KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

OPERATIONS AND MAINTENANCE PLAN
GROUNDWATER TREATMENT SYSTEM
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
REVISION R4

MARCH 2021

377 MSG/CEI
2050 Wyoming Boulevard Southeast
Kirtland Air Force Base, New Mexico 87117-5270

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Prepared for
Kirtland Air Force Base
2050 Wyoming Boulevard SE
Kirtland Air Force Base, New Mexico 87117-5270

Prepared by
EA Engineering, Science, and Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Contract No. W912PP20C0020

REPORT DOCUMENTATION PAGE	*Form Approved OMB No. 0704-0188*

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
31-03-2021	Annual Update	15-09-2017 to 31-03-2021

4. TITLE AND SUBTITLE Operations and Maintenance Plan Groundwater Treatment System Revision R4 Bulk Fuels Facility Solid Waste Management Units ST-106/SS-111 Kirtland Air Force Base, New Mexico	**5a. CONTRACT NUMBER** W912PP20C0020 **5b. GRANT NUMBER** **5c. PROGRAM ELEMENT NUMBER**
6360401	**5d. PROJECT NUMBER** 6360401 **5e. TASK NUMBER** 2002 **5f. WORK UNIT NUMBER** Not applicable
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) AND ADDRESS(ES) EA Engineering, Science, and Technology, Inc., PBC 320 Gold Avenue Southwest, Suite 1300 Albuquerque, New Mexico 87102	**8. PERFORMING ORGANIZATION REPORT NUMBER** Not assigned
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Corps of Engineers–Albuquerque District 4101 Jefferson Plaza Northeast Albuquerque, New Mexico 87109-3435	**10.SPONSOR/MONITOR'S ACRONYM(S)** **11. SPONSOR/MONITOR'S REPORT NUMBER(S)**
12. DISTRIBUTION/AVAILABILITY STATEMENT	
13. SUPPLEMENTARY NOTES	

14. ABSTRACT

This Operations and Maintenance (O&M) Plan for the groundwater treatment system (GWTS) was prepared for the Kirtland Air Force Base Bulk Fuels Facility (BFF), Solid Waste Management Units ST-106/SS-111 located in Albuquerque, New Mexico. This Plan was prepared in accordance with all applicable federal, state, and local laws and regulations, including the New Mexico Hazardous Waste Act (and regulations) and the New Mexico Water Quality Act (and regulations). The GWTS has been installed as an interim measure to collapse and contain the ethylene dibromide groundwater plume from the BFF site in order to protect Albuquerque, Kirtland Air Force Base, and the Raymond G. Murphy Veterans Affairs Medical Center drinking water supply wells. The GWTS currently includes groundwater extraction wells and groundwater treatment using granular activated carbon adsorption. Treated groundwater is utilized for irrigation or injected into the aquifer under an approved underground injection control discharge permit. This O&M Plan is intended to assist personnel in successfully operating the GWTS and serves as a resource for equipment information, operational procedures, inspections and maintenance, repairs, recordkeeping, and waste management.

15. SUBJECT TERMS
Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, interim measures, RCRA, groundwater sampling, groundwater treatment system operation, granular activated carbon, ethylene dibromide, underground injection control

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			Sheen Kottkamp
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	ABSTRACT	5413	**19b. TELEPHONE NUMBER** *(include area code)* 505-846-9017

Standard Form 298
(Rev. 8-98) **Prescribed by ANSI Std. Z39.18**

40 CFR 270.11
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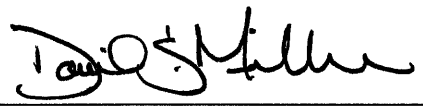

24 March 2021

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Commander, 377th Air Base Wing

Date

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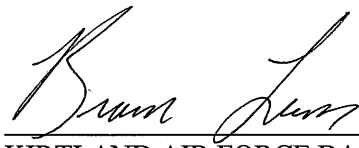

26 MAR 2021

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

Date

PREFACE

This Operations and Maintenance Plan for the groundwater treatment system (GWTS) was prepared for the U.S. Army Corps of Engineers. It pertains to the Kirtland Air Force Base Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111 located in Albuquerque, New Mexico. This Plan was prepared in accordance with all applicable federal, state, and local laws and regulations, including the New Mexico Hazardous Waste Act and the New Mexico Water Quality Act (New Mexico Statutes Annotated 1978), the New Mexico Hazardous Waste Management Regulations, and the Water Quality Control Commission Regulations.

This Operations and Maintenance Plan for the GWTS contains the necessary information to conduct operations at the GWTS.

REVISION TRACKING

Date	Revision	Section Changed	Description of Changes
8/2016	0	Baseline document	None.
9/2017	1	Front Matter	Added notice and revised preface.
		Executive Summary	Revised permit and agreement citations.
		Section 1 – Introduction	Revised all subsections to include KAFB-106239, operational changes, and permit requirements (DP-1839).
		Section 2 – Operation of the Groundwater Treatment System	Revised all subsections to reflect changes in system programming; added pending installation items and system utilities information.
		Section 3 – Inspection and Preventative Maintenance	Added subsections for additional maintenance activities including pending installation items.
		Section 4 – System Troubleshooting	Added this section to document nonstandard operational procedures.
		Section 5 – Process Monitoring	Revised all subsections to provide more accurate description of process monitoring activities.
		Section 6 – Recordkeeping	Revised all subsections to provide compliance with DP-1839.
		Section 7 – Waste Management	Revised text and added subsections for additional waste streams identified and created with pending installation items.
		References	Revised references.
		Figures	Removed Figure 1-1 extent of ethylene dibromide plume as updated plume maps are provided in quarterly monitoring reports, Figure 1-2 Site Map was revised to include new proposed conveyance line.
		Tables	Added the following tables: 1-1 Applicable Permits 1-2 Permit Terms and Conditions, Operations and Maintenance Plan Cross References 2-2 Permitted Extraction Well Flow Rates 2-3 Standard Operational Set Points 3-1 Groundwater Treatment System Routine Maintenance Schedule 3-2 Specific Consumable Product Codes, Suppliers, and Recommended On-Hand Inventory 3-3 Consumable Supply Inventory 3-4 Large Item Inventory 5-1 Influent Criteria 6-1 Reports and Recipients.

REVISION TRACKING

Date	Revision	Section Changed	Description of Changes
9/2017	1	Appendix A – Permits and Agreements	Revised to contain copies of regulatory approvals and permits as well as access agreements instead of a description of those items.
		Appendix B – Health and Safety	Added the following to the list of hazards: Hearing damage hazards Pinch points (lift gates, vault lids) Hand tool use Respiratory hazards (granular activated carbon fines).
		Appendix C – Organization and Responsibilities	Updated organization structure.
		Appendix D – Description of Groundwater Treatment System Equipment and Facilities	Revised to reflect equipment adjustments, added pending installation equipment descriptions, and references.
		Appendix E – Description of Groundwater Treatment System Equipment/Instrument Location Pictures	Revised to reflect equipment adjustments.
		Appendix F – Process Control Description	Revised to reflect equipment adjustments, programming changes, and added pending installation equipment control descriptions.
		Appendix G – Human Machine Interface Screens	Revised to reflect programming changes.
		Appendix H – Design Calculations for GAC Vessel Media Beds	Added manufacturer modeled granular activated GAC usage rates at two theoretical higher influent concentrations.
		Appendix I – Groundwater Treatment System Operations Log Sheets and Record Forms	Revised to reflect Train 2 expansion and new equipment.
		Appendix J – Manufacturers' Literature	Revised by adding in the Train 2 expansion equipment literature.
		Appendix K – Contingency Plan	Revised to maintain compliance with DP-1839, access agreements, update emergency response table, and added references.
		Appendix L – Sampling and Analysis Plan	Revised for compliance with DP-1839 and provide more detailed description of driving factors as well as monitoring locations and added references.
		Appendix N – User Operational Adjustments Documentation	Added to provide documentation of changes made to the system that deviate from as-built drawings or operational set points.
		Appendix O – Well Construction Diagrams and Borehole Logs	Added to provide extraction and injection well information readily to operators.
9/2017	1	Appendix P – Example Reports	Added to provide examples of report structures and ensure compliance with relevant permits.
		Appendix Q – Technical Memorandum	Added to provide approved technical memoranda that are applicable to the groundwater treatment system.

REVISION TRACKING

Date	Revision	Section Changed	Description of Changes
5/2018	2	Front Matter	Added revision tracking table.
		Section 1 – Introduction	Revised to include newly installed equipment.
		Section 2 – Operation of the Groundwater Treatment System	Revised to include newly installed Treatment Train 2 equipment and equipment pending installation.
		Section 3 – Inspection and Preventative Maintenance	Revised to include newly installed equipment maintenance and maintenance for equipment pending installation; added flowmeter verification testing Subsection 3.17.
		Section 4 – System Troubleshooting	Added Subsections 4.3 KAFB-7 Hydraulic Pump Overload Reset and 4.4 KAFB-106233 and KAFB-106234 Start Order.
		Section 5 – Process Monitoring	Minor text revisions.
		Section 6 – Recordkeeping	Minor text revisions.
		Section 7 – Waste Management	Added Kirtland Air Force Base Hazardous Materials Group management information.
		Figures	Revised Figure 1-1 to show KAFB-106239 conveyance line as installed.
		Tables	Revised the following tables: Added clarification to Table 2-2 Revised Table 2-3 to reflect required operational and programing changes Added skimming to Table 3-1 Added sand filter consumables to Table 3-2 Added tools to Table 3-3.
		Appendix A – Permits and Agreements	No revisions.
		Appendix B – Health and Safety	Added the following hazards: Exposure to oxidants (sodium hypochlorite) Respiratory hazards (sand filter media [IMA-65 or DMI-65]).
		Appendix D – Description of Groundwater Treatment System Equipment and Facilities	Revised text to properly refer to newly installed equipment as installed rather than pending installation.
		Appendix E – Description of Groundwater Treatment System Equipment/Instrument Location Pictures	Added photographs of newly installed equipment including sand filters, clarifier, KAFB-196239 wellhead and control panel.
		Appendix F – Process Control Description	Revised the control description to reflect programming changes.
		Appendix G – Human Machine Interface Screens	Revised the screens to reflect programming changes.
		Appendix I – Groundwater Treatment System Operations Log Sheets and Record Forms	Revised forms to reflect equipment additions.
		Appendix J – Manufacturers' Literature	Added construction as-builts, basis of design (includes manufacturers' literature) for sand filters, and manufacturers' literature for equipment associated with KAFB-106239.

REVISION TRACKING

Date	Revision	Section Changed	Description of Changes
5/2018	2	Appendix L – Sampling and Analysis Plan	Clarified requirements that result in extraction well sampling; revised to ensure compliance with DP-1839.
		Appendix O – Well Construction Diagrams and Borehole Logs	Updated KAFB-106239 construction diagram.
		Appendix P – Example Reports	Revised to most recent report examples.
		Appendix R – Approved Standard Operating Procedures	New appendix added to provide approved standard operating procedures that are applicable to the groundwater treatment system.
6/2019	3	Front matter	Updated name of responsible person. Removed Notice page.
		Section 1 – Introduction	Added sodium hypochlorite generator to list of GWTS expansion items, and added bulletin board to Health and Safety section.
		Section 2 – Operation of the Groundwater Treatment System	Added special GAC sampling procedure reference, KAFB-7 V-smart valve updates, and minor text edits.
		Section 3 – Inspection and Preventative Maintenance	Added details on sodium hypochlorite generator and associated shutdown procedure, and added reference for TIGG GAC change-out procedure.
		Section 4 – System Troubleshooting	Added preface to KAFB-7 V-smart valve section indicating its absence in the system.
		Section 5 – Process Monitoring	Revised for new water level transmitters in extraction wells and injection well.
		Section 8 – References	Revised references.
		Figures	Updated Figure 1-1 for updated EDB plume.
		Tables	Revised the following tables: Included set points on Table 2-1 Updated set point ranges on Table 2-3 Updated Table 3-1 for regular disinfection Added food grade salt for brine tank to Table 3-2 Updated Table 3-3 Added emergency conveyance line material and water trailer to Table 3-4.
		Appendix A – Permits and Agreements	Added three NMED approval letters.
		Appendix C – Organization and Responsibilities	Revised for staffing changes, general edits.
		Appendix D – Description of Groundwater Treatment System Equipment and Facilities	Added details on sodium hypochlorite generator, removed KAFB-7 V-smart valve descriptions, and added documents for water trailer as attachments; updated extraction well pump depths; updated for new SCADA system and clarifier drain line.
		Appendix E – Description of Groundwater Treatment System Equipment/Instrument Location Pictures	Updated for sodium hypochlorite generator, and associated equipment; updated for basket strainers, SCADA computer, bypasses, and clarifier drain line.
		Appendix F – Process Control Description	Added sodium hypochlorite generator controls and interlocks, and removed KAFB-7 V-smart control valve descriptions; updated language for SCADA.
		Appendix G – Supervisory Control and Data Acquisition and Human Machine Interface Screens	Included SCADA screenshots.
		Appendix I – Groundwater Treatment System Operations Log Sheets and Record Forms	Updated field forms.
		Appendix J – Manufacturers' Literature	Added sodium hypochlorite generator documentation, the TIGG GAC change-out procedure as an

REVISION TRACKING

Date	Revision	Section Changed	Description of Changes
			attachment, the new basket strainers, and a procedure for emergency conveyance line repairs.
		Appendix L – Sampling and Analysis Plan	Added GAC special sampling flow chart as attachment, and reference within appendix text; extraction well annual sampling data change. Added Table L-6 Field Measurement Frequency.
		Appendix O – Well Construction Diagrams and Borehole Logs	Updated KAFB-7 well construction diagram; updated KAFB-106228, KAFB-106234, and KAFB-106239 construction diagrams. Added conceptual design schematics for new UIC wells.
		Appendix P – Example Reports	Updated reports and recipients list.
		Appendix R – Approved Standard Operating Procedures	Updated for new revision 1 of Standard Operating Procedure for Cleaning and Disinfection of the Groundwater Treatment System Remediation Wells and Groundwater Monitoring Wells.
3/2020	3	Appendices	Removed Appendices B, K, and R as directed.
3/2021	4	Section 1	Added changeover valve upgrade and KAFB-106IN2 to list of GWTS expansion items.
		Section 2	Added sentence regarding wireless cameras used to view GWTS when personnel are not onsite and discussion of uninterruptible power supply checks.
		Section 2.6	Edited instructions for operating the automated changeover valves. Added information regarding KAFB-7 wellhead equipment. Added information regarding KAFB-106IN2 Baski flow control valve.
		Section 2.11	Added provision for inspecting the system uninterrupted power supplies.
		Section 3.5	Edited instructions for operating the automated changeover valves.
		Section 4.3	Removed Section 4.3 as the V-Smart control valve is no longer installed on the system.
		General	Added discussion of KAFB-106IN2 and NPDES outfall.
		Appendix A	Notice of Disapproval and Response to comments have been added to Appendix A-1. Added Revision Tracking/Red-Line Documents to Appendix A-2. Moved permits to Appendix A-3.
		Appendix B	Modified to only include USAF, USACE, and EA.
		Appendix C	Added details for the automated changeover valves and KAFB-106IN2.
		Appendix D	Updated the piping and instrumentation diagram and added construction drawings for the changeover valves and KAFB-106IN2.
		Appendix E	Added instructions for operating the automated changeover valves as wells as details regarding KAFB-106IN2.
		Appendix G	Removed as requested.
		Appendix H	Added material cutsheets for automated changeover valves and KAFB-106IN2 including O&M Manual for the Baski valve.
		Appendix I	Added information regarding the NPDES outfall.
		Appendix L	Added well completion diagram for KAFB-106IN2.
		Appendix O	Removed as requested.
		Response to comments from NMED on Disapproval on the O&M Revision R3	See response to comments spreadsheet for details of requested edits (provided in Appendix A-1).

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APPENDICES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

µg/L	microgram(s) per liter
AFB	Air Force Base
AWWA	American Water Works Association
Baski	Baski, Inc.
BFF	Bulk Fuels Facility
CFR	Code of Federal Regulations
DP	discharge permit
EDB	ethylene dibromide
EPA	U.S. Environmental Protection Agency
FCV	flow control valve
ft	foot/feet
GAC	granular activated carbon
GCMP	Golf Course main pond
gpm	gallon(s) per minute
GWQB	Groundwater Quality Bureau
GWTS	groundwater treatment system
HDPE	high density polyethylene
HWB	Hazardous Waste Bureau
IM	interim measure
IMOA	Interim Measure Operational Area
mg/L	milligram(s) per liter
NMED	New Mexico Environment Department
No.	Number
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
PLC	programmable logic controller
psi	pound(s) per square inch
psig	pound(s) per square inch gauge
RCRA	Resource Conservation and Recovery Act
SCADA	supervisory control and data acquisition
SE	Southeast
SWMU	Solid Waste Management Unit
UIC	underground injection control

UPS	uninterruptible power supply
VFD	variable frequency drive
WCH	well control house

EXECUTIVE SUMMARY

This Operations and Maintenance (O&M) Plan for the groundwater treatment system (GWTS) was prepared for the Bulk Fuels Facility (BFF), Solid Waste Management Units (SWMUs) ST-106/SS-111 located at Kirtland Air Force Base (AFB), New Mexico.

The GWTS has been installed as an interim measure to collapse and contain the ethylene dibromide groundwater plume from the BFF site in order to protect Albuquerque Bernalillo County Water Utility Authority, Kirtland AFB, and the Raymond G. Murphy Veterans Affairs Medical Center drinking water supply wells. The GWTS currently includes groundwater extraction wells and groundwater treatment using granular activated carbon adsorption. Treated groundwater is utilized for irrigation or injected into the aquifer. This O&M Plan is intended to assist personnel in successfully operating the GWTS and serves as a resource for equipment information, operational procedures, inspection and maintenance, troubleshooting and repairs, recordkeeping, and waste management.

A Notice of Disapproval of the O&M Plan GWTS, BFF SWMUs ST-106 and SS-111 Revision R3 (New Mexico Environment Department, 2020) was received on December 17, 2020. This O&M Plan revision addresses the comments received from the NMED. A response to comments is provided in Appendix A-1.

1. INTRODUCTION

This Operations and Maintenance (O&M) Plan is intended to assist personnel in successfully operating the groundwater treatment system (GWTS) to treat and collapse the ethylene dibromide (EDB) groundwater plume from the Kirtland Air Force Base (AFB) Bulk Fuels Facility (BFF) site. A Notice of Disapproval of the O&M Plan GWTS, BFF Solid Waste Management Units (SWMUs) ST-106 and SS-111 Revision R3 (New Mexico Environment Department [NMED] 2020) was received on December 17, 2020. This O&M Plan revision addresses the comments received from NMED. The letter from NMED and a response to their comments is provided in Appendix A-1. Revision tracking/red-line version of this document, detailing O&M updates and requested changes, is provided in Appendix A-2. This Plan serves as a resource for the following:

- Equipment information (one-stop for manufacturer-supplied catalog cuts and O&M manuals)
- Operational procedures
- Inspection and maintenance
- Troubleshooting
- Repairs
- Recordkeeping
- Waste management.

This O&M Plan contains the following appendices to support the above items:

- Appendix A – Regulatory Correspondence, Revision Tracking, and Permits
- Appendix B – Organization and Responsibilities
- Appendix C – Description of GWTS Equipment and Facilities
- Appendix D – Process Drawings and GWTS Equipment/Instrument Location Pictures
- Appendix E – Process Control Description
- Appendix F – Supervisory Control and Data Acquisition (SCADA) and Human Machine Interface Screens
- Appendix G – GWTS Operations Log Sheets and Record Forms
- Appendix H – Manufacturers' Literature
- Appendix I – Sampling and Analysis Plan
- Appendix J – Waste Characterization Documentation
- Appendix K – User Operational Adjustments Documentation
- Appendix L – Well Construction Diagrams and Borehole Logs
- Appendix M – Example Reports.

A copy of the most recent version of this Plan is kept onsite at the GWTS at all times.

1.1 Site Description

Kirtland AFB is located in Bernalillo County in central New Mexico, southeast (SE) of and adjacent to the City of Albuquerque and the Albuquerque International Sunport (Figure 1-1). The approximate area of the Base is 52,287 acres. The BFF site, comprised of SWMUs ST-106/SS-111, is located within the installation boundary in the northwestern portion of Kirtland AFB. The BFF site is the location of jet fuel releases that occurred over an unknown period of time at Kirtland AFB. The releases originated from fuel delivery infrastructure at the BFF and were identified by Kirtland AFB personnel in November 1999.

In 2015, pursuant to the Resource Conservation and Recovery Act Hazardous Waste Treatment Facility Operating Permit Number NM9570024423 (New Mexico Environment Department, 2010), an interim measure (IM) was implemented to collapse and hydraulically control the EDB plume north of Ridgecrest Drive SE. The current groundwater IM consists of a network of four groundwater extraction wells located within the Interim Measures Operational Area (IMOA) in the distal portion of the dissolved-phase EDB plume, conveyance lines, GWTS, the Tijeras Arroyo Golf Course main pond (GCMP), underground injection control (UIC) wells KAFB-7 and KAFB-106IN2, and a National Pollutant Discharge Elimination System (NPDES) outflow to Tijeras Arroyo. A site map is presented in Figure 1-1.

1.2 Overall System Description

The system currently includes four extraction wells located north of Kirtland AFB (Figure 1-1). Contaminated groundwater from the extraction wells is pumped to the GWTS through double-walled, high density polyethylene (HDPE) pipe equipped with leak detection. Off-Base, the influent piping is installed below ground along rights-of-way and alleys and on-Base in existing utility corridors. The conveyance line from extraction well KAFB-106239 is connected below grade with a Y-junction to the conveyance line for extraction well KAFB-106228 that runs directly to the GWTS. The conveyance lines from wells KAFB-106233 and KAFB-106234 run to a well control house (WCH) located on-Base. The combined flow from KAFB-106233 and KAFB-106234 is conveyed from the WCH through a single conveyance line to the GWTS. Construction diagrams and borehole logs for extraction wells are provided in Appendix L.

The GWTS treatment plant is located on Ridgecrest Drive SE on Kirtland AFB in the former Zia Park housing neighborhood. The building has three entrances, which are all locked to prevent unauthorized access. The system is designed to treat up to 800 gallons per minute (gpm) of non-hazardous, contaminated groundwater; each of two treatment trains can treat up to 400 gpm. Each treatment train is comprised of the following (Appendix D):

- Pre-treatment influent equalization tank (6,000-gallon capacity)
- Pre-treatment free chlorine analyzer and dosing station
- Two pre-treatment influent pumps (400-gpm combined flow capacity)
- Two pre-treatment sand filters (477-gpm combined flow capacity)
- Two pre-treatment bag filter units (six bag filters per unit)
- Two granular activated carbon (GAC) vessels (20,000 pounds of GAC per vessel)
- One treated water storage tank (6,000-gallon capacity)
- One treated effluent pump (400-gpm flow capacity)
- Two post-treatment bag filter units for treated water (six bag filters per unit).

The treated groundwater is transported via a single-walled HDPE pipe to a junction with an existing pipeline that connects well KAFB-7 to the GCMP. Treated water can also be diverted to UIC well KAFB-106IN2 from the main effluent conveyance line via piping to the well. During the summer months, the treated water is predominantly used to irrigate the golf course. During the winter months, when the demand for irrigation water is reduced, the excess treated water is injected into the aquifer through KAFB-7 and KAFB-106IN2 in accordance with an UIC Discharge Permit (DP)-1839 (Appendix A-3; [NMED, 2017]). A schematic of the injection equipment for UIC wells KAFB-7 and KAFB-106IN2 is provided in Appendix L.

Additionally, treated effluent water can be discharged to the NPDES outfall in accordance with the NPDES Permit Number (No.) NM0031216 (Appendix A-3) (U.S. Environmental Protection Agency [EPA, 2019]). The NPDES outfall is considered a non-continuous DP and will ONLY BE USED in instances where other discharge locations (GCMP, KAFB-7, and KAFB-106IN2) are not available for use.

1.3 Discharge Requirements

The GWTS supports a groundwater treatment IM that is being implemented pursuant to the Resource Conservation and Recovery Act (RCRA) corrective action provisions in Part 6 of Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit (Permit No. NM9570024423 [RCRA Permit]). Applicable state permits pertaining to GWTS effluent discharge are provided in Appendix A-3. Treated groundwater is either injected into the aquifer in accordance with DP-1839 or discharged to the GCMP in accordance with the April 4, 2016 letter from the NMED Hazardous Waste Bureau (NMED, 2016) (Table 1-1). All requirements from the associated applicable permits are strictly adhered to, such as discharge time limits or flow rates to any specific location. Table 1-2 provides each relevant permit term and condition and where each of the applicable items is addressed in this O&M Plan.

The GWTS has been designed to treat groundwater to meet the New Mexico Water Quality Control Commission water quality standards (20.6.2.3103 and 20.6.2.4103 New Mexico Administrative Code) and the drinking water maximum contaminant levels adopted by EPA under the Federal Safe Drinking Water Act (42 U.S. Code §§ 300f to 300j-26). GWTS effluent must comply with applicable permit or regulatory requirements including DP-1839 and NPDES Permit No. NM00131216. As stated in DP-1839, "The NMED's Hazardous Waste Bureau (HWB) and Groundwater Quality Bureau (GWQB) both provide regulatory oversight at the BFF project site. The HWB regulates the evaluation and remediation of the KAFB BFF dissolved-phase plume and the associated groundwater treatment system (GWTS). The GWQB regulates the procedures that ensure treated groundwater discharged from the GWTS to UIC well(s) meet Discharge Permit requirements." These discharge requirements, in accordance with DP-1839 Table 2, are presented in Table 1-3. Additional discharge criteria are specified when discharging to the NPDES outfall. However, the additional criteria (Table 1-3) is only required when discharge to the NPDES outfall is occurring (NPDES Permit No. NM0031216, Part I. Section A [1]).

The Sampling and Analysis Plan (Appendix I) contains the necessary reporting requirements, while the discharge limits, as stated in DP-1839 and the NPDES permit, are provided in Table 1-3. In the event that the GWTS effluent exceeds the discharge criteria listed in Table 1-3, the system will shut down until modifications can be implemented. The contingency plan (Appendix C of DP-1839) as well as any actions that can be taken to correct the problem and achieve the required effluent concentrations will be performed immediately. Notification to NMED will be provided within 24 hours of a system shutdown. Additional information regarding discharge criteria exceedance is provided in Appendix I, Section I.10.2. Operation of the GWTS will resume after appropriate modifications have been performed and the ability of the treatment system to meet discharge criteria will be verified by daily and then weekly sampling.

1.4 Health and Safety

The foremost priority in operating the GWTS is to ensure the health and safety of the GWTS control operators (Operators), visitors, and nearby residents. Activities follow health and safety guidelines of a U.S. Air Force or U.S. Army Corps of Engineers-approved safety plan or other approved safety document. Safety information pertinent to the GWTS O&M is provided in the Kirtland AFB Accident Prevention Plan (Kirtland AFB, 2020a). A hard copy of the Accident Prevention Plan is always kept within the GWTS. Emergency contact information placards are placed on all doors of the GWTS and WCH, and on a bulletin board installed within the GWTS. Copies of evacuation routes and mustering area are posted to the inside surface of all doors of the GWTS.

1.5 Organization and Responsibilities

The organization chart and roles and responsibilities for the operation of the GWTS are provided in Appendix B.

2. OPERATION OF THE GROUNDWATER TREATMENT SYSTEM

Descriptions of the GWTS equipment and facilities are provided in Appendix C. A flow diagram and piping and instrumentation diagrams for the GWTS are provided in Appendix D. The GWTS is highly automated. The GWTS control system is programmed to automatically perform normal plant operations and to safely shut down the system under fault conditions. The programmable logic controller (PLC) notifies the Operators of fault conditions and shutdowns via email and text notifications. In addition, wireless cameras are placed throughout the GWTS that provide a general view of the plant. The cameras can be accessed via mobile application to view the plant at times when the operator is not present. A summary of main alarms is provided in Table 2-1.

This section is intended to provide only an overview of system operation. Appendix E provides a more detailed account of the function of all instruments and control elements in the system and the actions of all interlocks and shutdowns. Screen capture printouts of the SCADA screens are provided in Appendix F. The PLC and SCADA are installed in the treatment plant's main control panel (CP-100).

2.1 Groundwater Treatment System Operational Approach

The GWTS consists of four groundwater extraction wells and two identical treatment trains. Groundwater pumped from the extraction wells is collected into the GWTS influent tanks (TK-110 and TK-210); note that extraction wells can be routed to either treatment train during operation using system influent manifold valves. The GWTS influent pumps (P-112 A/B and P-212 A/B) transfer the water from the influent tank through the pre-treatment sand filters (SF-101 and SF-102), bag filters (F-112 A/B and F-212 A/B), GAC beds (V-114 A/B and V-214 A/B), and into the treated water tanks (TK-116 and TK-216). The treated effluent pumps (P-118 and P-218) transfer the water through the post-treatment bag filters (F-118 A/B and F-218 A/B) and the effluent conveyance line to either the GCMP, KAFB-7, KAFB-106IN2, or a future UIC well.

As the aquifer responds to extraction well operation, adjustments to the extraction well operation are made to ensure plume containment and collapse. Plume containment and collapse are evaluated in the Kirtland AFB BFF Quarterly Reports and recommendations for changes in extraction well operation are provided therein to comply with DP-1839 (Table 1-2; Condition No. 22[e]). Both NMED agencies will be notified of any planned long-term adjustments that would result in a change in influent concentration, volume to be discharged, or location of discharge. Per DP-1839 Condition No. 34, NMED approval will be obtained prior to implementation. Temporary adjustments associated with an emergency, GWTS O&M, or system testing may occur, and NMED is notified of these changes during the following Quarterly Report in accordance with DP-1839 Condition Nos. 22 and 35.

The control mode for the feed rate to the GAC vessels depends on the amount of groundwater produced by the extraction wells. The minimum recommended groundwater flow rate into the carbon vessels is 120 gpm, which provides uniform flow distribution through the carbon bed. The feed rate to the carbon beds is controlled by a preset influent flow rate set by the Operator. The combined flow rate through the influent skids of both treatment trains is set to exceed the incoming flow rate produced by the extraction wells to ensure that the extraction wells remain online constantly during operation. The PLC controls the level in the tanks by cycling the pumps immediately downstream of the tank off or on when a preset tank level is reached.

If only one extraction well is online, groundwater flow to the GWTS may be below 120 gpm. In this case, one treatment train can be placed in operation at an operator specified flow rate and the PLC cycles the influent pumps on and off to maintain adequate flow through the carbon bed. The effluent flow rate is set

by the Operator to exceed the influent pumping rate to ensure that the effluent tank does not overfill. The effluent train discharge pressure is controlled by an electronically actuated valve that provides backpressure on the effluent pumps to limit cavitation.

2.2 Groundwater Well Pumps and Flow Control

Under normal conditions, well pumps are typically started by activating either train control switch with the well pumps placed in sequence mode on the SCADA. Well pumps cannot start and, if running, shut down under the following conditions:

- Switched on the SCADA to the Off position
- Low water level in the well
- Low current draw by the pump (for P-101 only, indicating run-dry condition)
- Leak detection in any vault or conveyance line associated with that well
- High-high water level in the GWTS influent tank or clarifier
- High-high water level in either GWTS building sumps
- Loss of power at the GWTS or wellhead
- Leak detection in the WCH (for KAFB-106233 and KAFB-106234).

Manual on/off switches for the well pumps are available in the SCADA and in the electrical shed at well KAFB-106228, the control panel at KAFB-106239, and at the WCH for KAFB-106233 and KAFB-106234. These local switches may be used for maintenance and troubleshooting pump problems but shall not be used during unmanned operation as they override PLC interlocks. Each extraction well has a maximum flow rate that can be extracted from the well, as permitted by the New Mexico Office of the State Engineer (Table 2-2). Extraction wells are equipped with totalizing, magnetic flowmeters and have been constructed to maximize water conservation to the maximum extent practical. Extraction wells cannot be operated in the event that a malfunction is detected with the totalizing flowmeter until the flowmeter is repaired or replaced.

2.3 Influent Tank, Pumps, and Pretreatment Sand Filters

The GWTS influent pumps, level in the GWTS influent tanks, and differential pressure across the pre-treatment bag filters are controlled and monitored by the PLC. The only Operator actions required during normal operations are to set the influent pump flow rates for the influent pump skids, put the control of the influent pumps into sequence using the SCADA, and change bag filters when the differential pressure across the pretreatment bag filters exceeds the differential pressure threshold (4 pounds per square inch [psi]). Pump sequence number determines which pump (A or B) is active during times when only a single influent pump is required to provide the preset system flow rate (<200 gpm per train). If the pump first in the sequence fails, the pump second in the sequence activates and continues processing water. In the event that one influent pump cannot satisfy the preset system flow rate (>200 gpm per train), the second pump is placed into the same sequence number as the operating pump; this activates the second pump and balances the flow load between the two pumps. Manual on/off switches for the GWTS influent pumps are provided in the SCADA and on the variable frequency drive (VFD) panels to the pumps to aid with maintenance and troubleshooting but cannot be used during unmanned operation as they override PLC interlocks. The GWTS influent pumps are interlocked to shut down under the following conditions:

- Switched to the Off position on the SCADA
- Switched both pumps on the SCADA to the zero sequence
- High-high water level in treated water storage tank or clarifier
- High-high water level in GWTS building sumps

- Low-low water level in GWTS influent tank
- High pump-outlet pressure
- High inlet pressure to the GAC vessels.

Pre-treatment sand filters are installed on each train between the influent pumps and the pre-treatment bag filters. In standard operation, the sand filters remove excess dissolved iron and manganese as well as capture any suspended solids, including biological material, entering the system. The sand filters can be bypassed by the isolation of butterfly valves at the inlets and outlets of the sand filters and by opening the butterfly valve at the bypass line. The sand filters remove excess dissolved metals by advanced oxidation processes that occur on the surface of catalytic media that causes the precipitation of metal oxides. The sand filters are equipped with a specialized sand (IMA-65 [American equivalent to DMI-65]) that, with the addition of sodium hypochlorite, oxidizes influent iron and manganese concentrations. The sand/sodium hypochlorite reaction causes the iron and manganese concentrations to precipitate out and become sequestered in the sand filter. The precipitates are then backwashed into the clarifier where they settle out. No additional water treatment system is combined with the sand filters. Further description of these advanced oxidation processes is provided in Appendix I.

Backwashing is manually activated by the Operator or occurs when differential pressure across a sand filter unit exceeds 10 psi from the clean operating differential pressure. Once activated, the sand filter controller actuates the appropriate valves to backwash the system for 4 minutes per sand filter vessel (two vessels per train). The system issues an alarm through the SCADA that backwash is occurring, and backwash water is transferred and stored in a clarifier located on top of the truck sump outside of the GWTS. The clarifier is equipped with a high-water level switch that alerts Operators that the clarifier is nearing capacity and results in a system-wide shut down. Water is automatically drained from the clarifier to the internal sump through a drain line that runs through the southern wall of the GWTS building to the western edge of the internal sump. A bag filter is installed at the outfall of the drain line to capture any remaining biofouling or sediments. If necessary, water can be manually transferred from the clarifier to the internal sump by the Operator. Hoses for manually transferring water from the clarifier to the GWTS sump are stored in the GWTS building.

