Agency (formerly DNA) submitted a Permit Renewal Addendum to EPA for continuing corrective actions at SWMUs and AOCs. The Permit was renewed by EPA, effective May 30, 2002, and further modified by EPA effective July 30, 2004, just after the closure of staffed operations at Johnston Atoll.

The U.S Air Force's 611th Civil Engineering Squadron submitted a Permit renewal application in July 2011 which was never approved. As such, corrective actions are still being conducted in accordance with 2004 Permit amendment. There were two monitoring efforts performed on-site in 2013 and 2015 which resulted in Permit related topics and comments that needed to be discussed, addressed, and resolved with the EPA prior to any resubmittal of another Permit application.

Additionally, in 2017, the EPA requested that CRDA units not previously included in the RFI or the TT0-570-090-002 Permit be assessed due to the concern for lead-based paint (LBP) (Figures 7 and 8) (USAF and EPA Letters 2016 and 2017). It was also requested that one additional CRDA (the RHSA Bunkers), which was addressed and closed previously, be included in the SWMU Assessment Process. The RHSA Bunkers were clean-closed under EPA HWCA Permit Identification No. TT0 570-090-001 (EPA 2003) but to ensure no subsequent activities would change that status, the Air Force agrees that the RHSA Bunkers CRDA unit and the other identified CRDA units are appropriately addressed using the Module III.D SWMU Assessment process, beginning with a thorough records search for all sites. The full decision logic for the seven CRDAs is outlined in Figure 9 and discussed in Section 2.4.

This 2018 permit application includes Permit modifications regarding the following three different types of sites:

- SWMUs that have completed the Corrective Action requirements and have received a letter of approval from the EPA for NFA and removal from the Permit: SWMU No. 5, SWMU No. 9, and SWMU No. 15 (all shown on Figure 2).

- SWMUs and AOCs that will continue to be under the Corrective Action Program authority (Figure 3): SWMU No. 1 (Figure 3), SWMU No. 2 (Figure 3), SWMU No. 6 (Figure 4), SWMU No. 16 and AOC No. 1 (Figure 5), and AOC Nos. 2 and 3 (Figure 6).

- Seven CRDA units requested for SWMU Assessment under Module III Section III.D of the Permit: Three of the seven CRDAs are located on Johnston Island, (Johnston Island Primary CRDA, Swimming Pool CRDA, and the previously clean-closed RHSA Bunkers) (Figure 7). Four of the CRDAs are located on the outer islands of the Facility (East Island, Sand Island, and North Island) (Figure 8).

This page intentionally left blank.

2. PROPOSED MODIFICATIONS FOR THE PERMIT RENEWAL

As originally written and approved, the Permit includes three Modules. Appendix A of this permit application presents the "redline" and "as proposed" changes that were submitted for Module I (General Permit Conditions), Module II (General Facility Conditions), and Module III (Corrective Action for Solid Waste Management Units). The "redline" changes reflect the modifications proposed to the effective 2004 Permit (Modification 1); and if this application is approved, the "as proposed" would become the effective 2018 Permit (Modification 2).

2.1 Module I and II Modifications

Module I changes were needed to reflect that the Permittee shall submit documents for EPA review prior to operation of a new unit or treatment of waste. Any submittal(s) were clarified to be made as addendum(s) to the original Corrective Measures Implementation (CMI) plan that only covers previous operations, which have been completed.

For Modules I and II, this Permit Renewal Addendum removes language that is specific to the thermal treatment unit activities conducted under the original CMI, which have been completed at SWMU No. 2 and SWMU No. 16/AOC No. 1. The Facility is no longer approved for any thermal or other treatment and the Permit should be updated to reflect that change. Module I.E.12 was revised to specify that the Air Force may not perform treatment of hazardous waste that is part of a corrective action of hazardous waste at the facility until a Permit modification has been approved by the EPA. Under Module II, these changes have been made to the applicable Sections II.B through II.O. All language in Sections II.L through II.N was related to the thermal treatment operations therefore these sections were deleted with "Not Applicable" listed under each section header.

Other parts of the Module I and II sections are proposed to be modified or have removed language because meeting some those specific requirements indicated in the regulation is not possible. The lack of infrastructure and staffing at the Facility prevents the Air Force from satisfying all of these requirements, and instead the Sections provide that the Air Force will ensure that records for the Facility are maintained off-site by the Facility Permit Contact (indicated on EPA OMB Form 2050-0024), and ensure that personnel (i.e Air Force and Contractors) that will be going on-site to perform Permit related monitoring activities are aware of and have proper training and planning documents that meet the regulatory requirements. These sections which were not applicable as written, include reference to on-site management of personnel (II.F), documents and records (I.J, II. F, II.I, II.J), and contingency planning (I.J and II.J).

As part of the proposed modification to Module II Section II.J, Table II.1 has been added that provides the specific remote monitoring and response requirements for SWMU No. 6 under different scenarios. The scenarios include remote monitoring and response requirements based on current conditions (no release), different no release and potential release scenarios, as well as under the catastrophic release scenario. The remote monitoring requirement is included in Module III as a Permit Performance Criteria for SWMU No. 6, but since it is also considered a type of contingency planning for if/when the site-specific scenario at the SWMU changes, there are additional modifications included under the Contingency Planning section of the Permit. Under

Subsection II.J.1, Table II.1 was developed specifically to incorporate the details of how the Air Force will respond to a change in site conditions [scenario] at SWMU No. 6.

As also discussed in the SWMU No. 6 Justification Statement (Appendix B), it is possible for the EPA to determine "No Effect" on the relevant threatened and endangered species under the proposed actions in the Permit. This finding is possible because under Module II modifications, the Air Force has incorporated into the Contingency Planning section a required response for different scenarios, including in a catastrophic release scenario where direct contact exposures may otherwise occur. Under the catastrophic release scenario, the Air Force's response would include immediately initiating a deployment of trained personnel to prevent Hawaiian Monk Seals and green sea turtles from being directly exposed to the ash contained within SWMU No. 6.

Section II.K Recordkeeping and Reporting, has been modified to reflect that due to current site usage and Facility conditions, all records will be maintained offsite. A new section II.K.2 has been added for Imagery Records, providing that the Air Force will maintain a record of remote monitoring imagery for three years (offsite).

2.2 Module III Modifications For Sites With Ongoing Requirements

Justification Statements describing the rationale for Permit Modifications at four SWMUs and one AOC have been provided in Appendices B though E for SWMUs Nos. 6, 1, 2, and 16/AOC No.1. Details for AOC No. 2 and 3 are presented within the Narrative text (no justification Statement Appendix is included for AOC No. 2 or 3). The following Sections 2.2.1 through 2.2.6 provide additional details on the modifications proposed for these units (generally and specifically) under Module III of the Permit.

2.2.1 Modifications to Module III Tables

Each of the tables in Module III are proposed to be updated or added as described below.

Table III.1 (Corrective Action Schedule of Compliance) has modified to reflect the achievements and completion of previous Facility Requirements conducted under the RFI and CMI processes. Overall the changes to Table III.1 reflect schedule due dates that are dependent on EPA approval instead of a specific timeframe (e.g., 30 days, 60 days, etc.). The completion of many corrective actions in the early 2000's allowed for the conclusion of staffed operations at the Facility. The current site conditions do not require or allow for compliance due dates of the previously required scheduling, and therefore many requirements have been made more general by allowing for approval from the EPA Division Director in place of a specified timeframe. Additionally, the various different types of work plans for groundwater sampling, biomonitoring, and monitored natural attenuation, have been condensed into one entry. At this stage of the Corrective Action, any work performed on-site will require a Work Plan, and will incorporate input from EPA and USFWS. As previously done, the Air Force will continue to submit the Work Plans for EPA Approval during development (provide a Draft version), and prior to mobilization.

Table III.2a (Newly-Identified SWMU Assessment Units) is a new table added to Module III Section III.D. Section III.D is where the CRDAs are incorporated into the Permit for assessment. The Table provides a list of the seven CRDAs proposed for evaluation under the SWMU Assessment Process. These modifications are further described in Section 2.4.

Table III.2b (SWMUs and AOCs Under the Corrective Action Process) has been renamed (previously titled 'Table III.2 SWMUs and AOCs Requiring Corrective Action Investigation') to better reflect the various stages that the remaining sites are under as of 2018: the RFI has been completed, and most sites are either in Long-Term Care or are in the Remedy Implementation stage (EPA 2017). Table III.2b now provides a list of the SWMUs and AOCs currently identified as requiring some level of corrective action under the HWCA Permit authority. The 2018 Permit application proposes to remove specific monitoring well identifiers (ID) from this table and instead refers to 'groundwater points of compliance' or 'compliance points'. This was done so that a permit modification would not be required if/when a specific well is replaced if unusable.

Since the Corrective Action Criteria (listed in Table III.3) have been completed at SWMUs No. 5, No. 9, and No. 15, these SWMUs should be removed from Table III.2b. The EPA Notification Letter of Approval for NFA for these three SWMUs is provided as Appendix I to this Narrative.

Additionally, the description of SWMU No. 6 needs to be updated to include in the name additional information, specifically that the site is a stabilized solid waste incinerator ash disposal area. The Site's previous name (Mixed Metal Debris Area) is not fully reflective of the contents currently present in this SWMU. The MMDA contents are not identified as the corrective action driver under the Permit. This is supported by the unit being justified and proposed for NFA in 1994 following a removal action with confirmation sampling, and prior to the ash placement (Raytheon Services Nevada 1994a). While it is unclear if NFA was approved prior to ash placement, this decision document provides historical data for soil and groundwater conditions prior to SWMU No. 6 becoming a solid waste incinerator ash disposal unit.

Table III.3 (Corrective Action Criteria) was modified to reflect the proposed performance criteria. The modifications are fully rationalized and described in Sections 2.1 through 2.3 of this Narrative. The table includes modifications for all SWMUs and AOCs remaining under Corrective Action (SWMU Nos. 1,2,6, and 16 and AOC Nos. 1, 2, and 3) since there has either been a proposed change to or added components to the Permit Performance Criteria for all of these units. Some specific and notable changes include the following:

Under biomonitoring requirements (Monitoring-Based criteria for SWMU Nos. 1, 2, and 16/AOC No.1), the purpose of the fish tissue sampling was to determine if a fishing prohibition should be maintained at the Facility. Sufficient data have been collected over four monitoring events to establish that it is appropriate to maintain a fishing prohibition as an institutional site control measure for these sites. The biomonitoring requirements are therefore proposed to be reduced to remove the requirement for continued fish tissue monitoring at SWMU Nos. 1, 2, and 16/AOC No.1. The biomonitoring requirement for sediment sampling will continue at marine areas offshore from SWMU Nos. 1, 2, and 16/AOC No.1.

The justification for the fishing prohibition is based on documented fish tissue concentrations for PCBs and dioxin/furans which in years 2003, 2008, 2013, and 2015 indicate unacceptable concentrations for human consumption. Using the Permit modification process, fish tissue monitoring should be resumed in a scenario where:

- The Air Force proposes to remove the fishing prohibition, or

- Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean.

Table III.4 (Soil Cleanup Goals) listed entries are proposed for deletion from Module III because soil treatment performance criteria have been achieved at the SWMUs and AOCs. If in the future, SWMUs or AOCs require soil cleanup activities, the Air Force will modify and submit a Permit modification or update to the Corrective Action Module III section to the EPA for approval. The modification or update will be approved by the EPA prior to initiating treatment activity and will ensure that a soil cleanup goal has been approved. The table will be left with "Not Currently Applicable" listed as the only line item.

Table III.5 (Groundwater Cleanup Goals) are proposed for modification under Module III. Listed contaminants no longer of concern will be removed from Table III.5, and dissolved and total lead cleanup goals will be specified and incorporated for groundwater. The incorporation of media cleanup goals for total and dissolved lead is an important step in the corrective action process for SWMU No. 6 and has been a topic of discussion for several years. In March of 2018, the EPA communicated to the Air Force that the proposal of the 0.015 milligrams per liter (mg/L) level as the groundwater cleanup goal for both dissolved and total lead was acceptable. This level is equal to the federal Maximum Contaminant Level (MCL), which is a drinking water and human-health risk-based level. The justification for using this level is provided in Section 2.2.3 and Appendix B.

2.2.2 General Monitoring Frequency Modification

In the 2002 Permit (EPA 2002), the frequency for monitoring was specified to occur annually. In the 2004 Permit, the frequency was removed based on island closure activities and was a point of discussion in the comment responses associated with Permit Modification 1 (EPA 2004). Because the sampling frequency was not formally codified in the interim period, the 2018 application officially proposes once every five-year monitoring frequency for the on-site monitoring-based and maintenance-based activities for applicable sites included in the Facility's Corrective Action program.

Based on discussion with the EPA, a monitoring frequency of once every five years for the on-site monitoring-based and maintenance-based activities is acceptable as long as remote monitoring is conducted. Therefore, a modification to designate the frequency as once every five (5) years for on-site monitoring and maintenance-based activities is proposed in the revised Permit. The previous monitoring activities were performed in 2015; therefore, the performance of the next Permit monitoring activities is planned in 2020.

2.2.3 SWMU No. 6 Modifications

The Permit proposes modifications to the monitoring and management-based criteria (discussed in Sections 2.2.3.1 through 2.2.3.3). Specific modifications in the Permit Performance Criteria are proposed and discussed as follows:

- Specify and incorporate the number of groundwater points of compliance (justification provided in Section 2.2.3.1);
- Specify and incorporate the analytical monitoring and cleanup criteria requirements (justification provided in Section 2.2.3.2);
- Specify and incorporate the management-based criteria for remote monitoring and surveys (justification provided in Section 2.2.3.3).

The Performance Criteria listed in Table III.3 of the 2004 Permit are as follows:

- *Monitoring-Based: Points of Compliance for groundwater monitoring are wells: MMD MW01, MMD MW04, MMD MW05, and MMD MW06. COCs in groundwater are total and dissolved lead. Continue groundwater monitoring in accordance with EPA approved Groundwater Monitoring Work plan prepared and submitted in accordance with Table 111.1. Upon island closure, initiate remote visual monitoring of SWMU and adjacent seawall integrity in accordance with EPA approved Groundwater Monitoring Workplan. This SWMU will require a perm it modification to select a final remedy with clean up goals or to propose No Further Action.*
- *Management-Based: Inspect and maintain integrity of soil cap. Prohibit excavation or construction of buildings within this SWMU.*

The Performance Criteria modified in Table III.3 of the Permit are proposed, as follows:

- *Monitoring-Based: For as long as stabilized ash is left in place, continue monitoring-based performance criteria every five (5) years. Monitoring will be conducted under the prepared, submitted, and approved Groundwater Monitoring Plan developed in accordance with Table III.1; Continue groundwater monitoring at four (4) points of compliance, including two (2) existing monitoring wells and two (2) new monitoring wells (install in 2020); COCs in groundwater are total and dissolved lead. Groundwater cleanup goals for COCs are specified in Table III.5.*
- *Management-Based: Continue management-based performance criteria every five (5) years in perpetuity for as long as ash in left in place. Inspect and maintain the integrity of the cap every 5 years with remote monitoring performed quarterly unless the site condition [scenario] changes, then perform remote monitoring and response as defined by Module II Table II.1. Conduct topographical, land, and groundwater elevation surveys for SWMU No. 6 during the next on-site event (2020); Identify boundaries and elevation of the SWMU based on survey data. Update groundwater flow based on groundwater elevation survey data. Update Base records with location data and maintain satellite imagery collected for remote monitoring for three (3) years. Install/maintain warning signs restricting access and excavation within this SWMU. Warning signs will be maintained by replacing signage every five (5) years and will be visible at all times.*

To note, additional justification details for modifications are provided in Appendix B (Justification Statement).

2.2.3.1 Monitoring-Based Criteria: Points of Compliance (SWMU No. 6 Monitoring Wells)

In 2013, missing monitoring well MMD MW04 was reinstalled as MMD MD04A midway along the northern boundary of SWMU No. 6 between the landfill and shoreline (Figure 4). The location for the reinstallation was based on agreement by email from the on-site EPA representative and was documented in the final monitoring report (EA Engineering, Science, and Technology, Inc., PBC [EA] 2016). This relocation allows assessment of potential migration of lead from SWMU No. 6 to the ocean. MMD MW06 was successfully sampled and documented in good condition during the 2015 effort.

The 2004 Permit includes requirements for collecting groundwater samples from four (4) point-of-compliance monitoring wells (Figure 4). However, two monitoring wells listed on the Permit were not located during the previous fieldwork efforts in both 2013 and 2015. These missing wells were not reinstalled in 2013 because at the time, discussions with the EPA allowed for a reduced number of wells as groundwater points of compliance. However, in more recent communications the EPA has indicated that the original number (four) wells should be maintained as the number of groundwater compliance points. The Air Force will replace wells determined to be unusable or destroyed in conjunction with the next field effort, and will sample the four (4) points of compliance in the monitoring well network.

To note, the planned new wells are intended to be true downgradient wells (between SWMU No. 6 and the nearest shoreline). The groundwater elevation survey discussed in Section 2.2.3.3 provides that the Air Force will conduct a groundwater elevation survey data to update the flow direction. The survey data will also be used understand one of the groundwater points of compliance south of the SWMU (monitored by MMD MW06) as a downgradient, upgradient, or cross-gradient point of compliance.

2.2.3.2 Monitoring-Based Criteria: Analytical Suite (SWMU No. 6)

Incorporating EPA guidance on the analytical and performance-based requirements for SWMU No. 6, the Air Force has included the federal drinking water MCL as the groundwater cleanup goal for both total and dissolved lead. The MCL is a risk-based level for human health and is the historical screening level concentration for this site.

This permit application incorporates a cleanup goal listed for total and dissolved lead in groundwater both equal to the Federal MCL (0.015 mg/L). The Federal MCL of 0.015 mg/L is considered protective for human and ecological receptors based on current land use and site conditions being contained without release, with the point of generation being located inland of the potential point of exposure (shoreline and adjacent lagoon) if a release potentially occurred - though groundwater data (Table 3) provides no evidence that a release has occurred. Therefore, the Federal MCL for total and dissolved lead (both 0.015 mg/L) is considered protective based on the potential human and ecological risks for the site. The responsibility and concern for adequately protecting receptors in changing site conditions is addressed through management-based Performance Criteria (Section 2.2.3.3), as well as Contingency Planning under Module II.

Samples collected from 1998 through 2015 from all available groundwater points of compliance, have shown that total and dissolved lead in groundwater analytical results are detected or non-detected below the MCL (Table 3). The Air Force will ensure that the analytical methods used to process SWMU No. 6 groundwater samples include a LOD that is below the Federal MCL criteria. The LOD will be specified and detailed in the Work Plan associated with the sampling effort and in accordance with the Performance criteria and Table III.1.

2.2.3.3 Management-Based Criteria: SWMU No. 6 Remote Monitoring and Survey

Remote Monitoring (SWMU No. 6 and Adjacent Shoreline)

The remote monitoring can be considered a type of contingency planning for SWMU No. 6 and therefore has been included under the Contingency Planning section of the Permit (Module II, Table II.1) as well as the Corrective Action section of the Permit (Module III, Table III.3).

There is currently a presence of on-site USFWS personnel at Johnston Island able to communicate changes in site conditions or relay information about severe storms. In May 2018 the Air Force initiated remote monitoring for SWMU No. 6 in accordance with the Permit. The Air Force understands that the USFWS staff will continue to communicate evident or possible erosion issues to the Air Force if they are on-site, but that their continued presence should not be relied upon. The presence of on-site personnel with internet and satellite communication capabilities does allow for rapid, real time, communications in the event of breach or other episodic event and will continue to be used when available. Additionally, the Air Force recognizes that USFWS staff are not necessarily qualified or responsible for providing reports in accordance with the Permit, nor will their presence on-island be used as the sole means of assurance of Permit compliance for SWMU No. 6 stability. Therefore, the Air Force has begun the review and retention of remote monitoring satellite imagery to satisfy the remote monitoring components of the Permit.

The review of satellite imagery of the adjacent shoreline conditions and SWMU No. 6 cap will be conducted quarterly unless the frequency is increased due to a change in site conditions indicated by the remote monitoring imagery or USFWS personnel reports. Remote monitoring will be conducted in accordance with the site conditions and scenarios shown in Table 4, which has also been added to the Permit under the Contingency Planning Section II.J as Table II.1 (Appendix A).

Table 4 – Remote Monitoring and Response Requirements for SWMU No. 6

Scenario	Site Condition	Remote Monitoring Frequency	Response Required by the Air Force
1	Shoreline Erosion, No Release	Quarterly	Inspect and maintain every 5 years
2	Inland Erosion, No Release	Once every 2 months	Inspect and stabilize during next scheduled visit
3	Cap requires maintenance, No Release (geotextile fabric intact)	Monthly	Perform required maintenance next scheduled visit
4	Shoreline is up to concrete rubble area and cap requires maintenance, Potential Release (geotextile fabric not intact)	Monthly	Perform required maintenance next scheduled visit
5	Shoreline at concrete rubble area, No Release	Monthly	Program maintenance, stabilization, or removal
6	Catastrophic Release	Monthly	Immediate USAF response including deployment of personnel. Program maintenance, stabilization, or removal.

To note, Figure 4 provides the access pathways for required maintenance or repairs at SWMU No. 6; the "concrete rubble area" referred to Table 4 is shown in SWMU No. 6 Justification Statement's Figure 2.

Conduct Various Surveys (SWMU No. 6)

The Air Force will conduct a land, topographical, and groundwater elevation survey of SWMU No. 6 to provide accurate location and boundary data and point of compliance location data for the unit and update predicted groundwater flow direction. The methods of these surveys will be coordinated with and decided with EPA input as there are various methods that conceptually would work but may not be feasible given the remoteness of the site, restrictions, and wildlife concerns. The surveys will be conducted in 2020, and the methods, accuracy, and goals will be outlined in the 2020 Work Plan, which is subject to EPA approval, and will be incorporated into the Permit, per Table III.1 of the Permit.

As shown in the SWMU No. 1 Close Out Report (USAF 1995) and documented photographs of the ash placement activities, ash was covered with a cap consisting of geotextile fabric and clean coral fill. Photographs document the stages of ash placement activities and are available in Section 10 of the SWMU No. 1 Close Out Report (USAF 1995). In addition to the location and boundary data for the SWMU, the topographical and land survey data will be used to better estimate the extent of the ash and to assess if integrity issues are occurring within the site boundary. The SWMU No. 1 Close out Report provides a historical reference to aid in the SWMU No. 6 surveys conducted regarding ash placement.

2.2.4 SWMU No. 1 Modifications

The Permit proposes modifications to the treatment-based, monitoring-based, and management-based criteria (discussed in Sections 2.2.4.1 through 2.2.4.3. Specific modifications in the Permit Performance Criteria are proposed and discussed as follows:

- Remove the Treatment-based criteria (justification provided in Section 2.2.4.1);
- Remove the fish tissue sampling requirement from the biomonitoring criteria (justification provided in Section 2.2.4.2);
- Identify when requirements for reinitiating fish tissue sampling exist (discussed in Section 2.2.4.2);
- Provide specifics on fishing prohibition and warning signs as control measures (justification provided in Section 2.2.4.3).

To note, additional justification details are provided in Appendix C (Justification Statement).

2.2.4.1 Treatment-Based Criteria: COMPLETED (SWMU No. 1)

Table III.3 of the 2004 Permit specified the following treatment-based performance criteria for SWMU No. 1:

- <u>*Treatment-Based:*</u> "*Excavation and off-island disposal of soil at locations where benzo(a)pyrene concentrations exceed risk-based Cleanup Goals. Work conducted in accordance with Corrective Measures Implementation Work Plan Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5…Cleanup Goals for COCs in soil are listed in Table III.4* (CH2MHill, 2003a)."

Conducted under the CMI, a 2004 removal action was performed at SMWU No. 1. Analytical results indicate that all excavation side walls and bottoms were below the soil cleanup goal for benzo(a)pyrene, and the four excavations were backfilled with clean fill material.

With the conclusion of the CMI activities at SWMU No. 1 (CH2M Hill 2004a), the treatment-based performance criteria listed in Table III.3 of the 2004 Permit have been met, and Table III.3 of the Permit has been updated to reflect this achievement by stating 'Treatment-based performance criteria achieved'. Detailed information presenting the results of the CMI at SWMU No. 1 is presented in Appendix C.

2.2.4.2 Monitoring-Based Criteria: Biomonitoring (SWMU No. 1)

Table III.3 of the 2004 Permit specified the following biomonitoring monitoring-based performance criteria for SWMU No. 1:

- *Monitoring-Based: Conduct sediment and fish tissue monitoring in the adjacent lagoon to demonstrate compliance with criteria presented in the EPA approved Monitored Natural Recovery Work Plan prepared and submitted in accordance with Table III.1. Monitored Natural Recovery [MNR] Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, criteria for removing the*

fishing prohibition and warning signs, and criteria for successful completion of monitored natural recovery."

The proposed changes to Table III.3 monitoring-based criteria are as follows:

- *Monitoring-Based: Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where:*
    - *Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or*
    - *The Air Force proposes to remove the fishing prohibition.*

2.2.4.3 Management-Based Criteria: (SWMU No. 1)

Minor changes to incorporate the five (5) year monitoring frequency have also been made to the Management-Based criteria in Table III.3, which was presented in the 2004 Permit, as follows:

- *<u>Management-Based:</u> Maintain existing fishing prohibition with posted warning signs until criteria identified in EPA approved Monitored Natural Recovery (Biomonitoring) Work Plan are met.*

The following proposed change clarifies the monitoring frequency in Table III.3, as follows:

- *<u>Management-Based</u>: Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.*

2.2.5 SWMU No. 2 Modifications

The Permit proposes modifications to the treatment-based, monitoring-based, and management-based criteria (discussed in Sections 2.2.5.1 through 2.2.5.3. Specific modifications in the Permit Performance Criteria are proposed and discussed as follows:

- Remove the Treatment-based criteria (justification provided in Section 2.2.5.1);
- Remove the fish tissue sampling requirement from the biomonitoring criteria (justification provided in Section 2.2.5.2);
- Identify when requirements for reinitiating fish tissue sampling exist (discussed in Section 2.2.5.2);
- Provide specifics on fishing prohibition and warning signs as control measures (justification provided in Section 2.2.5.3).

To note, additional justification details are provided in Appendix D (Justification Statement).

2.2.5.1 Treatment-Based Criteria: COMPLETED (SWMU No. 2)

The COCs listed in the Permit for SWMU No. 2 include dioxins/furans. Table III.3 of the 2004 Permit specified the following treatment-based performance criteria for SWMU No. 2:

- *Treatment-Based: "Excavate, stockpile, and treat dioxin-contaminated soil according to EPA approved CMI Plan. Complete within two (2) years of initiating treatment, or according to schedule approved by the Division Director* [EPA]. *CMI Final Report prepared and submitted to the Division Director* [EPA] *in accordance with Table III.1* (CH2M Hill 2004b)*"*

The treatment-based performance criteria listed above summarizes the performance criteria presented in the 2002 Permit, which included the following:

2002 Permit language

- *Treatment-Based: "Stockpile excavated soil in designated stating pile. Parameters of staging pile to be specified in CMI Plan and approved by Division Director* [EPA]. *Treatment of excavated dioxin-contaminated soil using thermal desorption in combination with thermal oxidation for treatment of off-gases. Excavation wall and treated soil achieve dioxin cleanup goal of one (1) microgram per kilogram toxicity equivalent. Return effectively treated soil to excavated areas or other locations on Johnston Island as approved by the Division Director* [EPA]. *Physical properties of treated soil will be examined, and potential soil amendments will be considered prior to backfilling to ensure no adverse environmental impacts. All hazardous waste and hazardous waste residues removed from the treatment unit and associated equipment, devices, structures, and areas. Complete within two years of initiating treatment, or according to schedule approved by the Division Director* [EPA]. *CMI Final Report prepared and submitted to the Division Director* [EPA] *in accordance with Table III.1"* (CH2M Hill 2004b)

With the conclusion of the CMI activities at SWMU No. 2, the treatment-based performance criteria listed in Table III.3 of the 2004 Permit have been met, and Table III.3 of the Permit has been updated to reflect this achievement by stating 'Treatment-based performance criteria achieved'.

Detailed information presenting the results of the CMI at SWMU No. 2 is presented in Appendix D.

2.2.5.2 Monitoring-Based Criteria: Biomonitoring (SWMU No. 2)

Table III.3 of the 2004 Permit specified the following biomonitoring monitoring-based performance criteria for SWMU No. 2:

- *Monitoring-Based: Conduct sediment and fish tissue monitoring in the adjacent lagoon to demonstrate compliance with criteria presented in the EPA approved Monitored Natural Recovery Work Plan prepared and submitted in accordance with Table III.1. Monitored Natural Recovery [MNR] Work Plan will include a plan for maintaining warning signs, a*

schedule for biomonitoring and reporting, a sampling plan, criteria for removing the fishing prohibition and warning signs, and criteria for successful completion of monitored natural recovery."

The proposed changes to Table III.3 monitoring-based criteria are as follows:

- *Monitoring-Based: Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in COC concentrations, which could indicate that a release(s) has occurred. A statistically significant increase in sediment concentrations may also be used as justification to reinitiate fish tissue monitoring. Statistical significance will be shown if the upper control limit is above the average baseline value by an order of magnitude for two consecutive monitoring events.*

2.2.5.3 Management-Based Criteria: (SWMU No. 2)

Changes to incorporate the five (5) year monitoring frequency have also been made to the Management-Based criteria in Table III.3, which was presented in the 2004 Permit, as follows:

- *Management-Based: Maintain existing fishing prohibition with posted warning signs until criteria identified in EPA approved Monitored Natural Recovery (Biomonitoring) Work Plan are met.*

The following proposed change clarifies the monitoring frequency in Table III.3, as follows:

- *Management-Based: Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.*

2.2.6 SWMU No. 16/AOC No. 1 Modifications

The Permit proposes that monitoring of groundwater at SWMU No. 16/AOC No. 1 will continue for PAH and TPH at six groundwater points of compliance, and modifications to the biomonitoring and management-based criteria (discussed in Sections 2.2.6.2 and 2.2.6.6. Specific reductions in the Permit Performance Criteria are proposed and discussed as follows:

- Remove the Treatment-based criteria (justification provided in Section 2.2.6.1);
- Remove the fish tissue sampling requirement from the biomonitoring criteria (justification provided in Section 2.2.6.2);
- Identify and incorporate when requirements for reinitiating fish tissue sampling exist (discussed in Section 2.2.6.2);
- Reduce the number of groundwater points of compliance from 12 to six (justification provided in Section 2.2.6.3);
- Reduce the analytical monitoring requirements (justification provided in Section 2.2.6.4)
- Specify and incorporate the management-based criteria for land use control measures (justification provided in Section 2.2.6.5).

To note, additional justification details are provided in Appendix E (Justification Statement).

2.2.6.1 Treatment-Based Criteria: COMPLETED (SWMU No. 16/AOC No. 1)

Table III.3 of the 2004 Permit specified the following treatment-based performance criteria for SWMU No. 16/AOC No. 1:

- *Treatment-Based: "Excavate, stockpile, and ship PCB-contaminated soil off-island for treatment and/or disposal according to CMI Plan Addendum. Excavate, stockpile, and treat soil contaminated by petroleum on-island using land-farming according to EPA approved CMI Plan Addendum. Cleanup Goals for COCs in soil are listed in Table III.4. Excavation wall (e.g. vertical face of horizontal limit of excavation) and treated soil to achieve Cleanup Goals unless surface structures scheduled to remain in place or subsurface physical barriers such as old seawalls, piers, heavy equipment, large concrete slabs or other unforeseen subsurface obstructions prevent access to contaminated areas. If such surface structures scheduled to remain in place or subsurface physical barriers prevent access to contaminated areas, the Permittee shall obtain written acknowledgement from the Division Director* [EPA] *that access to contamination is technically infeasible. Return effectively treated soil to excavated areas (with compaction for subsurface soils) or other locations on Johnston Island as described in EPA approved CMI Plan Addendum. Complete selected remedy within two (2) years of initiating treatment, or according to schedule approved by the Division Director* [EPA]. *All hazardous waste and hazardous waste residues removed from treatment units, excavation and other equipment, devices, structures, and areas associated with the corrective measure. CMI Final Report prepared and submitted to the Division Director* [EPA] *in accordance with Table III.1"* (CH2M Hill 2004c).

With the conclusion of the CMI activities at SWMU No. 16/AOC No. 1, the treatment-based performance criteria listed in Table III.3 of the 2004 Permit have been met, and Table III.3 of the Permit has been updated to reflect this achievement by stating 'Treatment-based performance criteria achieved'.

Detailed information presenting the results of the CMI at SWMU No. 16/AOC No. 1 is presented in Appendix E.

2.2.6.2 Monitoring-Based Criteria: Biomonitoring (SWMU No. 16/AOC No. 1)

Table III.3 of the 2004 Permit specifies the following biomonitoring monitoring-based performance criteria for SWMU No. 16:

- *Monitoring-Based: Conduct sediment and fish tissue monitoring in the adjacent lagoon to demonstrate compliance with criteria presented in the EPA approved Monitored Natural Recovery (Biomonitoring) Work Plan prepared and submitted in accordance with Table III.1. Monitored Natural Recovery [MNR] (Biomonitoring) Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, criteria for removing the fishing prohibition and warning signs, and criteria for successful completion of monitored natural recovery.*"

The proposed changes to Table III.3 monitoring-based criteria are as follows:

- *Monitoring-Based: Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in COC concentrations, which could indicate that a release(s) has occurred. A statistically significant increase in sediment concentrations may also be used as justification to reinitiate fish tissue monitoring. Statistical significance will be shown if the upper control limit is above the average baseline value by an order of magnitude for two consecutive monitoring events.*

2.2.6.3 Monitoring-Based Criteria: Points of Compliance (SWMU No. 16/AOC No. 1 Monitoring Wells)

Under the 2004 Permit, the monitoring program for SWMU No. 16/AOC No. 1 includes the collection of groundwater samples from 12 point-of-compliance monitoring wells (Figure 5). The Permit proposes to reduce the monitoring requirement to six groundwater points of compliance (justification for this is provided below), and to remove specific well IDs. The reduction in the number of points of compliance is justified as follows:

RFI Final Report (Raytheon Services Nevada 1994b) recommended monitoring for benzene, toluene, ethylbenzene, and total xylenes (BTEX) at eight monitoring wells in the SWMU No. 16/AOC No. 1 area to ensure that hydrocarbon contaminants were not migrating toward the reverse osmosis water treatment plant intake wells used to produce potable water. With the closure of Johnston Atoll, the water treatment plant has been demolished and is no longer present. Therefore, six wells (T49 MW11, T49 MW11D, MG MW03, MG MW03D, MG MW04A, and MG MW04DA shown on Figure 5) listed in the Permit may be removed as groundwater points of compliance because they no longer serve their intended purpose. Historical groundwater analytical results for COCs have consistently been either below detection limits or below their respective groundwater cleanup goals (historical concentrations are presented in Table 5 for total petroleum hydrocarbons [TPH], Table 6 for PCBs, Table 7 for BTEX, and Table 8 for polycyclic aromatic hydrocarbons [PAHs]).

As presented in the 2016 MNR Report and based on interaction with the EPA during the development of the associated MNR Work Plan (EA 2015), one replacement point of compliance (monitored by well T49 MW03B) was installed collocated with its original position and two compliance points required replacement wells, which were relocated within the SWMU No. 16/AOC No. 1 area, as follows:

- *Monitoring well T49 MW02B was moved approximately 310 feet at an azimuth of 45 degrees from its previous approximate location. The purpose of moving the monitoring well was to provide better coverage of SWMU No. 16/AOC No .1 to address a location data gap in an area without monitoring wells present. The monitoring well relocation was based on a review of previous data that indicated analytical results for two adjacent wells (T49 MW12A and T49 MW03A) were both below laboratory reporting limits or were present at concentrations below their respective action levels for several monitoring periods. The adjacent monitoring well T49 MW03A was interpreted as located in an area of slightly higher concentrations and a replacement well was installed in the former location.*

- *Monitoring well T49 MW07A was moved approximately 240 feet at an azimuth of 125 degrees from its previous location. The purpose of moving the monitoring well was to provide additional coverage in the area south of AOC No. 1 in an area without monitoring wells present. The monitoring well relocation was based on a review of previous data that indicated analytical results for adjacent northern and southern wells provided sufficient coverage to assess monitored natural attenuation in the central portion of SWMU No. 16.*

Any damaged groundwater point of compliance needing replacement, should be scheduled to be installed as near to the damaged/unusable point of compliance as possible, or as otherwise approved by the EPA.

2.2.6.4 Monitoring-Based Criteria: Analytical Suite (SWMU No. 16/AOC No. 1)

The COCs for SWMU No. 16/AOC No. 1 in groundwater include total PCBs, BTEX, TPH, and PAHs. TPH analysis at SWMU No. 16/AOC No. 1 included fractionation analysis using Northwest Total Petroleum Hydrocarbon (NWTPH) methods for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) or equivalent methods (Table 5).

Total PCBs were added as a COC in 2003. Since 2003, historical groundwater analytical results for total PCBs were either below detection limits or below the groundwater Cleanup Goal of 0.0020 mg/L (Table 6).

The compliance monitoring wells were sampled for BTEX annually between 1997 and 2004, biennially during 2006 and 2008, and once in both 2013 and 2015. Since 1997, the analytical results for BTEX constituents have remained below their respective groundwater cleanup goals (Table 7).

In accordance with the 2004 Permit, the Monitoring-Based criteria are as follows:

- *Monitoring-Based: Continue annual groundwater monitoring at T49 MW02, T49 MW03, T49 MW06, T49 MW07, T49 MW11, T49 MW11D, T49 MW12, T49 MW15, MG MW03, MG MW03D, MG MW04, and MG MW04D. Analyze groundwater samples for total PCBs, TPH, BTEX and PAHs. Continue groundwater monitoring until three (3) consecutive annual sampling events meet groundwater action levels (monitoring period to begin in 2004). Action levels for groundwater are listed in Table III.5."*

Per the 2004 Permit, sampling data have shown three consecutive events where there were no exceedances to the groundwater action level. Based on the historical groundwater analytical results showing three consecutive sampling events that met groundwater action levels, total PCBs and BTEX may be removed as analytes for the long-term monitoring of groundwater at SWMU No. 16/AOC No. 1. Long-term monitoring of groundwater at SWMU No. 16/AOC No. 1 will continue for TPH and PAHs at six groundwater points of compliance.

Therefore, the proposed changes to Table III.3 monitoring-based criteria are as follows:

- *Monitoring-Based: Continue groundwater monitoring at six groundwater points of compliance every five (5) years. Analyze groundwater samples for TPH and PAHs. Continue groundwater monitoring until three (3) consecutive sampling events meet groundwater action levels. Action levels for groundwater are listed in Table III.5".*

2.2.6.5 Management-Based Criteria: (SWMU No. 16/AOC No. 1)

Changes to incorporate the five (5) year monitoring frequency have also been made to the Management-Based criteria in Table III.3, which was presented in the 2004 Permit, as follows:

- *<u>Management-Based:</u> Maintain existing fishing prohibition with posted warning signs until criteria identified in EPA approved Monitored Natural Recovery (Biomonitoring) Work Plan are met.*

The following proposed change clarifies the management-based criteria in Table III.3, as follows

- *<u>Management-Based</u>: Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.*

2.2.7 AOC Nos. 2 and 3 Modifications

The Permit proposes that monitoring of groundwater at AOC Nos. 2 and 3 will continue for TPH at nine groundwater points of compliance, and modifications to the biomonitoring and management-based criteria (discussed in Sections 2.2.7.1 and 2.2.7.2). Specific modifications to the Permit Performance Criteria are proposed and discussed as follows:

- Reduce the number of points of compliance from 12 to nine (justification provided in Section 2.2.7.1);
- Reduce and incorporate the analytical monitoring requirements (justification provided in Section 2.2.7.2)

To note, sufficient detail has been provided in this Narrative text, therefore, an added Justification Statement Appendix has not been provided for AOC Nos. 2 and 3.

2.2.7.1 Monitoring-Based Criteria: Points of Compliance (AOC Nos. 2 and 3 Monitoring Wells)

In the 2004 Permit for AOC Nos. 2 and 3 includes the collection of samples from 12 groundwater points of compliance (monitoring well IDs RWY MW01, RWY MW02, FW MW3DA*, FW MW04D, SWM MW05A*, SWM MW06B*, SWM MW10A, SWM MW11, SWM MW13, SWM MW20, SWM MW21, and SWM MW22) (Figure 5). The three monitoring wells with an asterisk are replacement wells installed in 2015 because the existing wells were either lost or damaged.

Groundwater monitoring is proposed to continue to be collected from the nine points of compliance shown on Figure 5 (which includes locations covered by RWY MW02, SWM MW05A, SWM MW11, SWM MW13, SWM MW22, SWM MW21, FW MW3DA, SWM MW20, and SWM MW10A). The modifications related to the groundwater points of compliance for AOC Nos. 2 and 3 are described and justified as follows:

As presented in the 2016 MNR Report and based on interaction with the EPA during the development of the associated MNR Work Plan (EA 2015), the compliance point was moved and should be updated accordingly in the Permit. One replacement monitoring well was relocated within the AOC Nos. 2 and 3 areas. The groundwater point of compliance covered by monitoring well SWM MW05A was moved approximately 800 feet at an azimuth of 155 degrees from its previous approximate location. The purpose of moving the compliance point was to provide additional coverage in the area south and east of AOC No. 3. The monitoring well installation location was based on a review of previous data that indicated analytical results for the adjacent well SWM MW22 provide sufficient coverage to assess monitored natural attenuation in the swimming pool area.

The RFI Final Report (Raytheon Services Nevada 1994b) recommended monitoring for BTEX at four monitoring wells (SWM MW05A, SWM MW11, FW MW03DA, and FW MW04D) (Figure 5) in the AOC Nos. 2 and 3 area to evaluate the remote possibility that the very low levels of BTEX contaminants in groundwater may migrate toward the lagoon and/or toward the reverse osmosis treatment plant intake wells. The RFI Final Report recommended sampling of the wells for two years and, if the concentrations did not increase above the MCLs levels, that the monitoring be discontinued.

For monitoring wells FW MW04D, RWY MW01, and SWM MW06A (and replacement well SWM MW06B), TPH, BTEX, and PAHs have not been detected above their respective groundwater cleanup goals since the beginning of the groundwater monitoring program (historical results are presented in Table 9 for BTEX, Table 10 for PAHs, and Table 11 for TPH).

Therefore, three wells (FW MW04D, RWY MW01, and SWM MW06B) (Figure 5) currently identified as groundwater points of compliance in the Permit (or acting as a replacement well to an original compliance point) may be removed because they no longer serve their intended purpose and historical groundwater analytical results for COCs have consistently been either below detection limits or below their respective groundwater cleanup goals.

2.2.7.2 Monitoring-Based Criteria: Analytical Suite (AOC Nos. 2 and 3)

Per Table III.3 of 2004 Permit Performance criteria GW monitoring may be reduced upon completion of 3 consecutive GW monitoring events where concentrations are below cleanup goals. The 2004 Permit provides that the COCs for AOC Nos. 2 and 3 groundwater include BTEX, TPH (using the NWTPH methods), and PAHs.

The points of compliance (monitoring wells) were sampled for BTEX annually between 1997 and 2004, biennially during 2006 and 2008, and once in both 2013 and 2015. Since 1997, the analytical results for BTEX constituents have remained below their respective groundwater cleanup goals (Table 9).

PAHs were added as COCs in 2003. Since 2003, historical groundwater analytical results for PAHs were either below detection limits or below their respective groundwater cleanup goals (Table 10).

Based on historical groundwater analytical results and achievement of the Permit performance criteria, BTEX and PAHs may be removed as analytes for the long-term monitoring of groundwater at AOC Nos. 2 and 3. Long-term monitoring of groundwater at AOC Nos. 2 and 3 will continue for TPH at nine groundwater compliance points.

2.3 Module III Modifications for No Further Action

On 26 July 2016 the EPA sent the Air Force a letter stating their approval of the proposed NFA designation for SWMU Nos. 5, 9, and 15. The notice of approval is provided as Appendix I and includes that "the EPA concurs that no further corrective actions or measures are warranted or necessary" for SWMU Nos. 5, 9, and 15 and that "these units have met the permit requirements for an NFA designation" (EPA 2016). This application provides the record of that process, proposes the formal NFA designation, and proposes to officially remove them from the Permit.

Activities at SWMU No. 5 and SWMU No. 9 ended prior to closure of Johnston Atoll in June 2004, and treatment-based and assessment-based performance criteria were achieved; therefore, these SWMUs are recommended for NFA. Monitoring-based performance criteria for groundwater monitoring at SWMU No. 15 have been met with analytical results from three consecutive sampling events below permit established cleanup goals; therefore, this SWMU is recommended for NFA.

Appendices F, G, and H present the statements of basis for SWMU No. 5, SWMU No. 9, and SWMU No. 15, respectively, that meet the criteria for NFA status as defined in the Permit. Appendix I provides the 2016 letter from the EPA to the Air Force providing concurrence that these three sites have met the permit requirements for NFA designation. Soil and groundwater analytical results from these SWMUs have been evaluated and compared to the Permit Cleanup Goals, which are summarized in individual statements of basis for each SWMU.

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1, as follows:

a) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use;"* or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

2.3.1 SWMU No. 5 Modification (NFA)

2.3.1.1 Treatment-Based Criteria: Completed (SWMU No. 5)

The required performance-based criteria have been completed. Appendix F presents the statement of basis for SWMU No. 5. Table III.3 of the Permit specifies the following treatment-based performance criteria for SWMU No. 5:

- *Treatment-Based:* "*Excavation and off-island treatment and disposal of soil at locations where benzo(a)pyrene, lead, or copper concentrations exceed risk-based Cleanup Goals. Work conducted in accordance with Corrective Measures Implementation Work Plan Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5 …Cleanup Goals for COCs in soil are listed in Table III.4* (CH2M Hill 2003a)."

Soil and groundwater conditions at SWMU No. 5 were evaluated during four investigations between 1992 and 1998 and prior to a 2003 Data Gap Investigation. The investigations performed in the 1990s indicated that soil and groundwater beneath SWMU No. 5 were not impacted. However, the investigations did not include samples and analyses specific to the operation of the metal compactor, can/bottle crusher, and Scrap Metal Storage Yard.

A Data Gap Investigation was performed in 2003 to fill these data gaps. The Data Gap Investigation fieldwork included the collection of the following samples:

- Four surface soil grab samples near the metal compactor, which were analyzed for PAHs, priority pollutant metals, and TPH.

- Two surface soil grab samples from the immediate vicinity of two sumps located at the northwest and southeast corners of the metal compactor, which were analyzed for PAHs, priority pollutant metals, and TPH.

- Two surface soil grab samples near the can/bottle crusher, which were analyzed for PAHs, priority pollutant metals, and TPH.

- Forty-eight surface soil samples collected from a 50-foot grid network at the Scrap Materials Storage Yard, composited into 12 samples, which were analyzed for priority pollutant metals.

Analytical results from the field activities were documented in the Final Data Gap Investigation Report for SWMU No. 5, 19, 21, and 22 (CH2M Hill 2003b). Analytical results indicated concentrations of benzo(a)pyrene, lead, and copper exceeding their respective screening and risk-based action levels on the north side of the metal compactor. One sample collected on the east side of the compactor had elevated concentrations of copper, which exceeded both the screening level and risk-based action level. In addition, one of two surface soil samples collected near the can/bottle crusher had a concentration of benzo(a)pyrene that exceeded the screening level but was below the risk-based action level. Based on the analytical results, removal of impacted soil at the two exceedance locations to the north and east of the metal compactor was recommended.

A work plan addendum was prepared for the removal and disposal of soil from two locations at SWMU No. 5. The objective of the corrective measures conducted at SWMU No. 5 was to excavate and dispose of soil containing concentrations of benzo(a)pyrene, lead, and copper in excess of soil cleanup goals.

Soil excavation and disposal, and confirmation sampling was performed at SWMU No. 5 in February 2004. An initial excavation of 20 feet by 20 feet by 1 foot in depth was removed from the two locations immediately north and east of the former metal compactor concrete slab. Following excavations, confirmation samples were collected from the side walls and bottoms of the excavations.

The results from the initial confirmation sampling indicated that benzo(a)pyrene, lead, and copper concentrations in soil samples from the two excavations (EX01 and EX02) were below their respective cleanup goals. Based on these results, no further corrective measures were required to address benzo(a)pyrene, lead, or copper at excavation EX01 and EX02. Following receipt of analytical results indicating cleanup goals had been met, the two excavations were backfilled with clean fill material.

The corrective measures at SWMU No. 5 were completed in February 2004. Approximately 40 cubic yards were excavated and disposed from EX01 and EX02. The impacted soil was characterized as nonhazardous waste and was transported to a permitted disposal facility on the U.S. mainland.

With the completion of removal activities at SWMU No. 5, the treatment-based performance criteria listed in Table III.3 of the Permit have been met. Soil present at SWMU No. 5 no longer poses unacceptable risks to potential human or ecological receptors.

A NFA status is proposed for SWMU No. 5. The site was remediated in accordance with the corrective action requirements, and available data indicate that benzo(a)pyrene, lead, and copper are not present at concentrations exceeding their respective cleanup goals; therefore, under current and project future land use, unacceptable risk to human health or the environment is not present.

2.3.2 SWMU No. 9 Modification (NFA)

2.3.2.1 Assessment-Based Criteria: Completed (SWMU No. 9)

The required performance-based criteria have been completed. Appendix G presents the statement of basis for SWMU No. 9. Table III.3 of the Permit specifies the following assessment-based performance criteria for SWMU No. 9:

- *Assessment-Based: "Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) when storage activity is terminated. This SWMU will require a permit modification to select a final remedy with cleanup goals or propose No Further Action."*

Addendum No. 1 of the Draft Comprehensive Corrective Measures Study (CCMS) establishes the criteria and conceptual approach for removing SWMU No. 9 from the RCRA Permit.

Furthermore, this study specifies that the following characterization activities be completed prior to closure: 1) review available records to determine if spills or releases of contaminants have occurred and 2) visually inspect the SWMUs to identify stained soil, which may be indicative of an area containing contaminated soil.

A comprehensive records review of all Johnston Atoll facilities, including SWMU No. 9, was completed in 2003 as part of the Phase II Environmental Baseline Survey (EBS). Results of the 2003 records search show that no documented spills or releases of contaminants occurred at SWMU No. 9.

A visual site inspection (VSI) was also completed at SWMU No. 9 as part of the Phase II EBS, which did not identify evidence of staining at SWMU No. 9. A Certification of the Environmental Baseline Survey and Certification of No Contamination Present can be found in Attachment A of the EBS (USAF 2001). A VSI was also completed at SWMU No. 9 during the April 2015 monitoring event. The 2015 VSI did not identify evidence of staining or distressed vegetation.

A NFA status is proposed for SWMU No. 9. The site has met the assessment-based performance criteria presented in the Permit, which includes a records search and a VSI. The records search and the VSI indicate that under current and projected future land use, unacceptable risk to human health or the environment is not present at SWMU No. 9 (USAF 2001).

2.3.3 SWMU No. 15 Modification (NFA)

The required performance-based criteria have been completed. Appendix H presents the statement of basis for SWMU No. 15. Table III.3 of the Permit specifies the following performance criteria for SWMU No. 15 (EPA 2004):

- <u>Assessment-Based:</u> *"Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) after the tanks are emptied and/or removed."*

- <u>Monitoring-Based:</u> *"Points of Compliance for groundwater monitoring are wells: POL MW01, POL MW02, POL MW02D, POL MW03A, POL MW05A, and POL MW06. COCs in groundwater are TPH as JP-5, BTEX, and PAHs. Continue groundwater monitoring in accordance with EPA approved Groundwater Monitoring Workplan prepared and submitted in accordance with Table III.1. Upon completion of three (3) consecutive sampling events where concentrations of each analyte are below groundwater Cleanup Goals, groundwater monitoring may be reduced or terminated in accordance with EPA approved Groundwater Monitoring Workplan. Cleanup Goals for groundwater are listed in Table III.5."*

2.3.3.1 Assessment-Based Criteria: Completed (SWMU No. 15)

Addendum No. 1 of the Draft CCMS establishes the criteria and conceptual approach for removing SWMU No. 15 from the RCRA Permit. Furthermore, this study specifies that the following characterization activities be completed prior to closure: 1) review available records to determine if spills or releases of contaminants have occurred and 2) visually inspect the SWMUs to identify stained soil, which may be indicative of an area containing contaminated soil.

A comprehensive records review of Johnston Atoll facilities, including SWMU No. 15, was completed in 2003 as part of the Phase II EBS. Results of this records search indicated that records of leaks and spills prior to 1987 do not exist. Leaks and spills were known to have occurred within the bermed area, but the extent, location, and dates of releases are not known. No major uncontained releases were recorded at SWMU No. 15 since 1987.

A VSI was also completed at SWMU No. 15 as part of the Phase II EBS, which did not identify evidence of staining at SWMU No. 15. A Certification of the EBS and Certification of 'No Contamination Present' can be found in Attachment A. A VSI was also completed at SWMU No. 15 during the April 2015 monitoring event. The 2015 VSI did not identify evidence of staining or distressed vegetation.

2.3.3.2 Monitoring-Based Criteria: Completed (SWMU No. 15)

Subsurface assessment of soil, groundwater, and soil gas at SWMU No. 15 began in 1991 and indicated low to moderate petroleum impacts to the subsurface. In 2000, a SWMU-specific human health and ecological risk assessment was performed to assess whether the COCs present at SWMU No. 15 posed a significant risk to human or ecological receptors. The risk assessment concluded that the detected concentrations of COCs in soil and groundwater did not pose a significant risk to human or ecological receptors.

A groundwater monitoring program was conducted at SWMU No. 15 between 2000 and 2008. The monitoring program includes six monitoring wells as points of compliance with Permit conditions. The wells were sampled for TPH jet fuel; TPH diesel range; TPH gasoline range; and BTEX compounds annually between 2000 and 2004. Beginning in 2003, PAH compounds were added as COCs. Since 2000 (2003 for PAHs), all analytical results for TPH, BTEX, and PAHs have been less than their current cleanup goals, with the single exception of a TPH exceedance in April 2004 in one groundwater point of compliance. The well associated with that point of compliance was subsequently resampled in May 2004 using the NWTPH fractionation methods for EPH and VPH, and the results were less than the cleanup goal. NWTPH analytical results have remained below Cleanup Goals during 2006 and 2008 sampling.

NFA status is proposed for SWMU No. 15. The site was remediated and characterized with the corrective action requirements, and available data indicate that TPH, BTEX, and PAHs are not present in groundwater at concentrations exceeding their respective Cleanup Goals; therefore, under current and projected future land use, unacceptable risk to human health or the environment is not present.

2.4 Module III Modification for CRDAs Requiring SWMU Assessment

The Facility has seven CRDAs requested for SWMU Assessment under Module III Section III.D of the Permit. Three of the seven units are CRDAs located on Johnston Island, (Johnston Island Primary CRDA, Swimming Pool CRDA, and the previously clean-closed RHSA Bunkers) (Figure 7). The four remaining units are CRDAs located on the outer islands of the Facility (East Island, Sand Island, and North Island) (Figure 8).

For six CRDAs discovered but not originally identified during the RFI, and one CRDA needing verification and documentation for the approved status (clean-closure of the RHSA Bunkers), the Permit provides a SWMU Assessment process, as outlined in Section III.D. This SWMU Assessment process is in accordance with what regulation allows for new releases or new evidence (not previously considered) of past releases where if a release has occurred, the unit is subject to the corrective action process as long as the RCRA permit remains in effect (EPA 2002).

Section III.D has been updated to include schedule updates from Table III.1 and the content requirements for evaluating the CRDAs under the SWMU Assessment process. Table III.2a (Newly-Identified SWMU Assessment Units) has been added to the Permit to identify any units proposed for inclusion under the SWMU Assessment process and includes all seven CRDAs.

The SWMU Assessment process will begin following the approval of this Permit in accordance with the proposed Compliance Schedule outlined in Table III.1 and Section III.D of the Permit. A SWMU Assessment Plan will be developed for the CRDAs outlining the methods and requirements for conducting the SWMU Assessment and what data are required for the SWMU Assessment Reports.

There are numerous site documents that detail the development and contents of each of the seven CRDAs; the data in these documents and forms will be collected and evaluated to determine if there is sufficient information already available to determine how to proceed for each CRDA unit.

Figure 9 provides the decision logic diagram for the CRDAs. Regardless of which path forward is determined appropriate for each of the units, a Permit modification/update will be required following the completion of the SWMU Assessments to remove them from Table III.2a, and to incorporate, as appropriate, any required CRDAs as SWMUs into the Corrective Action process.

2.4.1 SWMU Assessment Process Goal

In accordance with the documents and processes outlined in Section III.D of the Permit and Compliance Schedule (Table III.1), as well as the Figure 9 Decision Logic, the SWMU Assessment process will result in a formal decision for each of the CRDAs, as follows:

- The CRDA is excluded from being incorporated as a SWMU subject to Corrective Action in the Permit.
- The CRDA is specifically excluded from the Corrective Action Process based on the site conditions not degrading.
- The CRDA is incorporated into the Permit as a SWMU and is subject to the Corrective Action process.

This page intentionally left blank.

3. REFERENCES

CH2M HILL. 2003a. Corrective Measures Implementation Work Plan Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5, Johnston Island. December.

CH2M HILL. 2003b. Final Data Gap Investigation Report for SWMU No. 5, 19, 21, and 22, Johnston Atoll. November.

CH2M HILL. 2004a. Draft Corrective Measures Implementation Report for SWMU No. 1 and 5. August.

CH2M HILL. 2004b. Draft Corrective Measures Implementation Report, SWMU No. 2, Johnston Atoll. September.

CH2M HILL. 2004c. Draft Corrective Measures Implementation Report, SWMU No. 16 and AOC No. 1. Johnston Atoll October.

EA Engineering, Science, and Technology, Inc., PBC (EA). 2015. Final Work Plan RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites, April.

EA. 2016. Final Monitoring, Engineering Evaluation, and Maintenance Report, Resource Conservation and Recovery Act Monitored Natural Attenuation and Corrective Action at Solid Waste Management Units and Areas of Concern and Engineering Evaluation Data Collection at Johnston Atoll Airfield Sites. January.

U.S. Environmental Protection Agency (EPA). 2002. Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002. Effective May 2002.

EPA. 2003. JACADS Closure and Corrective Action Plan. EPA Permit ID # TT0-570-090-001 December.

EPA. 2004. Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002. Effective July 2004.

EPA. 2016. Notice of Approval. Re. Proposed Johnston Atoll No Further Action Statements of Basis (2015). Letter dated 26 July 2016.

EPA. 2017. The Corrective Action Process. EPA Hazardous Waste Website. Retrieved From: https://www.epa.gov/hw/learn-about-corrective-action#theprocess

OHM Remediation Services Corporation (OHM). 2000. Addendum No. 1. Draft Comprehensive Corrective Measures Study. November.

Raytheon Services Nevada. 1994a. Decision Document for No Further Action Declaration Mixed Metal Debris (MMDA) SWMU No. 6/IRP Site NO. DP10, Johnston Island, USA. September.

Raytheon Services Nevada. 1994b. Johnston Island RCRA Facility Investigation (RFI) Final Report. September.

U.S. Air Force (USAF). 1995. Draft Close Out Report. Solid Waste Burn Pit Ash Stabilization/Solidification. Johnston Island. Administration Record Number 117. November.

USAF. 2001. Environmental Baseline Survey (EBS) Final Report Parts I and II. Johnston Atoll. April.

USAF and EPA Letters, Multiple, 2016-2017. (1 March 2017). Attachment 1 "Air Force Responses to EPA (Angela Hendrichsen Sandoval) Letter dated November 2, 2016." Response to Comment table (comment 1, 2).

TABLES

This page intentionally left blank.

Table 3
Historical Groundwater Analytical Results - SWMU No. 6

		Total Lead			Dissolved Lead		
Current Cleanup Goal (µg/L)		**15**			**15**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
MMD-MW01	Jun-97	**24**	**J**	**exceedance**	NA		--
	May-98	4.0	UJ	<15	4.0	UJ	<15
	Jun-99	15	U	Nondetectable at Cleanup Goal	15	U	<15
	Jul-00	1.2	U	<15	1.2	U	<15
	Jun-01	1.7	UJ	<15	1.7	UJ	<15
	Sep-02	5.0	U	<15	5.0	U	<15
	Jul-03	9.1	F	<15	7.0	U	<15
	Apr-04	6.2	U	<15	NA		--
	Aug-06	4.6	U	<15	4.6	U	<15
	Nov-08	1.53	U	<15	1.53	U	<15
	Dec-13	Not Sampled		--	Not Sampled		--
	Apr-15	Not Sampled		--	Not Sampled		--
MMD-MW04	Jun-97	**90**	**J**	**exceedance**	NA		<15
	May-98	4.0	UJ	<15	4.0	UJ	<15
	Jun-99	3.7	J	<15	15	U	<15
	Jul-00	1.2	U	<15	1.2	U	<15
	Jun-01	1.7	UJ	<15	1.7	UJ	<15
	Sep-02	5.0	U	<15	5.0	U	<15
	Jul-03	11	F	<15	11	F	<15
	Apr-04	6.2	U	<15	NA		<15
	Aug-06	Not Sampled		--	Not Sampled		--
	Nov-08	Not Sampled		--	Not Sampled		--
MMD-MW04A	Dec-13	10	U	<15	10	U	<15
	Apr-15	6.0	U	<15	6.0	U	<15
MMD-MW05	Jun-97	**25**	**UJ**	**Nondetectable at level greater than Cleanup Goal**	NA		<15
	May-98	4.0	UJ	<15	4.0	UJ	<15
	Jun-99	2.4	J	<15	10	U	<15
	Jul-00	1.2	U	<15	1.2	U	<15
	Jun-01	1.7	UJ	<15	1.7	UJ	<15
	Sep-02	5.0	U	<15	6.0	F	<15
	Jul-03	9.3	F	<15	13	F	<15
	Apr-04	6.2	U	<15	NA		<15
	Aug-06	4.6	U	<15	4.6	U	<15
	Nov-08	1.53	U	<15	1.53	U	<15
	Dec-13	Not Sampled		--	Not Sampled		--
	Apr-15	Not Sampled		--	Not Sampled		--
MMD-MW06	Jun-97	5.0	UJ	<15	NA		<15
	May-98	2.0	UJ	<15	2.0	UJ	<15
	Jun-99	10	U	<15	10	U	<15
	Jul-00	1.2	U	<15	1.2	U	<15
	Jun-01	1.7	UJ	<15	1.7	UJ	<15
	Sep-02	6.0	F	<15	5.0	U	<15
	Jul-03	6.7	F	<15	7.9	F	<15
	Apr-04	6.2	U	<15	NA		--
	Aug-06	Not Sampled		--	Not Sampled		--
	Nov-08	1.53	U	<15	1.53	U	<15
	Dec-13	10	U	<15	10	U	<15
	Apr-15	6.0	U	<15	6.0	U	<15

Notes:

Proposed cleanup goal for total and dissolved lead is equal to 15 µg/L.

Bold and shaded values indicate concentration exceeds cleanup goal.

µg/L	microgram(s) per liter
NA	Sample not analyzed for this compound.
Q	Qualifier

Qualifiers:

F	The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J	The analyte was present, but the reported value may not be accurate or precise (estimated value).
U	The analyte was not detected at the specified detection limit.
UJ	The analyte was not detected at the specified detection limit; the detection limit is estimated.