Dosing pumps are installed upstream of the influent tanks, on the influent pipe tree, and dose the influent water with sodium hypochlorite, an oxidant and disinfectant solution. The dosing pumps can be manually calibrated by the Operator to yield an influent concentration of free chlorine between 0.1 and 0.3 milligrams per liter (mg/L) or utilize a 4- to 20-milliamp signal from free chlorine analyzers installed immediately downstream of the influent equalization tanks to reach the same range. The dosage is calibrated by adjusting the injection rate of the dosing pumps and monitoring the free chlorine concentration read by the chlorine analyzers, readjusting until the free chlorine concentration is read at the correct range. Post-sand filter free chlorine concentration is monitored with a handheld analyzer as needed. The sodium hypochlorite maintains the function of the sand filters and disinfects the sand filter media and water, which minimizes the need to skim or backwash the GAC vessels due to the formation of biofouling. The dosing pumps are controlled by the primary system PLC and are only in operation during times that the extraction wells are in operation; this means the dosing pumps respond to shutdowns incurred by the fault conditions that halt the extraction wells. The dosing pumps are designed to deliver between 9 milliliters and 9 liters of sodium hypochlorite solution per hour and can be adjusted manually depending upon extraction well operation or utilizing a 4- to 20-milliamp signal from the free chlorine analyzers. The dosing pump reservoir is designed to hold 90 gallons of solution. The reservoir's solution level is checked by a level-switch within the tank and is maintained by the self-contained PLC within the sodium hypochlorite generator.

The sodium hypochlorite generator supplies the dosing pumps with a stock solution of sodium hypochlorite solution. The sodium hypochlorite generator is comprised of a brine tank, water softener,

electrode panel, and oxidant tank. The brine tank holds food grade salt and water supplied from the softened Base water supply. The brine is then pumped into the electrode panel where it is converted into dilute sodium hypochlorite solution. That solution is then stored in the oxidant tank until it is fed into the dosing pump tanks. A vent has been installed on the oxidant tank to relieve excess pressure and gas byproducts produced during sodium hypochlorite generation.

Free chlorine levels in the influent water are monitored by chlorine analyzers installed downstream of the influent tanks. The dosing pumps are manually adjusted by the Operator to maintain a free chlorine concentration between 0.1 and 0.3 mg/L. Field chlorine testing is performed using the reagent pillow pouch method. A testing container is filled to the specified line and a pouch of reagent is added to the container. The container is then mixed, allowed to sit for a specified amount of time, and then visibly compared to a color array to determine the free chlorine concentration. Field chlorine tests are performed upstream and downstream of the sand filters to ensure the accuracy of the chlorine analyzers and prevent excessive free chlorine transfer to the GAC vessels.

The pre-treatment bag filters on the GWTS influent pump skid remove any remaining suspended solids that may pass through the sand filter. Bag filters are equipped with differential pressure transmitters (both pre-treatment and post-treatment bag filters are equipped with 10-micron bag filters). If pressure drop across the filters increases to 4 psi, the filters need to be changed. If the differential pressure exceeds 4 psi, the system sends an alarm to the Operator indicating that the bag filters need to be changed (bag filters will be changed within 48 hours of receiving the alarm). If plugging occurs in the bag filters or a valve in the outlet piping is inadvertently shut, a deadhead situation could occur at the pump. To prevent a no-flow (deadhead) condition, a high-pressure switch is installed immediately downstream of the pump discharge. The switch shuts down the pump and alerts the Operator of the fault. High pressure set points are detailed in Appendix E.

2.4 Granular Activated Carbon Vessels

The only automatic control for each set of GAC vessels is a high-pressure switch on the inlet to the system. High inlet pressure to the GAC vessels causes a shutdown of the associated GWTS influent pumps. In order to prevent air from building up in the inlet piping and to prevent siphoning of water from the GAC vessels, there are air/vacuum relief valves on the inlet and outlet piping into the vessel valve manifold. A pressure relief valve and manual air vent valve are installed on the top of each GAC vessel. During initial startup and once each week, the Operator partially opens the manual vent valve to remove any air that may have accumulated in the GAC vessel (Train 2 only). In order to monitor pressure drop across the two GAC beds, each GAC vessel is fitted with a local pressure gauge on its outlet nozzle and on the inlet branch of the valve manifold. At a feed rate of 400 gpm, the pressure drop through each GAC bed should be less than 2 pounds per square inch gauge (psig), and the total system pressure drop should be less than 5 psig. The GAC beds are inspected to determine if skimming or backwashing is required when the pressure drop increases to 10 psig above ambient operating differential pressure.

Each of the GAC vessels is sized to provide 12 minutes of empty bed contact time at 400 gpm. With this extended contact time, the lead GAC bed can lower an EDB concentration in 400 gpm of groundwater from 2 micrograms per liter (µg/L) (the concentration used for the GAC design) to below the discharge limit. The lag GAC vessel provides a backup in the event of breakthrough of the lead vessel. When any regulated constituent is detected leaving the lead GAC vessel at a concentration of 90 percent of the effluent limit, that GAC vessel undergoes GAC change-out and the lag GAC vessel is placed into the lead position. However, a GAC change-out may be performed at lower effluent concentrations if deemed appropriate for efficient system operation. Valve alignment figures for the GAC beds are provided in Appendix D. These figures show valve alignment for operation of the GAC beds in lead-lag, backwash, and GAC change-out configurations. If water leaving the lead GAC vessel contains a regulated

concentration of *less* than 90 percent of the effluent limit, then a special sampling procedure will be followed month to month to keep track of where vertically in the lag GAC vessel the breakthrough is reaching. This sampling procedure can be found in Appendix I.

The GWTS GAC vessels were designed to treat low level contamination within the IMOA. Concentrations of benzene, toluene, ethylbenzene, and total xylenes have not been detected within the IMOA since the fourth quarter of 2016, while the EDB plume has been decreasing since the second quarter of 2016 as shown in Figure 2-1. Current system influent concentrations are below the original design criteria, indicating that the original design criteria are still valid under current operational conditions (Table 2-3). In the event that an increase in influent concentrations is observed or an additional extraction well is added in an area containing higher concentrations, the GAC design criteria will be adjusted, and new GAC bed life will be determined.

2.5 Treated Water Tank and Pump

The effluent pumps and level in the treated water tanks are controlled and monitored by the PLC. The only Operator actions required during normal operations are to set the effluent pumps to their appropriate flow rate, put the controls of the effluent pumps into sequence using the SCADA, and change bag filters when the differential pressure across the post-treatment bag filters exceeds the differential pressure threshold (4 psi). Manual on/off switches for the treated water pumps in the SCADA and on the motor starter panel are provided for maintenance and troubleshooting but cannot be used during unmanned operation as they override PLC interlocks. The treated effluent pumps are interlocked to shut down under the following conditions:

- Switched to the Off position on the SCADA
- High-high level in the GCMP or the injection well
- High-high level in GWTS building sumps or clarifier
- Low-low level in treated water storage tank
- High pump-outlet pressure
- High pressure at the injection well or in the discharge line.

The post-treatment bag filters on the treated effluent pump skids do not have automatic controls but are equipped with local differential pressure gauges. If pressure drop across the filters increases to 4 psi (differential pressure), the filters will be changed within 48 hours.

On the treated effluent line, between the post-treatment bag filters and the underground effluent pipeline leaving the building, there are two actuated valves that are used to deliver water to the truck bay to wet newly delivered GAC as part of the GAC change-out process and to provide backpressure on the effluent pumps. The valves are controlled by the PLC and can operated by utilizing an access code and keypad located on the exterior of the building in the truck bay. A timer on this switch returns the valves to their normal position after 30 minutes of being activated. The valves can also be set to their normal position by inputting the access code prior to the 30-minute cutoff. The main line valve's normal position is variable and is adjusted by the PLC in response to the pressure reading from the pressure transmitter located just upstream of the valve. The PLC is currently set to maintain 20 psi of back pressure on the effluent pumps to mitigate cavitation at the pump impellers.

2.6 Operation and Maintenance of Discharge Locations

Currently, the GCMP, KAFB-7, KAFB-106IN2, and the NPDES outfall are the only approved discharge locations for treated effluent. Other UIC wells may be added to supplement discharge options in the

future. As future UIC well(s) are brought on-line, all O&M forms, tables, monitoring, and reporting requirements associated with UIC wells will be updated. The GCMP consists of a lined pond that stores water for irrigation of the golf course. The liner extends up the sides of the pond and the water level in the pond cannot exceed the high-level set point of 4.5 feet (ft) with respect to the GCMP pump house transducer. The 4.5-ft-level set point provides an adequate safety factor to ensure that the pond is not overfilled. The pond also has a stadia rod in place near the intake of the GCMP pump house and the stadia rod level of 3.5 ft corresponds to a transducer reading of 4.5 ft. Currently, if the pond level exceeds 4.5 ft with respect to the transducer while the GCMP is selected as the discharge location, the system sends an alarm email and shuts down the effluent pumps at the GWTS. If this condition occurs, the effluent flow is redirected to KAFB-7, KAFB-106IN2, or a future UIC. Redirection of flow is performed by shutting down the GWTS and selecting a new discharge location on the SCADA. The automated changeover valves will adjust to direct water to the selected location.

Maintenance of the five golf course ponds includes performing semiannual inspections (spring and fall). Any new vegetative growth around the ponds (5 ft from edge of pond) and any new growth within the ponds will be removed using large rakes or a floating cutter for cattails. Evaluation for the need of a chipper for new growth removal will be made. If, during these inspections, evidence of leaks in the liner is observed, or if alerted to such evidence by golf course personnel, minor repairs will be implemented to restore liner integrity.

KAFB-7 and KAFB-106IN2 are permitted UIC wells that are equipped with dedicated flowmeters and water level transducers to ensure that the wells will not be overfilled (Table 1-2; DP-1839 Condition No. 14). The flowmeters are inspected and calibrated as scheduled per the manufacturer's recommendations. In addition, each UIC well is also equipped with wellhead control valves, pressure transmitters, and a wellhead control panel that communicates with the GWTS PLC via radio transmission. After the KAFB-7 downhole control valve (V-smart valve) was determined to be malfunctioning due to a hydraulic line failure, the control valve and all components associated with the valve were removed and replaced with an above ground wellhead flow control valve. The replacement wellhead flow control valve and control equipment were installed by APTIM in 2020 (Kirtland AFB, 2020b). A well head diagram detailing wellhead equipment is provided in Appendix D.

KAFB-106IN2 is equipped with a Baski, Inc. (Baski) downhole flow control valve (Baski FCV). The Baski FCV uses an inflatable rubber element, in association with compressed nitrogen, to control flow into the well. This flow control method reduces air intake into the injection well, thus decreasing the need for injection well rehabilitation. The Baski FCV is equipped with a control panel that communicates with the GWTS PLC to adjust the wellhead flowrate to match the current GWTS effluent flowrate. In addition, the control panel monitors the nitrogen supply and will notify the operator when the nitrogen level is getting low. The O&M manual for the Baski FCV is provided in Appendix H.

The PLC monitors the water level, effluent line pressure at the control valve in KAFB-7 or KAFB-106IN2, and effluent line pressure just downstream of the control valve at the GWTS. The system is set to alarm if the water level rises above a certain threshold (380 ft below ground surface for KAFB-7 and not yet determined for KAFB-106IN2) or if the pressure downstream of the GWTS control valve exceeds 45 psi. Any of these conditions cause a shutdown of the GWTS effluent pumps and send an alarm to Operators indicating that the UIC well has experienced a fault condition. Operators then divert flow to the GCMP, if there is adequate capacity, and inspect UIC wells for malfunctions. Discharge to UIC wells is not to exceed 1,440,000 gallons per day (1,000 gpm continuous flow) and records are maintained of all volumes injected into this well for reporting to the New Mexico Office of the State Engineer (Table 1-2; DP-1839 Condition No. 9).

Treated effluent water can be discharged to the NPDES outfall in accordance with the NPDES Permit No. NM0031216 (EPA, 2019). The NPDES outfall is considered a non-continuous discharge permit and will ONLY BE USED in instances where primary discharge locations (GCMP, KAFB-7, and KAFB-106IN2) are not available for use. O&M requirements for the NPDES outfall consist of proper operation and maintenance of the existing treatment system equipment, instrumentation to minimize infrastructure failures at the primary discharge locations. This O&M will be performed to prevent and/or minimize the number of discharge events to Tijeras Arroyo as specified in NPDES Permit Part II A. Discharge to the NPDES outfall is performed by manually opening the outfall gate valve and setting the SCADA programing to discharge water to the GCMP. Elevation head will force the water to discharge through the NPDES outfall.

2.7 Groundwater Treatment System Building Containment Sumps

A sump is installed in the GWTS building floor slab as part of the building's secondary containment system. This sump collects any spilled, leaked, or washdown water produced within the GWTS building, and any water that contains fines or particulates is first filtered through a 10-micron bag filter. The sump water is then pumped by a submersible centrifugal sump pump (P-111) into the Train 1 GWTS influent tank (TK-110) ensuring all water collected undergoes treatment. This pump is controlled by a float switch. The float switch can be overridden to pump water out of the sump if entry to the sump is required. A high-high level switch shuts down the GWTS if the water level in the sump becomes too high. A truck sump is located outside of the building in the truck bay; this sump is also equipped with a high-high level switch that shuts down the GWTS if the water level in this sump becomes too high. In order to pump water out of the truck sump, the grating of the sump must be removed to allow temporary installation of a sump pump into the sump. The water pumped by the temporary sump pump is then discharged to the GWTS building sump.

2.8 Startup Sequence

Prior to startup, ensure that all set points are set to appropriate values. Table 2-4 provides a list of standard operational set points. Prerequisites for normal startup of the GWTS include the following:

- Perform the valve lineup for normal operation as shown on the piping and instrumentation diagrams for the GWTS (Appendix D).
- Confirm that no maintenance activities are occurring at the extraction wells, the golf course, or UIC wells.
- Confirm there is communication (telemetry) between the WCH, GCMP, UIC wells, and the GWTS.
- Place local disconnects for pumps in the closed position.
- Place local switches for the well pumps, GWTS influent pumps, and treated water pump in the SEQ or AUTO position.
- Confirm that manual valves on the UIC well pipelines and SCADA distribution switch are set to send the treated water to the desired destination (GCMP or a UIC well).

The SCADA has color codes for quick reference to let the Operator know the status of system equipment.

The color codes are as follows:

- Blue = Standby and ready.
- Green = In operation using automated sequence.
- Yellow = Uncommanded and running, manual control assumed.
- Red = Fault or alarm condition exists.

At the SCADA, perform the following checks and setup steps:

- Verify there are no pumps or treatment trains in alarm on the Overview screen (any item in red may require to be reset) and on the train control screen.

- Verify that all required pumps and wells are indicating that they are in REMOTE AUTO mode on the SCADA screen.

- Verify on the alarm page that there are no active alarms (active alarms are highlighted in red). Clear or acknowledge any alarms or correct any false alarm conditions.

- Verify that all of the proportional-integral-derivative blocks for the active Wells/Pump Skids are in AUTO (this can be verified by viewing the proportional-integral-derivative block is green).

- Verify on the train control screen that the pumps for the system are in SEQ mode and that they have a sequence number (O = Off, 1 = Lead, 2 = Lag).

- Verify where the water is to be discharged to on the distribution screen. When the golf course or a UIC well is selected, a pop up appears reminding the Operator to verify that the correct valves are opened in the field.

- Verify all tank level transmitters are operational and that the water levels are acceptable to run the system. If the tank levels are not at acceptable levels to be in automated control, run the pumps manually to adjust water within the system to allow for automated control.

- Verify that all of the tank level float (LSH/LSL) devices are green on the overview and tank screens. If any of these devices are red, correct the alarm condition before proceeding.

- Set flow rates for the groundwater extraction wells to the values specified by the GWTS Project Manager. This may require that the system be in operation and for staff to be at the wellhead for wells that require manual valve closing to control flow rate. The flow rate from extraction wells equipped with VFDs can be manipulated using the SCADA.

To initiate system start, complete the following steps:

- On the train control screen, set each treatment train's influent flow set point to a flow rate exceeding 360 gpm but less than 400 gpm. Running the influent pumps above 360 gpm ensures that enough flow is supplied to maintain the minimum 120 gpm of flow to the GAC vessels as well as 239 gpm in the event that the sand filters require backwashing. This O&M Plan recommends exceeding the extraction flow rate entering the train's influent tank by at least 5 gpm to ensure that the system properly compensates for slight variations in flowmeter readings. Then set the effluent flow set point(s) to at least 5 gpm greater than the influent skid flow rates for the same reason as the previously mentioned offset. This O&M Plan also recommends that the

influent tanks remain isolated during normal operations to minimize the risk of preferential draining of either influent tank.

- Select the "ON" button for the trains intended for operation. The system starts the extraction wells in the sequence previously selected. After the system has verified that the extraction wells are operating, the influent train and effluent train skid pumps start up and run at the set point selected in previous setup (tanks first have to reach their high set point before starting).

- At any time during water processing, a train can be turned on or off and taken out of the AUTO sequence. It is the responsibility of the Operator to change the required flow set point on the trains to offset the incoming flow.

- Confirm proper operation of all equipment.

2.9 Normal Shut Down Procedure

When it is necessary to shut the entire system down, perform the following:

- On the train control screen, select the off button for both trains. If the extraction well pumps are expected to be shut down for more than 24 hours, put the manual switches in the WCH, the electrical rack at KAFB-106239, and the electrical shed at KAFB-106228 into the Off position. Open the electrical disconnects at those locations and lock them open.

- Confirm that the PLC shuts down the GWTS influent pump and treated effluent pump.

- If the system is going to be down for more than 24 hours, put the local switches on the motor starter panel for the GWTS influent pumps and the treated water pump into the Off position. Additionally, notify Kirtland AFB and NMED point(s) of contact.

- Manual valves on the process piping, tanks, and GAC vessels can be closed by turning the valve handle until the valve indicator signals that the valve is closed. However, the manual valves do not need to be closed during shut down unless a repair is being made on the process piping, tanks, and GAC vessels. The system is equipped with multiple check valves that prevent the backflow of water as well as multiple vacuum break points that would prevent drainage into or from the holding tanks during standard shut downs.

2.10 Emergency Shutdown Procedure

In case of fire, leak, or other emergency condition, any person can activate one of the local emergency shutdown buttons (one located inside the building on the east wall between the eastern entry and overhead door, and one located on the exterior of the building next to the keypad west of the southwestern-most entry), or on the train control screen select the off button for both trains, and notify the GWTS Project Manager, who notifies the appropriate Kirtland AFB contacts and regulatory agencies as described in the GWTS-specific Contingency Plan (found within the GWTS), immediately.

In the event of a spill, leak, or unplanned release to the environment associated with the treated effluent from the GWTS or the treated effluent conveyance system, Kirtland AFB will follow the release reporting requirements in 20.6.2.1203(A) New Mexico Administrative Code. These requirements are fundamentally equivalent to the Twenty-Four Hour and Subsequent Reporting requirements in Part 1.27 of the RCRA Permit. The NMED Hazardous Waste Bureau will be copied on all notifications and any subsequent reports.

If a power outage occurs, the system shuts down. The Operator is notified of the shutdown condition. Upon power returning, the system automatically restarts in standby and ready mode. Once in this mode, the system can be restarted as described in Section 2.7. Further information regarding the control of the system is detailed in Appendix E.

2.11 System Utilities

Only extraction well KAFB-106228 operates using off-Base power. It is the GWTS operating Contractor's (Contractor) responsibility to set up or take ownership of the Public Service Company of New Mexico account associated with powering extraction well KAFB-106228. Extraction wells KAFB-106233, KAFB-106234, and KAFB-106239; WCH; GWTS; UIC wells; and GCMP are all powered using on-Base utilities.

All PLCs, SCADA, and control panel power receptacles (telemetry and modem) are equipped with uninterruptable power supplies (UPS) that keep the attached items online for a short period following a loss of power at the GWTS. This ensures that all equipment responds properly in the event of a loss of power anywhere in the system. The status lights of the battery backup for the main control panel is inspected daily to ensure proper operation in the event of a power loss. In addition, the battery backup for each UPS is tested monthly. Testing is performed by temporarily shutting each system with a UPS off to see if the UPS maintains power to the system. These batteries should be replaced when the service light indicates when the battery is no longer operational, or every 2-3 years.

The GWTS is supplied with potable water from the on-Base community water system. This potable water is supplied at a pressure of 100 psi and can be used for various O&M activities.

Remote communications to the GWTS are transmitted using a cellular modem. It is the Contractor's responsibility to set up or take ownership of the cellular data account associated with the GWTS. Currently, the GWTS utilizes a 5-gigabyte per month cellular data plan provided by AT&T, Inc. Additionally, the Contractor needs to support alarm email distribution from the GWTS PLC. Email distribution may require the use of a third-party email hosting service if hosting cannot be supplied by the Contractor's own email hosting service.

To ensure that off-Base conveyance lines are secure, the conveyance lines are registered under Kirtland AFB as a line-owner with New Mexico 811. Kirtland AFB is responsible for off- and on-Base line locates. Off-Base line locates may be the Contractor's responsibility depending on the terms of the contract. On-Base conveyance lines are secured as Kirtland AFB issues permits after performing line locates on-Base for all excavation projects. Additionally, the influent lines are marked with monuments at a maximum of 400-ft intervals. In the event of a conveyance line breach, the Contractor is required to perform emergency response to minimize the release of any contaminated water. This O&M Plan recommends that the Contractor have a subcontractor or an internal department ready to perform emergency response in the event of a conveyance line breach. Off-Base owners of property containing an influent line are notified in accordance with executed access agreements and summarized in the Contingency Plan (found within the GWTS) Section 6 in the event of a breach.

3. INSPECTION AND PREVENTATIVE MAINTENANCE

This section presents instructions for routine inspection and normal equipment servicing and lubrication. The purpose of preventative maintenance is to ensure steady operation and to extend the life of equipment. The following text summarizes inspection and preventative maintenance frequencies and actions. Pertinent vendor or manufacturer information and manuals are provided in Appendix H. Appendix B provides an organization chart and roles and responsibilities for system operation.

In the event that an Operator-initiated system shutdown is needed for routine maintenance, non-routine maintenance, or any other nonemergency reason, the GWTS Project Manager must be contacted, and they will notify the designated Kirtland AFB points of contact. The NMED point(s) of contact is notified for any shutdowns of longer than 24 hours by U.S. Air Force personnel.

For all maintenance activities, the Operator always reviews the appropriate U.S. Air Force, U.S. Army Corps of Engineers, or other approved health and safety documents that are available onsite, and follows the requirements for additional personal protective equipment, equipment lock-out/tag-out, confined space entry, fall protection equipment, etc. Additional safety documentation for maintenance operations can be developed on an as-needed basis and be on file in the GWTS building. These requirements are always considered prior to initiating the task. The Operators perform maintenance tasks that do not require factory-authorized service on a routine basis. If factory-authorized service is required, it is pre-scheduled to ensure minimal disruption of the plant operating schedule. Records of all maintenance events will be documented in the quarterly report as specified in DP-1839 Condition No. 22. Records will be provided within the sections: GWTS Operation and Performance, GWTS Maintenance and Expansion Activities, and Non-Routine Maintenance Activities.

3.1 Scheduled Inspection and Routine Maintenance Activities

Table 3-1 provides a comprehensive list of routine maintenance activities. Inspection and preventative maintenance forms are provided in Appendix G. In general, the overall system does not have extensive preventative maintenance requirements. Most equipment requires inspection with periodic cleaning and repair as needed. The only recurring routine preventative maintenance operations are to change the oil in the influent and effluent pumps, grease pump bearings, and change the air filter on the air conditioner for the control room every 3 months. Requirements for calibration and inspection of flowmeters that measure groundwater feed and discharge flow rates are covered later in this section and inspection forms are provided in Appendix G.

3.2 Influent and Effluent Pump Monitors

All influent and effluent pumps in the GWTS are equipped with i-ALERT® Condition Monitors. These devices record pump operational metrics (i.e., vibration, temperature, and run-time) and can provide early detection of pump failures and metric trending. Treatment Train 2 and the effluent pump for Train 1 are equipped with i-ALERT® devices that can be connected to using a Bluetooth-enabled device with the i-ALERT® application. The Train 1 influent pumps are outfitted with i-ALERT® devices currently incapable of Bluetooth communication and only utilize light indictors to alert Operators to possible pump concerns. All i-ALERT® light indicators are inspected weekly.

3.3 Bag Filter Change-Out

Bag filters require replacement when the differential pressure across the bag filters exceeds the differential pressure threshold (4 psi). Replacement will be performed within 48 hours of the 4-psi threshold exceedance. Two bag filter housings are located on each skid with six 10-micron bag filters in each housing; this allows for continuous operation of the plant during bag filter change-out. Once the Operator has deemed that a change-out is required, the system remains on and the Operator isolates the filter housing needing change-out. The filters are replaced and the offline filter housing is reinstated into the treatment train. In the event that both bag filter housings on one skid require change-out, flow can be diverted to the other train (if less than 400 gpm) in order to avoid a system shutdown. If the flow is greater than 400 gpm on a single train, the entire system is shut down to avoid unnecessary strain on the system.

To change the filters, all flow is directed to the filter vessel not requiring maintenance (close valves leading to the vessel requiring change-out). The air vent and drain valves are opened to drain water from the top half of the filter housing. After the head bolts are loosened and disengaged, the davit jack is used to raise the filter lid and swing it out of the way. The filter bags can then be replaced. The O-ring on the top of the filter vessel is then inspected to see if it requires replacement and is aligned properly. The lid is then swung back into place and the head bolts are tightened. Head bolts on opposite sides of the lid will be alternately tightened. Do not overtighten the bolts and inspect the filter for leaks upon restart. The flow is then reinstated to the filter vessel with new bags and the procedure can be repeated for the second filter vessel if necessary. After replacement, the old filter bags are disposed of as described in Section 6 and characterization information is provided in Appendix J.

3.4 Basket Strainer and Y-Strainer Cleaning

Eaton Duplex Model 50 Basket Strainers are present between the influent tanks and their respective pump skids. The strainers require cleaning and maintenance on an as needed basis. If the influent tanks are not effectively equalizing, the most likely culprit is that one or both basket strainers between the two tanks has become clogged with fine sediment pumped from the extraction wells. Another indication that the basket strainer may need to be cleaned is when cavitation is heard at the pump impeller housing. The basket strainers can be cleaned while in operation and do not require a system or train shutdown. In order to clean the strainer, rotate the plug lift handle counter-clockwise to release the diverter plug, switch the diverter handle from one side to the other to divert water into the clean basket, and rotate the plug lift handle clockwise to set the diverter in place. Loosen the yoke screw of the clogged basket's housing until the cover can be lifted. The basket can then be removed, brushed, and rinsed to remove any collected debris. Once cleaned, the screen is reinserted, cover replaced, and yoke screw retightened. Documentation for the Eaton Duplex Model 50 Basket Strainers is provided in Appendix H.

Y-strainers are present between the effluent tanks and their respective pump skids. The strainers require cleaning and maintenance on an as needed basis. The Y-strainer may need to be cleaned when cavitation is heard at the pump impeller housing. In order to clean the strainer, lock-out the appropriate pump skid so that the pumps cannot be remotely started while the butterfly valves are closed. The line is then isolated by closing all incoming butterfly valves and then drained, and the Y-strainer blind flange is removed. The Y-strainer screen can then be removed, brushed, and rinsed to remove any collected debris. Once cleaned, the screen is reinserted, blind flange replaced, drain valves closed, butterfly valves reopened, and pump skid reinstated into operation.

This O&M Plan suggests that the influent basket strainers are inspected and cleaned weekly and the effluent Y-strainers are inspected and cleaned biannually.

3.5 Discharge Changeover

The treated effluent can be discharged to either the GCMP, UIC wells KAFB-7 and KAFB-106IN2, or the NPDES outfall. The entire system must be shut down (Section 2.9) prior to performing a discharge changeover. Once the system is offline, the discharge location can be changed as indicated on the SCADA Distribution screen. Upon confirming the discharge location on the SCADA, the automated changeover valves will adjust to direct effluent water to the chosen location. The existing manual changeover valves remain in place on the effluent line and are locked in the open position. In the event that the automated valves fail, the discharge location can be controlled with the use of the manual valves. After a change in the discharge location is performed, both treatment train effluent totalizers and the shutdown time are recorded, and the system is reinstated into operation (Section 2.8). Upon changing the discharge location from a UIC well, the wellhead flow totalizer is also recorded.

3.6 Granular Activated Carbon Backwashing, Skimming, and Change-Out

Before initial startup and following each GAC change-out (prior to re-start), the GAC beds must be backwashed. In order to perform the backwashing process, refer to the manufacturer O&M Manuals located in Appendix H and valve alignment figures in Appendix D. Backwashing the TIGG GAC beds requires at least 700 gpm of clean water, which can be provided from the fire hydrant near the GWTS building. The fire hydrant is connected to the Kirtland AFB potable water system. Backwashing the Calgon GAC beds requires at least 150 gpm of clean water, which can be provided from the TIGG treatment train, if the TIGG treatment train is processing water. Note that backwashing either train requires a temporary 21,000-gallon tank be available directly to the south of the GWTS building to store any produced backwash water. The 21,000-gallon tank allows for the settling out of fines produced during the backwash process. Sand filters pretreat the water for dissolved iron and manganese and suspended solids, including biological solids, which should mitigate scaling, biofouling, and plugging of the GAC beds. In the unlikely event that scale and fouling cause the pressure differential across the GAC vessels to exceed 10 psi before a change-out is required, either backwashing or, if the pressure loss is associated with the upper most layer of the GAC within the vessel, skimming the upper few inches of GAC removes limited scaling and fouling.

If a pressure drop of 10 psi or greater is primarily associated with the lead GAC vessel, vacuum skimming the top several inches of the lead GAC bed is a viable remedy instead of backwashing. Before skimming operations commence, lift equipment (e.g., scaffolding, scissor lift) is set up to access the top of the tank needing skimming of the GAC surface. Skimming requires that the system be shut down (Section 2.9) and the lead GAC vessel be drained so that the water level is below the bed surface. The vessel is then opened and the top several inches of the GAC are visually inspected. A sample can be collected by affixing a clear bailer, with its bottom removed to a pole and pressing the open end of the bailer into the top several inches of the GAC. The sample is then removed to determine the depth of the fouling and extent of the skimming required. The top layer of the GAC is then vacuumed until only non-fouled GAC is visible from the vessel entrance. GAC skimmed from the lead GAC vessel must be containerized and removed as solid waste. Skimming is often much more cost effective than performing a full GAC change-out and produces minimal investigation-derived waste compared to backwashing.

If skimming does not alleviate the pressure drop through the GAC vessel, the GAC vessel will be backwashed in accordance with the manufacturer's recommendation (Appendix H). Note that backwashing either train requires a temporary 21,000-gallon tank be available directly to the south of the GWTS building to store any produced backwash water. The backwashing procedure is also discussed in Section 7.4.

GAC needs to be changed out once breakthrough by the contaminants (defined in Section 2.4) occurs in the lead GAC vessel. In order to perform the GAC change-out process, refer to the manufacturer O&M Manuals provided in Appendix H. A procedure for the GAC change-out for the GAC vessels can be found in Appendix H. In addition, the Operator performs a visual inspection of the vessel's interior when the vessel is empty to determine if there is any plugging or damage of the inlets, distribution manifold, or feed and drain lines. Clean water from the plant hose connections can be pushed into the vessel to aid with visual inspections of all internal components. Only preconditioned GAC media are used to refill the GAC vessels during a change-out as this eliminates the need to store and dispose of conditioning reagents. When scheduling for the 7-day/4-week sampling required after a GAC change-out (as described in Appendix H), allow 2 full days between when the GAC is changed out and the first day of daily sampling as the slurry will need to sit for 24 hours before the backwashing process.

3.7 Dosing Pump, Chlorine Analyzer, and Sodium Hypochlorite Generator Maintenance

The pre-treatment dosing pumps that supply sodium hypochlorite solution to the influent water are sourced from a reservoir that holds approximately 90 gallons of generated solution. The usage of solution is dependent upon influent flow rates as well as sodium hypochlorite concentration in the dosing solution. Dosing rates must be adjusted to result in a concentration of sodium hypochlorite concentration upstream of the sand filters of 0.1-0.3 mg/L free chlorine. The free chlorine concentrations upstream and downstream of the sand filters should be measured and recorded at least once a month to ensure that the dosing pumps are supplying adequate volumes of oxidant and the sand filters are catalyzing oxidant to precipitate dissolved metals.

The pipe conveying water from the influent tanks to the influent skids is equipped with two free chlorine analyzers. The analyzers require weekly inspection and monthly replenishment of reagents in order to function properly.

The pre-treatment dosing pumps are supplied with a constant stream of freshly produced sodium hypochlorite solution created by the sodium hypochlorite generator. The generator requires weekly inspection and addition of food grade salt to the brine tank to provide a constant stream of sodium hypochlorite solution into the oxidant reservoir.

The Operator should refer to the manufacturer's recommendations in order to perform any additional maintenance on any of the dosing pumps, chlorine analyzers, or sodium hypochlorite generator. In the event that the sodium hypochlorite generator is off-line for more than 2 weeks, liquid sodium hypochlorite (bleach) will be provided in a batch process to be used with the dosing pumps.

3.8 Sand Filter Maintenance

The pre-treatment sand filters require occasional backwashing and infrequent replacement of filter media. Backwashing is required when differential pressure across a sand filter unit exceeds 10 psi from the clean operating differential pressure. The Operator first adjusts the backwash throttling valve (red handled valve located above the sand filter vessels on the backwash line) to provide 239 gpm throughput in the backwash line during a backwash cycle. The throttling valve must be manually adjusted at each different flow condition; thus, this O&M Plan recommends that flow conditions do not be frequently modified by the Operator. Once the flow requirement is met, the system can be set to automatically initialize the sand filter into backwash mode once a certain differential pressure is reached across the sand filters. The PLC is programmed to lock in the influent pump VFD frequency when a backwash cycle (alarm) is received

from the sand filter control unit. The VFD maintains the locked frequency until one of following three conditions occurs:

- The backwash cycle is completed (the VFD frequency remains locked for approximately 30 seconds following completion of the cycle).
- The low-level set point in the influent tank is reached (deactivating the influent pumps).
- Any alarm condition resulting in influent pump shutdown is received.

This O&M Plan recommends that the automatic backwashing differential pressure be set to no more than 10 psi above the clean operating differential pressure as differential pressures exceeding 10 psi, above background, results in significantly higher flow rates through the first sand filter vessel backwashed during backwash of the second vessel. Additionally, these conditions can result in flow rates that exceed design flow rates of the GAC vessels. Backwashing each vessel takes approximately 4 minutes to perform (8 minutes per skid). Backwash can only be performed on one sand filter housing per skid at a time as the second filter vessel supplies pretreated water to perform the backwashing of the first unit. Backwash water is transferred to the backwash clarifier located above the external truck sump.

Each sand filter vessel is loaded with the manufacturer's recommended amount of crushed gravel, garnet, and IMA-65 (or DMI-65) media. In the event that the removal efficiency of the sand filter begins to diminish, then media change-out may be required. The media manufacturer recommends that media be changed out regardless of a loss in removal efficiency following between 5 and 10 years of operation due to media degradation by particle contact and mechanical abrasion. Emptying and reloading of sand filter vessels is performed by following the manufacturer's instructions provided in Appendix H.