TABLE 5

Historical Groundwater Analytical Results for TPH - SWMU No. 16/AOC No. 1

Permit Renewal Application Addendum

Petroleum Hydrocarbons									
Well	**Date Sampled**	**TPH-Diesel[1] (µg/L) Q**	**TPH-Gasoline[1] (µg/L) Q**	**Sum TPH-Diesel + TPH-Gas (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Total EPH[2] (µg/L) Q**	**Total VPH[2] (µg/L) Q**	**Sum EPH + VPH (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**
Current Cleanup Goal		**+**	**+**	**640**		**+**	**+**	**640**	
MG-MW03	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr-04	70 F	20 F	90	<640	NA	NA	--	--
	Aug-06	NA	NA	--	--	160	3.2	163	<640
	Nov-08	NA	NA	--	--	49.3	ND	49.3	<640
	Dec-13	NA	NA	--	--	<160 UJ	<74 UJ	<240 UJ	<640
	Apr-15	NA	NA	--	--	<84 UJ	49 J	49 J	<640
MG-MW03D	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr-04	51 F	26 F	77	<640	NA	NA	--	--
	Aug-06	Well not sampled			--				--
	Nov-08	NA	NA	--	--	62.6	ND	62.6	<640
	Dec-13	NA	NA	--	--	<140 UJ	<29 UJ	<170 UJ	<640
	Apr-15	NA	NA	--	--	<54 UJ	30 J	30 J	<640
MG-MW04	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr-04	98 F	13 F	111	<640	NA	NA	--	--
	Aug-06	Well not sampled			--				--
	Nov-08	Well not sampled			--				--

TABLE 5
Historical Groundwater Analytical Results for TPH - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

Petroleum Hydrocarbons									
Well	**Date Sampled**	**TPH-Diesel[1] (µg/L) Q**	**TPH-Gasoline[1] (µg/L) Q**	**Sum TPH-Diesel + TPH-Gas (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Total EPH[2] (µg/L) Q**	**Total VPH[2] (µg/L) Q**	**Sum EPH + VPH (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**
Current Cleanup Goal		**+**	**+**	**640**		**+**	**+**	**640**	
MG-MW04A	Dec-13	NA	NA	--	--	<130 UJ	<6.0 UJ	<140 UJ	<640
	Apr-15	NA	NA	--	--	<71 UJ	15 J	15 J	<640
MG-MW04D	Jun-97	NA	NA	--	--	NA	NA	--	
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr-04	49 F	24 F	73	<640	NA	NA	--	--
	Aug-06	Well not sampled			--				--
	Nov-08	Well not sampled			--				--
MG-MW04DA	Dec-13	NA	NA	--	--	<130 UJ	<6.0 UJ	<140 UJ	<640
	Apr-15	NA	NA	--	--	<64 UJ	27 J	27 J	<640
T49-MW02	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
T49-MW02A	Apr-04	359 F	201	560	<640	NA	NA	--	
	Aug-06	NA	NA	--	--	273	3.2	276	<640
	Nov-08	NA	NA	--	--	95.6	ND	95.6	<640
	Dec-13	Well not sampled			--				--
T49-MW02B	Apr-15	NA	NA	--	--	460	190 J	**650**	**exceedance**
T49MW03	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
T49-MW03A	Apr/May-04	707	286	**993**	**exceedance**	411 M	149 F	560	<640
	Aug-06	NA	NA	--	--	204	8.3	213	<640
	Nov-08	NA	NA	--	--	58.8	ND	58.8	<640
	Dec-13	Well not sampled			--				--

TABLE 5

Historical Groundwater Analytical Results for TPH - SWMU No. 16/AOC No. 1

Permit Renewal Application Addendum

Petroleum Hydrocarbons									
Well	**Date Sampled**	**TPH-Diesel[(1)] (µg/L) Q**	**TPH-Gasoline[(1)] (µg/L) Q**	**Sum TPH-Diesel + TPH-Gas (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Total EPH[(2)] (µg/L) Q**	**Total VPH[(2)] (µg/L) Q**	**Sum EPH + VPH (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**
Current Cleanup Goal		**+**	**+**	**640**		**+**	**+**	**640**	
T49-MW03B	Apr-15	NA	NA	--	--	<350 UJ	150 J	150 J	<640
T49-MW06	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr/May-04	985	433	**1,418**	**exceedance**	602	300	**902**	**exceedance**
	Aug-06	NA	NA	--	--	849 J	25.7 J	**875 J**	**exceedance**
	Nov-08	NA	NA	--	--	1,020	31.3	**1,050**	**exceedance**
	Dec-13	NA	NA	--	--	590 J	210 J	**800 J**	**exceedance**
	Apr-15	NA	NA	--	--	550 J	190 J	**640 J**	**exceedance**
T49-MW07	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr/May-04	596	122	**718**	**exceedance**	263	64	327	<640
	Aug-06	NA	NA	--	--	249	ND	249	<640
	Nov-08	NA	NA	--	--	869	5.3	**875**	**exceedance**
	Dec-13	Well not sampled			--				--
T49-MW07A	Apr-15	NA	NA	--	--	1,400	1,300 J	**2,700**	**exceedance**

TABLE 5

Historical Groundwater Analytical Results for TPH - SWMU No. 16/AOC No. 1

Permit Renewal Application Addendum

Petroleum Hydrocarbons									
Well	**Date Sampled**	**TPH-Diesel[(1)] (µg/L) Q**	**TPH-Gasoline[(1)] (µg/L) Q**	**Sum TPH-Diesel + TPH-Gas (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Total EPH[(2)] (µg/L) Q**	**Total VPH[(2)] (µg/L) Q**	**Sum EPH + VPH (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**
Current Cleanup Goal		**+**	**+**	**640**		**+**	**+**	**640**	
T49-MW11	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr-04	442 F	60 F	502	<640	NA	NA	--	--
	Aug-06	NA	NA	--	--	341	134	476	<640
	Nov-08	NA	NA	--	--	160	1.9	161	<640
	Dec-13	NA	NA	--	--	<170 UJ	<75 UJ	<250 UJ	<640
	Apr-15	NA	NA	--	--	<140 UJ	130 J	130 J	<640
T49-MW11D	Jun-97	NA	NA	--	--	NA	NA	--	--
	Jun-98	NA	NA	--	--	NA	NA	--	--
	Jun-99	NA	NA	--	--	NA	NA	--	--
	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	NA	NA	--	--	NA	NA	--	--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr-04	52 F	38 F	90	<640	NA	NA	--	--
	Aug-06	NA	NA	--	--	128 J	4.2	132 J	<640
	Nov-08	NA	NA	--	--	61.5	4.2	66	<640
	Dec-13	NA	NA	--	--	<150 UJ	<7.9 UJ	<160 UJ	<640
	Apr-15	NA	NA	--	--	<61 UJ	28 J	28 J	<640
T49-MW12	Aug-00	NA	NA	--	--	NA	NA	--	--
T49-MW12A	Apr-04	130 F	127	257	<640	NA	NA	--	--
	Aug-06	NA	NA	--	--	297	13.5	310	<640
	Nov-08	NA	NA	--	--	89.5	7.0	96.5	<640
	Dec-13	NA	NA	--	--	<180 UJ	<76 UJ	<260 UJ	<640
	Apr-15	NA	NA	--	--	<110 UJ	48 J	48 J	<640

TABLE 5

Historical Groundwater Analytical Results for TPH - SWMU No. 16/AOC No. 1

Permit Renewal Application Addendum

Petroleum Hydrocarbons									
Well	**Date Sampled**	**TPH-Diesel[1] (µg/L) Q**	**TPH-Gasoline[1] (µg/L) Q**	**Sum TPH-Diesel + TPH-Gas (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Total EPH[2] (µg/L) Q**	**Total VPH[2] (µg/L) Q**	**Sum EPH + VPH (µg/L) Q**	**Results Compared to Current Cleanup Goal (µg/L)**
Current Cleanup Goal		**+**	**+**	**640**		**+**	**+**	**640**	
T49-MW15	Aug-00	NA	NA	--	--	NA	NA	--	--
	Jun-01	NA	NA	--	--	NA	NA	--	--
	Sep-02	Well not sampled			--				--
	Jul-03	NA	NA	--	--	NA	NA	--	--
	Apr/May-04	952	328	**1,280**	**exceedance**	122	252	374	<640
	Aug-06	NA	NA	--	--	489	5.0	494	<640
	Nov-08	NA	NA	--	--	360	10.7	371	<640
	Dec-13	NA	NA	--	--	660 J	170 J	**830** J	**exceedance**
	Apr-15	NA	NA	--	--	620 J	290 J	**910** J	**exceedance**

NOTES:

[1]	Total petroleum hydrocarbons (TPH) quantified as gasoline, diesel, or jet fuel analyzed by EPA Method 8015B.
[2]	Extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) analyzed by State of Washington NWTPH fractionation method.
Bold/Shaded	Indicates concentrations exceed current cleanup goal.
+	Cleanup goal based on sum of detected TPH results.
µg/L	microgram(s) per liter
F	The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J	The analyte was present, but the reported value may not be accurate or precise (estimated value).
UJ	The analyte was not detected; however, the quantitation limit is estimated due to discrepancies in the associated quality control criteria.
NA or --	Sample not analyzed for this compound
ND	Not detected

Data Sources: OHM Corp, January 2000; CH2MHill, February 2003, CH2MHill, March 2004; CH2MHill, September 2004, January 2007, CH2MHill, 2011

Table 6
Historical Groundwater Analytical Results for PCBs - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Total PCBs as Aroclors		
Current Cleanup Goal (µg/L)		**2.0**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
MG MW03	Jul-03	ND		<2.0
	Apr-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	10	U	<2.0
	Apr-15	0.54	UJ	<2.0
MG MW03D	Jul-03	ND		<2.0
	Apr-04	ND		<2.0
	Aug-06	Well not sampled		--
	Nov-08	ND		<2.0
	Dec-13	25	U	<2.0
	Apr-15	0.48	UJ	<2.0
MG MW04	Jul-03	ND		<2.0
	Apr-04	ND		<2.0
	Aug-06	Well not sampled		--
	Nov-08	Well not sampled		--
MG-MW04A	Dec-13	9.4	U	<2.0
	Apr-15	0.47	UJ	<2.0
MG MW04D	Jul-03	ND		<2.0
	Apr-04	ND		<2.0
	Aug-06	Well not sampled		--
	Nov-08	Well not sampled		--
MG MW04DA	Dec-13	25	U	<2.0
	Apr-15	0.56	UJ	<2.0
T49-MW02A	Apr-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	0.01		<2.0
	Dec-13	Well not sampled		--
T49-MW02B	Apr-15	0.59	U	<2.0
T49-MW03A	Apr/May-04	ND		<2.0
	Aug-06	0.042	F	<2.0
	Nov-08	ND		<2.0
	Dec-13	Well not sampled		--
T49-MW03B	Apr-15	0.58	U	<2.0
T49 MW06	Jul-03	ND		<2.0
	Apr/May-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	0.50	U	<2.0
	Apr-15	0.50	UJ	<2.0
T49 MW07	Jul-03	ND		<2.0
	Apr/May-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	Well not sampled		--
T49-MW07A	Apr-15	0.58	U	<2.0

Table 6

Historical Groundwater Analytical Results for PCBs - SWMU No. 16/AOC No. 1

Permit Renewal Application Addendum

		Total PCBs as Aroclors		
Current Cleanup Goal (µg/L)		**2.0**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
T49 MW11	Jul-03	ND		<2.0
	Apr-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	0.50	U	<2.0
	Apr-15	0.53	UJ	<2.0
T49 MW11D	Jul-03	ND		<2.0
	Apr-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	1.0	U	<2.0
	Apr-15	0.56	UJ	<2.0
T49-MW12A	Apr-04	0.066	F	<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	2.5	U	<2.0
	Apr-15	0.55	UJ	<2.0
T49 MW15	Jul-03	ND		<2.0
	Apr/May-04	ND		<2.0
	Aug-06	ND		<2.0
	Nov-08	ND		<2.0
	Dec-13	10	U	<2.0
	Apr-15	0.53	UJ	<2.0

NOTES:

PCBs analyzed by EPA Method SW8082. Total Aroclors are sum of PCB-1016 through 1260.

Bold and shaded values indicates concentrations exceed current cleanup goal.

µg/L	micrograms per liter
F	The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
NA	Sample not analyzed for this compound
ND	Not detected
U	The analyte was not detected at the specified detection limit.
UJ	The analyte was not detected; however, the quantitation limit is estimated due to discrepancies in the associated quality control criteria.

Data Sources: OHM Corp, January 2000; CH2MHill, February 2003; CH2MHill, March 2004; CH2MHill, September 2004; CH2MHill, January 2007; CH2MHill, 2011; EA, 2014; and EA, 2016.

Table 7
Historical Groundwater Analytical Results for BTEX - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Benzene			Ethylbenzene			Toluene			Xylenes[1]		
Current Cleanup Goal (µg/L)		**700**			**430**			**5,000**			**10,000**		
Well	**Date Sampled**	**Benzene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Ethylbenzene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Toluene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Xylenes[1] (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
MG-MW03	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	1	U	<700	1	U	<430	1	U	<5,000	3	U	<10,000
	Aug-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.098	U	<10,000
	Sep-02	0.32	U	<700	0.28	U	<430	0.27	U	<5,000	0.28	U	<10,000
	Jul-03	0.07	U	<700	0.11	U	<430	0.10	U	<5,000	0.26	U	<10,000
	Apr-04	0.07	U	<700	0.05	U	<430	0.03	U	<5,000	0.08	U	<10,000
	Aug-06	0.07	U	<700	0.06	U	<430	0.08	U	<5,000	0.12	U	<10,000
	Nov-08	0.057	U	<700	0.060	U	<430	0.050	U	<5,000	0.100	U	<10,000
	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
MG-MW03D	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	1	U	<700	1	U	<430	1	U	<5,000	3	U	<10,000
	Aug-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.098	U	<10,000
	Sep-02	0.32	U	<700	0.28	U	<430	0.27	U	<5,000	0.28	U	<10,000
	Jul-03	0.07	U	<700	0.11	U	<430	0.10	U	<5,000	0.26	U	<10,000
	Apr-04	0.07	U	<700	0.05	U	<430	0.03	U	<5,000	0.08	U	<10,000
	Aug-06	Well not sampled		--			--			--			--
	Nov-08	0.057	U	<700	0.060	U	<430	0.050	U	<5,000	0.100	U	<10,000
	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
MG-MW04	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	1	U	<700	1	U	<430	1	U	<5,000	3	U	<10,000
	Aug-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.098	U	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.21	U	<5,000	0.40	U	<10,000
	Jul-03	0.07	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.07	U	<700	0.05	U	<430	0.03	U	<5,000	0.08	U	<10,000
	Aug-06	Well not sampled		--			--			--			--
	Nov-08	Well not sampled		--			--			--			--
MG-MW04A	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
MG-MW04D	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	1	U	<700	1	U	<430	1	U	<5,000	3	U	<10,000
	Aug-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.098	U	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.21	U	<5,000	0.50	U	<10,000
	Jul-03	0.07	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.07	U	<700	0.05	U	<430	0.03	U	<5,000	0.08	U	<10,000
	Aug-06	Well not sampled		--			--			--			--
	Nov-08	Well not sampled		--			--			--			--
MG-MW04DA	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000

Table 7
Historical Groundwater Analytical Results for BTEX - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Benzene			Ethylbenzene			Toluene			Xylenes[1]		
Current Cleanup Goal (µg/L)		**700**			**430**			**5,000**			**10,000**		
Well	**Date Sampled**	**Benzene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Ethylbenzene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Toluene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Xylenes[1] (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
T49-MW02	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	NA		--	NA		<430	NA		<5,000	NA		<10,000
	Aug-00	0.29	U	<700	0.90		<430	0.21	U	<5,000	0.50		<10,000
	Jun-01	0.043	U	<700	0.300	J	<430	0.035	U	<5,000	0.400	J	<10,000
	Sep-02	0.20	U	<700	1.03	J	<430	0.21	U	<5,000	0.24	U	<10,000
T49-MW02A	Apr-04	0.07	U	<700	0.42	U	<430	0.06	U	<5,000	0.16	U	<10,000
	Aug-06	0.07	U	<700	0.06	U	<430	0.08	U	<5,000	0.12	U	<10,000
	Nov-08	0.057	U	<700	0.06	U	<430	0.05	U	<5,000	0.1	U	<10,000
	Dec-13	Well not sampled		--			--			--			--
T49-MW02B	Apr-15	4.0	UJ	<700	4.0	UJ	<430	8.0	UJ	<5,000	12.0	UJ	<10,000
T49MW03	Jun-97	6.2		<700	120.0		<430	37.0		<5,000	1500.0		<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	0.29	U	<700	1.2		<430	0.21	U	<5,000	0.67	U	<10,000
	Aug-00	0.29	U	<700	1.2		<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.400	J	<10,000
	Sep-02	0.2	U	<700	0.2	U	<430	0.2	U	<5,000	0.2	U	<10,000
T49-MW03A	Apr/May-04	0.07	U	<700	0.49	F	<430	0.08	F	<5,000	0.21	F	<10,000
	Aug-06	0.07	U	<700	0.06	U	<430	0.08	U	<5,000	0.12	U	<10,000
	Nov-08	0.057	U	<700	0.06	U	<430	0.05	U	<5,000	0.1	U	<10,000
	Dec-13	Well not sampled		--			--			--			--
T49-MW03B	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
T49-MW06	Jun-97	7.5		<700	46.0		<430	4.7	J	<5,000	25.0		<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	4.3		<700	35		<430	1.3	UJ	<5,000	5	U	<10,000
	Aug-00	5.8		<700	54.4		<430	2.4		<5,000	1.5		<10,000
	Jun-01	2.5		<700	20.0		<430	0.5		<5,000	0.7		<10,000
	Sep-02	1.0	J	<700	18.5		<430	0.6	F	<5,000	2.1	J	<10,000
	Jul-03	2.3		<700	26.0		<430	0.9	F	<5,000	1.1		<10,000
	Apr/May-04	1.2		<700	16.0		<430	0.4	F	<5,000	0.6	F	<10,000
	Aug-06	0.27	F	<700	4.4		<430	0.15	F	<5,000	0.2	F	<10,000
	Nov-08	0.29	F	<700	7.78		<430	0.16	F	<5,000	0.45	F	<10,000
	Dec-13	0.40	U	<700	0.40	U	<430	4.00		<5,000	1.20	U	<10,000
	Apr-15	8.0	U	<700	8.0	U	<430	16.0	U	<5,000	24.0	U	<10,000
T49-MW07	Jun-97	4.5	J	<700	54.0		<430	4.7	J	<5,000	16.0		<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	1	UJ	<700	39	J	<430	1.7	J	<5,000	26	J	<10,000
	Aug-00	0.29	U	<700	1.5		<430	0.21	U	<5,000	2		<10,000
	Jun-01	0.043	UJ	<700	0.036	UJ	<430	0.035	UJ	<5,000	0.098	UJ	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.21	U	<5,000	0.24	U	<10,000
	Jul-03	0.07	U	<700	0.11	U	<430	0.10	U	<5,000	0.26	U	<10,000
	Apr/May-04	0.07	U	<700	0.05	U	<430	0.08	U	<5,000	0.36	F	<10,000
	Aug-06	0.07	U	<700	0.06	U	<430	0.08	U	<5,000	0.12	U	<10,000
	Nov-08	0.08	F	<700	0.12	F	<430	0.06	F	<5,000	0.48	F	<10,000
	Dec-13	Well not sampled		--			--			--			--
T49-MW07A	Apr-15	20	J	<700	40	J	<430	8	UJ	<5,000	12	UJ	<10,000

Table 7
Historical Groundwater Analytical Results for BTEX - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Benzene			Ethylbenzene			Toluene			Xylenes[1]		
Current Cleanup Goal (µg/L)		**700**			**430**			**5,000**			**10,000**		
Well	**Date Sampled**	**Benzene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Ethylbenzene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Toluene (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Xylenes[1] (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
T49-MW11	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	1	U	<700	1	U	<430	1	U	<5,000	0.42	J	<10,000
	Aug-00	0.29	U	<700	0.3	U	<430	0.4	J	<5,000	0.67	U	<10,000
	Jun-01	0.043	UJ	<700	0.036	UJ	<430	0.035	UJ	<5,000	0.500	J	<10,000
	Sep-02	0.32	U	<700	0.28	U	<430	0.27	U	<5,000	0.66	F	<10,000
	Jul-03	0.07	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.07	U	<700	0.05	U	<430	0.03	U	<5,000	0.08	U	<10,000
	Aug-06	0.07	UJ	<700	0.06	UJ	<430	0.08	UJ	<5,000	0.12	UJ	<10,000
	Nov-08	0.08	F	<700	0.06	U	<430	0.05	U	<5,000	0.11	F	<10,000
	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
T49-MW11D	Jun-97	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-98	5	U	<700	5	U	<430	5	U	<5,000	5	U	<10,000
	Jun-99	0.19	J	<700	1.00	U	<430	1.00	U	<5,000	3.00	U	<10,000
	Aug-00	0.29	U	<700	0.3	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	UJ	<700	0.036	UJ	<430	0.035	UJ	<5,000	0.098	UJ	<10,000
	Sep-02	0.32	U	<700	0.28	U	<430	0.27	U	<5,000	0.28	U	<10,000
	Jul-03	0.07	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.07	U	<700	0.05	U	<430	0.03	U	<5,000	0.08	U	<10,000
	Aug-06	0.07	UJ	<700	0.06	UJ	<430	0.08	UJ	<5,000	0.12	UJ	<10,000
	Nov-08	0.057	U	<700	0.06	U	<430	0.05	U	<5,000	0.1	U	<10,000
	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
T49-MW12	Aug-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
T49-MW12A	Apr-04	0.18	F	<700	0.34	F	<430	0.94	F	<5,000	1.70		<10,000
	Aug-06	0.07	U	<700	0.06	U	<430	0.08	U	<5,000	0.12	U	<10,000
	Nov-08	0.057	U	<700	0.06	U	<430	0.05	U	<5,000	0.1	U	<10,000
	Dec-13	0.40	U	<700	0.40	U	<430	0.40	U	<5,000	1.20	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12.0	U	<10,000
T49-MW15	Aug-00	0.29	U	<700	1.30		<430	0.21	U	<5,000	1.00		<10,000
	Jun-01	0.043	U	<700	0.700		<430	0.035	U	<5,000	0.800		<10,000
	Sep-02	Well not sampled		--			--			--			--
	Jul-03	0.07	U	<700	0.79	F	<430	0.29	F	<5,000	0.99	F	<10,000
	Apr/May-04	0.07	U	<700	0.55	F	<430	0.18	F	<5,000	0.81	F	<10,000
	Aug-06	0.07	U	<700	0.17	F	<430	0.09	F	<5,000	0.32	F	<10,000
	Nov-08	0.14	F	<700	0.2	F	<430	0.11	F	<5,000	0.64	F	<10,000
	Dec-13	4.0	U	<700	4.0	U	<430	4.0	U	<5,000	12.0	U	<10,000
	Apr-15	4.0	UJ	<700	4.0	UJ	<430	8.0	UJ	<5,000	12.0	UJ	<10,000

NOTES:
(1) Xylene data for 1997 through 1999 are total xylenes. Data after 1999 list the highest detected isomer (either o-xylene or m- and p-xylenes); if no isomers were detected, the highest detection limit is listed.
VOCs analyzed by EPA Method SW8021B or SW8260B
µg/L micrograms per liter
F The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J The analyte was present, but the reported value may not be accurate or precise (estimated value).
NA Sample not analyzed for this compound
U The analyte was not detected at the specified detection limit.
UJ The analyte was not detected at the specified detection limit; the detection limit is estimated.
Data Sources: OHM Corp, January 2000; CH2MHill, February 2003; CH2MHill, March 2004; CH2MHill, September 2004; CH2MHill, January 2007; CH2MHill, 2011; EA, 2014; and EA, 2016.

Table 8
Historical Groundwater Analytical Results for PAHs - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Acenaphthene			Benzo(a)pyrene			Naphthalene			Phenanthrene		
Current Cleanup Goal (µg/L)		**710**			**300**			**2,350**			**4.6**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
MG-MW03	Jun-97	18	U	<710	0.23	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-98	1.0	U	<710	0.10	U	<300	1.0	U	<2,350	1.0	U	<4.6
	Jun-99	2.0	U	<710	0.050	U	<300	1.0	U	<2,350	0.08	U	<4.6
	Aug-00	6.0	J	<710	0.20	U	<300	18	U	<2,350	2.0	J	<4.6
	Jun-01	0.14	R	<710	0.013	R	<300	0.03	R	<2,350	0.0041	R	<4.6
	Sep-02	0.06	U	<710	0.006	U	<300	0.06	U	<2,350	0.01	U	<4.6
	Jul-03	0.10		<710	0.020	U	<300	0.10		<2,350	0.020	U	<4.6
	Apr-04	0.0022	F	<710	0.0034	U	<300	0.0044	F	<2,350	0.0011	U	<4.6
	Aug-06	0.018	F	<710	0.002	F	<300	0.022	F	<2,350	0.006	F	<4.6
	Nov-08	0.004	UJ	<710	0.009	UJ	<300	0.004	UJ	<2,350	0.005	UJ	<4.6
	Dec-13	0.11	U	<710	0.10	U	<300	0.11	U	<2,350	0.11	U	<4.6
	Apr-15	0.0084	J	<710	0.017	UJ	<300	0.0097	J	<2,350	0.017	UJ	<4.6
MG-MW03D	Jun-97	18	UJ	<710	0.23	UJ	<300	18	UJ	<2,350	**6.4**	**UJ**	**Nondetectable at level greater than Cleanup Goal**
	Jun-98	1.0	U	<710	0.10	U	<300	1.0	U	<2,350	1.0	U	<4.6
	Jun-99	2.0	U	<710	0.05	U	<300	1.0	U	<2,350	0.08	U	<4.6
	Aug-00	18	U	<710	0.20	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-01	0.14	U	<710	0.013	U	<300	0.030	U	<2,350	0.0041	U	<4.6
	Sep-02	0.06	U	<710	0.014	F	<300	0.06	U	<2,350	0.01	U	<4.6
	Jul-03	0.030	U	<710	0.020	U	<300	0.100		<2,350	0.020	U	<4.6
	Apr-04	0.003	F	<710	0.0035	U	<300	0.0043	F	<2,350	0.0012	F	<4.6
	Aug-06	Well not sampled		--			--			--			--
	Nov-08	0.004	UJ	<710	0.009	UJ	<300	0.007	J	<2,350	0.005	UJ	<4.6
	Dec-13	0.11	U	<710	0.10	U	<300	0.11	U	<2,350	0.11	U	<4.6
	Apr-15	0.015	UJ	<710	0.015	UJ	<300	0.015	UJ	<2,350	0.015	UJ	<4.6
MG-MW04	Jun-97	18	U	<710	0.23	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-98	1.0	U	<710	0.10	U	<300	1.0	U	<2,350	1.0	U	<4.6
	Jun-99	4.0	U	<710	0.10	U	<300	2.0	U	<2,350	0.16	U	<4.6
	Aug-00	18	U	<710	0.20	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-01	0.14	U	<710	0.013	U	<300	0.030	U	<2,350	0.0041	U	<4.6
	Sep-02	0.06	U	<710	0.006	U	<300	0.06	U	<2,350	0.01	U	<4.6
	Jul-03	0.030	U	<710	0.020	U	<300	0.110		<2,350	0.020	U	<4.6
	Apr-04	0.0015	U	<710	0.0036	U	<300	0.0031	F	<2,350	0.0021	F	<4.6
	Aug-06	Well not sampled		--			--			--			--
	Nov-08	Well not sampled		--			--			--			--
MG-MW04A	Dec-13	0.11	U	<710	0.10	U	<300	0.11	U	<2,350	0.11	U	<4.6
	Apr-15	0.017	UJ	<710	0.017	UJ	<300	0.015	J	<2,350	0.017	UJ	<4.6
MG-MW04D	Jun-97	18	U	<710	0.23	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-98	1.0	U	<710	0.10	U	<300	1.0	U	<2,350	1.0	U	<4.6
	Jun-99	20	U	<710	0.50	U	<300	10	U	<2,350	0.80	U	<4.6
	Aug-00	18	U	<710	0.20	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-01	0.14	U	<710	0.013	U	<300	0.030	U	<2,350	0.0041	U	<4.6
	Sep-02	0.06	U	<710	0.006	U	<300	0.06	U	<2,350	0.010	U	<4.6
	Jul-03	0.030	U	<710	0.020	U	<300	0.120		<2,350	0.020	U	<4.6
	Apr-04	0.0015	U	<710	0.0037	U	<300	0.0034	F	<2,350	0.0012	U	<4.6
	Aug-06	Well not sampled		--			--			--			--
	Nov-08	Well not sampled		--			--			--			--
MG-MW04DA	Dec-13	0.11	U	<710	0.10	U	<300	0.11	U	<2,350	0.11	U	<4.6
	Apr-15	0.016	UJ	<710	0.016	UJ	<300	0.016	UJ	<2,350	0.016	UJ	<4.6

Table 8
Historical Groundwater Analytical Results for PAHs - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Acenaphthene			Benzo(a)pyrene			Naphthalene			Phenanthrene		
Current Cleanup Goal (µg/L)		**710**			**300**			**2,350**			**4.6**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
T49-MW02	Jun-97	18	U	<710	0.23	U	<300	18	U	<2,350	**35**		**exceedance**
	Jun-98	1.0	U	<710	0.10	U	<300	4.0	U	<2,350	1.0	U	<4.6
	Jun-99	NA		<710	NA		<300	NA		<2,350	NA		<4.6
	Aug-00	18	U	<710	0.20	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-01	0.140	U	<710	0.013	U	<300	0.030	U	<2,350	0.0041	U	<4.6
	Sep-02	1.42	F	<710	0.006	U	<300	0.06	U	<2,350	0.75	F	<4.6
T49-MW02A	Apr-04	1.3		<710	0.0037	U	<300	1.8		<2,350	0.60	J	<4.6
	Aug-06	0.001	U	<710	0.001	U	<300	0.008	F	<2,350	0.001	U	<4.6
	Nov-08	0.004	UJ	<710	0.009	UJ	<300	0.004	UJ	<2,350	0.005	UJ	<4.6
	Dec-13	Well not sampled		--			--			--			--
T49-MW02B	Apr-15	0.82	J	<710	0.091	UJ	<300	0.47	J	<2,350	0.15	J	<4.6
T49-MW03	Jun-97	**900**	**U**	**le at level greater than C**	12	U	<300	900	U	<2,350	**890**		**exceedance**
	Jun-98	2.0	U	<710	0.2	U	<300	2.6	U	<2,350	**5.2**		**exceedance**
	Jun-99	2.3		<710	0.0031	U	<300	0.45		<2,350	3.3		<4.6
	Aug-00	18	U	<710	0.2	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-01	0.14	U	<710	0.013	U	<300	8.0	J	<2,350	0.5	J	<4.6
	Sep-02	2.15	F	<710	0.032	U	<300	0.28	U	<2,350	**7.0**	**F**	**exceedance**
T49-MW03A	Apr/May-04	2.3		<710	0.003	U	<300	0.450		<2,350	3.3		<4.6
	Aug-06	0.155	F	<710	0.001	U	<300	0.001	U	<2,350	0.001	U	<4.6
	Nov-08	0.094	J	<710	0.009	UJ	<300	0.004	UJ	<2,350	0.005	UJ	<4.6
	Dec-13	Well not sampled		--			--			--			--
T49-MW03B	Apr-15	1.2	J	<710	0.018	UJ	<300	0.11	J	<2,350	0.038	J	<4.6
T49-MW06	Jun-97	18	U	<710	0.23	U	<300	110		<2,350	**94**		**exceedance**
	Jun-98	50	U	<710	5.0	U	<300	160		<2,350	**53**		**exceedance**
	Jun-99	200	U	<710	5.0	U	<300	150	U	<2,350	**8.0**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Aug-00	98		<710	0.20	U	<300	83		<2,350	**6.0**	**J**	**exceedance**
	Jun-01	1.4	U	<710	0.130	U	<300	130	J	<2,350	**8.0**	**J**	**exceedance**
	Sep-02	2.6	F	<710	0.032	U	<300	56.2	F	<2,350	**9.1**	**F**	**exceedance**
	Jul-03	1.6		<710	0.020	U	<300	34		<2,350	**5.2**		**exceedance**
	Apr/May-04	2.0		<710	0.0042	U	<300	46		<2,350	**6.7**		**exceedance**
	Aug-06	1.2		<710	0.001	U	<300	19		<2,350	4.2	F	<4.6
	Nov-08	2.593	J	<710	0.255	J	<300	25.7	J	<2,350	**6.36**	**J**	**exceedance**
	Dec-13	0.57		<710	0.096	U	<300	7.0		<2,350	0.094	J	<4.6
	Apr-15	0.70	J	<710	0.082	UJ	<300	11	J	<2,350	0.14	J	<4.6
T49-MW07	Jun-97	18	U	<710	0.23	U	<300	97		<2,350	**42**		**exceedance**
	Jun-98	50	U	<710	5.0	U	<300	50	U	<2,350	**50**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-99	200	U	<710	5.0	U	<300	200	U	<2,350	**100**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Aug-00	18	J	<710	0.2	U	<300	75		<2,350	1.0	J	<4.6
	Jun-01	0.14	U	<710	0.013	U	<300	64		<2,350	0.0041	U	<4.6
	Sep-02	1.86	F	<710	0.006	U	<300	21.6	J	<2,350	0.12	F	<4.6
	Jul-03	1.2		<710	0.020	U	<300	0.070	F	<2,350	0.020	U	<4.6
	Apr/May-04	1.7		<710	0.0035	U	<300	0.026	F	<2,350	0.12		<4.6
	Aug-06	0.163	F	<710	0.001	U	<300	0.034	F	<2,350	0.001	U	<4.6
	Nov-08	4.07	J	<710	0.09	UJ	<300	0.039	UJ	<2,350	0.049	UJ	<4.6
	Dec-13	Well not sampled		--			--			--			--
T49-MW07A	Apr-15	1.4	J	<710	0.095	UJ	<300	25	J	<2,350	1.7	J	<4.6

Table 8
Historical Groundwater Analytical Results for PAHs - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Acenaphthene			Benzo(a)pyrene			Naphthalene			Phenanthrene		
Current Cleanup Goal (µg/L)		**710**			**300**			**2,350**			**4.6**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
T49-MW11	Jun-97	18	UJ	<710	0.23	UJ	<300	18	UJ	<2,350	**6.4**	**UJ**	**Nondetectable at level greater than Cleanup Goal**
	Jun-98	5.0	U	<710	0.50	U	<300	5.0	U	<2,350	**5.0**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-99	6.0	U	<710	0.15		<300	3.0	U	<2,350	0.24	U	<4.6
	Aug-00	2.0	J	<710	0.20	U	<300	18	U	<2,350	0.6	J	<4.6
	Jun-01	0.14	U	<710	0.013	U	<300	13	J	<2,350	0.0041	U	<4.6
	Sep-02	1.06	F	<710	0.006	U	<300	11	F	<2,350	0.42	F	<4.6
	Jul-03	0.36		<710	0.020	U	<300	0.22		<2,350	0.020	U	<4.6
	Apr-04	0.0015	U	<710	0.0094	F	<300	0.0260	F	<2,350	0.063		<4.6
	Aug-06	0.286	J	<710	0.005	J	<300	0.165	J	<2,350	0.001	UJ	<4.6
	Nov-08	0.097	J	<710	0.009	UJ	<300	0.004	UJ	<2,350	0.005	UJ	<4.6
	Dec-13	0.11	U	<710	0.10	U	<300	0.11	U	<2,350	0.11	U	<4.6
	Apr-15	0.016	UJ	<710	0.016	UJ	<300	0.069	J	<2,350	0.016	UJ	<4.6
T49-MW11D	Jun-97	18	U	<710	0.23	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-98	1.0	UJ	<710	0.10	U	<300	1.0	U	<2,350	1.0	U	<4.6
	Jun-99	20	U	<710	0.24	J	<300	10	U	<2,350	0.8	U	<4.6
	Aug-00	18	U	<710	0.20	U	<300	18	U	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
	Jun-01	0.14	U	<710	0.013	U	<300	8.0	J	<2,350	0.0041	U	<4.6
	Sep-02	0.060	U	<710	0.008	F	<300	0.060	U	<2,350	0.010	U	<4.6
	Jul-03	0.030	U	<710	0.24	J	<300	0.16		<2,350	0.16	J	<4.6
	Apr-04	0.017	F	<710	0.033	F	<300	0.011	F	<2,350	0.074		<4.6
	Aug-06	0.005	J	<710	0.036	J	<300	0.008	J	<2,350	0.010	J	<4.6
	Nov-08	0.048	J	<710	0.053	M	<300	0.004	UJ	<2,350	0.005	UM	<4.6
	Dec-13	0.10	U	<710	0.053	J	<300	0.10	U	<2,350	0.10	U	<4.6
	Apr-15	0.0075	J	<710	0.030	J	<300	0.018	UJ	<2,350	0.0089	J	<4.6
T49-MW12	Aug-00	0.50	J	<710	0.05	J	<300	0.2	J	<2,350	**6.4**	**U**	**Nondetectable at level greater than Cleanup Goal**
T49-MW12A	Apr-04	0.38		<710	0.0048	F	<300	3.8	J	<2,350	0.057		<4.6
	Aug-06	0.019	F	<710	0.025	F	<300	0.016	F	<2,350	0.001	U	<4.6
	Nov-08	0.004	UJ	<710	0.018	J	<300	0.052	J	<2,350	0.005	UJ	<4.6
	Dec-13	0.11	U	<710	0.10	U	<300	0.11	U	<2,350	0.11	U	<4.6
	Apr-15	0.018	UJ	<710	0.018	UJ	<300	0.018	UJ	<2,350	0.018	UJ	<4.6

Table 8
Historical Groundwater Analytical Results for PAHs - SWMU No. 16/AOC No. 1
Permit Renewal Application Addendum

		Acenaphthene			Benzo(a)pyrene			Naphthalene			Phenanthrene		
Current Cleanup Goal (µg/L)		**710**			**300**			**2,350**			**4.6**		
Well	**Date Sampled**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**	**Results (µg/L)**	**Q**	**Results Compared to Current Cleanup Goal (µg/L)**
T49-MW15	Aug-00	18	U	<710	0.20	U	<300	2.0	J	<2,350	0.30	J	<4.6
	Jun-01	0.14	U	<710	0.013	U	<300	0.030	U	<2,350	0.0041	U	<4.6
	Sep-02	Well not sampled		--			--			--			--
	Jul-03	0.44		<710	0.020	U	<300	3.2		<2,350	0.020	UM	<4.6
	Apr/May-04	0.61		<710	0.020	J	<300	3.0		<2,350	0.0012	M	<4.6
	Aug-06	0.507		<710	0.023	J	<300	0.821		<2,350	0.338	J	<4.6
	Nov-08	0.085	J	<710	0.009	UJ	<300	0.265	J	<2,350	0.005	UJ	<4.6
	Dec-13	0.35	U	<710	0.10	U	<300	0.82		<2,350	0.10	U	<4.6
	Apr-15	0.87	J	<710	0.18	UJ	<300	2.0	J	<2,350	0.18	UJ	<4.6

NOTES:

PAHs analyzed by EPA Method SW8270C SIM/ selected analytes are the most commonly detected PAH compounds in these wells.

Bold	Black text and shaded values indicate the laboratory detection limit exceed the current cleanup goal.
Bold	Red text and shaded values indicate detected concentrations exceed the current cleanup goal.
µg/L	micrograms per liter
NA	Sample not analyzed for this compound
ND	Not detected
U	The analyte was not detected at the specified detection limit.
UJ	The analyte was not detected at the specified detection limit; the detection limit is estimated.
M	A matrix effect was identified in the MS/MSD sample.
UM	A matrix effect was identified in the MS/MSD sample. The recovery of the analytes not detected in the native sample are considered to have been affected by the nature of the matrix.
F	The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J	The analyte was present, but the reported value may not be accurate orprecise (estimated value).
R	The analyte was rejected for use

Data Sources: OHM Corp, January 2000; CH2MHill, February 2003; CH2MHill, March 2004; CH2MHill, September 2004; CH2MHill, January 2007; CH2MHill, 2011; EA, 2014; and EA, 2016.

Table 9
Historical Groundwater Analytical Results for BTEX - AOC Nos. 2 and 3
Permit Renewal Application Addendum

		VOCs											
		Benzene			Ethylbenzene			Toluene			Xylenes[1]		
Current Cleanup Goal (µg/L)		700			430			5,000			10,000		
Well	Date Sampled	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)
RWY-MW01	Jul-00	4.0		<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.10	U	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.21	U	<5,000	0.24	U	<10,000
	Jul-03	0.070	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.070	U	<700	0.050	U	<430	0.030	U	<5,000	0.080	U	<10,000
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	0.057	U	<700	0.060	U	<430	0.050	U	<5,000	0.10	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000
RWY-MW02	Jul-00	0.60	J	<700	0.80	J	<430	7.5		<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.10	U	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.57	F	<5,000	0.93	F	<10,000
	Jul-03	0.070	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.070	U	<700	0.050	U	<430	0.030	U	<5,000	0.080	U	<10,000
	Aug-06	0.070	U	<700	0.060	U	<430	0.080	U	<5,000	0.12	U	<10,000
	Nov-08	0.057	U	<700	0.060	U	<430	0.050	U	<5,000	0.10	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000
FW-MW03D	Jun-97	5.0	U	<700	5.0	U	<430	5.0	U	<5,000	5.0	U	<10,000
	Jun-98	5.0	U	<700	5.0	U	<430	5.0	U	<5,000	5.0	U	<10,000
	Jun-99	1.0	U	<700	1.0	U	<430	0.59	J	<5,000	0.48	J	<10,000
	Jul-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.10	U	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.21	U	<5,000	0.24	U	<10,000
	Jul-03	0.070	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.070	U	<700	0.080	F	<430	0.030	U	<5,000	0.11	F	<10,000
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	--		--	--		--	--		--	--		--
FW-MW3DA	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000
FW-MW04D	Jun-97	5.0	U	<700	5.0	U	<430	5.0	U	<5,000	5.0	U	<10,000
	Jun-98	5.0	U	<700	5.0	U	<430	5.0	U	<5,000	5.0	U	<10,000
	Jun-99	1.0	U	<700	1.0	U	<430	1.0	U	<5,000	3.0	U	<10,000
	Jul-00	0.29	U	<700	0.30	U	<430	0.21	U	<5,000	0.67	U	<10,000
	Jun-01	0.043	U	<700	0.036	U	<430	0.035	U	<5,000	0.10	U	<10,000
	Sep-02	0.20	U	<700	0.16	U	<430	0.21	U	<5,000	0.24	U	<10,000
	Jul-03	0.070	U	<700	0.12	U	<430	0.11	U	<5,000	0.25	U	<10,000
	Apr-04	0.070	U	<700	0.050	U	<430	0.030	U	<5,000	0.080	U	<10,000
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	0.057	U	<700	0.060	U	<430	0.050	U	<5,000	0.10	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000
SWM-MW05	Jun-97	5.0	U	<700	1.8	J	<430	1.2	J	<5,000	5.0	U	<10,000
	Jun-98	5.0	U	<700	5.0	U	<430	5.0	U	<5,000	5.0	U	<10,000
	Jun-99	2.0	U	<700	3.0	U	<430	1.5		<5,000	3.0	U	<10,000
	Jul-00	1.0	J	<700	1.0	J	<430	9.0		<5,000	0.67	U	<10,000
	Jun-01	0.40	J	<700	1.0		<430	0.0035	U	<5,000	0.30	J	<10,000
	Sep-02	0.20	U	<700	2.92	J	<430	0.21	U	<5,000	2.33	J	<10,000
	Jul-03	2.78		<700	3.52		<430	0.27	U	<5,000	14.2		<10,000
	Apr-04	0.070	U	<700	0.050	U	<430	0.030	U	<5,000	0.080	U	<10,000
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	--		--	--		--	--		--	--		--
SWM-MW05A	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000
SWM-MW06A	Jul-03	0.070	U	<700	0.11	U	<430	0.12	F	<5,000	0.26	U	<10,000
	Apr-04	0.070	U	<700	0.10	U	<430	0.030	U	<5,000	0.080	U	<10,000
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	0.10	F	<700	0.060	U	<430	0.050	U	<5,000	0.14	F	<10,000
SWM-MW06B	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000
SWM-MW10A	Jul-03	0.070	U	<700	0.11	U	<430	0.10	U	<5,000	0.26	U	<10,000
	Apr-04	0.070	U	<700	0.050	U	<430	0.030	U	<5,000	0.080	U	<10,000
	Aug-06	0.070	U	<700	0.060	U	<430	0.080	U	<5,000	0.12	U	<10,000
	Nov-08	0.057	U	<700	0.060	U	<430	0.050	U	<5,000	0.10	U	<10,000
	Apr-15	4.0	U	<700	4.0	U	<430	8.0	U	<5,000	12	U	<10,000

Table 9
Historical Groundwater Analytical Results for BTEX - AOC Nos. 2 and 3
Permit Renewal Application Addendum

		VOCs								
		Benzene		Ethylbenzene		Toluene		Xylenes[(1)]		
Current Cleanup Goal (µg/L)		**700**		**430**		**5,000**		**10,000**		
SWM-MW11	Jun-97	5.0 U	<700	70 J	<430	24 J	<5,000	5.0 U	<10,000
	Jun-98	3.0 J	<700	26	<430	0.34 J	<5,000	1.1 J	<10,000
	Jun-99	1.0 U	<700	6.0 U	<430	36	<5,000	3.0 U	<10,000
	Jul-00	0.29 U	<700	40.0	<430	24	<5,000	4.0 J	<10,000
	Jun-01	0.043 U	<700	25.5	<430	0.035 U	<5,000	0.50 J	<10,000
	Sep-02	0.20 U	<700	39.7 J	<430	0.21 U	<5,000	2.31 J	<10,000
	Jul-03	0.070 U	<700	88.2	<430	0.19 F	<5,000	0.25 U	<10,000
	Apr-04	0.070 U	<700	38.7	<430	0.15 F	<5,000	0.080 U	<10,000
	Aug-06	0.070 U	<700	0.060 U	<430	0.080 U	<5,000	0.12 U	<10,000
	Nov-08	0.057 U	<700	17	<430	0.10 F	<5,000	0.10 U	<10,000
	Apr-15	4.0 U	<700	15	<430	8.0 U	<5,000	12 U	<10,000
SWM-MW13	Aug-00	0.29 U	<700	1.0 J	<430	14	<5,000	0.67 U	<10,000
	Jun-01	0.043 UJ	<700	0.036 UJ	<430	0.035 UJ	<5,000	0.10 UJ	<10,000
	Sep-02	0.20 U	<700	0.16 U	<430	0.87 F	<5,000	0.24 U	<10,000
	Jul-03	0.14 U	<700	0.14 F	<430	0.11 U	<5,000	0.25 U	<10,000
	Apr-04	0.22 M	<700	0.050 U	<430	0.030 U	<5,000	0.080 U	<10,000
	Aug-06	0.070 U	<700	0.060 U	<430	0.080 U	<5,000	0.12 U	<10,000
	Nov-08	0.13 F	<700	0.060 U	<430	0.050 U	<5,000	0.10 U	<10,000
	Apr-15	4.0 U	<700	4.0 U	<430	8.0 U	<5,000	12 U	<10,000
SWM-MW20	Jul-03	0.070 U	<700	17 J	<430	0.10 U	<5,000	0.25 J	<10,000
	Apr-04	0.070 U	<700	0.47 F	<430	0.030 U	<5,000	0.16 F	<10,000
	Aug-06	0.070 U	<700	0.060 U	<430	0.080 U	<5,000	0.12 U	<10,000
	Nov-08	0.057 U	<700	0.060 U	<430	0.050 U	<5,000	0.18 F	<10,000
	Apr-15	4.0 U	<700	4.0 U	<430	8.0 U	<5,000	12 U	<10,000
SWM-MW21	Jul-03	0.070 U	<700	0.11 U	<430	0.10 U	<5,000	0.26 U	<10,000
	Apr-04	0.070 U	<700	0.050 U	<430	0.030 U	<5,000	0.08 U	<10,000
	Aug-06	0.070 U	<700	0.060 U	<430	0.080 U	<5,000	0.12 U	<10,000
	Nov-08	0.057 U	<700	0.060 U	<430	0.050 U	<5,000	0.070 F	<10,000
	Apr-15	4.0 U	<700	4.0 U	<430	8.0 U	<5,000	12 U	<10,000
SWM-MW22	Jul-03	0.070 U	<700	8.1	<430	0.13 F	<5,000	0.31 F	<10,000
	Apr-04	0.070 U	<700	0.27	<430	0.060 F	<5,000	0.25 F	<10,000
	Aug-06	0.070 U	<700	0.060 U	<430	0.080 U	<5,000	0.12 U	<10,000
	Nov-08	0.057 U	<700	0.060 U	<430	0.050 U	<5,000	0.10 U	<10,000
	Apr-15	4.0 U	<700	4.0 U	<430	8.0 U	<5,000	12 U	<10,000

Notes:
(1) Xylene data for 1997 through 2000 and 2002 and 2015 are total xylenes. Data for 2001 and 2003 through 2006 list the highest detected isomer (either o-xylene or m- and p-xylenes); if no isomers detected the highest detection limit is listed.

Shading and bold indicates concentration is greater than the current cleanup goal.

µg/L = micrograms per liter
NA = Sample not analyzed for this compound
ND = Not detected
-- = well not sampled
F - The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J - The analyte was present, but the reported value may not be accurate or precise (estimated).
U - The analyte was not detected at the specified detection limit.
UJ - The analyte was not detected at the specified detection limit; the detection limit is estimated.

Data Sources: OHM Corp., January 2000; CH2M HILL, February 2003; CH2M HILL, March 2004; CH2M HILL, September 2004; CH2M HILL, January 2007; and

Table 10
Historical Groundwater Analytical Results for PAHs - AOC Nos. 2 and 3
Permit Renewal Application Addendum

		Selected PAHs											
		Acenaphthene			Benzo(a)pyrene			Naphthalene			Phenanthrene		
Current Cleanup Goal (µg/L)		710			300			2,350			4.6		
Well	Date Sampled	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)	Results (µg/L)	Q	Results Compared to Current Cleanup Goal (µg/L)
RWY MW01	Jul-03	0.030	U	<710	0.020	U	<300	0.10		<2,350	0.020	U	<4.6
	Apr-04	0.0023	U	<710	0.0040	F	<300	0.0025	F	<2,350	0.0063	F	<4.6
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	0.0040	UJ	<710	0.0090	UJ	<300	0.016	J	<2,350	0.0050	UJ	<4.6
	Apr-15	0.019	UJ	<710	0.019	UJ	<300	0.019	UJ	<2,350	0.019	UJ	<4.6
RWY MW02	Jul-03	0.030	U	<710	0.020	U	<300	0.12		<2,350	0.020	U	<4.6
	Apr-04	0.064	F	<710	0.0038	U	<300	0.0047	F	<2,350	0.0061	F	<4.6
	Aug-06	0.039	F	<710	0.0040	F	<300	0.056	F	<2,350	0.0050	F	<4.6
	Nov-08	0.0040	UJ	<710	0.009	UJ	<300	0.0040	UJ	<2,350	0.0050	UJ	<4.6
	Apr-15	0.0067	J	<710	0.016	UJ	<300	0.060	UJ	<2,350	0.0072	J	<4.6
FW MW03D	Jul-03	0.030	U	<710	0.020	U	<300	0.22		<2,350	0.16	U	<4.6
	Apr-04	0.16		<710	0.0067	F	<300	0.014	F	<2,350	0.048	F	<4.6
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	--		--	--		--	--		--	--		--
FW MW3DA	Apr-15	0.080	UJ	<710	0.080	UJ	<300	0.11	J	<2,350	0.080	UJ	<4.6
FW MW04D	Jul-03	0.030	U	<710	0.020	U	<300	0.15		<2,350	0.020	U	<4.6
	Apr-04	0.0018		<710	0.0034	U	<300	0.0064	F	<2,350	0.0035	F	<4.6
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	0.0050	J	<710	0.11	J	<300	0.050	J	<2,350	0.038	J	<4.6
	Apr-15	0.017	UJ	<710	0.017	UJ	<300	0.017	UJ	<2,350	0.017	UJ	<4.6
SWM MW05	Jul-03	0.030	U	<710	0.020	U	<300	0.040	F	<2,350	0.020	U	<4.6
	Apr-04	0.064		<710	0.0036	U	<300	0.15		<2,350	0.0059	F	<4.6
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	--		--	--		--	--		--	--		--
SWM MW05A	Apr-15	0.012	J	<710	0.02	UJ	<300	0.02	UJ	<2,350	0.028	J	<4.6
SWM MW06A	Jul-03	0.03	U	<710	0.020	U	<300	0.17		<2,350	0.020	U	<4.6
	Apr-04	0.002	F	<710	0.0035	U	<300	0.0071	F	<2,350	0.0032	F	<4.6
	Aug-06	--		--	--		--	--		--	--		--
	Nov-08	0.023	J	<710	0.010	UJ	<300	0.086	J	<2,350	0.0050	UJ	<4.6
SWM MW06B	Apr-15	0.015	J	<710	0.017	UJ	<300	0.036	J	<2,350	0.011	J	<4.6
SWM MW10A	Jul-03	0.10		<710	0.020	U	<300	0.10		<2,350	0.020	U	<4.6
	Apr-04	0.23		<710	0.0046	F	<300	0.014	F	<2,350	0.0099	F	<4.6
	Aug-06	0.032	F	<710	0.0010	U	<300	0.008	F	<2,350	0.0010	U	<4.6

Table 10
Historical Groundwater Analytical Results for PAHs - AOC Nos. 2 and 3
Permit Renewal Application Addendum

		Selected PAHs								
		Acenaphthene			Benzo(a)pyrene			Naphthalene			Phenanthrene		
Current Cleanup Goal (µg/L)		**710**			**300**			**2,350**			**4.6**		
	Nov-08	0.020	J	<710	0.0090	UJ	<300	0.0040	UJ	<2,350	0.0050	UJ	<4.6
	Apr-15	0.046	J	<710	0.019	UJ	<300	0.045	J	<2,350	0.019	UJ	<4.6
SWM MW11	Jul-03	0.030	U	<710	0.020	U	<300	0.10		<2,350	0.13		<4.6
	Apr-04	0.079	J	<710	0.0036	U	<300	0.29	M	<2,350	0.14		<4.6
	Aug-06	0.002	F	<710	0.002	F	<300	0.005	F	<2,350	0.003	F	<4.6
	Nov-08	0.073	J	<710	0.009	UJ	<300	0.36	J	<2,350	0.046	J	<4.6
	Apr-15	0.058	J	<710	0.017	UJ	<300	0.12	J	<2,350	0.030	J	<4.6
SWM MW13	Jul-03	0.21		<710	0.070	F	<300	0.15		<2,350	0.040	F	<4.6
	Apr-04	0.45		<710	0.0033	U	<300	0.042	F	<2,350	0.030	F	<4.6
	Aug-06	0.15	F	<710	0.0010	U	<300	0.025	F	<2,350	0.0010	U	<4.6
	Nov-08	0.32	M	<710	0.0090	UM	<300	0.0040	UJ	<2,350	0.0050	UM	<4.6
	Apr-15	0.020	UJ	<710	0.020	UJ	<300	0.057	J	<2,350	0.017	J	<4.6
SWM MW20	Jul-03	0.64		<710	0.020	U	<300	7.7		<2,350	1.1		<4.6
	Apr-04	0.49		<710	0.0034	U	<300	0.78		<2,350	0.41		<4.6
	Aug-06	0.10	F	<710	0.0080	J	<300	0.12	J	<2,350	0.012	J	<4.6
	Nov-08	0.40	J	<710	0.090	UJ	<300	0.040	UJ	<2,350	0.049	UJ	<4.6
	Apr-15	0.24	J	<710	0.017	UJ	<300	0.11	J	<2,350	0.017	UJ	<4.6
SWM MW21	Jul-03	0.18		<710	0.020	UM	<300	0.10		<2,350	0.020	U	<4.6
	Apr-04	0.41		<710	0.0036	U	<300	0.022	F	<2,350	0.0248	F	<4.6
	Aug-06	0.12	F	<710	0.0010	U	<300	0.022	F	<2,350	0.0010	U	<4.6
	Nov-08	0.22	J	<710	0.0090	UJ	<300	0.0040	UJ	<2,350	0.0050	UJ	<4.6
	Apr-15	0.13	J	<710	0.018	UJ	<300	0.061	J	<2,350	0.010	J	<4.6
SWM MW22	Jul-03	0.30		<710	0.020	U	<300	6.0		<2,350	0.93		<4.6
	Apr-04	0.31		<710	0.0036	U	<300	0.12		<2,350	0.086		<4.6
	Aug-06	0.11	J	<710	0.0010	UJ	<300	0.046	J	<2,350	0.019	J	<4.6
	Nov-08	0.17	J	<710	0.092	UJ	<300	0.041	UJ	<2,350	0.050	UJ	<4.6
	Apr-15	0.014	J	<710	0.019	UJ	<300	0.088	J	<2,350	0.022	J	<4.6

Notes:
Shading and bold indicates concentration is greater than the current cleanup goal.
µg/L = micrograms per liter
NA = Sample not analyzed for this compound
PAH = polycyclic aromatic hydrocarbon
-- = well not sampled
F - The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J - The analyte was present, but the reported value may not be accurate or precise (estimated).
U - The analyte was not detected at the specified detection limit.
UJ - The analyte was not detected at the specified detection limit; the detection limit is estimated.
UM - Matrix effects were identified in the matrix spike/matrix spike duplicate samples. The recovery of the analytes not detected in the native sample are considered to have been affected by the nature of the matrix.
Data Sources: OHM Corp., January 2000; CH2M HILL, February 2003; CH2M HILL, March 2004; CH2M HILL, September 2004; CH2M HILL, January 2007; and EA, 2016.

Table 11
Historical Groundwater Analytical Results for TPH - AOC Nos. 2 and 3
Permit Renewal Application Addendum

Well	Date Sampled	Petroleum Hydrocarbons								
		TPH-Diesel Results (µg/L) Q	TPH-JP5 Results (µg/L) Q	TPH-Gas Results (µg/L) Q	Sum TPH-Gas + TPH-Diesel OR TPH-Diesel + TPH-JP5[(1)] (µg/L) Q	Results Compared to Current Cleanup Goal (µg/L)	Total EPH (µg/L) Q	Total VPH (µg/L) Q	Sum EPH + VPH (µg/L) Q	Results Compared to Current Cleanup Goal (µg/L)
Current Cleanup Goal (µg/L)		+	+	+	**640**		+	+	**640**	
RWY MW01	Jul-03	NA	130 F	NA	130	<640	NA	NA	--	--
	Apr-04	83 F	NA	93 F	176	<640	NA	NA	--	--
	Aug-06	Well not sampled	--	--	--	--	--	--	--	--
	Nov-08	NA	NA	NA	--	--	29	40	69	<640
	Apr-15	NA	NA	NA	--	--	71 UJ	130 J	130 J	<640
RWY MW02	Jul-03	270 F	200 F	NA	470	<640	NA	NA	--	--
	Apr-04	123 F	NA	936	**1,060**	**exceedance**	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	627	485	**1,110**	**exceedance**
	Nov-08	NA	NA	NA	--	--	22	436	458	<640
	Apr-15	NA	NA	NA	--	--	79 UJ	570 J	570 J	<640
FW MW03D	Jul-03	2,860	Well not sampled	NA	**4,030**	**exceedance**	NA	NA	--	--
	Apr-04	146 F	NA	72 F	218	<640	NA	NA	--	--
	Aug-06	Well not sampled	--	--	--	--	--	--	--	--
	Nov-08	Well not sampled	--	--	--	--	--	--	--	--
FW MW3DA	Apr-15	NA	NA	NA	--	--	260 UJ	83 J	83 J	<640
FW MW04D	Jul-03	NA	100 U	NA	ND	<640	NA	NA	--	--
	Apr-04	53 F	NA	18 F	71	<640	NA	NA	--	--
	Aug-06	Well not sampled	--	--	--	--	--	--	--	--
	Nov-08	NA	NA	NA	--	--	Not Analyzed for TPH			
	Apr-15	NA	NA	NA	--	--	74 UJ	30 UJ	104 UJ	<640
SWM MW05	Jul-03	420 F	620 F	NA	**1,040**	**exceedance**	NA	NA	--	--
	Apr-04	157 F	NA	267	424	<640	NA	NA	--	--
	Aug-06	Well not sampled	--	--	--	--	--	--	--	--
	Nov-08	Well not sampled	--	--	--	--	--	--	--	--
SWM MW05A	Apr-15	NA	NA	NA	--	--	94 UJ	30 UJ	124 UJ	<640
SWM MW06A	Jul-03	360 F	250 J	NA	610	<640	NA	NA	--	--
	Apr-04	129 F	NA	70 F	199	<640	NA	NA	--	--
	Aug-06	Well not sampled	--	--	--	--	--	--	--	--
	Nov-08	NA	NA	NA	--	--	9	520	529	<640
SWM MW06B	Apr-15	NA	NA	NA	--	--	110 UJ	300 UJ	410 UJ	<640
SWM MW10A	Jul-03	310 F	290 J	NA	600	<640	NA	NA	--	--
	Apr-04	91 F	NA	121	212	<640	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	812	4.0 F	**816**	**exceedance**
	Nov-08	NA	NA	NA	--	--	38	7.1	45	<640
	Apr-15	NA	NA	NA	--	--	110 UJ	61 J	61 J	<640
SWM MW11	Jul-03	160 F	220 F	NA	380	<640	NA	NA	--	--
	Apr-04	103 F	NA	2,480	**2,583**	**exceedance**	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	103	40	143	<640
	Nov-08	NA	NA	NA	--	--	313	934	**1,247**	**exceedance**
	Apr-15	NA	NA	NA	--	--	550	890 J	**1,440**	**exceedance**
SWM MW13	Jul-03	440 F	300 F	NA	**740**	**exceedance**	NA	NA	--	--
	Apr-04	217 F	NA	1,580	**1,797**	**exceedance**	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	139	239	378	<640
	Nov-08	NA	NA	NA	--	--	76	660	**736**	**exceedance**
	Apr-15	NA	NA	NA	--	--	180 UJ	690 J	**690 J**	**exceedance**

Table 11
Historical Groundwater Analytical Results for TPH - AOC Nos. 2 and 3
Permit Renewal Application Addendum

Well	Date Sampled	Petroleum Hydrocarbons								
		TPH-Diesel Results (µg/L) Q	TPH-JP5 Results (µg/L) Q	TPH-Gas Results (µg/L) Q	Sum TPH-Gas + TPH-Diesel OR TPH-Diesel + TPH-JP5[(1)] (µg/L) Q	Results Compared to Current Cleanup Goal (µg/L)	Total EPH (µg/L) Q	Total VPH (µg/L) Q	Sum EPH + VPH (µg/L) Q	Results Compared to Current Cleanup Goal (µg/L)
Current Cleanup Goal (µg/L)		+	+	+	**640**		+	+	**640**	
SWM MW20	Jul-03	1,610	1,000 M	NA	**2,610**	**exceedance**	NA	NA	--	--
	Apr-04	316 F	NA	639	**955**	**exceedance**	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	351 J	22	373 J	<640
	Nov-08	NA	NA	NA	--	--	326	182	508	<640
	Apr-15	NA	NA	NA	--	--	380	290 J	**670**	**exceedance**
SWM MW21	Jul-03	540 F	280 J	NA	**820**	**exceedance**	NA	NA	--	--
	Apr-04	317 F	NA	923	**1,240**	**exceedance**	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	256	260	516	<640
	Nov-08	NA	NA	NA	--	--	127	631	**758**	**exceedance**
	Apr-15	NA	NA	NA	--	--	160 UJ	1,100 J	**1,100 J**	**exceedance**
SWM MW22	Jul-03	1,100	790 J	NA	**1,890**	**exceedance**	NA	NA	--	--
	Apr-04	314 F	NA	962	**1,280**	**exceedance**	NA	NA	--	--
	Aug-06	NA	NA	NA	--	--	288	428	**715**	**exceedance**
	Nov-08	NA	NA	NA	--	--	121	376	497	<640
	Apr-15	NA	NA	NA	--	--	220 UJ	600 J	600 J	<640

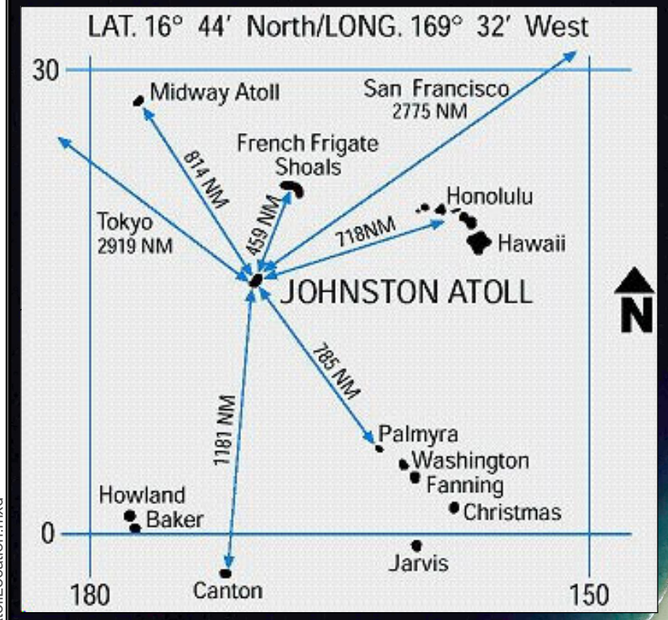
Notes:
(1) In 2003, samples were analyzed for TPH-JP5, but TPH-Diesel was reported for some samples. Sum of TPH-JP5 and TPH-Diesel shown for 2003 only. 2004 data are sum of TPH-Diesel and TPH-

Shading and bold indicates concentration is greater than the current cleanup goal.
+ = cleanup goal based on sum of detected TPH results
EPH = Extractable petroleum hydrocarbons
µg/L = micrograms per liter
NA = Sample not analyzed for this compound
ND = Not detected
TPH = total petroleum hydrocarbons
VPH = Volatile petroleum hydrocarbons

F - The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.
J - The analyte was present, but the reported value may not be accurate or precise (estimated).
U - The analyte was not detected at the specified detection limit.
UJ - The analyte was not detected at the specified detection limit; the detection limit is estimated.
Data Sources: OHM Corp., January 2000; CH2M HILL, February 2003; CH2M HILL, March 2004; CH2M HILL, September 2004; CH2M HILL, January 2007.

FIGURES

This page intentionally left blank.



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Data Sources
Insert Map: Pacific Airfields http://www.ww2aircraft.net
Primary Map: © Digital Worldview 2, March 2018.

1 inch equals 1,800 feet
(11x17 print-out)

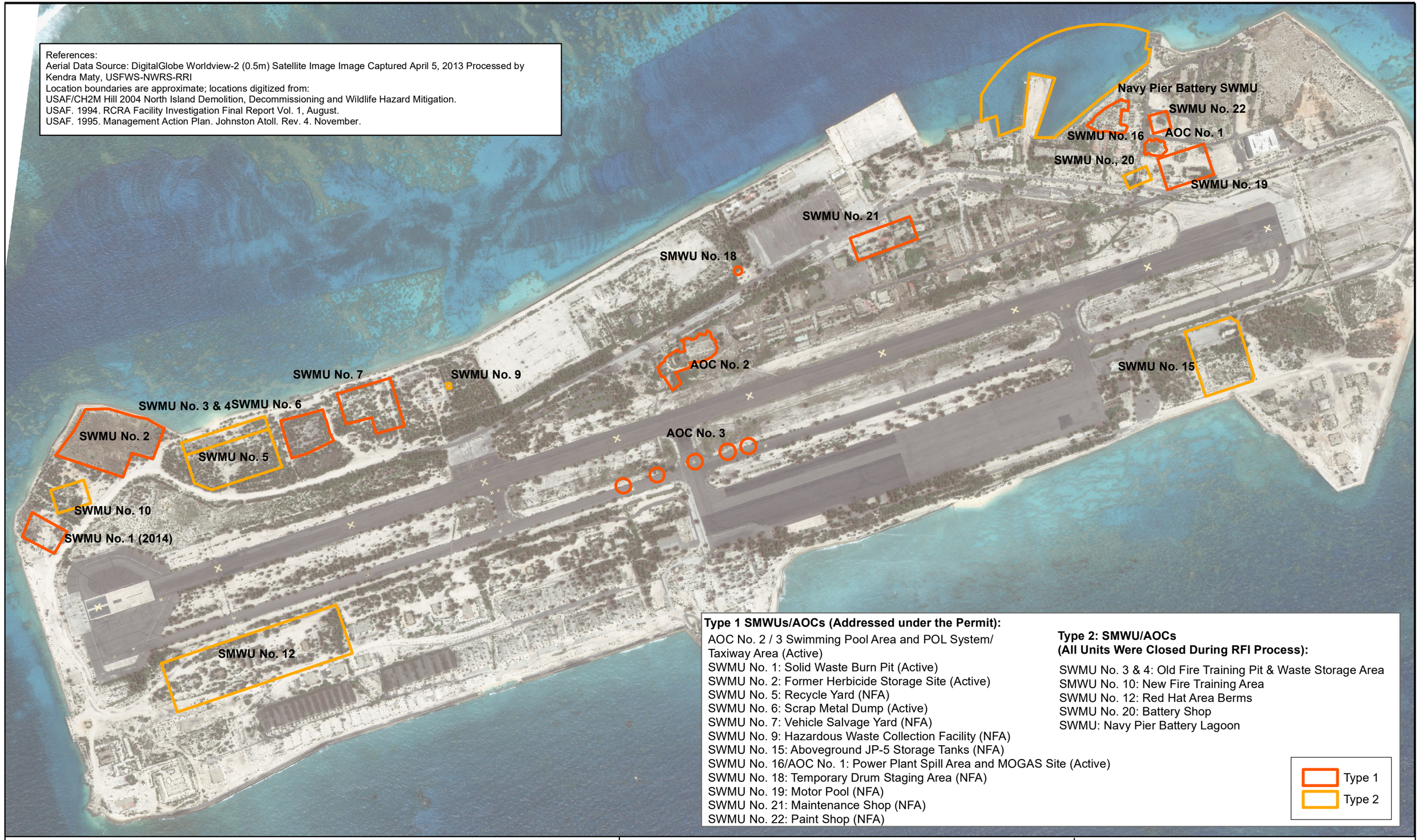
0 1,000 2,000 4,000 Feet

HAZARDOUS WASTE CORRECTIVE ACTION
PERMIT RENEWAL APPLICATION ADDENDUM
FOR JOHNSTON ATOLL FACILITY
EPA ID TT9 570 090 002

Figure 1
Johnston Atoll Location

enewberry Path: C:\Users\enewberry\Desktop\2018 Permit\GIS FILEs\Permit Ren EXPORT\mxd\Figure1 AtollLocation.mxd

References:
Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image Image Captured April 5, 2013 Processed by Kendra Maty, USFWS-NWRS-RRI
Location boundaries are approximate; locations digitized from:
USAF/CH2M Hill 2004 North Island Demolition, Decommissioning and Wildlife Hazard Mitigation.
USAF. 1994. RCRA Facility Investigation Final Report Vol. 1, August.
USAF. 1995. Management Action Plan. Johnston Atoll. Rev. 4. November.



Type 1 SMWUs/AOCs (Addressed under the Permit):

AOC No. 2 / 3 Swimming Pool Area and POL System/ Taxiway Area (Active)
SWMU No. 1: Solid Waste Burn Pit (Active)
SWMU No. 2: Former Herbicide Storage Site (Active)
SWMU No. 5: Recycle Yard (NFA)
SWMU No. 6: Scrap Metal Dump (Active)
SWMU No. 7: Vehicle Salvage Yard (NFA)
SWMU No. 9: Hazardous Waste Collection Facility (NFA)
SWMU No. 15: Aboveground JP-5 Storage Tanks (NFA)
SWMU No. 16/AOC No. 1: Power Plant Spill Area and MOGAS Site (Active)
SWMU No. 18: Temporary Drum Staging Area (NFA)
SWMU No. 19: Motor Pool (NFA)
SWMU No. 21: Maintenance Shop (NFA)
SWMU No. 22: Paint Shop (NFA)

Type 2: SMWU/AOCs
(All Units Were Closed During RFI Process):

SWMU No. 3 & 4: Old Fire Training Pit & Waste Storage Area
SMWU No. 10: New Fire Training Area
SWMU No. 12: Red Hat Area Berms
SWMU No. 20: Battery Shop
SWMU: Navy Pier Battery Lagoon

Type 1
Type 2

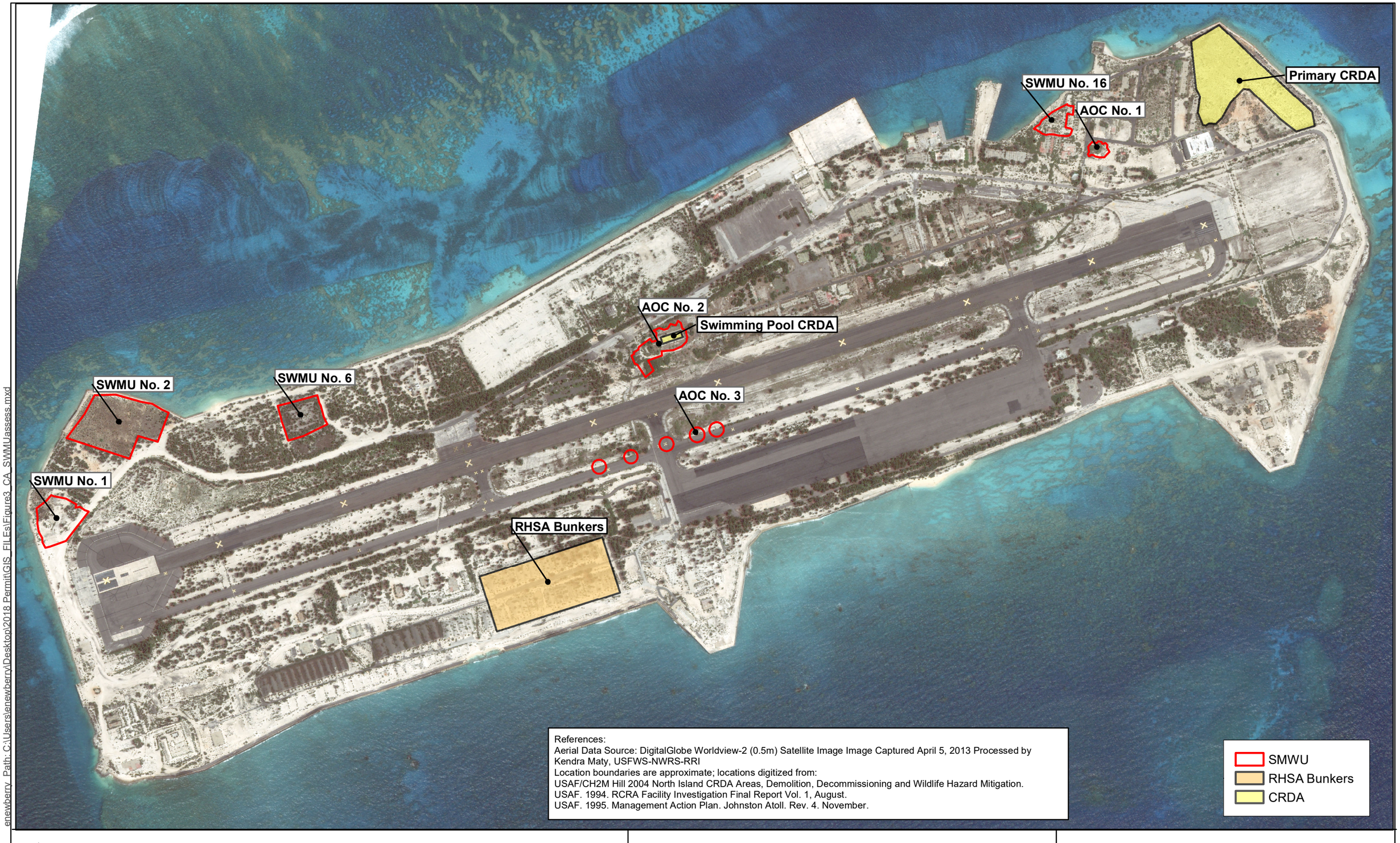
N

AOC: Area of Concern
CAP: Corrective Action Plan
MOGAS: motor gasoline
NFA: No Further Action
RCRA: Resource Conservation and Recovery Act

250 500 1,000 Feet

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ISLAND FACILITY EPA ID TT9 570 090 002

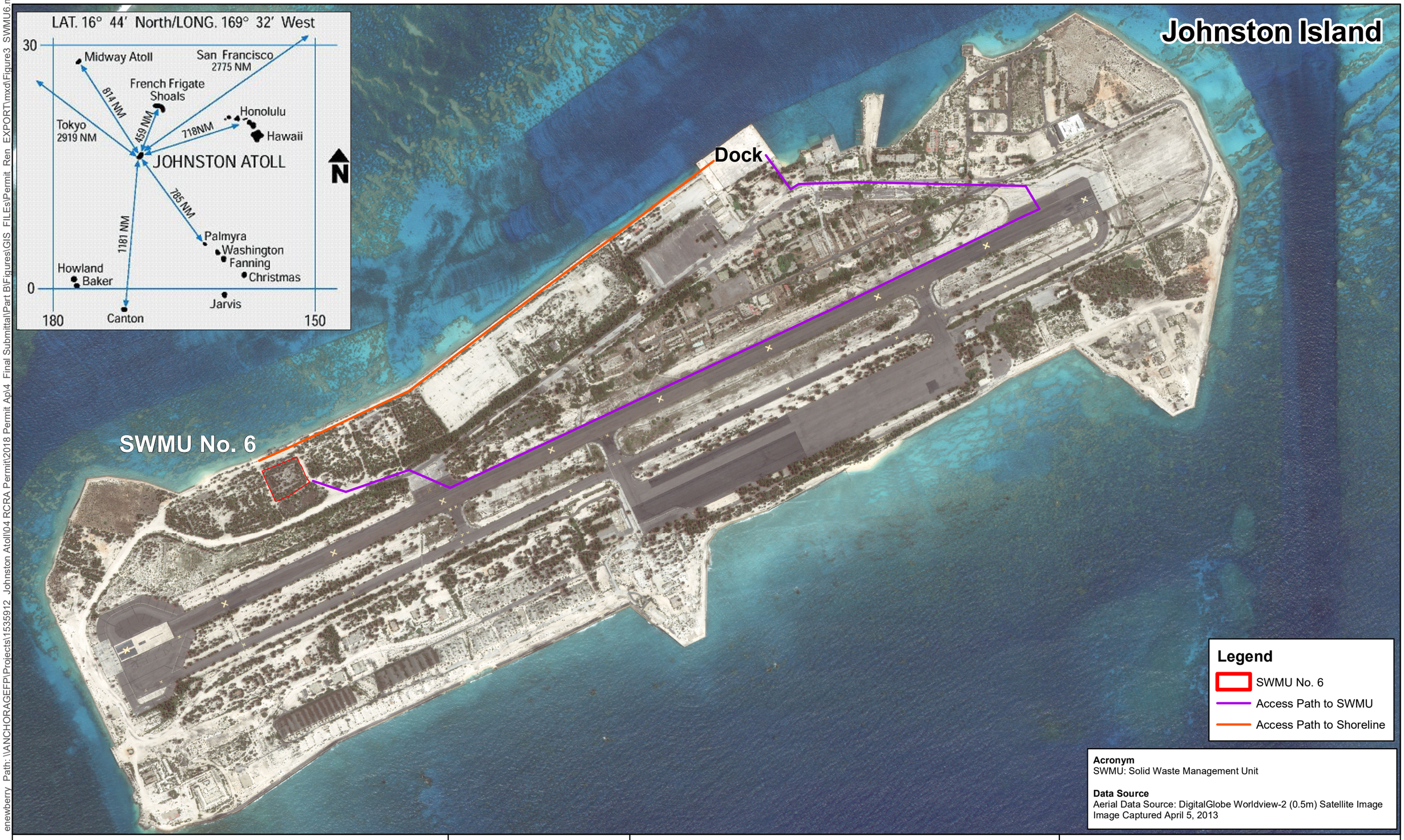
Figure 2
Active and Closed SMWU and AOC Locations at Johnston Island



enewberry Path: C:\Users\enewberry\Desktop\2018 Permit\GIS_FILEs\Figure3_CA_SWMUassess.mxd

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ATOLL FACILITY EPA ID TT9 570 090 002

Figure 3
Sites Under Corrective Action or SWMU Assessment



HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ATOLL FACILITY EPA ID TT9 570 090 002

Figure 4
SWMU No. 6 Location

1 inch equals 125 feet
(11x17 print-out)

N

0 100 200 400 Feet

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ATOLL FACILITY EPA ID TT9 570 090 002

Figure 5
SWMU No. 16/AOC No. 1 Locations

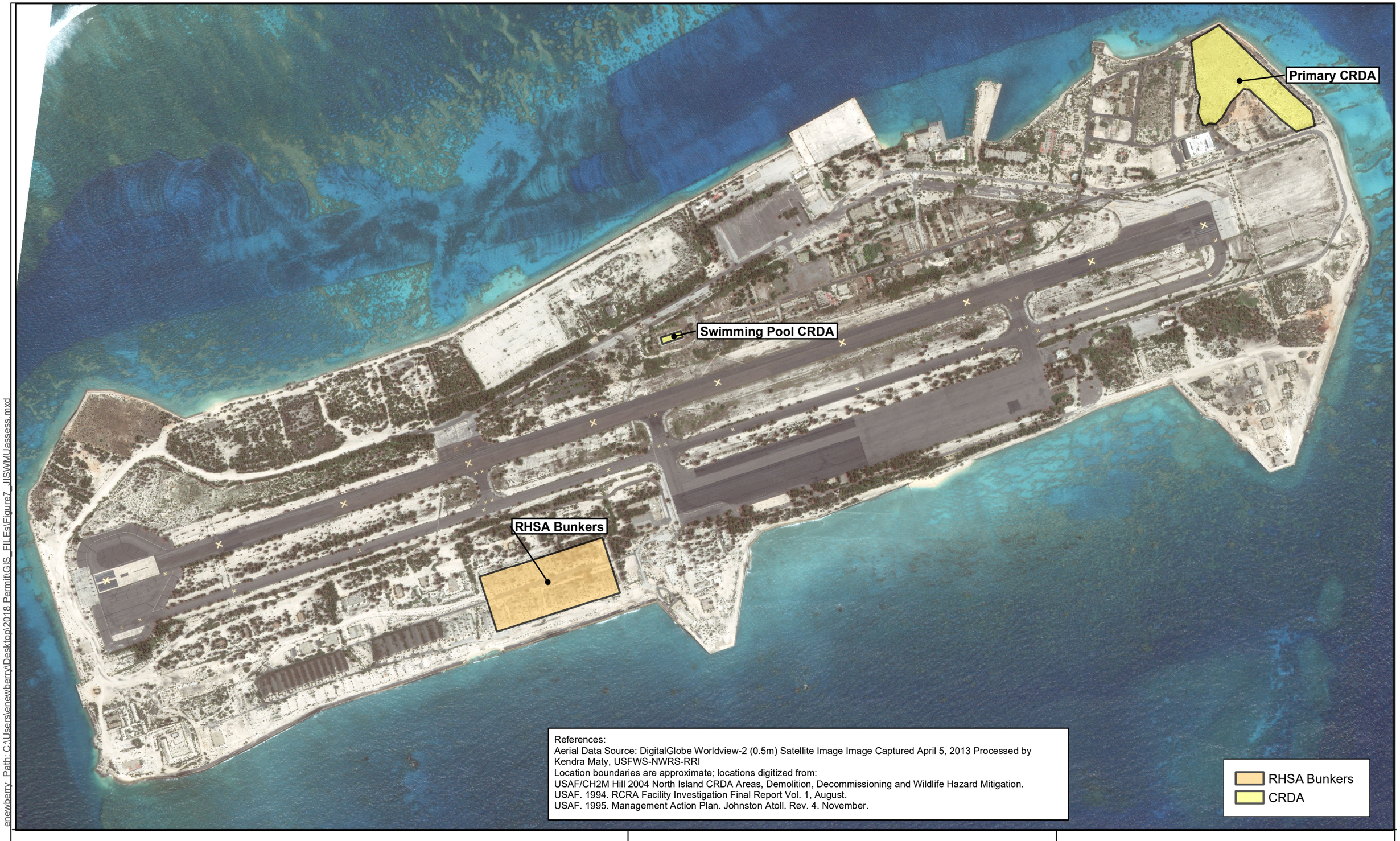
N

1 inch equals 200 feet
(11x17 print-out)

0 100 200 400 Feet

HAZARDOUS WASTE CORRECTIVE ACTION
PERMIT RENEWAL APPLICATION ADDENDUM
FOR JOHNSTON ATOLL FACILITY
EPA ID TT9 570 090 002

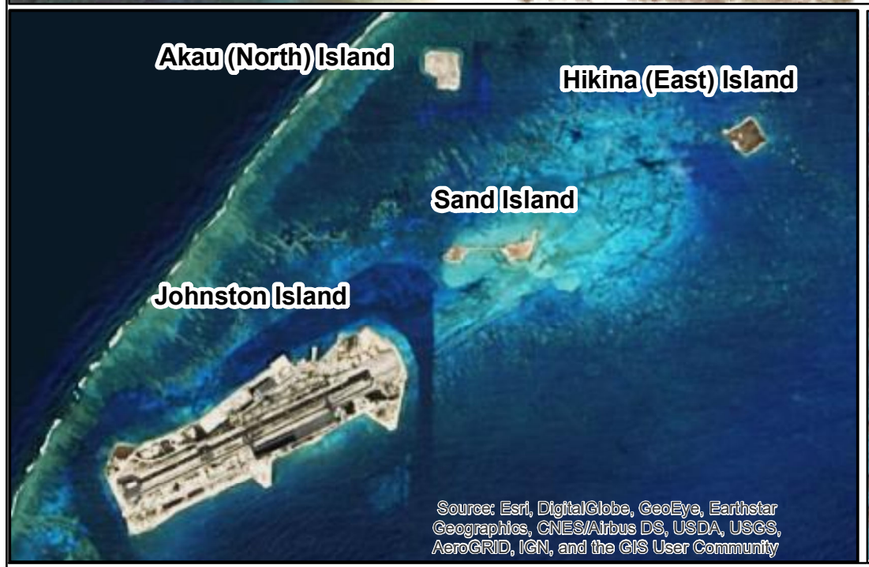
Figure 6
AOC Nos. 2 and 3 Locations



enewberry Path: C:\Users\enewberry\Desktop\2018 Permit\GIS_FILEs\Figure7_JISWMUassess.mxd

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ATOLL FACILITY EPA ID TT9 570 090 002

Figure 7
Johnston Island SWMU Assessment Locations



Legend

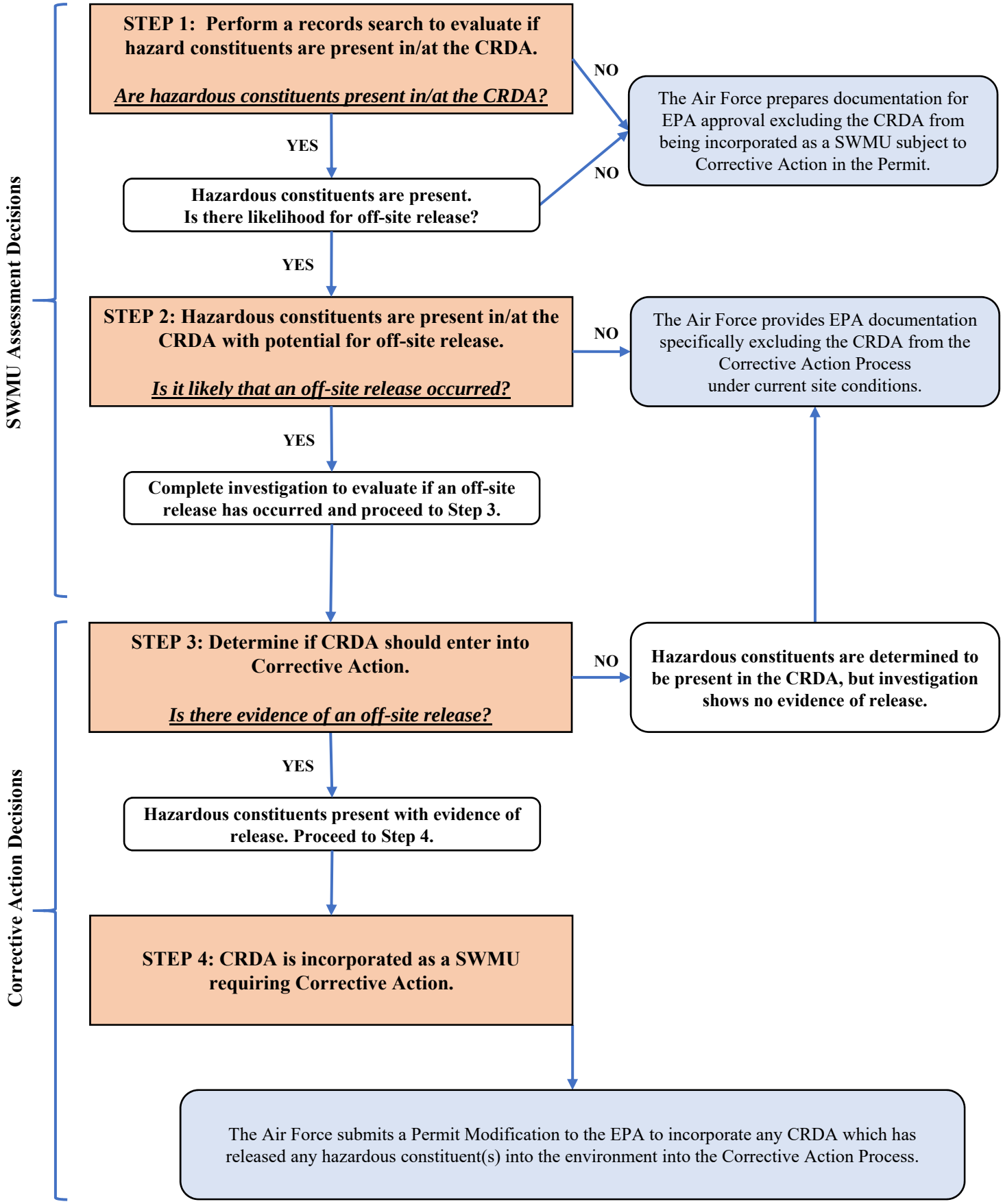
Construction Rubble Debris Area(s) (CRDA)

N

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL APPLICATION ADDENDUM FOR JOHNSTON ATOLL FACILITY EPA ID TT9 570 090 002

Figure 8
Outer Island SWMU Assessment Locations

FIGURE 9: DECISION LOGIC DIAGRAM FOR CRDA UNITS



APPENDICES

APPENDIX A

Corrective Action Permit Modules I, II, and III (“redline changes” and “as proposed”)

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL
APPENDIX A

"RED LINE CHANGES" OF MODIFICATIONS TO
MODULES I, II, and III OF THE
HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
EPA ID TT9 570 090 002
FOR JOHNSTON ATOLL FACILITY

PERMIT MODIFICATION PROPOSAL

July 2018

This page intentionally left blank

FINAL

APPENDIX A

"RED LINE CHANGES" OF MODIFICATIONS TO
MODULES I, II, and III OF THE
HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
EPA ID TT9 570 090 002
FOR JOHNSTON ATOLL FACILITY

PERMIT MODIFICATION PROPOSAL

This page intentionally left blank

MODULE I

GENERAL PERMIT CONDITIONS

I.A. EFFECT OF PERMIT

The Permittee is allowed to conduct corrective actions of Solid Waste Management Units (SWMU) and Areas of Concern (AOC) in accordance with the conditions of this Permit. Compliance with this Permit generally constitutes compliance, for purposes of enforcement, with Subtitle C of Resource Conservation and Recovery Act (RCRA) and with Hazardous and Solid Waste Amendments (HSWA). Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property or any invasion of other private rights. Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under Sections 3008(a), 3008(h), 3013, or 7003 of RCRA; Section 106(a), 104, or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9606(a), commonly known as CERCLA), or any other law providing for protection of public health or the environment. [40 Code of Federal Regulations (CFR) 270.4, 270.30]

I.B. PERMIT ACTIONS

I.B.1. Permit Modification, Revocation and Reissuance, and Termination

This Permit may be modified, revoked and reissued, or terminated for cause, as specified in 40 CFR 270.41, 270.42, and 270.43. The filing of a request for a Permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee, does not stay the applicability or enforceability of any Permit condition. Completion of corrective actions and subsequent Permit termination procedures are specified in Permit Condition III.O. [40 CFR 270.4(a) and 270.30(f)]

I.B.2. Permit Conditions

Pursuant to Section 3005(c)(3) of RCRA, 40 CFR Parts 260 through 270, and 40 CFR 270.32(b), this Permit contains conditions necessary to protect public health and the environment.

I.C. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby, as provided by 40 CFR 124.16(a).

I.D. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meaning as those in 40 CFR Parts 124, 260, 264, 266, 268, and 270, unless this Permit specifically provides otherwise; where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

I.D.1. *Division Director* means the Division Director of the Waste Management Division, EPA Region IX, or his designee or authorized representative.

I.D.2. The *Permit* consists of Modules I through III plus the application. If any portion of the application conflicts with permit conditions in this permit, the permit conditions will take precedence over the application.

I.E. DUTIES AND REQUIREMENTS

I.E.1. Duty to Comply

The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency Permit. Any Permit noncompliance, other than noncompliance authorized by an emergency Permit, constitutes a violation of RCRA and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a Permit renewal application. [40 CFR 270.30(a)]

I.E.2. Duty to Reapply

If the Permittee wishes to continue an activity allowed by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for a new Permit at least 180 days prior to Permit expiration. [40 CFR 270.l0(h), 270.30(b)]

I.E.3. Permit Expiration

Pursuant to 40 CFR 270.50, this Permit shall be effective for a fixed term not to exceed ten years. As long as EPA is the Permit-issuing authority, this Permit and all conditions herein will remain in effect beyond the Permit's expiration date, if the Permittee has submitted a timely, complete application (see 40 CFR 270.10, 270.13 through 270.29) and, through no fault of the Permittee, the Division Director has not issued a new Permit, as set forth in 40 CFR 270.51.

I.E.4. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee, in an enforcement action that it would have been necessary, to halt or reduce the Permitted activity in

order to maintain compliance with the conditions of this Permit. [40 CFR 270.30(c)]

I.E.5. Duty to Mitigate

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable, to prevent significant adverse impacts on human health or the environment. [40 CFR 270.30(d)]

I.E.6. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit. [40 CFR 270.30(e)]

I.E.7. Duty to Provide Information

The Permittee shall furnish to the Division Director, within a reasonable time, any relevant information which the Division Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Division Director, upon request, copies of records required to be kept by this Permit. [40 CFR 264.74(a), 270.30(h)]

I.E.8. Inspection and Entry

Pursuant to 40 CFR 270.30(i), the Permittee shall allow the Division Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

I.E.8.a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;

I.E.8.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;

I.E.8.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

I.E.8.d. Sample or monitor, at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA, any substances or parameters at any location.

I.E.9. Monitoring and Records

I.E.9.a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample to be analyzed must be the appropriate method from Appendix I of 40 CFR Part 261 or an equivalent method approved by the Division Director. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846, Standard Methods of Wastewater Analysis, or an equivalent method. [40 CFR 270.30(j)(l)]

I.E.9.b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, the certification required by 40 CFR 264.73(b)(9), and records of all data used to complete the application for this Permit for a period of at least ten years from the date of the sample, measurement, report, record, certification, or application. These periods may be extended by request of the Division Director at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility. [40 CFR 264.74(b) and 270.30(j)(2)]

Deleted: info1mation

I.E.9.c. The Permittee must retain all notices, certifications, demonstrations, waste analysis data, and other documentation produced pursuant to 40 CFR 268.7 for at least ten years from the date that the waste is subject to such documentation. Records on LDR waste must be maintained on-site for 10 years or until the facility is closed. [40 CFR 268.7(a)(6)] The Permittee shall maintain records for all ground water monitoring wells and associated ground water surface elevations for the full duration of the permit.

i. The data must be immediately available for review by authorized inspector personnel; and

ii. A hardcopy of the data shall be made available for review on-site by authorized inspection personnel within 24 hours of the request being made.

I.E.9.d. Pursuant to 40 CFR 270.30(j)(3), records of monitoring information shall specify:

i. The dates, exact place, and times of sampling or measurements;

ii. The individuals who performed the sampling or measurements;

iii. The dates analyses were performed;

iv. The individuals who performed the analyses;

v. The analytical techniques or methods used; and

vi. The results of such analyses.

I.E.10. Reporting Planned Changes

The Permittee shall give notice to the Division Director, as soon as possible, of any planned physical alterations or additions to the Permitted facility. [40 CFR 270.30(1)(1)]

I.E.11. Reporting Anticipated Noncompliance

The Permittee shall give advance notice to the Division Director of any planned changes in the Permitted facility or activity which may result in noncompliance with Permit requirements. [40 CFR 270.30(1)(2)]

I.E.12. Certification of Addition, Construction or Modification

The Permittee may not commence treatment of hazardous waste that is part of a corrective action of hazardous waste at the facility until:

:

I.E.12.a. The Permittee has submitted to the Division Director, a modification to Module III of the Permit; and,

I.E.12.b. i. The Division Director has inspected the new treatment unit and finds it is in compliance with the conditions of the Permit; or

Deleted: The Permittee may not commence thermal treatment of hazardous waste that is part of a corrective action of hazardous waste at the facility until

Deleted: The Permittee has submitted to the Division Director, by certified mail or hand delivery, a letter signed by the Permittee and a registered professional engineer stating that the new treatment unit will be capable of operating in compliance with the Permit and

Deleted: ¶

ii. The Division Director has either waived the inspection, or has not within 15 days of receipt of the Permittee's letter required by paragraph I.E.12.2, notified the Permittee of his intent to inspect. [40 CFR 270.30(1)(2)]; or

iii. The Division Director has notified the Permittee in writing that the treatment unit can be operated to treat hazardous waste contaminated soils and groundwater.

Deleted: thermal

I.E.13. Transfer of Permits

This Permit is not transferable to any person, except after notice to the Division Director. The Division Director may require modification or revocation and reissuance of the Permit pursuant to 40 CFR 270.40. Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 CFR Parts 264 and 270 of this Permit. [40 CFR 270.30(1)(3), 264.12(c)]

I.E.14. Twenty-Four Hour Reporting

I.E.14.a. The Permittee shall report to the Division Director any noncompliance which may endanger health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The report shall include the following:

i. Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies.

ii. A description of the occurrence and its causes.

iii. Any information of a release or discharge of hazardous waste or of a fire or explosion from the facility which could threaten the environment or human health outside the facility.

iv. Any release (1) of any hazardous waste if the released quantity exceeds 100 kilograms, or (2) of any material which becomes a hazardous waste, or (3) of any amount of hazardous waste where there is a potential for endangerment of human health or the environment.

I.E.14.b. The description of occurrence and its cause shall include:

i. Name, address, and telephone number of the owner or operator;

ii. Name, address, and telephone number of the facility;

iii. Date, time, and type of incident;

iv. Name and quantity of materials involved;

v. The extent of injuries, if any;

vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and

vii. Estimated quantity and disposition of recovered material that resulted from the incident.

I.E.14.c. The Permittee shall submit in writing any noncompliance within five days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period(s) of noncompliance (including exact dates and times); whether the noncompliance has been corrected; and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Division Director may waive the five-day written notice requirement in favor of a written report within 15 days. [40 CFR 270.30(1)(6)]

I.E.15. Compliance Schedule

The Permittee shall notify the EPA of reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Permit no later than 14 days following each schedule date.

I.E.16. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise required to be reported above in Permit Conditions I.E.10 through 15, at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Condition I.E.14. [40 CFR 270.30(1)(10)]

I.E.16. Other Information

Whenever the Permittee becomes aware that it failed to submit any relevant facts in the Permit application, or submitted incorrect information in a Permit application or in any report to the Division Director, the Permittee shall promptly submit such facts or information. [40 CFR 270.30(1)(11)]

I.F. SIGNATORY REQUIREMENT

All applications, reports, or information submitted to or requested by the Division Director, his designee, or authorized representative, shall be signed and certified in accordance with 40 CFR 270.11 and 270.30(k).

I.G. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DIVISION DIRECTOR

All reports, ·notifications, or other submissions which are required by this Permit to be sent or given to the Division Director or his designated representative should be sent by certified mail or given to:

Jeff Scott, Director
Waste Management Division
United States Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California, 94105
(415) 972-3311

I.H. CONFIDENTIAL INFORMATION

In accordance with 40 CFR 270.12, the Permittee may claim confidential any information required to be submitted by this Permit.

I.I. DOCUMENTS TO BE SUBMITTED PRIOR TO OPERATION OF A NEW UNIT

As needed, the Permittee shall submit for approval addendums to the original Corrective Measures Implementation (CMI) Plan to the Division Director by the dates shown in Table III.1. The CMI Plan shall include at a minimum the following: (1) Engineering plans and specifications, (2) a waste analysis plan (describing the waste stream(s) to be treated), (3) Performance Test Plan, Quality Assurance Project Plan (QAPP), (5) security requirements, (6) inspection schedule, (7) personnel training documents and records, (8) contingency plan, (9) operating records, (10) staging pile standards and design criteria and (11) a closure plan for the treatment unit. The Permittee may elect to submit any or all of the aforementioned components as stand-alone documents providing that each document is clearly labeled as a component of the overall CMI Plan.

Deleted: thermal

I.J. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The type and nature of this Facility does not allow for the Permitee to maintain documents on-site. The Permittee shall maintain records of the CMI Plan and all amendments, revisions and modifications to these documents off-site.

Deleted: The Permittee shall maintain at the facility, until closure is completed and certified by an independent, registered professional engineer, the CMI Plan and all amendments, revisions and modifications to these documents.¶

MODULE II

GENERAL FACILITY CONDITIONS

II.A. DESIGN AND OPERATION OF FACILITY

The Permittee shall construct, maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned, sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment, as required by 40 CFR 264.31.

II.B. WASTE RESTRICTIONS AND SPECIAL PROVISIONS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

II.B.1. The Permittee shall treat only those wastes approved by the Division Director.

II.B.2. The Permittee shall not receive any imported waste from off-site for treatment or storage.

II.C. GENERAL WASTE ANALYSIS

II.C.1. The Permittee shall follow the waste analysis procedures required by 40 CFR 264.13.

II.C.2. The Permittee shall verify the analysis of each waste stream annually as part of its quality assurance program, in accordance with Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA Publication SW-846, or equivalent methods approved by the Regional Administrator. At a minimum, the Permittee shall maintain proper functional instruments, use approved sampling and analytical methods, verify the validity of sampling and analytical procedures, and perform correct calculations. If the Permittee uses a contract laboratory to perform analyses, then the Permittee shall inform the laboratory in writing that it must operate under the waste analysis conditions set forth in this Permit.

II.D. SECURITY

The Permittee shall comply with the security provisions of 40 CFR 264.14(b).

II.E. GENERAL INSPECTION REQUIREMENTS

The Permittee shall remedy any deterioration or malfunction discovered by an inspection, as required by 40 CFR 264.15(c). Records of inspection shall be kept, as required by 40 CFR 264.15(d).

Deleted: This Page Intentionally Left Blank.¶

Deleted: listed in

Deleted: CMI Plan.

Deleted: , as described in the Waste Analysis Plan, which will be provided as part of the CMI Plan

Deleted: Compliance with security provisions will be described in the CMI Plan.

Deleted: The Permittee shall follow the inspection schedule set out in the CMI Plan.

II.F. PERSONNEL TRAINING

The Permittee shall ensure that contracted personnel and other site-workers have adequate training and supervision, as required by 40 CFR 264.16. The Permittee shall ensure that any contracted entities maintain all training documents and records for all site-workers while working at the remote Facility, and copies will be maintained off-site by the Facility Permit Contact indicated on EPA OMB Form 2050-0024, as required by 40 CFR 264.16(d) and (e).

Deleted: The Permittee shall conduct personnel training, as required by 40 CFR 264.16. This training program shall follow the outline provided in the CMI Plan. The Permittee shall maintain training documents and records, as required by 40 CFR 264.16(d) and (e).¶

II.G. SPECIAL PROVISIONS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

Deleted: INCOMPATICLE

The Permittee comply with the requirements of 40 CFR 264.17(a).

Deleted: The Permittee shall follow the procedures for handling ignitable, reactive, and incompatible wastes set forth in the CMI Plan.

II.H. LOCATION STANDARDS

II.H.1. The Permittee comply with all other applicable federal laws set forth in 40 CFR 270.3. The Permittee shall also comply with the requirements set forth in the Endangered Species Act of 1973 et.seq., 16 USC 1531 through 1543, the Migratory Bird Treaty Act et.seq., 16 USC 703 through 712 (or 50 CFR 10), the Marine Mammal Protection Act of 1972 et.seq., 16 USC 1361, EO 13089 Coral Reef Protection, Magnuson-Stevens Fishery Conservation and Management Act et.seq., 16 USC 1901 et.seq, and the National Wildlife Refuge Administration Act (16 USC 668dd-ee) and other federal laws as applicable.

Deleted: listed in Section 3.0 of the application

II.H.2. Johnston Island is not in a 100-year floodplain. A study of possible causes of island flooding was done in support of the Johnston Atoll Chemical Agent Disposal System (JACADS) RCRA Part B permit application in 1984.

Deleted: Additional information is included in Section 2.2 of the application.

II.I. PREPAREDNESS AND PREVENTION

The type and nature of this Facility (described in II. J), does not allow for the Permitee to be able to meet the outlined components or requirements listed in 40 CFR 264.32 and 40 CFR 264.34.

Deleted: At a minimum, the Permittee shall maintain at the facility the equipment set forth in the Contingency Plan, as required by 40 CFR 264.32 and 40 CFR 264.34 and provided in the CMI Plan.

II.J. CONTINGENCY PLAN

The Permit is for the continuation of corrective actions at Air Force SWMUs and AOCs only, with no on-site infrastructure or personnel located at the Facility. The Permit is not for hazardous waste treatment, storage, or disposal operations and thus the requirements outlined in 40 CFR 264.53 and 264.54 are not able to be implemented for the protection of human health or the environment.

For the protection of human health and the environment, site-specific contingency planning will be performed for applicable units under corrective action as shown in Section II.J.1.

II.J.1. Specific Contingency Requirements

Deleted: Implementation of Plan

Table II.1 Remote Monitoring and Response for SWMU No. 6

Applicable Unit	Scenario	Site Condition	Remote Monitoring Frequency	Response Required by the Air Force
SWMU No. 6 Mixed Metal Debris Area (Scrap Metal Dump) and Stabilized Solid Waste Incinerator Ash Disposal Area	1	Shoreline Erosion, No Release	Quarterly	Inspect and maintain every 5 years
	2	Inland Erosion, No Release	Once every 2 months	Inspect and stabilize during next scheduled visit
	3	Cap requires maintenance, No Release (geotextile fabric intact)	Monthly	Perform required maintenance next scheduled visit
	4	Shoreline is up to concrete rubble area and cap requires maintenance, Potential Release (geotextile fabric not intact)	Monthly	Perform required maintenance next scheduled visit
	5	Shoreline at concrete rubble area, No Release	Monthly	Program maintenance, stabilization, or removal
	6	Catastrophic Release	Monthly	Immediate USAF response including deployment of personnel. Program maintenance, stabilization, or removal.

Deleted: ¶

II.K. RECORDKEEPING AND REPORTING

Specifically meeting the requirements indicated in 40 CFR 264.73 is not possible because of the lack of infrastructure and staffing at the Facility. The Permittee instead shall ensure that any records for the Facility are maintained off-site by the Facility Permit Contact indicated on EPA OMB Form 2050-0024;

Deleted: The shall immediately carry out the provisions of the Contingency Plan, as provided in the CMI Plan, whenever there is a fire, explosion, or release of hazardous waste or constituents which could threaten human health or the environment. The Permittee shall comply with the requirements of 40 CFR 264.53, 264.54 and 264.55.¶
II.J.2. - The names, addresses, and phone numbers of all persons qualified to act as emergency coordinators shall be supplied to the Division Director at the time of certification. [40 CFR 264.52(d)].¶

II.K.1. Operating Record

Deleted: In addition to the recordkeeping and reporting requirements specified elsewhere in this Permit, the Permittee shall do the following

Deleted: J

Deleted: at

The Permittee shall maintain a written operating record for the facility, in accordance with 40 CFR 264.73, except that records will be maintained off-site.

II.K.2. Imagery Record

The Permittee shall maintain a record of any and all remote monitoring imagery collected for SWMU No. 6 for all efforts conducted in accordance with Section II.J.1 Table II.1 monitoring. Records will be maintained off-site for three (3) years.

II.L. PERFORMANCE TESTING REQUIREMENTS

Not Applicable.

II.M. PERFORMANCE STANDARDS

Not Applicable.

II.N. REQUIREMENTS PRIOR TO RESTART

Not Applicable.

II.O. GENERAL CLOSURE REQUIREMENT

II.O.1. The Permittee shall close the facility, as required by 40 CFR 264.111.

Deleted: II.L.1. The Permittee shall submit a Performance Test Plan to EPA for approval prior to startup of the thermal treatment unit. The Test Plan must include a detailed description of the thermal treatment unit along with engineering plans and specifications. The Test Plan must also include a description of the performance test objectives, including operational parameters that the Permittee wants to demonstrate during the test. The primary objective of the performance test will be to confirm whether the unit is meeting Performance standards specified in Permit condition II.N.¶
II.L.2. The Permittee shall conduct a Performance Test on the thermal treatment unit in accordance with the Performance Test Plan approved by the Division Director.¶
II.L.3. The Permittee may thermally treat hazardous waste not to exceed 720 operational hours during the shakedown (or pre-test) period. The Permittee may modify the test plan based on the results of the shakedown to adjust operational parameters. [40 CFR 63.1206(b)(5)(i)(C)(l)]¶
II.L.4. The Permittee may increase or modify operating conditions and limitations on waste feed as specified in the Performance Test Plan only during the approved shakedown period and the period of time in which the Test is being conducted. ¶
II.L.5. After the Performance Test, in accordance with 40 CFR 270.62(b)(7), the Permittee shall submit to the Division Director a certification that the Performance Test has been carried out in accordance with the approved Performance Test Plan, together with a Performance Test Report containing the results of the determinations made during the test. The Performance Test Report shall contain a signed statement by the Permittee's QA/QC coordinator delineating any differences between the QA/QC objectives required by the Performance Test Plan and the results actually achieved. The Certification and Performance Test Report shall be submitted within 90 days of the completion of the Performance Test. The Performance Test Report shall also document the following:¶
II.L.5.a. adherence to the Quality Assurance Project Plan, and¶
II.L.5.b. approved modifications or Memorandums of Record made to a Performance Test Plan after the test has been initiated.¶
II.L.6. If preliminary calculation results from the Performance Test show that one or more of the performance standards listed in Table 2-1 for a thermal treatment unit were not met during the Performance Test, the Permittee shall verbally notify the Division Director within 24 hours of this discovery. Based on this notification and any ...

Deleted: The Permittee shall maintain the thermal treatment unit so that when operated as described in the CMI Plan and the Permit Conditions of this module the thermal treatment unit will meet the following performance standards. The following performance standards shall be met when processing permitted hazardous wastes.¶
II.M.1. The unit shall not discharge or cause combustion gasses to be emitted into the atmosphere that contain in excess of the following: ¶
Table 2-1¶
CONSTITUENT ...

Deleted: Before first feeding hazardous waste into the thermal treatment unit which was not in operation or was out of service due to Preventive Maintenance, extensive repair, transfer from non-hazardous to hazardous waste feed or similar event, the Permittee shall calibrate the temperature, CO and 02 monitors in accordance with the CMI Plan and check all alarms and alarm systems for proper operation.¶

Deleted: and in the CMI Plan

MODULE III

CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS

III.A. DEFINITIONS

For the purposes of this Corrective Action Module, the following definitions shall apply:

"Division Director" means the Director of the Waste Management Division U.S. Environmental Protection Agency, Region 9.

"Facility" means the four islands that comprise Johnston Atoll and all property contiguous thereto under the control of the owner or operator seeking a Permit under Subtitle C of the RCRA; except for the areas associated with EPA ID No. TT0 570 090 001 which were subject to a separate hazardous waste permit.

"Release" means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of hazardous wastes (including hazardous constituents) into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous wastes or hazardous constituents).

"Site" has the same meaning as "Facility".

"Soil" shall include surface and subsurface soil unless otherwise specified.

"Solid Waste Management Units (SWMU)" means any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the facility in which solid wastes have been routinely and systematically released.

"Subsurface Soil" means soil greater than 2 feet below ground surface (bgs).

"Surface Soil" means soil from the ground surface to a depth of 2 feet bgs.

"Hazardous waste" means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. The term hazardous waste includes hazardous constituents as defined below.

"Hazardous constituent" means any constituent identified in Appendix VIII of the Code of Federal Regulations, Title 40 (40 CFR), Part 261, or any constituent at concentrations identified in Appendix IX of 40 CFR Part 264.

Deleted: .

"RCRA Facility Assessment (RFA)" means the investigation culminating in the RFA Final Report dated May 1990. This report identifies several SWMUs on Johnston Atoll and recommends further corrective action for some.

"RCRA Facility Investigation (RFI)" means the investigation culminating in the RCRA Facility Investigation Final Report dated September 1994 including revised pages dated 10 May 1995.

"Corrective Measures Study (CMS)" means the investigation and analysis culminating in the Comprehensive Corrective Measures Study (CCMS) dated January 2000 and the Draft Corrective Measures Study for the former Herbicide Orange Storage Area dated April 2000 and Addendum No. 1 to the Draft CCMS dated November 2000.

III.B. STANDARD CONDITIONS

III.B.1. Section 3004(u) of RCRA, as amended by the HSWA, and 40 CFR Part 264.101 require that Permits issued after November 8, 1984, address corrective action for releases of hazardous wastes including hazardous constituents from any SWMU at the facility, regardless of when the waste was placed in the unit.

III.B.2. Failure to submit the information required in Table III.1, or falsification of any submitted information, is ground for termination of this Permit (40 CFR Part 270.43). The Permittee shall ensure that all plans, reports, notifications, and other submissions to the Division Director required in Table III.1 are signed and certified in accordance with 40 CFR Part 270.11. Two copies of these plans, reports, notifications or other submissions shall be submitted to the Division Director by certified mail or hand delivered at the following address:

Jeff Scott, Director
Waste Management Division
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California, 94105

In addition, one copy of these documents must be mailed to the U.S. Department of the Interior, Fish and Wildlife Service at the following address:

U.S. Department of the Interior
Fish and Wildlife Service
Pacific Remote Islands Marine National Monument
P.O. Box 50167, Rm 5-231
Honolulu, Hawaii, 96850
Attention: Laura Beauregard, Superintendent
Lee Ann Woodward, Resource Contaminants Specialist

III.B.3. All plans and schedules required by the conditions of Table III.1 are, upon approval of the Division Director, incorporated into this Corrective Action

Module by reference and become an enforceable part of this Permit. Any noncompliance with such approved plans and schedules shall be termed noncompliance with this Permit

III.B.4. All requests for extensions to due dates for submittals must be made in writing to the Division Director at least one week in advance of the due date for the subject submittal. The request for extension should explain the circumstances requiring additional time and request a specific revised due date. Extensions of the due dates for submittals may be granted or denied by the Division Director.

III.B.5. If the Division Director determines that further actions beyond those provided in this Corrective Action Module, or changes to that which is stated herein, are warranted, the Division Director shall modify the Corrective Action Module either according to procedures of this Permit, or according to the Permit modification process under 40 CFR Part 270.41.

III.B.6. All raw data, such as laboratory reports, drilling logs, bench-scale or pilot-scale data, and other supporting information gathered or generated during activities undertaken at the facility (or other location approved by the Division Director) during the term of this Permit, including any reissued Permits.

Table III.1 Corrective Action Schedule of Compliance

Facility Requirement	Record/ Schedule
Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Workplan	February 1993 (Administrative Record File Number 35) [b]
RFI Workplan Addendums	Negotiated with the Division Director [a]
RFI Final Report and Summary Report	September 1994 (Administrative Record File Number 58-61) [b]
RFI Final Report Addendums	Negotiated with the Division Director [a]
Comprehensive Corrective Measures Study with Addendums	Several previous CCMS documents are available in Administrative Record Files [b]
Corrective Measures Study (CMS) Plan	Several previous CMS Plans are available in Administrative Record Files [b]
Corrective Measures Study (CMS) Plan Addendums	Negotiated with the Division Director [a]
Corrective Measures Implementation (CMI)	Several previous CMIs conducted are available in Administrative Record Files[b]; Additional CMIs, as needed, and as approved by the Division Director[a]
CMI Report (also called Corrective Measures Completion Reports)	Several previous CMI Reports submitted and available in Administrative Record Files[b]; Negotiated with the Division Director following completion of scheduled corrective measures implementation at the site[a]
Corrective Measures Implementation (CMI) Addendums	As approved by the Division Director [a]

Deleted: Due Date

Deleted: Biomonitoring Plan

Facility Requirement	Record/ Schedule
Work Plan(s) Related to Monitoring and Management-Based Performance Criteria	Several previous Work Plans submitted for on-site field activities and Corrective Actions are available in Administrative Record Files[b]. These include Monitored Natural Recovery Plans, Groundwater Monitoring Plan, and Biomonitoring Plans. Updated, or additional Work Plans are required for submittal as needed and as approved by the Division Director, and will be specific to the activities planned during the field efforts[a]
Contingency Planning: Remote Monitoring (Site-specific SWMU No. 6).	[a] Quarterly remote monitoring unless site conditions change from Scenario 1 (as defined in Table II.1); then as defined in Table II.1. Maintain all remote monitoring imagery records for three (3) years.
Progress Reports	As needed during years without on-site field activities, or as negotiated with the Division Director when implementing corrective action field operations [a]
Written notification of newly-identified Solid Waste Management Units (SWMU)	Within 30 calendar days after discovery [a]
Newly-Identified SWMU Assessment Plan	Within 90 calendar days after receipt of request for plan, or as approved by the Division Director [a]
Implementation of Newly-Identified SWMU Assessment Plan	Within 30 calendar days after written approval of plan, or as approved by the Division Director [a]
Newly-Identified SWMU Assessment Report	Within 90 calendar days from completion of plan implementation, or as approved by the Division Director[a]
Further investigations for newly-identified SWMU	Negotiated with the Division Director [a]
Written notification of newly-discovered release(s) at SWMU(s)	No later than 30 calendar days after discovery [a]
EPA Requirement	**Review Schedule**
Review and approve RFI Workplan	Completed February 1993 (Administrative Record File Number 35) [b]
Review and approve RFI Report	Completed September 1994 (Administrative Record File Number 58-61) [b]
Review and approve or disapprove CMS Plan(s) and Report(s)	Within 60 calendar days of receipt [a]
Review and approve or disapprove CMI Plan(s) and Report(s)	Within 60 calendar days of receipt [a]
Review and approve or disapprove Work Plan(s) and Report(s)	Within 60 calendar days of receipt [a]
Review and approve or disapprove SWMU Assessment Plan(s) and Report(s)	Within 60 calendar days of receipt [a]

[a] - Ongoing or as needed
[b] - Completed

III.C. REPORTING REQUIRMENTS

III.C.1. The Permittee shall submit to the Division Director a signed progress report on all activities (i.e., SWMU Assessment, Interim Measures, RCRA Facility Investigations, Corrective Measures Study, Corrective Measures

Deleted: Due Date
Deleted: Groundwater Monitoring Plan
Deleted: Several previous Groundwater Monitoring Plans submitted are available in Administrative Record Files[b]. Additional Groundwater Monitoring Plans required for submittal as needed and as approved by the Division Director[a].
Deleted: -
Deleted: more frequently
Deleted: Quarterly
Deleted: Quarterly [a]
Deleted: No later than 30
Deleted: [a]
Deleted: Resource Conservation
Deleted: Recovery Act (RCRA) Facility Investigation (
Deleted:)
Deleted: On or before 90 calendar days from the effective date of the Permit [b]
Deleted: RFI Workplan Implementation ...
Deleted: Summary
Deleted: Within 60 calendar days after completion of RFI Workplan implementation [b]
Deleted: Corrective Measures Study (CMS) Plan ...
Deleted: RFI Workplan
Deleted: [ab]
Deleted: RFI
Deleted: [ab]
Deleted: CMS
Deleted: [ab]
Deleted: CMI
Deleted: [ab]
Deleted: Initiate termination of Permit ...
Deleted: quarterly

Implementation) conducted pursuant to the provisions of this Corrective Action Module. If the Division Director determines that these progress reports are not adding value to the Corrective Action process, the Division Director may reduce or eliminate the reporting requirement. These reports shall contain:

a) A description of work completed;

b) Summaries of all findings, including summaries of laboratory data;

c) Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems; and

d) Projected work for the next reporting period.

III.C.2. Copies of other reports (e.g., inspection reports), drilling logs and laboratory data shall be made available to the Division Director upon request.

III.C.3. The Division Director may require the Permittee to conduct new or more extensive assessments, investigations, or studies, as needed, based on information provided in these progress reports or other supporting information.

III.D. NOTIFICATION REQUIREMENTS FOR AND ASSESSMENT OF NEWLY-IDENTIFIED SOLID WASTE MANAGEMENT UNIT(S)

III.D.1. The Permittee shall notify the Division Director in writing of any newly-identified SWMU(s) (i.e., a unit not specifically identified during the RFA) discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, no later than 30 calendar days after discovery.

III.D.2. After such notification, the Division Director may request, in writing, that the Permittee prepare a SWMU Assessment Plan and a proposed schedule of implementation and completion of the Plan for any additional SWMU(s) discovered subsequent to the issuance of this Permit.

III.D.3. Within 90 calendar days after receipt of the Division Director's request for a SWMU Assessment Plan, or as otherwise allowed by the Division Director, the Permittee shall prepare a SWMU Assessment Plan for determining past and present operations at the unit, as well as any sampling and analysis of groundwater, land surface and subsurface strata, surface water, or air, as necessary to determine whether a release of hazardous waste including hazardous constituents from such unit(s) has occurred, is likely to have occurred, or is likely to occur. The SWMU Assessment Plan must demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative samples, and must include parameters sufficient to identify migration of hazardous

Deleted: , beginning no later than ninety (90) calendar days after the Permittee is first required to begin implementation of any requirement herein.

waste including hazardous constituents from the newly-discovered SWMU(s) to the environment.

III.D.4. After the Permittee submits the SWMU Assessment Plan, the Division Director shall either approve or disapprove the Plan in writing.

If the Division Director approves the Plan, the Permittee shall begin to implement the Plan within 30 calendar days of receiving such written notification, or as otherwise allowed by the Division Director.

If the Division Director disapproves the Plan, the Division Director shall either (1) notify the Permittee in writing of the Plan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the Plan and notify the Permittee of the revisions. This Division Director-revised Plan becomes the approved SWMU Assessment Plan. The Permittee shall implement the Plan within 30 calendar days of receiving written approval, or as otherwise allowed by the Division Director.

III.D.5. The Permittee shall submit a SWMU Assessment Report to the Division Director within 90 calendar days from completion of the work specified in the approved SWMU Assessment Plan, or as otherwise allowed by the Division Director. The SWMU Assessment Report shall describe all results obtained from the implementation of the approved SWMU Assessment Plan. At a minimum, the Report shall provide the following information for each newly-identified SWMU:

a) The location of the newly-identified SWMU in relation to other SWMUs;

b) The type and function of the unit;

c) The general dimensions, capacities, and structural description of the unit (supply any available drawings);

d) The period during which the unit was operated;

e) The specifics on all wastes that have been or are being managed at the SWMU, to the extent available; and

f) The results of any sampling and analysis required for the purpose of determining whether releases of hazardous wastes including hazardous constituents have occurred, are occurring, or are likely to occur from the unit.

III.D.6. Based on the results of the SWMU Assessment Report, the Division Director shall determine the pathway for the specific unit(s) covered in the SWMU Assessment:

Deleted: no later than 30

Deleted: this

Deleted: need

Deleted: further investigations at

Deleted: .

a) If the Division Director determines that the SWMU Assessment Report indicates that further investigations are needed to determine an appropriate path, the Division Director may require the Permittee to prepare a Workplan for such investigations. SWMU Assessment Plans will be reviewed for approval as described under Permit Condition III.F.3.

Deleted: such

Deleted: plan

Deleted: This plan

Deleted: part of the RFI Workplan

b) If the Division Director determines that the SWMU Assessment Report provides that the unit is a SWMU subject to the required Corrective Action Investigation process, the Permit will be modified to identify the unit in table III.2a and the Division Director will provide, in writing, that the unit will be subject to all applicable authorities under the RCRA Hazardous Waste Corrective Action (HWCA) Program.

c) If the Division Director determines that the SWMU Assessment Report provides that no further investigation is needed, the Division Director will provide, in writing, that the unit will not be subject to the authorities under the RCRA HWCA Program with or without contingencies.

III.D.7. Newly-identified units being assessed for inclusion to the corrective action program will be evaluated in accordance with III.D and are identified in Table III.2a:

Table III.2a Newly-Identified SWMU Assessment Units

Unit	Description
Red Hat Storage Area Bunkers CRDA (Johnston Island)	Bunkers are located on the southwest part of the island. Available records need to be reviewed. Previously clean-closed under EPA ID TT9 570 090 001.
Primary CRDA (Johnston Island)	Approximately 8.0 acres in the northeast corner of the island.
Swimming Pool CRDA (Johnston Island)	Approximately 0.2 acres in the center of the island.
East Island CRDA (Hikina Island)	Approximately 0.1 acres in the center west part of the island.
Sand Island CRDA	Approximately 0.1 acres on the western lobe of the island.
North Island CRDA (Northern)	Approximately 0.1 acres in the center part of the island.
North Island CRDA (Southern)	Approximately 0.3 acres in the southcentral part of the island.

III.E. NOTIFICATION REQUIREMENTS FOR NEWLY-DISCOVERED RELEASES AT SWMUs

The Permittee shall notify the Division Director, in writing, of any release(s) of hazardous waste including hazardous constituents discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other activities

undertaken after the commencement of the RFI, no later than 30 calendar days after discovery. Per conditions stated in (Module I) Section I.E.14 (a) iv, additional twenty-four (24) hour reporting requirements apply for specific release scenarios and situations. Such newly-discovered releases may be from newly-identified units, from units for which, based on the findings of the RFA, the Division Director had previously determined that no further investigation was necessary, or from units investigated as part of the RFI, or from a unit identified during the SWMU Assessment process. The Division Director may require further investigation of the newly-identified release(s). A plan for such investigation will be reviewed for approval under a RFI Workplan addendum.

Deleted: The Permittee shall notify the Division Director, in writing, of any release(s) of hazardous waste including hazardous constituents discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other activities undertaken after the commencement of the RFI, no later than 30 calendar days after discovery. Such newly-discovered releases may be from newly-identified units, from units for which, based on the findings of the RFA, the Division Director had previously determined that no further investigation was necessary, or from units investigated as part of the RFI. The Division Director may require further investigation of the newly-identified release(s). A plan for such investigation will be reviewed for approval as part of the RFI Workplan

III.F. RCRA FACILITY INVESTIGATION (RFI) WORKPLAN

III.F.1. The RFI Workplan has been completed for the Facility. Any future RFI Workplans developed shall be provided as addendums to the RFI completed February 1993 and provided in accordance with Permit Condition III.D and III.F.3 and in accordance with the compliance schedule listed in Table III.1.

Deleted: III.F.1. . On or before ninety (90) calendar days from the effective date of this Permit, the Permittee shall submit a Workplan to the Division Director to address releases of hazardous waste including hazardous constituents and media of concern which, based on the results of the RFA, require further investigation for those units listed in Table III.2. This Plan must propose an investigation to include the following criteria:¶
The RFI Workplan must include a summary of those Solid Waste Management Units that are included in the present or future Installation Restoration Program (IRP) actions, what corrective actions steps have been or are to be taken on those units, and an analysis detailing which SWMUs may be more appropriately covered under the IRP and/or how the IRP may be incorporated into the RFI.¶
The Workplan

RFI Workplan addendums shall describe the objectives of the investigation and the overall technical and analytical approach to completing all actions necessary to characterize the nature, direction, rate, movement, and concentration of releases of hazardous waste including hazardous constituents from specific units or groups of units, and their actual or potential receptors. RFI Workplan addendums shall detail all proposed activities and procedures to be conducted at the facility, the schedule for implementing and completing such investigations, the qualifications of personnel performing or directing the investigations, including contractor personnel, and the overall management of the investigation.

Deleted: The

Deleted: RFI

In addition, the RFI Workplan addendum shall discuss sampling and data collection quality assurance and data management procedures, including formats for documenting and tracking data and other results of investigations, and health and safety procedures.

Deleted: .

III.F.2. SWMUs and AOCs remaining under the Corrective Action Process are identified in Table III.2b. Any RFI Workplan addendums shall be provided in accordance with Permit Condition III.D and III.F.3 and in accordance with the compliance schedule listed in Table III.1. After the Permittee submits a RFI Workplan addendum, the Division Director will either approve or disapprove the Workplan in writing within sixty (60) calendar days of receipt.

Deleted: III.F.2. . After the Permittee submits the Workplan

If the Division Director disapproves the RFI Workplan addendum, the Division Director shall either (1) notify the Permittee in writing of the Workplan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the Workplan and notify the Permittee of the revisions.

This modified RFI Workplan becomes an approved addendum to the RFI Workplan.

Deleted: the

Table III.2b SWMUs and AOCs Under the Corrective Action Process

Deleted: SWMUs AND AOCs REQUIRING CORRECTIVE ACTION INVESTIGATION

SWMU or AOC (as identified in RFA)	Description
SWMU No. 1	Solid Waste Burn Pit
SWMU No. 2	Former Herbicide Orange Storage Area
SWMU No. 6	Mixed Metal Debris Area (Scrap Metal Dump) and Stabilized Solid Waste Incinerator Ash Disposal Area
SWMU No. 16	Power Plant Spill Area
AOC No. 1	Motor Gas (MOGAS) Area
AOC No. 2	Swimming Pool Area and POL System
AOC No. 3	Taxiway Area

Deleted: ~~SWMU No. 5~~ ...

Deleted: ~~SWMU No. 9~~ ...

III.F.3. The Division Director shall review for approval, as addendums to the RFI Workplan, any plans developed pursuant to Permit Condition III.D, addressing further investigations of newly-identified SWMUs, or Permit Condition III.E, addressing new releases from previously- identified units. The Division Director shall modify this Corrective Action Module either according to procedures of this Permit, or according to the Permit modification procedures under 40 CFR Part 270.41, to incorporate these units and releases into the RFI Workplan.

Deleted: part of

Deleted: ¶

III.G. RCRA FACILITY INVESTIGATION WORKPLAN IMPLEMENTATION

No later than thirty (30) calendar days after the Permittee has received written approval from the Division Director for an addendum to the RFI Workplan, the Permittee shall begin implementation of the RCRA Facility Investigation according to the schedules specified in the addendum to the RFI Workplan. Pursuant to Permit Condition III.B.3, the RFI shall be conducted in accordance with the approved RFI Workplan.

III.H. RCRA FACILITY INVESTIGATION FINAL REPORT AND SUMMARY REPORT

III.H.1. The RFI Final Report was completed for the Facility. Addendums to the RFI Final Report will be provided after the completion of the RFI in accordance with the schedule outlined in Table III.1. The Permittee shall submit an addendum to the RFI Final Report and Summary Report. The addendum to the RFI Final Report shall describe the procedures, methods, and results of all facility investigations of SWMUs and their releases, including information on the type and extent of contamination at the

Deleted: Within sixty (60) calendar days

Deleted: ,

facility, sources and migration pathways, and actual or potential receptors. The addendum to the RFI Final Report shall present all information gathered under the approved RFI Workplan. The addendum to the RFI Final Report must contain adequate information to support further corrective action or NFA decisions at the facility.

NFA Criteria include, but are not limited to:

a) The area was characterized and/or remediated in accordance with Permit Condition III.O, a risk assessment was performed, and the available data indicate that contaminants do not pose an unacceptable level of risk to human health or the environment under current and projected future land use.

b) The area was characterized and/or remediated in accordance with Permit Condition III.O, and the available data indicate that the Performance Criteria in Permit Condition III.O have been met.

The Summary Report shall describe more briefly the procedures, methods, and results of the RFI process.

III.H.2. After the Permittee submits the addendum to the RFI Final Report and Summary Report, the Division Director shall either approve or disapprove the Reports in writing within sixty (60) calendar days of receipt.

If the Division Director approves the addendum to the RFI Report and Summary Report, the Permittee shall mail the approved Summary Report to all individuals on the facility mailing list established pursuant to 40 CFR Part 124.10, within fifteen (15) calendar days of receipt of approval.

If the Division Director determines the addendum to the RFI Final Report and Summary Report do not fully detail the objectives stated under Permit Condition III.F.1, the Division Director may disapprove the addendum to the RFI Final Report and Summary Report. If the Division Director disapproves the Reports, the Division Director shall notify the Permittee in writing of the Reports' deficiencies and specify a due date for submittal of a revised Final and Summary Report. The Summary Report, once approved, shall be mailed to all individuals on the facility mailing list.

III.I. CORRECTIVE MEASURES STUDY

III.I.1. A Comprehensive Corrective Measures Study (CMS) with addendums has been completed for the Facility. Additional CMS(s) may be required as addendums as follows: If the Division Director has reason to believe that a SWMU has released hazardous constituents in a concentration that poses a threat to human health and the environment given site-specific exposure conditions, the Division Director may require it to enter the CMS process and shall notify the Permittee in writing. This notice shall identify the hazardous constituent(s) which have been determined to threaten human

Deleted: III.I.1. -

Deleted: a

health and the environment given site-specific exposure conditions. The notification may also specify remedial alternatives to be evaluated by the Permittee during the CMS.

III.I.2. A CMS Plan was completed for the Facility. If the Division Director has required the CMS process for a SWMU or AOC, the Permittee shall submit an addendum to the CMS Plan to the Division Director within forty-five (45) calendar days from notification of the requirement to conduct a CMS.

The addendum to the CMS Plan shall provide the following information:

a) A description of the general approach to investigating and evaluating potential remedies;

b) A definition of the overall objectives of the study;

c) The specific plans for evaluating remedies to ensure compliance with remedy standards;

d) The schedules for conducting the study; and

e) The proposed format for the presentation of information.

III.I.3. If the Division Director disapproves the addendum to the CMS Plan, the Division Director shall, within sixty (60) calendar days of receipt, either (1) notify the Permittee in writing of the Plan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the Plan and notify the Permittee of the revisions. This modified Plan becomes the approved addendum to the CMS Plan.

III.J. CORRECTIVE MEASURES STUDY IMPLEMENTATION

Following the received written approval from the Division Director for the addendum to the CMS Plan, the Permittee shall begin to implement the Corrective Measures Study according to the schedules specified in Table III. 1. Pursuant to Permit Condition III.B.3, the CMS shall be conducted in accordance with the approved Plan.

III.K. CORRECTIVE MEASURES STUDY FINAL REPORT

III.K.1. Within sixty (60) calendar days after the completion of the CMS, the Permittee shall submit a CMS Final Report. The CMS Final Report shall summarize the results of the investigations for each remedy studied and of any bench-scale or pilot tests conducted. The CMS Report must include an evaluation of each remedial alternative. The CMS Report shall present all information gathered under the approved CMS Plan. The final report must contain adequate information to support the Division Director in the remedy selection decision making process, described in Permit Condition III.L.

Deleted: a

Deleted: No later than thirty (30) calendar days after the Permittee has

Deleted: the CMS Plan

III.K.2. If the Division Director determines that the CMS Final Report does not fully satisfy the information requirements specified under Permit Condition III.K.1, the Division Director may, within sixty (60) calendar days of receipt, disapprove the CMS Final Report. If the Division Director disapproves the Final Report, the Division Director shall notify the Permittee in writing of deficiencies in the Report and specify a due date for submittal of a revised Final Report.

III.K.3. As specified under Permit Condition III.B.5, based on preliminary results and the final CMS Report, the Division Director may require the Permittee to evaluate additional remedies or particular elements of one or more proposed remedies.

III.L. REMEDY SELECTION AND CORRECTIVE MEASURES IMPLEMENTATION

III.L.1. Based on the results of the CMS and any further evaluations of additional remedies under this study, the Division Director shall select a remedy from the remedial alternatives evaluated in the CMS that will (1) be protective of human health and the environment; (2) satisfy the concentration levels or other performance criteria as specified in Table III.3; (3) control the source(s) of release(s) so as to reduce or eliminate, to the maximum extent practicable, further releases that might pose a threat to human health and the environment; and (4) meet all applicable waste management requirements.

III.L.2. In selecting the remedy which meets the standards for remedies established under Permit Condition III.L.1, the Division Director shall consider the following evaluation factors, as appropriate:

a) Long-term reliability and effectiveness. Any potential remedy(s) may be assessed for the long-term reliability and effectiveness it affords, along with the degree of certainty that the remedy will prove successful. Factors that shall be considered in this evaluation include:

i. Magnitude of residual risks in terms of amounts and concentrations of waste remaining following implementation of a remedy, considering the persistence, toxicity, mobility, propensity to bioaccumulate, and other biological effects of such hazardous wastes including hazardous constituents;

ii. The type and degree of long-term management required, including monitoring and operation and maintenance;

iii. Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal or containment;

iv. Long-term reliability of the engineering and institutional controls, including uncertainties associated with land disposal of untreated wastes and residuals; and

v. Potential need for replacement of the remedy.

b) Reduction of toxicity, mobility, and volume. A potential remedy(s) may be assessed as to the degree to which it employs treatment that reduces toxicity, mobility, or volume of hazardous wastes including hazardous constituents.

Factors that shall be considered in such assessments include:

i. The treatment process the remedy(s) employs and materials it would treat;

ii. The amount of hazardous wastes including hazardous constituents that would be destroyed or treated;

iii. The degree to which the treatment is irreversible; and

iv. The residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous wastes including hazardous constituents.

c) The short-term effectiveness of a potential remedy(s) may be assessed considering the following:

i. Magnitude of reduction of existing risks;

ii. Short-term risks that might be posed to the community, workers, or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal or containment; and

iii. Time until full protection is achieved.

d) Implementability. The ease or difficulty of implementing a potential remedy(s) may be assessed by considering the following types of factors:

i. Degree of difficulty associated with constructing the technology;

ii. Expected operational reliability of the technologies;

iii. Need to coordinate with and obtain necessary approvals and permits from other agencies;

iv. Availability of necessary equipment and specialists; and

v. Available capacity and location of needed treatment, storage, and disposal services.

e) Cost. The types of costs that may be assessed include the following:

i. Capital costs;

ii. Operation and maintenance costs;

iii. Net present value of capital and operation and maintenance costs; and

iv. Potential future remedial action costs.

III.L.3. The Permittee shall submit a CMI Plan to the Division Director to address those units which, based on the results of the CMS, require corrective measures or additional environmental assessment and/or monitoring. The CMI Plan shall describe the design, construction, maintenance, monitoring and other applicable requirements of this permit for the selected remedy for each unit that requires corrective measures, and detail all proposed activities and procedures to be implemented.

III.L.4. After the Permittee submits the CMI Plan, the Division Director will either approve or disapprove the CMI Plan in writing within sixty (60) calendar days of receipt.

If the Division Director disapproves the CMI Plan, the Division Director shall either (1) notify the Permittee in writing of the CMI Plan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the CMI Plan and notify the Permittee of the revisions. This modified Plan becomes the approved CMI Plan.

III.L.5. No later than thirty (30) calendar days after the Permittee has received written approval from the Division Director for the CMI Plan, the Permittee shall begin to implement the corrective measures according to the schedules specified in the CMI Plan. Pursuant to Permit Condition III.B.3, the CMI shall be conducted in accordance with the approved Plan.

III.L.6. Within sixty (60) calendar days after the completion of the CMI, the Permittee shall submit a CMI Final Report. The CMI Final Report shall summarize the results of the corrective measures implemented and present all pertinent information gathered during implementation. The final report must contain adequate information to demonstrate to the Division Director that the remedial objectives and standards have been met.

If the Division Director determines that the CMI Final Report does not fully satisfy the information requirements specified above, the Division

Director may disapprove the CMI Final Report. If the Division Director disapproves the Final Report, the Division Director shall notify the Permittee in writing of deficiencies in the Report and specify a due date for submittal of a revised Final Report.

III.M. PERMIT MODIFICATION FOR REMEDY

Based on information the Permittee submits in the original and addendums to the RFI Final and Summary Reports, the CMS Final Report, and other information, the Division Director will select a remedy and, if necessary, initiate a modification to this Permit, pursuant to 40 CFR Part 270.42.

The modification or other information submitted pursuant to this Permit shall specify the selected remedy and include, at a minimum, the following:

a) Description of all technical features of the remedy that are necessary for achieving the standards for remedies established under this Permit including length of time for which compliance must be demonstrated at specified points of compliance;

b) All concentration levels of hazardous constituents in each medium or alternative controls that the remedy much achieve or implement, respectively, to be protective of human health and the environment;

c) All requirements for achieving compliance with hazardous constituent concentration levels or implementation of alternative controls.

d) All requirements for complying with the standards for management of wastes;

e) Requirements for removal, decontamination, closure, or post-closure of units, equipment, devices, or structures that will be used to implement the remedy;

f) A schedule for initiating and completing all major technical features and milestones of the remedy; and

g) Requirements for submission of reports and other information.

III.N. MODIFICATION OF THE CORRECTIVE ACTION MODULE

III.N.1. If at any time the Division Director or the Permittee determine that modification of this Corrective Action Module is necessary, he or she may initiate a modification according to the procedures of 40 CFR Part 124.10 and 40 CFR Part 270.42.

a) For documents pertaining to the corrective action SWMUs and AOCs addressed in this Permit, the following repository is hereby designated:

U.S. Environmental Protection Agency
Pacific Islands Contact Office
300 Ala Moana Blvd.
Prince Kuhio Federal Building, Room 5152
Honolulu, Hawaii 96813

III.N.2. Modifications to the Corrective Action Module do not constitute a reissuance of the Permit.

III.O. CORRECTIVE ACTIONS FOR SWMUs AND AOCs

III.O.1. Completion of Corrective Action Responsibilities

Corrective action responsibilities under this Permit shall be deemed complete with respect to an individual SWMU or AOC upon the occurrence of the following:

a) A determination, based on investigation(s) conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected future land use; or

b) A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected future land use.

III.O.2. Procedures for Acknowledging Completion

The following procedures shall confirm the completion of corrective action responsibilities for an individual SWMU or AOC:

a) The Permittee shall submit information to the Division Director demonstrating that Permit Condition III.O.1.a or III.O.1.b has been met. The information submitted may be in the form of a NFA Report, a CMI Final Report, or other report form, as appropriate, as described in Permit Condition III.O.4.

b) Within sixty (60) calendar days of receipt of the information required in Permit Condition III.O.2.a, the Division Director shall either (1) issue a letter to the Permittee approving the report and agreeing that either the NFA Criteria in Permit Condition III.H.1 or the Corrective Action Criteria in Table III.3 have been met; or (2) issue a letter to the Permittee disapproving the report and explaining the basis for the disapproval.

The Division Director's letter acknowledging completion of the NFA or Corrective Action Criteria may take the following or similar form, at the Division Director's discretion:

"Based on the [enter report title] dated [enter date], the [No Further Action Criteria in Permit Condition III.H.1 or Corrective Action Criteria in Table III.3 [enter appropriate criteria] have been met for the following SWMU(s)/AOC(s) [list SWMU(s)/AOC(s)]. Because the remediation objectives/goals at the identified SWMU(s)/AOC(s) are complete, the Division Director has determined that these SWMU(s)/AOC(s) require no further action at this time."