3.9 Clarifier Maintenance

The sand filter clarifier is designed to hold 8,000 gallons of backwash water (approximately 8 backwash cycles) and is automatically drained in order to provide space for additional backwashing. A drain line runs from the clarifier's last chamber, through the southern wall of the GWTS building, and to the western section of the internal sump. Flow through the drain line can be adjusted with the inline ball valve. Inline filtration of the draining water is recommended to collect fines that may not have settled out; for this purpose, a bag filter can be tied to the outlet of the drain line and should be replaced every three to four backwash cycles, or as needed.

If manual removal of clarifier water is necessary, the Operator first ensures that the clarifier has been allowed adequate time to settle out any fines backwashed from the sand filters. Once settling has occurred, the Operator sets up appropriate pumps and hoses to transfer clarified water to the GWTS internal sump for re-treatment through the system. Inline filtration of the clarified water is recommended in the event that some backwash fines may not have settled out. The clarified water is then discharged and, following this discharge, the clarifier is returned to its normal operating state and all equipment used is stored in the GWTS building.

3.10 Effluent Line Integrity Testing

The effluent line running between the GWTS and a UIC well requires integrity testing in accordance with DP-1839 (Table 1-2; Condition No. 15). DP-1839 requires that effluent line testing be performed in year five of the approval before a renewal application is submitted (April 2022). Result of the effluent line integrity test will be provided in the appropriate quarterly report.

3.11 Well Pump Pulling

The extraction well pumps are designed for little to no maintenance when properly installed and monitored. Removal of the extraction well pumps for inspection or cleaning is only considered in the event of a catastrophic failure or decrease in pump performance such as a decrease in flow rate, or an unexplained increase in amperage draw. Pump performance is monitored by observing the well flowrates presented on the SCADA. Verification of these flowrates is performed by monthly manual readings collected from the well head. Pump amperage draw is also monitored when a decrease in flow rate is observed and verified.

Prior to pulling any pump, ensure that the appropriate permits (barricade, etc.) have been obtained. Access to the well is made through the vault doors or manhole directly above the well head. Disconnection of electrical and control wiring must be performed by a licensed electrician. After disconnection at the wellhead from piping/equipment in the vault, the well casing, gauge lines, and pump columns are disinfected with a solution of potable water and WEL-CHLOR (calcium hypochlorite) or equivalent. The formula to calculate the concentration of calcium hypochlorite can be found in Section 3.12.1. The solution is mixed at the surface and introduced through the top of the casing, gauge lines, and pump discharge piping. A field chlorine test kit (Hach DR 900 Handheld Colorimeter, or equivalent) is utilized to monitor free chlorine concentrations. All field meters are calibrated in accordance with manufacturer's recommended procedures.

Following disinfection, all existing downhole piping (approximately 520-ft of 3-inch galvanized steel drop pipe), the submersible pump, and all associated wiring are removed. The pump is inspected for damage and replaced with a new pump, if required. Both 1.25-inch sounding tubes (for transducer and manual water level) are also removed. All pipes are stacked on a pipe trailer prior to storage, in order of retrieval, for subsequent inspection for corrosion and/or damage. All damaged materials are replaced prior to redeployment. Trailers with well equipment are stored and covered at the appropriate yard until needed for reinstallation. All pipe and wiring removed can be reinstalled at the completion of any work being performed so care is taken during handling and storage. Photographs are taken of all corrosion or damage on pipe, pumps, or other downhole materials for documentation purposes and identification of any replacement requirements.

An optional well inspection can be performed with a downhole video camera after the pump and piping equipment are removed and suspended solids have settled back into the well, if required. MUD-NOX (mud deflocculant/detergent) or equivalent may be added to the well to decrease solids suspension prior to the camera survey. Residual chlorine is measured downhole prior to deployment of the camera to ensure camera integrity. This camera survey can be used to evaluate the nature and extent of screen fouling, screen integrity, or other down well characteristic.

Prior to the reinstallation of pumps and downhole equipment into a well (disinfection, redevelopment, etc.), cathodic protection is also added to the pump, if not already installed, prior to redeployment. Cathodic protection consists of adding three 18-ft lengths of magnesium strips strapped to the stainless-steel drop pipe above the submersible pump. These strips are 3/8-inch thick by 0.75-inch wide and covered with a poly mesh sleeve and secured via stainless steel straps.

Prior to reinstallation of the downhole equipment, the original or new drop pipe, submersible pump, transducer, drop tubes, and wiring are disinfected aboveground following standard practices (i.e., American Water Works Association [AWWA] Standard for Disinfection of Wells (AWWA, 2003). After the pump is installed, the gauge lines and pump column are disinfected as previously described. The wellhead is then reconnected to the conveyance line within the vault, restoring the system to the original configuration. The system is then tested for operational readiness to ensure proper pump operation, valve

and meter operation, and verification and that there are no leaks or physical or electrical problems with the system.

3.12 Well and Conveyance Line Disinfection

Well and conveyance line disinfection is described in the following sections. Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition No. 22. Records will be provided within the sections: GWTS Operation and Performance, GWTS Maintenance and Expansion Activities, and Non-Routine Maintenance Activities. Disinfection is performed in accordance with the Conditional Approval letter for Standard Operation Procedure of Disinfection of the Groundwater Treatment System Remediation Wells and Groundwater Monitoring Wells; dated August 6, 2018 (Appendix A-3).

3.12.1 Well Disinfection

Extraction and monitoring wells may occasionally require disinfection to improve pumping and monitoring performance. Well disinfection is performed by adding a disinfectant solution directly to the well at the wellhead. The disinfectant solution is produced by mixing WEL-CHLOR and potable water at a concentration sufficient to provide adequate free chlorine through the entire water column. Calculations for determining well volume and the amount of disinfectant are provided below:

Non-submerged well screen:

$$V_{well} = 7.48\frac{gal}{ft^3}\left[\pi\left(\frac{d_b}{2}\right)^2 (B - H)\right]$$

$V_{well} = static\ water\ volume\ (gal)$
$d_b = borehole\ diameter\ (ft)$
$H = water\ level\ (ft\ bgs)$
$B = total\ depth\ (ft\ bgs)$

Submerged well screen:

$$V_{well} = 7.48\frac{gal}{ft^3}\left[\pi\left(\frac{d_b}{2}\right)^2 (B - T)\right] + 7.48\frac{gal}{ft^3}\left[\pi\left(\frac{d_c}{2}\right)^2 (T - H)\right]$$

$V_{well} = static\ water\ volume\ (gal)$
$d_b = borehole\ diameter\ (ft)$
$d_c = casing\ diameter\ (ft)$
$H = water\ level\ (ft\ bgs)$
$B = total\ depth\ (ft\ bgs)$
$T = top\ of\ screen\ (ft\ bgs)$

Disinfectant:

$$V_T = V_{well} + (V_{cont})(2)$$

$V_T = total\ volume\ that\ will\ dilute\ sodium\ hypochlorite\ (gal)$
$V_{well} = volume\ of\ well\ to\ be\ disinfected\ (gal, see\ Section\ 3.2.1)$
V_{cont} = volume of container to hold solution (gal, 250 gal recommended).

$$M_{WClP} = 0.05\ (\frac{\text{oz}}{\text{gal}})(V_T)$$

M_{MClP} = mass of Wel-Chlor *Plus* to add to the stock solution (ounces [oz])
V_T = total volume that will dilute Wel-Chlor *Plus* (gal)
Mixing should be performed in according with the manufacturer recomendations

Injection of disinfectants into the extraction and monitoring wells may possibly oxidize contaminants in the immediate vicinity of the wells. However, after disinfectant has been allowed to occupy the well for a given amount of time, water is removed from the well until the disinfectant is no longer observed in the purge water. The purge water will be monitored throughout the purging process using a reagent pillow pouch field testing kit. For any well disinfection, free chlorine concentrations after purging are targeted to less than 2 mg/L which is 50 percent of the National Primary Drinking Water Regulations 40 Code of Federal Regulations 141.54 Maximum residual disinfectant level goals for disinfectants (EPA, 1998).

3.12.2 Conveyance Line Disinfection

In order to perform conveyance line disinfection, the conveyance lines need to receive a dose of chlorine fed at a constant rate. An example target concentration of free chlorine throughout the conveyance line is 25 mg/L. To ensure that the appropriate concentration of free chlorine is provided, the chlorine concentration is measured at regular intervals in accordance with standard practices (i.e., AWWA Manual M12 procedures [AWWA, 1975]). Chlorine application is typically supplied through a temporary connection to the conveyance line and does not cease until the entire conveyance line is filled with chlorinated water. The chlorinated water is retained in the line to provide the appropriate amount of contact time (e.g., 24 hours). After, the chlorinated water is pumped from the line to a storage container(s) or the GWTS depending on water characterization.

3.13 Well Shocking

If iron-related and sulphate-reducing bacteria are suspected culprits of well biofouling or calcareous materials are observed on the well screen, well shocking may be used in addition to the above disinfection treatment. Shocking can be performed with a hydroxyacetic acid blend product Cotey Chemical Corporation BIOCLEAN or equivalent. Shocking can only be performed once all residual treatment chemicals have been removed from the well. The disinfectant solution is mechanically agitated into the well and gravel pack using a jetting or swabbing tool. An example treatment schedule is to perform agitation every 2-4 hours (during daylight hours) for a 24- to 36-hour period. The solution is worked across the entire length of the water column to ensure proper mixing and distribution through the well and gravel pack.

The well screen interval is then jetted or swabbed a final time before pumping fluids out of the well. Shock treatment fluids pumped from the well can be stored in temporary storage containers provided onsite. Pumping continues until all shock treatment fluids have been removed or a preset volume has been reached. All stored shock treatment liquids are sampled for waste characterization and held pending analytical results and final waste disposition. Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition No. 22. Records will be provided within the sections: GWTS Operation and Performance, GWTS Maintenance and Expansion Activities, and Non-Routine Maintenance Activities. Methods and materials used for well shocking will be in accordance with the Conditional Approval letter for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Revision 2; dated May 31, 2017 (Appendix A-3).

3.14 Well Cleaning and Redevelopment

Well cleaning and redevelopment is performed by a licensed driller and all mechanical cleaning activities will be performed using a drilling rig or pulling unit. Once the well pump has been removed, physical or chemical cleaning/redevelopment processes, or a combination of these two processes, can be used to address well performance problems. General descriptions of these processes are provided below. Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition No. 22. Records will be provided within the sections: GWTS Operation and Performance, GWTS Maintenance and Expansion Activities, and Non-Routine Maintenance Activities. Methods and materials used for well cleaning and redevelopment will be in accordance with the Conditional Approval letter for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Revision 2; dated May 31, 2017 (Appendix A-3).

3.14.1 Physical Cleaning

Mechanical cleaning may be performed to remove any physical buildup such as iron or calcium deposits on the well screens. In addition, biologic films present on well casing and screen surfaces are physically removed during the initial mechanical cleaning. The mechanical cleaning process consists of a combination of swabbing, bailing, surging, pumping, and jetting. All mechanical cleaning is performed using a drilling rig or pulling unit equipped with a wireline and mechanical winch. All water generated from this cleaning needs to be temporarily containerized until it is sampled and analyzed for appropriate waste disposition. Note that the process presented below is for general guidance and may be modified based on actual field observations.

- The redevelopment work may include the use of a mud deflocculant/detergent such as Cotey Chemical Corporation MUD-NOX or equivalent. Mud deflocculant/detergent is mixed with water at the surface and subsequently injected into the well in an attempt to disperse any remaining drilling mud that may remain in the gravel pack since well installation. The solution is mechanically worked into the gravel pack using a surge block in order to maximize effective distribution in the annular space.

- A decontaminated stainless steel bailer with a toggle valve or equivalent is lowered into the well and used to gently surge the screen interval to remove any accumulated sand, silt, and debris accumulated in the well bore. When the bailer is brought to the surface, an Imhoff cone or equivalent is used to collect water from the bailer to evaluate the amount of silt and sediment in the water. This process is repeated after each cycle of surging and jetting.

- Following bailing, a surge block is used to surge the screened interval. The screen is surged at set intervals with strokes repeated for a set time period per interval (e.g., 5-ft intervals for 5 minutes per interval). Following the surging cycle, the well bore is bailed again to remove any accumulated sand and silt. Bailing is repeated until the discharged water has reached a set sediment volume per volume of water (e.g., less than 2 milliliters of sediment per 1 liter of water) measured using an Imhoff cone or equivalent.

- Following the surging cycle, a temporary pump is installed in the well and used to remove silt loosened during surging and settle the filter pack. Pumping follows a predetermined schedule. An example pumping schedule is lowering the pump across the saturated screen in 10-ft sections (10 positions in 100-ft screen), pumping each area for approximately 5 minutes at 100 gpm. While pumping, temperature, pH, specific conductivity, and turbidity are monitored.

- Following pumping, a jet is installed in the well screen interval to jet increments of the screened interval. The jetting device is capable of injecting water at a predetermined flow rate applicable for the well screen and filter pack. A pump attached to the jet is used to pump at a rate slightly higher rate than the injection rate used for jetting. Each increment will be jetted for a set amount of time (e.g., 5-ft increment jetted for 5 minutes). Water used in jetting is clean potable water or it may be recirculated water from the well if allowed to settle to remove fines and keep from reintroducing solids to the screen before being reinjected. The proposed potable water source is identified during the readiness review meeting.

All water generated during the mechanical well development process is containerized onsite until characterized and determination of final disposition.

3.14.2 Chemical Cleaning

Acid treatments may be used to remove and weaken existing biologic colonies and remove biologically-induced iron deposits and chemical crusts. Well acidification is performed using commercially available acid with inhibitors to minimize corrosive effects on metal components of the well (e.g., sulfamic acid, Dry Acid Special®). Ensure that, if using chemical cleaning with any other chemical disinfection or other treatment, there are no adverse reactions between chemical additions or mitigate the possibility that an adverse reaction could occur.

Introduction of the acid solution into the well water column is performed using a tremie pipe or jetting tool. The solution remains in the well for a preset contact time with preset agitation intervals (e.g., 24-36 hours of contact time, agitated every 2-4 hours) with a bailer or surge block during daylight hours. Chemical additives are to be used per manufacturer recommendations for mixing, installation, retention time, pH monitoring, removal, and safety.

After the acid treatment is completed, a preset volume is mechanically bailed or pumped from the well and placed into a lined roll-off or equivalent. Acidic water is recovered after completion of each acid treatment; therefore, initial and periodic pH readings of the purged water are measured during removal to determine if purging has been adequately completed. For any acid treatment, pH values after purging are targeted to be similar to the pre-treatment pH (e.g., within 1.0 pH units).

Acidifying chemicals are selected that result in the production of minimal hazardous waste. If characteristic hazardous waste is produced, the waste is managed as described in the Contractor's Work Plan. All acid treatment waste solutions may be placed in lined 20-yard roll-off bins pending sampling, waste characterization, and processing.

3.15 Well Step-Testing

A step-test may be performed to evaluate well yield or the effectiveness of the well rehabilitation on the well screens and filter pack to improve well yield. Following pump removal and any other optional activities, a rest period is allowed for aquifer recovery to steady state conditions (e.g., 12 hours).

An initial static water level measurement is taken prior to pump removal to reference as the baseline static water level. Prior to the start of a step-test, the water level is measured and compared to the baseline level to see that static water level conditions have been obtained within a reasonable amount of error (e.g., ± 0.5 ft). Since a step-test is a single well test to record drawdown levels at various steady-state pumping rates, the initial static level in the well is not critical for hydraulic analyses. Other extraction wells do not need to be shut down during the testing, as the impact from other extraction wells is relatively

insignificant compared to the drawdown measured during the step-test and the sensitivity of the step-test analysis.

A temporary submersible pump/piping is installed into the well capable of producing the highest step flow rate under an expected total dynamic head. An inline flowmeter is necessary to monitor pumping rate. A pipe connection from the pump drop pipe to the existing conveyance line pipe in the vault may need to be fabricated for the step-test. Appropriate connector flanges, piping, and gaskets are to be provided to connect the temporary pump to the existing conveyance line. Disassembly and removal of vault instrumentation, equipment, and associated piping may be necessary to access the desired conveyance line hook-up point.

Once all physical and electrical connections are made and initial pump operational tests are complete, a water level probe(s) is installed within the sounding tube to record water level readings throughout the test. The step-test follows a pumping schedule without interruption based on field observations and equipment constraints.

Below is an example pumping schedule:

- 100 gpm for 60 minutes
- 150 gpm for 60 minutes
- 200 gpm for 60 minutes
- 250 gpm for 60 minutes.

Records of the time, pump flow rate, water levels in the well, and time for each step are recorded. Water level readings are to be taken at set intervals. An example of reading intervals is 1 reading per minute for the first 5 minutes and every 5-minute intervals thereafter for each step. The test water is pumped directly to the GWTS for treatment. At the completion of the test, all temporary piping, pump, and associated equipment are removed from the well and the original equipment can be installed provided there are no additional work requirements for the well.

3.16 Alarm Testing

Operators perform alarm testing semi-annually to ensure that: (1) alarm equipment has not failed; and (2) during an alarm condition, the system responds properly to the alarm. Alarm testing occurs on equipment affected by programming changes that may affect alarm equipment or response. Alarm testing typically consists of manually faulting or simulating fault conditions in order to have the system exhibit a fault alarm and response. Manual faulting is recommended on alarm equipment that is accessible and can be easily faulted (leak detectors). Leak detectors are tested by completing their circuit either using water, voltage meter, or conductors, but using water from the well(s) associated with the leak detector is recommended as this most closely resembles real-world conditions in the case of a leak. Certain equipment can be manually tested to see if they alarm; however, manual testing cannot be performed during normal operations (high pressure switches and tank level sensors). High pressure switches can be tested by isolating the location of the pressure switch and pressuring the line with potable water. The Operator ensures there is a gauge on the isolated line to test the switch pressure set point at the same time. Tank level sensors can be tested by manually operating the extraction well, influent, and effluent pumps to bring the tank levels above or below the level needed to cause the alarm condition.

Items that are inaccessible, difficult to fault under normal operating conditions (tank level sensors, high pressure switches), or could pose risk to equipment or personnel (skid power loss, extraction well alarms) can be tested for system response by simulating an alarm condition either through the software or by

tripping breakers in the PLC panel. While simulation does not test the alarm equipment for function, conditions that typically cause these types of alarms result in shutdown of the affected system regardless of PLC shutdown commands, except for the tank level sensors and high pressure switches (which can be tested manually for equipment function as described in the previous paragraph).

3.17 Flowmeter Verification Testing

Operators perform flowmeter verification testing at least annually to ensure that extraction well, influent, and effluent flowmeters are providing accurate flow information and totalized volumes. Flowmeter verification testing is typically performed by the following steps:

- Isolate the influent tanks.
- Shut down a treatment train and its respective extraction wells.
- Operate well pumps individually for the shutdown train using the "ON" mode on the SCADA for approximately 5-10 minutes each (as tank capacity allows), noting the following three items once flow has reached its maximum: (1) the start and end times of operation, (2) average flow rate of the flowmeter (taken from the flowmeter directly), and (3) initial and final tank levels on the flowmeter verification form (Appendix G).
- The average flow rate from the flowmeter is then compared to the tank volume change (calculated from the tank level change) divided by the change in time. If the flowmeter average flow varies by more than 5 percent from the tank calculated flow rate, the tested flowmeter requires recalibration. Recalibration is performed in accordance with manufacturer's specifications provided in Appendix H. Any recalibrated flowmeter is retested following recalibration. In the event that the recalibrated flowmeter fails to produce less than 5 percent error using the method described above, the flowmeter is replaced, and the replacement flowmeter tested.
- This process is then repeated for each flowmeter throughout the train. Note that effluent pumps use the loss of water from the effluent tanks in order to calculate the change in level and influent flowmeters can be tested using either change in influent or effluent tank level. Once all testing on a train has been completed, the other train then undergoes the same testing procedure until all of the flowmeters of the GWTS have been tested and verified.

3.18 Maintenance Logs

The Operators maintain logs that document and record all routine and non-routine maintenance activities. Forms used for recording general inspection, calibration of instruments, maintenance, and repair of equipment are provided in Appendix G. An example log sheet for lock-out/tag-out activities that may be required for equipment maintenance and repair activities is provided in Appendix G. Additionally, any records for repair of equipment (service invoices, spare parts orders and invoices, and service reports) are retained in an equipment file for individual pieces of equipment. Separate forms for maintenance and calibration of flowmeters are provided in Appendix G. The Contractor maintains hard copies of these records onsite in the GWTS building control room or the Contractor's office. If hard copies of records are kept offsite, electronic copies of the maintenance records are available to the Operator at the GWTS.

3.19 Non-Routine Maintenance and System Adjustments

Certain non-routine maintenance activities are uncommon. In the case that these activities occur, generalized procedures can be referenced here.

3.19.1 Emergency Conveyance Line Repairs

If the influent conveyance line is damaged, a current contract in place holds that the subcontractor will follow a general guideline, which is summarized below.

In the case that a damaged line results in water loss, NMED will be verbally notified as soon as possible after learning of the release, but no more than 24 hours thereafter.

The subcontractor will locate the damaged section of GWTS conveyance line and excavate the dirt to expose the damaged line. If the extraction well(s) associated with the damaged line have not already been automatically shut down due to a conveyance line leak detect, the well(s) in question will be shut down manually following immediate identification of the well(s). The subcontractor will make temporary emergency repairs to prevent further water loss and will remove any standing water and containerize for pending disposal/processing. Contaminated soil will also be containerized for pending disposal. Site security and safety will be maintained, and proper documentation of the incident will be completed. The subcontractor will then provide the necessary plans, drawings, and other documentation to properly repair the damaged conveyance line. Once repairs are completed, the newly repaired line and its alarms will be tested. The excavation will be backfilled and compacted; roadways, sidewalks, or landscapes will be reconstructed; and any remaining waste will be removed and held offsite. A full detailed list of the procedure is provided in Appendix H.

An emergency replacement double-wall conveyance line for all four extraction wells (KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239) and for combined lines (KAFB-106233/234 and KAFB-106228/239) is stored in the GWTS yard (Table 3-2). Note that the conveyance line material for KAFB-106228 is separate from the other extraction wells and must only be used with KAFB-106228.

The treated effluent meets all applicable standards as specified in Table 1-3. In the event that the effluent line is damaged, the system will be shut down and the leak will be contained. The subcontractor will make temporary emergency repairs to prevent further water loss. The extent of the spill will be marked with temporary flagging to identify the spill area should sampling be required. Spill notification will be made to NMED GWQB and HWB, in accordance with DP-1839 Condition No. 27. Upon repair of the piping, effluent line integrity testing will be performed prior to continued operation.

3.19.2 Single Train Diversion

If a train (Train 1 or 2) is damaged, undergoing servicing, or is otherwise unable to operate under normal conditions, the influent water for that train can be diverted into the other train to continue to pump a maximum number of extraction wells as possible through the GWTS. It should be noted that extraction wells can be routed to either treatment train during operation using system influent manifold valves. However, during standard operation Train 1 operates with extraction wells KAFB-106233 and KAFB-106234 and Train 2 operates with extraction wells KAFB-106228 and KAFB-106239.

To divert influent water for one train into the other, shut down the GWTS and ensure all four extraction wells are offline. Place the inoperable train's influent pump skid VFDs into manual to prevent accidental pump operation. At the influent tree, isolate the influent from the operable train by closing the train's

valve above the bypass. If only the wells from one train will be pumped into the other train (e.g., pumping KAFB-106228 and KAFB-106239 through Train 1, or pumping KAFB-106233 and KAFB-106234 through Train 2), isolate the wells not to be pumped through by closing the respective train's valve *below* the influent tree bypass. Lastly, open the butterfly valve at the influent tree bypass to combine the flows from the influent of both trains. Ensure that the valves are in their correct opened or closed positions. Restart only the operable train and extraction wells and adjust the throughput gallons per minute, as necessary.

3.20 Groundwater Treatment System Consumables and Small Parts Information

The GWTS contains materials and supplies needed for occasional O&M activities. Table 3-2 provides a list of large items, such as replacement pumps. A recommended inventory of on-hand specific consumable supplies, recommended supplier, and part numbers is provided in Table 3-3. A list of tools and small parts that are present in the GWTS to perform various O&M activities is provided in Table 3-4. Several items that are required for GWTS operations need to be provided by the Contractor. Tables 3-2 through 3-4 denote items that are transferable between Contractors and non-transferable items that are the responsibility of the Contractor to purchase.

4. SYSTEM TROUBLESHOOTING

Occasionally, during day-to-day GWTS operations, certain system-specific issues may occur. This troubleshooting section exists to remedy such issues. User operational adjustments are provided in Appendix K.

4.1 Influent Valve Set Points

During times when wells are offline, the valves on the influent tree may require adjustment to keep from preferentially filling one influent tank over the other, especially when the influent tanks are not open to equalization or equalization is hampered (as described below). This can cause operational issues and downtime as the tanks may activate a high- or low-level switch. For instance, when operating wells KAFB-106228, KAFB-106233, and KAFB-106234, the valve on the influent tree associated with KAFB-106228 is closed to approximately 60 percent to obtain similar flow rates to the influent tanks. Set points have been marked on the influent valve indicators; however, it is important that the Operator be aware of the need to adjust these valves in order to maintain consistent flow. Fine tuning of the valves may be required when the system is operating under a different influent flow condition.

4.2 Influent Tank Equalization

The influent tanks are connected by a 6-inch pipe that contains two basket strainers and feeds to both influent skids. Over time, the levels in the influent tanks may begin to deviate as there is a loss of equalization, preferentially pulling water from one tank with both skids. This can cause operational issues and downtime as the tanks may activate a high- or low-level switch. In this instance, the basket strainers are cleaned and inspected.

4.3 KAFB-106233 and KAFB-106234 Start Order

Occasionally, when KAFB-106233 is offline and KAFB-106234 is started, KAFB-106233 initializes and then fails. The easiest way to correct this is by setting KAFB-106233 before KAFB-106234 in the startup sequence. If KAFB-106233 is not intended to operate at the same time as KAFB-106234, then KAFB-106233 should be deenergized prior to startup of KAFB-106234. In the event that KAFB-106233 needs to be initialized following KAFB-106234, then the system should undergo a standard startup; and, following failure of KAFB-106233, the alarm condition can be reset by manually opening the remotely actuated valve, resetting the alarm on the SCADA, running KAFB-106233 locally, and then returning KAFB-106233 to the auto mode on the motor starter. KAFB-106233 must now be restarted using the “on” button on the SCADA. Once in operation, press the “auto” button to return the well into PLC controlled operation.

5. PROCESS MONITORING

This section provides an overview of the monitored operating parameters and sampling used to determine the performance of the GAC treatment system and quality of treated water discharged to the GCMP or a UIC well. The full requirements for sampling and analysis are covered in the Sampling and Analysis Plan (Appendix I). The results of the process monitoring sampling are used to evaluate performance of the GAC beds and determine if the online beds require GAC change-out. The analytical results are reviewed to confirm that the contaminant concentrations meet the discharge criteria provided in Appendix I.

Analytical results will be reported in routine monitoring reports (e.g., Quarterly Monitoring Report) to NMED as required in any approved permit. Each reporting event consists of a Data Quality Summary Report and laboratory data packages. For details on sampling and analysis procedures, refer to the Sampling and Analysis Plan (Appendix I). The Sampling and Analysis Plan includes laboratory testing requirements and the achievable laboratory limits.

Operational parameters for the treatment system are monitored by the SCADA. The SCADA records the output of automated flow and level instruments communicating with the PLC. The SCADA also records alarms and operating time totals for the influent pumps. These data are downloaded monthly and stored electronically by the Contractor for use in generating any system-related reports. System shutdowns are recorded on the shutdown logs provided in Appendix G.

5.1 Extraction Wells

The water level in the well casing, pump status, wellhead pressure, and groundwater flow rate at the extraction wells is monitored and recorded by the SCADA as part of normal process monitoring. Filter pack level at all extraction wells is monitored and recorded, at a minimum, annually. Laboratory analysis samples are collected in accordance with the Sampling and Analysis Plan (Appendix I). In addition to the information collected by the SCADA, the Operators record the readings of the local instruments in the well vaults for KAFB-106228 and KAFB-106239 as well as in the WCH for wells KAFB-106233 and KAFB-106234. These include any manual gauges located at the wellheads, WCH, and conveyance line vaults. These readings are recorded at least once per month using the forms provided in Appendix G.

Water level transmitters were installed in KAFB-106233, KAFB-106234, and KAFB-106239 to replace the transducers. Water level data from the new transmitters are automatically recorded by the GWTS SCADA.

5.2 Treatment System

As noted above, GWTS operational parameters are recorded by the SCADA. These parameters include the following:

- Extraction well flow rates
- Extraction well head pressures
- Extraction well water levels
- Influent skid flow rates
- Effluent skid flow rates
- Total system flow rate
- Upstream distribution pressure

UIC well flow rates

- UIC wellhead pressures
- UIC well water levels
- GCMP level.

In addition to the SCADA data, the Operators record the readings of the differential pressure gauges on all four of the influent bag filter housings (PDI-112 A/B and PDI-116 A/B) and record the inlet and outlet pressure gauge readings on all GAC beds and pump skids (PI-3104 A/B and PI-3105). The Operator also records the totalizer readings from all flowmeters. These readings are recorded on the forms provided in Appendix G. All data from the GWTS, including run data gathered from the wells, WCH, vaults, and treatment plant operation logs, maintenance, and regular inspections, are reviewed quarterly by project engineering personnel and provided in the quarterly reports. This review identifies trending details of the performance of wells, pumps, and treatment equipment.

The Operators must specifically collect the following information relevant to KAFB-7, KAFB-106IN2 and any additional UIC wells installed in the future in accordance with DP-1839 Condition No. 21 (Table 1-2):

- Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well

- The totalized monthly volume of treated effluent transferred to all UIC wells

- Monthly average, maximum, and minimum head values of injection water for each UIC well.

A transmitter is installed in each UIC well to monitor water level and ensure that the well is not overfilled during injection. The transmitter replaced the previous transducer. The PLC is programmed to shut down the well if the water level in the well exceeds the high-level set point. Water level data from the transmitter are automatically recorded by the GWTS SCADA.

5.3 Influent and Effluent Monitoring

Influent water to be processed by the GWTS must meet certain standards prior to processing to mitigate the potential release of partially treated water to select discharge locations. Influent water concentrations have been established for water that reaches the lead GAC vessel; these concentrations are presented in Table 5-1. GWTS effluent must comply with any approved federal, state, or local permits (DP-1839 and NPDES). Effluent discharged from the GWTS must not exceed the discharge criteria identified in Appendix I. Extraction well, influent, post-lead GAC vessel, and effluent sampling locations are described below.

Extraction Wells—Samples are collected from a sample port located at the wellhead and/or the WCH just downstream of the flowmeter. All of the extraction wells are capable of being sampled individually.

Samples are obtained at six locations throughout the plant. Each train can be sampled at each location individually.

Influent—Samples are collected at the combined outlet of the influent pumps, but prior to the pre-treatment bag filters on the influent pump skids.

Post-Lead GAC Vessel—Samples are collected at the outlet of the lead GAC vessels. Each train can be sampled individually.

Effluent—Samples are collected at the outlet of the effluent pump, but prior to the post-treatment bag filters on the effluent pump skids.

Extraction well and GWTS sampling schedules and analytes are described in Appendix I.

6. RECORDKEEPING

Records of the GWTS O&M and monitoring are maintained for use by operating personnel, management, and appropriate regulatory agencies. The proper collection and archiving of information are essential as the GWTS is intended for multiple years of operation. These records are used to establish a baseline and performance history of the GWTS. Records may be used for the following reasons:

- Evaluate plant performance
- Assist in troubleshooting operational problems at the GWTS
- Ensure the preventative maintenance schedule is performed
- Provide information for reports to regulatory agencies
- Comply with relevant permits and regulations.

Records are maintained by the Contractor onsite in the GWTS building control room or in the Contractor's office. Operators have access to electronic copies of the records if the hard copies are maintained in the Contractor's office. Records include hard copies of the O&M log sheets included in Appendix G and computerized operating records. Copies of reports are available to Operators electronically and at the Contractor's office. Waste characterization, generation, and waste records are maintained by the Contractor in accordance with the RCRA Permit.

6.1 Reporting

The Contractor submits weekly performance updates, monthly New Mexico Office of the State Engineer extraction/injection volumes, monthly Kirtland AFB Civil Engineering updates, and quarterly and annual performance reports, as required. Table 6-1 provides a list of reports, report contents, regulatory permits and/or documents requiring the reporting, and entities to which these reports need to be submitted. Examples of weekly and monthly reports are provided in Appendix M. Note that weekly reports are internal reports only (between the Contractor, USACE, and Kirtland AFB), and are used as an operational tool to evaluate and track operation and performance of the GWTS. All quarterly and annual reports are submitted to Kirtland AFB for review, approval, and submittal to NMED and can be found on the most recent project website (hosted and updated by Kirtland AFB or Contractor support). The quarterly and annual reports must include the items listed in Table 6-1 as well as the following:

- Monthly average, minimum, and maximum flow rate values collected throughout the system
- Total monthly/quarterly/annual treatment volumes
- Monthly volumes distributed to each discharge location
- Total monthly volumes extracted from extraction well(s)
- Monthly average, minimum, and maximum head values from extraction well(s)
- Percent system runtime per quarter/annum
- Average operational groundwater extraction rates for individual wells per quarter/annum
- Average specific capacities for individual extraction wells per quarter/annum

- Analytical metrics including system sampling forms, analytical results, with laboratory and data quality reports, and estimated EDB removal per quarter/annum

- Summary of routine and non-routine equipment maintenance activities, repairs, and modifications if performed, including but not limited to the following:

  — Bag filter change-outs
  — GAC change-outs
  — Mechanical integrity evaluations
  — Well rehabilitation
  — Malfunction, repair, or replacement of a flowmeter
  — Operational changes with the potential to affect discharge quality

- Status of off-Base conveyance line security and administrative controls per quarter/annum

- Summary of shutdown and alarm events, including O&M issues that contributed to significant downtime for the GWTS.

The quarterly and annual performance reports of the GWTS are incorporated into the Quarterly Reports, which are submitted at the following frequency:

- Report inclusive of January 1 through March 31 is due June 30 of the same year
- Report inclusive of April 1 through June 30 is due September 30 of the same year
- Report inclusive of July 1 through September 30 is due December 31 of the same year
- Report inclusive of October 1 through December 31 is due March 31 of the next year.

The Operator makes any required notifications to the GWTS Project Manager, who then notifies Kirtland AFB, who must then make any required regulatory notifications to NMED. Specific to the discharge requirements, the Contractor provides validated monitoring data in the Quarterly Reports to NMED.

The entire system performance is evaluated by a qualified engineer and/or hydrologist, at a minimum, annually. Well performance parameters (flow rates, drawdown, changes in water chemistry, as well as performance of the GAC beds and mechanical/electrical systems) are evaluated quarterly. Trending data are incorporated from sampling, run logs, maintenance activities, and Operator feedback. The evaluations are included in the appropriate report and provide direction for further maintenance or optimization of the system and its components.