III.O.3. Permit Termination

Upon completion of corrective actions in all SWMUs and AOCs as defined in Permit Condition III.O.2, the Division Director may initiate termination of the Permit, in accordance with Table III.1. If the Division Director determines that he or she will not initiate termination of the Permit, the Permittee may seek Permit termination by submission of a determination of completion, which shall include information sufficient for the Division Director to verify that corrective actions in all SWMUs and AOCs, and all other actions required by this Permit, have been successfully completed. The Division Director shall review the determination of completion, and either shall terminate the Permit or shall identify shortcomings in the Permittee's performance under this Permit and/or in the determination of completion, which the Permittee shall rectify prior to resubmission of the determination of completion

III.O.4. Requirements for Submission of Reports and Other Information

a) Within sixty (60) calendar days after the completion of the corrective action, the Permittee shall submit an NFA Report, a CMI Final Report, or other report form or information, as appropriate. The report shall summarize the results of the corrective action implementation, and present all pertinent information gathered during implementation. The report must contain adequate information to demonstrate to the Division Director that the remedial objectives/goals for each area have been met.
b) After the Permittee submits the report, the Division Director shall either approve or disapprove the report in writing. If the Division Director determines that the report does not fully satisfy the information requirements specified in Permit Condition III.O.4.a, he or she may disapprove the report. If the Division Director disapproves the report, he or she shall notify the Permittee in writing of the report's deficiencies and specify a due date for submittal of a revised final report.
c) If the Division Director determines that the report satisfies the information requirements specified in Permit Condition III.O.4.a, and if he or she determines that implementation of the selected corrective

action has achieved the cleanup objectives, the Division Director may initiate actions to remove the area from Tables III.2 and III.3.

III.P. STAGING PILES

Not Applicable.

Table III.3 CORRECTIVE ACTION CRITERIA

SWMU or AOC	Current Performance Criteria
SWMU No. 1 Solid Waste Burn Pit	**Treatment-based performance criteria achieved.** **Monitoring-Based:** Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where: • Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or • The Air Force proposes to remove the fishing prohibition. **Management-Based:** Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.
SWMU No. 2 Former Herbicide Orange Storage Area	**Treatment-based performance criteria achieved.** **Monitoring-Based:** Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where: • Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or • The Air Force proposes to remove the fishing prohibition. **Management-Based:** Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.

Deleted: III.P.1. - Designation¶
- A staging pile is designated for use by the Permittee to facilitate a reliable, effective, and protective remedy in accordance with 40 CFR 264.554 and subject to the Division Director's approval of the staging pile standards and design criteria to be submitted as part of the CMI Plan. ¶
III.P.2. - Operating Period¶
- The staging pile may operate for a period not to exceed two years from the time remediation waste is first placed into the staging pile.

Deleted: ¶
Page Break
¶
Table III.3 CORRECTIVE ACTION CRITERIA

Deleted: ¶
The Monitored Natural Recovery (MNR) Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, requirements for maintaining and replacing fishing prohibition warning signs.

Deleted: ¶
The MNR Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, requirements for maintaining and replacing fishing prohibition warning signs.

Table III.3 CORRECTIVE ACTION CRITERIA

SWMU or AOC	Current Performance Criteria
SWMU No. 6 Mixed Metal Debris Area and Stabilized Solid Waste Incinerator Ash Disposal Area	**Monitoring-Based:** For as long as stabilized ash is left in place, continue monitoring-based performance criteria every five (5) years. Monitoring will be conducted under the prepared, submitted, and approved Groundwater Monitoring Plan developed in accordance with Table III.1; Continue groundwater monitoring at four (4) points of compliance, including two (2) existing monitoring wells and two (2) new monitoring wells (install in 2020); COCs in groundwater are total and dissolved lead. Groundwater cleanup goals for COCs are specified in Table III.5. **Management-Based:** Continue management-based performance criteria every five (5) years in perpetuity for as long as ash in left in place. Inspect and maintain the integrity of the cap every 5 years with remote monitoring performed quarterly unless the site condition [scenario] changes, then perform remote monitoring and response as defined by Module II Table II.1. Conduct topographical, land, and groundwater elevation surveys for SWMU No. 6 during the next on-site event (2020); Identify boundaries and elevation of the SWMU based on survey data. Update groundwater flow based on groundwater elevation survey data. Update Base records with location data and maintain satellite imagery collected for remote monitoring for three (3) years. Install/maintain warning signs restricting access and excavation within this SWMU. Warning signs will be maintained by replacing signage every five (5) years and will be visible at all times.
SWMU No. 16, Power Plant Spill Site, and AOC No. 1, Motor Gasoline (MOGAS) Area	**Treatment-based performance criteria achieved.** **Monitoring-Based:** Continue groundwater monitoring at six groundwater points of compliance every five (5) years. Analyze groundwater samples for the COC(s). COC(s) in groundwater are TPH and PAHs. Continue groundwater monitoring until three (3) consecutive sampling events meet groundwater action levels. Action levels for groundwater are listed in Table III.5. Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where: • Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or • The Air Force proposes to remove the fishing prohibition. **Management-Based:** Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.
AOC No. 2, Swimming Pool Area, and AOC No. 3, Taxiway Area	**Monitoring-Based:** Continue groundwater monitoring at nine (9) groundwater points of compliance every five (5) years. Analyze groundwater samples for the COC(s). COC(s) in groundwater are TPH. Continue groundwater monitoring at points of compliance until three (3) consecutive sampling events meet groundwater action levels. Action levels for groundwater are listed in Table III.5.

Notes:
AOC = Area of Concern
COC = constituent of concern
PAH = polynuclear aromatic hydrocarbon
SWMU = Solid Waste Management Unit

Deleted: ¶

Deleted: ¶

Deleted: ¶
The Monitored Natural Recovery Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, requirements for maintaining and replacing fishing prohibition warning signs in accordance with the permit performance criteria.¶
¶

Deleted: ¶
The Groundwater Monitoring Work Plan will include the monitoring and reporting requirements in accordance with the permit performance criteria.¶

Deleted: ¶

Deleted: ¶
BTEX = benzene, toluene, ethylbenzene, and xylenes ¶
CCMS = Comprehensive Corrective Measures Study ¶
CMI = Corrective Measures Implementation¶

Deleted: EPA = U.S. Environmental Protection Agency ¶
JP-5 = jet propulsion fuel, grade 5¶

Deleted: PCB = polychlorinated biphenyl¶
POL = petroleum, oil, and lubricants ¶
SQG = small quantity generator¶

TPH = total petroleum hydrocarbons

TABLE III.4 SOIL ACTION LEVELS

Not Currently Applicable.

TABLE III.5 GROUNDWATER ACTION LEVELS

SWMU or AOC	Chemical Group	Constituent of Concern	Cleanup Goal (mg/L)	Basis
SWMU No. 16/AOC No. 1	PAH	Acenaphthylene	0.30	Marine acute AWQC
		Anthracene		
		Benzo(a)pyrene		
		Benzo(k)fluoranthene		
		Benzo(b)fluoranthene		
		Benzo(g,h,i)perylene		
		Benzo(a)anthracene		
		Chrysene		
		Dibenz(a,h)anthracene		
		Fluorene		
		Ideno(1,2,3-cd)pyrene		
		2-Methylnaphthalene		
		Pyrene		
		Acenaphthene	0.71	Marine chronic AWQC
		Fluoranthene	0.016	Marine chronic AWQC
		Naphthalene	2.35	Marine acute AWQC
		Phenanthrene	0.0046	Marine chronic AWQC
SWMU No. 6	Metal	Dissolved Lead	0.015	Federal MCL
		Total Lead	0.015	Federal MCL
SWMU No. 16/AOC No. 1, AOC Nos. 2 and 3	~~TPH[a]~~	~~VPH~~ ~~EPH~~	~~0.64~~	Marine bioassay testing; ~~RWQCB Region 2 – final groundwater screening level~~

Notes:
[a] – TPH assessed as fractional volatile petroleum hydrocarbons (VPH) and fractional extractable petroleum hydrocarbons (EPH) by Northwest Total Petroleum Hydrocarbon (NWTPH) method
AWQC = ambient water quality criteria
mg/L = milligram per liter
MCL = maximum contaminant level
RWQCB = Regional Water Quality Control Board
TPH = total petroleum hydrocarbons

Deleted: Notes:¶

Deleted: ELCR = excess lifetime cancer risk¶
RBAL = risk-based action level¶
mg/kg = milligram per kilogram¶
PAH = polycyclic aromatic hydrocarbon¶
PRG = Region 9 preliminary remediation goal¶
TPH = total petroleum hydrocarbons¶
Page Break

Deleted: TABLE III.5 GROUNDWATER ACTION LEVELS

Deleted: SWMU No. 15,¶

Deleted: , AOC No. 2/No. 3

Moved up [1]: Metal

Deleted: SWMU No. 15,¶
SWMU No. 16/AOC No. 1, AOC No. 2/No. 3 ...

Moved (insertion) [1]

Deleted: SWMU No. 15,¶

Deleted: /No.

Deleted: l

Deleted: SWMU No. 16/AOC No. 1 ...

Deleted: ¶

THE UNITED STATES AIR FORCE

FINAL
APPENDIX A

"AS-PROPOSED" MODIFICATIONS TO
MODULES I, II, and III OF THE
HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
EPA ID TT9 570 090 002
FOR JOHNSTON ATOLL FACILITY

PERMIT MODIFICATION PROPOSAL

July 2018

This page intentionally left blank

FINAL

APPENDIX A

"AS-PROPOSED" MODIFICATIONS TO MODULES I, II, and III OF THE HAZARDOUS WASTE CORRECTIVE ACTION PERMIT EPA ID TT9 570 090 002 FOR JOHNSTON ATOLL FACILITY

PERMIT MODIFICATION PROPOSAL

This page intentionally left blank

MODULE I

GENERAL PERMIT CONDITIONS

I.A. EFFECT OF PERMIT

The Permittee is allowed to conduct corrective actions of Solid Waste Management Units (SWMU) and Areas of Concern (AOC) in accordance with the conditions of this Permit. Compliance with this Permit generally constitutes compliance, for purposes of enforcement, with Subtitle C of Resource Conservation and Recovery Act (RCRA) and with Hazardous and Solid Waste Amendments (HSWA). Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property or any invasion of other private rights. Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under Sections 3008(a), 3008(h), 3013, or 7003 of RCRA; Section 106(a), 104, or 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9606(a), commonly known as CERCLA), or any other law providing for protection of public health or the environment. [40 Code of Federal Regulations (CFR) 270.4, 270.30]

I.B. PERMIT ACTIONS

I.B.1. Permit Modification, Revocation and Reissuance, and Termination

This Permit may be modified, revoked and reissued, or terminated for cause, as specified in 40 CFR 270.41, 270.42, and 270.43. The filing of a request for a Permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee, does not stay the applicability or enforceability of any Permit condition. Completion of corrective actions and subsequent Permit termination procedures are specified in Permit Condition III.O. [40 CFR 270.4(a) and 270.30(f)]

I.B.2. Permit Conditions

Pursuant to Section 3005(c)(3) of RCRA, 40 CFR Parts 260 through 270, and 40 CFR 270.32(b), this Permit contains conditions necessary to protect public health and the environment.

I.C. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby, as provided by 40 CFR 124.16(a).

I.D. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meaning as those in 40 CFR Parts 124, 260, 264, 266, 268, and 270, unless this Permit specifically provides otherwise; where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

I.D.1. *Division Director* means the Division Director of the Waste Management Division, EPA Region IX, or his designee or authorized representative.

I.D.2. The *Permit* consists of Modules I through III plus the application. If any portion of the application conflicts with permit conditions in this permit, the permit conditions will take precedence over the application.

I.E. DUTIES AND REQUIREMENTS

I.E.1. Duty to Comply

The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency Permit. Any Permit noncompliance, other than noncompliance authorized by an emergency Permit, constitutes a violation of RCRA and is grounds for enforcement action; for Permit termination, revocation and reissuance, or modification; or for denial of a Permit renewal application. [40 CFR 270.30(a)]

I.E.2. Duty to Reapply

If the Permittee wishes to continue an activity allowed by this Permit after the expiration date of this Permit, the Permittee shall submit a complete application for a new Permit at least 180 days prior to Permit expiration. [40 CFR 270.l0(h), 270.30(b)]

I.E.3. Permit Expiration

Pursuant to 40 CFR 270.50, this Permit shall be effective for a fixed term not to exceed ten years. As long as EPA is the Permit-issuing authority, this Permit and all conditions herein will remain in effect beyond the Permit's expiration date, if the Permittee has submitted a timely, complete application (see 40 CFR 270.10, 270.13 through 270.29) and, through no fault of the Permittee, the Division Director has not issued a new Permit, as set forth in 40 CFR 270.51.

I.E.4. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee, in an enforcement action that it would have been necessary, to halt or reduce the Permitted activity in order to maintain compliance with the conditions of this Permit. [40 CFR 270.30(c)]

I.E.5. Duty to Mitigate

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable, to prevent significant adverse impacts on human health or the environment. [40 CFR 270.30(d)]

I.E.6. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance/quality control procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit. [40 CFR 270.30(e)]

I.E.7. Duty to Provide Information

The Permittee shall furnish to the Division Director, within a reasonable time, any relevant information which the Division Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit. The Permittee shall also furnish to the Division Director, upon request, copies of records required to be kept by this Permit. [40 CFR 264.74(a), 270.30(h)]

I.E.8. Inspection and Entry

Pursuant to 40 CFR 270.30(i), the Permittee shall allow the Division Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

I.E.8.a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;

I.E.8.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Permit;

I.E.8.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

I.E.8.d. Sample or monitor, at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA, any substances or parameters at any location.

I.E.9. Monitoring and Records

I.E.9.a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample to be analyzed must be the appropriate method from Appendix I of 40 CFR Part 261 or an equivalent method approved by the Division Director. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846, Standard Methods of Wastewater Analysis, or an equivalent method. [40 CFR 270.30(j)(l)]

I.E.9.b. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this Permit, the certification required by 40 CFR 264.73(b)(9), and records of all data used to complete the application for this Permit for a period of at least ten years from the date of the sample, measurement, report, record, certification, or application. These periods may be extended by request of the Division Director at any time and are automatically extended during the course of any unresolved enforcement action regarding this facility. [40 CFR 264.74(b) and 270.30(j)(2)]

I.E.9.c. The Permittee must retain all notices, certifications, demonstrations, waste analysis data, and other documentation produced pursuant to 40 CFR 268.7 for at least ten years from the date that the waste is subject to such documentation. Records on LDR waste must be maintained on-site for 10 years or until the facility is closed. [40 CFR 268.7(a)(6)] The Permittee shall maintain records for all ground water monitoring wells and associated ground water surface elevations for the full duration of the permit.

i. The data must be immediately available for review by authorized inspector personnel; and

ii. A hardcopy of the data shall be made available for review on-site by authorized inspection personnel within 24 hours of the request being made.

I.E.9.d. Pursuant to 40 CFR 270.30(j)(3), records of monitoring information shall specify:

i. The dates, exact place, and times of sampling or measurements;

ii. The individuals who performed the sampling or measurements;

iii. The dates analyses were performed;

iv. The individuals who performed the analyses;

v. The analytical techniques or methods used; and

vi. The results of such analyses.

I.E.10. Reporting Planned Changes

The Permittee shall give notice to the Division Director, as soon as possible, of any planned physical alterations or additions to the Permitted facility. [40 CFR 270.30(1)(1)]

I.E.11. Reporting Anticipated Noncompliance

The Permittee shall give advance notice to the Division Director of any planned changes in the Permitted facility or activity which may result in noncompliance with Permit requirements. [40 CFR 270.30(1)(2)]

I.E.12. Certification of Addition, Construction or Modification

The Permittee may not commence treatment of hazardous waste that is part of a corrective action of hazardous waste at the facility until:

I.E.12.a. The Permittee has submitted to the Division Director, a modification to Module III of the Permit; and

i. The Division Director has inspected the new treatment unit and finds it is in compliance with the conditions of the Permit; or

ii. The Division Director has either waived the inspection, or has not within 15 days of receipt of the Permittee's letter required by

paragraph I.E.12.2, notified the Permittee of his intent to inspect. [40 CFR 270.30(1)(2)]; or

iii. The Division Director has notified the Permittee in writing that the treatment unit can be operated to treat hazardous waste contaminated soils and groundwater.

I.E.13. Transfer of Permits

This Permit is not transferable to any person, except after notice to the Division Director. The Division Director may require modification or revocation and reissuance of the Permit pursuant to 40 CFR 270.40. Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 CFR Parts 264 and 270 of this Permit. [40 CFR 270.30(1)(3), 264.12(c)]

I.E.14. Twenty-Four Hour Reporting

I.E.14.a. The Permittee shall report to the Division Director any noncompliance which may endanger health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. The report shall include the following:

i. Information concerning release of any hazardous waste that may cause an endangerment to public drinking water supplies.

ii. A description of the occurrence and its causes.

iii. Any information of a release or discharge of hazardous waste or of a fire or explosion from the facility which could threaten the environment or human health outside the facility.

iv. Any release (1) of any hazardous waste if the released quantity exceeds 100 kilograms, or (2) of any material which becomes a hazardous waste, or (3) of any amount of hazardous waste where there is a potential for endangerment of human health or the environment.

I.E.14.b. The description of occurrence and its cause shall include:

i. Name, address, and telephone number of the owner or operator;

ii. Name, address, and telephone number of the facility;

iii. Date, time, and type of incident;

iv. Name and quantity of materials involved;

v. The extent of injuries, if any;

vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and

vii. Estimated quantity and disposition of recovered material that resulted from the incident.

I.E.14.c. The Permittee shall submit in writing any noncompliance within five days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period(s) of noncompliance (including exact dates and times); whether the noncompliance has been corrected; and, if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Division Director may waive the five-day written notice requirement in favor of a written report within 15 days. [40 CFR 270.30(1)(6)]

I.E.15. Compliance Schedule

The Permittee shall notify the EPA of reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Permit no later than 14 days following each schedule date.

I.E.16. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise required to be reported above in Permit Conditions I.E.10 through 15, at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Condition I.E.14. [40 CFR 270.30(1)(10)]

I.E.16. Other Information

Whenever the Permittee becomes aware that it failed to submit any relevant facts in the Permit application, or submitted incorrect information in a Permit application or in any report to the Division Director, the Permittee shall promptly submit such facts or information. [40 CFR 270.30(1)(11)]

I.F. SIGNATORY REQUIREMENT

All applications, reports, or information submitted to or requested by the Division Director, his designee, or authorized representative, shall be signed and certified in accordance with 40 CFR 270.11 and 270.30(k).

I.G. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DIVISION DIRECTOR

All reports, ·notifications, or other submissions which are required by this Permit to be sent or given to the Division Director or his designated representative should be sent by certified mail or given to:

Jeff Scott, Director
Waste Management Division
United States Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California, 94105
(415) 972-3311

I.H. CONFIDENTIAL INFORMATION

In accordance with 40 CFR 270.12, the Permittee may claim confidential any information required to be submitted by this Permit.

I.I. DOCUMENTS TO BE SUBMITTED PRIOR TO OPERATION OF A NEW UNIT

As needed, the Permittee shall submit for approval addendums to the original Corrective Measures Implementation (CMI) Plan to the Division Director by the dates shown in Table III.1. The CMI Plan shall include at a minimum the following: (1) Engineering plans and specifications, (2) a waste analysis plan (describing the waste stream(s) to be treated), (3) Performance Test Plan, Quality Assurance Project Plan (QAPP), (5) security requirements, (6) inspection schedule, (7) personnel training documents and records, (8) contingency plan, (9) operating records, (10) staging pile standards and design criteria and (11) a closure plan for the treatment unit. The Permittee may elect to submit any or all of the aforementioned components as stand-alone documents providing that each document is clearly labeled as a component of the overall CMI Plan.

I.J. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

The type and nature of this Facility does not allow for the Permitee to maintain documents on-site. The Permittee shall maintain records of the CMI Plan and all amendments, revisions and modifications to these documents off-site.

MODULE II

GENERAL FACILITY CONDITIONS

II.A. DESIGN AND OPERATION OF FACILITY

The Permittee shall construct, maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned, sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water which could threaten human health or the environment, as required by 40 CFR 264.31.

II.B. WASTE RESTRICTIONS AND SPECIAL PROVISIONS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES

II.B.1. The Permittee shall treat only those wastes approved by the Division Director.

II.B.2. The Permittee shall not receive any imported waste from off-site for treatment or storage.

II.C. GENERAL WASTE ANALYSIS

II.C.1. The Permittee shall follow the waste analysis procedures required by 40 CFR 264.13.

II.C.2. The Permittee shall verify the analysis of each waste stream annually as part of its quality assurance program, in accordance with Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA Publication SW-846, or equivalent methods approved by the Regional Administrator. At a minimum, the Permittee shall maintain proper functional instruments, use approved sampling and analytical methods, verify the validity of sampling and analytical procedures, and perform correct calculations. If the Permittee uses a contract laboratory to perform analyses, then the Permittee shall inform the laboratory in writing that it must operate under the waste analysis conditions set forth in this Permit.

II.D. SECURITY

The Permittee shall comply with the security provisions of 40 CFR 264.14(b).

II.E. GENERAL INSPECTION REQUIREMENTS

The Permittee shall remedy any deterioration or malfunction discovered by an inspection, as required by 40 CFR 264.15(c). Records of inspection shall be kept, as required by 40 CFR 264.15(d).

II.F. PERSONNEL TRAINING

The Permittee shall ensure that contracted personnel and other site-workers have adequate training and supervision, as required by 40 CFR 264.16. The Permittee shall ensure that any contracted entities maintain all training documents and records for all site-workers while working at the remote Facility, and copies will be maintained off-site by the Facility Permit Contact indicated on EPA OMB Form 2050-0024, as required by 40 CFR 264.16(d) and (e).

II.G. SPECIAL PROVISIONS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTE

The Permittee comply with the requirements of 40 CFR 264.17(a).

II.H. LOCATION STANDARDS

II.H.1. The Permittee comply with all other applicable federal laws set forth in 40 CFR 270.3. The Permittee shall also comply with the requirements set forth in the Endangered Species Act of 1973 et.seq., 16 USC 1531 through 1543, the Migratory Bird Treaty Act et.seq., 16 USC 703 through 712 (or 50 CFR 10), the Marine Mammal Protection Act of 1972 et.seq., 16 USC 1361, EO 13089 Coral Reef Protection, Magnuson-Stevens Fishery Conservation and Management Act et.seq., 16 USC 1901 et.seq, and the National Wildlife Refuge Administration Act (16 USC 668dd-ee) and other federal laws as applicable.

II.H.2. Johnston Island is not in a 100-year floodplain. A study of possible causes of island flooding was done in support of the Johnston Atoll Chemical Agent Disposal System (JACADS) RCRA Part B permit application in 1984.

II.I. PREPAREDNESS AND PREVENTION

The type and nature of this Facility (described in II. J), does not allow for the Permitee to be able to meet the outlined components or requirements listed in 40 CFR 264.32 and 40 CFR 264.34.

II.J. CONTINGENCY PLAN

The Permit is for the continuation of corrective actions at Air Force SWMUs and AOCs only, with no on-site infrastructure or personnel located at the Facility. The Permit is not for hazardous waste treatment, storage, or disposal operations and thus the requirements outlined in 40 CFR

264.53 and 264.54 are not able to be implemented for the protection of human health or the environment.

For the protection of human health and the environment, site-specific contingency planning will be performed for applicable units under corrective action as shown in Section II.J.1.

II.J.1. Specific Contingency Requirements

Table II.1 Remote Monitoring and Response for SWMU No. 6

Applicable Unit	Scenario	Site Condition	Remote Monitoring Frequency	Response Required by the Air Force
SWMU No. 6 Mixed Metal Debris Area (Scrap Metal Dump) and Stabilized Solid Waste Incinerator Ash Disposal Area	1	Shoreline Erosion, No Release	Quarterly	Inspect and maintain every 5 years
	2	Inland Erosion, No Release	Once every 2 months	Inspect and stabilize during next scheduled visit
	3	Cap requires maintenance, No Release (geotextile fabric intact)	Monthly	Perform required maintenance next scheduled visit
	4	Shoreline is up to concrete rubble area and cap requires maintenance, Potential Release (geotextile fabric not intact)	Monthly	Perform required maintenance next scheduled visit
	5	Shoreline at concrete rubble area, No Release	Monthly	Program maintenance, stabilization, or removal
	6	Catastrophic Release	Monthly	Immediate USAF response including deployment of personnel. Program maintenance, stabilization, or removal.

II.K. RECORDKEEPING AND REPORTING

Specifically meeting the requirements indicated in 40 CFR 264.73 is not possible because of the lack of infrastructure and staffing at the Facility. The Permittee instead shall ensure that any records for the Facility are maintained off-site by the Facility Permit Contact indicated on EPA OMB Form 2050-0024:

II.K.1. Operating Record

The Permittee shall maintain a written operating record for the facility, in accordance with 40 CFR 264.73, except that records will be maintained off-site.

II.K.2. Imagery Record

The Permittee shall maintain a record of any and all remote monitoring imagery collected for SWMU No. 6 for all efforts conducted in accordance with Section II.J.1 Table II.1 monitoring. Records will be maintained off-site for three (3) years.

II.L. PERFORMANCE TESTING REQUIREMENTS

Not Applicable.

II.M. PERFORMANCE STANDARDS

Not Applicable.

II.N. REQUIREMENTS PRIOR TO RESTART

Not Applicable.

II.O. GENERAL CLOSURE REQUIREMENT

II.O.1. The Permittee shall close the facility, as required by 40 CFR 264.111.

MODULE III

CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS

III.A. DEFINITIONS

For the purposes of this Corrective Action Module, the following definitions shall apply:

"Division Director" means the Director of the Waste Management Division U.S. Environmental Protection Agency, Region 9.

"Facility" means the four islands that comprise Johnston Atoll and all property contiguous thereto under the control of the owner or operator seeking a Permit under Subtitle C of the RCRA; except for the areas associated with EPA ID No. TT0 570 090 001 which were subject to a separate hazardous waste permit.

"Release" means any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of hazardous wastes (including hazardous constituents) into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous wastes or hazardous constituents).

"Site" has the same meaning as "Facility".

"Soil" shall include surface and subsurface soil unless otherwise specified.

"Solid Waste Management Units (SWMU)" means any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at the facility in which solid wastes have been routinely and systematically released.

"Subsurface Soil" means soil greater than 2 feet below ground surface (bgs).

"Surface Soil" means soil from the ground surface to a depth of 2 feet bgs.

"Hazardous waste" means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. The term hazardous waste includes hazardous constituents as defined below.

"Hazardous constituent" means any constituent identified in Appendix VIII of the Code of Federal Regulations, Title 40 (40 CFR), Part 261, or any constituent at concentrations identified in Appendix IX of 40 CFR Part 264.

"RCRA Facility Assessment (RFA)" means the investigation culminating in the RFA Final Report dated May 1990. This report identifies several SWMUs on Johnston Atoll and recommends further corrective action for some.

"RCRA Facility Investigation (RFI)" means the investigation culminating in the RCRA Facility Investigation Final Report dated September 1994 including revised pages dated 10 May 1995.

"Corrective Measures Study (CMS)" means the investigation and analysis culminating in the Comprehensive Corrective Measures Study (CCMS) dated January 2000 and the Draft Corrective Measures Study for the former Herbicide Orange Storage Area dated April 2000 and Addendum No. 1 to the Draft CCMS dated November 2000.

III.B. STANDARD CONDITIONS

III.B.1. Section 3004(u) of RCRA, as amended by the HSWA, and 40 CFR Part 264.101 require that Permits issued after November 8, 1984, address corrective action for releases of hazardous wastes including hazardous constituents from any SWMU at the facility, regardless of when the waste was placed in the unit.

III.B.2. Failure to submit the information required in Table III.1, or falsification of any submitted information, is ground for termination of this Permit (40 CFR Part 270.43). The Permittee shall ensure that all plans, reports, notifications, and other submissions to the Division Director required in Table III.1 are signed and certified in accordance with 40 CFR Part 270.11. Two copies of these plans, reports, notifications or other submissions shall be submitted to the Division Director by certified mail or hand delivered at the following address:

Jeff Scott, Director
Waste Management Division
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California, 94105

In addition, one copy of these documents must be mailed to the U.S. Department of the Interior, Fish and Wildlife Service at the following address:

U.S. Department of the Interior
Fish and Wildlife Service
Pacific Remote Islands Marine National Monument
P.O. Box 50167, Rm 5-231
Honolulu, Hawaii, 96850
Attention: Laura Beauregard, Superintendent
Lee Ann Woodward, Resource Contaminants Specialist

III.B.3. All plans and schedules required by the conditions of Table III.1 are, upon approval of the Division Director, incorporated into this Corrective Action Module by reference and become an enforceable part of this Permit. Any noncompliance with such approved plans and schedules shall be termed noncompliance with this Permit

III.B.4. All requests for extensions to due dates for submittals must be made in writing to the Division Director at least one week in advance of the due date for the subject submittal. The request for extension should explain the circumstances requiring additional time and request a specific revised due date. Extensions of the due dates for submittals may be granted or denied by the Division Director.

III.B.5. If the Division Director determines that further actions beyond those provided in this Corrective Action Module, or changes to that which is stated herein, are warranted, the Division Director shall modify the Corrective Action Module either according to procedures of this Permit, or according to the Permit modification process under 40 CFR Part 270.41.

III.B.6. All raw data, such as laboratory reports, drilling logs, bench-scale or pilot-scale data, and other supporting information gathered or generated during activities undertaken at the facility (or other location approved by the Division Director) during the term of this Permit, including any reissued Permits.

Table III.1 Corrective Action Schedule of Compliance

Requirement	Record/ Schedule
Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Workplan	February 1993 (Administrative Record File Number 35) [b]
RFI Workplan Addendums	Negotiated with the Division Director [a]
RFI Final Report and Summary Report	September 1994 (Administrative Record File Number 58-61) [b]
RFI Final Report Addendums	Negotiated with the Division Director [a]
Comprehensive Corrective Measures Study with Addendums	Several previous CCMS documents are available in Administrative Record Files [b]

Table III.1 Corrective Action Schedule of Compliance	
Requirement	**Record/ Schedule**
Corrective Measures Study (CMS) Plan	Several previous CMS Plans are available in Administrative Record Files [b]
Corrective Measures Study (CMS) Plan Addendums	Negotiated with the Division Director [a]
Corrective Measures Implementation (CMI)	Several previous CMIs conducted are available in Administrative Record Files[b]; Additional CMIs, as needed, and as approved by the Division Director[a]
CMI Report (also called Corrective Measures Completion Reports)	Several previous CMI Reports submitted and available in Administrative Record Files[b]; Negotiated with the Division Director following completion of scheduled corrective measures implementation at the site[a]
Corrective Measures Implementation (CMI) Addendums	As approved by the Division Director [a]
Work Plan(s) Related to Monitoring and Management-Based Performance Criteria	Several previous Work Plans submitted for on-site field activities and Corrective Actions are available in Administrative Record Files[b]. These include Monitored Natural Recovery Plans, Groundwater Monitoring Plan, and Biomonitoring Plans. Updated, or additional Work Plans are required for submittal as needed and as approved by the Division Director, and will be specific to the activities planned during the field efforts[a]
Contingency Planning: Remote Monitoring (Site-specific SWMU No. 6).	[a] Quarterly remote monitoring unless site conditions change from Scenario 1 (as defined in Table II.1); then as defined in Table II.1. Maintain all remote monitoring imagery records for three (3) years.
Progress Reports	As needed during years without on-site field activities, or as negotiated with the Division Director when implementing corrective action field operations [a]
Written notification of newly-identified Solid Waste Management Units (SWMU)	Within 30 calendar days after discovery [a]
Newly-Identified SWMU Assessment Plan	Within 90 calendar days after receipt of request for plan, or as approved by the Division Director [a]
Implementation of Newly-Identified SWMU Assessment Plan	Within 30 calendar days after written approval of plan, or as approved by the Division Director [a]
Newly-Identified SWMU Assessment Report	Within 90 calendar days from completion of plan implementation, or as approved by the Division Director[a]
Further investigations for newly-identified SWMU	Negotiated with the Division Director [a]
Written notification of newly-discovered release(s) at SWMU(s)	No later than 30 calendar days after discovery [a]
Review and approve RFI Workplan	Completed February 1993 (Administrative Record File Number 35) [b]

Table III.1 Corrective Action Schedule of Compliance	
Requirement	**Record/ Schedule**
Review and approve RFI Report	Completed September 1994 (Administrative Record File Number 58-61) [b]
Review and approve or disapprove CMS Plan(s) and Report(s)	Within 60 calendar days of receipt [a]
Review and approve or disapprove CMI Plan(s) and Report(s)	Within 60 calendar days of receipt [a]
Review and approve or disapprove Work Plan(s) and Report(s)	Within 60 calendar days of receipt [a]
Review and approve or disapprove SWMU Assessment Plan(s) and Report(s)	Within 60 calendar days of receipt [a]

[a] - Ongoing or as needed
[b] - Completed

III.C. REPORTING REQUIRMENTS

III.C.1. The Permittee shall submit to the Division Director a signed progress report on all activities (i.e., SWMU Assessment, Interim Measures, RCRA Facility Investigations, Corrective Measures Study, Corrective Measures Implementation) conducted pursuant to the provisions of this Corrective Action Module. If the Division Director determines that these progress reports are not adding value to the Corrective Action process, the Division Director may reduce or eliminate the reporting requirement. These reports shall contain:

a) A description of work completed;

b) Summaries of all findings, including summaries of laboratory data;

c) Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems; and

d) Projected work for the next reporting period.

III.C.2. Copies of other reports (e.g., inspection reports), drilling logs and laboratory data shall be made available to the Division Director upon request.

III.C.3. The Division Director may require the Permittee to conduct new or more extensive assessments, investigations, or studies, as needed, based on information provided in these progress reports or other supporting information.

III.D. NOTIFICATION REQUIREMENTS FOR AND ASSESSMENT OF NEWLY-IDENTIFIED SOLID WASTE MANAGEMENT UNIT(S)

III.D.1. The Permittee shall notify the Division Director in writing of any newly-identified SWMU(s) (i.e., a unit not specifically identified during the RFA) discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, no later than 30 calendar days after discovery.

III.D.2. After such notification, the Division Director may request, in writing, that the Permittee prepare a SWMU Assessment Plan and a proposed schedule of implementation and completion of the Plan for any additional SWMU(s) discovered subsequent to the issuance of this Permit.

III.D.3. Within 90 calendar days after receipt of the Division Director's request for a SWMU Assessment Plan, or as otherwise allowed by the Division Director, the Permittee shall prepare a SWMU Assessment Plan for determining past and present operations at the unit, as well as any sampling and analysis of groundwater, land surface and subsurface strata, surface water, or air, as necessary to determine whether a release of hazardous waste including hazardous constituents from such unit(s) has occurred, is likely to have occurred, or is likely to occur. The SWMU Assessment Plan must demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative samples, and must include parameters sufficient to identify migration of hazardous waste including hazardous constituents from the newly-discovered SWMU(s) to the environment.

III.D.4. After the Permittee submits the SWMU Assessment Plan, the Division Director shall either approve or disapprove the Plan in writing.

If the Division Director approves the Plan, the Permittee shall begin to implement the Plan within 30 calendar days of receiving such written notification, or as otherwise allowed by the Division Director.

If the Division Director disapproves the Plan, the Division Director shall either (1) notify the Permittee in writing of the Plan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the Plan and notify the Permittee of the revisions. This Division Director-revised Plan becomes the approved SWMU Assessment Plan. The Permittee shall implement the Plan within 30 calendar days of receiving written approval, or as otherwise allowed by the Division Director.

III.D.5. The Permittee shall submit a SWMU Assessment Report to the Division Director within 90 calendar days from completion of the work specified in the approved SWMU Assessment Plan, or as otherwise allowed by the Division Director. The SWMU Assessment Report shall describe all

results obtained from the implementation of the approved SWMU Assessment Plan. At a minimum, the Report shall provide the following information for each newly-identified SWMU:

a) The location of the newly-identified SWMU in relation to other SWMUs;

b) The type and function of the unit;

c) The general dimensions, capacities, and structural description of the unit (supply any available drawings);

d) The period during which the unit was operated;

e) The specifics on all wastes that have been or are being managed at the SWMU, to the extent available; and

f) The results of any sampling and analysis required for the purpose of determining whether releases of hazardous wastes including hazardous constituents have occurred, are occurring, or are likely to occur from the unit.

III.D.6. Based on the results of the SWMU Assessment Report, the Division Director shall determine the pathway for the specific unit(s) covered in the SWMU Assessment:

a) If the Division Director determines that the SWMU Assessment Report indicates that further investigations are needed to determine an appropriate path, the Division Director may require the Permittee to prepare a Workplan for such investigations. SWMU Assessment Plans will be reviewed for approval as described under Permit Condition III.F.3.

b) If the Division Director determines that the SWMU Assessment Report provides that the unit is a SWMU subject to the required Corrective Action Investigation process, the Permit will be modified to identify the unit in table III.2a and the Division Director will provide, in writing, that the unit will be subject to all applicable authorities under the RCRA Hazardous Waste Corrective Action (HWCA) Program.

c) If the Division Director determines that the SWMU Assessment Report provides that no further investigation is needed, the Division Director will provide, in writing, that the unit will not be subject to the authorities under the RCRA HWCA Program with or without contingencies.

III.D.7. Newly-identified units being assessed for inclusion to the corrective action program will be evaluated in accordance with III.D and are identified in Table III.2a:

Table III.2a Newly-Identified SWMU Assessment Units

Unit	Description
Red Hat Storage Area Bunkers CRDA (Johnston Island)	Bunkers are located on the southwest part of the island. Available records need to be reviewed. Previously clean-closed under EPA ID TT9 570 090 001.
Primary CRDA (Johnston Island)	Approximately 8.0 acres in the northeast corner of the island.
Swimming Pool CRDA (Johnston Island)	Approximately 0.2 acres in the center of the island.
East Island CRDA (Hikina Island)	Approximately 0.1 acres in the center west part of the island.
Sand Island CRDA	Approximately 0.1 acres on the western lobe of the island.
North Island CRDA (Northern)	Approximately 0.1 acres in the center part of the island.
North Island CRDA (Southern)	Approximately 0.3 acres in the southcentral part of the island.

III.E. NOTIFICATION REQUIREMENTS FOR NEWLY-DISCOVERED RELEASES AT SWMUs

The Permittee shall notify the Division Director, in writing, of any release(s) of hazardous waste including hazardous constituents discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other activities undertaken after the commencement of the RFI, no later than 30 calendar days after discovery. Per conditions stated in (Module I) Section I.E.14 (a) iv, additional twenty-four (24) hour reporting requirements apply for specific release scenarios and situations. Such newly-discovered releases may be from newly-identified units, from units for which, based on the findings of the RFA, the Division Director had previously determined that no further investigation was necessary, or from units investigated as part of the RFI, or from a unit identified during the SWMU Assessment process. The Division Director may require further investigation of the newly-identified release(s). A plan for such investigation will be reviewed for approval under a RFI Workplan addendum..

III.F. RCRA FACILITY INVESTIGATION (RFI) WORKPLAN

III.F.1. The RFI Workplan has been completed for the Facility. Any future RFI Workplans developed shall be provided as addendums to the RFI completed February 1993 and provided in accordance with Permit

Condition III.D and III.F.3 and in accordance with the compliance schedule listed in Table III.1.

RFI Workplan addendums shall describe the objectives of the investigation and the overall technical and analytical approach to completing all actions necessary to characterize the nature, direction, rate, movement, and concentration of releases of hazardous waste including hazardous constituents from specific units or groups of units, and their actual or potential receptors. RFI Workplan addendums shall detail all proposed activities and procedures to be conducted at the facility, the schedule for implementing and completing such investigations, the qualifications of personnel performing or directing the investigations, including contractor personnel, and the overall management of the investigation.

In addition, the RFI Workplan addendum shall discuss sampling and data collection quality assurance and data management procedures, including formats for documenting and tracking data and other results of investigations, and health and safety procedures

III.F.2. SWMUs and AOCs remaining under the Corrective Action Process are identified in Table III.2b. Any RFI Workplan addendums shall be provided in accordance with Permit Condition III.D and III.F.3 and in accordance with the compliance schedule listed in Table III.1. After the Permittee submits a RFI Workplan addendum, the Division Director will either approve or disapprove the Workplan in writing within sixty (60) calendar days of receipt.

If the Division Director disapproves the RFI Workplan addendum, the Division Director shall either (1) notify the Permittee in writing of the Workplan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the Workplan and notify the Permittee of the revisions. This modified RFI Workplan becomes an approved addendum to the RFI Workplan.

Table III.2b SWMUs and AOCs Under the Corrective Action Process

SWMU or AOC (as identified in RFA)	Description
SWMU No. 1	Solid Waste Burn Pit
SWMU No. 2	Former Herbicide Orange Storage Area
SWMU No. 6	Mixed Metal Debris Area (Scrap Metal Dump) and Stabilized Solid Waste Incinerator Ash Disposal Area

Table III.2b SWMUs and AOCs Under the Corrective Action Process	
SWMU or AOC (as identified in RFA)	**Description**
SWMU No. 16	Power Plant Spill Area
AOC No. 1	Motor Gas (MOGAS) Area
AOC No. 2	Swimming Pool Area and POL System
AOC No. 3	Taxiway Area

III.F.3. The Division Director shall review for approval, as addendums to the RFI Workplan, any plans developed pursuant to Permit Condition III.D, addressing further investigations of newly-identified SWMUs, or Permit Condition III.E, addressing new releases from previously- identified units. The Division Director shall modify this Corrective Action Module either according to procedures of this Permit, or according to the Permit modification procedures under 40 CFR Part 270.41, to incorporate these units and releases into the RFI Workplan.

III.G. RCRA FACILITY INVESTIGATION WORKPLAN IMPLEMENTATION

No later than thirty (30) calendar days after the Permittee has received written approval from the Division Director for an addendum to the RFI Workplan, the Permittee shall begin implementation of the RCRA Facility Investigation according to the schedules specified in the addendum to the RFI Workplan. Pursuant to Permit Condition III.B.3, the RFI shall be conducted in accordance with the approved RFI Workplan.

III.H. RCRA FACILITY INVESTIGATION FINAL REPORT AND SUMMARY REPORT

III.H.1. The RFI Final Report was completed for the Facility. Addendums to the RFI Final Report will be provided after the completion of the RFI in accordance with the schedule outlined in Table III.1. The Permittee shall submit an addendum to the RFI Final Report and Summary Report. The addendum to the RFI Final Report shall describe the procedures, methods, and results of all facility investigations of SWMUs and their releases, including information on the type and extent of contamination at the facility, sources and migration pathways, and actual or potential receptors. The addendum to the RFI Final Report shall present all information gathered under the approved RFI Workplan. The addendum to the RFI Final Report must contain adequate information to support further corrective action or NFA decisions at the facility.

NFA Criteria include, but are not limited to:

a) The area was characterized and/or remediated in accordance with Permit Condition III.O, a risk assessment was performed, and the available data indicate that contaminants do not pose an unacceptable level of risk to human health or the environment under current and projected future land use.

b) The area was characterized and/or remediated in accordance with Permit Condition III.O, and the available data indicate that the Performance Criteria in Permit Condition III.O have been met.

The Summary Report shall describe more briefly the procedures, methods, and results of the RFI process.

III.H.2. After the Permittee submits the addendum to the RFI Final Report and Summary Report, the Division Director shall either approve or disapprove the Reports in writing within sixty (60) calendar days of receipt.

If the Division Director approves the addendum to the RFI Report and Summary Report, the Permittee shall mail the approved Summary Report to all individuals on the facility mailing list established pursuant to 40 CFR Part 124.10, within fifteen (15) calendar days of receipt of approval.

If the Division Director determines the addendum to the RFI Final Report and Summary Report do not fully detail the objectives stated under Permit Condition III.F.1, the Division Director may disapprove the addendum to the RFI Final Report and Summary Report. If the Division Director disapproves the Reports, the Division Director shall notify the Permittee in writing of the Reports' deficiencies and specify a due date for submittal of a revised Final and Summary Report. The Summary Report, once approved, shall be mailed to all individuals on the facility mailing list.

III.I. CORRECTIVE MEASURES STUDY

III.I.1. A Comprehensive Corrective Measures Study (CMS) with addendums has been completed for the Facility. Additional CMS(s) may be required as addendums as follows: If the Division Director has reason to believe that a SWMU has released hazardous constituents in a concentration that poses a threat to human health and the environment given site-specific exposure conditions, the Division Director may require it to enter the CMS process and shall notify the Permittee in writing. This notice shall identify the hazardous constituent(s) which have been determined to threaten human health and the environment given site-specific exposure conditions. The notification may also specify remedial alternatives to be evaluated by the Permittee during the CMS.

III.I.2. A CMS Plan was completed for the Facility. If the Division Director has required the CMS process for a SWMU or AOC, the Permittee shall

submit an addendum to the CMS Plan to the Division Director within forty-five (45) calendar days from notification of the requirement to conduct a CMS.

The addendum to the CMS Plan shall provide the following information:

a) A description of the general approach to investigating and evaluating potential remedies;

b) A definition of the overall objectives of the study;

c) The specific plans for evaluating remedies to ensure compliance with remedy standards;

d) The schedules for conducting the study; and

e) The proposed format for the presentation of information.

III.I.3. If the Division Director disapproves the addendum to the CMS Plan, the Division Director shall, within sixty (60) calendar days of receipt, either (1) notify the Permittee in writing of the Plan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the Plan and notify the Permittee of the revisions. This modified Plan becomes the approved addendum to the CMS Plan.

III.J. CORRECTIVE MEASURES STUDY IMPLEMENTATION

Following the received written approval from the Division Director for the addendum to the CMS Plan, the Permittee shall begin to implement the Corrective Measures Study according to the schedules specified in Table III. 1. Pursuant to Permit Condition III.B.3, the CMS shall be conducted in accordance with the approved Plan.

III.K. CORRECTIVE MEASURES STUDY FINAL REPORT

III.K.1. Within sixty (60) calendar days after the completion of the CMS, the Permittee shall submit a CMS Final Report. The CMS Final Report shall summarize the results of the investigations for each remedy studied and of any bench-scale or pilot tests conducted. The CMS Report must include an evaluation of each remedial alternative. The CMS Report shall present all information gathered under the approved CMS Plan. The final report must contain adequate information to support the Division Director in the remedy selection decision making process, described in Permit Condition III.L.

III.K.2. If the Division Director determines that the CMS Final Report does not fully satisfy the information requirements specified under Permit Condition III.K.1, the Division Director may, within sixty (60) calendar

days of receipt, disapprove the CMS Final Report. If the Division Director disapproves the Final Report, the Division Director shall notify the Permittee in writing of deficiencies in the Report and specify a due date for submittal of a revised Final Report.

III.K.3. As specified under Permit Condition III.B.5, based on preliminary results and the final CMS Report, the Division Director may require the Permittee to evaluate additional remedies or particular elements of one or more proposed remedies.

III.L. REMEDY SELECTION AND CORRECTIVE MEASURES IMPLEMENTATION

III.L.1. Based on the results of the CMS and any further evaluations of additional remedies under this study, the Division Director shall select a remedy from the remedial alternatives evaluated in the CMS that will (1) be protective of human health and the environment; (2) satisfy the concentration levels or other performance criteria as specified in Table III.3; (3) control the source(s) of release(s) so as to reduce or eliminate, to the maximum extent practicable, further releases that might pose a threat to human health and the environment; and (4) meet all applicable waste management requirements.

III.L.2. In selecting the remedy which meets the standards for remedies established under Permit Condition III.L.1, the Division Director shall consider the following evaluation factors, as appropriate:

a) Long-term reliability and effectiveness. Any potential remedy(s) may be assessed for the long-term reliability and effectiveness it affords, along with the degree of certainty that the remedy will prove successful. Factors that shall be considered in this evaluation include:

   i. Magnitude of residual risks in terms of amounts and concentrations of waste remaining following implementation of a remedy, considering the persistence, toxicity, mobility, propensity to bioaccumulate, and other biological effects of such hazardous wastes including hazardous constituents;

   ii. The type and degree of long-term management required, including monitoring and operation and maintenance;

   iii. Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, redisposal or containment;

iv. Long-term reliability of the engineering and institutional controls, including uncertainties associated with land disposal of untreated wastes and residuals; and

v. Potential need for replacement of the remedy.

b) Reduction of toxicity, mobility, and volume. A potential remedy(s) may be assessed as to the degree to which it employs treatment that reduces toxicity, mobility, or volume of hazardous wastes including hazardous constituents.

Factors that shall be considered in such assessments include:

i. The treatment process the remedy(s) employs and materials it would treat;

ii. The amount of hazardous wastes including hazardous constituents that would be destroyed or treated;

iii. The degree to which the treatment is irreversible; and

iv. The residuals that will remain following treatment, considering the persistence, toxicity, mobility, and propensity to bioaccumulate of such hazardous wastes including hazardous constituents.

c) The short-term effectiveness of a potential remedy(s) may be assessed considering the following:

i. Magnitude of reduction of existing risks;

ii. Short-term risks that might be posed to the community, workers, or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal or containment; and

iii. Time until full protection is achieved.

d) Implementability. The ease or difficulty of implementing a potential remedy(s) may be assessed by considering the following types of factors:

i. Degree of difficulty associated with constructing the technology;

ii. Expected operational reliability of the technologies;

iii. Need to coordinate with and obtain necessary approvals and permits from other agencies;

iv. Availability of necessary equipment and specialists; and

v. Available capacity and location of needed treatment, storage, and disposal services.

e) Cost. The types of costs that may be assessed include the following:

i. Capital costs;

ii. Operation and maintenance costs;

iii. Net present value of capital and operation and maintenance costs; and

iv. Potential future remedial action costs.

III.L.3. The Permittee shall submit a CMI Plan to the Division Director to address those units which, based on the results of the CMS, require corrective measures or additional environmental assessment and/or monitoring. The CMI Plan shall describe the design, construction, maintenance, monitoring and other applicable requirements of this permit for the selected remedy for each unit that requires corrective measures, and detail all proposed activities and procedures to be implemented.

III.L.4. After the Permittee submits the CMI Plan, the Division Director will either approve or disapprove the CMI Plan in writing within sixty (60) calendar days of receipt.

If the Division Director disapproves the CMI Plan, the Division Director shall either (1) notify the Permittee in writing of the CMI Plan's deficiencies and specify a due date for submittal of a revised Plan, or (2) revise the CMI Plan and notify the Permittee of the revisions. This modified Plan becomes the approved CMI Plan.

III.L.5. No later than thirty (30) calendar days after the Permittee has received written approval from the Division Director for the CMI Plan, the Permittee shall begin to implement the corrective measures according to the schedules specified in the CMI Plan. Pursuant to Permit Condition III.B.3, the CMI shall be conducted in accordance with the approved Plan.

III.L.6. Within sixty (60) calendar days after the completion of the CMI, the Permittee shall submit a CMI Final Report. The CMI Final Report shall summarize the results of the corrective measures implemented and present all pertinent information gathered during implementation. The final report

must contain adequate information to demonstrate to the Division Director that the remedial objectives and standards have been met.

If the Division Director determines that the CMI Final Report does not fully satisfy the information requirements specified above, the Division Director may disapprove the CMI Final Report. If the Division Director disapproves the Final Report, the Division Director shall notify the Permittee in writing of deficiencies in the Report and specify a due date for submittal of a revised Final Report.

III.M. PERMIT MODIFICATION FOR REMEDY

Based on information the Permittee submits in the original and addendums to the RFI Final and Summary Reports, the CMS Final Report, and other information, the Division Director will select a remedy and, if necessary, initiate a modification to this Permit, pursuant to 40 CFR Part 270.42.

The modification or other information submitted pursuant to this Permit shall specify the selected remedy and include, at a minimum, the following:

a) Description of all technical features of the remedy that are necessary for achieving the standards for remedies established under this Permit including length of time for which compliance must be demonstrated at specified points of compliance;

b) All concentration levels of hazardous constituents in each medium or alternative controls that the remedy much achieve or implement, respectively, to be protective of human health and the environment;

c) All requirements for achieving compliance with hazardous constituent concentration levels or implementation of alternative controls.

d) All requirements for complying with the standards for management of wastes;

e) Requirements for removal, decontamination, closure, or post-closure of units, equipment, devices, or structures that will be used to implement the remedy;

f) A schedule for initiating and completing all major technical features and milestones of the remedy; and

g) Requirements for submission of reports and other information.

III.N. MODIFICATION OF THE CORRECTIVE ACTION MODULE

III.N.1. If at any time the Division Director or the Permittee determine that modification of this Corrective Action Module is necessary, he or she may initiate a modification according to the procedures of 40 CFR Part 124.10 and 40 CFR Part 270.42.

a) For documents pertaining to the corrective action SWMUs and AOCs addressed in this Permit, the following repository is hereby designated:

U.S. Environmental Protection Agency
Pacific Islands Contact Office
300 Ala Moana Blvd.
Prince Kuhio Federal Building, Room 5152
Honolulu, Hawaii 96813

III.N.2. Modifications to the Corrective Action Module do not constitute a reissuance of the Permit.

III.O. CORRECTIVE ACTIONS FOR SWMUs AND AOCs

III.O.1. Completion of Corrective Action Responsibilities

Corrective action responsibilities under this Permit shall be deemed complete with respect to an individual SWMU or AOC upon the occurrence of the following:

a) A determination, based on investigation(s) conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected future land use; or

b) A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected future land use.

III.O.2. Procedures for Acknowledging Completion

The following procedures shall confirm the completion of corrective action responsibilities for an individual SWMU or AOC:

a) The Permittee shall submit information to the Division Director demonstrating that Permit Condition III.O.1.a or III.O.1.b has been met. The information submitted may be in the form of a NFA Report, a CMI Final Report, or other report form, as appropriate, as described in Permit Condition III.O.4.

b) Within sixty (60) calendar days of receipt of the information required in Permit Condition III.O.2.a, the Division Director shall either (1) issue a letter to the Permittee approving the report and agreeing that either the NFA Criteria in Permit Condition III.H.1 or the Corrective Action Criteria in Table III.3 have been met; or (2) issue a

letter to the Permittee disapproving the report and explaining the basis for the disapproval.

The Division Director's letter acknowledging completion of the NFA or Corrective Action Criteria may take the following or similar form, at the Division Director's discretion:

"Based on the [enter report title] dated [enter date], the [No Further Action Criteria in Permit Condition III.H.1 or Corrective Action Criteria in Table III.3 [enter appropriate criteria] have been met for the following SWMU(s)/AOC(s) [list SWMU(s)/AOC(s)]. Because the remediation objectives/goals at the identified SWMU(s)/AOC(s) are complete, the Division Director has determined that these SWMU(s)/AOC(s) require no further action at this time."

III.O.3. Permit Termination

Upon completion of corrective actions in all SWMUs and AOCs as defined in Permit Condition III.O.2, the Division Director may initiate termination of the Permit, in accordance with Table III.1. If the Division Director determines that he or she will not initiate termination of the Permit, the Permittee may seek Permit termination by submission of a determination of completion, which shall include information sufficient for the Division Director to verify that corrective actions in all SWMUs and AOCs, and all other actions required by this Permit, have been successfully completed. The Division Director shall review the determination of completion, and either shall terminate the Permit or shall identify shortcomings in the Permittee's performance under this Permit and/or in the determination of completion, which the Permittee shall rectify prior to resubmission of the determination of completion

III.O.4. Requirements for Submission of Reports and Other Information

a) Within sixty (60) calendar days after the completion of the corrective action, the Permittee shall submit an NFA Report, a CMI Final Report, or other report form or information, as appropriate. The report shall summarize the results of the corrective action implementation, and present all pertinent information gathered during implementation. The report must contain adequate information to demonstrate to the Division Director that the remedial objectives/goals for each area have been met.
b) After the Permittee submits the report, the Division Director shall either approve or disapprove the report in writing. If the Division Director determines that the report does not fully satisfy the information requirements specified in Permit Condition III.O.4.a, he or she may disapprove the report. If the Division Director disapproves the report, he or she shall notify the Permittee in writing of the report's deficiencies and specify a due date for submittal of a revised final report.

c) If the Division Director determines that the report satisfies the information requirements specified in Permit Condition III.O.4.a, and if he or she determines that implementation of the selected corrective action has achieved the cleanup objectives, the Division Director may initiate actions to remove the area from Tables III.2 and III.3.

III.P. STAGING PILES

Not Applicable.

Table III.3 CORRECTIVE ACTION CRITERIA

SWMU or AOC	Current Performance Criteria
SWMU No. 1 Solid Waste Burn Pit	**Monitoring-Based:** Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where: • Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or • The Air Force proposes to remove the fishing prohibition.
	Management-Based: Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.
SWMU No. 2 Former Herbicide Orange Storage Area	**Monitoring-Based:** Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where: • Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or • The Air Force proposes to remove the fishing prohibition.
	Management-Based: Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.

Table III.3 CORRECTIVE ACTION CRITERIA

SWMU or AOC	Current Performance Criteria
SWMU No. 6 Mixed Metal Debris Area and Stabilized Solid Waste Incinerator Ash Disposal Area	**Monitoring-Based:** For as long as stabilized ash is left in place, continue monitoring-based performance criteria every five (5) years. Monitoring will be conducted under the prepared, submitted, and approved Groundwater Monitoring Plan developed in accordance with Table III.1; Continue groundwater monitoring at four (4) points of compliance, including two (2) existing monitoring wells and two (2) new monitoring wells (install in 2020); COCs in groundwater are total and dissolved lead. Groundwater cleanup goals for COCs are specified in Table III.5. **Management-Based:** Continue management-based performance criteria every five (5) years in perpetuity for as long as ash in left in place. Inspect and maintain the integrity of the cap every 5 years with remote monitoring performed quarterly unless the site condition [scenario] changes, then perform remote monitoring and response as defined by Module II Table II.1. Conduct topographical, land, and groundwater elevation surveys for SWMU No. 6 during the next on-site event (2020); Identify boundaries and elevation of the SWMU based on survey data. Update groundwater flow based on groundwater elevation survey data. Update Base records with location data and maintain satellite imagery collected for remote monitoring for three (3) years. Install/maintain warning signs restricting access and excavation within this SWMU. Warning signs will be maintained by replacing signage every five (5) years and will be visible at all times.
SWMU No. 16, Power Plant Spill Site, and AOC No. 1, Motor Gasoline (MOGAS) Area	**Monitoring-Based:** Continue groundwater monitoring at six groundwater points of compliance every five (5) years. Analyze groundwater samples for the COC(s). COC(s) in groundwater are TPH and PAHs. Continue groundwater monitoring until three (3) consecutive sampling events meet groundwater action levels. Action levels for groundwater are listed in Table III.5. Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where: • Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or • The Air Force proposes to remove the fishing prohibition. **Management-Based:** Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.
AOC No. 2, Swimming Pool Area, and AOC No. 3, Taxiway Area	**Monitoring-Based:** Continue groundwater monitoring at nine (9) groundwater points of compliance every five (5) years. Analyze groundwater samples for the COC(s). COC(s) in groundwater are TPH. Continue groundwater monitoring at points of compliance until three (3) consecutive sampling events meet groundwater action levels. Action levels for groundwater are listed in Table III.5.
Notes:	AOC = Area of Concern COC = constituent of concern PAH = polynuclear aromatic hydrocarbon SWMU = Solid Waste Management Unit TPH = total petroleum hydrocarbons

TABLE III.4 SOIL ACTION LEVELS				
SWMU or AOC	**Chemical Group**	**Constituent of Concern**	**Cleanup Goal (mg/L)**	**Basis**
Not Currently Applicable.				

TABLE III.5 GROUNDWATER ACTION LEVELS				
SWMU or AOC	**Chemical Group**	**Constituent of Concern**	**Cleanup Goal (mg/L)**	**Basis**
SWMU No. 16/AOC No. 1	PAH	Acenaphthylene	0.30	Marine acute AWQC
		Anthracene		
		Benzo(a)pyrene		
		Benzo(k)fluoranthene		
		Benzo(b)fluoranthene		
		Benzo(g,h,i)perylene		
		Benzo(a)anthracene		
		Chrysene		
		Dibenz(a,h)anthracene		
		Fluorene		
		Ideno(1,2,3-cd)pyrene		
		2-Methylnaphthalene		
		Pyrene		
		Acenaphthene	0.71	Marine chronic AWQC
		Fluoranthene	0.016	Marine chronic AWQC
		Naphthalene	2.35	Marine acute AWQC
		Phenanthrene	0.0046	Marine chronic AWQC
SWMU No. 6	Metal	Dissolved Lead	0.015	Federal MCL
		Total Lead	0.015	Federal MCL
SWMU No. 16/AOC No. 1, AOC Nos. 2 and 3	TPH[a]	VPH EPH	0.64	Marine bioassay testing; RWQCB Region 2 – final groundwater screening level

Notes:
[a] – TPH assessed as fractional volatile petroleum hydrocarbons (VPH) and fractional extractable petroleum hydrocarbons (EPH) by Northwest Total Petroleum Hydrocarbon (NWTPH) method
AWQC = ambient water quality criteria
mg/L = milligram per liter
MCL = maximum contaminant level
RWQCB = Regional Water Quality Control Board
TPH = total petroleum hydrocarbons

APPENDIX B

Justification Statement for Permit Modification for SWMU No. 6

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL

APPENDIX B

JUSTIFICATION STATEMENT FOR
PERMIT MODIFICATION FOR
SOLID WASTE MANAGEMENT UNIT NUMBER 6

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL
FOR
JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

July 2018

FINAL

APPENDIX B

JUSTIFICATION STATEMENT FOR PERMIT MODIFICATION FOR SOLID WASTE MANAGEMENT UNIT NUMBER 6

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL FOR JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

Prepared for:

Air Force Civil Engineer Center

July 2018

TABLE OF CONTENTS

Page

LIST OF FIGURES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

µg/kg	Microgram(s) per kilogram
µg/L	Microgram(s) per liter
Air Force	U.S. Air Force
AOC	Area of contamination
AWQC	Ambient water quality criteria
CAMU	Corrective Action Management Unit
CCC	Criterion Continuous Concentration
CFR	Code of Federal Regulations
COC	Contaminant of concern
EA	EA Engineering, Science, and Technology, Inc., PBC
EPA	U.S. Environmental Protection Agency
EPC	Exposure point concentrations
HSWA	Hazardous Solid Waste Amendments of 1984
HWCA	Hazardous Waste Corrective Action
ID	Identification or Identifier
JI	Johnston Island
LOD	Limit of detection
MCL	Maximum contaminant level
mg/kg	Milligram(s) per kilogram
mg/L	Milligram(s) per liter
MMDA	Mixed Metal Debris Area
NFA	No Further Action
No.	Number
NOAA	National Oceanic and Atmospheric Administration
RA	Risk assessment
RCRA	Resource Conservation and Recovery Act
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TSDF	Treatment, storage, and disposal facility
UHC	Underlying hazardous constituent
	U.S. Air Force (Air Force) (*used in references*)
UTS	Universal treatment standard

1. INTRODUCTION AND PURPOSE

The U.S Air Force (Air Force) is requesting permit modification for Solid Waste Management Unit (SWMU) Number (No.) 6 for Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004 (EPA 2004). The monitoring-based and management-based performance criteria at SWMU No. 6 are not complete and will be retained, with changes, in the permit modification.

This SWMU is currently operated under agreement by the Air Force and EPA. Outstanding requirements and modifications to the requirements listed as Performance Criteria under the 2004 Permit have been addressed in this Permit Modification, as discussed in Section 2. A map showing the general location of Johnston Atoll is shown in Figure 1, and the location of the SWMU is shown in Figure 2.

Information and analytical data presented in the following documents were used to evaluate site conditions and historical information about SWMU No. 6:

- U.S. Air Force and EPA Letters. Multiple letters from 2016-2017.
- Corrective Measures Completion Report (CMCR) for SWMU No. 6 Johnston Atoll.
- Final Technical Report Johnston Island Seawall Evaluation and Estimate of Island Erosion and Future State.
- Final Monitoring, Engineering Evaluation, and Maintenance Report, Resource Conservation and Recovery Act Monitored Natural Attenuation and Corrective Action at Solid Waste Management Units and Areas of Concern and Engineering Evaluation Data Collection at Johnston Atoll Airfield Sites.
- Temporary Authorization for Permit Modifications Johnston Atoll Storage EPA I.D. Number TT9570090002.
- Memorandum. 17 August 2010. Conceptual Review of the Document: Appendix B: Corrective Measures Completion Report for SWMU No. 6, Conservative Risk Evaluation for Single-Release Event, Dated May 6 2005.
- Draft Close Out Report for Solid Waste Burn Pit Ash Stabilization /Solidification (1995).
- Johnston Island RCRA Facility Investigation Final Report.
- Decision Document for No Further Action Declaration Mixed Metal Debris Installation Restoration Program Site No. DP10 Johnston Island, USA.

1.1 Permit Criteria

Monitoring and management-based performance criteria have not been met and are ongoing. A permit modification is being requested for SWMU No. 6 in order to establish groundwater cleanup criteria for the site and identify Permit requirements for the conducting activities during

the next on-site visit (in 2020). In addition to the other Performance Criteria modifications proposed, the Air Force has included more details on the remote monitoring requirement. The Air Force proposes responses for several different scenarios that may occur with changing site-conditions.

SWMU No. 6 does not currently meet the criteria for NFA and all required performance criteria corrective action will continue at SWMU No. 6. The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1, as follows:

a) *"A determination, based on investigations conducted in accordance with this permit, that no further action is necessary, and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

If the Air Force decides to pursue NFA for this site, they will work with the EPA to develop an acceptable strategy to do so in accordance with the EPA permit modification process and in accordance with all applicable regulations. The Air Force understands that currently a proposal of NFA with contents left in place will not be considered by EPA without sufficiently providing that there is not unacceptable level of risk to human health or the environment under current or projected land use.

1.2 Document Organization

The modifications made in the proposed Permit for SWMU No. 6 are addressed in Section 2. The information presented in Section 2 includes a brief description of the SWMU, including its location and physical description, its operating history, and a brief summary of relevant investigation results. The justification for the permit modification decisions are provided IN Section 3. The references used during the preparation of this document are listed in Section 4.

2. GENERAL INFORMATION FOR SWMU NO. 6

2.1 Location and Physical Description

SWMU No. 6, is located on the northwest side of JI (Figure 1). Also known as the MMDA, the unit was previously (1970s) used as a solid waste disposal incineration pit and reportedly contained a variety of waste including lead-acid batteries and asbestos-containing debris. A remedial effort in the late 1980s removed all buried asbestos-containing debris and lead-acid batteries (Raytheon 1994a, 1994b).

In 1995, as part of a remedial corrective action for SWMU No. 1, untreated non-hazardous ash and decharacterized non-hazardous ash were placed for final disposal at SWMU No. 6 (USAF 1995). The estimated volume of all contents at SWMU No. 6 is 70,000 cubic yards (cy), including the ash and the remaining MMDA related contents. To note, decharacterized is the RCRA term for characteristic hazardous waste that has been treated to the specified RCRA universal treatment standard requirements rendering resulting in non-hazardous solid waste (EPA 2001). For differentiating the SWMU No. 6 site circumstances, there are two types of ash present originating from approved and permitted corrective action activities carried out at SWMU No. 1 in 1995: untreated non-hazardous ash, and decharacterized non-hazardous ash (Raytheon 1994a).

A typical cross section of the SWMU No. 6 design (as provided in the CMCR) is reproduced for inclusion in this document on Figure 2 (CH2M Hill 2005).

2.2 Investigation Summary

Under the SWMU No. 1 remediation project, the Air Force gained approval from the EPA to place approximately 15,000 cy of solid waste incinerator ash originating from SWMU No. 1 at SWMU No. 6 area for final disposal. The remediation project was carried out under the Temporary Authorization for Permit Modifications for Johnston Atoll Storage, EPA ID No. TT9570090002 (EPA 1995). Temporary Authorization allowed the specific treatment activities to be conducted within a specified timeframe and at specific approved areas. All activities were successfully completed in accordance with the Permit Modification approval and prior to the expiration of the Temporary Authorization timeframe. Records and site history for SWMU No. 1 indicate that there were no known listed wastes included in the incineration that created the ash, but that some of the ash was classified hazardous due to the toxicity characteristic for D008 (lead). The remaining volume of ash was classified as non-hazardous (USAF 1995).

All RCRA classified hazardous (D008) ash was successfully treated and stabilized onsite at the CAMU established at SWMU No. 1 using approved stabilization methods and was verified through representative sampling to be below the effective universal treatment standards and applicable hazardous regulatory level (5.0 mg/L TCLP for D008 Lead) (Raytheon 1994a, USAF 1995). The stabilized ash was therefore decharacterized to non-hazardous classification as is defined by the EPA and RCRA regulation.

The estimated volume of all ash placed at SWMU No. 6 is estimated 15,000 cy of ash and related SWMU No. 1 debris was reported in historical documents to be placed using methods enabling the possibility of future removal. Also, as part of the conditions of the disposal of the ash, sampling occurred at SWMU No. 6 prior to and following the placement of the ash. Results from the pre and post sampling presented the following:

> "To evaluate the potential for human health risk, the calculated EPCs [exposure point concentrations] were compared to risk-based action levels for soil [presented in Corrective Measures Completion Report (CMCR) Table 4-1]. The methodology used to develop the risk-based action levels is described in *Task Order No. 208, Technical Memorandum No. 1: Proposed Action Levels and Cleanup Goals for Soil and Groundwater at Johnston Atoll"* (USAF 1995, CH2M HILL 2005).

The results indicate that, of the 31 constituents detected in the stabilized ash material, the EPCs were below the action level for all except four constituents: arsenic, chromium, lead, and benzo(a)pyrene. These constituents were evaluated more closely to determine the significance of these exceedances, where lead was determined to be the only contaminant of concern (USAF 1995, CH2M HILL 2005).

The following summary is from the CMCR, and provides detail on the placement of the ash:

> "Prior to placing the ash, the SWMU consisted of a pit and piles of concrete rubble adjacent to the pit. To allow for a potential future removal of the ash, the gaps between the concrete piles were filled with smaller sized rubble, clean fill, and smoothed. Of the 12,100 cubic yards of ash, 2,100 cubic yards was untreated non-hazardous ash. The uncontaminated [untreated non-hazardous] ash was placed first in 6-inch-thick lift layers and compacted to 85% of maximum dry density. The remaining 10,000 cubic yards of decharacterized non-hazardous ash was placed over the layer of untreated non-hazardous ash starting in the pit. Upon filling the pit, the remaining decharacterized non-hazardous ash was spread over the smoothed concrete rubble. The ash was graded flat and sides sloped at 4:1 horizontal to vertical. The final lift of ash was compacted to 95% of maximum density. A geotextile fabric (100-mil) was placed over the compacted ash and 12-18 inches of clean fill was added on top in 6-inch-thick lift layers and compacted to 95% of maximum density" (USAF 1995, CH2M HILL 2005).

The CMCR was conducted in accordance with the Permit requirements and the findings of the RFI. According to the Decision Document the limits of the MMDA contents of the SWMU included the pit itself and the berm surrounding the pit. It does not include the area south of the pit (Raytheon 1994b).

Although decharacterization was performed, lead originating from and found within the decharacterized ash and the other SWMU No. 6 contents have been communicated to the Air Force as being of concern to EPA due to the primary risk of direct contact to primarily marine receptors during erosion or a catastrophic event (EPA 2004, EPA 2010, and EPA 2017).

Beginning in at least 2010 the EPA has communicated that NFA would not be agreeable with the decharacterized ash remaining in place based on the health risk assessments (EPA 2010, and EPA Letters 2017).

Prior to ash placement at SWMU No. 6, there was limited removal of the historical MMDA contents, and the site received NFA following those efforts (Raytheon 1994b). Therefore, it unlikely that any remaining historical MMDA contents existing underneath the ash would be the rationale for the prevention of NFA.

The groundwater data available for SWMU No. 6 ranges from samples collected from 1998 through 2015 from two or four points of compliance (monitoring wells) outlined in the Permit. Some points of compliance became unavailable for sampling, which is why no data are available for those wells in certain years. All groundwater data for SWMU No. 6 are summarized in Table 3 of the Permit Narrative. The historic groundwater data show that there have not been any recent exceedances for total lead exceeding the Federal drinking water standard Maximum Contaminant Level [MCL] of 0.015 mg/L, and none of the dissolved lead concentration results have exceed this proposed groundwater cleanup level. Most recent dissolved and total lead data were not detected at the limit of detection (LOD), when the LOD was below 0.015 mg/L.

This page intentionally left blank

3. PROPOSED PERMIT CHANGES

The Justification for the Permit modifications described below, including referenced discussion for the changes proposed in Module II, are discussed in the following Sections 3.1 and 3.2. If SWMU No. 6 ash is left in place, monitoring and management-based performance criteria (including all remote monitoring requirements) will be performed in perpetuity.

Table III.3 of the 2004 Permit (Modification 1) specifies the following monitoring and management-based performance criteria for SWMU No. 6:

- *Monitoring-Based: Points of Compliance for groundwater monitoring are wells: MMD MW01, MMD MW04, MMD MW05, and MMD MW06. COCs in groundwater are total and dissolved lead. Continue groundwater monitoring in accordance with EPA approved Groundwater Monitoring Work plan prepared and submitted in accordance with Table 111.1. Upon island closure, initiate remote visual monitoring of SWMU and adjacent seawall integrity in accordance with EPA approved Groundwater Monitoring Workplan. This SWMU will require a permit modification to select a final remedy with clean up goals or to propose No Further Action.*
- *Management-Based: Inspect and maintain integrity of soil cap. Prohibit excavation or construction of buildings within this SWMU.*

The Permit modification proposed includes the following as the monitoring and management-based performance criteria for SWMU No. 6:

- *Monitoring-Based: For as long as stabilized ash is left in place, continue monitoring-based performance criteria every five (5) years. Monitoring will be conducted under the prepared, submitted, and approved Groundwater Monitoring Plan developed in accordance with Table III.1; Continue groundwater monitoring at four (4) points of compliance, including two (2) existing monitoring wells and two (2) new monitoring wells (install in 2020); COCs in groundwater are total and dissolved lead. Groundwater cleanup goals for COCs are specified in Table III.5.*

- *Management-Based: Continue management-based performance criteria every five (5) years in perpetuity for as long as ash in left in place. Inspect and maintain the integrity of the cap every 5 years with remote monitoring performed quarterly unless the site condition [scenario] changes, then perform remote monitoring and response as defined by Module II Table II.1. Conduct topographical, land, and groundwater elevation surveys for SWMU No. 6 during the next on-site event (2020); Identify boundaries and elevation of the SWMU based on survey data. Update groundwater flow based on groundwater elevation survey data. Update Base records with location data and maintain satellite imagery collected for remote monitoring for three (3) years. Install/maintain warning signs restricting access and excavation within this SWMU. Warning signs will be maintained by replacing signage every five (5) years and will be visible at all times.*

3.1 Modules I and II Modifications

No site-specific modifications are proposed for Module I (General Permit Conditions).

Site-specific modifications are proposed for Module II (General Facility Conditions). As part of the modification to Module II, a new Table has been added to the Contingency Planning Section II.J that provides the site-specific remote monitoring and response requirements for SWMU No. 6 under different scenarios where remote monitoring indicates there is no release, potential release, or catastrophic release of solid waste incinerator ash material into the environment. This Module II incorporation of site-specific remote monitoring is in addition to additions made to the Module III Corrective Action Section of the Permit (discussed in section 3.2).

The modifications include a new table, Table II.1, used to incorporate the remote monitoring frequency under different scenarios and the associated required Air Force response for possible changing and degrading site conditions. The responses required under a potential or confirmed release were appropriate to address under the Contingency Plan section of the Permit (II.D). The scenarios and associated required responses shown in Table II.1 of the Permit (Appendix A) are intended to prevent or mitigate for any potential exposures to receptors, including threatened and endangered species (green sea turtle and Hawaiian Monk Seal).

Table II.1 lists six scenarios that cover the existing, likely, and hypothetical site conditions. A remote monitoring frequency for each of the scenarios is included that increases the frequency of monitoring based on the specified site-condition. Additionally, the Air Force's response is specified under each of the scenarios and was selected based on its ability to be protective to potential receptors, especially threatened and endangered species.

Of particular importance is the catastrophic release scenario, which EPA has communicated as a concern because previous Permits have not specified how the Air Force would be required to respond to such an event. The proposed modifications to the Permit, incorporates this element of contingency planning and response for a catastrophic event, and other degraded site-conditions into the permit.

The Air Force has proposed a response which includes immediately initiating the deployment of personnel to mitigate potential exposures to threatened and endangered species. While these sensitive species would be the focused priority for the deployed personnel, depending on the mitigation approach, those actions may also reduce exposures and impacts to non- threatened and endangered species (i.e. migratory birds), which is a potential added benefit of this response approach. Because the Air Force has included a response for the current, likely, possible, and hypothetical scenarios, it is proposed that the EPA may find "No Effect" on threatened and endangered species under the proposed action of the Permit Renewal. By including a response for the possible releases into the environment, the Air Force has provided the mitigation approach that would protect receptors, including the green sea turtle and Hawaiian Monk Seal.

Because any response activity performed at SWMU No. 6, would be conducted under the authority of RCRA corrective action, there are important human health safety considerations

required by other regulatory authorities. Responses completed under RCRA corrective actions are discussed in the Occupational Safety and Health Administration (OSHA), Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard's scope in subparagraph 29 CFR 1910.120 (a)(1)(ii). As, such, the Air Force would only allow adequately and relevantly trained personnel to be deployed to the Facility under a catastrophic scenario at SWMU No. 6. Under OSHA and HAZWOPER regulation standards, the site would need to be evaluated to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect deployed personnel from the identified hazards (29 CFR 1910.120(c)(1)). Especially under a catastrophic scenario, the Air Force would deploy personnel after determining acceptable site conditions exist, and Personnel would be deployed when adequate risk protections to those site-workers were determined possible.

Section II.K (Record Keeping and Reporting) was also modified to include a record requirement for the satellite imagery collected for SWMU No. 6 Remote Monitoring. The Air Force will specifically keep and maintain the remote monitoring imagery for three years. This requirement ensures access to those records should a request be made for them for any reason, including for an independent evaluation of the site conditions.

3.2 Module III Modifications

Several site-specific modifications were made to Module III (Corrective Action for SWMUs and AOCs). Module III modifications discussed in this section provide additional details on the proposed incorporation of the Federal MCL as the groundwater protection standard for total and dissolved lead; and additional information on the monitoring-based performance criteria modifications. As previously discussed, Module III addresses the general requirement for performing remote monitoring as a corrective action performance criterion for this site.

3.2.1 Modifications to Monitoring-Based Criteria

A permit modification is being requested for SWMU No. 6 which if approved, the proposed groundwater cleanup level (0.015 mg/L) will become the designated groundwater cleanup goals for both total lead and dissolved lead. This modification is justified based on EPA guidance during March 2018 meetings.

Table III.5 of the 2004 Permit does not specify the media cleanup goals for total or dissolved lead. It was previously proposed to use the Federal MCL of 0.015 mg/L, but the proposed level was never officially approved by the EPA. In all future sampling, the analytical method LOD will be below the media cleanup goal with this specific requirement stated in the Groundwater Monitoring Plan, which is an extension of the Permit.

The 2004 Permit and previous EPA communications with the Air Force have discussed the various alternative levels considered for use as the groundwater cleanup goal for total and dissolved lead. Recent groundwater results have shown non-detectable concentrations of total and dissolved lead, with LOD(s) less than the proposed cleanup goal. The Air Force will specify

that the LOD be at least below the cleanup goal in the associated Groundwater Monitoring Work Plan (GWMP)_completed prior to each monitoring event.

To note, the LOD for dissolved lead could also be specified to be below the most conservative saltwater ecological risk-based level specified in the Ambient Water Quality Criteria (AWQC) guidance (0.0081 mg/L) (EPA, n.d). While any concentration of dissolved lead detected in the monitoring wells would likely need to consider a dilution attenuation factor or other site-specific evaluations, this would be a way to address historical comments regarding the LOD not being low enough to evaluate potential impacts to marine-based receptors. To note, as provided in Attachment 1, if ever the AWQC is used for data evaluation, only dissolved lead results are appropriate for comparison to the standard. The Air Force does not propose to develop a site-specific level that calculates the dilution attenuation factor at this time but would evaluate that approach should groundwater conditions change and exceedances to the cleanup goal are reported.

Additional modifications made to the Monitoring-based criteria for SWMU No. 6 are sufficiently addressed in the Permit Narrative, but are summarized here, as follows:

- Specify the scheduled monitoring frequency as every five (5) years;
- Update the identifiers (IDs) of listed monitoring well (MW) points of compliance;
- Install replacement MWs and maintain a total of four (4) MW points of compliance.

3.2.2 Modifications to Management-Based Criteria

The Air Force will perform quarterly satellite imagery evaluations and will provide the EPA notification of any erosion issues discovered through these data evaluations, or of any site-conditions that change the effective scenario (per Table II.1) which are reported by the on-site USFWS personnel.

Additional modifications made to the maintenance-based criteria for SWMU No. 6 are sufficiently addressed in the Permit Narrative, but are summarized here, as follows:

- Specify the scheduled maintenance frequency as every five (5) years;
- Conduct topological, land and groundwater surveys for SWMU No. 6;
- Install and maintain warning signs every five (5) years communicating restricted access and prohibiting excavation.

4. REFERENCES

29 CFR 1910.120. Occupational Safety and Health Administration, Hazardous Waste Operations and Emergency Response Standard. Retrieved from: https://www.osha.gov/html/faq-hazwoper.html; https://www.osha.gov/laws-regs/standardinterpretations/1992-07-14 . Accessed 11 June 2018.

U.S. Air Force () and EPA Letters. 2017. Multiple letters from 2016-2017. Air Force communications with EPA (Angela Hendrichsen Sandoval) Letters from November 2016 through March 2017; and Response to Comment table.

CH2M Hill. 2005. Corrective Measures Completion Report (CMCR) for SWMU No. 6 Johnston Atoll. Prepared for 15th Airlift Wing, Hickam Air Force Base, Oahu, Hawaii. 6 May.

CH2M Hill. 2009. Final Technical Report Johnston Island Seawall Evaluation and Estimate of Island Erosion and Future State. 21 August

EA Engineering, Science, and Technology, Inc., PBC (EA). 2016. Final Monitoring, Engineering Evaluation, and Maintenance Report, Resource Conservation and Recovery Act Monitored Natural Attenuation and Corrective Action at Solid Waste Management Units and Areas of Concern and Engineering Evaluation Data Collection at Johnston Atoll Airfield Sites. January.

U.S. Environmental Protection Agency (EPA). n.d. National Recommended Water Quality Criteria- Aquatic Life Criteria (Table). Retrieved from: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

EPA. 1993. MEMORANDUM Dated 1 October 1993. Additional Material for the Water Quality Standards Handbook (Second Edition). EPA, Office of Water. October.

EPA. 1995. Temporary Authorization for Permit Modifications Johnston Atoll Storage EPA I.D. Number TT9570090002. Retrieved from Administrative Record Number 117, Draft Close Out Report Solid Waste Burn Pit Ash Stabilization/Solidification. November

EPA. 2001. Land Disposal Restrictions: Summary of Requirements. Revised August 2001. Retrieved from: https://www.epa.gov/sites/production/files/documents/ldisressumm-rpt.pdf

EPA. 2010. Memorandum. 17 August 2010. Conceptual Review of the Document: Appendix B: Corrective Measures Completion Report for SWMU No. 6, Conservative Risk Evaluation for Single-Release Event, Dated May 6 2005".

Raytheon Services Nevada. 1994a. Johnston Island RCRA Facility Investigation Final Report. September.

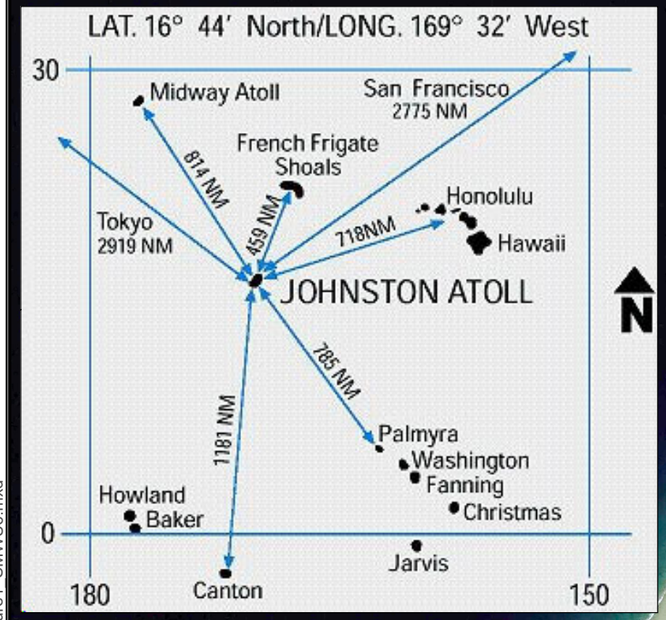
Raytheon. 1994b. Raytheon Services Nevada. For Decision Document for No Further Action Declaration Mixed Metal Debris Installation Restoration Program Site No. DP10 Johnston Island, USA. September.

USAF. 1995. Draft Close Out Report for Solid Waste Burn Pit Ash Stabilization /Solidification, Johnston Island. November.

This page intentionally left blank

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

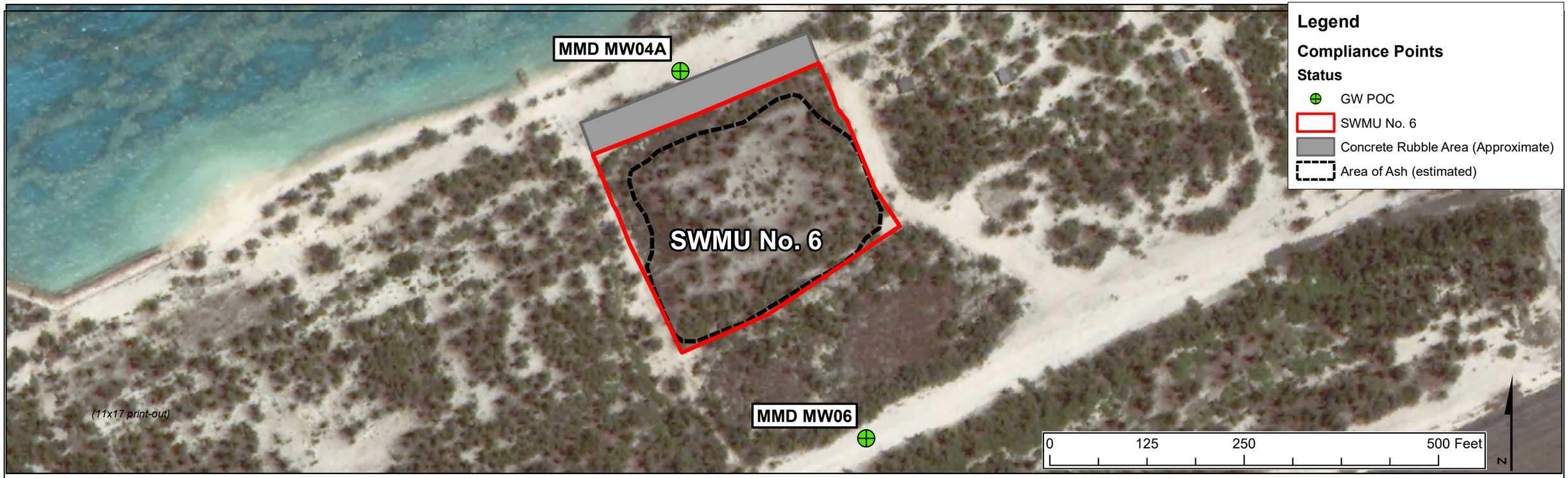
Data Sources
Insert Map: Pacific Airfields http://www.ww2aircraft.net
Primary Map: © Digital Worldview 2, March 2018.

1 inch equals 1,800 feet
(11x17 print-out)

0 1,000 2,000 4,000 Feet

Justification Statement for Permit Modification For Solid Waste Management Unit Number 6

Figure 1
Johnston Atoll Location Map



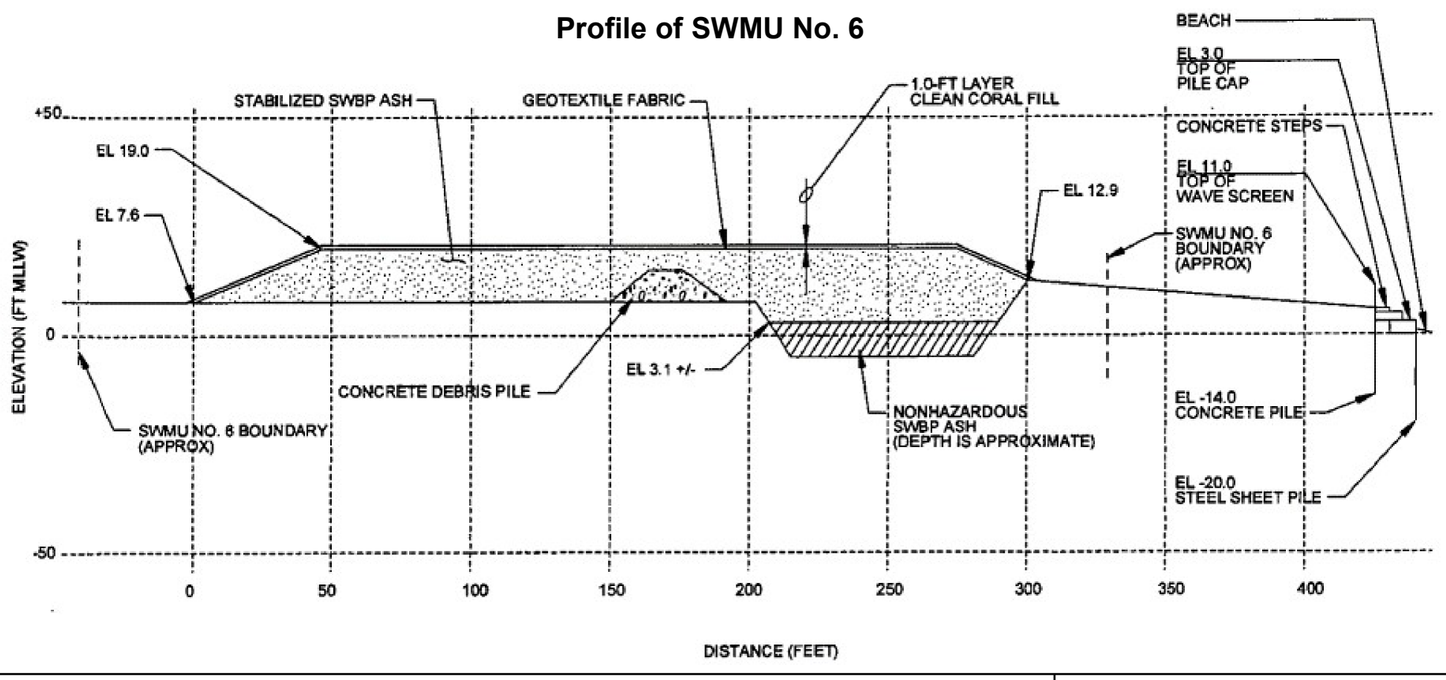
Legend

Compliance Points

Status

- GW POC
- SWMU No. 6
- Concrete Rubble Area (Approximate)
- Area of Ash (estimated)

Profile of SWMU No. 6



Scale is Approximate

Profile from: CH2M Hill. Corrective Measures Completion Report for SMWU No. 6 2005.

Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image
Image Captured April 5, 2013
Processed by Kendra Maty, USFWS-NWRS-RRI

Acronym
GW: Groundwater
POC: Point of Compliance
RCRA: Resource Conservation and Recovery Act

Justification Statement for Permit Modification For Solid Waste Management Unit Number 6

Figure 2
SMWU No. 6 Location

ATTACHMENTS

This page intentionally left blank

822F93009

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

NOTE:

SUBJECT: Additional Material for the Water Quality Standards Handbook

FROM: David K. Sabock, Chief
Water Quality Standards Branch

TO: Recipients of the Water Quality Standards Handbook - Second Edition

On October 1, 1993, the Acting Assistant Administrator for Water issued the Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria.

Since the policy document was signed too late for inclusion in the Water Quality Standards Handbook - Second Edition, the complete policy document is attached and should be kept with the Handbook. Later this fiscal year, you will receive an update to the Handbook, to be inserted in this section, reflecting the policy document.

If you have any further questions on the Handbook or the attached guidance, contact me at 202-260-1315 or the appropriate technical contacts listed on page 7 of the cover memorandum of the guidance.

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 15 1993

OFFICE OF
WATER

Dear Environmental Advocate:

On October 1, 1993, I signed a memorandum regarding the Office of Water's Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. This memorandum covers a number of areas including the expression of aquatic life criteria, total maximum daily loads, National Pollution Discharge Elimination System permits and enforcement, effluent monitoring, and ambient monitoring. The policy and guidance in this document considers comments received from the U.S. Environmental Protection Agency (EPA) Regional Offices, recommendations made to EPA by the participants in a meeting held in January 1993 in Annapolis, Maryland, and public comments in the June 8, 1993, Federal Register notice requesting general public comments on the Annapolis meeting recommendations. As stated in the enclosed memorandum, we will continue to issue guidance as more information becomes available.

Sincerely yours,

Martha G. Prothro
Acting Assistant Administrator

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 1 1993

OFFICE OF WATER

MEMORANDUM

SUBJECT: Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria

FROM: Martha G. Prothro
Acting Assistant Administrator for Water

TO: Water Management Division Directors
Environmental Services Division Directors
Regions I-X

Introduction

The implementation of metals criteria is complex due to the site-specific nature of metals toxicity. We have undertaken a number of activities to develop guidance in this area, notably the Interim Metals Guidance, published May 1992, and a public meeting of experts held in Annapolis, MD, in January 1993. This memorandum transmits Office of Water (OW) policy and guidance on the interpretation and implementation of aquatic life criteria for the management of metals and supplements my April 1, 1993, memorandum on the same subject. The issue covers a number of areas including the expression of aquatic life criteria; total maximum daily loads (TMDLs), permits, effluent monitoring, and compliance; and ambient monitoring. The memorandum covers each in turn. Attached to this policy memorandum are three guidance documents with additional technical details. They are: Guidance Document on Expression of Aquatic Life Criteria as Dissolved Criteria (Attachment #2), Guidance Document on Dynamic Modeling and Translators (Attachment #3), and Guidance Document on Monitoring (Attachment #4). These will be supplemented as additional data become available. (See the schedule in Attachment #1.)

Since metals toxicity is significantly affected by site-specific factors, it presents a number of programmatic challenges. Factors that must be considered in the management of metals in the aquatic environment include: toxicity specific to effluent chemistry; toxicity specific to ambient water chemistry; different patterns of toxicity for different metals; evolution of the state of the science of metals toxicity, fate, and transport; resource limitations for monitoring, analysis, implementation, and research functions; concerns regarding some of the analytical data currently on record due to possible sampling and analytical contamination; and lack of standardized protocols for clean and ultraclean metals analysis. The States have the key role in the risk management process of balancing these factors in the management of water programs. The site-specific nature of this issue could be perceived as requiring a permit-by-permit approach to implementation. However, we believe

that this guidance can be effectively implemented on a broader level, across any waters with roughly the same physical and chemical characteristics, and recommend that we work with the States with that perspective in mind.

Expression of Aquatic Life Criteria

o Dissolved vs. Total Recoverable Metal

A major issue is whether, and how, to use dissolved metal concentrations ("dissolved metal") or total recoverable metal concentrations ("total recoverable metal") in setting State water quality standards. In the past, States have used both approaches when applying the same Environmental Protection Agency (EPA) criteria numbers. Some older criteria documents may have facilitated these different approaches to interpretation of the criteria because the documents were somewhat equivocal with regards to analytical methods. The May 1992 interim guidance continued the policy that either approach was acceptable.

It is now the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. This conclusion regarding metals bioavailability is supported by a majority of the scientific community within and outside the Agency. One reason is that a primary mechanism for water column toxicity is adsorption at the gill surface which requires metals to be in the dissolved form.

The position that the dissolved metals approach is more accurate has been questioned because it neglects the possible toxicity of particulate metal. It is true that some studies have indicated that particulate metals appear to contribute to the toxicity of metals, perhaps because of factors such as desorption of metals at the gill surface, but these same studies indicate the toxicity of particulate metal is substantially less than that of dissolved metal.

Furthermore, any error incurred from excluding the contribution of particulate metal will generally be compensated by other factors which make criteria conservative. For example, metals in toxicity tests are added as simple salts to relatively clean water. Due to the likely presence of a significant concentration of metals binding agents in many discharges and ambient waters, metals in toxicity tests would generally be expected to be more bioavailabile than metals in discharges or in ambient waters.

If total recoverable metal is used for the purpose of water quality standards, compounding of factors due to the lower bioavailability of particulate metal and lower bioavailability of metals as they are discharged may result in a conservative water quality standard. The use of dissolved metal in water quality standards gives a more accurate result. However, the majority of the participants at the Annapolis meeting felt that total recoverable measurements in ambient water had some value, and that exceedences of criteria on a total recoverable basis were an indication that metal loadings could be a stress to the ecosystem, particularly in locations other than the water column.

The reasons for the potential consideration of total recoverable measurements include risk management considerations not covered by evaluation of water column toxicity. The ambient water quality criteria are neither designed nor intended to protect sediments, or to prevent effects due to food webs containing sediment dwelling organisms. A risk manager, however, may consider sediments and food chain effects and may decide to take a conservative approach for metals, considering that metals are very persistent chemicals. This conservative approach could include the use of total recoverable metal in water quality standards. However, since consideration of sediment impacts is not incorporated into the criteria methodology, the degree of conservatism inherent in the total recoverable approach is unknown. The uncertainty of metal impacts in sediments stem from the lack of sediment criteria and an imprecise understanding of the fate and transport of metals. EPA will continue to pursue research and other activities to close these knowledge gaps.

Until the scientific uncertainties are better resolved, a range of different risk management decisions can be justified. EPA recommends that State water quality standards be based on dissolved metal. (See the paragraph below and the attached guidance for technical details on developing dissolved criteria.) EPA will also approve a State risk management decision to adopt standards based on total recoverable metal, if those standards are otherwise approvable as a matter of law.

o Dissolved Criteria

In the toxicity tests used to develop EPA metals criteria for aquatic life, some fraction of the metal is dissolved while some fraction is bound to particulate matter. The present criteria were developed using total recoverable metal measurements or measures expected to give equivalent results in toxicity tests, and are articulated as total recoverable. Therefore, in order to express the EPA criteria as dissolved, a total recoverable to dissolved correction factor must be used. Attachment #2 provides guidance for calculating EPA dissolved criteria from the published total recoverable criteria. The data expressed as percentage metal dissolved are presented as recommended values and ranges. However, the choice within ranges is a State risk management decision. We have recently supplemented the data for copper and are proceeding to further supplement the data for copper and other metals. As testing is completed, we will make this information available and this is expected to reduce the magnitude of the ranges for some of the conversion factors provided. We also strongly encourage the application of dissolved criteria across a watershed or waterbody, as technically sound and the best use of resources.

o Site-Specific Criteria Modifications

While the above methods will correct some site-specific factors affecting metals toxicity, further refinements are possible. EPA has issued guidance (Water Quality Standards Handbook, 1983; Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria, EPA-600/3-H4-099, October 1984) for three site-specific criteria development methodologies: recalculation procedure, indicator species procedure (also known as the water-effect ratio (WER)) and resident species procedure. Only the first two of these have been widely used.

In the National Toxics Rule (57 FR 60848, December 22, 1992), EPA identified the WER as an optional method for site-specific criteria development for certain metals. EPA committed in the NTR preamble to provide guidance on determining the WER. A draft of this guidance has been circulated to the States and Regions for review and comment. As justified by water characteristics and as recommended by the WER guidance, we strongly encourage the application of the WER across a watershed or waterbody as opposed to application on a discharger by discharger basis, as technically sound and an efficient use of resources.

In order to meet current needs, but allow for changes suggested by protocol users, EPA will issue the guidance as "interim." EPA will accept WERs developed using this guidance, as well as by using other scientifically defensible protocols. OW expects the interim WER guidance will be issued in the next two months.

Total Maximum Daily Loads (TMDLs) and National Pollutant Discharge Elimination System (NPDES) Permits

o Dynamic Water Quality Modeling

Although not specifically part of the reassessment of water quality criteria for metals, dynamic or probabilistic models are another useful tool for implementing water quality criteria, especially for those criteria protecting aquatic life. These models provide another way to incorporate site-specific data. The 1991 Technical Support Document for Water Quality-based Toxics Control (TSD) (EPA/505/2-90-001) describes dynamic, as well as static (steady-state) models. Dynamic models make the best use of the specified magnitude, duration, and frequency of water quality criteria and, therefore, provide a more accurate representation of the probability that a water quality standard exceedence will occur. In contrast, steady-state models make a number of simplifying, worst case assumptions which makes them less complex and less accurate than dynamic models.

Dynamic models have received increased attention over the last few years as a result of the widespread belief that steady-state modeling is over-conservative due to environmentally conservative dilution assumptions. This belief has led to the misconception that dynamic models will always lead to less stringent regulatory controls (e.g., NPDES effluent limits) than steady-state models, which is not true in every application of dynamic models. EPA considers dynamic models to be a more accurate approach to implementing water quality criteria and continues to recommend their use. Dynamic modeling does require commitment of resources to develop appropriate data. (See Attachment #3 and the TSD for details on the use of dynamic models.)

o Dissolved-Total Metal Translators

Expressing water quality criteria as the dissolved form of a metal poses a need to be able to translate from dissolved metal to total recoverable metal for TMDLs and NPDES permits. TMDLs for metals must be able to calculate: (1) dissolved metal in order to ascertain attainment of water quality standards, and (2) total recoverable metal in order to achieve mass balance necessary for permitting purposes.

EPA's NPDES regulations require that limits of metals in permits be stated as total recoverable in most cases (see 40 CFR §122.45(c)) except when an effluent guideline specifies the limitation in another form of the metal, the approved analytical methods measure only dissolved metal, or the permit writer expresses a metals limit in another form (e.g., dissolved, valent, or total) when required to carry out provisions of the Clean Water Act. This is because the chemical conditions in ambient waters frequently differ substantially from those in the effluent, and there is no assurance that effluent particulate metal would not dissolve after discharge. The NPDES rule does not require that State water quality standards be expressed as total recoverable; rather, the rule requires permit writers to translate between different metal forms in the calculation of the permit limit so that a total recoverable limit can be established. Both the TMDL and NPDES uses of water quality criteria require the ability to translate between dissolved metal and total recoverable metal. Attachment #3 provides methods for this translation.

Guidance on Monitoring

o Use of Clean Sampling and Analytical Techniques

In assessing waterbodies to determine the potential for toxicity problems due to metals, the quality of the data used is an important issue. Metals data are used to determine attainment status for water quality standards, discern trends in water quality, estimate background loads for TMDLs, calibrate fate and transport models, estimate effluent concentrations (including effluent variability), assess permit compliance, and conduct research. The quality of trace level metal data, especially below 1 ppb, may be compromised due to contamination of samples during collection, preparation, storage, and analysis. Depending on the level of metal present, the use of "clean" and "ultraclean" techniques for sampling and analysis may be critical to accurate data for implementation of aquatic life criteria for metals.

The magnitude of the contamination problem increases as the ambient and effluent metal concentration decreases and, therefore, problems are more likely in ambient measurements. "Clean" techniques refer to those requirements (or practices for sample collection and handling) necessary to produce reliable analytical data in the part per billion (ppb) range. "Ultraclean" techniques refer to those requirements or practices necessary to produce reliable analytical data in the part per trillion (ppt) range. Because typical concentrations of metals in surface waters and effluents vary from one metal to another, the effect of contamination on the quality of metals monitoring data varies appreciably.

We plan to develop protocols on the use of clean and ultra-clean techniques and are coordinating with the United States Geological Survey (USGS) on this project, because USGS has been doing work on these techniques for some time, especially the sampling procedures. We anticipate that our draft protocols for clean techniques will be available in late calendar year 1993. The development of comparable protocols for ultra-clean techniques is underway and will be available in 1995. In developing these protocols, we will consider the costs of these techniques and will give guidance as to the situations where their use is necessary. Appendix B to the WER guidance document provides some general guidance on the use of

clean analytical techniques. (See Attachment #4.) We recommend that this guidance be used by States and Regions as an interim step, while the clean and ultra-clean protocols are being developed.

o Use of Historical Data

The concerns about metals sampling and analysis discussed above raise corresponding concerns about the validity of historical data. Data on effluent and ambient metal concentrations are collected by a variety of organizations including Federal agencies (e.g., EPA, USGS), State pollution control agencies and health departments, local government agencies, municipalities, industrial dischargers, researchers, and others. The data are collected for a variety of purposes as discussed above.

Concern about the reliability of the sample collection and analysis procedures is greatest where they have been used to monitor very low level metal concentrations. Specifically, studies have shown data sets with contamination problems during sample collection and laboratory analysis, that have resulted in inaccurate measurements. For example, in developing a TMDL for New York Harbor, some historical ambient data showed extensive metals problems in the harbor, while other historical ambient data showed only limited metals problems. Careful resampling and analysis in 1992/1993 showed the latter view was correct. The key to producing accurate data is appropriate quality assurance (QA) and quality control (QC) procedures. We believe that most historical data for metals, collected and analyzed with appropriate QA and QC at levels of 1 ppb or higher, are reliable. The data used in development of EPA criteria are also considered reliable, both because they meet the above test and because the toxicity test solutions are created by adding known amounts of metals.

With respect to effluent monitoring reported by an NPDES permittee, the permittee is responsible for collecting and reporting quality data on a Discharge Monitoring Report (DMR). Permitting authorities should continue to consider the information reported to be true, accurate, and complete as certified by the permittee. Where the permittee becomes aware of new information specific to the effluent discharge that questions the quality of previously submitted DMR data, the permittee must promptly submit that information to the permitting authority. The permitting authority will consider all information submitted by the permittee in determining appropriate enforcement responses to monitoring/reporting and effluent violations. (See Attachment #4 for additional details.)

Summary

The management of metals in the aquatic environment is complex. The science supporting our technical and regulatory programs is continuing to evolve, here as in all areas. The policy and guidance outlined above represent the position of OW and should be incorporated into ongoing program operations. We do not expect that ongoing operations would be delayed or deferred because of this guidance.

If you have questions concerning this guidance, please contact Jim Hanlon, Acting Director, Office of Science and Technology, at 202-260-5400. If you have questions on specific details of the guidance, please contact the appropriate OW Branch Chief. The Branch Chiefs responsible for the various areas of the water quality program are: Bob April (202-260-6322, water quality criteria), Elizabeth Fellows (202-260-7046, monitoring and data issues), Russ Kinerson (202-260-1330, modeling and translators), Don Brady (202-260-7074, Total Maximum Daily Loads), Sheila Frace (202-260-9537, permits), Dave Sabock (202-260-1315, water quality standards), Bill Telliard (202-260-7134, analytical methods) and Dave Lyons (202-260-8310, enforcement).

Attachments

ATTACHMENT #1

TECHNICAL GUIDANCE FOR METALS

Schedule of Upcoming Guidance

Water-effect Ratio Guidance - September 1993

Draft "Clean" Analytical Methods - Spring 1994

Dissolved Criteria - currently being done; as testing is completed, we will release the updated percent dissolved data

Draft Sediment Criteria for Metals - 1994

Final Sediment Criteria for Metals - 1995

ATTACHMENT #2

GUIDANCE DOCUMENT
ON DISSOLVED CRITERIA
Expression of Aquatic Life Criteria
October 1993

10-1-93

Percent Dissolved in Aquatic Toxicity Tests on Metals

The attached table contains all the data that were found concerning the percent of the total recoverable metal that was dissolved in aquatic toxicity tests. This table is intended to contain the available data that are relevant to the conversion of EPA's aquatic life criteria for metals from a total recoverable basis to a dissolved basis. (A factor of 1.0 is used to convert aquatic life criteria for metals that are expressed on the basis of the acid-soluble measurement to criteria expressed on the basis of the total recoverable measurement.) Reports by Grunwald (1992) and Brungs et al. (1992) provided references to many of the documents in which pertinent data were found. Each document was obtained and examined to determine whether it contained useful data.

"Dissolved" is defined as metal that passes through a 0.45-μm membrane filter. If otherwise acceptable, data that were obtained using 0.3-μm glass fiber filters and 0.1-μm membrane filters were used, and are identified in the table; these data did not seem to be outliers.

Data were used only if the metal was in a dissolved inorganic form when it was added to the dilution water. In addition, data were used only if they were generated in water that would have been acceptable for use as a dilution water in tests used in the derivation of water quality criteria for aquatic life; in particular, the pH had to be between 6.5 and 9.0, and the concentrations of total organic carbon (TOC) and total suspended solids (TSS) had to be below 5 mg/L. Thus most data generated using river water would not be used.

Some data were not used for other reasons. Data presented by Carroll et al. (1979) for cadmium were not used because 9 of the 36 values were above 150%. Data presented by Davies et al. (1976) for lead and Holcombe and Andrew (1978) for zinc were not used because "dissolved" was defined on the basis of polarography, rather than filtration.

Beyond this, the data were not reviewed for quality. Horowitz et al. (1992) reported that a number of aspects of the filtration procedure might affect the results. In addition, there might be concern about use of "clean techniques" and adequate QA/QC.

Each line in the table is intended to represent a separate piece of information. All of the data in the table were determined in fresh water, because no saltwater data were found. Data are becoming available for copper in salt water from the New York

Harbor study; based on the first set of tests, Hansen (1993) suggested that the average percent of the copper that is dissolved in sensitive saltwater tests is in the range of 76 to 82 percent.

A thorough investigation of the percent of total recoverable metal that is dissolved in toxicity tests might attempt to determine if the percentage is affected by test technique (static, renewal, flow-through), feeding (were the test animals fed and, if so, what food and how much), water quality characteristics (hardness, alkalinity, pH, salinity), test organisms (species, loading), etc.

The attached table also gives the freshwater criteria concentrations (CMC and CCC) because percentages for total recoverable concentrations much (e.g., more than a factor of 3) above or below the CMC and CCC are likely to be less relevant. When a criterion is expressed as a hardness equation, the range given extends from a hardness of 50 mg/L to a hardness of 200 mg/L.

The following is a summary of the available information for each metal:

Arsenic(III)

The data available indicate that the percent dissolved is about 100, but all the available data are for concentrations that are much higher than the CMC and CCC.

Cadmium

Schuytema et al. (1984) reported that "there were no real differences" between measurements of total and dissolved cadmium at concentrations of 10 to 80 ug/L (pH = 6.7 to 7.8, hardness = 25 mg/L, and alkalinity = 33 mg/L); total and dissolved concentrations were said to be "virtually equivalent".

The CMC and CCC are close together and only range from 0.66 to 8.6 ug/L. The only available data that are known to be in the range of the CMC and CCC were determined with a glass fiber filter. The percentages that are probably most relevant are 75, 92, 89, 78, and 80.

Chromium(III)

The percent dissolved decreased as the total recoverable concentration increased, even though the highest concentrations reduced the pH substantially. The percentages that are probably

most relevant to the CMC are 50-75, whereas the percentages that are probably most relevant to the CCC are 86 and 61.

Chromium(VI)

The data available indicate that the percent dissolved is about 100, but all the available data are for concentrations that are much higher than the CMC and CCC.

Copper

Howarth and Sprague (1978) reported that the total and dissolved concentrations of copper were "little different" except when the total copper concentration was above 500 ug/L at hardness = 360 mg/L and pH = 8 or 9. Chakoumakos et al. (1979) found that the percent dissolved depended more on alkalinity than on hardness, pH, or the total recoverable concentration of copper.

Chapman (1993) and Lazorchak (1987) both found that the addition of daphnid food affected the percent dissolved very little, even though Chapman used yeast-trout chow-alfalfa whereas Lazorchak used algae in most tests, but yeast-trout chow-alfalfa in some tests. Chapman (1993) found a low percent dissolved with and without food, whereas Lazorchak (1987) found a high percent dissolved with and without food. All of Lazorchak's values were in high hardness water; Chapman's one value in high hardness water was much higher than his other values.

Chapman (1993) and Lazorchak (1987) both compared the effect of food on the total recoverable LC50 with the effect of food on the dissolved LC50. Both authors found that food raised both the dissolved LC50 and the total recoverable LC50 in about the same proportion, indicating that food did not raise the total recoverable LC50 by sorbing metal onto food particles; possibly the food raised both LC50s by (a) decreasing the toxicity of dissolved metal, (b) forming nontoxic dissolved complexes with the metal, or (c) reducing uptake.

The CMC and CCC are close together and only range from 6.5 to 34 ug/L. The percentages that are probably most relevant are 74, 95, 95, 73, 57, 53, 52, 64, and 91.

Lead

The data presented in Spehar et al. (1978) were from Holcombe et al. (1976). Both Chapman (1993) and Holcombe et al. (1976) found that the percent dissolved increased as the total recoverable concentration increased. It would seem reasonable to expect more precipitate at higher total recoverable concentrations and

therefore a lower percent dissolved at higher concentrations. The increase in percent dissolved with increasing concentration might be due to a lowering of the pH as more metal is added if the stock solution was acidic.

The percentages that are probably most relevant to the CMC are 9, 18, 25, 10, 62, 68, 71, 75, 81, and 95, whereas the percentages that are probably most relevant to the CCC are 9 and 10.

Mercury

The only percentage that is available is 73, but it is for a concentration that is much higher than the CMC.

Nickel

The percentages that are probably most relevant to the CMC are 88, 93, 92, and 100, whereas the only percentage that is probably relevant to the CCC is 76.

Selenium

No data are available.

Silver

There is a CMC, but not a CCC. The percentage dissolved seems to be greatly reduced by the food used to feed daphnids, but not by the food used to feed fathead minnows. The percentages that are probably most relevant to the CMC are 41, 79, 79, 73, 91, 90, and 93.

Zinc

The CMC and CCC are close together and only range from 59 to 210 ug/L. The percentages that are probably most relevant are 31, 77, 77, 99, 94, 100, 103, and 96.

Recommended Values (%)[A] and Ranges of Measured Percent Dissolved Considered Most Relevant in Fresh Water

Metal	CMC		CCC	
	Recommended Value (%)	(Range %)	Recommended Value (%)	(Range %)
Arsenic(III)	95	100-104[B]	95	100-104[B]
Cadmium	85	75-92	85	75-92
Chromium(III)	85	50-75	85	61-86
Chromium(VI)	95	100[B]	95	100[B]
Copper	85	52-95	85	52-95
Lead	50	9-95	25	9-10
Mercury	85	73[B]	NA[E]	NA[E]
Nickel	85	88-100	85	76
Selenium	NA[E]	NA[C]	NA[E]	NA[C]
Silver	85	41-93	YY[D]	YY[D]
Zinc	85	31-103	85	31-103

[A] The recommended values are based on current knowledge and are subject to change as more data becomes available.

[B] All available data are for concentrations that are much higher than the CMC.

[C] NA = No data are available.

[D] YY = A CCC is not available, and therefore cannot be adjusted.

[E] NA = Bioaccumulative chemical and not appropriate to adjust to percent dissolved.

Concn.[A] (ug/L)	Percent Diss.[B]	n[C]	Species[D]	SRF[E]	Food	Hard.	Alk.	pH	Ref.
ARSENIC(III) (Freshwater: CCC = 190 ug/L; CMC = 360 ug/L)									
600-15000	104	5	?	?	?	48	41	7.6	Lima et al. 1984
12600	100	3	FM	F	No	44	43	7.4	Spehar and Fiandt 1986
CADMIUM (Freshwater: CCC = 0.66 to 2.0 ug/L; CMC = 1.8 to 8.6 ug/L)[F]									
0.16	41	?	DM	R	Yes	53	46	7.6	Chapman 1993
0.28	75	?	DM	R	Yes	103	83	7.9	Chapman 1993
0.4-4.0	92[G]	?	CS	F	No	21	19	7.1	Finlayson and Verrue 1982
13	89	3	FM	F	No	44	43	7.4	Spehar and Fiandt 1986
15-21	96	8	FM	S	No	42	31	7.5	Spehar and Carlson 1984
42	84	4	FM	S	No	45	41	7.4	Spehar and Carlson 1984
10	78	?	DM	S	No	51	38	7.5	Chapman 1993
35	77	?	DM	S	No	105	88	8.0	Chapman 1993
51	59	?	DM	S	No	209	167	8.4	Chapman 1993
6-80	80	8	?	S	No	47	44	7.5	Call et al. 1982
3-232	90[H]	5	?	F	?	46	42	7.4	Spehar et al. 1978
450-6400	70	5	FM	F	No	202	157	7.7	Pickering and Gast 1972

CHROMIUM(III) (Freshwater: CCC = 120 to 370 ug/L; CMC = 980 to 3100 ug/L)[F]

5-13	94	?	SG	F	?	25	24	7.3	Stevens and Chapman 1984
19-495	86	?	SG	F	?	25	24	7.2	Stevens and Chapman 1984
>1100	50-75	?	SG	F	No	25	24	7.0	Stevens and Chapman 1984
42	54	?	DM	R	Yes	206	166	8.2	Chapman 1993
114	61	?	DM	R	Yes	52	45	7.4	Chapman 1993
16840	26	?	DM	S	No	<51	9	6.3[I]	Chapman 1993
26267	32	?	DM	S	No	110	9	6.7	Chapman 1993
27416	27	?	DM	S	No	96	10	6.0[I]	Chapman 1993
58665	23	?	DM	S	No	190	25	6.2[I]	Chapman 1993

CHROMIUM(VI) (Freshwater: CCC = 11 ug/L; CMC = 16 ug/L)

>25,000	100	1	FM,GF	F	Yes	220	214	7.6	Adelman and Smith 1976
43,300	99.5	4	FM	F	No	44	43	7.4	Spehar and Fiandt 1986

COPPER (Freshwater: CCC = 6.5 to 21 ug/L; CMC = 9.2 to 34 ug/L)[F]

10-30	74	?	CT	F	No	27	20	7.0	Chakoumakos et al. 1979
40-200	78	?	CT	F	No	154	20	6.8	Chakoumakos et al. 1979
30-100	79	?	CT	F	No	74	23	7.6	Chakoumakos et al. 1979
100-200	82	?	CT	F	No	192	72	7.0	Chakoumakos et al. 1979
20-200	86	?	CT	F	No	31	78	8.3	Chakoumakos et al. 1979
40-300	87	?	CT	F	No	83	70	7.4	Chakoumakos et al. 1979
10-80	89	?	CT	F	No	25	169	8.5	Chakoumakos et al. 1979

300-1300	92	?	CT	F	No	195	160	7.0	Chakoumakos et al. 1979
100-400	94	?	CT	F	No	70	174	8.5	Chakoumakos et al. 1979
3-4[J]	125-167	2	CD	R	Yes	31	38	7.2	Carlson et al. 1986a,b
12-91[J]	79-84	3	CD	R	Yes	31	38	7.2	Carlson et al. 1986a,b
18-19	95	2	DA	S	No	52	55	7.7	Carlson et al. 1986b
20[J]	95	1	DA	R	No	31	38	7.2	Carlson et al. 1986b
50	96	2	FM	S	No	52	55	7.7	Carlson et al. 1986b
175[J]	91	2	FM	R	No	31	38	7.2	Carlson et al. 1986b
5-52	82[K]	?	FM	F	Yes[L]	47	43	8.0	Lind et al. 1978
6-80	83[O]	?	CS	F	No	21	19	7.1	Finlayson and Verrue 1982
6.7	57	?	DM	S	No	49	37	7.7	Chapman 1993
35	43	?	DM	S	Yes	48	39	7.4	Chapman 1993
13	73	?	DM	R	Yes	211	169	8.1	Chapman 1993
16	57	?	DM	R	Yes	51	44	7.6	Chapman 1993
51	39	?	DM	R	Yes	104	83	7.8	Chapman 1993
32	53	?	DM	S	No	52	45	7.8	Chapman 1993
33	52	?	DM	S	No	105	79	7.9	Chapman 1993
39	64	?	DM	S	No	106	82	8.1	Chapman 1993
25-84	96	14	FM,GM	S	No	50	40	7.0	Hammermeister et al. 1983
17	91	6	DM	S	No	52	43	7.3	Hammermeister et al. 1983
120	88	14	SG	S	No	48	47	7.3	Hammermeister et al. 1983
15-90	74	19	?	S	No	48	47	7.7	Call et al. 1982
12-162	80[M]	?	BG	F	Yes[L]	45	43	7-8	Benoit 1975
28-58	85	6	DM	R	No	168	117	8.0	Lazorchak 1987
26-59	79	7	DM	R	Yes[M]	168	117	8.0	Lazorchak 1987
56,101	86	2	DM	R	Yes[N]	168	117	8.0	Lazorchak 1987

96	86	4	FM	F	No	44	43	7.4	Spehar and Fiandt 1986
160	94	1	FM	S	No	203	171	8.2	Geckler et al. 1976
230-3000	>69->79	?	CR	F	No	17	13	7.6	Rice and Harrison 1983
LEAD (Freshwater: CCC = 1.3 to 7.7 ug/L; CMC = 34 to 200 ug/L)[F]									
17	9	?	DM	R	Yes	52	47	7.6	Chapman 1993
181	18	?	DM	R	Yes	102	86	7.8	Chapman 1993
193	25	?	DM	R	Yes	151	126	8.1	Chapman 1993
612	29	?	DM	S	No	50	--	---	Chapman 1993
952	33	?	DM	S	No	100	--	---	Chapman 1993
1907	~38	?	DM	S	No	150	--	---	Chapman 1993
7-29	10	?	EZ	R	No	22	--	---	JRB Associates 1983
34	62[H]	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
58	68[H]	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
119	71[H]	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
235	75[H]	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
474	81[H]	?	BT	F	Yes	44	43	7.2	Holcombe et al. 1976
4100	82[H]	?	BT	F	No	44	43	7.2	Holcombe et al. 1976
2100	79	7	FM	F	No	44	43	7.4	Spehar and Fiandt 1986
220-2700	96	14	FM,GM,DM	S	No	49	44	7.2	Hammermeister et al. 1983
580	95	14	SG	S	No	51	48	7.2	Hammermeister et al. 1983
MERCURY(II) (Freshwater: CMC = 2.4 ug/L)									
172	73	1	FM	F	No	44	43	7.4	Spehar and Fiandt 1986

NICKEL (Freshwater: CCC = 88 to 280 ug/L; CMC = 790 to 2500 ug/L)[F]

21	81	?	DM	R	Yes	51	49	7.4	Chapman 1993
150	76	?	DM	R	Yes	107	87	7.8	Chapman 1993
578	87	?	DM	R	Yes	205	161	8.1	Chapman 1993
645	88	?	DM	S	No	54	43	7.7	Chapman 1993
1809	93	?	DM	S	No	51	44	7.7	Chapman 1993
1940	92	?	DM	S	No	104	84	8.2	Chapman 1993
2344	100	?	DM	S	No	100	84	7.9	Chapman 1993
4000	90	?	PK	R	No	21	--	---	JRB Associates 1983

SELENIUM (FRESHWATER: CCC = 5 ug/L; CMC = 20 ug/L)

No data are available.

SILVER (Freshwater: CMC = 1.2 to 13 ug/L; a CCC is not available)

0.19	74	?	DM	S	No	47	37	7.6	Chapman 1993
9.98	13	?	DM	S	Yes	47	37	7.5	Chapman 1993
4.0	41	?	DM	S	No	36	25	7.0	Nebeker et al. 1983
4.0	11	?	DM	S	Yes	36	25	7.0	Nebeker et al. 1983
3	79	?	FM	S	No	51	49	8.1	UWS 1993
2-54	79	?	FM	S	Yes[O]	49	49	7.9	UWS 1993
2-32	73	?	FM	S	No	50	49	8.1	UWS 1993
4-32	91	?	FM	S	No	48	49	8.1	UWS 1993
5-89	90	?	FM	S	No	120	49	8.2	UWS 1993
6-401	93	?	FM	S	No	249	49	8.1	UWS 1993

ZINC (Freshwater: CCC = 59 to 190 ug/L; CMC 65 to 210 ug/L)[F]

52	31	?	DM	R	Yes	211	169	8.2	Chapman 1993
62	77	?	DM	R	Yes	104	83	7.8	Chapman 1993
191	77	?	DM	R	Yes	52	47	7.5	Chapman 1993
356	74	?	DM	S	No	54	47	7.6	Chapman 1993
551	78	?	DM	S	No	105	85	8.1	Chapman 1993
741	76	?	DM	S	No	196	153	8.2	Chapman 1993
7[I]	71-129	2	CD	R	Yes	31	38	7.2	Carlson et al. 1986b
18-273[I]	81-107	2	CD	R	Yes	31	38	7.2	Carlson et al. 1986b
167[I]	99	2	CD	R	No	31	38	7.2	Carlson et al. 1986b
180	94	1	CD	S	No	52	55	7.7	Carlson et al. 1986b
188-393[I]	100	2	FM	R	No	31	38	7.2	Carlson et al. 1986b
551	100	1	FM	S	No	52	55	7.7	Carlson et al. 1986b
40-500	95[Q]	?	CS	F	No	21	19	7.1	Finlayson and Verrue 1982
1940	100	?	AS	F	No	20	12	7.1	Sprague 1964
5520	83	?	AS	F	No	20	12	7.9	Sprague 1964
<4000	90	?	FM	F	No	204	162	7.7	Mount 1966
>4000	70	?	FM	F	No	204	162	7.7	Mount 1966
160-400	103	13	FM,GM,DM	S	No	52	43	7.5	Hammermeister et al. 1983
240	96	13	SG	S	No	49	46	7.2	Hammermeister et al. 1983

[A] Total recoverable concentration.

[B] Except as noted, a 0.45-μm membrane filter was used.

[C] Number of paired comparisons.

[D] The abbreviations used are:

AS = Atlantic salmon	DM = Daphnia magna
BT = Brook trout	EZ = Elassoma zonatum
CD = Ceriodaphnia dubia	FM = Fathead minnow
CR = Crayfish	GF = Goldfish
CS = Chinook salmon	GM = Gammarid
CT = Cutthroat trout	PK = Palaemonetes kadiakensis
DA = Daphnids	SG = Salmo gairdneri

[E] The abbreviations used are:

S = static
R = renewal
F = flow-through

[F] The two numbers are for hardnesses of 50 and 200 mg/L, respectively.

[G] A 0.3-μm glass fiber filter was used.

[H] A 0.10-μm membrane filter was used.

[I] The pH was below 6.5.

[J] The dilution water was a clean river water with TSS and TOC below 5 mg/L.

[K] Only limited information is available concerning this value.

[L] It is assumed that the solution that was filtered was from the test chambers that contained fish and food.

[M] The food was algae.

[N] The food was yeast-trout chow-alfalfa.

[O] The food was frozen adult brine shrimp.

References

Adelman, I.R., and L.L. Smith, Jr. 1976. Standard Test Fish Development. Part I. Fathead Minnows (Pimephales promelas) and Goldfish (Carassius auratus) as Standard Fish in Bioassays and Their Reaction to Potential Reference Toxicants. EPA-600/3-76-061a. National Technical Information Service, Springfield, VA. Page 24.

Benoit, D.A. 1975. Chronic Effects of Copper on Survival, Growth, and Reproduction of the Bluegill (*Lepomis macrochirus*). Trans. Am. Fish. Soc. 104:353-358.

Brungs, W.A., T.S. Holderman, and M.T. Southerland. 1992. Synopsis of Water-Effect Ratios for Heavy Metals as Derived for Site-Specific Water Quality Criteria.

Call, D.J., L.T. Brooke, and D.D. Vaishnav. 1982. Aquatic Pollutant Hazard Assessments and Development of a Hazard Prediction Technology by Quantitative Structure-Activity Relationships. Fourth Quarterly Report. University of Wisconsin-Superior, Superior, WI.

Carlson, A.R., H. Nelson, and D. Hammermeister. 1986a. Development and Validation of Site-Specific Water Quality Criteria for Copper. Environ. Toxicol. Chem. 5:997-1012.

Carlson, A.R., H. Nelson, and D. Hammermeister. 1986b. Evaluation of Site-Specific Criteria for Copper and Zinc: An Integration of Metal Addition Toxicity, Effluent and Receiving Water Toxicity, and Ecological Survey Data. EPA/600/S3-86-026. National Technical Information Service, Springfield, VA.

Carroll, J.J., S.J. Ellis, and W.S. Oliver. 1979. Influences of Hardness Constituents on the Acute Toxicity of Cadmium to Brook Trout (*Salvelinus fontinalis*).

Chakoumakos, C., R.C. Russo, and R.V. Thurston. 1979. Toxicity of Copper to Cutthroat Trout (*Salmo clarki*) under Different Conditions of Alkalinity, pH, and Hardness. Environ. Sci. Technol. 13:213-219.

Chapman, G.A. 1993. Memorandum to C. Stephan. June 4.

Davies, P.H., J.P. Goettl, Jr., J.R. Sinley, and N.F. Smith. 1976. Acute and Chronic Toxicity of Lead to Rainbow Trout *Salmo gairdneri*, in Hard and Soft Water. Water Res. 10:199-206.

Finlayson, B.J., and K.M Verrue. 1982. Toxicities of Copper, Zinc, and Cadmium Mixtures to Juvenile Chinook Salmon. Trans. Am. Fish. Soc. 111:645-650.

Geckler, J.R., W.B. Horning, T.M. Neiheisel, Q.H. Pickering, E.L. Robinson, and C.E. Stephan. 1976. Validity of Laboratory Tests for Predicting Copper Toxicity in Streams. EPA-600/3-76-116. National Technical Information Service, Springfield, VA. Page 118.

Grunwald, D. 1992. Metal Toxicity Evaluation: Review, Results, and Data Base Documentation.

Hammermeister, D., C. Northcott, L. Brooke, and D. Call. 1983. Comparison of Copper, Lead and Zinc Toxicity to Four Animal Species in Laboratory and ST. Louis River Water. University of Wisconsin-Superior, Superior, WI.

Hansen, D.J. 1993. Memorandum to C.E. Stephan. April 15.

Holcombe, G.W., D.A. Benoit, E.N. Leonard, and J.M. McKim. 1976. Long-Term Effects of Lead Exposure on Three Generations of Brook Trout (*Salvelinus fontinalis*). J. Fish. Res. Bd. Canada 33:1731-1741.

Holcombe, G.W., and R.W. Andrew. 1978. The Acute Toxicity of Zinc to Rainbow and Brook Trout. EPA-600/3-78-094. National Technical Information Service, Springfield, VA.

Horowitz, A.J., K.A. Elrick, and M.R. Colberg. 1992. The Effect of Membrane Filtration Artifacts on Dissolved Trace Element Concentrations. Water Res. 26:753-763.

Howarth, R.S., and J.B. Sprague. 1978. Copper Lethality to Rainbow Trout in Waters on Various Hardness and pH. Water Res. 12:455-462.

JRB Associates. 1983. Demonstration of the Site-specific Criteria Modification Process: Selser's Creek, Ponchatoula, Louisiana.

Lazorchak, J.M. 1987. The Significance of Weight Loss of Daphnia magna Straus During Acute Toxicity Tests with Copper. Ph.D. Thesis.

Lima, A.R., C. Curtis, D.E. Hammermeister, T.P. Markee, C.E. Northcott, L.T. Brooke. 1984. Acute and Chronic Toxicities of Arsenic(III) to Fathead Minnows, Flagfish, Daphnids, and an Amphipod. Arch. Environ. Contam. Toxicol. 13:595-601.

Lind, D., K. Alto, and S. Chatterton. 1978. Regional Copper-Nickel Study. Draft.

Mount, D.I. 1966. The Effect of Total Hardness and pH on Acute Toxicity of Zinc to Fish. Air Water Pollut. Int. J. 10:49-56.

Nebeker, A.V., C.K. McAuliffe, R. Mshar, and D.G. Stevens. 1983. Toxicity of Silver to Steelhead and Rainbow Trout, Fathead Minnows, and *Daphnia magna*. Environ. Toxicol. Chem. 2:95-104.

Pickering, Q.P., and M.H. Gast. 1972. Acute and Chronic Toxicity of Cadmium to the Fathead Minnow (*Pimephales promelas*). J. Fish. Res. Bd. Canada 29:1099-1106.

Rice, D.W., Jr., and F.L. Harrison. 1983. The Sensitivity of Adult, Embryonic, and Larval Crayfish *Procambarus clarkii* to Copper. NUREG/CR-3133 or UCRL-53048. National Technical Information Service, Springfield, VA.

Schuytema, G.S., P.O. Nelson, K.W. Malueg, A.V. Nebeker, D.F. Krawczyk, A.K. Ratcliff, and J.H. Gakstatter. 1984. Toxicity of Cadmium in Water and Sediment Slurries to *Daphnia magna*. Environ. Toxicol. Chem. 3:293-308.

Spehar, R.L., R.L. Anderson, and J.T. Fiandt. 1978. Toxicity and Bioaccumulation of Cadmium and Lead in Aquatic Invertebrates. Environ. Pollut. 15:195-208.

Spehar, R.L., and A.R. Carlson. 1984. Derivation of Site-Specific Water Quality Criteria for Cadmium and the St. Louis River Basin, Duluth, Minnesota. Environ. Toxicol. Chem. 3:651-665.

Spehar, R.L., and J.T. Fiandt. 1986. Acute and Chronic Effects of Water Quality Criteria-Based Metal Mixtures on Three Aquatic Species. Environ. Toxicol. Chem. 5:917-931.

Sprague, J.B. 1964. Lethal Concentration of Copper and Zinc for Young Atlantic Salmon. J. Fish. Res. Bd. Canada 21:17-9926.

Stevens, D.G., and G.A. Chapman. 1984. Toxicity of Trivalent Chromium to Early Life Stages of Steelhead Trout. Environ. Toxicol. Chem. 3:125-133.

University of Wisconsin-Superior. 1993. Preliminary data from work assignment 1-10 for Contract No. 68-C1-0034.

ATTACHMENT #3

GUIDANCE DOCUMENT
ON DYNAMIC MODELING AND TRANSLATORS
August 1993

Total Maximum Daily Loads (TMDLs) and Permits

o Dynamic Water Quality Modeling

Although not specifically part of the reassessment of water quality criteria for metals, dynamic or probabilistic models are another useful tool for implementing water quality criteria, especially those for protecting aquatic life. Dynamic models make best use of the specified magnitude, duration, and frequency of water quality criteria and thereby provide a more accurate calculation of discharge impacts on ambient water quality. In contrast, steady-state modeling is based on various simplifying assumptions which makes it less complex and less accurate than dynamic modeling. Building on accepted practices in water resource engineering, ten years ago OW devised methods allowing the use of probability distributions in place of worst-case conditions. The description of these models and their advantages and disadvantages is found in the 1991 Technical Support Document for Water Quality-based Toxic Control (TSD).

Dynamic models have received increased attention in the last few years as a result of the perception that static modeling is over-conservative due to environmentally conservative dilution assumptions. This has led to the misconception that dynamic models will always justify less stringent regulatory controls (e.g. NPDES effluent limits) than static models. In effluent dominated waters where the upstream concentrations are relatively constant, however, a dynamic model will calculate a more stringent wasteload allocation than will a steady state model. The reason is that the critical low flow required by many State water quality standards in effluent dominated streams occurs more frequently than once every three years. When other environmental factors (e.g. upstream pollutant concentrations) do not vary appreciably, then the overall return frequency of the steady state model may be greater than once in three years. A dynamic modeling approach, on the other hand, would be more stringent, allowing only a once in three year return frequency. As a result, EPA considers dynamic models to be a more accurate rather than a less stringent approach to implementing water quality criteria.

The 1991 TSD provides recommendations on the use of steady state and dynamic water quality models. The reliability of any modeling technique greatly depends on the accuracy of the data used in the analysis. Therefore, the selection of a model also depends upon the data. EPA recommends that steady state wasteload allocation analyses generally be used where few or no whole effluent toxicity or specific chemical measurements are available, or where daily receiving water flow records are not available. Also, if staff resources are insufficient to use and defend the use of dynamic models, then steady state

models may be necessary. If adequate receiving water flow and effluent concentration data are available to estimate frequency distributions, EPA recommends that one of the dynamic wasteload allocation modeling techniques be used to derive wasteload allocations which will more exactly maintain water quality standards. The minimum data required for input into dynamic models include at least 30 years of river flow data and one year of effluent and ambient pollutant concentrations.

o Dissolved-Total Metal Translators

When water quality criteria are expressed as the dissolved form of a metal, there is a need to translate TMDLs and NPDES permits to and from the dissolved form of a metal to the total recoverable form. TMDLs for toxic metals must be able to calculate 1) the dissolved metal concentration in order to ascertain attainment of water quality standards and 2) the total recoverable metal concentration in order to achieve mass balance. In meeting these requirements, TMDLs consider metals to be conservative pollutants and quantified as total recoverable to preserve conservation of mass. The TMDL calculates the dissolved or ionic species of the metals based on factors such as total suspended solids (TSS) and ambient pH. (These assumptions ignore the complicating factors of metals interactions with other metals.) In addition, this approach assumes that ambient factors influencing metal partitioning remain constant with distance down the river. This assumption probably is valid under the low flow conditions typically used as design flows for permitting of metals (e.g., 7Q10, 4B3, etc) because erosion, resuspension, and wet weather loadings are unlikely to be significant and river chemistry is generally stable. In steady-state dilution modeling, metals releases may be assumed to remain fairly constant (concentrations exhibit low variability) with time.

EPA's NPDES regulations require that metals limits in permits be stated as total recoverable in most cases (see 40 CFR §122.45(c)). Exceptions occur when an effluent guideline specifies the limitation in another form of the metal or the approved analytical methods measure only the dissolved form. Also, the permit writer may express a metals limit in another form (e.g., dissolved, valent, or total) when required, in highly unusual cases, to carry out the provisions of the CWA.

The preamble to the September 1984 National Pollutant Discharge Elimination System Permit Regulations states that the total recoverable method measures dissolved metals plus that portion of solid metals that can easily dissolve under ambient conditions (see 49 Federal Register 38028, September 26, 1984). This method is intended to measure metals in the effluent that are or may easily become environmentally active, while not measuring metals that are expected to settle out and remain inert.

The preamble cites, as an example, effluent from an electroplating facility that adds lime and uses clarifiers. This effluent will be a combination of solids not removed by the clarifiers and residual dissolved metals. When the effluent from the clarifiers, usually with a

high pH level, mixes with receiving water having significantly lower pH level, these solids instantly dissolve. Measuring dissolved metals in the effluent, in this case, would underestimate the impact on the receiving water. Measuring with the total metals method, on the other hand, would measure metals that would be expected to disperse or settle out and remain inert or be covered over. Thus, measuring total recoverable metals in the effluent best approximates the amount of metal likely to produce water quality impacts.