6.2 Equipment Warranties

Manufacturer's warranties for GWTS equipment are included with the manufacturers' information in Appendix H. The Contractor monitors system performance and identifies the need for additional spare parts based on assessing the likelihood of component failures and consequences. Spare parts and consumables are addressed in Section 3.15. Subcontractors for construction and installation of GWTS components provide guarantees that all work and services performed are in accordance with accepted standards and practices. These subcontractors also guarantee that all equipment and materials are furnished against defects in construction and/or workmanship for a period of 1 year following completion of its work and acceptance.

7. WASTE MANAGEMENT

Onsite waste management is performed by the Operator or other designated waste management person. Bag filters, water from monitoring wells, backwash water, depleted GAC, and pH adjustment solutions are the primary waste items requiring management at the GWTS facility. All waste requiring specialized disposal is disposed of in accordance with applicable permits.

7.1 Bag Filters

Spent bag filters are produced after any bag filter change-out occurs. The bag filters are dried prior to disposal and disposed of as non-hazardous solid waste; supporting documentation for this disposal decision is provided in Appendix J.

7.2 Monitoring Well and Maintenance Activity Water

All groundwater generated during well installation, development, or routine groundwater monitoring events and all well maintenance activities are 100 percent captured and contained during generation. The following categories of water are discussed in the paragraphs below:

- **Non-hazardous water** generated from:
  - — Water from wells for which the sampling data for two consecutive preceding sampling events document no contaminants are present at concentrations that meet the definition of characteristic hazardous waste (40 Code of Federal Regulations [CFR] Part 261).
- **Hazardous/potentially hazardous water** generated from:
  - — Water from wells for which any data from two consecutive preceding sampling events document contamination is present at concentrations that exceed the characteristic hazardous waste toxicity criteria (40 CFR Part 261.24) that have not been characterized.
  - — Water from wells for which historical data show water quality fluctuating between non-hazardous and hazardous classification over the past four quarters that have not been characterized.
  - — Water that had concentrations relatively close to the regulatory standard in 40 CFR part 261.24 (e.g., water that exhibited benzene above 0.4 mg/L in at least one of the previous two events that has not been characterized).
  - — Decontamination water from equipment cleaning across all hazardous or potentially hazardous well activities that has not been characterized.
- **Water of unknown quality** generated from installation, development, decontamination, sampling, maintenance, or other activities for which data are not available for two sampling events and that has not been characterized.

7.2.1 Non-Hazardous Water

Based on the previous sampling data as described above, non-hazardous water generated from well sampling activities do not require segregation either at the point of generation or while contained at the GWTS. Water generated at these wells is discharged to the GWTS in-floor sump if they meet the investigation-derived waste requirements provided in Table 5-1. Water that does not meet the requirements is disposed of at an offsite location. Water discharged to the GWTS in-floor sump is pumped from the sump to the Train 1 influent tank for treatment through the system. The quantity of water generated from each well and the total quantity of water transferred to the GWTS in-floor sump is recorded. A minimal quantity of fines is anticipated to be present in this water and pre-filtering before batching into the GWTS is not anticipated. Unfiltered water will be run through a 10-micron bag filter as a pretreatment step to remove any sediments.

If, for any reason, the GWTS cannot accept water as it is generated (e.g., shut down for maintenance, improper flow condition, etc.), the water is temporarily stored in the investigation-derived waste area on pallets and properly labeled until it can be discharged to the GWTS in-floor sump.

7.2.2 Hazardous/Potentially Hazardous Water

Based on the previous quarterly sampling event as described above, characteristically hazardous water generated from well sampling activities is kept segregated by point of origin both during transport and while pending disposal. Upon generation, the water is placed in dedicated drums and transported to the less than 90-day accumulation area where the drums are labeled and held pending receipt of laboratory analytical results. This water is profiled for disposal based on the analytical data from the sample collected from the generating well. If the water is determined to be non-hazardous following characterization and meets the criteria identified in Table 5-1 then that water is processed as described in the above section. Water generated from uncharacterized sources is treated the same way as the hazardous water until proven that the water is non-hazardous. The quantity of water generated from each well or activity is recorded.

Drums containing hazardous purge water are labeled with standard “Hazardous Waste” labels with RCRA waste code identified on the label and a separate label with the identifying hazard(s) of the waste. For the BFF hazardous purge water, the RCRA code is D018 and the hazard identification is “Toxic.” Updated labeling requirements are found in 40 CFR 262.17(a)(5), which were promulgated by EPA under the Generator Improvement Rule in May 2017 and adopted by NMED in December 2018 (20.4.3 New Mexico Administrative Code).

Drums that contain potentially hazardous purge water are labeled with “This Container ON HOLD Pending Analysis.” Upon receipt of analytical data, the drum is either relabeled as hazardous or non-hazardous as dictated by the analytical results. Once classified as non-hazardous purge water, the drum is moved out of the <90-day accumulation area to the BFF non-hazardous investigation-derived waste yard.

7.2.3 Water of Unknown Quality

Water of unknown quality associated with installation, development, maintenance, or other activities is initially placed in portable tanks located at the wellhead where it is produced. Any fines are allowed to settle before the water is transported, on a daily basis, using vacuum trucks from the wellhead to a centralized storage area where it is pumped into storage tanks. The quantity of water generated and the total quantity of water transferred into any storage tanks is recorded. Upon conclusion of an activity, or when a storage tank reaches capacity, one water sample is collected from the tank; proper

disposal/processing takes place upon receipt of the analytical results. Upon receipt of the analytical results confirming that the water is non-hazardous and conforms to the requirements identified in Table 5-1, the water is processed as described in Section 6.2. If the water is hazardous based on toxicity characteristics or does not conform to the requirements identified in Table 5-1, the water is disposed of offsite in accordance with appropriate regulations.

7.3 Pre-Treatment pH Adjustment

A pH adjustment will be performed for any IDW water associated with well cleaning and redevelopment events that require chemical clean with acid treatments. The pH will be adjusted with soda ash, or other appropriate basic materials, until a pH of 7 is obtained. Once adjusted, the water can be processed as described in the investigation-derived waste processing requirements provided in Section 7.2. Any basic material used for the pH adjustment will be tracked and tagged with a Hazardous Waste Group label, use recorded, and storage capacities must not exceed the prescribed limits outlined in Kirtland AFB Hazardous Materials Group's Shop No. 1706A database. Materials will be used on an as needed basis and will not be stored within the GWTS.

7.4 Backwash Water

Backwash water from GWTS components (GAC vessels, sand filters, etc.) is created when the components require backwashing due to differential pressure increases or during change-out of the GAC.

Backwash water originating from the sand filters is transferred to the clarifier and then to the internal sump where it is processed through the Train 1 influent tank. During processing, the backwash water is pre-treated with sodium hypochlorite and processed through the sand filters and bag filters. This pre-treatment process removes biological materials and eliminates any remaining microbes within the backwash water.

Backwash water originating from GAC change-out or backwash events is containerized in a 21,000-gallon onsite storage tank. The backwash water is given sufficient time for suspended solids to settle, and then is filtered prior to processing through the GWTS. The backwash water is processed through the GWTS influent tanks where it is pre-treated with sodium hypochlorite and processed back through the sand filters and bag filters. This pre-treatment process removes biological materials and eliminates any remaining microbes within the backwash water. Backwash water is characterized prior to processing through the GWTS. In the event that the backwash water cannot be filtered effectively, the backwash water is disposed of offsite in accordance with appropriate regulations.

While not expected, it is possible to experience desorption of contaminants during backwashing of the GAC vessels. If the presence of desorbed contaminants is detected within the backwash water, it will be processed through the GWTS influent. In the event that the backwash water cannot be processed through the GWTS for either of the above reasons, the backwash water is disposed of offsite in accordance with appropriate regulations. Backwash water sampling requirements are described in the Sampling and Analysis Plan (Appendix I, Section I.2.3).

7.5 Depleted Granular Activated Carbon

Eventual depletion of the ability of the GAC to remove contaminants of concern will require removal of the depleted GAC from their associated vessels. Depleted GAC is removed from the GAC vessels and regenerated offsite by a third party for recycling. The regeneration process involves thermal regeneration

through a rotary kiln at temperatures up to 1,450 degrees Fahrenheit. A certificate of regeneration will be provided to Kirtland AFB, by the third party, upon completion of the GAC regeneration.

7.6 Used Pump Oil

Used pump oil and oil-contaminated materials including gloves, paper towels, or plastic bags are kept in labeled, lined 5-gallon buckets placed on polyethylene pallets with secondary containment in the GWTS building's southwest corner. Once the containers are near to being full, the oil and materials are recycled or disposed of, in accordance with approved Base requirements.

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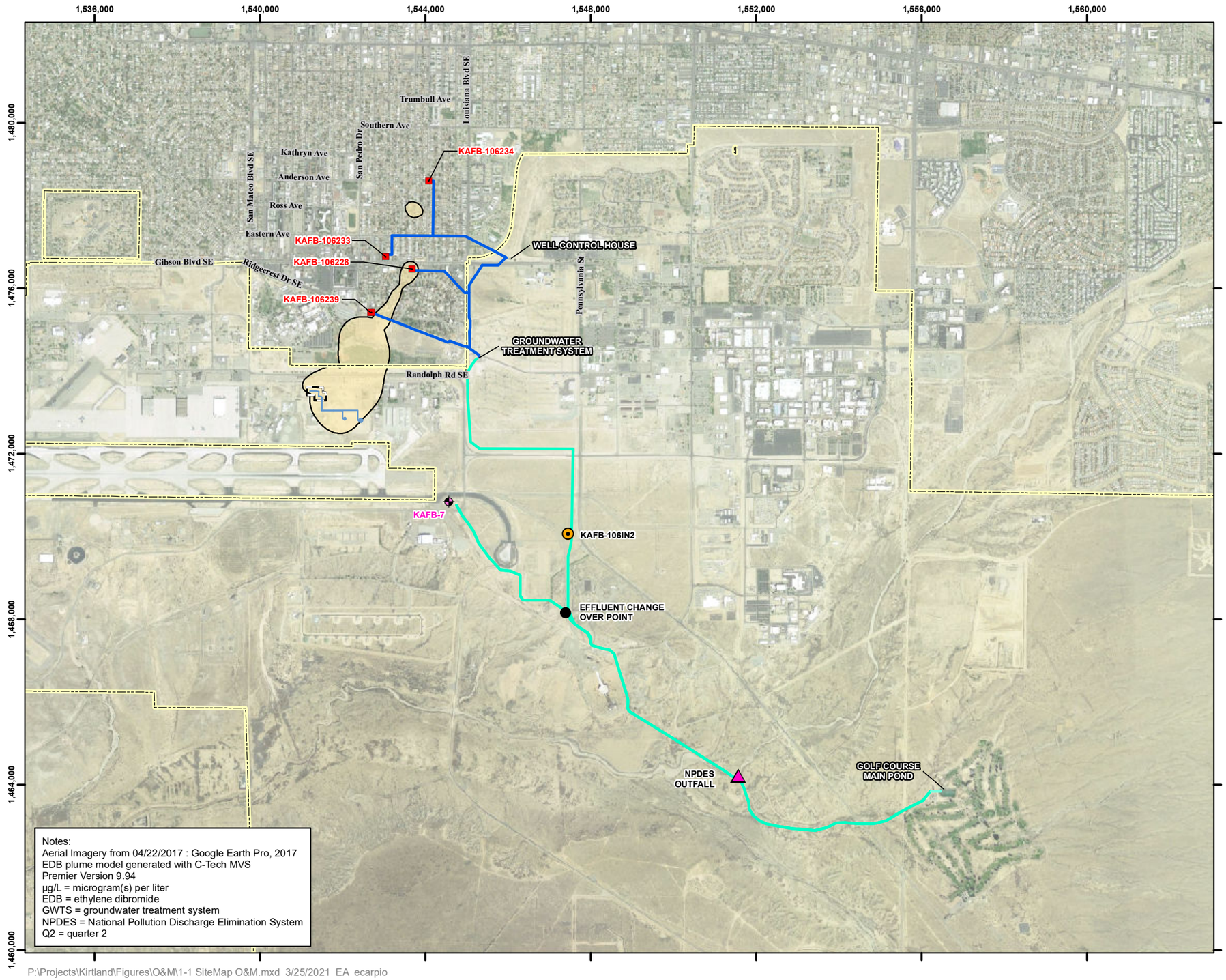
NMED. 2017b. Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Revision 2, Solid Waste Management Units S—106/SS-111, Kirtland Air Force Base, Bernalillo County, New Mexico, by the New Mexico Environment Department Groundwater Quality Bureau. May.

NMED. 2018. Conditional Approval of Standard Operating Procedure for Effluent Conveyance Line Integrity Testing of the Groundwater Treatment System, DP-1839, Kirtland Air Force Base, Bernalillo County, New Mexico, by the New Mexico Environment Department Groundwater Quality Bureau. March.

NMED. 2020. Disapproval of Operations and Maintenance Plan Groundwater Treatment System, Bulk Fuels Facility Solid Waste Management Units ST-106 and SS-111 Revision R3, Kirtland Air Force Base, New Mexico, by the New Mexico Environment Department Hazardous Waste Bureau. December.

FIGURES

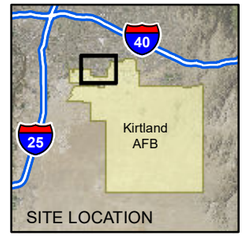


Notes:
Aerial Imagery from 04/22/2017 : Google Earth Pro, 2017
EDB plume model generated with C-Tech MVS Premier Version 9.94
µg/L = microgram(s) per liter
EDB = ethylene dibromide
GWTS = groundwater treatment system
NPDES = National Pollution Discharge Elimination System
Q2 = quarter 2

P:\Projects\Kirtland\Figures\O&M\1-1 SiteMap O&M.mxd 3/25/2021 EA ecarpio

Legend

- Injection Well KAFB-106IN2
- Extraction Well
- Existing Injection Well
- NPDES Outfall
- Former Aboveground Storage Tank
- Former Fuel Transfer Line
- GWTS Influent Piping
- GWTS Effluent Piping
- Installation Boundary
- Source Area
- EDB Plume Q4 2020 (>0.05 µg/L)



N

0 1,250 2,500 5,000

Feet

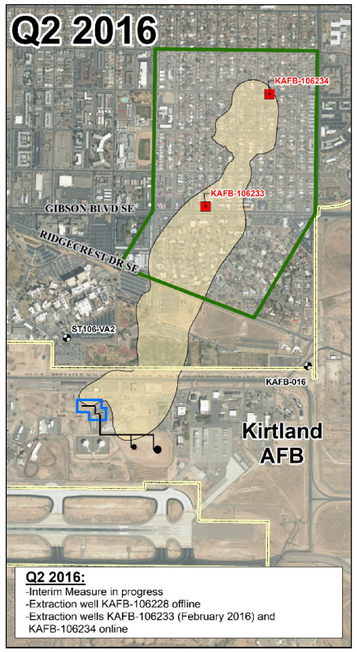
1 inch = 2,500 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

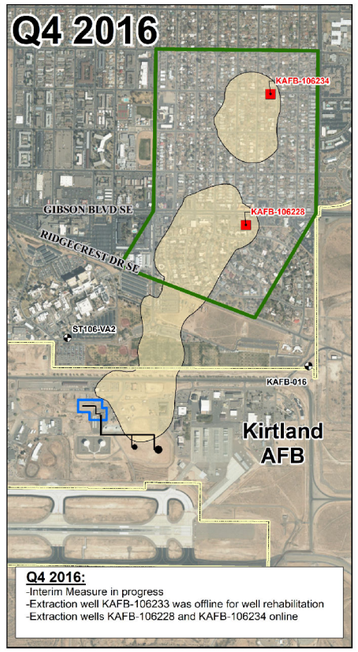
OPERATIONS AND MAINTENANCE PLAN
REVISION 4
GROUNDWATER TREATMENT SYSTEM
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-1

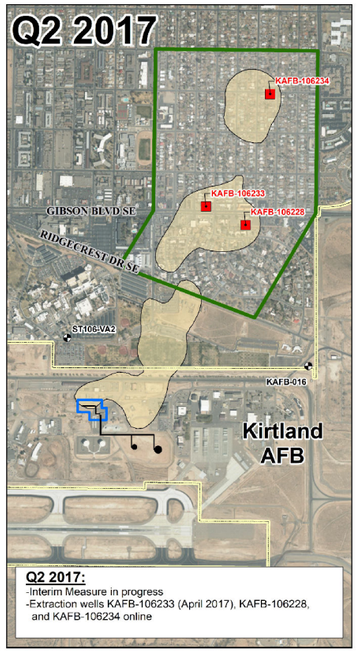
SITE MAP



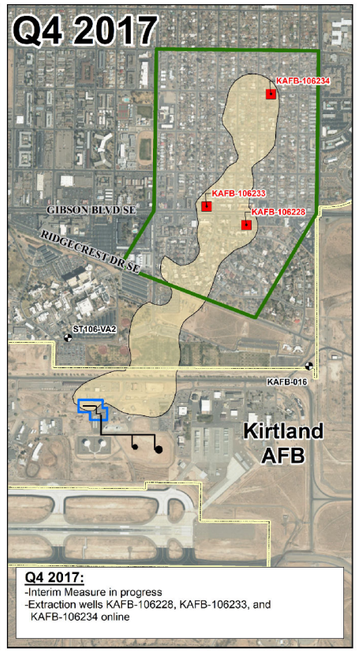
Q2 2016:
-Interim Measure in progress
-Extraction well KAFB-106228 offline
-Extraction wells KAFB-106233 (February 2016) and KAFB-106234 online



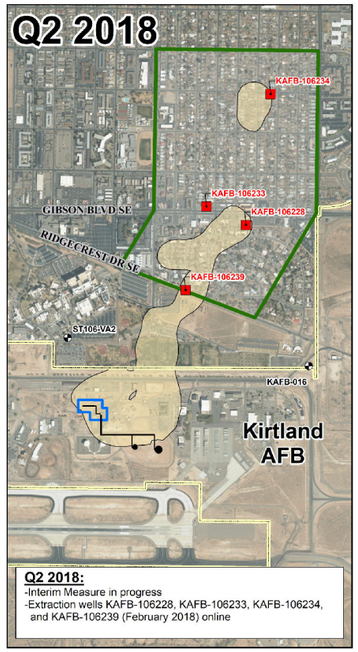
Q4 2016:
-Interim Measure in progress
-Extraction well KAFB-106233 was offline for well rehabilitation
-Extraction wells KAFB-106228 and KAFB-106234 online



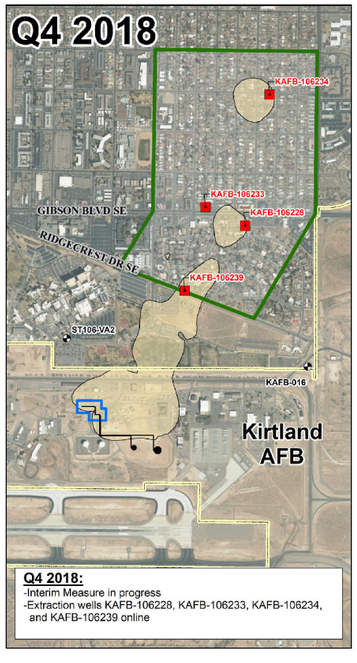
Q2 2017:
-Interim Measure in progress
-Extraction wells KAFB-106233 (April 2017), KAFB-106228, and KAFB-106234 online



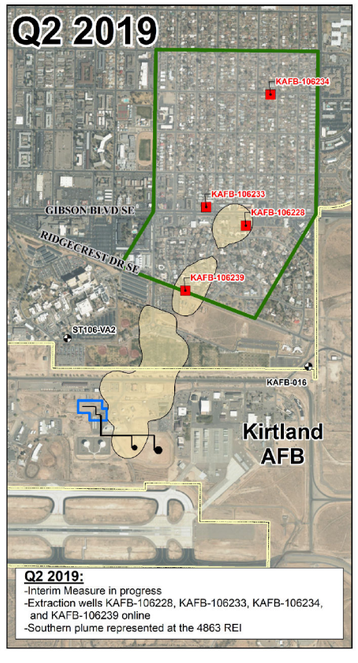
Q4 2017:
-Interim Measure in progress
-Extraction wells KAFB-106228, KAFB-106233, and KAFB-106234 online



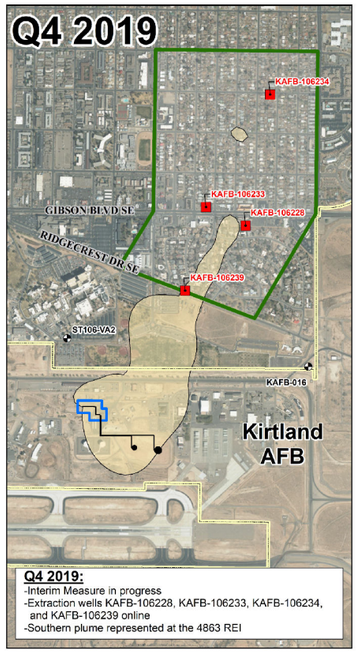
Q2 2018:
-Interim Measure in progress
-Extraction wells KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239 (February 2018) online



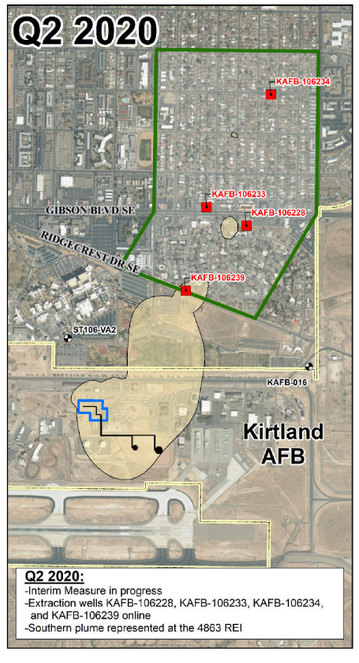
Q4 2018:
-Interim Measure in progress
-Extraction wells KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239 online



Q2 2019:
-Interim Measure in progress
-Extraction wells KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239 online
-Southern plume represented at the 4863 REI



Q4 2019:
-Interim Measure in progress
-Extraction wells KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239 online
-Southern plume represented at the 4863 REI



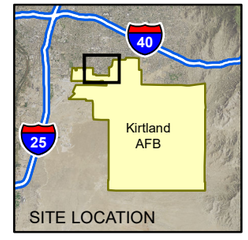
Q2 2020:
-Interim Measure in progress
-Extraction wells KAFB-106228, KAFB-106233, KAFB-106234, and KAFB-106239 online
-Southern plume represented at the 4863 REI

General Notes:
-Aerial imagery provided by ESRI Online service
-EDB plume models generated with C-Tech MVS Premier Version 9.94

Acronym(s):
AFB = Air Force Base
EDB = ethylene dibromide
EPA MCL = Environmental Protection Agency maximum contaminant level
REI = reference elevation interval in feet
SWMU = solid waste management unit
WUA = Water Utility Authority
µg/L = microgram(s) per liter
Q2 = quarter 2
Q4 = quarter 4

Legend

- Drinking Water Supply Well
- Kirtland AFB Extraction Well
- Kirtland AFB Installation Boundary
- Former Fuel Transfer Lines
- Former Aboveground Storage Tank
- Bulk Fuels Facility (SWMU ST-106/SS-111)
- Interim Measure Operational Area for Dissolved-Phase EDB
- Dissolved-Phase EDB ≥ 0.05 µg/L (EPA MCL) in REI 4857



N

0 1,250 2,500 5,000

Feet

Reference Scale: 1:30,000

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

OPERATIONS AND MAINTENANCE PLAN
REVISION 4
GROUNDWATER TREATMENT SYSTEM
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-1

PROGRESS ON DISSOLVED-PHASE EDB COLLAPSE IN TARGET CAPTURE ZONE

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TABLES

Table 1-1
Applicable Permits

Permit	Issuing Agency	Date Issued	Date Expires	Permitted Activities
New Mexico Environment Department Permits				
Discharge Permit, DP-1839	Ground Water Quality Bureau New Mexico Environment Department 1190 South St. Francis Drive Santa Fe, NM 87502-5469	28 April 2017	28 April 2022	Discharge Permit for treated effluent maximum discharge of 1,000 gallons per minute to maximum of five underground injection control wells
Hazardous Waste Treatment Facility Operating Permit U.S. Environmental Protection Agency Identification Number NM9570024423	Hazardous Waste Bureau New Mexico Environment Department 2905 Rodeo Park Drive E, Building 1, Santa Fe, NM 87505	July 2010	Permit is administratively extended	The Bulk Fuels Facility corrective action, including the design and operation of the groundwater treatment system, is being implemented pursuant to the Resource Conservation and Recovery Act corrective action provisions in Part 6 of the Resource Conservation and Recovery Act Permit
State of New Mexico Office of the State Engineer Permits				
RG-1587	State of New Mexico Office of the State Engineer District I 5550 San Antonio NE Albuquerque, NM 87109	10 December 2015	1 December 2025	Allows for the injection of 1239 gpm (2,000 acre-feet per annum) into injection well KAFB-7
RG-1579 POD 292	State of New Mexico Office of the State Engineer District I 5550 San Antonio NE Albuquerque, NM 87109	17 June 2015	15 June 2025	Allows for the extraction of 250 gpm (403 acre-feet per annum) from extraction well KAFB-106228
RG-1579 POD 309	State of New Mexico Office of the State Engineer District I 5550 San Antonio NE Albuquerque, NM 87109	29 October 2015	1 November 2025	Allows for the extraction of 200 gpm (323 acre-feet per annum) from extraction well KAFB-106233
RG-1579 POD 310	State of New Mexico Office of the State Engineer District I 5550 San Antonio NE Albuquerque, NM 87109	29 October 2015	1 November 2025	Allows for the extraction of 200 gpm (323 acre-feet per annum) from extraction well KAFB-106234
RG-1579 POD 319	State of New Mexico Office of the State Engineer District I 5550 San Antonio NE Albuquerque, NM 87109	7 December 2016	1 December 2025	Allows for the extraction of 200 gpm (323 acre-feet per annum) from extraction well KAFB-106239

gpm = gallon(s) per minute.
KAFB = Kirtland Air Force Base.
Copies of all permits are provided in Appendix A.

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
	Discharge Permit, DP-1839	
	A. Operational Plan	
1	The Permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 2 and 4 NMAC. [20.6.2.3109.C NMAC]	Section 1.3 - Discharge Requirements
2	The Permittee shall operate in a manner such that standards and requirements of Sections 20.6.2.3101 and 20.6.2.3103 NMAC are not violated. [20.6.2.3101 NMAC,20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]	Section 1.3 - Discharge Requirements
3	The Permittee shall ensure that the most recent versions of all Work Plans associated with the GWTS, the effluent conveyance pipeline, and the UIC well(s) are consistent with the requirements of this Discharge Permit. [20.6.2.3101 NMAC,20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]	NA
4	The Permittee shall ensure all discharges associated with this Discharge Permit are located within the Designated UIC Area within Section 01 of T9N R3E; Sections 05, 06, 07, 08, and 09 of T9N R4E; and Section 31 of T10N R4E (see Appendix B). [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]	Appendix C - System Description
5	The Permittee shall ensure that proposed UIC well locations (see Appendix B) and associated discharges are consistent with the most recent approved Stage 2 Abatement Plan for SWMU ST-105. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]	NA
6	The Permittee shall ensure that discharged groundwater effluent is less than or equal to the effluent standards for all constituents referenced in 20.6.2.3103 NMAC. The term "effluent standard" is used in this Discharge Permit to refer to the New Mexico Water Quality Control Commission (NMWQCC) groundwater standard or the federal U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL); whichever is more stringent. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]	Appendix I - Sampling and Analysis Plan
7	The Permittee shall ensure that GWTS influent chemistry is consistent with the design basis of the GWTS. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]	Section 5.3 - Influent and Effluent Monitoring
8	The Permittee is authorized to install and operate not more than five UIC wells. Authorized UIC wells are listed in Table 1. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]	Section 2.6 - Operation and Maintenance of Discharge Locations, Table 2-2 - Permitted Extraction Rates
9	The Permittee shall ensure that the total discharge from the facility via UIC wells does not exceed 1,440,000 gpd. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]	Section 2.6 - Operation and Maintenance of Discharge Locations, Table 2-2 - Permitted Extraction Rates
10	Prior to the installation of a new UIC well, the Permittee shall submit a Work Plan for NMED approval that satisfies the requirements of this Discharge Permit and the corrective action provisions at Part 6 of the RCRA Permit. This Work Plan shall, at a minimum, include the following information unless the Permittee can demonstrate to NMED that an item is not applicable or appropriate under the proposed activity or if an item has been provided separately under another submission: a. A statement of purpose and need for the additional UIC well(s); b. A list of groundwater monitoring wells which may be added to the monitoring program to effectively monitor performance of the new UIC well(s); c. A map showing the location of the proposed UIC well(s) and the location of all associated monitoring well(s); d. The geographic coordinates of the location of the UIC well(s) including township/range and section; e. A map showing the location of the nearest production well; f. A proposal of how the structural integrity of the treated effluent conveyance system between the GWTS and the new well will be demonstrated; g. Existing data showing the depth to water and general groundwater quality at the proposed new UIC well discharge location; h. A detailed description of groundwater flow modeling (numeric or analytical) predicting the effect of injection on the groundwater flow direction at the discharge location; i. A detailed description of geochemical modeling (numeric or analytical) evaluating the interaction between the treated effluent and receiving groundwater. Prior to any such geochemical modeling the treated effluent and receiving groundwater shall be tested for the analytes listed in Table 5 unless the Permittee can demonstrate that testing for a particular analyte is unnecessary; j. A detailed description of the impact that the proposed injection will have on any known groundwater contaminant plumes, e.g., the nitrate plume(s) addressed in the Site ST-105 Stage 2 Abatement Plan for Nitrate Contaminated Water; k. Maximum estimated monthly discharge volume to the UIC well(s); l. Project schedule, including the date the discharge is to commence and the anticipated duration; and m. Necessary changes to this Discharge Permit's language should the proposal be approved, e.g., the listing of authorized injection wells and associated monitoring wells in Table 1. These Work Plans shall be submitted for NMED approval at least 90 days prior to the scheduled installation of any UIC well. Proposed changes to this Discharge Permit constituting a "permit modification" as defined at 20.6.2.7.P NMAC shall not be submitted as a Work Plan, but shall instead be submitted as a discharge permit modification request as specified at 20.6.2.3109.G NMAC. A proposal to locate a discharge at a location outside the areas specified in Permit Condition #4 shall be considered a permit modification. A proposal to locate a UIC well at a location within the Designated UIC Area shall not be considered a permit modification unless the discharge quality or quantity is modified from that permitted herein. The Permittee shall post the approved Work Plan to the appropriate web site, i.e., KAFB/Environment/Kirtland AFB Fuel Plume Project Documents. [20.6.2.7(P) NMAC, 20.6.2.3107(A) NMAC, 20.6.2.3109(G) NMAC, 20.6.2.5003 NMAC]	NA

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
11	Prior to discharging to a newly installed UIC well, the Permittee shall submit written notification to NMED stating the date that the discharge is to commence. [20.6.2.3107(A) NMAC]	Appendix A - Regulatory Requirements
12	The Permittee shall ensure that the GWTS is secured to control access by the general public. [20.6.2.3109(B) and (C) NMAC, NMSA 1978, §74-6-5(D)]	Section 1.2 - Overall System Description
13	The Permittee shall maintain signs in English and Spanish (unless otherwise prohibited by KAFB policy) at appropriate locations indicating that the GWTS effluent is non-potable. Signs shall be posted at the UIC wellheads, at the GWTS, and any associated UIC well related infrastructure. [20.6.2.3109(B) and (C) NMAC, NMSA 1978, § 74-6-S(D)]	NA
14	The Permittee shall ensure that the UIC well(s) include monitoring devices, i.e., water level and pressure head transducers, to prevent overfilling of the well. The Permittee shall measure the volume of treated effluent discharged to each UIC well and maintain a record of these volumes. [20.6.2.3107 and 20.6.2.3109(C)(3)(c)(i) NMAC]	Section 2.6 - Operation and Maintenance of Discharge Locations
15	The Permittee shall ensure the treated effluent conveyance system, i.e., piping, between the GWTS and the UIC well(s) does not leak and shall report any such leakage to the NMED GWQB in accordance with 20.6.2.1203(A) NMAC and copy the NMED HWB. Within one year of the effective date of this Discharge Permit, the Permittee shall demonstrate the structural integrity of the treated effluent conveyance system between the GWTS and KAFB-7. Prior to testing, the Permittee shall propose for NMED approval the test method to be used. The results of the mechanical integrity testing shall be submitted to NMED within 60 days of test completion. The Permittee shall integrity test the treated effluent conveyance system between GWTS and the UIC well(s) prior to submitting a permit renewal application. [20.6.2.3106(C) NMAC, 20.6.2.3107(A) NMAC]	Section 3.10 - Effluent Line Integrity Testing
16	Prior to an initial discharge from the GWTS of treated effluent associated with a new extraction well, the Permittee shall submit documentation to NMED demonstrating that the treated effluent is at or below the effluent standards specified for the contaminants of concern listed in Table 2. [20.6.2.1202(A) and (C) NMAC, 20.6.2.3109(C) NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]	Appendix I - Sampling and Analysis Plan
B. Monitoring, Reporting, and Other Requirements		
17	The Permittee shall conduct the monitoring, operations, and reporting listed below. Unless otherwise specified, all periodic monitoring results or general information obtained shall be reported in the forthcoming quarterly report. [20.6.2.3107 NMAC]	Section 6.1 - Reporting
18	Unless otherwise approved by NMED, the Permittee shall conduct sampling in accordance with standard industry practice. Sampling in accordance with the most current version of the GWTS Sampling and Analysis Plan (Appendix L of the O&M Plan), which includes sampling locations, procedures, field measurements, quality control samples, handling and custody, analytical methods, quality control, analytical validation, and reporting requirements, satisfies this Condition. [20.6.2.3107(B) NMAC]	Appendix I - Sampling and Analysis Plan
19	The Permittee shall submit quarterly and annual reports to NMED pursuant to the most recent NMED HWB approved Work Plans. The Permittee shall identify the portions of these reports pertaining to this Discharge Permit with a table in the reports that identifies those portions. Quarterly reports shall be submitted as specified below unless otherwise authorized by NMED: • January 1st through March 31st - due by June 30th • April 1st through June 30th_ due by September 30th • July 1st through September 30th_ due by December 31st • October 1st through December 31st - due by March 31st Annual reporting requirements for the previous year, i.e., January 1st through December 31st, shall be reported in the March 31st quarterly report. [20.6.2.3107(A) NMAC]	Section 6.1 - Reporting
20	The Permittee shall monitor the concentration of all contaminants of concern listed on Table 2 in GWTS treated effluent. Associated sampling and analysis shall be performed monthly at a minimum. When groundwater from a new extraction well is first introduced to the GWTS, contaminant of concern monitoring of the GWTS treated effluent shall occur daily for the first week of treatment, weekly for the first month of treatment, and monthly thereafter. If alterations to, or conditions at, the GWTS result in a potential impact to effluent quality, the Permittee will repeat this sampling sequence as directed by NMED. A representative sample of GWTS influent and effluent shall be analyzed annually for the constituents identified in Table 3. A representative sample of GWTS influent and effluent shall be analyzed every five years for the constituents identified in Table 4. The first analysis of the five-year constituent list shall occur in July 2017. Any newly identified constituents detected during the five-years sampling events will be added to the annual sampling constituent list in Table 3. All analysis of GWTS influent and effluent shall utilize analytical methods with detection limits that are sufficiently low to allow comparison to the standards included in the above referenced state and federal regulations. All sampling, analysis, and reporting shall comply with the most recent approved Work Plans. [20.6.2.3107(A) NMAC and 20.6.2.3107(B) NMAC]	Appendix I - Sampling and Analysis Plan

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
21	The Permittee shall report the volume of treated GWTS effluent discharged to each UIC well each quarter. This report shall include the following: a. Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well; b. The totalized monthly volume of treated effluent transferred to all UIC wells; and c. Monthly average, maximum, and minimum head values of injection water for each UIC well. The Permittee shall monitor the GWTS effluent volume utilizing an effluent flow meter installed on the effluent pump skid after the GAC units. Each UIC well shall have a dedicated flow meter. Flow meters shall be inspected and calibrated in accordance with the associated manufacturer's recommendations. [20.6.2.3107 NMAC]	Section 2.6 - Operation and Maintenance Discharge Locations, Section 6.1 - Reporting

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
22	The Permittee shall include the following results and general information in quarterly reports to NMED: a. Any mechanical integrity conducted on either the GWTS or a UIC well; b. Any replacement of GAC media and the associated data that initiated the decision to replace the media; c. Any UIC well rehabilitation conducted; d. Any malfunction, repair, or replacement of a flow meter; and e. Any additional operational changes with the potential to affect the discharge. [20.6.2.3107 NMAC]	Section 6.1 - Reporting
23	The Permittee shall monitor the groundwater wells in the vicinity of KAFB-7 and in the vicinity of any newly installed UIC well(s) to determine any change to aquifer chemistry that may be the result of injection. This monitoring shall be performed annually, shall conform to the procedures of the most current approved Work Plan, and shall measure the contaminants of concern listed in Table 2. This chemistry will be reported in the Annual Report for BFF. ST-105 Annual Report includes elevation contour mapping and analytical parameters identified in the Stage 2 Abatement Plan. The Permittee shall develop a groundwater elevation contour map depicting the groundwater flow direction in the vicinity of each UIC well and report it in the ST-105 Annual Report. If the chemical quality of the treated groundwater being injected changes over time, NMED may require the Permittee to repeat geochemical modeling (numeric or analytical) to predict the interaction between the treated effluent and receiving groundwater. [20.6.2.3107 NMAC]	Appendix I - Sampling and Analysis Plan
24	The Permittee shall post all reports required by this Discharge Permit on KAFB's most current web site (e.g., https://kirtlandafb.tlisolutions.com/main.aspx.) [20.6.2.3107(A) NMAC]	Section 6.1 - Reporting
	C. Contingency Plan	
25	If the automated monitoring system records a system alarm indicating a threat condition to a UIC well, and that threat condition is confirmed, at a minimum the affected UIC well will be taken off-line. If the alarm condition is confirmed during the response investigation, the UIC well(s) will be taken off-line and the discharge to the UIC well(s) will not be resumed until the problem is identified and corrected. [20.6.2.3107(A) NMAC]	Appendix C - Description of GWTS Equipment and Facilities
26	In accordance with this Discharge Permit, if the discharge to a UIC well exceeds effluent standards, the Permittee shall enact the Contingency Plan (Appendix C). The Permittee may be required to remediate water pollution in accordance with the corrective action provisions in Part 6 of the RCRA Permit except as provided in 20.6.2.4105(B) NMAC. [20.6.2.3107(A) NMAC, 20.6.2.3109(E) NMAC, 20.6.2.4105(A)(2) and (3) NMAC]	Section 1.3 - Discharge Requirements
27	In the event that a release or a spill occurs that is not authorized under this Discharge Permit, the Permittee shall notify the NMED GWQB in accordance with 20.6.2.1203(A) NMAC, shall include any additional reporting requirements specified at RCRA Permit Section 1.27, and shall copy the NMED HWB. The Permittee shall also take measures to mitigate damage from the unauthorized discharge and initiate corrective actions specified in the Contingency Plan (Appendix C). The Permittee may be required to remediate water pollution in accordance with the corrective action provisions in Part 6 of the RCRA Permit except as provided in 20.6.2.4105(B) NMAC. Nothing in this condition shall be construed as relieving the Permittee of the obligation to comply with all requirements of Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC, 20.6.2.4105(A)(2) and (3) NMAC]	Section 3.19.1 Emergency Conveyance Line Repairs
28	In the event that information indicates that a UIC well referenced at Table 1 is not constructed in a manner consistent with its intended use or is not completed in a manner that is protective of groundwater quality, the Permittee shall submit a Work Plan to the NMED with a proposal for well rehabilitation, abandonment only, or abandonment and replacement. This Work Plan shall include a project schedule and shall be submitted for NMED approval within 120 days following confirmation of the above referenced problems. The Permittee may propose an alternate use for the well. The UIC well requiring replacement shall be properly plugged and abandoned in accordance with Part 6.5.17.10.9 of the RCRA permit. [20.6.2.3107(A) NMAC, 20.6.2.5005 NMAC]	NA
29	In the event that NMED or the Permittee identifies any failures of the Application or this Discharge Permit not specifically noted herein, NMED may require the Permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failures. Additionally, NMED may require a modification to this Discharge Permit to achieve compliance with 20.6.2 NMAC. [20.6.2.3107(A) NMAC, 20.6.2.3109(E) NMAC]	NA

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
	D. Closure Plan	
30	Upon permanent cessation of discharge to a UIC well(s), the Permittee shall perform the following closure measures upon NMED approval, unless UIC well(s) and/or conveyance pipelines are needed for another use: a) Cap, plug, or remove all conveyance pipelines to prevent the discharge of GWTS treated effluent to all UIC well(s); b) Abandon UIC well(s) in accordance with Part 6.5.17.10.9 of the RCRA permit, which reference OSE regulation 19.27.4.30 and 31 NMAC and associated well abandonment guidance; and c) Appropriately dispose of any wastes associated with UIC well plugging and abandonment. The Permittee may, instead of abandoning a UIC well, propose an alternate use for the well. Upon cessation of the closure measures, the Permittee shall perform the following post-closure measures: a) Continue monitoring contaminants of concern in groundwater for at least 2 years, or as appropriate and in concurrence with NMED; and b) Enact the release notification requirements of the Contingency Plan if groundwater standards are exceeded. The Permittee may be required to remediate water pollution in accordance with the corrective action provisions in Part 6 of the RCRA Permit except as provided in 20.6.2.4105(B) NMAC. When all post-closure requirements have been met, the Permittee may request to terminate the Discharge Permit. [20.6.2.3107 (A) 11 NMAC]	NA
	E. General Terms and Conditions	
31	The Permittee shall maintain a written record of the following information: a) Information and data used to complete the Application for this Discharge Permit; b) Records of any releases or spills not authorized under this Discharge Permit and reports submitted pursuant to 20.6.2.1203 NMAC; c) Records of the operation, maintenance, and repair of all facilities/equipment used to treat, store, or inject the treated groundwater; d) Facility record drawings (plans and specifications) showing the actual construction of the facility and that the construction complies with all applicable statutes, regulations, and codes including applicable Department of Defense Engineering Standards; e) Copies of quarterly reports completed and/or submitted to NMED pursuant to this Discharge Permit; t) The volume of treated water discharged pursuant to this Discharge Permit; g) Groundwater quality and injected water quality data collected pursuant to this Discharge Permit; h) Copies of construction records and well logs for all groundwater monitoring wells required to be sampled pursuant to this Discharge Permit; i) Records of the maintenance, repair, replacement, or calibration of any monitoring equipment or flow measurement devices required by this Discharge Permit; and j) Data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit. The following information shall be recorded and made available to NMED upon request: i) The dates, location, and times of sampling or field measurements; ii) The sample analysis date of each sample; iii) The name and address of the laboratory, and the name of the signatory authority for the laboratory analysis; iv) The analytical technique or method used to analyze each sample or collect each field measurement; v) The results of each analysis or field measurement; vi) The results of any split, spiked, duplicate or repeat sample; and vii) A copy of the laboratory analysis chain-of-custody as well as a description of the quality assurance and quality control procedures used. The written record shall be maintained by the Permittee so that it is accessible within a reasonable time period during or following a facility inspection by NMED through the post-closure period and shall be made available to NMED upon request. [20.6.2.3107(A) and (C) NMAC]	Section 6 - Recordkeeping
32	The Permittee shall allow NMED representatives to inspect the facility and its operations, which are subject to this Discharge Permit and the NMWQCC regulations. NMED representatives may, upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which any records are located regarding this discharge permit or related discharges required to be maintained by regulations of the federal government or the NMWQCC. The Permittee shall allow NMED representatives to have access to any copy of the records, and to perform assessments, sampling, or monitoring during an inspection for the purpose of evaluating compliance with this Discharge Permit and the NMWQCC regulations. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the NMWQCC Regulations, or any other local, state, or federal regulations. [20.6.2.3107(D) NMAC, NMSA 1978, §§ 74-6-9(B) and 74-6-9(E)]	NA
33	The Permittee shall, upon NMED's request, allow for NMED's duplication of records required by this Discharge Permit and/or furnish to NMED electronic copies of such records. [20.6.2.3107(D) NMAC]	NA
34	In the event the Permittee proposes a change to the facility or the facility's discharge that would result in a change in the volume discharged; the location of the discharge; or in the amount or character of water contaminants received, treated, or discharged by the facility that differs from the terms and conditions in this Discharge Permit, the Permittee shall notify NMED prior to implementing such changes. The Permittee shall obtain approval (which may require modification of this Discharge Permit) by NMED prior to implementing such changes. [20.6.2.7(P) NMAC, 20.6.2.3107(C) NMAC, 20.6.2.3109(E) and (G) NMAC]	Table 6-1 - List of Reports and Recipients

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
35	In the event the Permittee proposes to construct or change an existing system such that the quantity or quality of the discharge will change substantially from that authorized by this Discharge Permit, the Permittee shall submit construction plans and specifications to NMED for the proposed system or process unit prior to the commencement of construction. In the event the Permittee implements changes to an existing system authorized by this Discharge Permit which will result in only a minor effect on the quality of the discharge, the Permittee shall report such changes (including the submission of record drawings, where applicable) in the next quarterly report to NMED. [20.6.2.1202(A) and (C) NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]	NA
36	Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow properly credentialed NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information required to be maintained by this Discharge Permit or related regulation may subject the Permittee to a civil enforcement action. Pursuant to WQA 74-6-1 O(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-lO(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the NMWQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the Permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10 and 74-6-10.1]	NA
37	No person shall: 1) make any false material statement, representation, certification, or omission of material fact in an application, record, report, plan, or other document filed, submitted, or required to be maintained under the WQA; 2) falsify, tamper with, or render inaccurate any monitoring device, method, or record required to be maintained under the WQA; or 3) fail to monitor, sample, or report as required by a permit issued pursuant to a state or federal law or regulation. Any person who knowingly violates or knowingly causes or allows another person to violate the requirements of this condition is guilty of a fourth degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who is convicted of a second or subsequent violation of the requirements of this condition is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition or knowingly causes another person to violate the requirements of this condition and thereby causes a substantial adverse environmental impact is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition and knows at the time of the violation that he is creating a substantial danger of death or serious bodily injury to any other person is guilty of a second degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10.2(A) through 74-6-10.2.F]	NA
38	Nothing in this Discharge Permit shall be construed in any way as relieving the Permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits, or orders. [NMSA 1978, § 74-6-5.L]	NA
39	The Permittee may file a petition for review before the NMWQCC on this Discharge Permit. Such petition shall be in writing to the NMWQCC within 30 days of the receipt of postal notice of this Discharge Permit and shall include a statement of the issues to be raised and the relief sought. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [20.6.2.3112 NMAC, NMSA 1978, § 74-6-5.O]	NA
40	Prior to the transfer of any ownership, control, or possession of this facility or any portion thereof, the Permittee shall: 1) notify the proposed transferee in writing of the existence of this Discharge Permit; 2) include a copy of this Discharge Permit with the notice; and 3) Deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. Until both ownership and possession of the facility have been transferred to the transferee, the Permittee shall continue to be responsible for any discharge from the facility. [20.6.2.3111 NMAC]	NA
41	Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. Permit fees are associated with issuance of this Discharge Permit. Nothing in this Discharge Permit shall be construed as relieving the Permittee of the obligation to pay all permit fees assessed by NMED. A Permittee that ceases discharging or does not commence discharging from the facility during the term of the Discharge Permit shall pay all permit fees assessed by NMED. An approved discharge permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [20.6.2.3114(F) NMAC, NMSA 1978, § 74-6-5(K)]	NA

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
	RG-1587 (KAFB-7)	
1	This application is approved as follows: Permittee: Kirtland Air Force Base Permit No: RG-1587 Application File Date: September 17, 2015 Notice for Publication Issued: October 13, 2015 Affidavit of Publication Filed: November 4, 2015, The Albuquerque Journal published on October 16, 23, and 30, 2015 Priority: March 1, 1949 Source: Groundwater Point of Diversion: RG-1587: Located at a point where X=1,544,731.13 feet and Y=1,470,756.22 feet, NMSPCS, Central Zone, NAD83, on land owned by the Kirtland Air Force Base, Bernalillo County, New Mexico. Purpose of Use: Extraction/Production, Injection, and Irrigation Place of Use: NE1/4 NE1/4, Section 1, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico, and under permits RG-1579 through RG-1589 the applicant will discharge treated groundwater into the Tijeras Arroyo Golf Course main pond, infiltration galleries located adjacent to the golf course, and injection wells on land owned by the Kirtland Air Force Base.	NA
2	The total diversion of water from well RG-1587 under this permit shall not exceed 4,500 acre-feet per annum.	NA
3	The total injection of water from well RG-1587 under this permit shall not exceed 2,000 acre-feet per annum.	Table 2-2 - Permitted Extraction Rates
4	Well RG-1587 shall be equipped with a totalizing meter of a type, at location(s) approved by, and installed in a manner acceptable to the State Engineer. Records of the amount of water pumped and injected shall be submitted, in writing, to the District 1 Office of the State Engineer on or before the 10th day of January, April, July and October of each year. No water shall be diverted from any well unless equipped with a functional totalizing meter. The Permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.	Section 2.6 - Operation and Maintenance of Discharge Locations, Section 6.1 - Reporting
5	The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.	Section 2.6 - Operation and Maintenance of Discharge Locations
6	This Permit will expire on December 1, 2025.	Table 1-1
	RG-1579 POD 292 (KAFB-106228)	
1	This application is approved as follows: Permittee: Kirtland Air Force Base Permit Number: RG-1579 POD 292 Application File Date: November 13, 2014 Notice for Publication: February 10, 2015 Affidavit of Publication: May 1, 2015 from the Albuquerque Journal Priority: March 1, 1949 Source: Groundwater Points of Diversion: RG-1581 POD 292, located at a point where X=1,543,677 feet and Y=1,476,476 feet, NMSPCS, Central Zone, NAD 83, within the NE 1/4 NE 1/4 of Section 36, Township 10 North, Range 3 East, NMPM, Bernalillo County New Mexico. Purpose of Use: Pollution control and recovery, specifically extraction of groundwater for remediation Place of Use: Land within Kirtland Air Force Base, and land within Section 36, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico. Amount of Water: 403 acre-feet per annum	NA
2	The total diversion of groundwater from well RG-1579 POD 292 shall be limited to 403 acre-feet per annum, measured at the well, a portion of the 6,398 acre-feet per annum, which includes the water right of 4,500 acre-feet per annum from well Numbers RG-1581 through RG-1589 (Kirtland East), and 1,898 acre-feet per annum from Numbers RG-1579, RG-1580 and RG-1579 and RG-1580 Combined-S (Kirtland West).	Table 2-2 - Permitted Extraction Rates
3	The total amount of water pumped from well RG-1579 POD 292 shall be measured by a totalizing meter of a type, at a location, and installed in a manner acceptable to the State Engineer. The Permittee shall provide the make, model, serial number, initial reading, units, multiplier, data of installation, and dates of recalibration to the State Engineer prior to any diversion of water under this permit.	Section 2.2 - Groundwater Well Pumps and Flow Control, Section 6.1 - Reporting
4	Records of the quantity of water diverted from well RG-1579 POD 292 shall be submitted to the District 1 Office via mail, e-mail, or facsimile on or before the 10th day of the months of January, April, July, and October for the preceding 3 calendar months, i.e., quarterly.	Table 6.1 - List of Reports and Recipients
5	None	NA
6	The Permittee shall utilize the highest and best technology available to assure conservation of water to the maximum extent practical.	Section 2.2 - Groundwater Well Pumps and Flow Control
7	This permit shall automatically expire on June 15, 2025 or upon completion of the intended purpose of use. If the intended purpose of use is completed prior to June 15, 2025, the permittee shall notify the State Engineer by certified letter.	Table 1-1 - Applicable Permits
8	Proof of Completion of Well shall be filed on or before June 15, 2017.	NA

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan
	RG-1579 POD 309 (KAFB-106233) and POD 310 (KAFB-106234)	
1	This application is approved as follows: Permittee: Kirtland Air Force Base Permit No: RG-1579 POD 309 and POD 310 Application File Date: July 10, 2015 Notice for Publication Issued: August 25, 2015 Affidavit of Publication Filed: September 14, 2015, The Albuquerque Journal published on August 28, September 5, and September 11, 2015 Priority: March 1 , 1949 Source: Groundwater Point of Diversion: RG-1579 POD 309: Located at a point where X=1,543,061 feet and Y=1,476,824 feet, NMSPCS, Central Zone, NAD 83, on land owned by the City of Albuquerque, Bernalillo County, New Mexico. RG-1579 POD 310: Located at a point where X=1,544,083 feet and Y=1,478,577 feet, NMSPCS, Central Zone, NAO 83, on land owned by the City of Albuquerque, Bernalillo County, New Mexico. Purpose of Use: Pollution Control and Recovery, and Irrigation Place of Use: SE 1/4 SE 1/4, Section 25, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico, and under permits RG-1579 through RG-1589 the applicant will discharge treated groundwater into the Tijeras Arroyo Golf Course main pond, infiltration galleries located adjacent to the golf course, and injection wells on land owned by the Kirtland Air Force Base.	NA
2	The total diversion of water from wells RG-1579 POD309 and RG-1579 POD310 under this permit shall not exceed 636 acre-feet per annum.	Table 2-2 - Permitted Extraction Rate
3	Wells RG-1579 POD309 and RG-1579 POD310 shall be equipped with a totalizing meter of a type, at location(s) approved by, and installed in a manner acceptable to the State Engineer. Records of the amount of water pumped shall be submitted, in writing, to the District 1 Office of the State Engineer on or before the 10th day of January, April, July and October of each year. No water shall be diverted from any well unless equipped with a functional totalizing meter. The Permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.	Section 2.2 - Groundwater Well Pumps and Flow Control, Section 6.1 - Reporting
4	The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.	Section 2.2 - Groundwater Well Pumps and Flow Control
5	This Permit will expire on November 1, 2025.	Table 1-1 - Applicable Permits
	RG-1579 POD 319 (KAFB-106239)	
1	This application is approved as follows: Permittee: Kirtland Air Force Base Permit No: RG-1579 POD319 Application File Date: August 25, 2016 Notice for Publication Issued: September 14, 2016 Affidavit of Publication Filed: October 6, 2016, The Albuquerque Journal published on September 18, 25, and October 2, 2016 Priority: March 1, 1949 through March 6, 1956 Source: Groundwater Point of Diversion: RG-1579 POD319: (KAFB-106239) Located at a point where X=1,542,707.9 feet and Y=1,475,412 feet, NAD 83, SPCS, Central Zone, on land owned by the City of Albuquerque, Bernalillo County, New Mexico. Purpose of Use: Pollution Control and Recovery Place of Use: SE 1/4 SE 1/4,, Section 25, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico, and under permits RG-1579 through RG-1589 the applicant will discharge treated groundwater into the Tijeras Arroyo Golf Course main pond, infiltration galleries located adjacent to the golf course, and injection well, RG-1587, on land owned by Kirtland Air Force Base.	NA
2	The total diversion of water from well RG-1579 POD319 under this permit shall not exceed 323 acre-feet per annum consumptive use.	Table 2-2 - Permitted Extraction Rate
3	The new well shall be drilled by a well driller licensed in the State of New Mexico, and a well record for new well RG-1579 POD319 shall be filed with the Office of the State Engineer within twenty (20) days of drilling the well.	NA
4	Well RG-1579 POD319 shall be equipped with a totalizing meter of a type, at location(s) approved by, and installed in a manner acceptable to the State Engineer. Records of the amount of water pumped shall be submitted, in writing, to the District 1 Office of the State Engineer on or before the 10th day of each month. No water shall be diverted from any well unless equipped with a functional totalizing meter. The permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.	Section 2.2 - Groundwater Well Pumps and Flow Control, Section 6.1 - Reporting
5	The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.	Section 2.2 - Groundwater Well Pumps and Flow Control
6	This permit will expire on December 1, 2025.	Table 1-1 - Applicable Permits
7	The State Engineer retains jurisdiction over this permit.	NA
8	Pursuant to Section 72-8-1 NMSA, the permittee shall allow the state engineer and his representative's entry upon private property for the performance of their respective duties, including access to the wells for meter readings and water level measurements.	NA

Table 1-2
Permit Terms and Conditions, Operations and Maintenance Plan Cross References

Condition No.	Terms and Conditions	Reference Location in O&M Plan

$ = dollar(s)
AF = Air Force
AFB = Air Force Base
BFF = Bulk Fuels Facility
EBS = environmental baseline survey
EDB = ethylene dibromide
EPA = U.S. Environmental Protection Agency
EUL = enhanced use lease
GAC = granular activated carbon
gpd = gallon per day
GWQB = Groundwater Quality Bureau
GWTS = groundwater treatment system
HWB = Hazardous Waste Bureau
KAFB = Kirtland Air Force Base
LNAPL = light non-aqueous phase liquid
MCL = maximum contaminant level
NA = not applicable
NM = New Mexico
NMAC = New Mexico Administrative Code
NMED = New Mexico Environment Department
NMPM = New Mexico Principal Meridian
NMSA = New Mexico Statutes Annotated
NMSPCS = New Mexico State Place Coordinate System
NMVAHCS = New Mexico Veterans Administration Health Care System
NMWQCC = New Mexico Water Quality Control Commission
O&M = operations and maintenance
OSE = Office of the State Engineer
POD = point of diversion
RCRA = Resource Conservation and Recovery Act
SWMU = solid waste management unit
UIC = underground injection control
WQA = Water Quality Act

Table 1-3
GWTS Effluent UIC Well Discharge Limits

Constituents	Effluent Standard
Ethylene Dibromide[1]	0.05 µg/L
Benzene[1]	5.0 µg/L
Ethylbenzene[1]	700 µg/L
Toluene[1]	750 µg/L
Total Xylenes[1]	620 µg/L
Iron[1]	1,000 µg/L
Manganese[1]	200 µg/L
pH[2,3]	6 (minimum) to 9 (maximum)
Total residual chlorine[2,3]	NA mg/L - 11 µg/L
Total suspended solids[2,3]	21 mg/L - 33 mg/L
Biochemical oxygen demand[2,3]	26 mg/L - 48 mg/L
Oil and grease[2,3]	8 mg/L - 15 mg/L

[1]UIC discharge limits are in accordance with Table 2 of DP-1839.

[2]NPDES discharge limits are in accordance with NPDES Permit Number NM0031216 Part I Section A(1).

[3]Only applicable during times of discharge to the NPDES outfall.

GWTS = groundwater treatment system
NPDES = National Pollutant Discharge Elimination System
UIC = underground injection control
µg/L = micrograms per liter
mg/L = milligrams per liter

Table 2-1
Alarm Conditions, Interlocks, and System Responses

Alarm Condition	Interlock	System Response
Leak detected in an extraction well vault or well control house	Disables extraction pumps associated with the affected vault	Email and shutdown of the affected equipment
Leak detected in a double walled pipe	Disables all extraction pumps	Email and shutdown of the affected equipment
High water level in groundwater treatment system building sump or truck bay sump	Disables all extraction pumps and all skid pumps	Email and immediate Full system shutdown
Water level too high in influent tank	Disables all extraction pumps	Email and eventual Full system shutdown
Water level too low in influent tank or too high in effluent tank	Disables influent skid pumps	Email and eventual Full system shutdown
Water level too high in effluent tank	Disables effluent skid pump	Email and eventual Full system shutdown
Water level too low in effluent tank	Disables effluent skid pump	Email and eventual Full system shutdown
Influent skid or granular activated carbon pressure exceeds set point	Disables influent skid pumps	Email and eventual Full system shutdown
Effluent skid pressure exceeds set point	Disables effluent skid pump	Email and eventual Full system shutdown
Main panel AC power failure	Disables all skid pump and extraction wells	Email and eventual Full system shutdown
Intrusion alert, low temperature detected, or high influent bag filter differential pressure	None	Email
Smoke detected in groundwater treatment system	None	Email and notifies Kirtland Air Force Base Fire Department
High water level or high pressure in well KAFB-7	Disables effluent skid pump	Email and eventual Full system shutdown
High water level or high pressure in well KAFB-106IN2	Disables effluent skid pump	Email and eventual Full system shutdown
High water level in Golf Course Main Pond	Disables effluent skid pump	Email and eventual Full system shutdown
Activation of emergency stop	Disables all extraction pumps and all skid pumps	Email and immediate Full system shutdown
High water level in sand filter clarifier	Entire system shutdown	Email and immediate Full system shutdown

Table 2-2
Permitted Extraction Well Flow Rates

Well ID	Permit No.	Extraction/Injection Flow Rate Not to Exceed (gpm, continuous for 24 hours)	Total Extracted Volume Not to Exceed (gallons, continuous for 24 hours)
KAFB-106228	RG-1579 POD 292	250	360,000
KAFB-106233	RG-1579 POD 309	197	283,680
KAFB-106234	RG-1579 POD 310	197	283,680
KAFB-106239	RG-1579 POD 319	200	288,000
KAFB-7	DP-1839	1000 (injection)	1,440,000
KAFB-106IN2	DP-1839	1000 (injection)	1,440,000
NPDES outfall	NM0031216	800 (discharge)	1,152,000

ID = identification
gpm = gallon per minute
No. = number

Table 2-3
GAC Loading Criteria

Contaminant	Maximum Influent Concentrations Reaching the Lead GAC Vessel	GAC Design Concentrations	Current Influent Concentrations
1,2-Dibromoethane	250	2	<0.019
Benzene	197	<0.5	<0.5
Ethylbenzene	197	<0.5	<0.8
Toluene	200	<0.5	<0.5
Xylenes, Total	1,000	<1.5	<3.0

All concentrations are reported in micrograms per liter

Maximum incluent concentrations reaching the lead GAC vessel are discussed in the Technical Memorandum Establishing the Basis of Design Maximum Concentration Limits for the Kirtland BFF GWTS

GAC design concentrations are presented in Appendix G of this Operations and Maintenance Plan

Current influent concentrations are from December 2020

Table 2-4
Standard Operational Set Points

PID Set Points			
Item		**Set Point**	**Units**
Groundwater Influent Pump 112	Flow Rate	Varies	gpm
	KP	1.5	--
	KI	0.05	--
	KD	0	--
Groundwater Influent Pump 212	Flow Rate	Varies	gpm
	KP	1.5	--
	KI	0.05	--
	KD	0	--
Treated water Effluent Pump 118	Flow Rate	Varies	gpm
	KP	1.25	--
	KI	0.09	--
	KD	0	--
Treated water Effluent Pump 218	Flow Rate	Varies	gpm
	KP	1.25	--
	KI	0.09	--
	KD	0	--
System Distribution Pressure Control	Pressure	20	psi
	KP	2	--
	KI	0.02	--
	KD	0	--
KAFB-7 Injection Pressure	Pressure	15	psi
	KP	1.5	--
	KI	0.2	--
	KD	0.02	--

Train Control Set Points		
Item	**Set Point**	**Units**
Extraction Well Drawdown	1.0 - 5.0	ft
Influent Bag Filter High Differential Pressure	4	psid
Downstream Distribution High Pressure	45	psid
KAFB-7 High Level	200	ft
Golf Course High Level	5.3 - 5.7	ft
Groundwater Influent Pumps - Level Stop	3.5 - 4.5	ft
Groundwater Influent Pumps - Level Start	7.0 - 8.0	ft
Treated water Effluent Pumps - Level Stop	3.5 - 4.5	ft
Treated water Effluent Pumps - Level Start	7.0 - 8.0	ft

Manual Alarm Set Points		
Item	**Set Point**	**Units**
Influent Skid High Pressure Switches	40	psi
Carbon Absorber High Pressure Switches	40	psi
Effluent Skid High Pressure Switches	50	psi
Tank High Level Switches	11	ft
Tank Low Level Switches	2	ft

gpm = gallon per minute
ft = foot/feet
KD = derivative gain
KI = integral gain
KP = proportional gain
PID = proportional–integral–derivative
psi = pound per square inch
psid = pound per square inch differential

Table 3-1
Groundwater Treatment System Routine Maintenance Schedule

	Frequency			
Maintenance Activity	**Daily**	**Weekly**	**Monthly**	**As Needed**
Recording and inspecting influent, GAC vessel, and effluent skid pressure, flow rate, and totalizer readings from their respective gauges and the human machine	X			
Recording extraction well pressure, flow rate, and totalizer readings from the human machine interface	X			
Recording extraction well pressure, flow rate, and totalizer readings from the gauges at the well vaults		X		
Inspecting well control house and recording well control house pressure, flow rate, and totalizer readings		X		
Recording totalizer reading at KAFB-7		X		
Running and inspecting the GWTS air compressor		X		
Inspecting extraction well, conveyance line, and air release valve vaults			X	
Inspecting wellhead and associated equipment of injection well KAFB-7			X	
Inspecting and performing maintenance of flowmeters throughout the system			X	
Inspecting and performing maintenance on actuating valves throughout the system			X	
Performing confined space entries			X	
Gauging extraction well filter pack			X	
Inspecting and cleaning the GWTS Y-strainer				X
Logging lockout-tagout entries				X
Logging system shutdowns				X
Emptying storm water runoff flooded vaults				X
Performing air compressor maintenance				X
Cleaning GWTS sumps				X
Draining air release valve containment vessels				X
Grounds keeping including vegetation control				X
Semiannual inspections and maintenance of Tijeras Arroyo Gold Course ponds				X[a]
Performing flow meter calibration				X[b]
Greasing pump bearings				X[c]
Changing process pump oil				X[c]
Changing air filter on control room air conditioner				X[c]
Changing bag filters				X[d]
Changing out GAC				X[d]
Disinfection of extraction wells and conveyance lines				X[e]
Testing of alarms and interlocks				X[f]
Cleaning coils and replacing air filter for the Well Control House air conditioner				X[g]
GAC Skimming of the lead GAC vessel				X[h]

Table 3-1
Groundwater Treatment System Routine Maintenance Schedule

[a] Inspections are performed semi-annually while maintenance is performed as needed.
[b] Flowmeters are calibrated at a minimum of once per year, but may be calibrated more often as needed.
[c] Changing of process pump oil, greasing pump bearings, and replacing the air filter in the air conditioning unit are
[d] Bag filters are scheduled for change out when the pressure differential across a bag filter vessel exceeds 15 psi
[e] Disinfection of extraction wells and conveyance lines occurs semiannually or more often as needed.
[f] Testing of alarms and interlocks occurs annually or more often as needed.
[g] Cleaning of the coil and replacing of the air filter are scheduled as quarterly activities, but frequency may be
[h] GAC skimming is performed when the differential pressure in the lead GAC vessel has increased from the
GAC = granular activated carbon
GWTS = groundwater treatment system
KAFB = Kirtland Air Force Base
psi = pound per square inch

Table 3-2
Large Item Inventory

Item	Item Description	Quantity in Inventory	Owner
Replacement Transducer and Cable	In-Situ Level TROLL 700, 30 pounds per square inch gauge with 500+ foot rugged, vented, TEFZEL cable	5	Government
Replacement Pump and Motor for Extraction Wells KAFB-106233 and KAFB-106234	Grundfos 13B63622 150S400-22 60 Hertz	1	Government
Replacement Skid Pump and Motor	Goulds Pumps Model 3196 Sti Size 2 x 3-6 i-FRAME with 15-horsepower, 3,600 revolutions per minute motor	1	Government
Replacement Variable Frequency Drive for Pump Skids	Allen-Bradley PowerFlex 700 Adjustable Frequency AC Drive	0	Government
Replacement Magnetic Flowmeter	Siemens SITRANS F M MAG 5100 W	0	Government
Replacement Dosing Pump	Pumps and tanks for injection and storage of oxidants	2	Government
Replacement Production Pump for KAFB-7	HydrofloPumps Model 11ML-9, SN: CA21506	1	Government
Replacement Pump and Motor for Extraction Well KAFB-106239	Grundfos 25HP 460V 3PH 6-inch Motor and Frantklin 100 FA25S6PE Pump End	1	Government
Replacement emergency conveyance line for KAFB-106233, KAFB-106234, and KAFB-106239	ASAHI 4" SDR-11 X 8" SDR-17 HDPE Double Containment Pipe by 20' Length; 2 4"x8" HDPE SDR 11x17 Cap; 8 4"x8" Centralizer Dbl Cont BF HDPE 11x17 STD SDR Fluid-Lok; 1 4"x8" 45 Elbow DBL Cont BF HDPE 11x17 STD SDR Fluid-lok; 1 4"x8" 90 Elbow DBL Cont BF HDPE 11x17 STD SDR Fluid-lok. ASAHI 8"x12" Pipe Simult DBL Cont BF HDPE 11x17 STD SDR Fluid-lok; 2 8"x12" HDPE IPS SDR11x17 Fluidlok Cap; 8 8"x12" Centralizer DBL Cont BF HDPE 11x17 STD SDR Fluid-lok; 1 8"x12" 45 Elbow DBL Dont BF HDPE 11x17 STD SDR Fluid-lok; 1 8"x12" 90 Elbow DBL Cont BF HDPE 11x17 STD SDR Fluid-lok	1	Government
Replacement emergency conveyance line for KAFB-106228	SECOR 4" SDR-11 X 8" SDR-17 IPS HDPE Dual Containment Pipe by 20' Length; 2 Dual Containment BF End Cap; 8 Dual Containment Centralizer; 1 Dual Containment BF 45 degree Elbow; 1 Dual Containment BF 90 degree Elbow	1	Government
Dust Suppression Water Trailer	2018 Wylie EXP-500L-E Tank Trailer for dust supression	1	Government

Table 3-3
Specific Consumable Product Codes, Suppliers, and Recommended On-Hand Inventory