However, the NPDES rule does not require in any way that State water quality standards be in the total recoverable form; rather, the rule requires permit writers to consider the translation between differing metal forms in the calculation of the permit limit so that a total recoverable limit can be established. Therefore, both the TMDL and NPDES uses of water quality criteria require the ability to translate from the dissolved form and the total recoverable form.

Many toxic substances, including metals, have a tendency to leave the dissolved phase and attach to suspended solids. The partitioning of toxics between solid and dissolved phases can be determined as a function of a pollutant-specific partition coefficient and the concentration of solids. This function is expressed by a linear partitioning equation:

$$C = \frac{C_T}{1 + K_d \cdot TSS \cdot 10^{-6}}$$

where,

C = dissolved phase metal concentration,
C_T = total metal concentration,
TSS = total suspended solids concentration, and
K_d = partition coefficient.

A key assumption of the linear partitioning equation is that the sorption reaction reaches dynamic equilibrium at the point of application of the criteria; that is, after allowing for initial mixing the partitioning of the pollutant between the adsorbed and dissolved forms can be used at any location to predict the fraction of pollutant in each respective phase.

Successful application of the linear partitioning equation relies on the selection of the partition coefficient. The use of a partition coefficient to represent the degree to which toxics adsorb to solids is most readily applied to organic pollutants; partition coefficients for metals are more difficult to define. Metals typically exhibit more complex speciation and complexation reactions than organics and the degree of partitioning can vary greatly depending upon site-specific water chemistry. Estimated partition coefficients can be determined for a number of metals, but waterbody or site-specific observations of dissolved and adsorbed concentrations are preferred.

EPA suggests three approaches for instances where a water quality criterion for a metal is expressed in the dissolved form in a State's water quality standards:

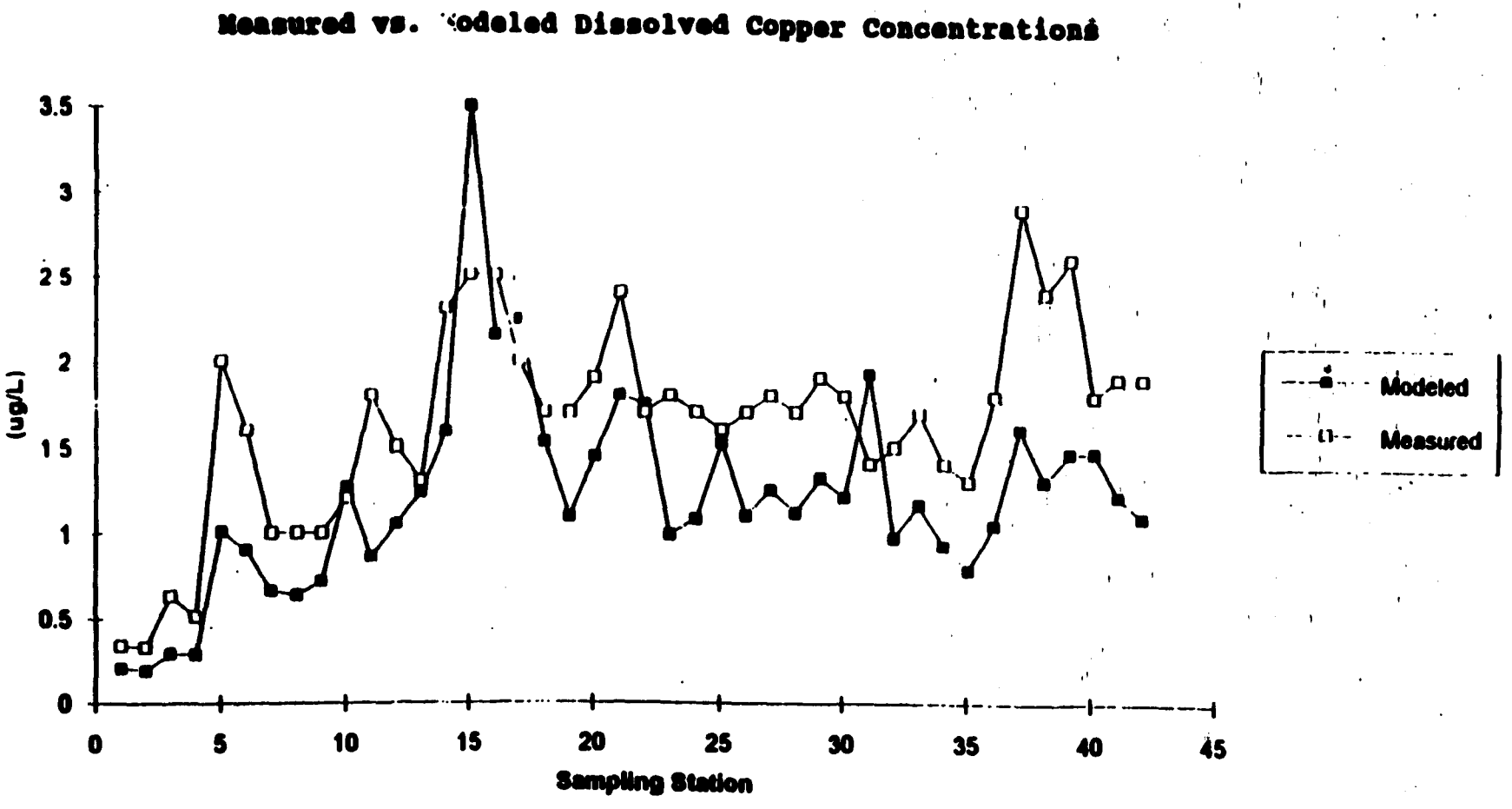
1. Using clean analytical techniques and field sampling procedures with appropriate QA/QC, collect receiving water samples and determine site specific values of K_d for each metal. Use these K_d values to "translate" between total recoverable and dissolved metals in receiving water. This approach is more difficult to apply because it relies upon the availability of good quality measurements of ambient metal concentrations. This approach provides an accurate assessment of the dissolved metal fraction providing sufficient samples are collected. EPA's initial recommendation is that at least four pairs of total recoverable and dissolved ambient metal measurements be made during low flow conditions or 20 pairs over all flow conditions. EPA suggests that the average of data collected during low flow or the 95th percentile highest dissolved fraction for all flows be used. The low flow average provides a representative picture of conditions during the rare low flow events. The 95th percentile highest dissolved fraction for all flows provides a critical condition approach analogous to the approach used to identify low flows and other critical environmental conditions.

2. Calculate the total recoverable concentration for the purpose of setting the permit limit. Use a value of 1 unless the permittee has collected data (see #1 above) to show that a different ratio should be used. The value of 1 is conservative and will not err on the side of violating standards. This approach is very simple to apply because it places the entire burden of data collection and analysis solely upon permitted facilities. In terms of technical merit, it has the same characteristics of the previous approach. However, permitting authorities may be faced with difficulties in negotiating with facilities on the amount of data necessary to determine the ratio and the necessary quality control methods to assure that the ambient data are reliable.

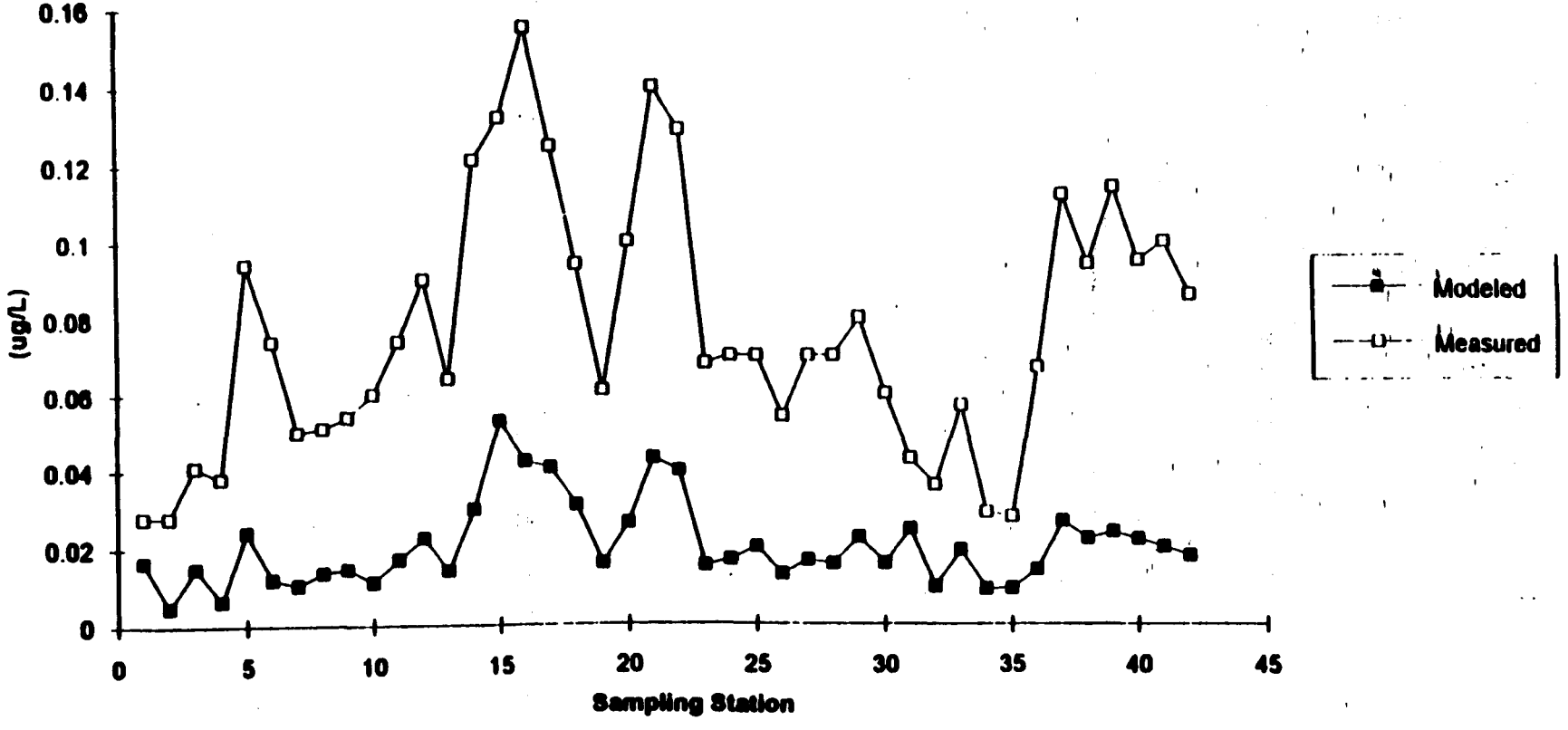
3. Use the historical data on total suspended solids (TSS) in receiving waterbodies at appropriate design flows and K_d values presented in the Technical Guidance Manual for Performing Waste Load Allocations. Book II. Streams and Rivers. EPA-440/4-84-020 (1984) to "translate" between (total recoverable) permits limits and dissolved metals in receiving water. This approach is fairly simple to apply. However, these K_d values are suspect due to possible quality assurance problems with the data used to develop the values. EPA's initial analysis of this approach and these values in one site indicates that these K_d values generally over-estimate the dissolved fraction of metals in ambient waters (see Figures following). Therefore, although this approach may not provide an accurate estimate of the dissolved fraction, the bias in the estimate is likely to be a conservative one.

EPA suggests that regulatory authorities use approaches #1 and #2 where States express their water quality standards in the dissolved form. In those States where the standards are in the total recoverable or acid soluble form, EPA recommends that no

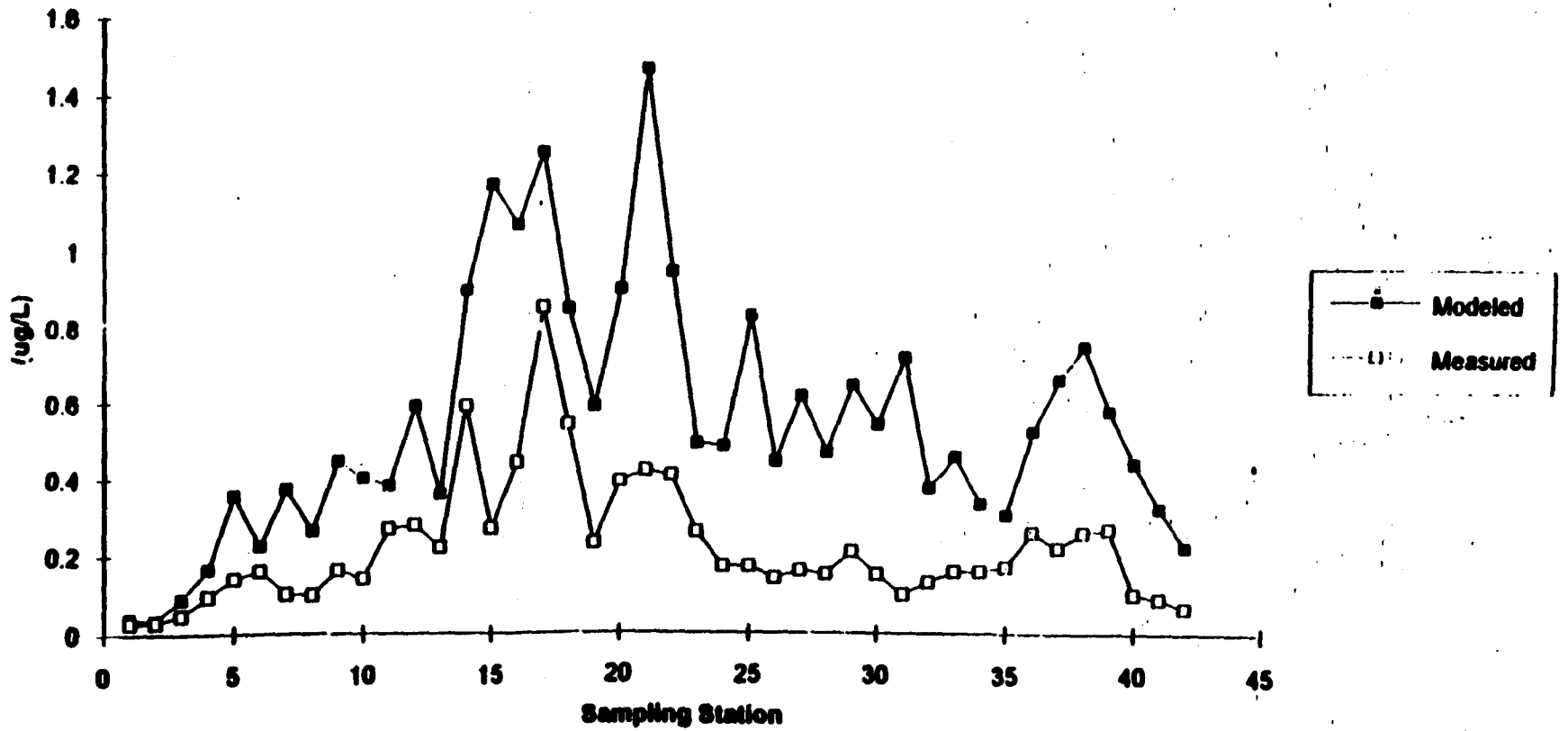
translation be used until the time that the State changes the standards to the dissolved form. Approach #3 may be used as an interim measure until the data are collected to implement approach #1.

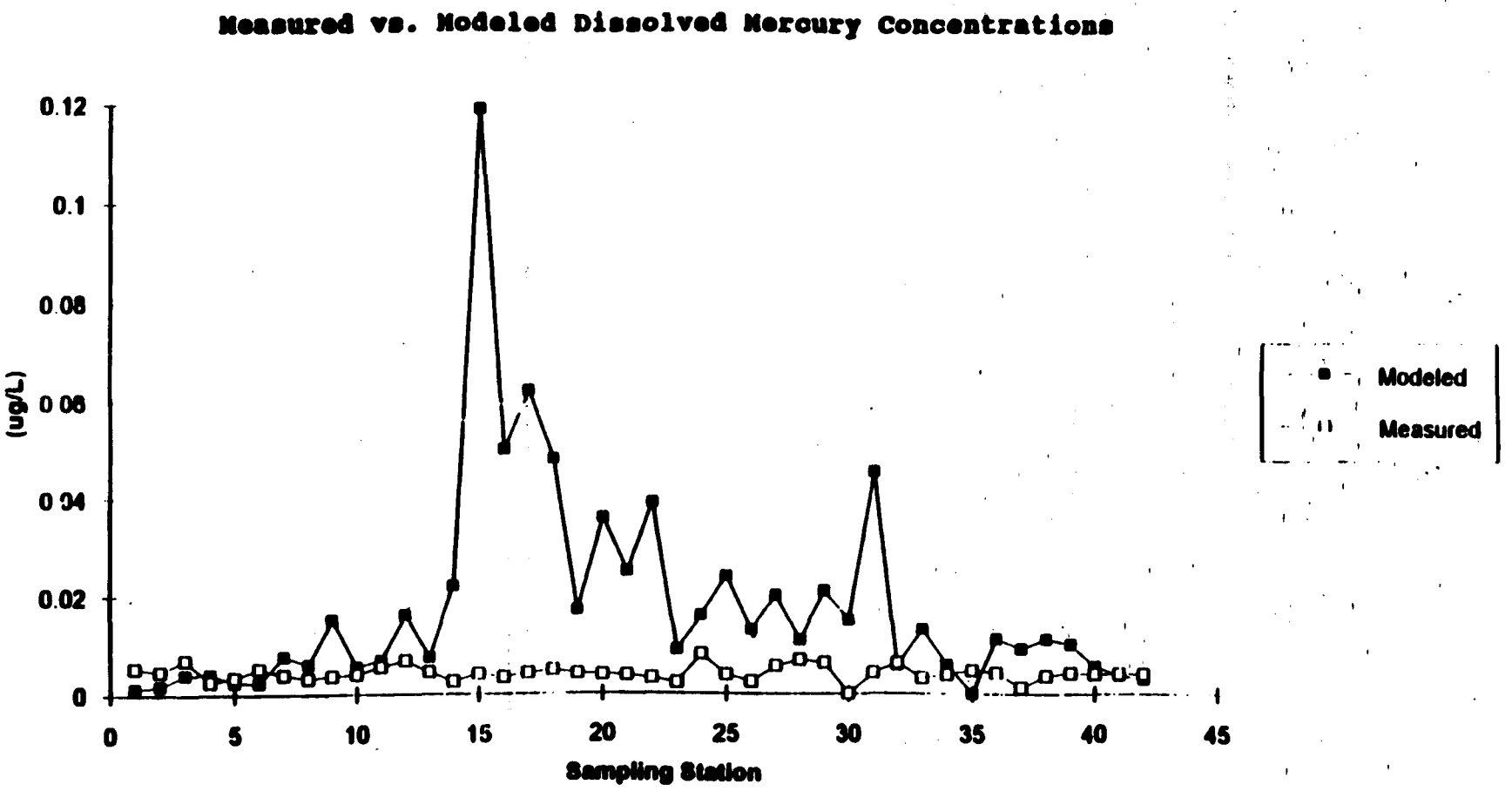

Measured vs. Modeled Dissolved Copper Concentrations
3.5
3
2.5
2
1.5
1
0.5
0
(ug/L)
0
5
10
15
20
25
30
35
40
45
Sampling Station
Modeled
Measured

Measured vs. Modeled Dissolved Cadmium Concentrations

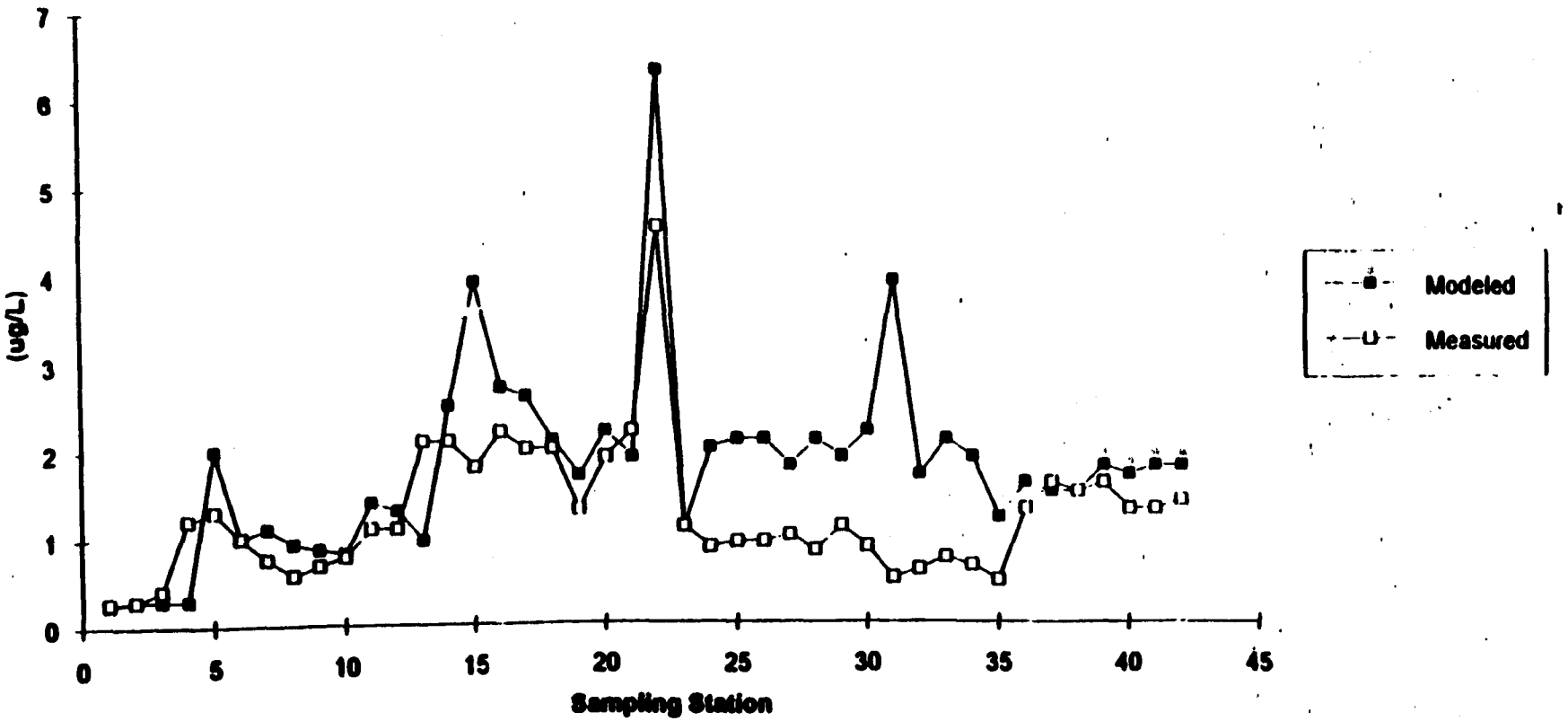


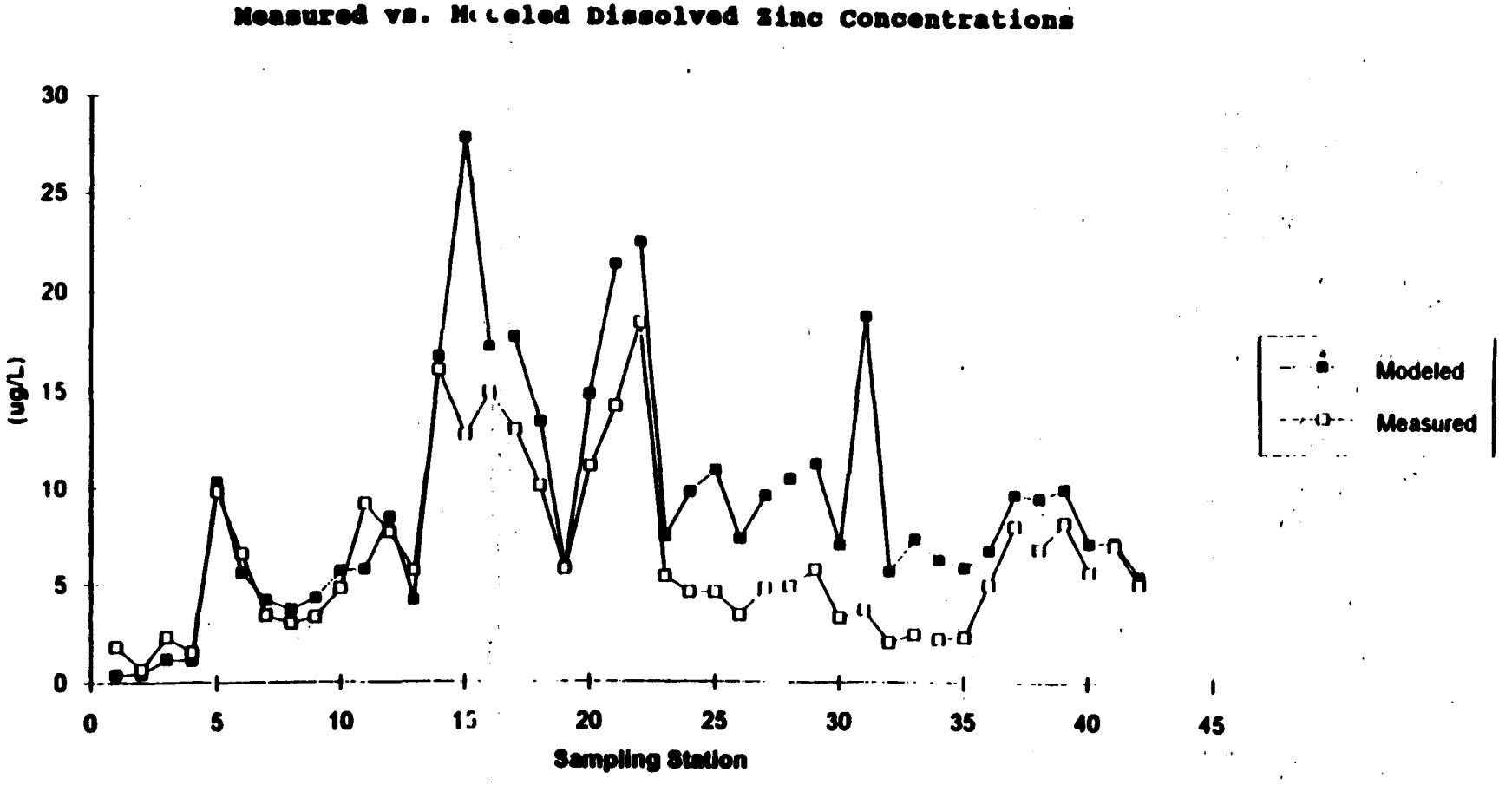
Measured vs. Modeled Dissolved Lead Concentrations

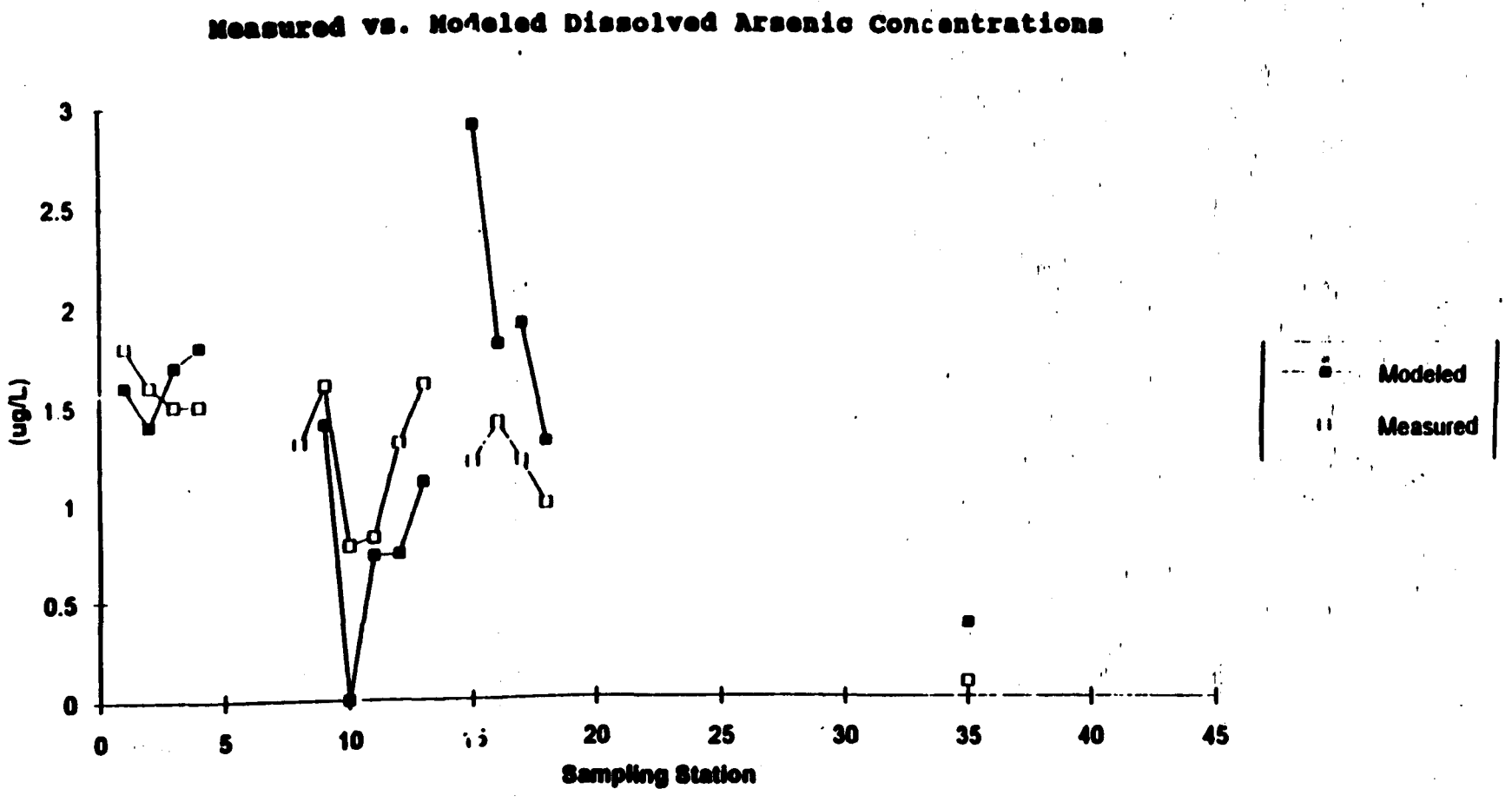



Measured vs. Modeled Dissolved Mercury Concentrations
0.12
0.1
0.08
0.06
0.04
0.02
0
(ug/L)
0
5
10
15
20
25
30
35
40
45
Sampling Station
Modeled
Measured

Measured vs. Modeled Dissolved Nickel Concentrations




Measured vs. Modeled Dissolved Zinc Concentrations
(ug/L)
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
Sampling Station
Modeled
Measured


Measured vs. Modeled Dissolved Arsenic Concentrations
3
2.5
2
1.5
1
0.5
0
(ug/L)
0
5
10
20
25
30
35
40
45
Sampling Station
Modeled
Measured

ATTACHMENT #4

GUIDANCE DOCUMENT
ON CLEAN ANALYTICAL TECHNIQUES AND MONITORING
October 1993

Guidance on Monitoring

o Use of Clean Sampling and Analytical Techniques

Appendix B to the WER guidance document (attached) provides some general guidance on the use of clean techniques. The Office of Water recommends that this guidance be used by States and Regions as an interim step while the Office of Water prepares more detailed guidance.

o Use of Historical DMR Data

With respect to effluent or ambient monitoring data reported by an NPDES permittee on a Discharge Monitoring Report (DMR), the certification requirements place the burden on the permittee for collecting and reporting quality data. The certification regulation at 40 CFR 122.22(d) requires permittees, when submitting information, to state: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Permitting authorities should continue to consider the information reported in DMRs to be true, accurate, and complete as certified by the permittee. Under 40 CFR 122.41(l)(8), however, as soon as the permittee becomes aware of new information specific to the effluent discharge that calls into question the accuracy of the DMR data, the permittee must submit such information to the permitting authority. Examples of such information include a new finding that the reagents used in the laboratory analysis are contaminated with trace levels of metals, or a new study that the sampling equipment imparts trace metal contamination. This information must be specific to the discharge and based on actual measurements rather than extrapolations from reports from other facilities. Where a permittee submits information

supporting the contention that the previous data are questionable and the permitting authority agrees with the findings of the information, EPA expects that permitting authorities will consider such information in determining appropriate enforcement responses.

In addition to submitting the information described above, the permittee also must develop procedures to assure the collection and analysis of quality data that are true, accurate, and complete. For example, the permittee may submit a revised quality assurance plan that describes the specific procedures to be undertaken to reduce or eliminate trace metal contamination.

Appendix B. Guidance Concerning the Use of "Clean Techniques" and QA/QC in the Measurement of Trace Metals

Recent information (Shiller and Boyle 1987; Windom et al. 1991) has raised questions concerning the quality of reported concentrations of trace metals in both fresh and salt (estuarine and marine) surface waters. A lack of awareness of true ambient concentrations of metals in saltwater and freshwater systems can be both a cause and a result of the problem. The ranges of dissolved metals that are typical in surface waters of the United States away from the immediate influence of discharges (Bruland 1983; Shiller and Boyle 1985,1987; Trefry et al. 1986; Windom et al. 1991) are:

Metal	Salt water (ug/L)	Fresh water (ug/L)
Cadmium	0.01 to 0.2	0.002 to 0.08
Copper	0.1 to 3.	0.4 to 4.
Lead	0.01 to 1.	0.01 to 0.19
Nickel	0.3 to 5.	1. to 2.
Silver	0.005 to 0.2	----------
Zinc	0.1 to 15.	0.03 to 5.

The U.S. EPA (1983,1991) has published analytical methods for monitoring metals in waters and wastewaters, but these methods are inadequate for determination of ambient concentrations of some metals in some surface waters. Accurate and precise measurement of these low concentrations requires appropriate attention to seven areas:

1. Use of "clean techniques" during collecting, handling, storing, preparing, and analyzing samples to avoid contamination.
2. Use of analytical methods that have sufficiently low detection limits.
3. Avoidance of interference in the quantification (instrumental analysis) step.
4. Use of blanks to assess contamination.
5. Use of matrix spikes (sample spikes) and certified reference materials (CRMs) to assess interference and contamination.
6. Use of replicates to assess precision.
7. Use of certified standards.

In a strict sense, the term "clean techniques" refers to techniques that reduce contamination and enable the accurate and precise measurement of trace metals in fresh and salt surface waters. In a broader sense, the term also refers to related issues concerning detection limits, quality control, and quality assurance. Documenting data quality demonstrates the amount of confidence that can be placed in the data, whereas increasing the sensitivity of methods reduce the problem of deciding how to

interpret results that are reported to be below detection limits.

This appendix is written for those analytical laboratories that want guidance concerning ways to lower detection limits, increase precision, and/or increase accuracy. The ways to achieve these goals are to increase the sensitivity of the analytical methods, decrease contamination, and decrease interference. Ideally, validation of a procedure for measuring concentrations of metals in surface water requires demonstration that agreement can be obtained using completely different procedures beginning with the sampling step and continuing through the quantification step (Bruland et al. 1979), but few laboratories have the resources to compare two different procedures. Laboratories can, however, (a) use techniques that others have found useful for improving detection limits, accuracy, and precision, and (b) document data quality through use of blanks, spikes, CRMs, replicates, and standards.

In general, in order to achieve accurate and precise measurement of a particular concentration, both the detection limit and the blanks should be less than one-tenth of that concentration. Therefore, the term "metal-free" can be interpreted to mean that the total amount of contamination that occurs during sample collection and processing (e.g., from gloves, sample containers, labware, sampling apparatus, cleaning solutions, air, reagents, etc.) is sufficiently low that blanks are less than one-tenth of the lowest concentration that needs to be measured.

Atmospheric particulates can be a major source of contamination (Moody 1982; Adeloju and Bond 1985). The term "class-100" refers to a specification concerning the amount of particulates in air (Moody 1982); although the specification says nothing about the composition of the particulates, generic control of particulates can greatly reduce trace-metal blanks. Except during collection of samples and initial cleaning of equipment, all handling of samples, sample containers, labware, and sampling apparatus should be performed in a class-100 bench, room, or glove box.

Nothing contained or not contained in this appendix adds to or subtracts from any regulatory requirements set forth in other EPA documents concerning metal analyses. The word "must" is used in this appendix merely to indicate items that are considered very important by analytical chemists who have worked to increase accuracy and precision and lower detection limits in trace-metal analysis. Some items are considered important because they have been found to have received inadequate attention in some laboratories performing trace-metal analyses.

Two topics that are not addressed in this appendix are:
1. The "ultraclean techniques" that are likely to be necessary when trace analyses of mercury are performed.
2. Safety in analytical laboratories.

Other documents should be consulted if these topics are of concern.

Avoiding contamination by use of "clean techniques"

Measurement of trace metals in receiving waters must take into account the potential for contamination during each step in the process. Regardless of the specific procedures used for collection, handling, storage, preparation (digestion, filtration, and/or extraction), and quantification (instrumental analysis), the general principles of contamination control must be applied. Some specific recommendations are:

a. Non-talc latex or class-100 polyethylene gloves must be worn during all steps from sample collection to analysis. (Talc seems to be a particular problem with zinc; gloves made with talc cannot be decontaminated sufficiently.) Gloves should only contact surfaces that are metal-free; gloves should be changed if even suspected of contamination.
b. The acid used to acidify samples for preservation and digestion and to acidify water for final cleaning of labware, sampling apparatus, and sample containers must be metal-free. The quality of the acid used should be better than reagent-grade. Each lot of acid must be analyzed for the metal(s) of interest before use.
c. The water used to prepare acidic cleaning solutions and to rinse labware, sample containers, and sampling apparatus may be prepared by distillation, deionization, or reverse osmosis, and must be demonstrated to be metal-free.
d. The work area, including bench tops and hoods, should be cleaned (e.g., washed and wiped dry with lint-free, class-100 wipes) frequently to remove contamination.
e. All handling of samples in the laboratory, including filtering and analysis, must be performed in a class-100 clean bench or a glove box fed by particle-free air or nitrogen; ideally the clean bench or glove box should be located within a class-100 clean room.
f. Labware, reagents, sampling apparatus, and sample containers must never be left open to the atmosphere; they should be stored in a class-100 bench, covered with plastic wrap, stored in a plastic box, or turned upside down on a clean surface. Minimizing the time between cleaning and using will help minimize contamination.
g. Separate sets of sample containers, labware, and sampling apparatus should be dedicated for different kinds of samples, e.g., receiving water samples, effluent samples, etc.
h. To avoid contamination of clean rooms, samples that contain very high concentrations of metals and do not require use of "clean techniques" should not be brought into clean rooms.
i. Acid-cleaned plastic, such as high-density polyethylene (HDPE), low-density polyethylene (LDPE), or a fluoroplastic, must be the only material that ever contacts a sample, except possibly during digestion for the total recoverable

measurement. (Total recoverable samples can be digested in some plastic containers.) Even HDPE and LDPE might not be acceptable for mercury, however.

j. All labware, sample containers, and sampling apparatus must be acid-cleaned before use or reuse.
   1. Sample containers, sampling apparatus, tubing, membrane filters, filter assemblies, and other labware must be soaked in acid until metal-free. The amount of cleaning necessary might depend on the amount of contamination and the length of time the item will be in contact with samples. For example, if an acidified sample will be stored in a sample container for three weeks, ideally the container should have been soaked in an acidified metal-free solution for at least three weeks.
   2. It might be desirable to perform initial cleaning, for which reagent-grade acid may be used, before the items are allowed into a clean room. For most metals, items should be either (a) soaked in 10 percent concentrated nitric acid at 50°C for at least one hour, or (b) soaked in 50 percent concentrated nitric acid at room temperature for at least two days; for arsenic and mercury, soaking for up to two weeks at 50°C in 10 percent concentrated nitric acid might be required. For plastics that might be damaged by strong nitric acid, such as polycarbonate and possibly HDPE and LDPE, soaking in 10 percent concentrated hydrochloric acid, either in place of or before soaking in a nitric acid solution, might be desirable.
   3. Chromic acid must not be used to clean items that will be used in analysis of metals.
   4. Final soaking and cleaning of sample containers, labware, and sampling apparatus must be performed in a class-100 clean room using metal-free acid and water. The solution in an acid bath must be analyzed periodically to demonstrate that it is metal-free.
   5. After labware and sampling apparatus are cleaned, they may be stored in a clean room in a weak acid bath prepared using metal-free acid and water. Before use, the items should be rinsed at least three times with metal-free water. After the final rinse, the items should be moved immediately, with the open end pointed down, to a class-100 clean bench. Items may be dried on a class-100 clean bench; items must not be dried in an oven or with laboratory towels. The sampling apparatus should be assembled in a class-100 clean room or bench and double-bagged in metal-free polyethylene zip-type bags for transport to the field; new bags are usually metal-free.
   6. After sample containers are cleaned, they should be filled with metal-free water that has been acidified to a pH of 2 with metal-free nitric acid (about 0.5 mL per liter) for storage until use. At the time of sample collection, the sample containers should be emptied and rinsed at least twice with the solution being sampled before the actual

sample is placed in the sample container.

k. Field samples must be collected in a manner that eliminates the potential for contamination from the sampling platform, probes, etc. Exhaust from boats and the direction of wind and water currents should be taken into account. The people who collect the samples must be specifically trained on how to collect field samples. After collection, all handling of samples in the field that will expose the sample to air must be performed in a portable class-100 clean bench or glove box.
l. Samples must be acidified (after filtration if dissolved metal is to be measured) to a pH of less than 2, except that the pH must be less than 1 for mercury. Acidification should be done in a clean room or bench, and so it might be desirable to wait and acidify samples in a laboratory rather than in the field. If samples are acidified in the field, metal-free acid can be transported in plastic bottles and poured into a plastic container from which acid can be removed and added to samples using plastic pipettes. Alternatively, plastic automatic dispensers can be used.
m. Such things as probes and thermometers must not be put in samples that are to be analyzed for metals. In particular, pH electrodes and mercury-in-glass thermometers must not be used if mercury is to be measured. If pH is measured, it must be done on a separate aliquot.
n. Sample handling should be minimized. For example, instead of pouring a sample into a graduated cylinder to measure the volume, the sample can be weighed after being poured into a tared container; alternatively, the container from which the sample is poured can be weighed. (For saltwater samples, the salinity or density should be taken into account when weight is converted to volume.)
o. Each reagent used must be verified to be metal-free. If metal-free reagents are not commercially available, removal of metals will probably be necessary.
p. For the total recoverable measurement, samples should be digested in a class-100 bench, not in a metallic hood. If feasible, digestion should be done in the sample container by acidification and heating.
q. The longer the time between collection and analysis of samples, the greater the chance of contamination, loss, etc.
r. Samples must be stored in the dark, preferably between 0 and 4°C with no air space in the sample container.

Achieving low detection limits

a. Extraction of the metal from the sample can be extremely useful if it simultaneously concentrates the metal and eliminates potential matrix interferences. For example, ammonium 1-pyrrolidinedithiocarbamate and/or diethylammonium diethyldithiocarbamate can extract cadmium, copper, lead,

nickel, and zinc (Bruland et al. 1979; Nriagu et al. 1993).
b. The detection limit should be less than ten percent of the lowest concentration that is to be measured.

Avoiding interferences

a. Potential interferences must be assessed for the specific instrumental analysis technique used and each metal to be measured.
b. If direct analysis is used, the salt present in high-salinity saltwater samples is likely to cause interference in most instrumental techniques.
c. As stated above, extraction of the metal from the sample is particularly useful because it simultaneously concentrates the metal and eliminates potential matrix interferences.

Using blanks to assess contamination

a. A laboratory (procedural, method) blank consists of filling a sample container with analyzed metal-free water and processing (filtering, acidifying, etc.) the water through the laboratory procedure in exactly the same way as a sample. A laboratory blank must be included in each set of ten or fewer samples to check for contamination in the laboratory, and must contain less than ten percent of the lowest concentration that is to be measured. Separate laboratory blanks must be processed for the total recoverable and dissolved measurements, if both measurements are performed.
b. A field (trip) blank consists of filling a sample container with analyzed metal-free water in the laboratory, taking the container to the site, processing the water through tubing, filter, etc., collecting the water in a sample container, and acidifying the water the same as a field sample. A field blank must be processed for each sampling trip. Separate field blanks must be processed for the total recoverable measurement and for the dissolved measurement, if filtrations are performed at the site. Field blanks must be processed in the laboratory the same as laboratory blanks.

Assessing accuracy

a. A calibration curve must be determined for each analytical run and the calibration should be checked about every tenth sample. Calibration solutions must be traceable back to a certified standard from the U.S. EPA or the National Institute of Science and Technology (NIST).
b. A blind standard or a blind calibration solution must be included in each group of about twenty samples.

c. At least one of the following must be included in each group of about twenty samples:
   1. A matrix spike (spiked sample; the method of known additions).
   2. A CRM, if one is available in a matrix that closely approximates that of the samples. Values obtained for the CRM must be within the published values.

The concentrations in blind standards and solutions, spikes, and CRMs must not be more than 5 times the median concentration expected to be present in the samples.

Assessing precision

a. A sampling replicate must be included with each set of samples collected at each sampling location.
b. If the volume of the sample is large enough, replicate analysis of at least one sample must be performed along with each group of about ten samples.

Special considerations concerning the dissolved measurement

Whereas the total recoverable measurement is especially subject to contamination during the digestion step, the dissolved measurement is subject to both loss and contamination during the filtration step.

a. Filtrations must be performed using acid-cleaned plastic filter holders and acid-cleaned membrane filters. Samples must not be filtered through glass fiber filters, even if the filters have been cleaned with acid. If positive-pressure filtration is used, the air or gas must be passed through a 0.2-um in-line filter; if vacuum filtration is used, it must be performed on a class-100 bench.
b. Plastic filter holders must be rinsed and/or dipped between filtrations, but they do not have to be soaked between filtrations if all the samples contain about the same concentrations of metal. It is best to filter samples from low to high concentrations. A membrane filter must not be used for more than one filtration. After each filtration, the membrane filter must be removed and discarded, and the filter holder must be either rinsed with metal-free water or dilute acid and dipped in a metal-free acid bath or rinsed at least twice with metal-free dilute acid; finally, the filter holder must be rinsed at least twice with metal-free water.
c. For each sample to be filtered, the filter holder and membrane filter must be conditioned with the sample, i.e., an initial portion of the sample must be filtered and discarded.

The accuracy and precision of the dissolved measurement should be

assessed periodically. A large volume of a buffered solution (such as aerated 0.05 N sodium bicarbonate) should be spiked so that the concentration of the metal of interest is in the range of the low concentrations that are to be measured. The total recoverable concentration and the dissolved concentration of the metal in the spiked buffered solution should be measured alternately until each measurement has been performed at least ten times. The means and standard deviations for the two measurements should be the same. All values deleted as outliers must be acknowledged.

Reporting results

To indicate the quality of the data, reports of results of measurements of the concentrations of metals must include a description of the blanks, spikes, CRMs, replicates, and standards that were run, the number run, and the results obtained. All values deleted as outliers must be acknowledged.

Additional information

The items presented above are some of the important aspects of "clean techniques"; some aspects of quality assurance and quality control are also presented. This is not a definitive treatment of these topics; additional information that might be useful is available in such publications as Patterson and Settle (1976), Zief and Mitchell (1976), Bruland et al. (1979), Moody and Beary (1982), Moody (1982), Bruland (1983), Adeloju and Bond (1985), Berman and Yeats (1985), Byrd and Andreae (1986), Taylor (1987), Sakamoto-Arnold (1987), Tramontano et al. (1987), Puls and Barcelona (1989), Windom et al. (1991), U.S. EPA (1992), Horowitz et al. (1992), and Nriagu et al. (1993).

References

Adeloju, S.B., and A.M. Bond. 1985. Influence of Laboratory Environment on the Precision and Accuracy of Trace Element Analysis. Anal. Chem. 57:1728-1733.

Berman, S.S., and P.A. Yeats. 1985. Sampling of Seawater for Trace Metals. CRC Reviews in Analytical Chemistry 16:1-14.

Bruland, K.W., R.P. Franks, G.A. Knauer, and J.H. Martin. 1979. Sampling and Analytical Methods for the Determination of Copper, Cadmium, Zinc, and Nickel at the Nanogram per Liter Level in Sea Water. Anal. Chim. Acta 105:233-245.

Bruland, K.W. 1983. Trace Elements in Sea-water. In: Chemical Oceanography, Vol. 8. J.P. Riley and R. Chester, eds. Academic Press, New York, NY. pp. 157-220.

Byrd, J.T., and M.O. Andreae. 1986. Dissolved and Particulate Tin in North Atlantic Seawater. Marine Chemistry 19:193-200.

Horowitz, A.J., K.A. Elrick, and M.R. Colberg. 1992. The Effect of Membrane Filtration Artifacts on Dissolved Trace Element Concentrations. Water Res. 26:753-763.

Moody, J.R. 1982. NBS Clean Laboratories for Trace Element Analysis. Anal. Chem. 54:1358A-1376A.

Moody, J.R., and E.S. Beary. 1982. Purified Reagents for Trace Metal Analysis. Talanta 29:1003-1010.

Nriagu, J.O., G. Lawson, H.K.T. Wong, and J.M. Azcue. 1993. A Protocol for Minimizing Contamination in the Analysis of Trace Metals in Great Lakes Waters. J. Great Lakes Res. 19:175-182.

Patterson, C.C., and D.M. Settle. 1976. The Reduction in Orders of Magnitude Errors in Lead Analysis of Biological Materials and Natural Waters by Evaluating and Controlling the Extent and Sources of Industrial Lead Contamination Introduced during Sample Collection and Processing. In: Accuracy in Trace Analysis: Sampling, Sample Handling, Analysis. P.D. LaFleur, ed. National Bureau of Standards Spec. Publ. 422, U.S. Government Printing Office, Washington, DC.

Puls, R.W., and M.J. Barcelona. 1989. Ground Water Sampling for Metals Analyses. EPA/540/4-89/001. National Technical Information Service, Springfield, VA.

Sakamoto-Arnold, C.M., A.K. Hanson, Jr., D.L. Huizenga, and D.R. Kester. 1987. Spatial and Temporal Variability of Cadmium in Gulf Stream Warm-core Rings and Associated Waters. J. Mar. Res. 45:201-230.

Shiller, A.M., and E. Boyle. 1985. Dissolved Zinc in Rivers. Nature 317:49-52.

Shiller, A.M., and E.A. Boyle. 1987. Variability of Dissolved Trace Metals in the Mississippi River. Geochim. Cosmochim. Acta 51:3273-3277.

Taylor, J.K. 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Chelsea, MI.

Tramontano, J.M., J.R. Scudlark, and T.M. Church. 1987. A Method for the Collection, Handling, and Analysis of Trace Metals in Precipitation. Environ. Sci. Technol. 21:749-753.

Trefry, J.H., T.A. Nelsen, R.P. Trocine, S. Metz., and T.W. Vetter. 1986. Rapp. P.-v. Reun. Cons. int. Explor. Mer. 186:277-288.

U.S. Environmental Protection Agency. 1983. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020. National Technical Information Service, Springfield, VA. Sections 4.1.1, 4.1.3, and 4.1.4

U.S. Environmental Protection Agency. 1991. Methods for the Determination of Metals in Environmental Samples. EPA-600/4-91-010. National Technical Information Service, Springfield, VA.

U.S. Environmental Protection Agency. 1992. Evaluation of Trace-Metal Levels in Ambient Waters and Tributaries to New York/New Jersey Harbor for Waste Load Allocation. Prepared by Battelle Ocean Sciences under Contract No. 68-C8-0105.

Windom, H.L., J.T. Byrd, R.G. Smith, and F. Huan. 1991. Inadequacy of NASQAN Data for Assessing Metals Trends in the Nation's Rivers. Environ. Sci. Technol. 25:1137-1142. (Also see Comment and Response, Vol. 25, p. 1940.)

Zief, M., and J.W. Mitchell. 1976. Contamination Control in Trace Element Analysis. Chemical Analysis Series, Vol. 47. Wiley, New York, NY.

APPENDIX C

Justification Statement for Permit Modification for SWMU No. 1

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL

APPENDIX C

JUSTIFICATION STATEMENT FOR
PERMIT MODIFICATION FOR
SOLID WASTE MANAGEMENT UNIT NUMBER 1

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL
FOR
JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

July 2018

FINAL

APPENDIX C

JUSTIFICATION STATEMENT FOR PERMIT MODIFICATION FOR SOLID WASTE MANAGEMENT UNIT NUMBER 1

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL FOR JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

Prepared for:

Air Force Civil Engineer Center

July 2018

TABLE OF CONTENTS

Page

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

Air Force	U.S. Air Force
AR	Administrative Record
COC	contaminant of concern
cy	cubic yard(s)
DTRA	Defense Threat Reduction Agency
EA	EA Engineering, Science, and Technology, Inc., PBC
EPA	U.S. Environmental Protection Agency
mg/kg	milligram(s) per kilogram
NFA	No Further Action
No.	number
Ogden	Ogden Environmental and Energy Services Company, Inc.
OHM	OHM Remediation Services Corporation
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RSN	Raytheon Services Nevada
SVOC	semivolatile organic compound
SWBP	Solid Waste Burn Pit
SWMU	Solid Waste Management Unit
USAF	U.S. Air Force (Air Force) (*used in references*)
yd^3	cubic yard(s)

1. INTRODUCTION AND PURPOSE

The U.S Air Force (Air Force) is requesting permit modification for Solid Waste Management Unit (SWMU) Number (No.) 1 for Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004 (EPA 2004). This action is being requested because corrective action responsibilities related to treatment-based performance criteria at SWMU No. 1 are complete, as defined in the permit. Monitoring-based and management-based performance criteria at SWMU No. 1 are not complete and are proposed for continuation in the permit modification.

This SWMU is currently operated under agreement by the Air Force and EPA. A map showing the general location of Johnston Atoll is shown in Figure 1, and the location of the SWMU is shown in Figure 2.

Information and analytical data presented in the following documents were used to evaluate conditions at SWMU No. 1 (references with an Administrative Record [AR] number are underlined below):

- *Johnston Island RCRA Facility Investigation Report* (Raytheon Services Nevada [RSN] 1994); AR58, AR59, AR60, and AR61
- *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll* (Ogden Environmental and Energy Services Company, Inc. [Ogden] 1999); AR206
- *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM Remediation Services Corporation [OHM] 2000a); AR105, AR106, and AR107
- *Draft SWMU- and AOC-Specific Risk Assessment, Volume II* (OHM 2000b); AR106
- *Site Characterization Sampling and Analysis Report, Solid Waste Burn Pit (Solid Waste Management Unit No. 1), Johnston Atoll* (OHM 2002a)
- *Draft Risk Assessment, Solid Waste Burn Pit, SWMU No. 1, Johnston Island* (OHM 2002b)
- *Investigation, Remedial Action, and Closure Report, Defense Threat Reduction Agency (DTRA) Sites, Johnston Atoll* (Earth Tech 2002)
- *Data Gap Biomonitoring Work Plan for SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Atoll* (CH2M HILL 2003a); AR140
- *Corrective Measures Implementation Work Plan, Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5* (CH2M HILL 2003b); No AR number; but copy included on compact disk

- *Final Biomonitoring Report and Risk Assessment for SWMU No. 1, 2, and 16 and AOC No. 1* (CH2M HILL 2004a); AR172
- *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 1 and 5, Johnston Atoll* (CH2M HILL 2004b); AR199
- *Final Monitored Natural Recovery (Biomonitoring) Work Plan for the Lagoon Areas at Johnston Island* (CH2M HILL 2005); AR195
- *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites* (EA 2016)

1.1 Permit Criteria

SWMU No. 1 does not meet the criteria for NFA and monitoring-based and management-based performance criteria corrective action will continue at SWMU No. 1. The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1, as follows:

a) *"A determination, based on investigations conducted in accordance with this permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

1.2 Document Organization

The conditions at SWMU No. 1 are addressed in Section 2. The information presented in Section 2 includes a brief description of the SWMU, including its location and physical description, its operating history, and a brief summary of relevant investigation results. The justification for the permit modification decision is provided in Section 3. The references used during the preparation of this document are listed in Section 4.

2. GENERAL INFORMATION FOR SWMU NO. 1

2.1 Location and Physical Description

The Solid Waste Burn Pit (SWBP) is located on the northwest end of Johnston Island (the largest island at Johnston Atoll), approximately 50 feet from the lagoon (Figure 2). In the 1960s, this area contained the Liquid Oxygen/Cryogenics Plant that supported missile launches from Johnston Island (Ogden 1999). The SWBP was constructed around 1978 and was used for the daily disposal of combustible domestic trash generated during operations at Johnston Island. Noncombustible items, such as lead acid batteries and shop wastes, were also disposed of at the SWBP. As a result, ash, coral aggregate, metal debris, and other noncombustible items accumulated to form a large waste pile.

The waste pile was characterized and removed from the site in 1995. The lead-impacted ash was stabilized with hydrated lime and the stabilized material was moved to SWMU No. 6, the Mixed Metal Debris Area. At SWMU No. 6, the stabilized material was placed in a containment cell covered with a geotextile membrane and clean fill material, and the area was vegetated. The excavation at SWMU No. 1 was backfilled with decontaminated metal debris and asphalt rubble and was covered by 2 to 3 feet of clean fill material (OHM 2002b).

A thermal oxidizer was formerly located on a concrete pad on the eastern side of the SWMU, which was shut down in July 1998. The active portion of the SWMU consisted of two air curtain incineration units located within a concrete-floored containment area surrounded on three sides by concrete walls. Prior to decommissioning, the two units received and burned up to approximately 15 cubic yards (yd^3) of nonhazardous dry refuse each day. One unit was taken offline at the end of May 2004 and was transferred to the Republic of the Marshall Islands. The second unit was taken offline in June 2004 and transported to Hawaii for recycling. The burn pit was further decommissioned by removing fencing, bollards, signs, and guardrails.

2.2 Investigation and Treatment Summary

In July 2000, surface and subsurface soil samples were collected to characterize the conditions at the unit following removal of ash from the burn pit. Twenty-eight soil samples were collected from the area surrounding the active burn pit, the excavation footprint (from removal of the ash material), the thermal oxidizer, the former cryogenic aboveground storage tank, and the perimeter of the SWMU. The soil samples were analyzed for polychlorinated biphenyls (PCBs), dioxins/furans, priority pollutant metals, and semivolatile organic compounds (SVOCs). The results from the sample collection activities were documented in the *Site Characterization and Analysis Report, Solid Waste Burn Pit (Solid Waste Management Unit No. 1), Johnston Atoll* (OHM 2002a).

The analytical results from the surface and subsurface soil samples were summarized and compared to soil cleanup goals in the *Draft Risk Assessment, Solid Waste Burn Pit, SWMU No. 1, Johnston Island* (OHM 2002b). The SVOC constituent benzo(a)pyrene was identified as a contaminant of concern (COC) based on detected concentrations in soil exceeding the

risk-based cleanup goal of 0.62 milligrams per kilogram (mg/kg). Four surface soil sample locations (SWBP 104, SWBP 105, SWBP 108/109, and SWBP 116) had detected concentrations of benzo(a)pyrene exceeding the cleanup goal. A work plan addendum (CH2M HILL 2003b) was prepared for the removal and disposal of soil from four locations at SWMU No. 1. The objective of the corrective measures conducted at SWMU No. 1 was to excavate and dispose of soil containing concentrations of benzo(a)pyrene in excess of soil cleanup goals.

Soil removal and disposal, and confirmation soil sampling was conducted beginning in February 2004 (CH2M HILL 2004b). An initial excavation of 20 feet by 20 feet by 0.5 feet in depth was removed from each of the four sample locations. Following excavation, confirmation soil samples were collected from the excavation side walls and bottom of each of the four excavations. The confirmation soil samples were analyzed for benzo(a)pyrene.

The results from the initial confirmation sampling indicated that benzo(a)pyrene concentrations in soil samples from the two southern excavations (EX03 and EX04) were below the cleanup goal. Based on these results, no further corrective measures were required to address benzo(a)pyrene at excavation EX03 and EX04.

The results from the initial confirmation sampling indicated that benzo(a)pyrene concentrations in soil samples from the two northern excavations (EX01 and EX02) exceeded the soil cleanup goal, hence further soil removal was required. Additional excavation was completed at EX01 and EX02, which consisted of expanding the excavation by 5 feet at each sidewall and extending the depth by an additional 0.5 feet. Confirmation samples were collected from the sidewalls and excavation bottom following each excavation phase.

Four excavation phases at EX01 and three excavation phases at EX02 were required to remove soil exceeding the cleanup goal of 0.62 mg/kg. Following receipt of analytical results indicating that excavation side walls and bottoms were below the cleanup goal for benzo(a)pyrene, the four excavations were backfilled with clean fill material.

3. PROPOSED PERMIT CHANGES

The Justification for the Permit modifications listed below are discussed in Section 3.1. The Permit Narrative also provides supportive rationale. The 2004 Permit performance criteria and proposed language and changes to Permit performance criteria, specifically Table III.3 is provided below for reference.

Table III.3 of the 2004 Permit (Modification 1) specifies the following treatment, monitoring, and management-based performance criteria for SWMU No. 1:

- *Treatment-Based: "Excavation and off-island disposal of soil at locations where benzo(a)pyrene concentrations exceed risk-based Cleanup Goals. Work conducted in accordance with Corrective Measures Implementation Work Plan Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5 (CH2M HILL, dated December 19, 2003) Cleanup Goals for COCs in soil are listed in Table III.4."*
- *Monitoring-Based: "Conduct sediment and fish tissue monitoring in the adjacent lagoon to demonstrate compliance with criteria presented in the Monitored Natural Recovery Work Plan prepared and submitted in accordance with Table III.1. Monitored Natural Recovery Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, criteria for removing the fishing prohibition and warning signs, and criteria for successful completion of monitored natural recovery."*
- *Management-Based: "Maintain existing fishing prohibition with posted warning signs until criteria identified in EPA approved Monitored Natural Recovery (Biomonitoring) Work Plan are met."*

The proposed Permit modification includes the following as performance criteria for SWMU No. 1:

- *Treatment-based performance criteria achieved.*
- *Monitoring-Based: Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where:*
    - *Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or*
    - *The Air Force proposes to remove the fishing prohibition.*

The Monitored Natural Recovery (MNR) Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, requirements for maintaining and replacing fishing prohibition warning signs.

- *Management-Based:* *Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.*

3.1 Modules I , II, and III Modifications

No site-specific modifications are proposed for Module I (General Permit Conditions).

No site-specific modifications are proposed for Module II (General Facility Conditions).

Several site-specific modifications were made to Module III (Corrective Action for SWMUs and AOCs). These modifications are justified in Sections 3.1.1, 3.1.2, and 3.1.3. Additional modifications made to the Performance criteria for SWMU No. 1 are sufficiently addressed in the Permit Narrative, but are summarized here, as follows:

- Specify the scheduled monitoring and maintenance frequency as every five (5) years

3.1.1 Modifications to Treatment-Based Criteria

The removal action conducted as a corrective action at SWMU No. 1 were completed in April 2004 (discussed in section 2.2). Approximately 330 yd^3 of benzo(a)pyrene-impacted soil was excavated from four locations at SWMU No. 1. Confirmation sampling verified extent of contamination was removed and the impacted soil was characterized as nonhazardous waste and was transported to a permitted disposal facility on the U.S. mainland (CH2M HILL 2004b).

With the completion of removal activities at SWMU No. 1 (CH2M HILL 2004b), the treatment-based performance criteria listed in Table III.3 of the 2004 Permit have been met. These achievements need to be incorporated into the permit though removing the treatment-based performance criteria.

3.1.2 Modifications to Monitoring-Based Criteria

Monitoring-based performance criteria are proposed to continue under modified criteria. Long-term monitoring was completed for sediment and fish in the lagoon adjacent to SWMU No. 1 in 2003 (CH2M HILL 2004a), 2008 (CH2M HILL 2011), 2013 (EA Engineering, Science, and Technology, Inc., PBC [EA] 2014), and 2015 (EA, 2016). Sufficient data exists to support the need for a continued fishing prohibition, and sediment monitoring. Fish and sediment in the lagoon immediately offshore from SWMU No. 1 contain elevated levels of dioxins/furans related to historical releases from Johnston Island. Sediment sampling data is proposed to continue to be used as an indicator for a change in conditions, and an indication of a release into the marine

system. Based on the fish tissue and sediment data, the Air Force has determined it is most appropriate to maintain a fishing prohibition for the lagoon and continue monitoring sediment.

There is no known source remaining at SWMU No.1, and the purpose of monitoring fish tissue has been completed and results support that a fishing prohibition should be maintained. Therefore, the Air Force proposes to discontinue fish tissue sampling as part of the biomonitoring component, unless one of the following situations are presented:

- Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or
- The Air Force proposes to remove the fishing prohibition.

The fishing prohibition is proposed to be in effect as part of the ongoing performance criteria for this unit, and a permit modification would be required with adequate justification to remove this control measure. The next monitoring-based activities will be completed in 2020 along with the management-based activities described in Section 3.1.3.

3.1.3 Modifications to Management-Based Criteria

Management-based performance criteria are proposed to continue under modified criteria. Under the conditions of the 2004 Permit, the Air Force is required to maintain fishing prohibition warning signs at SWMU No. 1. The warning signs at SWMU No. 1 were assessed and additional warning signs were installed in 2015. The proposed modifications specify that maintenance of warning signs at SWMU No. 1 will be through anticipated sign replacement every 5 years and ensuring the signs are visible at all times. The next warning sign replacement is scheduled for 2020 along with the monitoring-based activities (sediment sampling).

4. REFERENCES

CH2M HILL. 2003a. *Data Gap Biomonitoring Work Plan for SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Atoll.* February

CH2M HILL. 2003b. *Corrective Measures Implementation Work Plan, Addendum No 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5.* December.

CH2M HILL. 2004a. *Final Biomonitoring Report and Risk Assessment for SWMU No. 1, 2, and 16 and AOC No. 1, Johnston Atoll*. March.

CH2M HILL. 2004b. *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 1 and 5, Johnston Atoll.* December.

CH2M HILL. 2005. *Final Monitored Natural Recovery (Biomonitoring) Work Plan for the Lagoon Areas at Johnston Island.* April 29.

CH2M HILL. 2011. *Final 2008 Biomonitoring Report and Risk Assessment, SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Island.* March

EA Engineering, Science, and Technology, Inc., PBC. (EA). 2014. *Monitoring, Engineering Evaluation, and Maintenance Report, Resource Conservation and Recovery Act Monitored Natural Attenuation and Corrective Action at Solid Waste Management Units and Area of Concern and Engineering Evaluation Data Collection at Johnston Atoll Airfield Sites.* September

EA. 2016. *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites.* January.

Earth Tech. 2002. *Investigation, Remedial Action, and Closure Report, DTRA Sites, JA.* October.

United States Environmental Protection Agency (EPA). 2002. *Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002.* Effective May 30, 2002.

EPA. 2004. *Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002.* Effective July 30, 2004.

Ogden Environmental and Energy Services Company, Inc. (Ogden). 1999. *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll.* January.

OHM Remediation Services Corporation (OHM). 2000a. *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* January.

OHM. 2000b. *Draft SWMU- and AOC-Specific Risk Assessment, Volume II.* January.

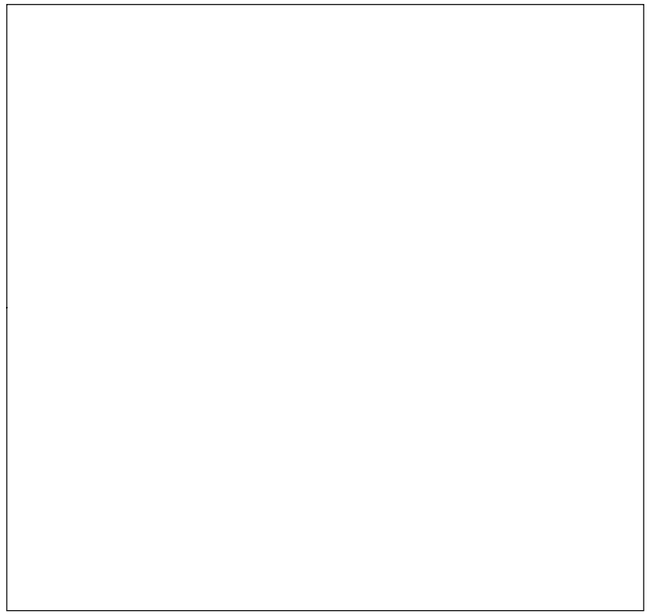
OHM. 2002a. *Site Characterization Sampling and Analysis Report, Solid Waste Burn Pit (Solid Waste Management Unit No. 1), Johnston Atoll.*

OHM. 2002b. *Draft Risk Assessment, Solid Waste Burn Pit, SWMU No. 1, Johnston Island.* August.

Raytheon Services Nevada. 1994. *Johnston Island RCRA Facility Investigation Final Report*. September.

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Data Sources
Insert Map: Pacific Airfields http://www.ww2aircraft.net
Primary Map: © Digital Worldview 2, March 2018.

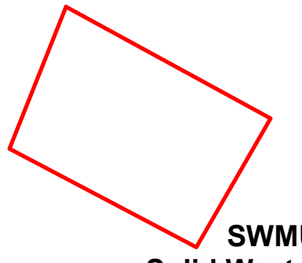
1 inch equals 1,800 feet
(11x17 print-out)
0 1,000 2,000 4,000 Feet

Justification Statement for Permit Modification For Solid Waste Management Unit Number 1

Figure 1
Johnston Atoll Location Map

enewberry Path: C:\Users\enewberry\Desktop\2018 Permit\GIS FILEs\Permit Ren EXPORT\mxd\AppC Figure1 SMWU1.mxd

Johnston Island



SWMU 1
Solid Waste Burn Pit

Legend
SWMU No. 1 Location

Acronym
SWMU: Solid Waste Management Unit

Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image
Image Captured April 5, 2013
Processed by Kendra Maty, USFWS-NWRS-RRI

N

1 inch equals 200 feet
(11x17 print-out)

0 100 200 400 Feet

Justification Statement for Permit Notification for Solid Waste Management Unit Number 1

Figure 2
Johnston Atoll SWMU 1

APPENDIX D

Justification Statement for Permit Modification for SWMU No. 2

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL

APPENDIX D

JUSTIFICATION STATEMENT FOR
PERMIT MODIFICATION FOR
SOLID WASTE MANAGEMENT UNIT NUMBER 2

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL
FOR
JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

July 2018

FINAL

APPENDIX D

JUSTIFICATION STATEMENT FOR PERMIT MODIFICATION FOR SOLID WASTE MANAGEMENT UNIT NUMBER 2

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL FOR JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

Prepared for:

Air Force Civil Engineer Center

July 2018

TABLE OF CONTENTS

Page

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

µg/kg	microgram(s) per kilogram
Air Force	U.S. Air Force
AR	Administrative Record
CMI	Corrective Measures Investigation
CMS	Corrective Measures Study
EPA	U.S. Environmental Protection Agency
HO	Herbicide Orange
LTTD	low-temperature thermal desorption
NFA	No Further Action
No.	number
OHM	OHM Remediation Services Corporation
RCRA	Resource Conservation and Recovery Act
SWMU	Solid Waste Management Unit
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TDS	thermal desorption system
TEQ	toxicity equivalent
USAF	U.S. Air Force (Air Force) (*used in references*)

1. INTRODUCTION AND PURPOSE

The U.S Air Force (Air Force) is requesting a permit modification for treatment-based performance criteria for Solid Waste Management Units (SWMU) Number (No.) 2 for Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on 30 April 2002, and effective 30 May 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective 30 July 2004 (EPA 2004).

This SWMU is currently operated under agreement by the Air Force and EPA. A map showing the general location of Johnston Atoll is shown on Figure 1 and the location of SWMU No. 2 is shown on Figure 2.

Information and analytical data presented in the following documents were used to evaluate conditions at SWMU No. 2 (copies of references with an underlined Administrative Record [AR] number are included on a Compact Disk accompanying this report):

- *Johnston Island RCRA Facility Investigation Report* (Raytheon Services Nevada 1994) ; AR58, AR59, AR60, and AR61
- *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM Remediation Services Corporation [OHM] 2000a); AR105, AR106, and AR107
- *Addendum No. 1 to Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM 2000b); AR110
- *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 2, Johnston Atoll* (CH2M HILL 2004a); (no AR number, copy included with disk)
- *Final Phase II Environmental Baseline Survey Report, Johnston Atoll* (Earth Tech 2005); (AR206).
- *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites* (EA 2016)

1.1 Permit Criteria

SWMU No. 2 does not meet the criteria for NFA and monitoring-based and management-based performance criteria corrective action will continue. The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1 (EPA 2004), as follows:

a) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or* [Area of Concern] *AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

1.2 Document Organization

The conditions at SWMU No. 2 are addressed in Section 2. The information presented in Section 2 includes a brief description of the SWMU, including its location and physical description, its operating history, and a brief summary of relevant investigation results. The justification for the permit modification decision is provided at the end of Section 3. The references used during the preparation of this document are listed in Section 4.

2. GENERAL INFORMATION FOR SWMU NO. 2

2.1 Location and Physical Description

SWMU No. 2, also known as the Former Herbicide Orange (HO) Storage Area, is an approximately 6-acre area near the extreme northwestern tip of Johnston Island (Figure 2). From 1972 through 1977, approximately 1.37 million gallons (approximately 25,000 55-gallon drums) of HO was kept in the storage area. Between 1972 and 1977, the drums corroded and released an estimated 250,000 pounds of HO. In 1977, the HO was transferred to new drums and disposed of by incineration at sea. Because of the HO release at this area, the soil was contaminated with dioxin/furan compounds, a manufacturing byproduct of HO. To prevent surface runoff of contaminated sediments into the adjacent lagoon, a soil berm was constructed around the north and west ends of the Former HO Storage Area in 1995.

The Former HO Storage Area was bordered by two other sections known as the Primary Area and the Secondary Area. The Primary Area was approximately 4.3 acres and was located just southwest of the Former HO Storage Area. In 1977, the Primary Area was used for transferring HO from corroded drums into new drums (OHM 2000a). The Secondary Area was approximately 2 acres and was located immediately southwest of the Former HO Storage Area.

In 1997, an interim corrective measure was performed in the Primary and Secondary Areas to address potential dioxins/furans in the soil at concentrations greater than 1.0 microgram per kilogram (μg/kg) 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalent (TEQ). Both areas were extensively sampled. Approximately 1,700 cubic yards of dioxin/furan-contaminated soil was excavated and removed from the Primary Area and placed within the Former HO Storage Area. No excavation was required in the Secondary Area. The resulting dioxin/furan concentration of the soil remaining at the site was less than 0.3 μg/kg 2,3,7,8-TCDD TEQ. Additional corrective actions were not required in either area.

2.2 Investigation Summary

In July 1986, a pilot study was performed using an indirect-fired thermal desorption unit to treat the dioxin/furan-contaminated soil. The pilot study demonstrated that thermal treatment of the soil was feasible. In 2000, a Draft Corrective Measures Study (CMS) was prepared with the following objectives:

- Document the environmental history and conditions at SWMU No. 2.
- Document the current environmental and regulatory basis on which to make recommendations and administrative decisions.
- Identify, evaluate, and recommend a remedy to ensure compliance with remedial objectives and standards established in the Permit.

In the Draft CMS, 18 corrective measure alternatives were identified as being potentially applicable for the remediation of dioxin/furan-contaminated soil at the Former HO Storage Area

(OHM 2000a). The alternatives were evaluated using the criteria defined in RCRA corrective action guidance documents and were narrowed down to five alternatives considered feasible to reduce potential risk at the site to acceptable levels. The alternatives were as follows:

- Management in place
- Onsite storage and management
- In situ thermal desorption
- Onsite thermal desorption
- Onsite incineration.

Of these five alternatives, management in place and onsite thermal desorption with thermal oxidation for treatment of off-gasses was recommended for treating the dioxin/furan-contaminated soil at the Former HO Storage Area. The onsite thermal desorption was recommended for the following reasons:

- Would protect human health and the environment
- Has been proven to be capable of achieving the cleanup goals
- Reduces contaminant volume, mass, and toxicity, and therefore could eliminate potential liability and long-term monitoring requirements
- Has been determined to be the most cost-effective of the appropriate and proven remedial technologies currently available.

2.3 Treatment Summary

The objective of the Corrective Measures Investigation (CMI) was to reduce risks to human and ecological receptors at the Former HO Storage Area by removing and thermally treating the dioxin/furan-contaminated soil. In accordance with Table III.3 of the Permit, the corrective measures criterion for SWMU No. 2 was 1.0 µg/kg for TCDD TEQ, as calculated using the World Health Organization methodology (Van den Berg, et. al. 2006). The criterion was determined to be appropriately protective of human and ecological receptors as outlined in the human and ecological risk assessments included in the Draft CMS (OHM 2000a). To add a conservative factor to the analytical data, non-detect results were incorporated into the TEQ at one-half of the reporting limit, instead of a value of zero.

As specified in the Draft CMS and Permit, a thermal desorption system (TDS) employing low-temperature thermal desorption (LTTD) technology was used to treat the soil onsite. Soil treated in the TDS was required to meet the corrective measures criterion prior to backfill. In addition, the Permit required that stack gas from the TDS meet stack gas emissions criteria for dioxins/furans and other related constituents.

Field activities at SWMU No. 2 were performed in accordance with the following documents:

- *Draft Work Plan for Vegetation Removal and Surface Soil Excavation at SWMU No. 2, RCRA Corrective Measures Implementation, Johnston Atoll* (CH2M HILL 2002a) and EPA's conditional approval dated October 7, 2002
- *Draft Corrective Measures Implementation Work Plan for Thermal Treatment of Contaminated Soil, Johnston Atoll* (CH2M HILL 2002b) and EPA's conditional approval dated February 12, 2003
- *Draft Corrective Measures Implementation Work Plan for Thermal Treatment of Contaminated Soil, Johnston Atoll, Performance Test Plan* (CH2M HILL 2003a) and EPA's approval dated March 5, 2003
- *Petition for Interim Conditions for Thermal Treatment Operations at Johnston Atoll* (CH2M HILL 2003b) and EPA's approval dated July 16, 2003
- Technical memoranda approved by EPA, including the following:
    - *Technical Memorandum No. 1, Sampling and Analysis Plan of Trees for Dioxin at SWMU No. 2, August* (CH2M HILL 2002c)
    - *Technical Memorandum No. 2, Revised Soil Sampling Approach at SWMU No. 2, December* (CH2M HILL 2002d)
    - *Technical Memorandum No. 3, Concrete Pad Sampling Approach, SWMU No. 2, January* (CH2M HILL 2003c)
    - *Technical Memorandum No. 4, Differences between Preliminary and Final Soil Analytical Results, SWMU No. 2, July* (CH2M HILL 2003d)
    - *Technical Memorandum No. 5, Removal of Concrete Pad and Excavation of Contaminated Soil, SWMU No. 2, October* (CH2M HILL 2003e)
    - *Technical Memorandum No. 7, Thermal Treatment of SWMU No. 2 Ash and Coral, January* (CH2M HILL 2004b)

      Technical Memorandum No. 7, Addendum No. 1, Thermal Treatment of SWMU No. 2 Ash and Coral, March (CH2M HILL 2004c)

      Technical Memorandum No. 7, Addendum No. 2, Thermal Treatment of SWMU No. 2 Ash and Coral, April (CH2M HILL 2004d)
    - *Technical Memorandum No. 8, Offsite Soil and Vegetation Sampling, December* (CH2M HILL 2003f)
    - *Technical Memorandum No. 9, Thermal Desorption System Demobilization, February* (CH2M HILL 2004e)

      Technical Memorandum No. 9, Addendum No. 1, Thermal Desorption System Demobilization, March (CH2M HILL 2004f)

Technical Memorandum No. 9, Response to Comments and Revised Figure (CH2M HILL 2004g)

- *Technical Memorandum No. 10, Discharge of Treated Wastewater from TDS, March* (CH2M HILL 2004h)
- *Technical Memorandum No. 11, Request for a "No Longer Contains" Determination for SWMU No. 2 Soil Contaminated with Plutonium, April* (CH2M HILL 2004i).

Note that Technical Memorandum No. 6 does not pertain to activities conducted at SWMU No. 2 and instead refers to activities conducted concurrently at SWMU No. 16.

Removal of dioxin/furans-contaminated soil at SWMU No. 2 included excavation of 9 to 12 inches of surface soil for thermal treatment. Then the site was laid out in 40-foot by 50-foot grid cells with a 6-point composite sample collected from each grid cell and analyzed for dioxins/furans by EPA Method 8290. Grids where dioxin/furans concentrations exceeded the corrective measures criterion were excavated one additional foot and resampled. This process was repeated until the soil remaining in all 129 grid cells met the corrective measures criterion. The average TCDD TEQ concentration in the remaining unexcavated soil was 0.28 µg/kg (CH2M HILL 2004a).

Contaminated soil that was excavated from SWMU No. 2 was treated in an onsite TDS employing LTTD technology. Soil was screened, briquetted, and placed in trays for treatment. The trays were then loaded into matrix constituent separator units and heated to a minimum of 950 degrees Fahrenheit. Upon reaching the treatment temperature, the soil was removed, allowed to cool, and then rehydrated. Treated soil was placed in a daily staging pile and sampled for dioxins/furans. Treated soil meeting the corrective measures criterion was backfilled in SWMU No. 2 following EPA approval. The average TCDD TEQ concentration of the successfully treated soil was 0.49 µg/kg. Treated soil not meeting the corrective measures criterion was re-treated until it met the criterion. Thermal treatment of SWMU No. 2 soil was conducted from 25 June 2003 through 21 March 2004. Following completion of thermal treatment, the TDS was dismantled, decontaminated, and returned to Charlotte, North Carolina (CH2M HILL 2004a).

Soil that was treated to the corrective measures criterion was backfilled in SWMU No. 2 and then approximately 6 inches of topsoil was placed over the site to support revegetation with native species. Approximately 26,390 plants of various native species were planted at SWMU No. 2 and approximately 6,975 plants of various native species were planted at the TDS site (CH2M HILL 2004a).

3. PROPOSED PERMIT CHANGES

The Justification for the Permit modifications listed below are discussed in Section 3.1. The Permit Narrative also provides supportive rationale. The 2004 Permit performance criteria and proposed language and changes to Permit performance criteria, specifically Table III.3 is provided below for reference.

Table III.3 of the 2004 Permit (Modification 1) specifies the following performance criteria for SWMU No. 2 (EPA 2004):

- *Treatment-Based: "Excavate, stockpile, and treat dioxin-contaminated soil according to EPA approved CMI Plan. Complete within two (2) years of initiating treatment, or according to schedule approved by the Division Director. CMI Final Report prepared and submitted to the Division Director in accordance with Table III.1."*

- *Monitoring-Based: "Conduct sediment and fish tissue monitoring in the adjacent lagoon to demonstrate compliance with criteria presented in the Monitored Natural Recovery Work Plan prepared an submitted in accordance with Table III.1. Monitored Natural Recovery Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, criteria for removing the fishing prohibition and warning signs, and criteria for successful completion of monitored natural recovery."*

- *Management-Based: "Maintain existing fishing prohibition with posed warning signs until criteria identified in EPA approved Monitored Natural Recovery (Biomonitoring) Work Plan are met."*

The treatment-based performance criteria listed above summarizes the performance criteria presented in the original Permit (EPA 2002), which included the following:

- *Treatment-Based: "Stockpile excavated soil in designated stating pile. Parameters of staging pile to be specified in CMI Plan and approved by Division Director. Treatment of excavated dioxin-contaminated soil using thermal desorption in combination with thermal oxidation for treatment of off-gases. Excavation wall and treated soil achieve dioxin cleanup goal of one (1) microgram per kilogram (μg/kg) toxicity equivalent (TEQ[1]). Return effectively treated soil to excavated areas or other locations on Johnston Island as approved by the Division Director. Physical properties of treated soil will be examined and potential soil amendments will be considered prior to backfilling to ensure no adverse environmental impacts. All hazardous waste and hazardous waste residues removed from the treatment unit and associated equipment, devices, structures, and areas. Complete within two years of initiating treatment, or*

[1] TEQ is obtained by summation of individual TEFs for each dioxin congener. TEF/TEQ shall be calculated based upon protocol established by the World Health Organization 1998.

according to schedule approved by the Division Director. CMI Final Report prepared and submitted to the Division Director in accordance with Table III.1."

The proposed Permit modification includes the following as performance criteria for SWMU No. 2:

- *Treatment-based performance criteria achieved.*
- *Monitoring-Based: Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where:*
    - *Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or*
    - *The Air Force proposes to remove the fishing prohibition.*

  The Monitored Natural Recovery (MNR) Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, requirements for maintaining and replacing fishing prohibition warning signs.

- *Management-Based: Warning signs will be maintained by replacing signage every five (5) years, and will be visible at all times. EPA must determine no or acceptable risk to human health in order for the fishing prohibition and sediment sampling control measures to be removed.*

3.1 Modules I , II, and III Modifications

No site-specific modifications are proposed for Module I (General Permit Conditions) or Module II (General Facility Conditions). However, much of the language in Module I and II has been edited to remove reference to thermal treatment- which was originally included to address the treatment standards and conditions for corrective action being conducted at SWMU No. 2 (and SWMU No. 16/AOC No. 1). The details on the language edits to Modules I and II have been sufficiently addressed in the Permit Narrative (Section 2.1).

Several site-specific modifications were made to Module III (Corrective Action for SWMUs and AOCs). These modifications are justified in Sections 3.1.1, 3.1.2, and 3.1.3. Additional modifications made to the Performance criteria for SWMU No. 2, which specified the scheduled monitoring and maintenance frequency as every five (5) years, are addressed in the Permit Narrative.

3.1.1 Modifications to Treatment-Based Criteria

As discussed in Section 2.3, during 2003 through 2004, all contaminated soils were successfully treated to below the cleanup criteria as shown by verification sampling. The source of impacted soil has been adequately treated to the cleanup criteria and was disposed of on-island in accordance with the CMI and EPA Approval. With completion of the CMI activities at SWMU No. 2 (CH2M HILL 2004a), the treatment-based performance criteria listed in Table III.3 of the Permit have been met. These achievements need to be incorporated into the permit though removing the treatment-based performance criteria.

3.1.2 Modifications to Monitoring-Based Criteria

Monitoring-based performance criteria are proposed to continue under modified criteria. Long-term monitoring was completed for sediment and fish in the lagoon adjacent to SWMU No. 2 in 2003 (CH2M HILL 2004a), 2008 (CH2M HILL 2011), 2013 (EA Engineering, Science, and Technology, Inc., PBC [EA] 2014), and 2015 (EA, 2016). Sufficient data exists to support the need for a continued fishing prohibition, and sediment monitoring. Fish and sediment in the lagoon immediately offshore from SWMU No. 2 contain elevated levels of dioxins/furans related to historical releases from Johnston Island. Sediment sampling data is proposed to continue to be used as an indicator for a change in conditions, and an indication of a release into the marine system. Based on the fish tissue and sediment data, the Air Force has determined it is most appropriate to maintain a fishing prohibition for the lagoon and continue monitoring sediment.

There is no known source remaining at SWMU No. 2, and the purpose of monitoring fish tissue has been completed and results support that a fishing prohibition should be maintained. Therefore, the Air Force proposes to discontinue fish tissue sampling as part of the biomonitoring component, unless one of the following situations are presented:

- Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or
- The Air Force proposes to remove the fishing prohibition.

The fishing prohibition is proposed to be in effect as part of the ongoing performance criteria for this unit, and a permit modification would be required with adequate justification to remove this control measure. The next monitoring-based activities will be completed in 2020 along with the management-based activities described in Section 3.1.3.

3.1.3 Modifications to Management-Based Criteria

Management-based performance criteria are proposed to continue under modified criteria. Under the conditions of the 2004 Permit, the Air Force is required to maintain fishing prohibition warning signs at SWMU No. 2. The warning signs at SWMU No. 2 were assessed and additional warning signs were installed in 2015. The proposed modifications specify that maintenance of warning signs at SWMU No. 2 will be through anticipated sign replacement every 5 years and

ensuring the signs are visible at all times. The next warning sign replacement is scheduled for 2020 along with the monitoring-based activities (sediment sampling).

4. REFERENCES

CH2M HILL. 2003a. *Data Gap Biomonitoring Work Plan for SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Atoll.* February

CH2M HILL. 2003b. *Corrective Measures Implementation Work Plan, Addendum No 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5.* December.

CH2M HILL. 2004a. *Final Biomonitoring Report and Risk Assessment for SWMU No. 1, 2, and 16 and AOC No. 1, Johnston Atoll*. March.

CH2M HILL. 2004b. *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 1 and 5, Johnston Atoll.* December.

CH2M HILL. 2005. *Final Monitored Natural Recovery (Biomonitoring) Work Plan for the Lagoon Areas at Johnston Island.* April 29.

CH2M HILL. 2011. *Final 2008 Biomonitoring Report and Risk Assessment, SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Island.* March

EA Engineering, Science, and Technology, Inc., PBC. (EA). 2014. *Monitoring, Engineering Evaluation, and Maintenance Report, Resource Conservation and Recovery Act Monitored Natural Attenuation and Corrective Action at Solid Waste Management Units and Area of Concern and Engineering Evaluation Data Collection at Johnston Atoll Airfield Sites.* September

EA. 2016. *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites.* January.

Earth Tech. 2002. *Investigation, Remedial Action, and Closure Report, DTRA Sites, JA.* October.

United States Environmental Protection Agency (EPA). 2002. *Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002.* Effective May 30, 2002.

EPA. 2004. *Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002.* Effective July 30, 2004.

Ogden Environmental and Energy Services Company, Inc. (Ogden). 1999. *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll.* January.

OHM Remediation Services Corporation (OHM). 2000a. *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* January.

OHM. 2000b. *Draft SWMU- and AOC-Specific Risk Assessment, Volume II.* January.

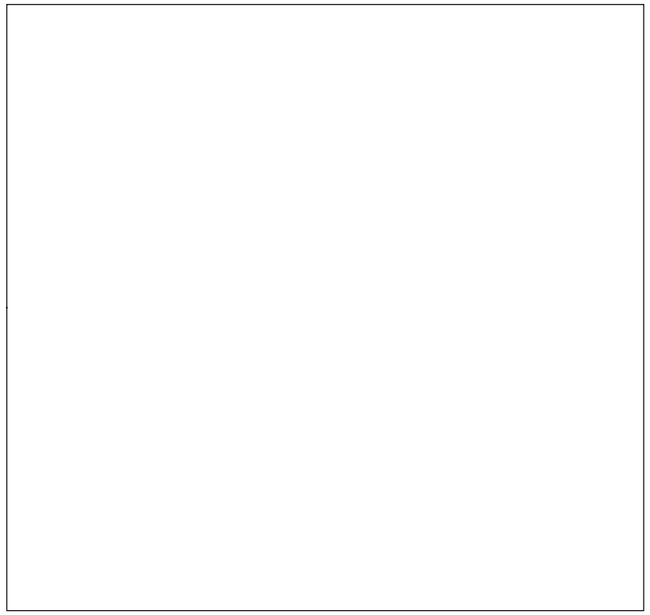
OHM. 2002a. *Site Characterization Sampling and Analysis Report, Solid Waste Burn Pit (Solid Waste Management Unit No. 1), Johnston Atoll.*

OHM. 2002b. *Draft Risk Assessment, Solid Waste Burn Pit, SWMU No. 1, Johnston Island.* August.

Raytheon Services Nevada. 1994. *Johnston Island RCRA Facility Investigation Final Report*. September.

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Data Sources
Insert Map: Pacific Airfields http://www.ww2aircraft.net
Primary Map: © Digital Worldview 2, March 2018.

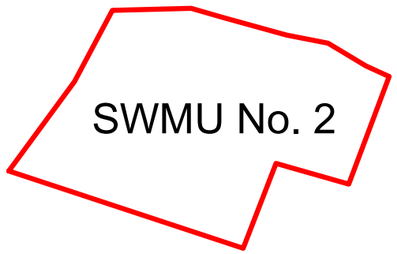
1 inch equals 1,800 feet
(11x17 print-out)

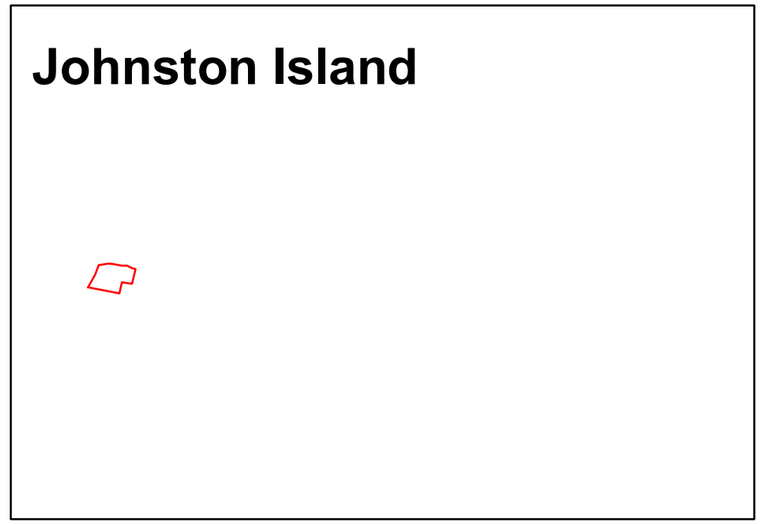
0 1,000 2,000 4,000 Feet

Justification Statement for Permit Modification For Solid Waste Management Unit Number 2

Figure 1
Johnston Atoll Location Map

enewberry Path: C:\Users\enewberry\Desktop\2018 Permit\GIS FILEs\Permit Ren EXPORT\mxd\AppD Figure1 SMWU2.mxd





Legend

SWMU

Acronym
SWMU: Solid Waste Management Unit

Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image
Image Captured April 5, 2013
Processed by Kendra Maty, USFWS-NWRS-RRI

N

1 inch equals 333 feet
(11x17 print-out)

0 250 500 1,000 Feet

Justification Statement of Permit Modification For Solid Waste Management Unit Number 2

Figure 2
SWMU No. 2 Location

APPENDIX E

Justification Statement for Permit Modification for SWMU No. 16/AOC No. 1

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL

APPENDIX E

JUSTIFICATION STATEMENT FOR
PERMIT MODIFICATION FOR
SOLID WASTE MANAGEMENT UNIT NUMBER 16 AND
AREA OF CONCERN NUMBER 1

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL
FOR
JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

July 2018

FINAL

APPENDIX E

JUSTIFICATION STATEMENT FOR PERMIT MODIFICATION FOR SOLID WASTE MANAGEMENT UNIT NUMBER 16 AND AREA OF CONCERN NUMBER 1

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT RENEWAL FOR JOHNSTON ATOLL FACILITY

Contract Number: FA8903-16-D-8791- 0046

Order Number: FA8903-17-F-0238

Prepared for:

Air Force Civil Engineer Center

July 2018

TABLE OF CONTENTS

Page

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
AR	Administrative record
AST	aboveground storage tank
BTEX	benzene, toluene, ethylbenzene, and xylene
CA	Corrective Action
CMI	Correct Measures Implementation
CMS	Corrective Measures Study
COC	contaminant of concern
EPA	U.S. Environmental Protection Agency
JP-5	jet propulsion fuel grade 5
MOGAS	Motor Gas
NFA	No Further Action
No.	number
OHM	OHM Remediation Services Corporation
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
USAF	U.S. Air Force

1. INTRODUCTION AND PURPOSE

The U.S Air Force (USAF) is requesting a permit modification for treatment-based performance criteria for Solid Waste Management Units (SWMUs) Number (No.) 16 and Area of Concern (AOC) No. 1 for Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on 30 April 2002, and effective 30 May 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective 30 July 2004 (EPA 2004).

This combined SWMU and AOC is currently operated under agreement by the USAF and EPA. A map showing the general location of Johnston Atoll is shown on Figure 1 and the location of SWMU No. 16/AOC No. 1 is shown on Figure 2.

Information and analytical data presented in the following documents were used to evaluate conditions at SWMU No. 16/AOC No. 1 (copies of references with an underlined Administrative Record [AR] number are included on a Compact Disk accompanying this report):

- *Johnston Island RCRA Facility Investigation Report* (Raytheon Services Nevada 1994) ; AR58, AR59, AR60, and AR61
- *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM Remediation Services Corporation [OHM] 2000a); AR105, AR106, and AR107
- *Addendum No. 1 to Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM 2000b); AR110
- *Final Phase II Environmental Baseline Survey Report, Johnston Atoll* (Earth Tech 2005); (AR206 and 207)
- *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 16 and Area of Concern No. 1, Johnston Atoll* (CH2M HILL 2005); No AR number, copy included
- *Draft Demolition, Decommissioning, and Wildlife Hazard Mitigation Report, Johnston Atoll* (CH2M HILL 2004a); No AR number, copy included.
- *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites* (EA 2016).

1.1 Permit Criteria

SWMU No. 16/AOC No. 1 do not meet the criteria for NFA and monitoring-based and management-based performance criteria (corrective action) will continue.

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1 (EPA 2004), as follows:

a) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or* [Area of Concern] *AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

1.2 Document Organization

The conditions at SWMU No. 16/AOC No. 1 are addressed in Section 2. The information presented in Section 2 includes brief descriptions of the SWMU and AOC, including locations and physical descriptions, operating history, and brief summaries of relevant investigation results. The justification for the permit modification decision is provided at the end of Section 3. The references used during the preparation of this document are listed in Section 4.

2. GENERAL INFORMATION FOR SWMU NO. 16/AOC NO. 1

2.1 Location and Physical Description

SWMU No. 16/AOC No. 1 are the Power Plant Spill Site and the Motor Gas (MOGAS) Area, respectively. These sites are adjacent to each other, located in the northeast quadrant of Johnston Island adjacent to the lagoon (Figure 1) and include the former Power Plant (former Facility 48), a former 567,000-gallon aboveground storage tank (AST) (former Tank 49), and the adjacent motor pool refueling site. Surface structures within this area formerly included the Power Plant, the Switchgear Building (former Facility 46), the Paint Storage Shed (former Facility 66), the Water Plant (former Facility 45), fuel storage tanks and dispenser pumps (former facility 50), and a warehouse.

2.2 Background and Investigation Summary

Petroleum contamination of groundwater at SWMU No. 16 was identified in May 1988 (OHM 2000a). In September 1993, a leak in a 2-inch delivery line released up to 20,000 gallons of JP-5 fuel. The leak resulted in free-phase petroleum product on the groundwater surface. It has also been reported that a leak was found in the bottom of Tank 49 and was subsequently repaired, although the date and the quantity of leakage was not known. Former Tank 49 was constructed in 1964 and provided fuel for the Power Plant. The tank contained diesel fuel No. 2 until November 1991, when the contents were changed to jet propulsion fuel grade 5 (JP-5). During October 2003, JP-5 fuel was removed from Tank 49, and the tank was decontaminated and prepared for demolition. Interim corrective actions, including the use of skimmer pumps, oil-absorbent pads, and the installation and operation of a bioslurper system, were undertaken to intercept and recover the hydrocarbons from trenches and wells installed around the area. Between July 1992 and December 2002, approximately 15,565 gallons of petroleum product had been recovered from the area (OHM 2000a), which suggests that the quantity of product released from Tank 49 was likely greater than 20,000 gallons.

In 1998, during waste characterization activities for the recovered petroleum product, it was determined that polychlorinated biphenyls (PCBs) were present in the recovered petroleum product. The maximum concentration detected was 90 milligrams per kilogram. The source of the PCBs was not determined; however, numerous transformers, switches, and other electrical/power equipment were associated with the power-generating plant and structures within SWMU No. 16. An investigation was performed in 1999 to assess the nature and extent of the PCB contamination at SWMU No. 16/AOC No. 1. PCBs were detected in surface and subsurface soil, the soil near the bioslurper infiltration gallery, recovered free product, lagoon sediment, and lagoon biota samples. PCBs were not detected in any groundwater or lagoon seawater samples.

The MOGAS refueling area (AOC No. 1) is located southeast of former Tank 49. Six 25,000-gallon ASTs located just southeast of former Tank 49 were used for refueling vehicles on the island. Before decommissioning, four tanks contained JP-5, while two contained unleaded gasoline.

SWMU No. 16/AOC No. 1, and their adjacent lagoon areas, were grouped together and were the subject of previous investigations and risk assessments. To provide a characterization of baseline conditions in the lagoon areas, marine sediment, seawater, and fish tissue samples were collected in February 2003. An assessment of risks posed to humans and ecological receptors was conducted based on the investigation, which was documented in *Biomonitoring Report and Risk Assessment for SWMU No. 1, 2 and 16 and AOC No. 1, Johnston Atoll* (CH2M HILL 2004b). The results of the risk assessment recommended follow-on biomonitoring because of the presence of elevated concentrations of contaminants of concern (COCs) in fish tissue that may pose unacceptable risks to humans (through unauthorized recreational anglers) and ecological receptors in the lagoon.

In January 2000, a Draft Corrective Measures Study (CMS) (OHM 2000a) was prepared, with the following objectives:

- Document the environmental history and conditions at SWMU No. 16 and AOC No. 1.
- Document the current environmental and regulatory basis on which to make recommendations and administrative decisions.
- Identify, evaluate, and recommend additional and/or alternative remedies to ensure compliance with remedial objectives and standards established in the Permit.

In the Draft CMS, 13 corrective measure alternatives were identified as being potentially applicable for the remediation of PCB-contaminated soil at SWMU No. 16. The alternatives were evaluated using the criteria defined in the RCRA corrective action guidance documents and were narrowed down to four alternatives considered feasible to reduce potential risk at the site to acceptable levels. The alternatives were as follows:

- Management in place
- Offsite landfill
- Onsite thermal desorption
- Onsite incineration.

Of these four alternatives, management in place and onsite thermal desorption with thermal oxidation for treatment of off-gasses was recommended for treating the PCB-contaminated soil. The onsite thermal desorption was recommended for the following reasons:

- Would protect human health and the environment
- Has been proven to be capable of achieving the cleanup goals
- Reduces contaminant volume, mass, and toxicity, and therefore could eliminate potential liability and long-term monitoring requirements

- Has been determined to be the most cost-effective of the appropriate and proven remedial technologies currently available because soil from SWMU No. 16 could be treated in conjunction with treatment of soil from SWMU No. 2.

Follow-on biomonitoring activities were conducted in 2008, 2013, and 2015 to further characterize the potential risks and to evaluate trends on constituent concentrations to assess whether natural recovery of biota in the lagoon is occurring. The 2008 biomonitoring activities were documented in CH2M HILL 2011 and EA Engineering, Science, and Technology, Inc., PBC 2014. The 2015 biomonitoring activities were documented in the 2016 *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites* (EA Engineering, Science, and Technology, Inc., PBC. [EA] 2016).

- The COCs listed in the Permit for monitoring at SWMU No. 16/AOC No. 1 include benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), and PCBs. As reported in the 2004 Annual Groundwater Monitoring Report (CH2M HILL 2004c), all BTEX, PAH, and PCB results were below the proposed groundwater cleanup goals, which were approved in the Permit modification. Historical results for TPH are not available because TPH was added as a COC in the 2004 Permit modification.

2.3 Treatment Summary

The treatment-based activities at SWMU No. 16/AOC No. 1 were documented in *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 16 and Area of Concern No. 1, Johnston Atoll* (CH2M HILL 2005). The information presented below is partially excerpted from the above referenced document.

The Corrective Measures Implementation (CMI) objective for the treatment-based performance criteria identified in Table III.3 of the original Permit (EPA 2002) was to remove and thermally treat contaminated soil from SWMU No. 16 to the corrective measures criteria provided in Table III.3. As outlined in the *Draft CMI Work Plan Addendum No. 2* (CH2M HILL 2004d) and *Draft CMI Work Plan Addendum No. 3* (CH2M HILL 2004e), this objective was subsequently modified. For the PCB-contaminated soil, thermal treatment was replaced with offsite disposal at an appropriately permitted disposal facility. For the TPH- and PAH-contaminated soil, thermal treatment was replaced with onsite landfarming.

In addition, the Corrective Action Module of the Permit was modified on 30 July 2004, to incorporate revised TPH and PAH soil cleanup goals (EPA 2004). This same modification also removed BTEX from the constituents of concern. The modified TPH criterion was based on the residual saturation concentration and risk assessment considerations (CH2M HILL 2004f). The modified PAH criteria were developed using site-specific, risk-based action levels and EPA Region 9 Preliminary Remediation Goals. BTEX compounds were removed as COCs because repeated rounds of soil sampling from excavation sidewalls and soil staging piles showed the concentrations of the constituents to be below the respective cleanup goals. These modifications in the cleanup goals were determined to be appropriately protective of human and ecological

receptors and were used as the final soil cleanup goals for SWMU No. 16 and AOC No. 1. In areas where surface or subsurface features prevented soil removal, small quantities of soil were left in place consistent with provisions in the Permit.

Remediation of petroleum hydrocarbons and PCB-contaminated soil at the unit was completed in June 2004 and documented in the CMI Report (CH2M HILL 2005). This work was completed in accordance with the following documents:

- *Draft Comprehensive Corrective Measures Implementation Work Plan for Thermal Treatment of Contaminated Soil, Johnston Atoll* (CH2M HILL 2002)
- *Conditional Approval of the Draft Corrective Measures Implementation Work Plan for Thermal Treatment of Contaminated Soil, Johnston Atoll* (EPA 2003)
- *Draft Corrective Measures Implementation Work Plan Addendum No. 2, Transportation and Disposal of PCB-Contaminated Soil from SWMU No. 16, Johnston Atoll* (CH2M HILL 2004d)
- *Draft Corrective Measures Implementation Work Plan Addendum No. 3, Landfarm Treatment of Petroleum Contaminated Soil, Johnston Atoll* (CH2M HILL 2004e)
- *Technical Memorandum No. 6, Landfarm Pilot Study for TPH-Impacted Soil* (CH2M HILL 2003).

PCB-contaminated soil at SWMU No. 16 was excavated between the Power Plant (Facility 48) and Switchgear Building (Facility 46) and the seawall. The Switchgear Building and a section of the Power Plant were demolished to access the contaminated soil. Confirmation samples were collected from the excavation sidewalls at the capillary fringe. If contaminant concentrations were above the soil cleanup goals, additional soil was excavated. This process was repeated until the soil cleanup goals for PCBs were met. The PCB-contaminated soil was shipped off-island via the barge ALASKA on 29 March 2004 to Seattle, Washington. Once the barge arrived, the soil was offloaded into trucks and transported to Waste Management's Columbia Ridge Landfill in Arlington, Oregon, for disposal. A total of 8,090 tons of PCB-contaminated soil and concrete from SWMU No. 16 was transported and disposed of in Oregon.

Following completion of excavation of the PCB-contaminated soil, TPH- and PAH-contaminated soil was excavated from SWMU No. 16 and four locations along the inactive fuel pipelines. Following excavation in each of the areas, confirmation samples were collected to ensure that the contaminated soil had been removed. The soil was placed in landfarm treatment cells located at AOC Nos. 2 and 3 for bioremediation. After the addition of soil to each landfarm cell, cornstarch was added to the soil and an initial pretreatment sample was collected. Soil in the treatment cells was tilled a minimum of three times per week, and water was added to maintain optimum conditions for microbial activity. Soil samples were collected every three weeks to monitor contaminant reduction. After four to six weeks of treatment, the contaminated soil met the TPH and PAH soil cleanup goals in all six cells. In early June, the landfarm treatment cells were capped with soil and approximately 6 inches of aggregate. A total of 1,740 tons of soil impacted with TPH and PAHs was excavated and landfilled.

Following confirmation that the soil cleanup goals met, the excavations at SWMU No. 16 were backfilled. During backfill activities, three groundwater monitoring wells (T49-MW02A, T49-MW03A, and T49-MW12A) were installed to replace lost or damaged wells. The excavation was backfilled to existing grade with clean coral. Wastes generated from the CMI activities were manifested and transported off-island for disposal. Upon arrival in Seattle, the wastes were off-loaded from the barge and transported to the appropriate disposal facilities.

This page intentionally left blank

3. PROPOSED PERMIT CHANGES

The Justification for the Permit modifications listed below are discussed in Section 3.1. The Permit Narrative also provides supportive rationale. The 2004 Permit performance criteria and proposed language and changes to Permit performance criteria, specifically Table III.3 is provided below for reference.

Table III.3 of the Permit specifies the following performance criteria for SWMU No. 16/AOC No. 1 (EPA 2004):

- <u>Treatment-Based:</u> *"Excavate, stockpile, and ship PCB-contaminated soil off-island for treatment and/or disposal according to CMI Plan Addendum. Excavate, stockpile, and treat soil contaminated by petroleum on-island using land-farming according to CMI Plan Addendum. Action levels for COCs in soil are listed in Table III.4. Excavation wall and treated soil to achieve action levels unless subsurface physical barriers such as old seawalls, piers, heavy equipment, large concrete slabs or other unforeseen subsurface obstructions prevent access to contaminated areas. If such subsurface physical barriers prevent access to contaminated areas, the Permittee shall obtain written acknowledgement from the Division Director that access to contamination is technically infeasible. Return effectively treated soil to excavated areas (with compaction for subsurface soils) or other locations on Johnston Island as approved by the Division Director. Physical properties of treated soil will be examined and potential soil amendments will be considered prior to backfilling to ensure no adverse environmental impacts. Complete selected remedy within two (2) years of initiating treatment, or according to schedule approved by the Division Director. All hazardous waste and hazardous waste residues removed from treatment units, excavation and other equipment, devices, structures, and areas associated with the corrective measure. CMI Final Report prepared and submitted to the Division Director in accordance with Table III.1."*

- <u>Monitoring-Based:</u> *"Continue annual groundwater monitoring at T49 MW02, T49 MW03, T49 MW06, T49 MW07, T49 MW11, T49 MW11D, T49 MW12, T49 MW15, MG MW03, MG MW03D, MG MW04, and MG MW04D. Analyze groundwater samples for total PCBs, TPH, BTEX and PAHs. Continue groundwater monitoring until three (3) consecutive annual sampling events meet groundwater action levels (monitoring period to begin in 2004). Action levels for groundwater are listed in Table III.5."*

- <u>Management-Based:</u> *"Maintain existing fishing prohibition with posted warning signs until criteria identified in Monitored Natural Recovery Plan are met."*

The proposed Permit modification includes the following as performance criteria for SWMU No. 16/AOC No. 1:

- <u>Treatment-based performance criteria achieved.</u>

- <u>Monitoring-Based:</u> *Continue groundwater monitoring at six groundwater points of compliance every five (5) years. Analyze groundwater samples for the COC(s). COC(s) in groundwater are TPH and PAHs. Continue groundwater monitoring until three (3)*

consecutive sampling events meet groundwater action levels. Action levels for groundwater are listed in Table III.5.

- *Conduct sediment monitoring every five (5) years in the adjacent lagoon to monitor for any statistically significant increases in sediment COC concentrations, which could indicate that a release(s) has occurred. A Permit modification that incorporates resuming fish tissue monitoring should be performed in a scenario where:*

  - *Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or*
  - *The Air Force proposes to remove the fishing prohibition.*

- *The Monitored Natural Recovery Work Plan will include a plan for maintaining warning signs, a schedule for biomonitoring and reporting, a sampling plan, requirements for maintaining and replacing fishing prohibition warning signs in accordance with the permit performance criteria.*

3.1 Modules I , II, and III Modifications

No site-specific modifications are proposed for Module I (General Permit Conditions) or Module II (General Facility Conditions). However, much of the language in Module I and II has been edited to remove reference to thermal treatment- which was originally included to address the treatment standards and conditions for corrective action being conducted at SWMU No. 16/AOC No. 1 (and SWMU No. 2). The details on the language edits to Modules I and II have been sufficiently addressed in the Permit Narrative (Section 2.1).

Several site-specific modifications were made to Module III (Corrective Action for SWMUs and AOCs). These modifications are justified in Sections 3.1.1, 3.1.2, and 3.1.3.

Additional modifications made to the Performance criteria for SWMU No. 16/AOC No. 1 are justified fully in the Permit Narrative, and include the following proposed modifications:

- Designated the scheduled monitoring and maintenance frequency as every five (5) years.
- Reduce the number of groundwater points of compliance from twelve (12) to six (6) monitoring wells.

3.1.1 Modifications to Treatment-Based Criteria

As discussed in Section 2.3, all contaminated soils were successfully treated to below the cleanup criteria, or were removed and transported for offsite disposal. The source of impacted soil has been verified to be below the associated cleanup criteria or were disposed of off-island in accordance with the CMI and EPA Approval. With completion of the CMI activities at SWMU No. 16/AOC No. 1, the treatment-based performance criteria listed in Table III.3 of the Permit

have been met. These achievements need to be incorporated into the permit though removing the treatment-based performance criteria.

3.1.2 Modifications to Monitoring-Based Criteria (Biomonitoring)

Monitoring-based performance criteria are proposed to continue under modified criteria. Long-term biomonitoring was completed for sediment and fish tissue in the lagoon adjacent to SWMU No. 16/ AOC No. 1 in 2003 (CH2M HILL 2004a), 2008 (CH2M HILL 2011), 2013 (EA Engineering, Science, and Technology, Inc., PBC [EA] 2014), and 2015 (EA, 2016). Sufficient data exists to support the need for a continued fishing prohibition, and sediment monitoring. Fish and sediment in the lagoon immediately offshore from for SWMU No. 16/AOC No. 1 contain elevated levels of COCs related to historical releases from Johnston Island. Sediment sampling data is proposed to continue to be used as an indicator for a change in conditions, and an indication of a release into the marine system. Based on the fish tissue and sediment data, the Air Force has determined it is most appropriate to maintain a fishing prohibition for the lagoon and continue monitoring sediment.

The purpose of monitoring fish tissue has been completed and results support that a fishing prohibition should be maintained. Therefore, the Air Force proposes to discontinue fish tissue sampling as part of the biomonitoring component, unless one of the following situations are presented that would require to:

- Two consecutive sediment monitoring events show statistically significant increases in COC concentration(s) indicating a potential release of a contaminant source. For statistical significance, the upper control limit is defined as one (1) order of magnitude above the baseline mean; or
- The Air Force proposes to remove the fishing prohibition.

The fishing prohibition is proposed to be in effect as part of the ongoing performance criteria for these units, and a permit modification would be required with adequate justification to remove this control measure. The next monitoring-based activities will be completed in 2020 along with the management-based activities described in Section 3.1.3.

3.1.3 Modifications to Management-Based Criteria

Management-based performance criteria are proposed to continue under modified criteria. Under the conditions of the 2004 Permit, the Air Force is required to maintain fishing prohibition warning signs for SWMU No. 16/AOC No. 1. The warning signs at were assessed and additional warning signs were installed in 2015. The proposed modifications specify that maintenance of warning signs for SWMU No. 16/AOC No. 1 will be through anticipated sign replacement every 5 years and ensuring the signs are visible at all times. The next warning sign replacement is scheduled for 2020 along with the monitoring-based activities (sediment sampling).

This page intentionally left blank

4. REFERENCES

CH2M HILL. 2003a. *Data Gap Biomonitoring Work Plan for SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Atoll.* February

CH2M HILL. 2003b. *Corrective Measures Implementation Work Plan, Addendum No 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5.* December.

CH2M HILL. 2004a. *Final Biomonitoring Report and Risk Assessment for SWMU No. 1, 2, and 16 and AOC No. 1, Johnston Atoll*. March.

CH2M HILL. 2004b. *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 1 and 5, Johnston Atoll.* December.

CH2M HILL. 2005. *Final Monitored Natural Recovery (Biomonitoring) Work Plan for the Lagoon Areas at Johnston Island.* April 29.

CH2M HILL. 2011. *Final 2008 Biomonitoring Report and Risk Assessment, SWMU No. 1, 2, and 16, and AOC No. 1, Johnston Island.* March

EA Engineering, Science, and Technology, Inc., PBC. (EA). 2014. *Monitoring, Engineering Evaluation, and Maintenance Report, Resource Conservation and Recovery Act Monitored Natural Attenuation and Corrective Action at Solid Waste Management Units and Area of Concern and Engineering Evaluation Data Collection at Johnston Atoll Airfield Sites.* September

EA. 2016. *Final Monitoring, Engineering Evaluation, and Maintenance Report RCRA MNA and CA at SWMU and AOC at Johnston Atoll Airfield Sites.* January.

Earth Tech. 2002. *Investigation, Remedial Action, and Closure Report, DTRA Sites, JA.* October.

United States Environmental Protection Agency (EPA). 2002. *Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002.* Effective May 30, 2002.

EPA. 2004. *Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002.* Effective July 30, 2004.

Ogden Environmental and Energy Services Company, Inc. (Ogden). 1999. *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll.* January.

OHM Remediation Services Corporation (OHM). 2000a. *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* January.

OHM. 2000b. *Draft SWMU- and AOC-Specific Risk Assessment, Volume II.* January.

OHM. 2002a. *Site Characterization Sampling and Analysis Report, Solid Waste Burn Pit (Solid Waste Management Unit No. 1), Johnston Atoll.*

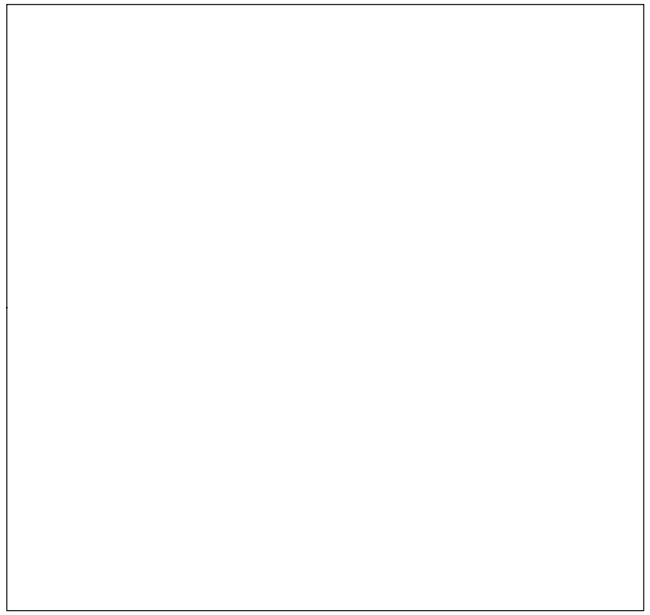
OHM. 2002b. *Draft Risk Assessment, Solid Waste Burn Pit, SWMU No. 1, Johnston Island.* August.

Raytheon Services Nevada. 1994. *Johnston Island RCRA Facility Investigation Final Report*. September.

This page intentionally left blank

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Data Sources
Insert Map: Pacific Airfields http://www.ww2aircraft.net
Primary Map: © Digital Worldview 2, March 2018.

1 inch equals 1,800 feet
(11x17 print-out)

0 1,000 2,000 4,000 Feet

Justification Statement for Permit Modification For Solid Waste Management Unit Number 16 and Area of Concern Number 1

Figure 1
Johnston Atoll Location Map

enewberry Path: C:\Users\enewberry\Desktop\2018 Permit\GIS FILEs\Permit Ren EXPORT\mxd\AppE Figure1 SMWU16 AOC1.mxd

Johnston Island

SWMU No. 16

AOC No. 1

Legend

Compliance Monitoring Well Location Status

- GW POC
- Removed POC
- SWMU/AOC

Acronym
AOC: Area of Concern
SWMU: Solid Waste Management Unit

Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image
Image Captured April 5, 2013
Processed by Kendra Maty, USFWS-NWRS-RRI

N

0 125 250 500 Feet

Justification Statement for Permit Modification for Solid Waste Management Unit Number 16 and Area of Concern No. 1

Figure 2
SWMU No. 16/AOC No. 1 Location

APPENDIX F

Statement of Basis for SWMU No. 5

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL
STATEMENT OF BASIS FOR
NO FURTHER ACTION PROPOSAL FOR
SOLID WASTE MANAGEMENT UNIT
NUMBER 5

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
RENEWAL
FOR
JOHNSTON ATOLL AIRFIELD SITES

Contract Number: FA8903-08-D-8791-0048

September 2015

This page intentionally left blank

FINAL
STATEMENT OF BASIS FOR
NO FURTHER ACTION PROPOSAL FOR
SOLID WASTE MANAGEMENT UNIT
NUMBER 5

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
RENEWAL
FOR
JOHNSTON ATOLL AIRFIELD SITES

Contract Number: FA8903-08-D-8791-0048

Prepared for:

Air Force Civil Engineer Center

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
615 Piikoi Street, Suite 515
Honolulu, Hawaii 96814
(808) 589-1455

September 2015

This page intentionally left blank

TABLE OF CONTENTS

Page

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
COC	contaminant of concern
DTRA	Defense Threat Reduction Agency
EPA	U.S. Environmental Protection Agency
MTBE	methyl tertiary butyl ether
NFA	No Further Action
No.	number
Ogden	Ogden Environmental and Energy Services Company, Inc.
OHM	OHM Remediation Services Corporation
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSN	Raytheon Services Nevada
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
USAF	U.S. Air Force
VOC	volatile organic hydrocarbon
WSS/OFP	Waste Storage Site/Old Fire Training Pit

1. INTRODUCTION AND PURPOSE

The U.S Air Force (USAF) is requesting No Further Action (NFA) for Solid Waste Management Units (SWMU) Number (No.) 5 from Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004 (EPA 2004).

This SWMU is currently operated under agreement by the USAF and EPA. A map showing the general location of Johnston Atoll is shown in Figure 1, and the location of the SWMU is shown in Figure 2.

Information and analytical data presented in the following documents were used to evaluate conditions at SWMU No. 5 (copies of references with an underlined Administrative Record [AR] number are included on a Compact Disk accompanying this report):

- *Johnston Island RCRA Facility Investigation Report* (Raytheon Services Nevada [RSN] 1994); AR58, AR59, AR60, and AR61
- *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll* (Ogden Environmental and Energy Services Company, Inc. [Ogden] 1999)
- *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM Remediation Services Corporation [OHM] 2000a); AR105, AR106, and AR107
- *Draft SWMU- and AOC-Specific Risk Assessment, Volume II* (OHM 2000b); AR106
- *Investigation, Remedial Action, and Closure Report, Defense Threat Reduction Agency (DTRA) Sites, JA* (Earth Tech 2002)
- *Data Gap Investigation Work Plan for Solid Waste Management Units No. 5, 19, 21, and 22, Johnston Atoll* (CH2M HILL 2002); AR149
- *Final Data Gap Investigation Report for SWMU No. 5, 19, 21, and 22, Johnston Atoll* (CH2M HILL 2003a); AR163
- *Corrective Measures Implementation Work Plan, Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5* (CH2M HILL 2003b); No AR number; but copy included
- *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 1 and 5, Johnston Atoll* (CH2M HILL 2004); AR199

1.1 NO FURTHER ACTION CRITERIA

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1, as follows:

a) *"A determination, based on investigations conducted in accordance with this permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

1.2 DOCUMENT ORGINIZATION

The conditions at SWMU No. 5 are addressed in Section 2. The information presented in Section 2 includes a brief description of the SWMU, including its location and physical description, its operating history, and a brief summary of relevant investigation results. The justification for the NFA decision is provided at the end of the section. The references used during the preparation of this document are listed in Section 3.

2. SWMU NO. 5: RECYCLE YARD

2.1 LOCATION AND PHYSICAL DESCRIPTION

The Recycle Yard is approximately 6.5 acres in size and is located near the northwest corner of Johnston Island (the largest island at Johnston Atoll; Figure 2). SWMU No. 5 is located approximately 160 feet south of the lagoon, east of SWMU No. 2, and west of SWMU No. 6. The Waste Storage Site/Old Fire Training Pit (WSS/OFP) is located immediately to the north. The Recycle Yard operated from 1987 to 2004 as a processing and storage area for noncombustible solid waste, including scrap metal, tires, pipe, electronics, porcelain, appliances, and glass.

Surface water is not present within the SWMU. Surface runoff drainage ditches lie along the south, east, and northwest corners of the site, draining the road and adjacent areas. The soil consists of compacted, crushed coral fill that was dredged from the surrounding lagoon in 1964. Vegetation, grasses, and shrubs have established on the unit since it was last active in 2004, and the unit is surrounded by vegetation. Seabirds nesting sites exist within the boundaries of the SWMU.

Operations at SWMU No. 5 began in 1987 when the area was used to store segregated scrap metals that were compacted at the site, salvaged metals from the Solid Waste Burn Pit, properly prepared lead-acid batteries, tires, containers of creosote, adhesives, and non-hazardous materials. These materials were stored at the site prior to being shipped to the Defense Reutilization Material Office in Hawaii.

Historically, creosote, adhesives, and other materials were stored at the SWMU in containers that were reportedly weathered and potentially compromised, resulting in leaks. The containers were removed prior to 2004 and materials are no longer stored at the SWMU. Asbestos and asbestos-containing materials were stored in a separate fenced and locked area on the northern side of the Recycle Yard.

In the Spring of 1994, the scrap metal compactor was moved to a concrete containment pad approximately 50 feet west of the previous location. A large oil stain was visible on the ground surface at the compactor location, approximately 50 feet east of the concrete containment pad. The stain reportedly resulted from the use of oil to lubricate the compactor's arms (OHM 2000a).

2.2 INVESTIGATION SUMMARY

Previous investigations have been conducted at SWMU No. 5, as follows:

- **Soil Gas, June 1992, Tracer Research Corporation (presented as Appendix E in RSN 1994).** In June 1992, Tracer Research Corporation collected a total of 20 soil gas samples in the area of the Recycle Yard and the WSS/OFP (located to the north of the Recycle Yard). Six of the soil gas samples were collected within the area of the Recycle

Yard, and two samples were collected from the area between the Recycle Yard fence and the coral road. These samples were analyzed on site for benzene, toluene, ethyl benzene, xylenes (BTEX), total volatile hydrocarbons, carbon monoxide, carbon dioxide, oxygen, nitrogen, and methane.

Hydrocarbons were not detected in the eight samples that were collected from within or near the Recycle Yard. High concentrations of carbon dioxide were not detected, nor was oxygen found to be depleted. The normal ratio of these two gases confirms that hydrocarbons were absent and that biodegradation was not occurring. Typically, oxygen is depleted due to aerobic respiration in areas where petroleum impacts are observed.

- **Soil Samples, March 1993 (RSN 1994) (RCRA Facility Investigation [RFI] Program).** In March 1993, RSN collected a total of seven subsurface soil samples and one duplicate from within the Recycle Yard. Samples were generally taken from 5 to 7 feet below ground surface (bgs), just above the water table. These samples were analyzed for total petroleum hydrocarbons (TPH) as diesel, TPH as gasoline, and BTEX. Two of the samples were also analyzed for toxicity characteristic leaching procedure (TCLP) volatile organic compounds (VOCs), TCLP semivolatile organic compounds (SVOCs), TCLP pesticides/herbicides, polychlorinated biphenyls (PCBs), and TCLP metals. RSN also collected five surface soil samples in the northwest quadrant of the Recycle Yard where used fluorescent bulbs had been stored. These samples were analyzed for mercury. Two samples were collected from the stained soil area where the compactor had been located. These samples were collected from the upper 6 inches of the ground surface. These samples were analyzed for TPH as diesel, TPH as gasoline, TCLP VOCs, TCLP SVOCs, TCLP pesticides/herbicides, and TCLP metals.

  Results for samples collected during this sample event were either not detected or were detected concentrations below applicable action levels.

- **Groundwater Samples, March 1993 (RSN 1994) (RFI Program).** In March 1993, RSN installed two groundwater monitoring wells, RCY MW#l and RCY MW#2, to a depth of 13 feet bgs. These wells were sampled and analyzed for TPH as diesel, TPH as gasoline, BTEX, VOCs, SVOCs, pesticides, herbicides, PCBs, metals, and cyanide.

  Benzene, toluene, and xylenes were detected in the groundwater samples. The benzene concentration in sample RCY MW#2 was 0.011 parts per million (ppm), which was above the maximum contaminant level of 0.005 ppm. Other organic constituents were not detected. The concentrations of metals were either not detected or were within the expected ranges for brackish water in this environment.

- **Groundwater Samples, June 1998 (OHM 2000a) (Corrective Measures Study Report).** In June 1998, the two monitoring wells (RCY MW#l and RCY MW#2) were sampled and analyzed for methyl tertiary butyl ether (MTBE) and BTEX. MTBE and BTEX were not detected in the two groundwater samples.

Soil and groundwater conditions at SWMU No. 5 were evaluated in the four investigations listed above prior to a Data Gap Investigation. The previous investigations indicate that soil and groundwater beneath SWMU No. 5 were not impacted. However, the investigations did not include samples and analyses specific to the operation of the metal compactor, can/bottle crusher, and Scrap Metal Storage Yard. A Data Gap Investigation was performed in 2003 to fill these data gaps. The fieldwork for SWMU No. 5 included the collection of the following samples:

- Four surface soil grab samples near the metal compactor, which were analyzed for polycyclic aromatic hydrocarbons (PAHs), priority pollutant metals, and TPH.

- Two surface soil grab samples from the immediate vicinity of two sumps located at the northwest and southeast corners of the metal compactor, which were analyzed for PAHs, priority pollutant metals, and TPH.

- Two surface soil grab samples near the can/bottle crusher, which were analyzed for PAHs, priority pollutant metals, and TPH.

- Forty-eight surface soil samples collected from a 50-foot grid network at the Scrap Materials Storage Yard, composited into 12 samples, which were analyzed for priority pollutant metals.

Analytical results from the field activities were documented in the *Final Data Gap Investigation Report for SWMU No. 5, 19, 21, and 22, Johnston Atoll* (CH2M HILL 2003a). Analytical results indicated concentrations of benzo(a)pyrene, lead, and copper exceeding their respective screening and risk-based action levels on the north side of the metal compactor. One sample collected on the east side of the compactor had elevated concentrations of copper, which exceeded both the screening level and risk-based action level. In addition, one of two surface soil samples collected near the can/bottle crusher had a concentration of benzo(a)pyrene that exceeded the screening level, but was below the risk-based action level. Based on the analytical results, removal of impacted soil at the two exceedance locations to the north and east of the metal compactor was recommended.

A work plan addendum (CH2M HILL 2003b) was prepared for the removal and disposal of soil from two locations at SWMU No. 5. The objective of the corrective measures conducted at SWMU No. 5 was to excavate and dispose of soil containing concentrations of benzo(a)pyrene, lead, and copper in excess of soil cleanup goals.

Soil excavation and disposal, and confirmation sampling was performed at SWMU No. 5 in February 2004. An initial excavation of 20 feet by 20 feet by 1 foot in depth was removed from the two locations immediately north and east of the former metal compactor concrete slab. Following excavations, confirmation samples were collected from the side walls and bottoms of the excavations.

The results from the initial confirmation sampling indicated that benzo(a)pyrene, lead, and copper concentrations in soil samples from the two excavations (EX01 and EX02) were below their respective cleanup goals. Based on these results, no further corrective measures were required to address benzo(a)pyrene, lead, or copper at excavation EX01 and EX02. Following receipt of analytical results indicating cleanup goals had been met, the two excavations were backfilled with clean fill material.

The corrective measures at SWMU No. 5 were completed in February 2004. Approximately 40 cubic yards were excavated and disposed from EX01 and EX02. The impacted soil was characterized as nonhazardous waste and was transported to a permitted disposal facility on the U.S. mainland.

2.3 PERMIT REQUIREMENTS AND STATUS

Table III.3 of the Permit specifies the following treatment based performance criteria for SWMU No. 5:

"Excavation and off-island treatment and disposal of soil at locations where benzo(a)pyrene, lead, or copper concentrations exceed risk-based Cleanup Goals. Work conducted in accordance with Corrective Measures Implementation Work Plan Addendum No. 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5 (CH2 M Hill, dated Dec 19, 2003) Cleanup Goals for Contaminants of Concern (COCs) in soil are listed in Table 111.4."

With the completion of removal activities at SWMU No. 5, the treatment-based performance criteria listed in Table III.3 of the Permit has been met. Soil present at SWMU No. 5 no longer poses unacceptable risks to potential human or ecological receptors.

2.4 NO FURTHER ACTION PROPOSAL

An NFA status is being requested for SWMU No. 5. The site was remediated in accordance with the corrective action requirements, and available data indicate that benzo(a)pyrene, lead, and copper are not present at concentrations exceeding their respective cleanup goals; therefore, under current and project future land use, unacceptable risk to human health or the environment is not present.

3. REFERENCES

CH2M HILL. 2002. *Data Gap Investigation Work Plan for Solid Waste Management Units No. 5, 19, 21, and 22, Johnston Atoll.* December.

CH2M HILL. 2003a. *Final Data Gap Investigation Report for SWMU No. 5, 19, 21, and 22, Johnston Atoll.* November.

CH2M HILL. 2003b. *Corrective Measures Implementation Work Plan, Addendum No 1; Removal and Disposal of Soil from SWMU No. 1 and No. 5.* December.

CH2M HILL. 2004. *Final Corrective Measures Implementation Report, Solid Waste Management Unit No. 1 and 5, Johnston Atoll.* December.

Earth Tech. 2002. *Investigation, Remedial Action, and Closure Report, DTRA Sites, JA.* October.

United States Environmental Protection Agency (EPA). 2002. *Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002.* Effective May 30, 2002.

EPA. 2004. *Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002.* Effective July 30, 2004.

Ogden Environmental and Energy Services Company, Inc. (Ogden). 1999. *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll.* January.

OHM Remediation Services Corporation (OHM). 2000a. *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* January.

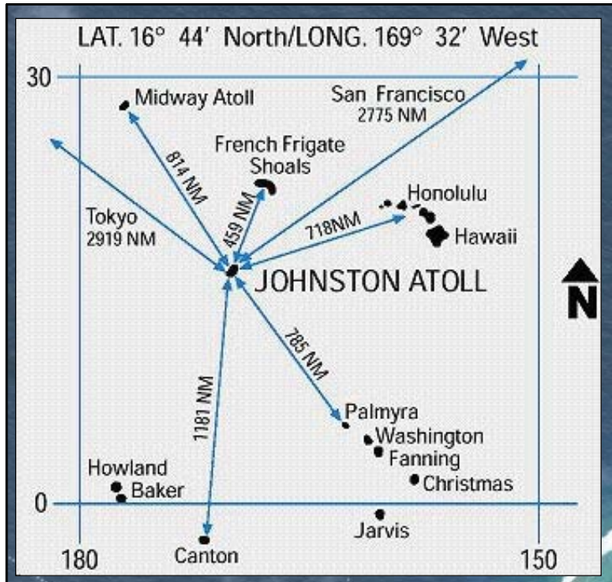
OHM. 2000b. *Draft SWMU- and AOC-Specific Risk Assessment, Volume II.* January.

Raytheon Services Nevada (RSN). 1994. *Johnston Island RCRA Facility Investigation Final Report*. September.

This page intentionally left blank

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Acronym
AOC: Area of Concern
RCRA: Resource Conservation and Recovery Act
SWMU: Solid Waste Management Unit

Data Sources
Bing Maps Hybrid (c) 2010 Microsoft Corporation
Insert Map: Pacific Airfields http://www.ww2aircraft.net

rkinchla Path: J:\GIS\Johnston Atoll\mxd\Figure 1 Site Location.mxd

1 inch equals 2,000 feet
(11x17 print-out)

N

0 1,000 2,000 4,000 Feet

Statement of Basis for No Further Action Proposal
For Solid Waste Management Unit
Numbers 1 and 5

Figure 1
Johnston Atoll Location Map

Contract No. AFCEC/4PAE08 FA8903-08-D-8791 TO: 0048

EA Project No. 1456048

This page intentionally left blank

rkinchla Path: J:\GIS\Johnston_Atoll\mxd\2014_2015 Update\Figure_2_SWMU 1 and 5.mxd

Statement of Basis for No Further Action Proposal For Solid Waste Management Unit Number 5

Figure 2
Johnston Atoll SWMU 5

Contract No. AFCEC/4PAE08 FA8903-08-D-8791 TO: 0048

EA Project No.1456048

This page intentionally left blank

APPENDIX G

Statement of Basis for SWMU No. 9

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL
STATEMENT OF BASIS FOR
NO FURTHER ACTION PROPOSAL FOR
SOLID WASTE MANAGEMENT UNIT
NUMBER 9

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
RENEWAL
FOR
JOHNSTON ATOLL AIRFIELD SITES

Contract Number: FA8903-08-D-8791-0048

October 2016

This page intentionally left blank

FINAL
STATEMENT OF BASIS FOR
NO FURTHER ACTION PROPOSAL FOR
SOLID WASTE MANAGEMENT UNIT
NUMBER 9

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
RENEWAL
FOR
JOHNSTON ATOLL AIRFIELD SITES

Contract Number: FA8903-08-D-8791-0048

Prepared for:

Air Force Civil Engineer Center

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
615 Piikoi Street, Suite 515
Honolulu, Hawaii 96814
(808) 589-1455

October 2016

This page intentionally left blank

TABLE OF CONTENTS

Page

LIST OF FIGURES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

CCMS	Comprehensive Corrective Measures Study
EBS	Environmental Baseline Survey
EPA	U.S. Environmental Protection Agency
NFA	No Further Action
No.	number
Ogden	Ogden Environmental and Energy Services Company, Inc.
OHM	OHM Remediation Services Corporation
RCRA	Resource Conservation and Recovery Act
RSN	Raytheon Services Nevada
SWMU	Solid Waste Management Unit
USAF	U.S. Air Force
VSI	visual site inspection

EXECUTIVE SUMMARY

The U.S Air Force (USAF) is requesting No Further Action (NFA) for Solid Waste Management Units (SWMU) Number (No.) 9 from Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004.

The former Hazardous Waste Storage Facility was located in Building 780, immediately east of SWMU No. 8 and west of the Plutonium Emplacement Area in the north central portion of Johnston Island. Building 780 featured a sloping bermed concrete slab, which was divided into four separate bays with collection sumps for storage of properly packaged waste prior to off island shipment/disposal. This facility was used to store wastes, excluding dioxin contaminated wastes, on a temporary basis within the 270-day small quantity generator storage limit, prior to shipping wastes to the DRMO in Hawaii. Waste oil, paint, solvent, waste JP-5, ethylene glycol, waste gasoline, and sludge in containers have been stored at this facility. Building 780 was demolished on 29 April 2004. Because the facility was still active when the RCRA Permit became effective, it was stipulated that additional characterization would be required when current activities at this unit terminated.

Table III.3 of the Permit specifies the following assessment-based performance criteria for SWMU No. 9:

"Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) when storage activity is terminated. This SWMU will require a permit modification to select a final remedy with cleanup goals or propose No Further Action."

Addendum No. 1 of the Draft Comprehensive Corrective Measures Study (CCMS) establishes the criteria and conceptual approach for removing SWMU No. 9 from the RCRA Permit. Furthermore, this study specifies that the following characterization activities be completed prior to closure: 1) review available records to determine if spills or releases of contaminants have occurred and 2) visually inspect the SWMUs to identify stained soil, which may be indicative of an area containing contaminated soil.