Consumable Item	Product Ordering Code	Supplier[a]	Recommended On-Hand Inventory
10-micrometer bag filters	PES10P2S-H	Baker Corp 2400 South Cedar ST Borger, TX 79007 Phone: (806) 273-3747	48+
Bag Filter Housing O-Rings	CB26LB O Ring, Buna, LR6/C26	Pentair Residential Filtration, LLC. 5730 North Glen Park Road Milwaukee, WI 53209	8
Culinox 999 Food Grade Salt	Culinox 999 Food Grade Salt	Univar USA Inc. P.O. Box 34325 Seattle, WA 98124	500 pounds
GAC Vessel Manway O-Rings	14- X 18-inch Elliptical Manway Gasket (TIGG) 14- X 18-inch Elliptical Manway Gasket, G46, EPDM, Off-White (Calgon Carbon)	TIGG LLC (for Train 1) 1 Willow Avenue Oakdale, PA 15071 Calgon Carbon Corporation (for Train 2) 3000 GSK Drive Moon Township, PA 15108	2 per train
KAFB-7 Hydraulic Oil filter	Filter P551551	Grainger 3901 Osuna Rd. NE Albuquerque, NM 87109	1
Pump grease	Mobile PolyRex EM	Grainger 3901 Osuna Rd. NE Albuquerque, NM 87109	3 tubes
Pump oil	DTE 26 Mobile hydraulic oil	Grainger 3901 Osuna Rd. NE Albuquerque, NM 87109	5 gallons
Sand Filter Media	GRAVEL #3 CRUSHED 5/8 inches	Yardney Water Filtration Systems, Inc. 6666 Box Springs Blvd. Riverside, CA 92507	None
	8/12 GARNET		None
	SILICA BASE QUANTUM DMI 65		None
VFD Fuses	FLSR 100, 100 A, 600 VAC	Littelfuse, Inc. 8755 West Higgins Road Suite 500 Chicago, IL 60631	4

[a] Supplier listed or equivalent.
GAC = granular activated carbon
VFD = variable frequency drive

Table 3-4
Consumables Supply Inventory

Item	Item Description/ Intended Use	Quantity Needed Onsite	Owner
Laptop	Laptop for various calculations and data collection	1	Contractor
In-Situ TROLLCOM	Communication device used to communicate with downhole transducers	1	Contractor
Emergency contact signage	A sign of current emergency contacts	4	Contractor
Well control house key	Well control house door key	2	Government
Master lock keys	Key for locks on well vaults	2	Government
Vault keys	Keys to open well vaults	1	Government
Locks	For well vaults, electric panels, and other items	6	Government
5-gallon bucket	Water collection under air release valves both in plant and in vaults	16	Contractor
Sump pump	7-gallon per minute/quick water transfer	3	Contractor
Extension cord	Various applications and lengths	3	Contractor
Surge protector	Various applications	3	Contractor
Flex hose	For quick draining of bag filter housings	2	Government
Garden hoses	Various applications and lengths	3	Government
Hose nozzle attachment	Controlled water usage with hose	1	Government
Diffusers for carbon vessels	Replacement for inside vessels	2	Government
Pipe drop sump pump configuration	Liberty B39676506X /for truck sump drainage with associated piping to camlock fitting	1	Government
Cam fitted hose	2-inch identification cam fitted hose for moving water, 25-foot sections	4	Government
Cam fitted hose	1.5-inch identification cam fitted hose for moving water, various length	2	Government
Cam fitted hose	6-inch cam fitted hose for moving water, 10-foot sections	3	Government
Shop vac	Various applications	1	Contractor
Shop vac wet filter	Vacuuming water	2	Contractor
Shop vac dry filter	Vacuuming particulate	2	Contractor
Truck sump grate lift	Chain and rigid wood configuration used in conjunction with lift gates on a truck	1	Contractor
Teflon thread tape roll	Protective thread tape needed to ensure fittings seal	2	Contractor
Air hose	1-inch hose for air compressor with Chicago fittings, 50-foot sections	2	Government
Air nozzle	Nozzle for controlled air from compressor	1	Government
Heat gun	Various applications	1	Contractor
Lockout/tagout tags and locks	Electrical panel safety	1 package	Contractor
Zip ties	Various applications and lengths	2 packages	Contractor
Contractor bags	Various uses	1 package	Contractor
Ladder	4-foot and 8-foot, various uses	2	Contractor
Pens	Various uses	1 package	Contractor
Permanent markers	Various uses	1 package	Contractor
Brooms	GWTS maintenance	2	Contractor
First aid kits	GWTS safety	2	Contractor
Trash cans	Store trash prior to disposal	3	Contractor

Table 3-4
Consumables Supply Inventory

Item	Item Description/ Intended Use	Quantity Needed Onsite	Owner
Traffic cones	Various uses, for barricading vaults and denoting exclusion zones	10	Contractor
Caution tape	Taping off exclusion zones	3 rolls	Contractor
Fire extinguisher	GWTS safety	3	Government
Eyewash	GWTS safety	2	Government
Secondary containment pallets	GWTS safety	3	Government
2-inch valve key	Effluent line integrity testing	1	Contractor
Food grade salt	50 lb Morton Culinox 999 Food Grade Salt for brine tank for sodium hypochlorite generator	10	Contractor

GWTS = groundwater treatment system

Table 5-1
Influent Criteria

Parameter	Contaminant	Analysis	Discharge Criteria[1]	Maximum Influent Concentrations Reaching the Lead Granular Activated Carbon Vessel	Maximum Single Extraction Well Concentrations[2]	Small Volume IDW Concentrations at Minimum Flow Conditions[3]	Small Volume IDW Concentrations at Maximum Flow Conditions[4]	Large Volume IDW Concentrations at Minimum Flow Conditions[5]	Large Volume IDW Concentrations at Maximum Flow Conditions[6]
Ethylene Dibromide	1,2-Dibromoethane	EPA Method SW8011	0.05	20	41	1,100	1,250	88	225
Volatile Organic Compounds	Benzene	EPA Method SW8260C	5.0	450	405	499	499	499	499
	Ethylbenzene	EPA Method SW8260C	750	102	210	5,500	6,000	450	1,150
	Toluene	EPA Method SW8260C	700	212	436	12,000	13,250	935	2,400
	Xylenes, Total	EPA Method SW8260C	620	110	226	5,750	6,500	485	1,225
Dissolved Metals	Iron	EPA Method SW6010C	1000	1,000	20,571 (2,057)	570,000 (57,000)	625,000 (62,500)	44,250 (4,425)	112,500 (11,250)
	Manganese	EPA Method SW6010C	200	200	20,571 (411)	570,000 (11,000)	625,000 (12,000)	44,250 (880)	112,500 (2,250)
Field Parameters	Temperature (°C)	NA	NA	NS	NS	NS	NS	NS	NS
	Spec Cond (µS/cm)	NA	NA	NS	NS	NS	NS	NS	NS
	pH (S.U.)[7]	NA	NA	7 - 8	NS	NS	NS	NS	NS
	ORP (mV)	NA	NA	NS	NS	NS	NS	NS	NS
	DO (mg/L)[7]	NA	NA	4.5 - 8.6	NS	NS	NS	NS	NS

Maximum influent concentrations reaching the lead GAC vessel are discussed in the Technical Memorandum Establishing the Basis of Design Maximum Concentration Limits for the Kirtland BFF GWTS

Simple continuous mixing calculations and AQUASIM model descriptions are further described in the Technical Memorandum Establishing the Basis of Design Maximum Concentration Limits for the Kirtland BFF GWTS

Field parameter criteria is established from the historical maximum and minimum readings obtained during monthly sampling. These criteria are used as a guideline, if reading are observed outside of the of the specified range a system assessment will be performed. The parameters are collected as specified in Appendix I for monitoring purposes.

Values in parentheses indicate values calculated assuming the sand filters are not installed or otherwise offline.

[1] Discharge criteria is in accordance with DP-1839 Table 2.

[2] Maximum concentrations of water produced from a single well were calculated assuming a maximum well flow rate of 175 gpm, maximum system flow rate of 400 gpm, installation of the sand filters, and using a simple continuous mixing calculation.

[3] Maximum concentrations of 55 gallons of IDW water that can be discharged to the GWTS sump, which were calculated assuming a minimum system flow rate of 120 gpm, installation of the sand filters, and using the AQUASIM model.

[4] Maximum concentrations of 55 gallons of IDW water that can be discharged to the GWTS sump, which were calculated assuming a maximum system flow rate of 365 gpm, installation of the sand filters, and using the AQUASIM model.

[5.] Maximum concentrations of 21,000 gallons of IDW water that can be discharged to the GWTS sump, which were calculated assuming a minimum system flow rate of 120 gpm, installation of the sand filters, and using the AQUASIM model.

[6] Maximum concentrations of 21,000 gallons of IDW water that can be discharged to the GWTS sump, which were calculated assuming a maximum system flow rate of 365 gpm, installation of the sand filters, and using the AQUASIM model6

[7] Operational parameter not required by discharge permit.

°C = degree Celsius
µg/L = microgram(s) per liter
µS/cm = microsiemen(s) per centimeter
DO = dissolved oxygen
gpm = gallon per minute
GWTS = groundwater treatment system
IDW = investigation-derived waste
mg/L = milligram per liter
mV = millivolt
NS = not specified
ORP = oxidation reduction potential
Spec Cond = specific conductivity
S.U. = standard unit

Table 6-1
Reports and Recipients

Report Title	Regulatory Permit/Document Requiring	Report Contents	Responsible Party	Recipients	Transmission Method
Greater than 24-Hour Shutdown Notification	Operations and Maintenance Plan	- Notification of greater than 24-hour shutdown -Notification will be provided within 24-hours	Operator	AFCEC and USACE	Email
			AFCEC	NMED GWQB and NMED HWB	Email
Notification of Change resulting in change in volume of discharge, location of discharge, or amount or character of contaminants received, treated, or discharged outside of DP-1839 scope	DP-1839 issued by NMED GWQB, Condition 22.e	- Notification of change in volume of discharge, location of discharge, or amount or character of contaminants received, treated, or discharged outside of DP-1839 scope -Notification will be provided within 24-hours	Operator	AFCEC and USACE	Email
			AFCEC	NMED GWQB and NMED HWB	Email
Kirtland BFF - Weekly Update-W/E mm/dd/yy	USACE Contract Requirement	- Site Monitoring Status - Weekly GWTS Operational Values - Current Discharge Location - Recent Effluent Analytical Results - Weekly Maintenance Information	Operator	Kirtland Air Force Base Civil Engineering Group AFCEC/USACE	Email
Kirtland BFF - GWTS Monthly Water Summary - month year	Kirtland Air Force Base Water Use/conservation Internal Reporting	- Table containing monthly total extracted and discharged by Discharge Location	Operator	Kirtland Air Force Base Civil Engineering Group AFCEC/USACE	Email
Kirtland BFF - NMOSE Monthly Reporting for GWTS - month year	Kirtland Air Force Base NMOSE Quarterly Reporting for all NMOSE Permits	- Table containing monthly extraction totals per well and injection volume	Operator	Kirtland Air Force Base Civil Engineering Group AFCEC/USACE	Email
			Kirtland Air Force Base Civil Engineering Group	NMOSE	Email

Table 6-1
Reports and Recipients

Report Title	Regulatory Permit/Document Requiring	Report Contents	Responsible Party	Recipients	Transmission Method
Kirtland BFF Quarterly/Annual Report	DP-1839 issued by NMED GWQB	- Summarize ongoing site monitoring and interim measure activities (Condition 17) - Any mechanical integrity testing conducted on either the GWTS or a UIC well (Condition 22.a) - Any replacement of granular activated carbon media and the associated data that initiated the decision to replace the media (Condition 22.b) - Any UIC well rehabilitation conducted (Condition 22.c) - Any malfunction, repair, or replacement of a flow meter (Condition 22.d) - Any additional operational changes with the potential to affect the discharge (Condition 22.e) - Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well (Condition 21.a) - The totalized monthly volume of treated effluent transferred to all UIC wells (Condition 21.b) - Monthly average, maximum, and minimum head values of injection water for each UIC well (Condition 21.c)	Operator	AFCEC/USACE	Electronic Deliverable
			AFCEC	NMED GWQB and NMED HWB	Hardcopy and Electronic Deliverable (provided by Operator)
	HWTF Interim Measure Resource Conservation and Recovery Act Permit Section 6.2.4.4 Periodic Monitoring Reports Approved Work Plans USACE Contract Requirements	- A description of the work completed and an estimate of the percentage of total planned work completed - Summaries of all findings, including summaries of laboratory data - Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems - Planned work for the next reporting period - Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups, or State government during the reporting period - Changes in key project personnel during the reporting period - Summaries of any variances from approved investigation or remediation work plans - Brief summaries of any periodic monitoring reports prepared in accordance with the requirements in Permit Section 6.2.4.4.	Operator	AFCEC/USACE	Electronic Deliverable
			AFCEC	NMED HWB	Hardcopy and Electronic Deliverable (provided by Operator)

AFCEC = Air Force Civil Engineer Center
BFF = Bulk Fuels Facility
DP = discharge permit
GWQB = Groundwater Quality Bureau
GWTS = groundwater treatment system
HWB = Hazardous Waste Bureau
HWTF = Hazardous Waste Treatment Facility
NMED = New Mexico Environment Department
NMOSE = New Mexico Office of the State Engineer
UIC = underground injection control
USACE = U.S. Army Corps of Engineers

LIST OF REGULATORY CORRESPONDENCE, REVISION TRACKING, AND PERMITS

A-1 Regulatory Correspondence

Notice of Disapproval for the Operations and Maintenance Plan Revision R3
Response to Comments

A-2 Revision Tracking/Red-Line Documents
Provided via CD

A-3 Regulatory Approvals and Permits

Groundwater Treatment System Design Approvals

New Mexico Environment Department Permits
Hazardous Waste Treatment Facility Operating Permit EPA ID No. NM9570024423
DP-1770 Modification Application and Termination
Discharge Permit Issuance, DP-1839, Kirtland Air Force Base

State of New Mexico Office of the State Engineer Permits
RG-1587 - KAFB-7
RG-1587 - POD 376-379 KAFB-106IN2
RG-1579 POD 292
RG-1579 POD 309 and 310
RG-1579 POD 319

U.S. Environmental Protection Agency Permits
NPDES Permit No. NM0031216

APPENDIX A

REGULATORY CORRESPONDENCE, REVISION TRACKING, AND PERMITS

APPENDIX A-1

Regulatory Correspondence

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

December 17, 2020

Colonel David S. Miller
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117

Lt. Colonel Wayne J. Acosta
Civil Engineer Office
377 Civil Engineer Division
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, NM 87117

RE: DISAPPROVAL
OPERATIONS AND MAINTENANCE PLAN GROUNDWATER TREATMENT SYSTEM
BULK FUELS FACILITY SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
REVISION R3
KIRTLAND AIR FORCE BASE, NEW MEXICO
EPA ID# NM6213820974
HWB-KAFB-20-003

Dear Colonel Miller and Lt. Colonel Acosta:

The New Mexico Environment Department (NMED) is in receipt of the Kirtland Air Force Base (Permittee) *Operations and Maintenance Plan Groundwater Treatment System*, *Bulk Fuels Facility, Solid Waste Management Units ST-106/SS-111, Revision R3* (O&M Plan), dated April 2020. NMED has reviewed the O&M Plan and hereby issues this Disapproval. NMED's comments are provided in the attachment to this letter.

The Permittee must submit a revised O&M Plan that addresses all comments contained in the attachment. Two hard copies and an electronic version of the revised O&M Plan must be submitted to the NMED. The Permittee must also include a redline-strikeout version of the O&M Plan in electronic format showing where all revisions to the O&M Plan have been made. The revised O&M Plan must be accompanied with a response letter that details where all

revisions have been made, cross-referencing NMED's numbered comments. The Revised O&M Plan must be submitted to NMED no later than **March 31, 2021**.

Should you have any questions, please contact Michiya Suzuki of my staff at (505) 476-6046.

Sincerely,

Kevin Pierard

Digitally signed by Kevin Pierard
Date: 2020.12.17 14:39:09 -07'00'

Kevin M. Pierard, Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
M. Suzuki, NMED HWB
L. King EPA Region 6 (6LCRRC)
S. Kottkamp, KAFB
K. Lynnes, KAFB
C. Cash, KAFB

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

Attachment

GENERAL COMMENTS

1. **Lack of Page Numbers in Tables, Figures, and Appendices**

   NMED Comment: Page numbers are missing from some sections of the O&M Plan (e.g., Revision Tracking Table, Appendix D, *Process Drawings and Groundwater Treatment System Equipment/Instrument Location Pictures*). Please provide appropriate page numbers in all parts of the O&M Plan, including tables, figures, and appendices. Please revise the O&M Plan accordingly.

2. **Inclusion of New Information**

   NMED Comment: An installation of UIC Injection Well KAFB-106IN2 was approved on March 3, 2020. If installed, the Permittee must add the installation information for the well to the next annual revision of the O&M Plan. New relevant information and changes to the system must be included in the latest version of the O&M Plan. No response required.

3. **Acronyms and Abbreviations**

   NMED Comment: The Acronyms and Abbreviations section must include the meaning of all acronyms and abbreviations where those were not included in the text. For example, the meaning of "TIGG" is not provided in the Acronyms and Abbreviations section, nor is it included in the text of the O&M Plan. Similarly, the acronyms KD, KI, and KP appear in several places in Table 2-3, *Standard Operational Set Points*, page 1 of 1, and Appendix D, *Process Drawings and Groundwater Treatment System Equipment/Instrument Location Pictures* without the meaning of these acronyms provided. Please make the necessary revisions to the O&M Plan.

SPECIFIC COMMENTS

4. **Section 1.2, Overall System Description, page 1-2, and Section 2.3, Influent Tank, Pumps, and Pretreatment Sand Filters, pages 2-2 and 2-3**

   Permittee Statement: "In 2018, pretreatment sand filters were installed to sequester any excess dissolved iron or manganese and suspended solids, including biological material entering the system."
   and,
   "The sand filters remove excess dissolved metals by advanced oxidation processes that occur on the surface of catalytic media that causes the precipitation of metal oxides. Further description of these advanced oxidation processes is provided in Appendix I. The metal oxides are then captured by the filter and removed from the system via backwashing."

NMED Comment: Sand filters are capable of removing suspended solids from influent; however, they do not sequester dissolved iron and manganese. The latter statement suggests that the sand filters are combined with a water treatment unit capable of precipitating the dissolved metals. Please revise the former statement for clarity.

In addition, in the text of the revised O&M Plan, please explain how sequestration of the dissolved metals is accomplished.

5. **Section 1.2, Overall System Description, page 1-3**

Permittee Statement: "A schematic of the injection equipment in KAFB-7 and conceptual schematics of KAFB-106IN2 are provided in Appendix M."

NMED Comment: Appendix M, *Well Construction Diagrams and Borehole Logs,* contains 128 pages of data. It is difficult to find the referenced schematics without page numbers. The relevant page numbers must be provided so that the information can easily be located. Please revise the O&M Plan accordingly.

6. **Section 1.3, Discharge Requirements, page 1-3**

Permittee Statement: "Applicable state permits pertaining to GWTS effluent discharge are provided in Appendix A."

NMED Comment: Appendix A, *Permits and Agreements,* contains 445 pages of information. Some documents included in Appendix A are not pertinent to GWTS effluent discharge. Please provide page numbers to Appendix A and identify the relevant page numbers.

7. **Section 1.3, Discharge Requirements, page 1-3**

Permittee Statement: "Appendix C within the DP-1839 permit provides corrective actions to be enacted in the event of an exceedance of the discharge criteria."

NMED Comment: Please provide a discussion of the corrective actions that will be implemented in the event of an exceedance of the discharge criteria in the text of the revised O&M Plan. In addition, include a copy of the DP-1839 permit in an appendix section of the revised O&M Plan.

8. **Section 2.3, Influent Tank, Pumps, and Pretreatment Sand Filters, page 2-3**

Permittee Statement: "The system issues an alarm through the SCADA that backwash is occurring, and backwash water is transferred and stored in a clarifier located on top of the

truck sump outside of the GWTS."

NMED Comment: Section 7.4, *Backwash Water,* page 7-3, states that the backwash water is disposed through the GWTS. The backwash water may contain microbes that are responsible for fouling. If the backwash water is reapplied and treated through the GWTS, the water must be disinfected so that the microbes will not contaminate the adsorber beds. In addition, backwashing may desorb soluble contaminants such as EDB. Please clarify whether adsorbed EDB is potentially desorbed from the beds at the time of backwashing, and if so, explain what measures are taken to address the issue in the revised O&M Plan.

9. Section 2.3, Influent Tank, Pumps, and Pretreatment Sand Filters, page 2-3

Permittee Statement: "The sodium hypochlorite maintains the function of the sand filters and disinfects the sand filter media and water, which minimizes the need to skim or backwash the granular activated carbon (GAC) vessels due to the formation of biofouling."

NMED Comment: Application of free chlorine may generate undesirable byproducts and shorten the usable lifetime of GAC. Please explain whether any monitoring, control, or countermeasures for formation of undesirable byproducts have been implemented in the disinfection process in the revised O&M Plan, and if such measures have not been implemented, include appropriate measures in the revised O&M Plan, as necessary.

10. Section 2.4, Carbon Vessels, page 2-4

Permittee Statement: "With this extended contact time, the lead carbon bed can lower an EDB concentration in 400 gpm of groundwater from 2 micrograms per liter to below the discharge limit."

NMED Comment: Relatively high EDB concentrations (e.g., 820 µg/L in a groundwater sample collected from well KAFB-106153-484 during the November 1, 2019 sampling event) have been detected in groundwater samples. EDB concentrations at the influent of the carbon vessel have been lower than two µg/L; however, they may potentially exceed two µg/L if the extraction well network is optimized in the future. Please clarify whether the carbon vessels are capable of reducing higher influent EDB concentrations, and if so, provide the maximum EDB concentration that the GAC is capable of reducing to the discharge limit at the maximum loading rate in the revised O&M Plan. If there is a correlation between the loading rates and maximum treatable influent EDB concentrations, provide a figure that demonstrates the correlation in the revised O&M Plan.

In addition, other petroleum hydrocarbon constituents (e.g., benzene) are present in the groundwater. Please explain whether the carbon vessels are designed to handle petroleum hydrocarbon constituents in the revised O&M Plan. Appendix O, *Technical Memorandum,*

provides a discussion regarding the effectiveness of the carbon vessels; however, the 2016 data was used for the discussion. Clarify whether the 2016 data are still relevant to the current operation; otherwise, reevaluate the effectiveness of the carbon vessels using the most recent data. Furthermore, the discharge limit for each constituent is not provided in the text of the O&M Plan. Provide the discharge limits in the text of the revised O&M Plan.

11. Section 2.4, Carbon Vessels, page 2-4

Permittee Statement: "When water leaving the lead GAC vessel contains EDB concentrations of 90 percent of the effluent limit, that GAC vessel undergoes GAC change out and the lag carbon vessel is placed into the lead position."

NMED Comment: EDB is not the only contaminant in the groundwater; petroleum hydrocarbon constituents (e.g., benzene) and metals (e.g., manganese) are present and were detected in influent samples previously. The lag carbon vessel must replace the lead position when water leaving the lead carbon vessel contains any regulated constituent at a concentration that is 90 percent of its respective effluent limit. Please include the provision in the revised O&M Plan.

12. Section 2.6, Operation and Maintenance of Discharge Locations, page 2-5

Permittee Statement: "The liner extends up the sides of the pond and the water level in the pond cannot not [sic] exceed the high-level set point of 5.5 feet with respect to the GCMP pump house transducer."

NMED Comment: Since the information regarding the depth of the pond is not provided, it is not clear whether the high-level point of 5.5 feet can sufficiently prevent overfilling. A minimum of two-foot freeboard must be maintained to prevent overfilling. Please clarify if sufficient freeboard is maintained in the revised O&M Plan; otherwise, propose to change the high-level set point to maintain sufficient freeboard in the revised O&M Plan.

In addition, there is a typographical error in the statement (i.e., "cannot not"). Please correct the typographical error in the revised O&M Plan.

13. Section 2.6, Operation and Maintenance of Discharge Locations, page 2-5

Permittee Statement: "If this condition occurs, the effluent flow is redirected to KAFB-7, KAFB-106IN2, or a future UIC."

NMED Comment: Section 2.6 also states, "[c]urrently, the GCMP and KAFB-7 are the only two approved discharge locations for treated effluent." If well KAFB-106IN2 is installed, the Permittee must add information for the well to the next annual revision of the O&M Plan

(see Comment 2). No revision required.

14. Section 2.9, Normal Shut Down Procedure and Section 2.10, EmergencyShutdown Procedure, page 2-8

NMED Comment: A provision to close the valves for holding tanks is not included in the procedures. In order to prevent drainage from holding tanks at a time when the system is shut down, holding tanks must be isolated from the rest of the system. Please include a provision to close all valves located in the holding tanks.

15. Section 3.3, Bag Filter Change-Out, page 3-1

Permittee Statement: "Bag filters require replacement as needed to correct a pressure drop across the pre- and post-treatment bag filters… Once the Operator has deemed that a change-out is required, the system remains on and the Operator isolates the filter housing needing change-out."

NMED Comment: Criteria that prompt the replacement of bag filters (e.g., pressure drop across the filters) are not specified in the statement. The criteria are discussed in different sections of the O&M Plan; however, they are not consistent. Please provide consistent criteria throughout the revised O&M Plan.

16. Section 3.5, Discharge Changeover, page 3-2

Permittee Statement: "Commute to the effluent changeover location shown on Figure 1-1 and close the valve where the system was previously discharging and open the valve leading to the new discharge location. It takes approximately 38.5 turns of each post indicator to completely close or open the resilient wedge gate valve."

NMED Comment: The statement describes operating procedures in a manner which appears to be directions for field personnel. Please revise the O&M Plan to describe the procedures in a manner that provides a description rather than instructions.

17. Section 3.6 Granular Activated Carbon Backwashing, Skimming, and Change-Out, page 3-3

Permittee Statement: "Before initial startup and following each carbon change-out (prior to re-start), the carbon beds must be backwashed."

NMED Comment: Backwashing of the carbon beds is proposed only at the time of startup and carbon change-out. Backwashing is essential to remove solids to maintain the desired hydraulic properties of the carbon beds and to minimize bacteria growth in the beds; therefore, backwashing should be conducted when the performance of the GAC starts to

decline. Performance criteria (e.g., pressure drop increase) for backwashing must be established although backwashing is not required on a routine basis. Please revise the O&M Plan accordingly.

18. Section 3.6 Granular Activated Carbon Backwashing, Skimming, and Change-Out, page 3-3

Permittee Statement: "Backwashing the TIGG carbon beds requires at least 700 gpm of clean water, which can be provided from the fire hydrant near the GWTS building."

NMED Comment: Please clarify the source of fire hydrant water and how the quality of this water will be assured in the revised O&M Plan.

19. Section 3.6 Granular Activated Carbon Backwashing, Skimming, and Change-Out, page 3-3

Permittee Statement: "This tank doubles as a clarifier for settling out fines produced during the backwash process."

NMED Comment: If the tank is used as a clarifier, please explain whether the tank and the backwash process is designed to assure detention time necessary to settle out fines during the backwash process in the revised O&M Plan.

20. Section 3.7, Dosing Pump, Chlorine Analyzer, and Sodium Hypochlorite Generator Maintenance, pages 3-4 and 3-5

NMED Comment: Detailed procedures in the event that the sodium hypochlorite generator is off-line for more than two weeks are described in Section 3.7. However, it is not necessary to include such details in the text of the O&M Plan. Please revise the O&M Plan to describe the procedures in a manner that provide a description rather than instructions (see Comment 16).

21. Section 3.10, Effluent Line Integrity Testing, page 3-6

Permittee Statement: "The [effluent] line must be tested in year one of DP-1839 approval (by April 28, 2018) and in year five of the approval before a renewal application is submitted (2022)."

NMED Comment: Please clarify whether the line was tested on or before April 28, 2018. If the line was tested, describe the conditions of the line at the time of testing or provide a reference to the submittal that describes the conditions. If the line was not tested, propose to conduct the test in the revised O&M Plan.

22. Section 3.11, Well Pump Pulling, page 3-6

Permittee Statement: "Extraction well pumps are pulled for inspection and maintenance only after a minimum of 10 years in the absence of documented performance issues."

NMED Comment: Please provide a date for the upcoming inspection and maintenance for the extraction well pumps in the revised O&M Plan.

23. Section 3.11, Well Pump Pulling, page 3-7

Permittee Statement: "This example [500 gallons of calcium hypochlorite solution] is sufficient to initially produce a chlorine concentration of approximately 50 mg/L throughout the entire water column."

NMED Comment: Unless the information regarding volume of groundwater present in each extraction well is provided, it would not be possible to verify whether the chlorine concentration reaches a minimum of 50 mg/L. Please provide an estimated volume of groundwater in each extraction well or present the calculation to demonstrate that the chlorine level exceeds 50 mg/L in each extraction well in the revised O&M Plan.

24. Section 3.11, Well Pump Pulling, page 3-7

Permittee Statement: "Other cathodic protection options may be considered."

NMED Comment: Other cathodic protection options are not discussed in the section. Please remove the statement or provide a discussion for any optional methods in the revised O&M Plan.

25. Section 3.12.1, Well Disinfection, page 3-7

Permittee Statement: "Extraction and monitoring wells may occasionally require disinfection to improve pumping and monitoring performance. Well disinfection is performed by adding disinfectant directly to the well at the wellhead."

NMED Comment: An addition of disinfectant directly into the extraction and monitoring wells may affect contaminant concentrations or oxidation of contaminants. Please explain whether the disinfection practice can affect analytical results in groundwater samples collected from these or neighboring wells. If the analytical results are not representative of formation water due to the practice, other measures must be taken to counter the effects disinfection may have on wells, or an alternative disinfection method must be used.

26. Section 3.14.1, Physical Cleaning, page 3-8

Permittee Statements: "A bailer with a toggle valve or equivalent is lowered into the well and used to gently surge the screen interval to remove any accumulated sand, silt, and debris accumulated in the well bore."
and,
"Bailing is repeated until the discharged water has reached a set sediment volume per volume of water (e.g., less than 2 milliliters of sediment per 1 liter of water) measured using an Imhoff cone or equivalent."

NMED Comment: The depth to water at the site is approximately 500 feet below ground surface (bgs). Please provide a description of how bailing is conducted in the revised O&M Plan.

27. Section 3.14.2, Chemical Cleaning, page 3-9

Permittee Statement: "Acid treatments may be used to remove and weaken existing biologic colonies and remove biologically-induced iron deposits and chemical crusts. Well acidification is performed using commercially available acid with inhibitors to minimize corrosive effects on metal components of the well (e.g., sulfamic acid, Dry Acid Special®)."

NMED Comment: The acid treatment of wells may inhibit biodegradation of EDB and hydrocarbon constituents if the solution used for the acid treatment migrates outside the well-casing. Please discuss how such treatment will be controlled to minimize this potential impact in the revised O&M Plan.

28. Section 3.12, Well and Conveyance Line Disinfection, Section 3.13, Well Shocking, and Section 3.14, Well Cleaning and Redevelopment

NMED Comment: In the revised O&M Plan, the Permittee must add a reference to the reporting of maintenance procedures that have been performed on the GWTS. This may be achieved by either referencing reports submitted to NMED where this information is contained, or the Permittee may include the information in an additional section in Appendix M, *Well Construction Diagrams and Borehole Logs*, where the original well development records are located.

29. Section 3.17, Flowmeter Verification Testing, page 3-11, and Section 3.19.2, Single Train Diversion, page 3-13

Permittee Statements: "Shut down a treatment train and its respective extraction wells (KAFB-106233 and KAFB- 106234 for Train 1; KAFB-106228 and KAFB-106239 for Train 2)."
and,

"If only the wells from one train will be pumped into the other train (e.g., pumping KAFB-106228 and KAFB-106239 through Train 1, or pumping KAFB-106233 and KAFB-106234 through Train 2), isolate the wells not to be pumped through by closing the respective train's valve below the influent tree bypass."

NMED Comment: According to the information provided in Appendices D, page 6 of 83, and E, page 21 of 23, treatment trains do not appear to designate extraction wells. Train 1 influent designates extracted water discharged into Tank 110 and Train 2 influent designates extracted water discharged into Tank 210. However, the statements above indicate that each treatment train is specific to particular extraction wells. Please provide a clarification in the revised O&M Plan.

In addition, the designation of extraction wells for Train 1 and Train 2 is not consistent between the former and latter statements. Provide a clarification in the revised O&M Plan.

30. Section 3.19.1, Emergency Conveyance Line Repairs, page 3-12

Permittee Statement: "If the influent conveyance line is damaged, a current contract in place holds that the subcontractor will follow a general guideline, which is summarized below."

NMED Comment: A detailed emergency procedure to mitigate damaged influent conveyance lines is discussed. However, a procedure to mitigate damaged effluent conveyance lines is not included in the section. Please revise the O&M Plan to include the procedure to mitigate damaged effluent conveyance lines, as well.

31. Section 5, Process Monitoring, page 5-1

Permittee Statement: "The analytical results are reviewed to confirm that the contaminant concentrations meet the discharge criteria provided in Appendix J."

NMED Comment: According to Appendix J, Section J.1, *Discharge Requirements*, page J-1 of J-8, discharge criteria of EDB, benzene, ethylbenzene, toluene, total xylenes, iron, and manganese are specified. The quarterly monitoring reports only provide analytical results for these contaminant concentrations. However, other contaminants are present at the site and must be monitored as well. For example, according to the *Quarterly Monitoring Report – October – December 2019 and Annual Report for 2019,* dated March 2020, the concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene in groundwater samples collected from wells KAFB-106S5-446, located close to extraction well KAFB-106239, exceeded the applicable screening levels. Similarly, the dissolved arsenic concentrations in groundwater samples collected from wells KAFB-106021 and KAFB-106055, located near extraction well KAFB-106233, exceeded the applicable screening level.

Since these contaminants are not currently monitored, propose to monitor the concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, naphthalene, and dissolved arsenic in influent and effluent samples in future monitoring events. Please revise the O&M Plan accordingly.

32. Section 7.2.1, Non-Hazardous Water, page 7-2

Permittee Statement: "At the discretion of the Operator, the unfiltered water may be run through a 50-, 10-, or 1-micron bag filter as a pretreatment step."

NMED Comment: The discretion criteria used by the Operator is not identified. Please provide criteria used to select appropriate size of the filters in the revised O&M Plan.

In addition, Section 2.3, *Influent Tank, Pumps, and Pretreatment Sand Filters*, page 2-3, states, "[t]he pre-treatment bag filters on the GWTS influent pump skid are equipped with differential pressure transmitters (both pre-treatment and post-treatment bag filters are equipped with 10-micron bag filters)," and Section 3.3, *Bag Filter Change-Out*, page 3-1, states, "[t]wo bag filter housings are located on each skid with six 10-micron bag filters in each housing." Sections 2.3 and 3.3 indicate that the filter size is set to be 10-micron. Please resolve the discrepancy or provide a clarification in the revised O&M Plan.

33. Section 7.3, Pre-Treatment pH Adjustment and Disinfection, page 7-3

Permittee Statement: "Sodium hypochlorite solution (8.25 percent) is used for two pre-treatment processes: (1) injection as an oxidant, disinfectant upstream of the pre-treatment sand filters; and (2) to adjust the pH, disinfect investigation-derived waste monitoring network purge water prior to disposal."

NMED Comment: Section 3.11, *Well Pump Pulling,* states, "[a]n example mix of solution could consist of 1 pound of 65percent dry granular, calcium hypochlorite and 500 gallons of clear water…" The solution prepared for well pump pulling contains lower hypochlorite concentration (less than 0.2%) relative to the concentration of sodium hypochlorite solution (8.25 percent) used for pretreatment processes. Please explain why a lower concentration of calcium hypochlorite solution is used to disinfect well casings in the revised O&M Plan.