A comprehensive records review of all Johnston Atoll facilities, including SWMU No. 9, was completed in 2003 as part of the Phase II Environmental Baseline Survey (EBS). Results of the 2003 records search show that no documented spills or releases of contaminants occurred at SWMU No. 9.

A visual site inspection (VSI) was also completed at SWMU No. 9 as part of the Phase II EBS, which did not identify evidence of staining at SWMU No. 9. A Certification of the Environmental Baseline Survey and Certification of No Contamination Present can be found in

Attachment A. A VSI was also completed at SWMU No. 9 during the April 2015 monitoring event. The 2015 VSI did not identify evidence of staining or distressed vegetation.

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1 as follows:

a) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

An NFA status is being requested for SWMU No. 9. The site has met the assessment-based performance criteria presented in the Permit, which includes a records search and a VSI. The records search and the VSI indicate that under current and projected future land use, unacceptable risk to human health or the environment is not present at SWMU No. 9.

1. INTRODUCTION AND PURPOSE

The U.S Air Force (USAF) is requesting No Further Action (NFA) for Solid Waste Management Units (SWMU) Number (No.) 9 from Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004 (EPA 2004).

This SWMU is currently operated under agreement by the USAF and EPA. A map showing the general location of Johnston Atoll is shown in Figure 1, and the location of SWMU No. 9 is shown in Figure 2.

Information and analytical data presented in the following documents were used to evaluate conditions at SWMU No. 9 (copies of references with an underlined Administrative Record [AR] number are included on a Compact Disk accompanying this report):

- *Johnston Island RCRA Facility Investigation Report* (Raytheon Services Nevada [RSN] 1994); AR58, AR59, AR60, and AR61
- *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM Remediation Services Corporation [OHM] 2000a); AR105, AR106, and AR107
- *Addendum No. 1 to Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM 2000b); AR110
- *Draft Demolition, Decommissioning, and Wildlife Hazard Mitigation Report, Johnston Atoll* (CH2M HILL 2004); No AR number, copy included

1.1 NO FURTHER ACTION CRITERIA

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1 (EPA 2004), as follows:

c) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

d) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

1.2 DOCUMENT ORGINIZATION

The conditions at SWMU No. 9 are addressed in Section 2. The information presented in Section 2 includes a brief description of the SWMU, including its location and physical description, its operating history, and a brief summary of relevant investigation results. The justification for the NFA decision is provided at the end of the section. The references used during the preparation of this document are listed in Section 3.

2. SWMU NO. 9: HAZARDOUS WASTE STORAGE FACILITY

2.1 LOCATION AND PHYSICAL DESCRIPTION

The former Hazardous Waste Storage Facility was located in Building 780, immediately east of SWMU No. 8 and west of the Plutonium Emplacement Area in the north central portion of Johnston Island (Figure 2). Building 780 was formerly a three-sided corrugated metal structure with a sloping bermed concrete slab. The concrete pad was divided into four separate bays with collection sumps for storage of properly packaged waste prior to off island shipment/disposal. This facility was used to store wastes, excluding dioxin contaminated wastes, on a temporary basis, prior to shipping wastes to the DRMO in Hawaii. Wastes were shipped to the DRMO in Hawaii within the 270-day small quantity generator storage limit. Waste oil, paint, solvent, waste JP-5, ethylene glycol, waste gasoline, and sludge in containers have been stored at this facility (OHM 2000a). Building 780 was demolished on 29 April 2004 (CH2M HILL 2004). Because the facility was still active when the RCRA Permit became effective, it was stipulated that additional characterization would be required when current activities at this unit terminated.

2.2 SITE CHARACTERIZATION ACTIVITIES

Table III.3 of the Permit specifies the following assessment-based performance criteria for SWMU No. 9 (EPA 2002 and EPA 2004). :

"Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) when storage activity is terminated. This SWMU will require a permit modification to select a final remedy with cleanup goals or propose No Further Action."

Addendum No. 1 of the Draft CCMS (OHM 2000b) establishes the criteria and conceptual approach for removing SWMU Nos. 1, 5, 7, 15, 19, 21, and 22 from the RCRA Permit. SWMU No. 9 is not listed in the Addendum; however, subsequent reports indicated that additional characterization activities should be performed according to Addendum No. 1. Addendum No. 1 specifies that the following characterization activities be completed prior to closure: 1) review available records to determine if spills or releases of contaminants have occurred and 2) visually inspect the SWMUs to identify stained soil, which may be indicative of an area containing contaminated soil (OHM 2000b).

In 2003, a comprehensive records review and visual site inspections (VSI) of Johnston Atoll facilities, including SWMU No. 9, were completed as part of the Phase II Environmental Baseline Survey (EBS), Johnston Atoll, hereafter referred to as, "Phase II EBS" (Earth Tech 2005). Additionally, in spring 2015, a second VSI was performed by the Air Force to confirm the results of the Phase II EBS.

Results of these activities include the following.

- **Records Search:** A comprehensive records review of all Johnston Atoll facilities, including SWMU No. 9, was completed in 2003 as part of the Phase II EBS. Under this survey, all documents prepared since the Environmental Baseline/Property Transfer Survey Report (Ogden Environmental and Energy Services Company, Inc. [Ogden] 1999) through preparation of the Phase II EBS were reviewed to determine if spills or releases of contaminants have occurred. Additionally, interview of on-island as well as off-island personnel associated with all Johnston Atoll organizations on an as-needed basis was also completed. Results of this records search show that no documented spills or releases of contaminants have occurred at SWMU No. 9 (Earth Tech 2005).

- **Visual Site Inspection (VSI):**

    - 2003 Phase II EBS: A Phase II EBS Site Survey was conducted on 13-24 October 2003 which involved a visual inspection and photo documentation of the entire Atoll and all associated facilities, including SWMU No. 9. According to the 2004 Phase II EBS Report, no evidence of staining was observed at the Hazardous Waste Storage Facility and SWMU No. 9 was recommended for NFA (Earth Tech 2005). A Certification of the Environmental Baseline Survey and Certification of No Contamination Present can be found in Attachment A.

    - 2015 VSI: A VSI was also completed at SWMU No. 9 on 26 April 2015 to inspect for areas of stained soil in the vicinity of the footprint of the former building 780. The VSI included inspecting the concrete pad and walking along the perimeter of the foundation to inspect for evidence of staining and collecting photographic documentation of site conditions (Attachment B). The foundation was easily located, but is becoming heavily vegetated along the outside perimeter. As with the 2003 Phase II EBS Site Survey, no evidence of staining or contamination was observed during the 2015 VSI.

2.3 PERMIT REQUIREMENTS AND STATUS

Table III.3 of the Permit specifies the following assessment-based performance criteria for SWMU No. 9:

"Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) when storage activity is terminated. This SWMU will require a permit modification to select a final remedy with cleanup goals or propose No Further Action."

With the completion of VSI activities at SWMU No. 9, the assessment-based performance criteria listed in Table III.3 of the Permit has been met. The conditions documented at SWMU No. 9 no longer pose unacceptable risks to potential human or ecological receptors.

2.4 NO FURTHER ACTION PROPOSAL

An NFA status is being requested for SWMU No. 9. The site has met the assessment-based performance criteria presented in the Permit, which includes a records search and a VSI. The records search and the VSI indicate that under current and projected future land use, unacceptable risk to human health or the environment is not present at SWMU No. 9.

This page intentionally left blank

3. REFERENCES

CH2M HILL. 2004. *Draft Demolition, Decommissioning, and Wildlife Hazard Mitigation Report, Johnston Atoll.* November.

Earth Tech. 2005. *Final Phase II Environmental Baseline Survey Report, Johnston Atoll.* April.

United States Environmental Protection Agency (EPA). 2002. *Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002.* Effective May 30, 2002.

EPA. 2004. *Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002.* Effective July 30, 2004.

Ogden Environmental and Energy Services Company, Inc. (Ogden). 1999. *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll.* January.

OHM Remediation Services Corporation (OHM). 2000a. *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* January.

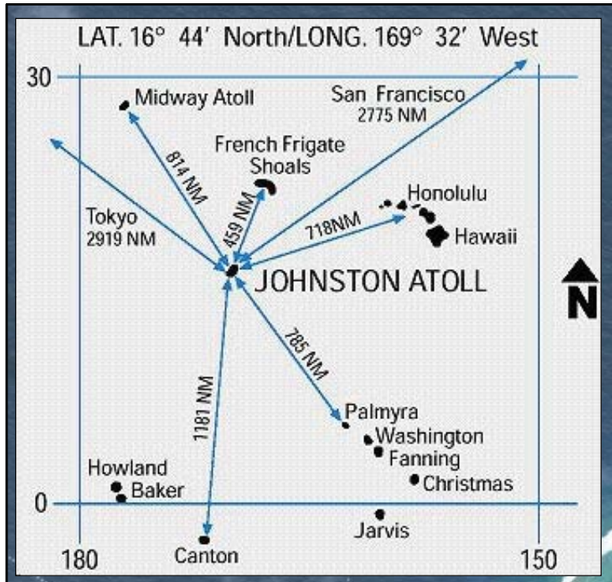
OHM. 2000b. *Addendum No. 1 to Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* November.

Raytheon Services Nevada (RSN). 1994. *Johnston Island RCRA Facility Investigation Final Report*. September.

This page intentionally left blank

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Summit Peak

bing™

© 2010 DigitalGlobe © 2010 GeoEye © 2013 Microsoft Corporation © 2010 NAVTEQ ©

Acronym
AOC: Area of Concern
SWMU: Solid Waste Management Unit

Data Sources
Bing Maps Hybrid (c) 2010 Microsoft Corporation
Insert Map: Pacific Airfields http://www.ww2aircraft.net

rkinchla Path: J:\GIS\Johnston Atoll\mxd\Figure 1 Site Location.mxd

N

1 inch equals 2,000 feet
(11x17 print-out)

0 1,000 2,000 4,000 Feet

Statement of Basis for No Further Action Proposal For Solid Waste Management Unit Number 9

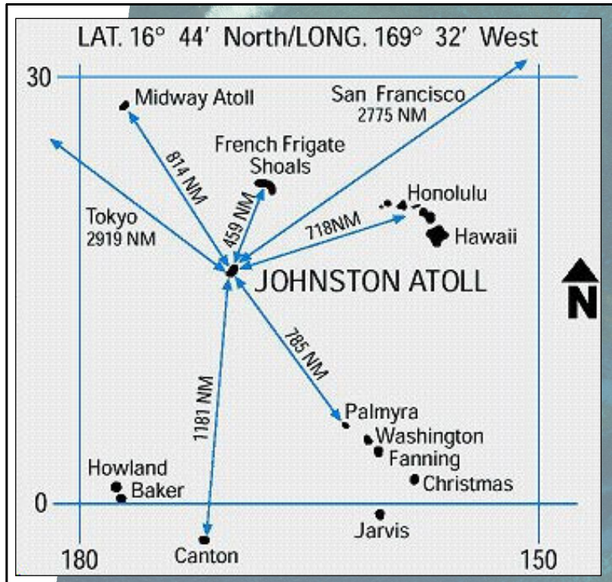
Figure 1
Johnston Atoll Location Map

Contract No. AFCEC/4PAE08 FA8903-08-D-8791 TO: 0048

EA Project No. 1456048

This page intentionally left blank

Johnston Island



SWMU No. 9

Legend

SWMU/AOC

Acronym
AOC: Area of Concern
SWMU: Solid Waste Management Unit

Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image
Image Captured April 5, 2013
Processed by Kendra Maty, USFWS-NWRS-RRI

1 inch equals 718 feet
(11x17 print-out)

0 250 500 1,000 Feet

N

Statement of Basis for No Further Action
Proposal for Solid Waste Management Unit Number 9

Contract No. AFCEC/ECOS09 FA8903-08-D-8791 TO: 0048

Figure 2
SWMU No. 9 Location

EA Project No.1456048

asherris Path: \\HONOLULU\External GIS\Johnston_Atoll\mxd\1456048\Figure_2_SWMU9.mxd

This page intentionally left blank

ATTACHMENT A

This page intentionally left blank

Certification of the Environmental Baseline Survey

JOHNSTON ATOLL

Earth Tech, Inc. (Earth Tech) conducted this Phase II Environmental Baseline Survey on behalf of the U.S. Air Force, specifically the 15 CES/CEVJ – Johnston Atoll Program Element, Hickam Air Force Base, Oahu, Hawaii. Earth Tech has reviewed all appropriate records made available; conducted visual site inspections of all Johnston Atoll facilities, structures, and land use areas; and performed an analysis of information collected during these survey activities. In our professional judgment and opinion, the facts and conditions depicted are accurate and are subject to limitations inherent in the investigative techniques used and any expressed limitations in this survey.

Certified by: Betsy S. Alspaugh Date: 22 MAR 05
BETSY S. ALSPAUGH, CHMM, CPEA #399432
CTO Manager
Earth Tech, Inc.

I certify that the property conditions stated in this report are based on a thorough review of available records and visual inspections as noted, and are true and correct to the best of my knowledge and belief.

Certified by: Frances D. Saunders Date: 14MAR05
FRANCES D. SAUNDERS
Supervisory Environmental Engineer
15 Civil Engineer Squadron, Johnston Atoll Program Element

Certified by: Richard W. Parkinson Date: 21 MAR 05
RICHARD W. PARKINSON, P.E.
Chief, Environmental Flight
15 Civil Engineer Squadron

Certification of No Contamination

JOHNSTON ATOLL

This real property contains no hazardous substances as that term is defined in the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601), amended or other contamination as specified by the Resource Conservation and Resource Act 1976, the implementing Environmental Protection Agency regulations (40 CFR Parts 261, 262, 263, and 761), and Federal Property Management, Regulations (41 CFR Part 101-47). A search of Johnston Atoll facilities and/or records revealed that no hazardous substances have been released at Johnston Atoll without appropriate response and clean-up actions having been taken or disposed of on the Air Force-controlled real property.

Certified by: Betsy S. Alspaugh Date: 22 MAR 05
BETSY S. ALSPAUGH, CHMM, CPEA#399432
CTO Manager
Earth Tech, Inc.

Certified by: Frances D Saunders Date: 14 MAR 05
FRANCES D. SAUNDERS
Supervisory Environmental Engineer
15 Civil Engineer Squadron, Johnston Atoll Program Element

Certified by: Richard W. Parkinson Date: 21 MAR 05
RICHARD W. PARKINSON, P.E.
Chief, Environmental Flight
15 Civil Engineer Squadron

Certification of Polychlorinated Biphenyl (PCB) Clearance

JOHNSTON ATOLL

This Real Property is in compliance with 40 CFR Part 761. Radio interference filters and light ballasts presumed to contain PCBs were handled, packaged, and disposed as PCB-containing waste. Therefore, no known PCB-containing materials are present at Johnston Atoll. In addition, no known PCB-contaminated soil, wastes, or unserviceable equipment remains on the existing Air Force property.

Certified by: Betsy S. Alspaugh Date: 22 MAR 05
BETSY S. ALSPAUGH, CHMM, CPEA #3999432
CTO Manager
Earth Tech, Inc.

Certified by: Frances D Saunders Date: 14 MAR 05
FRANCES D. SAUNDERS
Supervisory Environmental Engineer
15 Civil Engineer Squadron, Johnston Atoll Program Element

Certified by: Richard W. Parkinson Date: 21 MAR 05
RICHARD W. PARKINSON, P.E.
Chief, Environmental Flight
15 Civil Engineer Squadron

This page intentionally left blank

ATTACHMENT B

This page intentionally left blank

Project No. 1456048	**Description:**	Entrance through brush to SWMU No. 9 location off of access road. Photograph taken facing northeast.	**Photo 1**
	Site Name:	Johnston Atoll Airfield Sites	**Photo Date** 4/29/2015
	Client:	United States Air Force	

Project No. 1456048	**Description:**	Photograph of eastern side of concrete pad. No signs of staining or other evidence of contaminated media. Photograph taken facing south.	**Photo 2**
	Site Name:	Johnston Atoll Airfield Sites	**Photo Date** 4/29/2015
	Client:	United States Air Force	

Project No.	Description:	Photograph of western side of concrete pad. No signs of staining or other evidence of contaminated media. Photograph taken facing southeast.	Photo 3
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/29/2015
	Client:	United States Air Force	

Project No.	Description:	Photograph of central portion of concrete pad. No signs of staining or other evidence of contaminated media. Photograph taken facing west.	Photo 4
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/29/2015
	Client:	United States Air Force	

Project No.	Description:	Area surrounding SWMU No. 9 was inspected. There was no sign of staining, stressed vegetation, or other evidence of contamination. No remaining sources of potential contaminants were identified. Photograph taken facing southeast.	Photo 5
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/29/2015
	Client:	United States Air Force	

Project No.	Description:	Photograph of USFW compound adjacent to SWMU No. 9. No sign of staining or other evidence of contamination in the surrounding area. No remaining sources of potential contaminants were identified. Photograph taken facing north.	Photo 6
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/29/2015
	Client:	United States Air Force	

This page intentionally left blank

APPENDIX H

Statement of Basis for SWMU No. 15

This page intentionally left blank.

THE UNITED STATES AIR FORCE

FINAL
STATEMENT OF BASIS FOR
NO FURTHER ACTION PROPOSAL FOR
SOLID WASTE MANAGEMENT UNIT
NUMBER 15

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
RENEWAL
FOR
JOHNSTON ATOLL AIRFIELD SITES

Contract Number: FA8903-08-D-8791-0048

October 2016

This page intentionally left blank

FINAL
STATEMENT OF BASIS FOR
NO FURTHER ACTION PROPOSAL FOR
SOLID WASTE MANAGEMENT UNIT
NUMBER 15

HAZARDOUS WASTE CORRECTIVE ACTION PERMIT
RENEWAL
FOR
JOHNSTON ATOLL AIRFIELD SITES

Contract Number: FA8903-08-D-8791-0048

Prepared for:

Air Force Civil Engineer Center

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
615 Piikoi Street, Suite 515
Honolulu, Hawaii 96814
(808) 589-1455

October 2016

This page intentionally left blank

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
COC	contaminant of concern
EPA	U.S. Environmental Protection Agency
NFA	No Further Action
No.	number
Ogden	Ogden Environmental and Energy Services Company, Inc.
OHM	OHM Remediation Services Corporation
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSN	Raytheon Services Nevada
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
USAF	U.S. Air Force
VOC	volatile organic hydrocarbon

EXECUTIVE SUMMARY

The U.S Air Force (USAF) is requesting No Further Action (NFA) for Solid Waste Management Units (SWMU) Number (No.) 15 from Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004 (EPA 2004).

SWMU No. 15 is located within the former petroleum, oil, and lubricants (POL) tank farm near the former airport terminal in the southeast corner of Johnston Island. The POL tank farm originally consisted of four steel aboveground storage tanks (ASTs) that formerly contained diesel, JP-5, and aviation gasoline. Two of the steel storage tanks (Tanks 260 and 261) had a 557,000-gallon capacity, and two tanks (Tanks 263 and 264) had a 53,000-gallon capacity. The ASTs were formerly surrounded by a berm system that was configured so that each tank had a separate containment area with a capacity greater than the tank volume. Tanks 263 and 264 were removed from the POL tank farm in July 1995. Tanks 260 and 261 and the berm were decommissioned and demolished in June 2004 (CH2M HILL 2004a). The site also included a loading area for aircraft refueling trucks. The decommissioned concrete pad of the former loading area is still present at the site.

The contaminants of concern (COCs) listed in the permit for monitoring at SWMU No. 15 include total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and xylenes (BTEX); and polynuclear aromatic hydrocarbons (PAHs).

Table III.3 of the Permit specifies the following performance criteria for SWMU No. 15 (EPA 2004):

Assessment-Based: "Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) after the tanks are emptied and/or removed.."

Monitoring-Based: "Points of Compliance for groundwater monitoring are wells: POL MW01, POL MW02, POL MW02D, POL MW03A, POL MW05A, and POL MW06. COCs in groundwater are TPH as JP-5, BTEX, and PAHs. Continue groundwater monitoring in accordance with EPA approved Groundwater Monitoring Workplan prepared and submitted in accordance with Table III.1. Upon completion of three (3) consecutive sampling events where concentrations of each analyte are below groundwater Cleanup Goals, groundwater monitoring may be reduced or terminated in accordance with EPA approved Groundwater Monitoring Workplan. Cleanup Goals for groundwater are listed in Table III.5. "

Assessment-Based Performance Criteria

Addendum No. 1 of the Draft Comprehensive Corrective Measures Study (CCMS) establishes the criteria and conceptual approach for removing SWMU No. 15 from the RCRA Permit. Furthermore, this study specifies that the following characterization activities be completed prior to closure: 1) review available records to determine if spills or releases of contaminants have occurred and 2) visually inspect the SWMUs to identify stained soil, which may be indicative of an area containing contaminated soil.

A comprehensive records review of all Johnston Atoll facilities, including SWMU No. 15, was completed in 2003 as part of the Phase II Environmental Baseline Survey (EBS). Results of this records search indicated that records of leaks and spills prior to 1987 do not exist. Leaks and spills were known to have occurred within the bermed area, but the extent, location, and dates of releases are not known. No major uncontained releases were recorded at SWMU No. 15 since 1987.

A visual site inspection (VSI) was also completed at SWMU No. 15 as part of the Phase II EBS, which did not identify evidence of staining at SWMU No. 15. A Certification of the Environmental Baseline Survey and Certification of No Contamination Present can be found in Attachment A. A VSI was also completed at SWMU No. 15 during the April 2015 monitoring event. The 2015 VSI did not identify evidence of staining or distressed vegetation.

Monitoring-Based Performance Criteria

Subsurface assessment of soil, groundwater, and soil gas at SWMU No. 15 began in 1991 and indicated low to moderate petroleum impacts to the subsurface. In 2000, a SWMU-specific human health and ecological risk assessment was performed to assess whether the contaminants of concern (COCs) present at SWMU No. 15 posed a significant risk to human or ecological receptors. The risk assessment concluded that the detected concentrations of COCs in soil and groundwater did not pose a significant risk to human or ecological receptors.

A groundwater monitoring program has been conducted at SWMU No. 15 between 2000 and 2008. The monitoring program includes six monitoring wells as points of compliance with Permit conditions including POL MW1, POL MW2, POL MW2D, POL MW3A, POL MW5A, and POL MW6. The wells were sampled for TPH jet fuel (TPH-jet fuel); TPH diesel range (TPH-d); TPH gasoline range (TPH-g); and BTEX compounds annually between 2000 and 2004. Beginning in 2003, PAH compounds were added as COCs. Since 2000 (2003 for PAHs), all analytical results for TPH, BTEX, and PAHs have been less than their current cleanup goals, with the single exception of a TPH exceedance in April 2004 in well POL-MW02. This well was subsequently resampled in May 2004 using the Northwest TPH (NWTPH) fractionation methods for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH), and the results were less than the cleanup goal. NWTPH analytical results have remained below Cleanup Goals during 2006 and 2008 sampling.

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1 as follows:

a) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

b) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

An NFA status is being requested for SWMU No. 15. The site was remediated in characterized with the corrective action requirements, and available data indicate that TPH, BTEX, and PAHs are not present in groundwater at concentrations exceeding their respective Cleanup Goals; therefore, under current and projected future land use, unacceptable risk to human health or the environment is not present.

1. INTRODUCTION AND PURPOSE

The U.S Air Force (USAF) is requesting No Further Action (NFA) for Solid Waste Management Units (SWMU) Number (No.) 15 from Module III (Corrective Action For Solid Waste Management Units) of the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Corrective Action Permit Johnston Atoll Facility, U.S. Environmental Protection Agency (EPA) I.D. TT9 570 090 002 (the Permit) issued by the EPA on April 30, 2002, and effective May 30, 2002 (EPA 2002) and Modification No. 1 – Changes to the Corrective Action Module: Effective July 30, 2004 (EPA 2004).

This SWMU is currently operated under agreement by the USAF and EPA. A map showing the general location of Johnston Atoll is shown in Figure 1, and the location of SWMU No. 15 is shown in Figure 2.

Information and analytical data presented in the following documents were used to evaluate conditions at SWMU No. 15 (copies of references with an underlined Administrative Record [AR] number are included on a Compact Disk accompanying this report)::

- *Johnston Island RCRA Facility Investigation Report* (Raytheon Services Nevada [RSN] 1994) ; AR58, AR59, AR60, and AR61
- *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM Remediation Services Corporation [OHM] 2000a); AR105, AR106, and AR107
- *Addendum No. 1 to Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll* (OHM 2000b); AR110
- *Final Phase II Environmental Baseline Survey Report, Johnston Atoll* (Earth Tech 2005); (AR206 and 207)
- *Groundwater Monitoring Report, Solid Waste Management Units No. 6, 15, 16 and Areas of Concern No. 1, 2, 3, Johnston Atoll* (CH2M HILL 2003a); (AR139)
- *Final 2003 Annual Groundwater Monitoring Report for SWMU No. 6, 15, and 16 and AOC No. 1, 2, and 3, Johnston Atoll* (CH2M HILL 2004a); (AR175)
- *Final 2004 Annual Groundwater Monitoring Report for SWMU No. 6, 15, and 16 and AOC No. 1, 2, and 3, Johnston Atoll* (CH2M HILL 2004b); (AR188)
- *Final 2006 Groundwater Monitoring Report for SWMU No. 6, 15, and 16 and AOC No. 1, 2, and 3, Johnston Atoll* (CH2M HILL 2007); (AR204)
- *2008 Groundwater Monitoring Report, SWMU No. 6, 15, and 16 and AOC No. 1, 2, and 3, Johnston Island* (CH2M HILL 2009); (AR209)
- *Draft Demolition, Decommissioning, and Wildlife Hazard Mitigation Report, Johnston Atoll* (CH2M HILL 2004); No AR number, copy included

1.1 NO FURTHER ACTION CRITERIA

The NFA criteria for completion of corrective action responsibilities are defined in Permit Condition III.O.1 (EPA 2004), as follows:

c) *"A determination, based on investigations conducted in accordance with this Permit, that no further action is necessary and that any contaminants present do not pose an unacceptable level of risk to human health or the environment under current or projected land use"*; or

d) *"A determination that all performance criteria outlined in Table III.3 have been fully met and, thus, the SWMU or AOC does not pose an unacceptable level of risk to human health or the environment under current or projected land use."*

1.2 DOCUMENT ORGINIZATION

The conditions at SWMU No. 15 are addressed in Section 2. The information presented in Section 2 includes a brief description of the SWMU, including its location and physical description, its operating history, and a brief summary of relevant investigation results. The justification for the NFA decision is provided at the end of the section. The references used during the preparation of this document are listed in Section 3.

2. SWMU NO. 15: HAZARDOUS WASTE STORAGE FACILITY

2.1 LOCATION AND PHYSICAL DESCRIPTION

SWMU No. 15 is located within the former petroleum, oil, and lubricants (POL) tank farm near the former airport terminal and was commonly referred to as the POL SWMU. SWMU No. 15 is located in the southeast corner of the island (Figure 2) and is approximately 100 feet north of the lagoon. The shoreline in this area is protected by a seawall with sheet pilings. The soil at the site consists of compacted, crushed coral fill, which was hydraulically dredged from the surrounding lagoon in 1964. The fill is approximately 30 feet thick. The coral fill material is characterized as a white to tan color, with coral fragments ranging from very coarse sand to gravel (one to two inches in diameter).

The POL tank farm originally consisted of four steel aboveground storage tanks (ASTs) that formerly contained unspecified volumes of diesel, JP-5, and aviation gasoline. Two of the steel storage tanks (Tanks 260 and 261) had a 557,000-gallon capacity, and two tanks (Tanks 263 and 264) had a 53,000-gallon capacity. The ASTs were formerly surrounded by a berm system that was configured so that each tank had a separate containment area with a capacity greater than the tank volume. Tanks 263 and 264 were removed from the POL tank farm in July 1995. The remaining tanks and berm were decommissioned in June 2004 (CH2M HILL 2004a). The site also included a loading area for aircraft refueling trucks. The concrete pad of the former loading area is still present at the site.

The contaminants of concern (COCs) listed in the permit for monitoring at SWMU No. 15 include total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and xylenes (BTEX); and polynuclear aromatic hydrocarbons (PAHs).

2.2 INVESTIGATION SUMMARY

The following previous investigations have been conducted at SWMU No. 15:

- **Soil and Groundwater Samples, July and August 1991, Raytheon Services Nevada (RSN 1994).** In July and August 1991, RSN installed monitoring well POL MW-1 and collected three subsurface soil samples and one groundwater sample, which were analyzed for fuel hydrocarbons. The groundwater sample was additionally analyzed for salinity and dissolved oxygen (O_2).

  The results of the soil and groundwater analyses indicated low levels of oil, grease, and TPH as diesel. Salinity measurements indicated a thin, brackish layer grading into a more saline water approximately one-half the salinity of seawater. The analysis of O_2 in groundwater indicated an oxygen-depletion in the groundwater.

- **Soil Gas, June 1992, Tracer Research Corporation (presented as Appendix E in RSN 1994).** In June 1992, Tracer Research Corporation collected a total of 64 soil gas samples in the POL SWMU area. The samples were analyzed on-site for BTEX, total volatile hydrocarbons (TVHC) C_4 to C_9, TVHC C_{10} to C_x, carbon monoxide (CO_2), carbon dioxide, O_2, nitrogen, and methane using a laboratory-grade gas chromatograph.

  Ethylbenzene, TVHC C_4 to C_9, TVHC C_{10} to C_x, CO_2, O_2, and nitrogen were detected in the soil gas samples. TVHC C_4 to C_9 was detected at two locations within the berm surrounding Tank 260 and at two locations within the berm surrounding Tanks 263 and 264. Very small concentrations were detected at two locations within the berm of Tank 261. Other samples collected in the area were below the TVHC C_4 to C_9 detection limit.

  The report concluded that relatively high concentrations of CO_2 and relatively low concentrations of O_2 coincide with the detection of hydrocarbons. The relative concentrations of these two biogenic gasses indicate that biodegradation is occurring to produce CO_2 and deplete O_2.

- **Soil Samples, 1992 (RSN 1994) (RCRA Facility Investigation [RFI] Program).** In 1992, soil samples were collected in a phased approach; initially three soil samples were collected, followed by 12 samples collected to confirm the soil gas survey results presented above. The soil samples were collected from 5 to 7 below ground surface (bgs), just above the water table. These samples were analyzed for total petroleum hydrocarbons (TPH) as diesel and TPH as gasoline. Twelve samples were analyzed for BTEX. One sample was also analyzed for toxicity characteristic leaching procedure (TCLP) volatile organic compounds (VOCs), TCLP semivolatile organic compounds (SVOCs), TCLP pesticides/herbicides, and TCLP metals. One sample was also analyzed for Priority Pollutant volatiles, Priority Pollutant semivolatiles, organochlorine pesticides and total polychlorinated biphenyls (PCBs), Priority Pollutant metals, and total cyanide.

  Toluene was detected at 2.2 parts per billion (ppb) in one soil sample (POL SS-11) collected south of Tank 260, and xylenes were detected in two soil samples (POL SS-11 and POL D5) at 1.0 ppb and 27 ppb, respectively. The soil data did not confirm the Tracer soil gas data. RSN concluded that either no spill had occurred or the contamination did not migrate laterally. RSN also suggested that if contamination existed below the bermed areas and had not been detected, the low hydraulic conductivity of the berm material would help keep precipitation from leaching contamination into the groundwater. The results for TCLP analyses were either non-detect or below the RCRA regulatory action level for toxicity.

- **Groundwater Samples, 1992 (RSN 1994) (RFI Program).** In 1992, RSN installed seven groundwater monitoring wells (POL MW1 through POL MW6, and POL MW2D). Six monitoring wells were installed to a depth of 13 feet bgs and were constructed with 10-foot screens intersecting the water table. One monitoring well was installed to a depth of 38 feet bgs and was constructed with a 5-foot screen. Groundwater samples were

collected from these wells in August 1992 and analyzed for TPH as diesel, TPH as gasoline, BTEX. Two groundwater samples were additionally analyzed for VOCs, SVOCs, metals, pesticides, and PCBs. Two other groundwater samples were additionally analyzed for volatiles, semivolatiles, metals (lead, mercury, selenium, and thallium), pesticides, and PCBs.

BTEX was not detected in the groundwater samples. Two monitoring wells (POL MW1 and POL MW2) were impacted with detectable concentrations of TPH as diesel and TPH as gasoline. The maximum concentration of TPH as diesel was 2,060 ppb (POL MW1) and the maximum concentration of TPH as gasoline was 430 ppb (POL MW2).

- **Groundwater Samples, 1994 (RSN 1994) (RFI Program).** A groundwater sample was collected from POL MW2 in February 1994. The results indicated TPH as diesel was detected at a concentration of 900 ppb and TPH as gasoline was non-detect.

  Groundwater samples were collected from POL MW1 and POL MW2 in May 1994. The results indicated TPH as diesel and TPH as gasoline were non-detect.

  The decrease in concentrations of TPH as diesel and gasoline was attributed to intrinsic remediation (bioremediation) based on comparison to the similarity of evidence observed at AOC Nos. 2 and 3. The report also indicated that dilution, sorption, and dispersion may have contributed to the decrease in concentrations.

- **Interim Corrective Measure (Bioventing), 1993 (RSN 1994).** The former Air Force Center for Environmental Excellence (AFCEE) initiated a pilot program to assess the effectiveness of bioventing. One bioventing well was installed in the bermed area of Tank 206 based on the 1992 soil gas survey results. The purpose of the bioventing well was to inject air into the subsurface to replace oxygen that was depleted during biodegradation. The results of the bioventing program indicated decreasing concentrations of TPH, ethylbenzene, and xylene in soil gas.

- **SWMU-Specific Risk Assessment, 2000 (OHM 2000a).** OHM performed a human health and ecological risk assessment to determine if the COCs present at SWMU No. 15 posed a significant risk to human or ecological receptors. The maximum detected concentrations of COCs in subsurface soil and groundwater samples was used to perform the risk assessment.

  The risk assessment concluded that the detected concentrations of COCs in soil and groundwater did not pose a significant risk to human or ecological receptors.

- **Demolition and Decommissioning, 2004 (CH2M HILL 2004c).** This report documents the abatement, demolition, decommissioning, and wildlife hazard mitigation activities performed on Johnston, East, Sand, and North Islands as part of the closure of Johnston Atoll in 2004. These activities were documented on Demolition/Decommissioning

Tracking Forms, which were inspected and approved by the USAF. With the exception of the bunkers and the Joint Operations Center (Facility 20), which were decommissioned, and the Tide Gauge House (Facility 108), which was retained by the National Oceanic and Atmospheric Administration, all structures on Johnston Atoll were demolished, including Tanks 260 and 261 and the berm associated with SWMU No. 15.

2.3 GROUNDWATER MONITORING PROGRAM

This section summarizes the results of the groundwater monitoring program conducted between 2002 and 2008. A summary of the analytical results presented below is presented in Table 1.

- **2002 Groundwater Monitoring (CH2M HILL 2003a).** In September 2002, a preliminary groundwater monitoring event was performed. The primary objectives of the preliminary groundwater monitoring event were (1) locate, determine the condition of, and sample monitoring wells listed on the EPA Hazardous Waste Corrective Action Permit, (2) perform laboratory analysis on the groundwater samples collected from functioning wells, and (3) assess existing conditions onsite to follow up on finding of previous investigations.

  The six monitoring wells listed in the Permit for SWMU No. 15 were located; however, two monitoring wells (POL MW3 and POL MW5) were obstructed at approximately 5 feet below ground surface and did not contain groundwater. Groundwater samples were collected from the four functional wells (POL MW1, POL MW2, POL MW2D, and POL MW6), which were analyzed for BTEX and total petroleum hydrocarbons-extractable (TPH-e) as jet fuel. During the collection of groundwater samples, a strong hydrogen sulfide odor was observed at POL MW2 and a slight hydrogen sulfide odor was observed at POL MW6. Petroleum sheens or odors were not observed during the collection of groundwater samples from the four functional wells.

  Analytical results indicate that concentrations of BTEX compounds were below their laboratory method detection limits (MDLs) or reporting limits (RLs) for the four groundwater sample. The MDLs and RLs were below cleanup goals specified in the Permit.

  TPH-e was detected at low concentrations, below the RL in three of the four groundwater samples. The chromatograms most closely matched weathered diesel fuel. At the time of the sampling event, cleanup goals for TPH in groundwater were not developed.

- **2003 Groundwater Monitoring (CH2M HILL 2004b).** In June and July 2003, the two obstructed monitoring wells identified in the previous section were replaced with monitoring wells POL MW3A and POL MW5A, which were installed adjacent to the previous wells. In July 2003, groundwater samples were collected from the full suite of six monitoring wells, which were analyzed for BTEX, ethylene glycol, PAHs, and TPH as JP-5. The report notes that the previous analysis of TPH-e was intended to assess and

quantify TPH as JP-5. The review of the chromatograms for several samples indicated that diesel was also present. The TPH results for both fuel types were reported for several samples.

One BTEX compound, toluene, was detected at POL-MW3A at a concentration of 0.12 micrograms per liter (ug/L), which was below the action level. At least one PAH analyte was detected in each of the six wells; however, the detected concentrations were below their respective proposed groundwater action levels. TPH as jet fuel and diesel were detected in samples collected from three wells (POL MW02, POL MW03, and POL MW06); however, the sum of the detected TPH concentrations in each sample was less than the proposed TPH action level. Ethylene glycol was not detected in any of the samples.

- **2004 Groundwater Monitoring (CH2M HILL 2004c).** In April 2004, groundwater samples were collected from the full suite of six monitoring wells, which were analyzed for BTEX, PAHs, TPH as gasoline, and TPH as diesel fuel. One monitoring well (POL MW02) was resampled in May 2004 because the reported concentrations of TPH using Method 8015 were greater than the TPH groundwater cleanup goal and also appeared to be different from historical TPH results for certain wells. The second groundwater sample from POL MW02 was analyzed using Northwest TPH (NWTPH) fractionation methods for extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH).

  TPH as gasoline and TPH as diesel were detected in the six groundwater samples. The sample collected from well POL MW02 exhibited the highest concentrations with the sum of the TPH as gasoline and TPH as diesel concentrations (sum TPH) equal to 1,217 ug/L, which exceeded the TPH cleanup goal of 640 ug/L. For the second sample collected from POL MW02, the sum of the EPH and VPH concentrations (sum EPH/VPH) was 277 ug/L.

  For BTEX analytes, ortho-xylene (o-xylene) was detected at a concentration of 0.14 ug/L in the sample collected from POL MW02. The detected concentration was below the cleanup goal. One or more PAH analyte was detected in each of the six groundwater samples; however, the detected concentrations of PAH analytes were below their respective cleanup levels.

- **2006 Groundwater Monitoring (CH2M HILL 2007).** In August 2006, groundwater samples were collected from five of six monitoring wells. Monitoring well POL MW02D was not sampled because the adjacent shallow well (POL MW02) was sampled, and because the COC concentrations in POL MW02D were below applicable cleanup goals since 2000. The five groundwater samples were analyzed for BTEX, PAHs and EPH and VPH using the NWTPH fractionation methods.

EPH was detected in the five groundwater samples, with the maximum concentration of 136.3 ug/L detected in POL MW05A. VPH was not detected in the five groundwater samples. The sum EPH/VPH concentrations did not exceed the groundwater cleanup level of 640 ug/L for the five groundwater samples.

One or more PAH analyte was detected in each of the five groundwater samples; however, the detected concentrations of PAH analytes were below their respective cleanup levels. BTEX analytes were not detected above the laboratory detection limit in the five groundwater samples.

- **2008 Groundwater Monitoring (CH2M HILL 2009).** In November 2008, groundwater samples were collected from the six monitoring wells. The groundwater samples were analyzed for BTEX, PAHs, and EPH and VPH using the NWTPH fractionation methods.

  EPH was detected in the six groundwater samples, with the maximum concentration of 245.4 ug/L detected in POL MW01. VPH was detected in two groundwater samples, with the maximum concentration of 6.5 ug/L, which was also detected in POL MW01. The sum EPH/VPH concentration did not exceed the groundwater cleanup level of 640 ug/L for the six groundwater samples.

  One or more PAH analyte was detected at low, estimated concentrations in four of the six groundwater samples, which were below their respective cleanup levels. BTEX analytes were not detected above the laboratory detection limit in the six groundwater samples.

Table 1 presents a historical summary of SWMU No. 15 groundwater analytical results from July 2000 through November 2008 and a comparison to the Cleanup Goals listed in the Permit. The wells were sampled for TPH jet fuel (TPH-jet fuel); TPH diesel range (TPH-d); TPH gasoline range (TPH-g); and BTEX compounds annually between 2000 and 2004. Beginning in 2003, PAH compounds were added as COCs. Since 2000 (2003 for PAHs), all analytical results for TPH, BTEX, and PAHs have been less than their current cleanup goals, with the single exception of a TPH exceedance in April 2004 in well POL-MW02. This well was subsequently resampled in May 2004 using the NWTPH analyses and the results were less than the cleanup goal. NWTPH analytical results have remained below cleanup goals during 2006 and 2008 sampling.

2.4 SITE CHARACTERIZATION ACTIVITIES

Addendum No. 1 of the Draft CCMS (OHM 2000b) establishes the criteria and conceptual approach for removing SWMU No. 15 from the RCRA Permit. Furthermore, this study specifies that the following characterization activities be completed prior to closure: 1) review available records to determine if spills or releases of contaminants have occurred and 2) visually inspect the SWMUs to identify stained soil, which may be indicative of an area containing contaminated soil (OHM 2000b).

In 2003, a comprehensive records review and visual site inspections (VSI) of Johnston Atoll facilities, including SWMU No. 15, were completed as part of the Phase II Environmental Baseline Survey (EBS), Johnston Atoll, hereafter referred to as, "Phase II EBS" (Earth Tech 2005). Additionally, in spring 2015, a second VSI was performed by the Air Force to confirm the results of the Phase II EBS.

Results of these activities include the following.

- **Records Search:** A comprehensive records review of all Johnston Atoll facilities, including SWMU No. 15, was completed in 2003 as part of the Phase II EBS. Under this survey, all documents prepared since the Environmental Baseline/Property Transfer Survey (EB/PTS) Report (Ogden 1999) through preparation of the Phase II EBS were reviewed to determine if spills or releases of contaminants have occurred. Additionally, interview of on-island as well as off-island personnel associated with all Johnston Atoll organizations on an as-needed basis was also completed. Results of this records search indicated that records of leaks and spills prior to 1987 do not exist. Leaks and spills were known to have occurred within the bermed area, but the extent, location, and dates of releases are not known. No major uncontained releases were recorded at SWMU No. 15 since 1987 (OHM 2000a).

- **Visual Site Inspection (VSI):**

    - 2003 Phase II EBS: A Phase II EBS Site Survey was conducted on 13-24 October 2003 which involved a visual inspection and photo documentation of the entire Atoll and all associated facilities, including SWMU No. 15. According to the 2004 Phase II EBS Report, no evidence of staining was observed at the site and SWMU No. 15 was recommended for NFA (Earth Tech 2005). A Certification of the Environmental Baseline Survey and Certification of No Contamination Present can be found in Attachment A.

    - 2015 VSI: A VSI was also completed at SWMU No. 15 on 26 April 2015 to inspect for areas of stained soil in the vicinity of the former ASTs and refueling pad. The VSI included inspecting the refueling concrete pad and walking along the perimeter and interior of the site to inspect for evidence of staining and collecting photographic documentation of site conditions (Attachment B). The site is becoming heavily vegetated. As with the 2003 Phase II EBS Site Survey, no evidence of staining or contamination was observed during the 2015 VSI.

2.5 PERMIT REQUIREMENTS AND STATUS

Table III.3 of the Permit specifies the following performance criteria for SWMU No. 15 (EPA 2004):

Assessment-Based: "Conduct additional characterization (in accordance with Addendum No. 1 of the Draft CCMS) after the tanks are emptied and/or removed.."

Monitoring-Based: "Points of Compliance for groundwater monitoring are wells: POL MW01, POL MW02, POL MW02D, POL MW03A, POL MW05A, and POL MW06. COCs in groundwater are TPH as JP-5, BTEX, and PAHs. Continue groundwater monitoring in accordance with EPA approved Groundwater Monitoring Workplan prepared and submitted in accordance with Table III.1. Upon completion of three (3) consecutive sampling events where concentrations of each analyte are below groundwater Cleanup Goals, groundwater monitoring may be reduced or terminated in accordance with EPA approved Groundwater Monitoring Workplan. Cleanup Goals for groundwater are listed in Table III.5. "

With the completion of VSI activities at SWMU No. 15, the assessment-based performance criteria listed in Table III.3 of the Permit has been met. With the completion of groundwater sample collection and analysis activities in November 2008, the monitoring-based performance criteria listed in Table III.3 of the permit has been met. The conditions documented at SWMU No. 15 no longer pose unacceptable risks to potential human or ecological receptors.

2.6 NO FURTHER ACTION PROPOSAL

An NFA status is being requested for SWMU No. 15. The site was remediated and characterized in accordance with the corrective action requirements, and available data indicate that TPH, BTEX, and PAHs are not present in groundwater at concentrations exceeding their respective Cleanup Goals; therefore, under current and projected future land use, unacceptable risk to human health or the environment is not present.

This page intentionally left blank

3. REFERENCES

CH2M HILL. 2003a. *Groundwater Monitoring Report, Solid Waste Management Units No. 6, 15, 16 and Areas of Concern No. 1, 2, 3, Johnston Atoll.* February 10. (AR139)

CH2M HILL. 2003b. *Technical Memorandum 1, Groundwater Monitoring Plan for SWMUs 6, 15, and 16 and AOCs 1, 2, and 3, Johnston Island.* April 21. (AR152)

CH2M HILL. 2004a. *Final 2003 Annual Groundwater Monitoring Report for SWMU No. 6, 15, and 15 and AOC No. 1, 2, and 3, Johnston Atoll.* March 16. (AR175)

CH2M HILL, 2004b. *Final 2004 Annual Groundwater Monitoring Report for SWMU No. 6, 15, and 15 and AOC No. 1, 2, and 3, Johnston Atoll.* September 17. (AR188)

CH2M HILL. 2004c. *Draft Demolition, Decommissioning, and Wildlife Hazard Mitigation Report, Johnston Atoll.* November.

CH2M HILL, 2007. *Final 2006 Annual Groundwater Monitoring Report for SWMU No. 6, 15, and 15 and AOC No. 1, 2, and 3, Johnston Atoll.* January 23. (AR204)

CH2M HILL, 2009. *Final 2008 Annual Groundwater Monitoring Report for SWMU No. 6, 15, and 15 and AOC No. 1, 2, and 3, Johnston Atoll.* March 26. (AR209)

Earth Tech. 2005. *Final Phase II Environmental Baseline Survey Report, Johnston Atoll.* April.

United States Environmental Protection Agency (EPA). 2002. *Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID TT9 570 090 002.* Effective May 30, 2002.

EPA. 2004. *Notice of Approval, Modification No. 1 to Hazardous Waste Corrective Action Permit, Johnston Atoll Facility, EPA ID No. TT9 570 090 002.* Effective July 30, 2004.

Ogden Environmental and Energy Services Company, Inc. (Ogden). 1999. *Environmental Baseline/Property Transfer Survey Report for Johnston Atoll.* January.

OHM Remediation Services Corporation (OHM). 2000a. *Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* January.

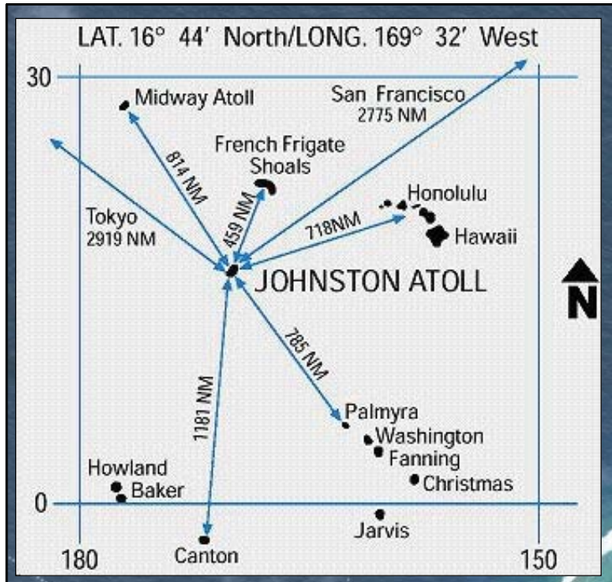
OHM. 2000b. *Addendum No. 1 to Draft Comprehensive Corrective Measures Study for RCRA Part B Permit No. TT9 570 090 002, Johnston Atoll.* November.

Raytheon Services Nevada (RSN). 1994. *Johnston Island RCRA Facility Investigation Final Report*. September.

This page intentionally left blank

FIGURES

This page intentionally left blank



Akau (North) Island

Hikina (East) Island

Sand Island

Johnston Island

Summit Peak

bing™

© 2010 DigitalGlobe © 2010 GeoEye © 2013 Microsoft Corporation © 2010 NAVTEQ ©

Acronym
AOC: Area of Concern
SWMU: Solid Waste Management Unit

Data Sources
Bing Maps Hybrid (c) 2010 Microsoft Corporation
Insert Map: Pacific Airfields http://www.ww2aircraft.net

N

1 inch equals 2,000 feet
(11x17 print-out)

0 1,000 2,000 4,000 Feet

Statement of Basis for No Further Action Proposal
For Solid Waste Management Unit Number 15

Figure 1
Johnston Atoll Location Map

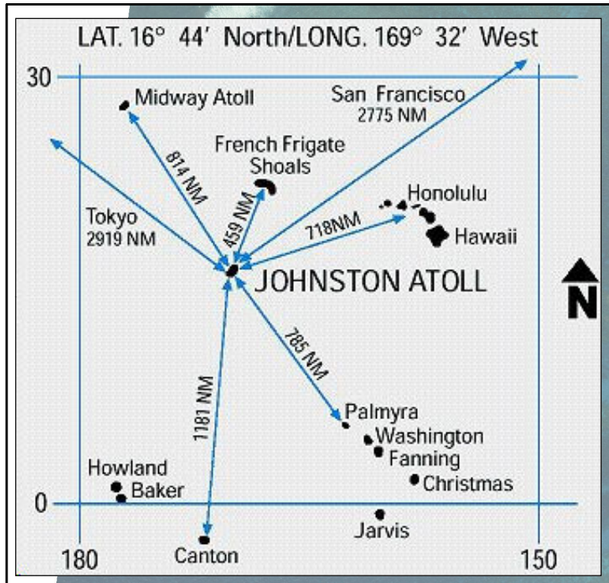
Contract No. AFCEC/4PAE08 FA8903-08-D-8791 TO: 0048

EA Project No. 1456048

rkinchla Path: J:\GIS\Johnston Atoll\mxd\Figure 1 Site Location.mxd

This page intentionally left blank

Johnston Island



SWMU No. 15

Legend

SWMU/AOC

Acronym
AOC: Area of Concern
SWMU: Solid Waste Management Unit

Aerial Data Source: DigitalGlobe Worldview-2 (0.5m) Satellite Image
Image Captured April 5, 2013

N

1 inch equals 718 feet
(11x17 print-out)

0 250 500 1,000 Feet

Statement of Basis for No Further Action
Proposal for Solid Waste Management Unit Number 15

Figure 2
SWMU No. 15 Location

Contract No. AFCEC/ECOS09 FA8903-08-D-8791 TO: 0048

EA Project No.1456048

asherris Path: \\HONOLULU\External\GIS\Johnston_Atoll\mxd\1456048\Figure_2_SWMU15.mxd

This page intentionally left blank

TABLE

This page intentionally left blank

TABLE 3-4

Cumulative Groundwater Analytical Results, SWMU No. 15

2008 Groundwater Monitoring Report for SWMU No. 6, 15, and 16 and AOC No. 1, 2, and 3, Johnston Atoll

		Petroleum Hydrocarbons							VOCs[3]				Selected PAHs[5]			
Well	Date Sampled	TPH-Diesel[1] (ug/L)	TPH-JP5[1] (ug/L)	TPH-Gas[1] (ug/L)	Sum TPH-Gas + TPH-Diesel (ug/L)	Total EPH[2] (ug/L)	Total VPH[2] (ug/L)	Sum EPH + VPH (ug/L)	Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Xylenes[4] (ug/L)	Acenaphthene (ug/L)	Benzo(a)pyrene (ug/L)	Naphthalene (ug/L)	Phenanthrene (ug/L)
POL-MW01	Jul-00	100 J	23 U	NA	--	NA	NA	--	0.29 U	0.30 U	0.30 J	0.67 U	NA	NA	NA	NA
	Jul-01	NA	200	NA	--	NA	NA	--	0.26 U	2.0 U	2.0 J	0.75 U	NA	NA	NA	NA
	Sep-02	190 F	NA	NA	--	NA	NA	--	0.32 U	0.28 U	0.28 F	0.28 U	NA	NA	NA	NA
	Jul-03	NA	100 U	NA	--	NA	NA	--	0.07 U	0.12 U	0.11 U	0.25 U	0.030 U	0.020 U	0.060 F	0.020 U
	Apr-04	99 F	NA	35 F	134	NA	NA	--	0.07 U	0.05 U	0.03 U	0.08 U	0.0014 U	0.0055 F	0.0037 F	0.0037 F
	Aug-06	NA	NA	NA	--	110	ND	110	0.07 U	0.06 U	0.08 U	0.12 U	0.0014 U	0.0014 U	0.006 F	0.001 U
	Nov-08	NA	NA	NA	--	245.4	6.5	251.9	0.057 U	0.06 U	0.05 U	0.1 U	0.0040 U	0.0090 U	0.004 U	0.005 U
POL-MW02	Jul-00	100 J	23 U	NA	--	NA	NA	--	0.29 U	0.3 U	0.21 U	0.67 U	NA	NA	NA	NA
	Jul-01	NA	60 J	NA	--	NA	NA	--	0.26 U	2.0 U	0.33 U	0.75 U	NA	NA	NA	NA
	Sep-02	130 F	NA	NA	--	NA	NA	--	0.32 U	0.28 U	0.27 U	0.28 U	NA	NA	NA	NA
	Jul-03	260 F	240 F	NA	--	NA	NA	--	0.07 U	0.12 U	0.11 U	0.25 U	0.030 UM	0.020 U	0.030 F	0.040 F
	Apr/May-04	1,112	NA	105	**1,217**	171 F	106 F	277	0.07 U	0.05 U	0.03 U	0.08 U	0.110	0.0056 F	0.380	0.140
	Aug-06	NA	NA	NA	--	104 J	ND	104 J	0.07 U	0.06 U	0.08 U	0.12 U	0.0014 U	0.054 J	0.004 F	0.001 UJ
	Nov-08	NA	NA	NA	--	99	ND	99	0.057 U	0.06 U	0.05 U	0.1 U	0.0040 UJ	0.009 UJ	0.004 UJ	0.005 UJ
POL-MW02D	Jul-00	70 J	23 U	NA	--	NA	NA	--	0.29 U	0.3 U	0.21 U	0.67 U	NA	NA	NA	NA
	Jul-01	NA	40 U	NA	--	NA	NA	--	0.26 U	2.0 U	0.33 U	0.75 U	NA	NA	NA	NA
	Sep-02	360 F	NA	NA	--	NA	NA	--	0.32 U	0.28 U	0.27 U	0.28 U	NA	NA	NA	NA
	Jul-03	NA	100 U	NA	--	NA	NA	--	0.07 U	0.12 U	0.11 U	0.25 U	0.030 U	0.020 U	0.10 J	0.020 U
	Apr-04	135 F	NA	18 F	153	NA	NA	--	0.07 U	0.05 U	0.03 U	0.08 U	0.0015 U	0.004 U	0.0039 F	0.0014 F
	Aug-06	WELL NOT SAMPLED														
	Nov-08	NA	NA	NA	--	121.2	ND	121.2	0.057 U	0.06 U	0.05 U	0.1 U	0.004 U	0.054 F	0.005 F	0.017 F
POL-MW03A	Jul-03	210 J	100 R	NA	--	NA	NA	--	0.07 U	0.11 U	0.10 F	0.26 U	0.030 U	0.020 U	0.130	0.020 U
	Apr-04	77 F	NA	21 F	98	NA	NA	--	0.07 U	0.05 U	0.03 U	0.08 U	0.002 F	0.0044 F	0.0024 F	0.0036 F
	Aug-06	NA	NA	NA	--	107	ND	107	0.07 U	0.06 U	0.08 U	0.12 U	0.0014 U	0.001 U	0.005 F	0.001 U
	Nov-08	NA	NA	NA	--	39.2	3.4	42.6	0.057 U	0.06 U	0.05 U	0.1 U	0.0040 U	0.009 U	0.005 F	0.005 U
POL-MW05A	Jul-03	NA	100 R	NA	--	NA	NA	--	0.07 U	0.11 U	0.12 F	0.26 U	0.030 U	0.020 U	0.070 F	0.020 U
	Apr-04	44 F	NA	26 F	70	NA	NA	--	0.07 U	0.05 U	0.03 U	0.08 U	0.0015 U	0.0036 U	0.0045 F	0.003 F
	Aug-06	NA	NA	NA	--	136	ND	136	0.07 U	0.06 U	0.08 U	0.12 U	0.0014 U	0.001 U	0.006 F	0.001 U
	Nov-08	NA	NA	NA	--	113.4	ND	113.4	0.057 U	0.06 U	0.05 U	0.1 U	0.0040 U	0.009 U	0.004 U	0.005 U
POL-MW06	Jul-00	70 J	23 U	NA	--	NA	NA	--	0.29 U	0.30 U	0.21 U	0.67 U	NA	NA	NA	NA
	Jul-01	NA	24 U	NA	--	NA	NA	--	0.26 U	0.27 U	0.33 U	0.75 U	NA	NA	NA	NA
	Sep-02	100 F	NA	NA	--	NA	NA	--	0.32 U	0.28 U	0.27 U	0.28 U	NA	NA	NA	NA
	Jul-03	170 F	100 U	NA	--	NA	NA	--	0.07 U	0.12 U	0.11 U	0.25 U	0.030 U	0.020 U	0.060 F	0.020 U
	Apr-04	40 F	NA	15 F	55	NA	NA	--	0.07 U	0.05 U	0.03 U	0.08 U	0.0015 U	0.0037 U	0.0025 F	0.0016 F
	Aug-06	NA	NA	NA	--	79	ND	79	0.07 U	0.06 U	0.08 U	0.12 U	0.001 U	0.001 U	0.005 F	0.001 U
	Nov-08	NA	NA	NA	--	44.5	ND	44.5	0.057 U	0.06 U	0.05 U	0.1 U	0.004 UJ	0.009 UJ	0.005 J	0.005 UJ
Current Cleanup Goal		**+**	**+**	**+**	**640**	**+**	**+**	**640**	**700**	**430**	**5,000**	**10,000**	**710**	**300**	**2,350**	**4.6**

Notes:

(1) TPH quantitated as gasoline, diesel, or jet fuel analyzed by EPA Method 8015 or 8015E

(2) Extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH) analyzed by State of Washington NWTPH fractionation method

(3) VOCs analyzed by EPA Methods SW8021B or SW8260B

(4) Xylene data for 2000 through 2002 are total xylenes. Data after 2002 list the highest detected isomer (either o-xylene or m, p-xylene); if no isomers detected the highest detection limit is listed

(5) PAHs analyzed by EPA Method SW8270SIM; selected analytes are the most commonly detected PAH compounds in these wells; see Table 3-3 for full analyte list

Shading and bold indicates concentration is greater than the current proposed cleanup goal.

+ = cleanup goal based on sum of detected TPH results

ug/L = micrograms per liter

NA = Sample not analyzed for this compound

ND = Not detected

U - The analyte was not detected at the specified detection limit.

UJ - The analyte was not detected at the specified detection limit; the detection limit is estimated.

UM - A matrix effect was identified in the MS/MSD sample. The recovery of the analytes not detected in the native sample are considered to have been affected by the nature of the matrix

F - The analyte was detected at a concentration less than the reporting limit but greater than the method detection limit.

J - The analyte was present, but the reported value may not be accurate or precise (estimated).

R - The analyte was rejected for use.

Data Sources: OHM Corp., January 2000; CH2M HILL, February 2003; CH2M HILL, March 2004; CH2M HILL, September 2004; CH2M HILL, January 2007.

This page intentionally left blank

ATTACHMENT A

This page intentionally left blank

Certification of the Environmental Baseline Survey

JOHNSTON ATOLL

Earth Tech, Inc. (Earth Tech) conducted this Phase II Environmental Baseline Survey on behalf of the U.S. Air Force, specifically the 15 CES/CEVJ – Johnston Atoll Program Element, Hickam Air Force Base, Oahu, Hawaii. Earth Tech has reviewed all appropriate records made available; conducted visual site inspections of all Johnston Atoll facilities, structures, and land use areas; and performed an analysis of information collected during these survey activities. In our professional judgment and opinion, the facts and conditions depicted are accurate and are subject to limitations inherent in the investigative techniques used and any expressed limitations in this survey.

Certified by: Betsy S. Alspaugh Date: 22 MAR 05
BETSY S. ALSPAUGH, CHMM, CPEA #399432
CTO Manager
Earth Tech, Inc.

I certify that the property conditions stated in this report are based on a thorough review of available records and visual inspections as noted, and are true and correct to the best of my knowledge and belief.

Certified by: Frances D. Saunders Date: 14MAR05
FRANCES D. SAUNDERS
Supervisory Environmental Engineer
15 Civil Engineer Squadron, Johnston Atoll Program Element

Certified by: Richard W. Parkinson Date: 21 MAR 05
RICHARD W. PARKINSON, P.E.
Chief, Environmental Flight
15 Civil Engineer Squadron

Certification of No Contamination

JOHNSTON ATOLL

This real property contains no hazardous substances as that term is defined in the Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601), amended or other contamination as specified by the Resource Conservation and Resource Act 1976, the implementing Environmental Protection Agency regulations (40 CFR Parts 261, 262, 263, and 761), and Federal Property Management, Regulations (41 CFR Part 101-47). A search of Johnston Atoll facilities and/or records revealed that no hazardous substances have been released at Johnston Atoll without appropriate response and clean-up actions having been taken or disposed of on the Air Force-controlled real property.

Certified by: Betsy S. Alspaugh Date: 22 MAR 05
BETSY S. ALSPAUGH, CHMM, CPEA#399432
CTO Manager
Earth Tech, Inc.

Certified by: Frances D Saunders Date: 14 MAR 05
FRANCES D. SAUNDERS
Supervisory Environmental Engineer
15 Civil Engineer Squadron, Johnston Atoll Program Element

Certified by: Richard W. Parkinson Date: 21 MAR 05
RICHARD W. PARKINSON, P.E.
Chief, Environmental Flight
15 Civil Engineer Squadron

Certification of Polychlorinated Biphenyl (PCB) Clearance

JOHNSTON ATOLL

This Real Property is in compliance with 40 CFR Part 761. Radio interference filters and light ballasts presumed to contain PCBs were handled, packaged, and disposed as PCB-containing waste. Therefore, no known PCB-containing materials are present at Johnston Atoll. In addition, no known PCB-contaminated soil, wastes, or unserviceable equipment remains on the existing Air Force property.

Certified by: Betsy S. Alspaugh Date: 22 MAR 05
BETSY S. ALSPAUGH, CHMM, CPEA #3999432
CTO Manager
Earth Tech, Inc.

Certified by: Frances D Saunders Date: 14 MAR 05
FRANCES D. SAUNDERS
Supervisory Environmental Engineer
15 Civil Engineer Squadron, Johnston Atoll Program Element

Certified by: Richard W. Parkinson Date: 21 MAR 05
RICHARD W. PARKINSON, P.E.
Chief, Environmental Flight
15 Civil Engineer Squadron

This page intentionally left blank

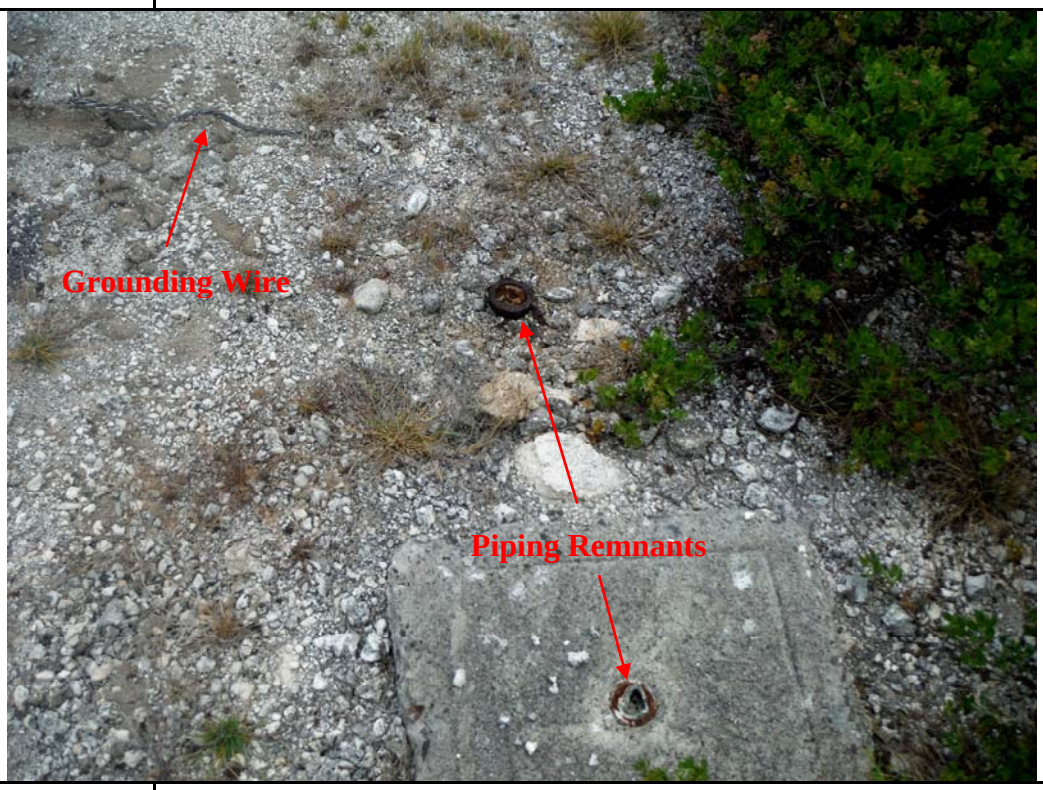
ATTACHMENT B

This page intentionally left blank

Project No.			
1456048	**Description:**	Remnants of a former filling stand located immediately to the northwest of SWMU No. 15. No evidence of staining was observed in or around this area. Photograph taken facing southwest.	**Photo 1**
	Site Name:	Johnston Atoll Airfield Sites	**Photo Date** 4/26/2015
	Client:	United States Air Force	

Project No.			
1456048	**Description:**	Photograph of SWMU No. 15 taken from the northern edge looking into the site. No staining was observed and the area was rapidly becoming vegetated. Many nesting birds were located throughout the site. Photograph taken facing south.	**Photo 2**
	Site Name:	Johnston Atoll Airfield Sites	**Photo Date** 4/26/2015
	Client:	United States Air Force	

Project No.	Description:	Circular area of compacted sand and nearby grounding wire suggests small aboveground tank was located here. There was no evidence of staining or odor in soils. Photograph taken near northeast corner of the site facing southeast.	Photo 3
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/26/2015
	Client:	United States Air Force	



Project No.	Description:	Photograph of suspected grounding wire and remnants of demolished piping. There was no evidence of staining, odor, or other sign of contamination in this area. Photograph taken near northeast corner of the site facing northwest.	Photo 4
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/26/2015
	Client:	United States Air Force	

Project No.	Description:	Photograph showing vegetation of the southeastern portion of the site. Photograph taken near the northeastern corner of the site facing south.	Photo 5
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/26/2015
	Client:	United States Air Force	

Project No.	Description:	Photograph taken along the former western fence line looking into SWMU No. 15. There was no evidence of staining, odor, or other indication of contamination observed at the site. Photograph taken facing southeast.	Photo 6
1456048	Site Name:	Johnston Atoll Airfield Sites	Photo Date 4/26/2015
	Client:	United States Air Force	

This page intentionally left blank

APPENDIX I

EPA Concurrence Letter for NFA designation for SWMU Nos. 5, 9, and 15.

This page intentionally left blank.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

July 26, 2016

Mr. Steven Mattson, Chief
Environmental Restoration
AFCEC/CZOP
10471 20th Street
JBER, AK 99506-2201

Re. Proposed Johnston Atoll No Further Action Statements of Basis (2015)

Dear Mr. Mattson,

I have received and reviewed the following Statements of Basis for your No Further Action (NFA) proposals for the Johnston Atoll Airfield Solid Waste Management Units (SWMU): SWMU-5 (09/15), SWMU-9 (10/15), and SWMU-15 (10/15). As per previous conversations with Stephen Krause we concur that based upon your submissions these units have met the permit requirements for an NFA designation. That formal designation will be addressed with the permit renewal currently under coordination and development.

Under the conditions of the existing permit dated May 30, 2002 (EPA-JA Permit, 2002), and as modified on July 30, 2004 (EPA-JA Permit Mod, 2004) US EPA concurs that no further corrective actions or measures are warranted or necessary.

If you have any questions or concerns regarding this concurrence please contact Angela Sandoval of this office at (415) 972-3831.

Sincerely,

John R. Moody, GS-13
EPA JA Project Manager