34. Section 7.3.2, Investigation-Derived Waste Purge Water, page 7-3

Permittee Statement: "When performing a pH adjustment or disinfection with sodium hypochlorite solution, ensure that the pH of the water being adjusted is continuously monitored."

NMED Comment: Please provide the target range of pH for adjustment of the influent and

effluent water in the O&M Plan.

35. Section 7.5, Depleted Granular Activated Carbon, page 7-4

Permittee Statement: "Depleted GAC is removed from the GAC vessels and regenerated offsite by a third party for reuse in accordance with appropriate permits and regulations."

NMED Comment: Section 6.5.7, *Collection and Management of Investigation Derived Waste [IDW]* of the RCRA Permit states, "[t]he Permittee shall include a description of the anticipated IDW management process as part of any work plan submitted to the Department for approval". The O&M Plan however refers to the Permit for management of this waste. As required by the Permit, please provide a more detailed description of the management process for the depleted GAC in the revised O&M Plan.

36. Table 1-1, Applicable Permits, page 2 of 2

NMED Comment: The table indicates that the Christ United Methodist Church License to Kirtland Air Force Base, which allows for the entry and performance of tasks in and around extraction well KAFB-106228, has expired as of January 8, 2020. According to Figure 1-1*, Site Map*, this extraction well is at the leading edge of the EDB plume, and therefore key to the remedial activities associated with containment of the EDB plume. The Permittee must renew this license as soon as possible and provide proof to NMED that continued access to this well has been secured.

37. Table 2-2, Permitted Extraction Well Flow Rates, page 1 of 1

NMED Comment: The permitted injection rate for well KAFB-7 is recorded as 1,239 gpm in the table. Section 2.6, *Operation and Maintenance of Discharge Locations,* page 2-6, states that the maximum permitted injection rate is 1,000 gpm. Please resolve the discrepancy in the revised O&M Plan.

38. Table 2-2, Permitted Extraction Well Flow Rates, page 1 of 1

NMED Comment: The table presents the permitted maximum 24-hour continuous extraction flow rates in gallons per minute (gpm). The table must also provide the permitted maximum 24-hour extracted groundwater volume for each well. Please revise the table accordingly.

39. Table 3-1, Groundwater Treatment System Routine Maintenance Schedule, page 1 of 2

NMED Comment: According to Table 3-1, the inspections and maintenance of the Tijeras Arroyo Golf Course ponds are required on an as needed basis. However, the maintenance

and inspection activity at the location is scheduled semiannually according to Section 2.6, *Operation and Maintenance of Discharge Locations,* page 2-5. Please resolve the discrepancy in the revised O&M Plan.

40. Table 5-1, Influent Criteria, page 1 of 1

NMED Comment: The table presents the analytical suite for the influent samples; however, it does not present the analytical suite for the effluent samples. Please modify Table 5-1 or provide a separate table to present the analytical suite for effluent samples and the applicable screening level for each analyte.

41. Table 5-1, Influent Criteria, page 1 of 1

NMED Comment: The pH and dissolved oxygen levels are not specified as influent criteria. However, these parameters may influence the GAC performance. For example, the level of dissolved oxygen may affect the amount of biofouling and the pH level may affect the longevity of chlorine and the ability of the GAC to adsorb compounds. An optimal range of these parameters must be evaluated and presented in the revised table.

In addition, NMED's *Kirtland Air Force Base Bulk Fuel Facility Mid-Plume Pump and Treat System Basis of Design -Addendum #1*, dated December 16, 2015, approved the addition of the pH adjustment system for the GAC effluent. The O&M Plan does not include the operation and maintenance activities related to operation of the pH adjustment system. Please revise the O&M Plan to include the pH adjustment system operation and maintenance tasks.

42. Table 6-1, Reports and Recipients, page 1 of 1

NMED Comment: The Permittee must add a reporting time (e.g., within 24 hours, within 48 hours, etc.) in which to report a greater than 24-hour shut down and any changes in volume of discharge, location of discharge, or amount or character of contaminants received, treated, or discharged outside of the DP-1839 scope. In addition to the NMED Ground Water Quality Bureau, the Permittee must add the NMED Hazardous Waste Bureau to the "Notification of change in volume of discharge, location of discharge, or amount or character of contaminants received, treated, or discharged outside of DP-1839 scope." Please revise the O&M Plan accordingly.

43. Appendix B, Organization and Responsibilities

NMED Comment: Appendix B includes an organization chart. In the chart, no description is provided under NMED. Please clarify the chart to describe that NMED Hazardous Waste Bureau is the lead regulatory organization for the SWMUs in the revised O&M Plan.

44. Appendix D, Process Drawings and Groundwater Treatment System Equipment/Instrument Location Pictures

NMED Comment: Appendix D includes pictures of various parts and equipment of the system. Some pictures identify the parts and equipment with both descriptions and abbreviation/numbers as identified in the process flow diagrams. However, other pictures identify the parts and equipment with abbreviation/numbers (e.g., PSH-3218) only, with no descriptions. Therefore, it is not clear what parts and equipment are presented in the pictures. Please provide the descriptions of parts and equipment in each picture in the revised O&M Plan.

45. Appendix F, Supervisory Control and Data Acquisition and Human Machine Interface Screens

NMED Comment: Injection and extraction wells are designated with different nomenclature in Appendix F. Well designations must be consistent throughout the O&M Plan. Please revise the O&M Plan accordingly.

46. Appendix F, Supervisory Control and Data Acquisition and Human Machine Interface Screens

NMED Comment: Images of the computer screen are presented in Appendix F; however, an explanation is not provided for each screen image. Please provide an explanation for each image of the computer screen in the revised O&M Plan.

47. Appendix G, Design Calculations for Carbon Vessel Media Beds, page 4

Permittee Statement: "The additional contact time and carbon volume will be needed if dissolved gasoline range organics (GRO) from the downgradient plume are pulled into the extraction well."

NMED Comment: The carbon adsorber design calculation was conducted based on a single contaminant, EDB. The presence of dissolved gasoline range organics was previously observed in the influent water (e.g., December 2015 sampling event) but not detected in recent sampling events (e.g., November 2019). It is possible that hydrocarbon constituents may reappear in the process stream in the future. Provisions must be included in the O&M Plan to re-evaluate the effectiveness of the current carbon adsorber design should this occur. Please revise the O&M Plan accordingly.

48. Appendix K, Waste Characterization Documentation

NMED Comment: Although it appears that disposal of bag filters was approved by the June 9, 2016 email correspondence from Mr. Sampler of US Army Corps of Engineers that states, "[w]e spoke with Katrina and she is good with us throwing the bag filters away. There is no official reply. Consider this your approval to put used bag filters in the dumpster." Spent filters may contain EDB and other hazardous constituents. The basis for the approval is not described in the email correspondence. Please provide a basis for managing the bag filters in this manner in the response letter.

49. Appendix N, Example Reports, Recipients

NMED Comment: The Permittee provides copies of email addresses for the recipients. It is not clear to whom and what organizations these emails were addressed. In the revised O&M Plan, please provide a list of individual recipient names and the organizations that he or she represent.

50. Appendix O, Technical Memorandum

NMED Comment: The cover pages for Attachments 3B, *Raw Model Outputs*, and Attachment 3C, *Source Model Code and AQUASIM Manual*, state that they are "[p]rovided on Compact Disk". The attachments were not included on the compact disks provided with the O&M Plan. Please include these missing attachments with the revised O&M Plan.

51. Appendix O, Technical Memorandum, Figure 1, GWTS Process Flow Diagram

NMED Comment: Figure 1 indicates that the lead and lag GAC vessels are used in series; however, the process flow diagram included in Appendices D and F indicate that these vessels are used in parallel and Section 2.4, *Carbon Vessels*, page 2-4, indicates that the lead GAC is bypassed and the lag GAC replaces it at a time when breakthrough occurs from the lead GAC. Please provide a clarification in the response letter and correct Figure 1 in the revised O&M Plan, as appropriate.

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Item	**Section**	**Page**	**General Comments**	**Response**
1.	Tables, Figures, Appendices	NA	Page numbers are missing from some sections of the O&M Plan (e.g., Revision Tracking Table, Appendix D, Process Drawings and Groundwater Treatment System Equipment/Instrument Location Pictures). Please provide appropriate page numbers in all parts of the O&M Plan, including tables, figures, and appendices. Please revise the O&M Plan accordingly.	Pages numbers on all tables, figures, and appendices have been added to the revised O&M Plan. (Note that page numbers may differ between the redline and untracked versions)
2	NA	NA	An installation of UIC Injection Well KAFB-106IN2 was approved on March 3, 2020. If installed, the Permittee must add the installation information for the well to the next annual revision of the O&M Plan. New relevant information and changes to the system must be included in the latest version of the O&M Plan. No response required.	Information for operation and maintenance for new components and equipment has been added to the revised O&M Plan. New equipment includes effluent check valves, automated changeover vales, and the new UIC well KAFB-106IN2. Associated equipment literature has been added to Appendix H (formerly Appendix I) and the well boring log and construction diagram has been added to Appendix L (formerly Appendix M). Appendices have been bookmarked appropriately. A description of the addition of wireless cameras to remotely monitor the GWTS is provided in Section 2. A description of uninterruptible power supply checks is provided in Section 2.11.
3	NA	NA	The Acronyms and Abbreviations section must include the meaning of all acronyms and abbreviations where those were not included in the text. For example, the meaning of "TIGG" is not provided in the Acronyms and Abbreviations section, nor is it included in the text of the O&M Plan. Similarly, the acronyms KD, KI, and KP appear in several places in Table 2-3, Standard Operational Set Points, page 1 of 1, and Appendix D, Process Drawings and Groundwater Treatment System Equipment/Instrument Location Pictures without the meaning of these acronyms provided. Please make the necessary revisions to the O&M Plan.	Applicable acronyms and abbreviation have been included in the revised O&M Plan. TIGG is the manufacturer of the carbon vessels, it is not an acronym.
4	1.2 2.3	1-2 2-2 & 2-3	Sand filters are capable of removing suspended solids from influent; however, they do not sequester dissolved iron and manganese. The latter statement suggests that the sand filters are combined with a water treatment unit capable of precipitating the dissolved metals. Please revise the former statement for clarity. In addition, in the text of the revised O&M Plan, please explain how sequestration of the dissolved metals is accomplished.	Section 2.3 was revised to read as follows (new text in italics), "*The sand filters are equipped with a specialized sand (IMA-65 [American equivalent to DMI-65]) that with the addition of sodium hypochlorite oxidizes influent iron and manganese concentrations. The sand/sodium hypochlorite reaction causes the iron and manganese concentrations to precipitate out and become sequestered in the sand filter. The precipitates are then backwashed into the clarifier where they settle out. No additional water treatment system is combined with the sand filters. Further description of these advanced oxidation processes is provided in Appendix I.*"
5	1.2	1-3	Appendix M, Well Construction Diagrams and Borehole Logs, contains 128 pages of data. It is difficult to find the referenced schematics without page numbers. The relevant page numbers must be provided so that the information can easily be located. Please revise the O&M Plan accordingly.	Pages numbers on all tables, figures, and appendices have been added to the revised O&M Plan. (Note that page numbers may differ between the redline and clean versions)

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6	1.3	1-3	Appendix A, Permits and Agreements, contains 445 pages of information. Some documents included in Appendix A are not pertinent to GWTS effluent discharge. Please provide page numbers to Appendix A and identify the relevant page numbers.	NMED has requested that relevant information be provided in each document. All of the permits and agreements provided in Appendix A pertain to the construction and operation of the GWTS and are therefore relevant to the operation and maintenance of the GWTS. Pages numbers have been provided on all tables, figures, and appendices in the revised O&M Plan. (Note that page numbers may differ between the redline and clean versions)
7	1.3	1-3	Please provide a discussion of the corrective actions that will be implemented in the event of an exceedance of the discharge criteria in the text of the revised O&M Plan. In addition, include a copy of the DP-1839 permit in an appendix section of the revised O&M Plan.	The last paragraph of section 1.3 has been revised (new text in italics): "The Sampling and Analysis Plan (Appendix I [formerly Appendix J]) contains the necessary reporting requirements, while *the discharge limits, as stated in DP-1839, are provided in Table 1-3. In the event that the GWTS effluent exceeds the discharge criteria listed in Table 1-3, the system will shut down until modifications can be implemented. The contingency plan (Appendix C of DP-1839) as well as any actions that can be taken to correct the problem and achieve the required effluent concentrations will be performed immediately. Notification to the NMED will be provided within 24 hours of a system shut down. Additional information regarding discharge criteria exceedance is provided in Appendix I, Section I.10.2. Operation of the GWTS will resume after appropriate modifications have been performed and the ability of the treatment system to meet discharge criteria will be verified by daily and then weekly sampling*." The DP-1839 permit is included in Appendix A of the O&M Manual.

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8	7.4	7-3	Section 7.4, Backwash Water, page 7-3, states that the backwash water is disposed through the GWTS. The backwash water may contain microbes that are responsible for fouling. If the backwash water is reapplied and treated through the GWTS, the water must be disinfected so that the microbes will not contaminate the adsorber beds. In addition, backwashing may desorb soluble contaminants such as EDB. Please clarify whether adsorbed EDB is potentially desorbed from the beds at the time of backwashing, and if so, explain what measures are taken to address the issue in the revised O&M Plan.	Section 7.4 has been revised to add clarity (new text in italics). "Backwash water from GWTS components (*GAC* vessels, *sand filters*, etc.) is created when the components require backwashing *due to differential pressure increases* or during change-out of the GAC. *Backwash water originating from the sand filters is transferred to the clarifier and then to the internal sump where it is processed through the Train 1 influent tank. During processing the backwash water is pre-treated with sodium hypochlorite and processed back through the sand filters and bag filters. This pre-treatment process removes biological materials and eliminates any remaining microbes within the backwash water.* *Backwash water originating from GAC change-out or backwash events is containerized in a 21,000-gallon onsite storage tank. The backwash water is given sufficient time for suspended solids to settle, and then is filtered prior to processing through the GWTS. The backwash water is processed through the GWTS influent tanks where it is pre-treated with sodium hypochlorite and processed through the sand filters and bag filters. This pre-treatment process removes biological materials and eliminates any remaining microbes within the backwash water. Backwash water is characterized prior to processing through the GWTS. In the event that the backwash water cannot be filtered effectively, the backwash water is disposed of offsite in accordance with appropriate regulations.* *While not expected, it is possible to experience desorption of contaminants during backwashing of the GAC vessels. If the presence of desorbed contaminants is detected within the backwash water, it will be processed through the GWTS influent. In the event that the backwash water cannot be processed through the GWTS, the backwash water will be disposed of offsite in accordance with appropriate regulations. Backwash water sampling requirements are described in the Sampling and Analysis Plan (Appendix I, Section I.2.3).*"
9	2.3	S	Application of free chlorine may generate undesirable byproducts and shorten the usable lifetime of GAC. Please explain whether any monitoring, control, or countermeasures for formation of undesirable byproducts have been implemented in the disinfection process in the revised O&M Plan, and if such measures have not been implemented, include appropriate measures in the revised O&M Plan, as necessary.	Procedure for monitoring of free chlorine has been added to Section 2.3 (new text in italics). "*Free chlorine levels in the influent water are monitored by chlorine analyzers installed downstream of the influent tanks. The dosing pumps are manually adjusted by the Operator to maintain a free chlorine concentration between 0.1 and 0.3 mg/L. Field chlorine testing is performed using the reagent pillow pouch method. A testing container is filled to the specified line and a pouch of reagent is added to the container. The container is then mixed, allowed to sit for a specified amount of time, and then visibly compared to a color array to determine the free chlorine concentration. Field chlorine tests are performed upstream and downstream of the sand filters to ensure the accuracy of the chlorine analyzers and prevent excessive free chlorine transfer to the GAC vessels.*"
10	2.4	2-4	Relatively high EDB concentrations (e.g., 820 µg/L in a groundwater sample collected from well KAFB-106153-484 during the November 1, 2019 sampling event) have been detected in	While KAFB-106153-484 may have had a relatively high EDB concentrations, the well is approximately 2000-feet away from the nearest extraction well (KAFB-106239), is

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			groundwater samples. EDB concentrations at the influent of the carbon vessel have been lower than two µg/L; however, they may potentially exceed two µg/L if the extraction well network is optimized in the future. Please clarify whether the carbon vessels are capable of reducing higher influent EDB concentrations, and if so, provide the maximum EDB concentration that the GAC is capable of reducing to the discharge limit at the maximum loading rate in the revised O&M Plan. If there is a correlation between the loading rates and maximum treatable influent EDB concentrations, provide a figure that demonstrates the correlation in the revised O&M Plan. In addition, other petroleum hydrocarbon constituents (e.g., benzene) are present in the groundwater. Please explain whether the carbon vessels are designed to handle petroleum hydrocarbon constituents in the revised O&M Plan. Appendix O, Technical Memorandum, provides a discussion regarding the effectiveness of the carbon vessels; however, the 2016 data was used for the discussion. Clarify whether the 2016 data are still relevant to the current operation; otherwise, reevaluate the effectiveness of the carbon vessels using the most recent data. Furthermore, the discharge limit for each constituent is not provided in the text of the O&M Plan. Provide the discharge limits in the text of the revised O&M Plan.	outside of the well's cone of depression, and is not within the IMOA. The GWTS GAC vessels were designed to treat low level contamination within the IMOA. Concentrations of benzene, toluene, ethylbenzene, and total xylenes have not been detected within the IMOA since Q4 2016, while the EDB plume has been decreasing since Q2 2016 as shown in Figure 2-1. Current system influent concentrations are below the original design criteria, indicating that the original design criteria are still valid under current operational conditions (Table 2-3). In the event that an increase in influent concentrations is observed or an additional extraction well is added in an area containing higher concentrations, the GAC design criteria will be adjusted, and new GAC bed life will be determined. Discharge limits, in accordance with DP-1839 Table 2, have been added to the revised O&M Plan in Table 1-3 Discharge limits. Appendix O – Technical Memo has been removed from the revised O&M Plan as the GAC max loading design is not applicable to system operational procedure documented in this O&M Plan.
11	2.4	2-4	EDB is not the only contaminant in the groundwater; petroleum hydrocarbon constituents (e.g., benzene) and metals (e.g., manganese) are present and were detected in influent samples previously. The lag carbon vessel must replace the lead position when water leaving the lead carbon vessel contains any regulated constituent at a concentration that is 90 percent of its respective effluent limit. Please include the provision in the revised O&M Plan.	Revised section 2.4 to state (new text in italics), "When *any regulated constituent is detected* leaving the lead GAC vessel *at a* concentration of 90 percent of the effluent limit, that GAC vessel undergoes GAC change-out and the lag *GAC* vessel is placed into the lead position. *However, a GAC changeout may be performed at lower effluent concentrations if deemed appropriate for efficient system operation.*" Note that no other VOCs besides EDB have been observed within the GWTS influent since Q4 of 2016.
12	2.6	2-5	Since the information regarding the depth of the pond is not provided, it is not clear whether the high-level point of 5.5 feet can sufficiently prevent overfilling. A minimum of two-foot freeboard must be maintained to prevent overfilling. Please clarify if sufficient freeboard is maintained in the revised O&M Plan; otherwise, propose to change the high-level set point to maintain sufficient freeboard in the revised O&M Plan. In addition, there is a typographical error in the statement (i.e., "cannot not"). Please correct the typographical error in the revised O&M Plan.	As stated in the DP-1770 Modification Application and Termination letter dated April 4, 2016; a discharge permit for land application of treated effluent is not required. The two-foot minimum freeboard is not a permit requirement. Management of water discharged to the GCMP will be conducted as stated in Section 2.6 of the revised O&M Plan. Additionally, the transducer located at the Pond was repaired and reinstalled slightly shallower than the previous placement. The new high-level point is now 4.5 feet above the transducer. The typographical error has been corrected.
13	2.6	2-5	Section 2.6 also states, "[c]urrently, the GCMP and KAFB-7 are the only two approved discharge locations for treated effluent." If well KAFB-106IN2 is installed, the Permittee must add information for the well to the next annual revision of the O&M Plan (see Comment 2). No revision required.	Information regarding well KAFB-106IN2 has been added throughout the text as necessary to describe discharge activity. See response to Comment # 2. Additionally, information regarding the NPDES outfall was added throughout the text.

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14	2.9	2-8	A provision to close the valves for holding tanks is not included in the procedures. In order to prevent drainage from holding tanks at a time when the system is shut down, holding tanks must be isolated from the rest of the system. Please include a provision to close all valves located in the holding tanks.	The following statement has been added to the section (new text in italics): *"Manual valves on the process piping, tanks, and GAC vessels can be closed by turning the valve handle until the valve indicator signals that the valve is closed. However, the manual valves do not need to be closed during shut down unless a repair is being made on the process piping, tanks, and GAC vessels. The system is equipped with multiple check valves that prevent the backflow of water as well as multiple vacuum break points that would prevent drainage into or from the holding tanks during standard shut downs.*"
15	3.3	3-1	Criteria that prompt the replacement of bag filters (e.g., pressure drop across the filters) are not specified in the statement. The criteria are discussed in different sections of the O&M Plan; however, they are not consistent. Please provide consistent criteria throughout the revised O&M Plan.	Bag filter changeout criteria was changed to 4 psi throughout the revised O&M Plan and has been added to Section 3.3 (new text in italics), "Bag filters require replacement *when the differential pressure across the bag filters exceeds the differential pressure threshold (4 psi). Replacement will be performed within 48-hours of the 4-psi threshold exceedance*." In addition, a bag filter replacement timeframe of 48-hours has been added in Sections 2.3, 2.5, and 3.5.
16	3.5	3-2	The statement describes operating procedures in a manner which appears to be directions for field personnel. Please revise the O&M Plan to describe the procedures in a manner that provides a description rather than instructions.	Revised text to read (new text in italics): "The treated effluent can be discharged to either the GCMP or UIC wells *KAFB-7 or KAFB-106IN2*. The entire system *must be* shut down (Section 2.9) prior to performing a discharge change-over. Once the system is offline, the discharge location *can be changed* as indicated on the SCADA Distribution screen. *Upon confirming the discharge location on the SCADA, the automated changeover valves will adjust to direct effluent water to the chosen location. The existing manual changeover valves remain in place on the effluent line and are locked in the open position. In the event that the automated valves fail, the discharge location can be controlled with the use of the manual valves.* After a *change in the discharge location is performed, record both treatment train effluent totalizers, shutdown time, and reinstate the system into operation (Section 2.8). Upon changing the discharge location from a UIC well, the wellhead flow totalizer should be recorded.*"
17	3.6	3-3	Backwashing of the carbon beds is proposed only at the time of startup and carbon change-out. Backwashing is essential to remove solids to maintain the desired hydraulic properties of the carbon beds and to minimize bacteria growth in the beds; therefore, backwashing should be conducted when the performance of the GAC starts to decline. Performance criteria (e.g., pressure drop increase) for backwashing must be established although backwashing is not required on a routine basis. Please revise the O&M Plan accordingly.	Provisions for backwashing the GAC vessels have been added (new text in italics). "*If skimming does not alleviate the pressure drop through the GAC vessel, the GAC vessel will be backwashed in accordance with the manufacturer's recommendation (Appendix H). Note that backwashing either train requires a temporary 21,000-gallon tank be available directly to the south of the GWTS building to store any produced backwash water. The backwashing procedure is also discussed in Section 7.4.*"
18	3.6	3-3	Please clarify the source of fire hydrant water and how the quality of this water will be assured in the revised O&M Plan.	The O&M plan has been revised as follows (new text in italics), "Backwashing the TIGG *GAC* beds requires at least 700 gpm of clean water, which can be provided from the fire hydrant near the GWTS building. *The fire hydrant is connected to the KAFB potable water system which is sampled quarterly to meet safe drinking water standards.*"

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19	3.6	3-3	If the tank is used as a clarifier, please explain whether the tank and the backwash process is designed to assure detention time necessary to settle out fines during the backwash process in the revised O&M Plan.	The 21,000-gallon tank is not part of the treatment system and is simply used to hold backwash water. There is no defined retention time. Management of the backwash water is discussed in Section 7.4 of the O&M Plan. Revised text as follows (new text in italics): "*The 21,000-gallon tank allows* for *the* settling out *of* fines produced during the backwash process."
20	3.7	3-4 & 3-5	Detailed procedures in the event that the sodium hypochlorite generator is off-line for more than two weeks are described in Section 3.7. However, it is not necessary to include such details in the text of the O&M Plan. Please revise the O&M Plan to describe the procedures in a manner that provide a description rather than instructions (see Comment 16).	Statement has been revised to read (new text in italics), "*In the event that the sodium hypochlorite generator is off-line for more than 2 weeks, liquid sodium hypochlorite (bleach) will be provided in a batch process to be used with the dosing pumps.*" Excessive details have been removed.
21	3.10	3-6 & 3-7	Please clarify whether the line was tested on or before April 28, 2018. If the line was tested, describe the conditions of the line at the time of testing or provide a reference to the submittal that describes the conditions. If the line was not tested, propose to conduct the test in the revised O&M Plan.	Line testing was performed before April 28, 2018 and the result were provided to the GWQB as well as included in the Q2 2018 report. Results of the effluent line integrity testing are provided in the quarterly reports, in accordance with DP-1839 (Table 1-2; Condition No. 15), and thus are not included in the revised O&M Plan. Section 3.10 has been revised as follows: "The effluent line running between the GWTS and a UIC well requires integrity testing in accordance with DP-1839 (Table 1-2; Condition No. 15). *DP-1839 requires that effluent line testing be performed* in year five of the approval before a renewal application is submitted (*April* 2022). *Result of the effluent line integrity test will be provided in the appropriate quarterly report in accordance with the DP-1839.*"
22	3.11	3-6	Please provide a date for the upcoming inspection and maintenance for the extraction well pumps in the revised O&M Plan.	Dates were not added to the revised O&M Plan as inspections are performed on an as needed basis. The statement in Section 3.11 has been revised to read (new text in italics): "The extraction well pumps are designed for little to no maintenance when properly installed and monitored. Removal of the extraction well pumps for inspection or cleaning *is* only considered in the event of a catastrophic failure or decrease in pump performance *such as a decrease in flow rate, or an unexplained increase in amperage draw. Pump performance is monitored by observing the well flowrates presented on the SCADA. Verification of these flowrates is performed by monthly manual readings collected from the well head. Pump amperage draw is also monitored when a decrease in flow rate is observed and verified.*"
23	3.11	3-7	Unless the information regarding volume of groundwater present in each extraction well is provided, it would not be possible to verify whether the chlorine concentration reaches a minimum of 50 mg/L. Please provide an estimated volume of groundwater in each extraction well or present the calculation to demonstrate that the chlorine level exceeds 50 mg/L in each extraction well in the revised O&M Plan.	The following text was added to Section 3.11 (new text in italics), "*The formula to calculate the concentration of calcium hypochlorite can be found in Section 3.12.1." The formula to calculate the correct concentrations was added to section 3.12*."
24	3.11	3-7	Other cathodic protection options are not discussed in the section. Please remove the statement or provide a discussion for any optional methods in the revised O&M Plan.	The proposed cathodic protection method is the preferred way to prevent corrosion and has been utilized on the project when a pump is replaced or inspected. The statement "Other cathodic protection options may be considered" has been removed from Section 3.11 in the revised text as requested.

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25	3.12.1	3-7	An addition of disinfectant directly into the extraction and monitoring wells may affect contaminant concentrations or oxidation of contaminants. Please explain whether the disinfection practice can affect analytical results in groundwater samples collected from these or neighboring wells. If the analytical results are not representative of formation water due to the practice, other measures must be taken to counter the effects disinfection may have on wells, or an alternative disinfection method must be used.	Disinfection is performed in accordance with the Conditional Approval letter for Standard Operation Procedure of Disinfection of the Groundwater Treatment System Remediation Wells and Groundwater Monitoring Wells dated August 6, 2018. This Approval Letter is provided in Appendix A-3 of the O&M Plan. The following statements have been added to the following Sections: Section 3.12 (new text in italics), "*Disinfection is performed in accordance with the Conditional Approval letter for Standard Operation Procedure of Disinfection of the Groundwater Treatment System Remediation Wells and Groundwater Monitoring Wells; dated August 6, 2018 (Appendix A-3).*" Section 3.12.1 (new text in italics), "*Injection of disinfectants into the extraction and monitoring wells may possibly oxidize contaminants in the immediate vicinity of the wells. However, after disinfectant has been allowed to occupy the well for a given amount of time, water is removed from the well until the disinfectant is no longer observed in the purge water. The purge water will be monitored throughout the purging process using a reagent pillow pouch field testing kit. For any well disinfection, free chlorine concentrations after purging are targeted to less than 2 mg/L which is 50 percent of the National Primary Drinking Water Regulations 40 Code of Federal Regulations 141.54 Maximum residual disinfectant level goals for disinfectants (U.S. Environmental Protection Agency, 1998).*"
26	3.14.1	3-8	The depth to water at the site is approximately 500 feet below ground surface (bgs). Please provide a description of how bailing is conducted in the revised O&M Plan.	Section 3.14 has been revised as follows (new text in italics), "*Well cleaning and redevelopment is performed by a licensed driller and all mechanical cleaning activities will be performed using a drilling rig or pulling unit.* Once the well pump has been removed, physical or chemical cleaning/redevelopment processes, or a combination of these two processes, can be used to address well performance problems. General descriptions of these processes are provided below." The following statement has been added to Section 3.14.1 (new text in italics): "*All mechanical cleaning is performed using a drilling rig or pulling unit equipped with a wireline and mechanical winch.*"

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27	3.14.2	3-9	The acid treatment of wells may inhibit biodegradation of EDB and hydrocarbon constituents if the solution used for the acid treatment migrates outside the well-casing. Please discuss how such treatment will be controlled to minimize this potential impact in the revised O&M Plan.	Acid treatment will only be performed on extraction wells and only when absolutely necessary. After treatment is completed, the pump is reinstalled and the well is purged until the groundwater quality measurements return to pretreatment conditions. In section 3.14.2, paragraph 3, the O&M plan states “Acidic water is recovered after completion of each acid treatment; therefore, initial and periodic pH readings of the purged water are measured during removal to determine if purging has been adequately completed. For any acid treatment, pH values after purging are targeted to be similar to the pre-treatment pH (e.g., within 1.0 pH units).” Methods and materials used for well cleaning and redevelopment are in accordance with the conditional workplan approval letter for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Revision 2; dated May 31, 2017. The Approval Letter is provided in Appendix A-3 of the O&M Plan.

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28	3.12 3.13 3.14	NA	In the revised O&M Plan, the Permittee must add a reference to the reporting of maintenance procedures that have been performed on the GWTS. This may be achieved by either referencing reports submitted to NMED where this information is contained, or the Permittee may include the information in an additional section in Appendix M, Well Construction Diagrams and Borehole Logs, where the original well development records are located.	All maintenance activities conducted during a given quarter will be reported in the applicable quarterly monitoring report as specified in DP-1839 Condition 22. Records will be provided within the sections; Groundwater Treatment System Operation and Performance, Groundwater Treatment System Maintenance and Expansion Activities, and Non-Routine Maintenance Activities. The following statements have been added to the revised text (new text in italics): Section 3: "*Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition 22. Records will be provided within the sections; Groundwater Treatment System Operation and Performance, Groundwater Treatment System Maintenance and Expansion Activities, and Non-Routine Maintenance Activities*." Section 3.12: "*Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition 22. Records will be provided within the sections; Groundwater Treatment System Operation and Performance, Groundwater Treatment System Maintenance and Expansion Activities, and Non-Routine Maintenance Activities*." Section 3.13: "*Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition 22. Records will be provided within the sections; Groundwater Treatment System Operation and Performance, Groundwater Treatment System Maintenance and Expansion Activities, and Non-Routine Maintenance Activities*." Section 3.14: "*Records of all maintenance events will be provided in the quarterly report as specified in DP-1839 Condition 22. Records will be provided within the sections; Groundwater Treatment System Operation and Performance, Groundwater Treatment System Maintenance and Expansion Activities, and Non-Routine Maintenance Activities*." .

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29	3.17 3.19.2	3-11 3-13	According to the information provided in Appendices D, page 6 of 83, and E, page 21 of 23, treatment trains do not appear to designate extraction wells. Train 1 influent designates extracted water discharged into Tank 110 and Train 2 influent designates extracted water discharged into Tank 210. However, the statements above indicate that each treatment train is specific to particular extraction wells. Please provide a clarification in the revised O&M Plan. In addition, the designation of extraction wells for Train 1 and Train 2 is not consistent between the former and latter statements. Provide a clarification in the revised O&M Plan.	Extraction wells are not designated to a given treatment train and can be routed to either Train 1 or Train 2. Equipment associated with a specific treatment train such as pumps, filters, and GAC vessels are dedicated to the specified treatment train. Clarification has been added to the revised O&M Plan in the following sections (new text in italics). Section 2.1. "Groundwater pumped from the extraction wells is collected into the GWTS influent tanks (TK-110 and TK 210), *note that extraction wells can be routed to either treatment train during operation using system influent manifold valves.*" Section 3.19.2. "*It should be noted that extraction wells can be routed to either treatment train during operation using system influent manifold valves. However, during standard operation Train 1 operates with extraction wells KAFB-106233 and KAFB-106234 and Train 2 operates with extraction wells KAFB-106228 and KAFB-106239.*"
30	3.19.1	3-12	A detailed emergency procedure to mitigate damaged influent conveyance lines is discussed. However, a procedure to mitigate damaged effluent conveyance lines is not included in the section. Please revise the O&M Plan to include the procedure to mitigate damaged effluent conveyance lines, as well.	The following statement has been added to Section 3.19.1, "*The treated effluent meets all applicable standards as specified in Table 1-3. In the event that the effluent line is damaged, the system will be shut down and the leak will be contained. The subcontractor will make temporary emergency repairs to prevent further water loss. The extent of the spill will be marked with temporary flagging to identify the spill area should sampling be required. Spill notification will be made to NMED GWQB and HWB, in accordance with DP-1839 Condition No. 27. Upon repair of the piping, effluent line integrity testing will be performed prior to continued operation.*"

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31	5	5-1	According to Appendix J, Section J.1, *Discharge Requirements*, page J-1 of J-8, discharge criteria of EDB, benzene, ethylbenzene, toluene, total xylenes, iron, and manganese are specified. The quarterly monitoring reports only provide analytical results for these contaminant concentrations. However, other contaminants are present at the site and must be monitored as well. For example, according to the *Quarterly Monitoring Report – October – December 2019 and Annual Report for 2019*, dated March 2020, the concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene in groundwater samples collected from wells KAFB-106S5-446, located close to extraction well KAFB-106239, exceeded the applicable screening levels. Similarly, the dissolved arsenic concentrations in groundwater samples collected from wells KAFB-106021 and KAFB- 106055, located near extraction well KAFB-106233, exceeded the applicable screening level. Since these contaminants are not currently monitored, propose to monitor the concentrations of 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, naphthalene, and dissolved arsenic in influent and effluent samples in future monitoring events. Please revise the O&M Plan accordingly.	Monitoring of the system discharge is performed to meet the requirements of discharge permit DP-1839. As stated in the introduction of DP-1839; "The constituents of concern (CoC) within the dissolved-phase portion of the contaminant plume have been extensively investigated at the KAFB BFF under the RCRA Permit and have been narrowed to seven CoCs based on groundwater monitoring of the dissolved-phase portion of the contaminant plume within the regional aquifer. These seven CoCs have been identified as being present in untreated groundwater at concentrations potentially exceeding their respective regulatory action levels, and include ethylene dibromide (EDB), benzene, toluene, ethylbenzene, total xylenes, dissolved iron, and dissolved manganese. The CoCs and their respective effluent standards are listed in Table 2. The term "effluent standard" is used in this Discharge Permit to refer to the New Mexico Water Quality Control Commission (WQCC) groundwater standard or the federal Environmental Protection Agency (EPA) maximum contaminant level (MCL); whichever is more stringent." According to the permit, naphthalene is monitored annually (DP-1839 Condition No. 20 and Table 3), and arsenic is monitored every 5 years (DP-1839 Condition No. 20 and Table 4). Trimethylbenzenes are not required for analysis under the current discharge permit and are not included under NMAC 6.2.1.3103. Concentrations of arsenic are not a constituent of concern because they were not part of the release. Any concentrations of arsenic are naturally occurring. Currently the system is only operational in the Interim Measure Operational Area located to the north of Ridgecrest Dr. SE. Groundwater monitoring results of this area have not indicated the presence of naphthalene, BTEX, or trimethylbenzenes. Additionally, well KAFB-106S5 is approximately 700 linear feet away from KAFB-106239. This distance places KAFB-106S5 well outside the cone of depression for KAFB-106239, and thus contaminant transport between wells is not likely.
32	7.2.1	7-2	The discretion criteria used by the Operator is not identified. Please provide criteria used to select appropriate size of the filters in the revised O&M Plan. In addition, Section 2.3, *Influent Tank, Pumps, and Pretreatment Sand Filters*, page 2-3, states, "[t]he pre-treatment bag filters on the GWTS influent pump skid are equipped with differential pressure transmitters (both pre-treatment and post-treatment bag filters are equipped with 10-micron bag filters)," and Section 3.3, *Bag Filter Change-Out*, page 3-1, states, "[t]wo bag filter housings are located on each skid with six 10-micron bag filters in each housing." Sections 2.3 and 3.3 indicate that the filter size is set to be 10-micron. Please resolve the discrepancy or provide a clarification in the revised O&M Plan.	Revised statement to state (new text in italics), "Unfiltered water *will* be run through a 10-micron bag filter as a pretreatment step *to remove any sediments*." Both influent and effluent bag filter housing units use only 10-micron bag filters.

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33	7.3	7-3	Section 3.11, *Well Pump Pulling,* states, "[a]n example mix of solution could consist of 1 pound of 65percent dry granular, calcium hypochlorite and 500 gallons of clear water…" The solution prepared for well pump pulling contains lower hypochlorite concentration (less than 0.2%) relative to the concentration of sodium hypochlorite solution (8.25 percent) used for pretreatment processes. Please explain why a lower concentration of calcium hypochlorite solution is used to disinfect well casings in the revised O&M Plan.	This O&M Plan serves to document current GWTS management practices. These two processes are not related in terms of operation. The sodium hypochlorite used in the pretreatment process (8.25%) is metered at a rate high enough to maintain a low-level free chlorine concentration of approximately 0.1-0.3 mg/L into an influent stream that flows between 75 and 400 gallons per minute. This process is used for prevention of biofouling within the GAC tanks and for the proper operation of the sand filter. The concentration used for pump pulling is mixed to be sufficient to treat biological growth down well. A higher in-well concentration would only result in the need to remove additional purge water. Additional explanation has not been added to the text.
34	7.3.2	7-3	Please provide the target range of pH for adjustment of the influent and effluent water in the O&M Plan.	A pH adjustment is not performed on the influent or effluent water as the water is a neutral pH. Section 7.3 has been revised to discuss the pH adjustment of acid treatment IDW water produced during well redevelopment. All purge water will be adjusted to a pH of 7 prior to being treated through the GWTS. Section 7.3.1 Sand Filter Pre-Treatment has been removed as the pre-treatment process does not adjust pH but is used to oxidize dissolved metals. Section 7.3.2 Investigation Derived Waste Purge Water have been removed as monitoring well network purge water has never needed, nor is expected to need pH adjustment.
35	7.5	7-4	Section 6.5.7, *Collection and Management of Investigation Derived Waste [IDW]* of the RCRA Permit states, "[t]he Permittee shall include a description of the anticipated IDW management process as part of any work plan submitted to the Department for approval". The O&M Plan however refers to the Permit for management of this waste. As required by the Permit, please provide a more detailed description of the management process for the depleted GAC in the revised O&M Plan.	Section 7.5 has been revised to state (new text in italics), "Eventual depletion of the ability of the GAC to remove contaminants of concern will require removal of the depleted GAC from their associated vessels. Depleted GAC is removed from the GAC vessels and regenerated offsite by a third party for *recycling. The regeneration process involves thermal regeneration through a rotary kiln at temperatures up to 1450 °F. A certificate of regeneration will be provided to Kirtland AFB, by the third party, upon completion of the GAC regeneration.*"
36	Table 1-1	2	The table indicates that the Christ United Methodist Church License to Kirtland Air Force Base, which allows for the entry and performance of tasks in and around extraction well KAFB-106228, has expired as of January 8, 2020. According to Figure 1-1, *Site Map,* this extraction well is at the leading edge of the EDB plume, and therefore key to the remedial activities associated with containment of the EDB plume. The Permittee must renew this license as soon as possible and provide proof to NMED that continued access to this well has been secured.	These access agreements are legal documents that detail agreements between the Air Force and outside parties and are not subject to the NMED review and or related to the scope of a O&M Plan. It is the Air Force's responsibility to obtain and renew any necessary agreements. Access agreements have been removed from the revised O&M Plan.
37	Table 2-2	1	The permitted injection rate for well KAFB-7 is recorded as 1,239 gpm in the table. Section 2.6, *Operation and Maintenance of Discharge Locations,* page 2-6, states that the maximum permitted injection rate is 1,000 gpm. Please resolve the discrepancy in the revised O&M Plan.	Permit RG-1587 is the point of discharge permit registered with the New Mexico Office of the State Engineer and allows for up to 1,239 GPM for injection. However, the limit set in DP-1839 for any UIC well is 1,000 GPM. Table 2-2 has been revised to show allowable injection rate of 1,000 GPM as provided by DP-1839.
38	Table 2-2	1	The table presents the permitted maximum 24-hour continuous extraction flow rates in gallons per minute (gpm). The table must also provide the permitted maximum 24-hour extracted groundwater volume for each well. Please revise the table accordingly.	Table 2-2 has been revised to include the maximum 24-hour extracted volume.
39	Table 3-1	1	According to Table 3-1, the inspections and maintenance of the Tijeras Arroyo Golf Course ponds are required on an as needed basis. However, the maintenance and inspection activity at the location is scheduled semiannually according to Section 2.6, *Operation and Maintenance of Discharge Locations,* page 2-5. Please resolve the discrepancy in the revised O&M Plan.	A footnote has been added to indicate a semiannual inspection schedule.

Common Comment and Response Worksheet(Version 3)				
Date	**Reviewer**	**Document Title (version)**		**Contract/TO Number**
04 Jan 20	**NMED HWB**	**Operation and Maintenance Plan Groundwater Treatment System, Bulk Fuels Facility Solid Waste Management Units ST-106 and SS-111 Revision 3**		**EPA ID# NM6213820974**
Item	**Section**	**Page**	**General Comments**	**Response**
40	Table 5-1	1	The table presents the analytical suite for the influent samples; however, it does not present the analytical suite for the effluent samples. Please modify Table 5-1 or provide a separate table to present the analytical suite for effluent samples and the applicable screening level for each analyte.	Table 5-1 has been edited to include the analytical suite and the discharge criteria. Additionally, the analytical suite of the effluent samples is provided in Tables 2, 3, and 4 in discharge permit DP-1839 which can be found in Appendix A. Analytical methods, reporting limits, and screening levels are provide in Table I-4 within Appendix I (formerly Appendix J).
41	Table 5-1	1	The pH and dissolved oxygen levels are not specified as influent criteria. However, these parameters may influence the GAC performance. For example, the level of dissolved oxygen may affect the amount of biofouling and the pH level may affect the longevity of chlorine and the ability of the GAC to adsorb compounds. An optimal range of these parameters must be evaluated and presented in the revised table. In addition, NMED's *Kirtland Air Force Base Bulk Fuel Facility Mid-Plume Pump and Treat System Basis of Design -Addendum #1*, dated December 16, 2015, approved the addition of the pH adjustment system for the GAC effluent. The O&M Plan does not include the operation and maintenance activities related to operation of the pH adjustment system. Please revise the O&M Plan to include the pH adjustment system operation and maintenance tasks.	Influent parameter such as pH and dissolved oxygen (DO) have been very consistent since the initiation of the GWTS and there has not been a need for adjusting the influent pH or DO. In the event that the influent concentrations change due to a reconfiguration of extraction wells, the need for pH adjustment and additional biofouling prevention methods will be assessed. Currently, biofouling that may be caused by high dissolved oxygen is addressed by the addition of the sand filters (sequestration) and associated sodium hypochlorite generator (disinfection). Chlorine addition in the influent water is performed using dosing pumps. In the event that a change in pH results in a change in residual chlorine in the system, the dosing pumps will be adjusted to compensate. Parameters of pH and DO are collected monthly during sampling events for management of the operation of the GWTS and their typical range has been added to Table 5-1. The data collected are used to create a consistent range for the influent criteria and to observe for changes in influent concentrations. However, given the consistent source of the influent water, these parameters do not vary significantly. If the parameters are ever observed to be outside of the influent criteria, a system evaluation will be performed. The GWTS is not currently equipped with a pH adjustment system as it is not necessary. In the unlikely event there are changes to the influent water, the Air Force will reevaluate the need for a pH adjustment system.
42	Table 6-1	1	The Permittee must add a reporting time (e.g., within 24 hours, within 48 hours, etc.) in which to report a greater than 24-hour shut down and any changes in volume of discharge, location of discharge, or amount or character of contaminants received, treated, or discharged outside of the DP-1839 scope. In addition to the NMED Ground Water Quality Bureau, the Permittee must add the NMED Hazardous Waste Bureau to the "Notification of change in volume of discharge, location of discharge, or amount or character of contaminants received, treated, or discharged outside of DP-1839 scope." Please revise the O&M Plan accordingly.	Notification will continue to be provided within 24 hours for both cases. NMED HWB has been added to the Recipients list and Table 6-1 has been revised.
43	Appendix B	NA	Appendix B includes an organization chart. In the chart, no description is provided under NMED. Please clarify the chart to describe that NMED Hazardous Waste Bureau is the lead regulatory organization for the SWMUs in the revised O&M Plan.	Organization chart has been revised to include NMED HWB.

Common Comment and Response Worksheet(Version 3)				
Date	**Reviewer**	**Document Title (version)**		**Contract/TO Number**
04 Jan 20	**NMED HWB**	**Operation and Maintenance Plan Groundwater Treatment System, Bulk Fuels Facility Solid Waste Management Units ST-106 and SS-111 Revision 3**		**EPA ID# NM6213820974**
Item	**Section**	**Page**	**General Comments**	**Response**
44	Appendix D	NA	Appendix D includes pictures of various parts and equipment of the system. Some pictures identify the parts and equipment with both descriptions and abbreviation/numbers as identified in the process flow diagrams. However, other pictures identify the parts and equipment with abbreviation/numbers (e.g., PSH-3218) only, with no descriptions. Therefore, it is not clear what parts and equipment are presented in the pictures. Please provide the descriptions of parts and equipment in each picture in the revised O&M Plan.	Descriptions and identification tags have been added to all photos.
45	Appendix F	NA	Injection and extraction wells are designated with different nomenclature in Appendix F. Well designations must be consistent throughout the O&M Plan. Please revise the O&M Plan accordingly.	Nomenclature within in the SCADA and HMI appear different due to character limitations within the programing. Because of this, it is not possible for the nomenclature withing the SCADA and HMI to match the standard nomenclature within the O&M Plan and other documents. Additionally, the SCADA and HMI are used solely by plant operators and engineers who are familiar with the controls system. Operators are trained in the SCADA and HMI nomenclature prior to performing system operations.
46	Appendix F	NA	Images of the computer screen are presented in Appendix F; however, an explanation is not provided for each screen image. Please provide an explanation for each image of the computer screen in the revised O&M Plan.	Appendix F has been revised to include descriptions of each component of the SCADA screens.
47	Appendix G	NA	The carbon adsorber design calculation was conducted based on a single contaminant, EDB. The presence of dissolved gasoline range organics was previously observed in the influent water (e.g., December 2015 sampling event) but not detected in recent sampling events (e.g., November 2019). It is possible that hydrocarbon constituents may reappear in the process stream in the future. Provisions must be included in the O&M Plan to re-evaluate the effectiveness of the current carbon adsorber design should this occur. Please revise the O&M Plan accordingly.	Appendix G – GAC Design Calculations has been removed from the revised O&M Plan as the GAC design is not applicable to system operational procedure documented in this O&M Plan. The original calculations were performed only for EDB by CB&I in March 2015. However, in April 2017, EA had TIGG perform loading and life of bed calculations for both EDB and BTEX (the main constituents of concern in Table 2 DP-1839) and was presented and approved in the Technical Memorandum Establishing the Basis of Design Maximum Concentration Limits for the Kirtland BFF GWTS. The GWTS GAC vessels were designed to treat low level contamination within the IMOA. Concentrations of benzene, toluene, ethylbenzene, and total xylenes have not been detected within the IMOA since Q4 2016, while the EDB plume has been decreasing since Q2 2016 as shown in Figure 2-1. Current system influent concentrations are below the original design criteria, indicating that the original design criteria are still valid under current operational conditions (Table 2-3). In the event that an increase in influent concentrations is observed or an additional extraction well is added in an area containing higher concentrations, the GAC design criteria will be adjusted, and new GAC bed life will be determined.
48	Appendix K	NA	Although it appears that disposal of bag filters was approved by the June 9, 2016 email correspondence from Mr. Sampler of US Army Corps of Engineers that states, “[w]e spoke with Katrina and she is good with us throwing the bag filters away. There is no official reply. Consider this your approval to put used bag filters in the dumpster.” Spent filters may contain EDB and other hazardous constituents. The basis for the approval is not described in the email correspondence. Please provide a basis for managing the bag filters in this manner in the response letter.	The basis for disposal of the bag filters is provided in Appendix J (Formerly Appendix K) as “Attachment 1. Bag Filter Waste Characterization and Request for Disposal”. Waste characterization is discussed on page 6 of the PDF.

Common Comment and Response Worksheet(Version 3)				
Date	**Reviewer**	**Document Title (version)**		**Contract/TO Number**
04 Jan 20	**NMED HWB**	**Operation and Maintenance Plan Groundwater Treatment System, Bulk Fuels Facility Solid Waste Management Units ST-106 and SS-111 Revision 3**		**EPA ID# NM6213820974**
Item	**Section**	**Page**	**General Comments**	**Response**
49	Appendix N	NA	The Permittee provides copies of email addresses for the recipients. It is not clear to whom and what organizations these emails were addressed. In the revised O&M Plan, please provide a list of individual recipient names and the organizations that he or she represent.	Recipient emails have been removed from Appendix M (formerly Appendix N) as this document will be available to the public at large and distribution of email contact information was not approved to the entire list by the Air Force.
50	Appendix O	NA	The cover pages for Attachments 3B, *Raw Model Outputs*, and Attachment 3C, *Source Model Code and AQUASIM Manual*, state that they are "[p]rovided on Compact Disk". The attachments were not included on the compact disks provided with the O&M Plan. Please include these missing attachments with the revised O&M Plan.	Appendix O – Technical Memo has been removed from the revised O&M Plan as the GAC max loading design is not applicable to system operational procedure documented in this O&M Plan.
51	Appendix O	NA	Figure 1 indicates that the lead and lag GAC vessels are used in series; however, the process flow diagram included in Appendices D and F indicate that these vessels are used in parallel and Section 2.4, *Carbon Vessels*, page 2-4, indicates that the lead GAC is bypassed and the lag GAC replaces it at a time when breakthrough occurs from the lead GAC. Please provide a clarification in the response letter and correct Figure 1 in the revised O&M Plan, as appropriate.	Appendix O – Technical Memo has been removed from the revised O&M Plan as the GAC max loading design is not applicable to system operational procedure documented in this O&M Plan. The GAC vessels can be operated in parallel if needed. However, standard operation dictates that they are operated in series to provide the most adsorptive capacity to make sure that effluent concentration limits are never exceeded. The process flow diagram in Appendix D indicates that the valve configurations can allow for both parallel and series flow. The process flow diagrams shown on the SCADA screens represent that the treatment water passes through the GAC vessels. It is not meant to show whether they are being operated in parallel or series which is not a parameter that the SCADA manages. Section 2.4 is describing that the GAC tank valve configuration allows for the reversal of lead and lag tanks. This is only performed when a vessel has been refreshed with new GAC. In this case the lag vessel becomes the lead vessel, and the newly refreshed vessel becomes the lag vessel. Based on this Figure 1 is correct. This provides the maximum adsorptive capacity to make sure that effluent concentrations limits are not exceeded. See comment 10 for additional discussion.

NA = Not applicable

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

September 25, 2020

Colonel David S. Miller
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117

Lt. Colonel Wayne J. Acosta
Civil Engineer Office
377 Civil Engineer Division
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, NM 87117

RE: APPROVAL WITH MODIFICATIONS
PHASE I RCRA FACILITY INVESTIGATION REPORT
BULK FUELS FACILITY SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO
EPA ID# NM6213820974
HWB-KAFB-18-009

Dear Colonel Miller and Lt. Colonel Acosta:

The New Mexico Environment Department (NMED) is in receipt of the Kirtland Air Force Base (Permittee) *Phase I RCRA Facility Investigation Report, Bulk Fuels Facility, Solid Waste Management Unit ST-106 and SS-111, August 2018* (Report), received August 30, 2018. NMED has reviewed the Report and hereby issues this Approval with Modifications. NMED's comments are attached to this letter.

The Report is approved with modifications to allow the Permittee to focus resources on completing investigation activities at the Kirtland Airforce Base (KAFB) Bulk Fuels Facility Spill (BFFS) site in order to acquire sufficient data to select a final remedy for the BFFS site. However, NMED is aware that additional site investigations have been performed at the Site since 2016 which have provided additional information and that further site investigations are

currently in the planning stages which should lead to a more comprehensive conceptual site model (CSM). Therefore, the CSM presented in this Phase I RFI Report is not approved. A comprehensive CSM must be included in the Phase II RFI report to be submitted to NMED at the conclusion of investigation activities at the site.

This Approval with Modifications does not require any revisions to the Report. The attached comments discuss limitations regarding use of the information provided in the Report. General topics and several examples of NMED's comments were discussed during a NMED/KAFB conference call on August 27, 2020.

This Approval with Modifications is based on the information presented in the document as it relates to the objectives of the work identified by NMED at the time of review. Approval of this document does not constitute agreement with all information, or every statement presented in the document.

The Permittee must submit a work plan for a Phase II RCRA Facility Investigation Report to NMED for review no later than **April 30, 2021**.

Should you have any questions please contact me at (505) 476-6035.

Sincerely,

Kevin Pierard, Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
L. Andress, NMED HWB
L. King EPA Region 6 (6LCRRC)
S. Kottkamp, KAFB
K. Lynnes, KAFB
C. Cash, KAFB

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

Attachment

Kirtland Air Force Base (KAFB) Bulk Fuels Facility
Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation Report History

The history of this document involves draft documents and meetings; therefore, a brief background is presented below.

Correspondence History:

Date	Action	Abbreviation
1/20/17	KAFB Submitted Phase I RCRA Facility Investigation Report	2017 RFI
8/3/17	NMED sent preliminary review letter to KAFB	
11/16/17	NMED sent Notice of Disapproval (NOD)	2017 NOD
1/19/18	Draft Second NOD prepared by NMED	2018 NOD
1/31/18	Meeting between NMED and KAFB resulting in the submittal of KAFB's Response to Comments (RTC) matrix regarding 2018 Draft NOD	RTC
8/30/18	KAFB Submitted a revised Phase I RCRA Facility Investigation Report	2018 RFI

In summary, NMED issued a Draft Notice of Disapproval letter dated January 19, 2018 in response to the Permittees Resource Conservation and Recovery Act (RCRA) Phase I Facility Investigation (RFI) Report dated January 2017. The Permittee and NMED met on January 31, 2018 to discuss these NOD comments. The RTC generated as a result of this meeting states that the Permittee agreed to make specific revisions to the Phase I RFI, which was submitted to NMED as the Phase I RFI Report (Report) on August 2018. This Approval with Modifications pertains to the Report submitted to NMED on August 30, 2018.

The comments below are organized into three sections:

1. Comments made in NMEDs 2018 Draft second NOD including KAFB's 2018 RTC are indented, followed by the current NMED 2020 comment, which is not indented.
2. General Comments on the August 2018 Phase I RFI Report, comments are not indented.
3. Specific Comments on the August 2018 Phase I RFI Report, comments are not Indented.

MODIFICATION COMMENTS:

2018 NOD COMMENTS

1. **2018 NOD Comment 43:** Response required in the Phase II RFI Report.

   Permittee's Statement in 2017 RFI Report, p. 4-27, 5th paragraph: "In 2014, based on exceedances of the 2012 NMED residential soil screening levels (SSLs) detected in samples from the former pipeline investigation, approximately 2,340 cy (3,648 tons) of

soil was removed and transported off-site for disposal at Valencia Regional Landfill in Los Lunas, NM…"

NMED 2018 Comment: "The Permittee shall update the text to include soil concentrations."

Permittee 2018 RTC Response: "Concur."

NMED 2020 Comment: This comment was not fully addressed in the response to the 2018 NOD. The revised text includes a bulleted list of some soil concentrations and states "Appendix B includes all analytical data from the original source area investigation and excavation confirmation samples collected." Appendix B contains three tables, one of which is a 5,684-page PDF table in which data is not presented chronologically and cannot be sorted by date. The data for the 2012 and 2014 former pipeline investigation soil samples cannot be located in Appendix B. The Permittee must clearly present all analytical data from the former pipeline investigations in a searchable format in the Phase II RFI report to allow for these data to be evaluated for decision-making purposes.

2. **2018 NOD Comments 45, 46, 47, and 48:** No response required.

   NMED 2018 Comment 45: "The equation for calculating the mass of hydrocarbon (HC) extracted is not dimensionally correct as provided. The Permittee shall revise the text and calculations to use the correct equation and show the units for the conversion factor of 24.055."

   NMED 2018 Comment 46: "The operating times are not provided in the RFI Report and the flowrate and hydrocarbon content are provided in a format that does not lend itself to being useful for checking the calculations. The Permittee must revise the RFI Report to include a summary table such as Table 3-5 in the April -July 2015 quarterly monitoring report. NMED is unable to verify the accuracy of the calculations in the report without the missing information."

   NMED 2018 Comment 47: "The equation for calculating the mass of HC biodegraded is not dimensionally correct as provided. The Permittee must verify the equation being used and recomplete the calculations present. The Permittee must revise the text to define variable "D" and indicate the units. Additionally, the Permittee must include the value of C_{Vbkgd} used in the calculation."

   NMED 2018 Comment 48: "The Permittee points the reader to Appendix L for a summary of biodegradation calculations and the cover sheet for Appendix L-1 states that the calculations are provided. However, the appendix only contains the results and

not the actual calculations. Consequently, NMED cannot verify the accuracy of the calculations. The Permittee must revise the RFI Report to include the calculations so that NMED can verify the results presented."

Permittee 2018 RTC Response to Comments 45, 46, 47, and 48: "Not all requested inputs are provided in the original reports. Some of the information is available, however the SVE operation goes back to 2003. Individual inputs for the soil vapor monitoring locations are not available."

NMED 2018 Response: "Agrees that we are limited with what was provided by previous sub-contractors."

2018 Decision: "Remove the sections talking about the calculations, but refer to the actual report, and state that the calculations cannot be reproduced, and state as such. Concur with solution."

NMED 2020 Comment: Section 4.6.2.5 [soil vapor extraction] SVE HC Mass Removal, of the Report does not contain the requested information regarding the equations, defining variables, units, and inputs used to make these calculations, nor was the reason for omitting this information included in the Report. Furthermore, Appendix L-1 (Mass Extraction Calculations) from the 2017 Phase I RFI was removed from the 2018 Report rather than being updated to contain the information specified in NMED 2018 Draft NOD Comments 45, 46, 47, and 48. Therefore, hydrocarbon removal estimates prior to 2016 as a result of the CATOX operations or biodegradation cannot be used for decision-making purposes at the site unless the data is re-presented along with the necessary supporting information.

3. **2018 NOD General Comment 3:** No response required.

   NMED 2018 Comment: "The RFI Report discusses vapor testing in soil and on-base industrial buildings, including the issue of vapor intrusion into industrial buildings. The Permittee's discussion of the potential for groundwater contaminant diffusion and vapor transport, as it pertains to the potential for vapor intrusion both on-base and off-base, is piecemeal and does not compare off-base soil vapor and groundwater data with NMED risk-based screening levels. The Permittee shall provide a rigorous analysis of the potential for soil vapor contamination to migrate into homes and buildings located off-base and the findings integrated into the Conceptual Site Model presented in the RFI Report"

   Permittee 2018 RTC Response: "Any discussion related to vapor intrusion risk will be removed from the RFI Report. The report will point to the Risk Assessment, take out all reference to potential for vapor intrusion. Keep soil vapor data, tables, discussion "just stick to the data only."

NMED 2020 Comment: Since the discussion of the soil vapor intrusion data was deleted from the Report, should the Permittee wish to use the pre-2016 soil vapor data for decision-making purposes, this data must be presented in the Phase II RFI report. All soil vapor data included in the Phase II RFI Report must be screened against the NMED vapor intrusion screening levels (VISLs) in effect at the conclusion of all related investigation activities at the site.

4. **2018 NOD Comment 37:** Response required in the Phase II RFI.

   NMED 2018 Comment: "Section 4.4.1: The Permittee does not discuss soil vapor detections off base and compare those detections to NMED VISLs, as outlined in the NMED screening guidance published March 2017. The Permittee shall revise the RFI Report to incorporate NMED VISLs."

   Permittee 2018 RTC Response: "VISLs are used in the Risk Assessment. Defer to Risk Assessment by stating just the data and then refer to the Risk Assessment."

   NMED 2020 Comment: The Permittee must discuss soil vapor intrusion detections off base and compare those detections to NMED VISLs in effect at the conclusion of investigation activities at the site in the Phase II RFI.

5. **2018 NOD Comment 24:** No response required.

   NMED 2018 Comment: "The Permittee shall add a bullet to state that additional information is required on locations of ethylene dibromide (EDB) partitioning out of the [light non-aqueous phase liquid] LNAPL and the rate(s) of partitioning under varying redox conditions. Additionally, a bullet is required to address the need for revising and updating the [compound specific isotope analysis] CSIA that was conducted at the site to obtain a more meaningful and robust analysis of residual and degraded fractions of EDB. The CSIA included in the RFI Report is not technically defensible due to coelution of benzene and other organic compounds with EDB, not using two-dimensional gas chromatography as the preferred analytical method, EDB concentrations at detection limits of analytical instruments, and lack of fresh LNAPL samples for carbon isotope analysis on EDB."

   Permittee 2018 RTC Response: "Include map of locations where benzene exceeds effective solubility…"

   NMED 2020 Comment: Figure 5-1, Wells with Historical LNAPL Detections, depicts wells that have exceeded the effective solubility for benzene, but does not state when these wells were sampled. This figure does not clearly illustrate the exceedance of effective solubility

for benzene or EDB, nor does it illustrate the inference of submerged LNAPL. In addition, the CSIA used likely underestimated EDB concentrations, this is further discussed in Specific Comment 15 below.

6. **2018 NOD Comment 28.d:** No response required.

   NMED 2018Comment: "Figure ES-9: The Permittee shall revise the figure to fix the typographical error and correct "Dissolve Magnesium" to "Dissolved Manganese."

   Permittee 2018 RTC Response: "Concur."

   NMED 2020 Comment: The figure was not corrected. The Permittee must ensure that all figure titles are correct in the Phase II RFI report.

7. **2018 NOD Comment 38:** No response required.

   NMED 2018 Comment: "The 2005 temporary [soil vapor monitoring] SVM results are not included in Appendix G. Additionally, the locations of and boring logs for SB-01 through SB-09 are not provided in the RFI Report. The Permittee must revise the RFI Report to include this missing data. If the data is not available to be included, the statement should be revised to clarify the data available and included in the report."

   Permittee 2018 RTC Response: "Concur."

   NMED 2020 Comment: The table of historical soil vapor analytical results provided as a PDF in Appendix G is 7,357 pages long and does not appear to include data from 2005. The Permittee must not rely on this data for future decision-making purposes.

8. **2018 NOD Comment 49:** No response required.

   NMED 2018 Comment: "Many of the figures in Section 4.0 rely on color to differentiate wells, borings, and sampling locations or data. Thus, these figures are essentially meaningless to the roughly 7 percent of the population who have color vision deficiency. NMED requests that the Permittee revise the figures to be able to be interpreted by all readers, including those with color vision deficiency."

   Permittee 2018 RTC Response: "Can alter a few specific maps, but will be concise moving forward with symbols. Mainly the section 4 figures…"

   NMED 2020 Comment: No figures were revised in the Report. The Permittee must ensure that all figures in the Phase II RFI report are able to be interpreted by all readers, including those with color vision deficiency.

9. 2018 NOD Comment 54: No response required.

> **NMED 2018 Comment:** "Asked for clarification regarding use of the term bioslurping regarding Permittee's Statement on p. 5-2, 5th paragraph: "These systems did not have a small diameter drop pipe but were still able to volatilize LNAPL off of the water table as these SVE locations are screened in both the saturated and unsaturated zone, thus performing a bioslurping function."
>
> **Permittee 2018 RTC Response:** "Concur."

NMED 2020 Comment: The language was changed slightly as "bioslurping function" was changed to "LNAPL recovery", however both LNAPL and soil vapor are recovered in modified bioslurping activities. The Permittee must clarify whether water, LNAPL, and / or soil vapor were recovered with modified bioslurping methods when discussing this method.

10. 2018 NOD Comment 87: Response required in the Phase II RFI Report.

> **NMED 2018 Comment:** "…floating LNAPL has been detected in a water table groundwater monitoring well at the In-Situ Bioremediation (ISB) Pilot Test, indicating that the Permittee's assertion of no floating LNAPL inside monitoring wells is incorrect. The Permittee must revise this conclusion."
>
> **Permittee 2018 RTC Response:** "Concur – Will make correction."

NMED 2020 Comment: While the main issue of this comment was addressed appropriately, the Permittee did not revise the text to include the presence of LNAPL in ISB wells. This is critical information for understanding the nature and extent of contamination at the site. This information must be included in the Phase II RFI report.

11. 2018 NOD Comment 35: Response required in the Phase II RFI Report.

> **NMED 2018 Comment:** "During an evaluation of soil vapor monitoring points ("SVMPs"), sampling processes, and development of the soil vapor rebound and biorespiration testing, the Permittee noted that many SVMPs did not have air tight seals. The Permittee must revise the RFI Report to include a discussion on the lack of SVMP seals and potential impacts on soil vapor concentration data as well as on estimates of soil vapor contaminant degradation."
>
> **Permittee 2018 RTC Response:** "Concur."

NMED 2020 Comment: The Permittee removed all text related to air tight seals from the

Report. For these data to be used for decision-making purposes at the site, a discussion regarding the lack of SVMP seals and the potential impacts on soil vapor concentration data and estimates of soil vapor contaminant degradation must be included in the Phase II RFI report.

12. 2018 NOD Comment 92: No response required.

NMED 2018 Comment: "Appendix L-1, [Mass Extraction Calculations]: The results are in units of volume (gallons) and not mass (pounds) as indicated by the sub-appendix title."

Permittee 2018 RTC Response: "Concur."

NMED 2020 Comment: The Permittee removed Appendix L-1 in its entirety; therefore, all data and conclusions related to information dependent upon mass extraction calculations may not be used for decision-making purposes at the site.

13. 2018 NOD Comment 94: No response required.

NMED 2018 Comment: "Appendix R, Quant-Array™-Chlor and Reduced Gases (Hydrogen/Methane/Ethene/Ethane) Study: Please see Attachment B for NMED's technical memorandum on the errors, comments, and revisions required for Appendix Q."

Permittee 2018 RTC Response: "Concur. [waiting for further comments from NMED, to see if will remove or not.]"

NMED 2020 Comment: The Permittee removed Appendix R in its entirety, therefore all data and conclusions related to the information contained in the Quant-Array™-Chlor and Reduced Gases (Hydrogen/Methane/Ethene/Ethane) Study may not be used for decision-making purposes at the site.

14. 2018 NOD Comment 95: No response required.

NMED 2018 Comment: "Appendix T, Trend Analysis of EDB and Benzene in Groundwater at Kirtland Air Force Base, [fourth quarter] Q4 2015: Please see Attachment C for NMED technical memorandum on errors, comments, and revisions required for Appendix T."

Permittee 2018 RTC Response: "Concur. Will discuss further."

NMED 2020 Comment: The Permittee removed Appendix T in its entirety; therefore, all data and conclusions related to trend analysis of EDB and benzene in groundwater at the

site prior to 2016 may not be used for decision-making purposes.

SPECIFIC 2020 COMMENTS ON THE 2018 REPORT:

15. Section 6.2.1.2, Compound Specific Isotope and Microbial Analyses Sampling, page 6-6, line 28; Response required in the Phase II RFI Report.

Permittee Statement: "CSIA and biological parameter samples were collected at 31 wells in [third quarter] Q3 2013. Quality issues were identified with these 2013 data in an EPA review (EPA, 2014). Consequently, the 2013 CSIA data were not used in this Report."

NMED Comment: A discussion of the data quality issues regarding CSIA performed at the site (i.e., samples were not analyzed using two-dimensional gas chromatography), the potential of the underestimation of EDB concentrations, the affected data, and what was done to correct the issue must be included in the Phase II RFI report or the data cannot be used for decision-making purposes.

16. Section 7.7, Current and Future Land Use, page 7-7, line 40; Response required in the Phase II RFI Report.

Permittee Statement: "Kirtland [Air Force Base] AFB is an active military installation and is expected to remain active for the foreseeable future. Kirtland AFB is adjacent to the Albuquerque International Sunport and is bounded to the north and west by the city of Albuquerque (residential areas), to the south by the Pueblo of Isleta, and to the east by the Cibola National Forest."

NMED Comment: The property to the north Kirtland AFB, and over the off-base EDB plume is a mixed-use area containing recreational (Bullhead Park), residential, and commercial properties. The Phase II RFI Report must discuss all land use over the groundwater contaminant plumes (i.e., recreational and commercial).

17. Section 2.2, Initial Discovery of Leaked Fuel and Subsequent Investigations, page 2-4, line 2; Response required in the Phase II RFI Report.

Permittee Statement: "Site specific measurements of LNAPL in the soil and soil vapor were entered into Rockworks and ArcGIS, and apparent LNAPL thicknesses in the saturated zone were entered into the software program OILVOL."

and

"The software also used vadose zone soil and vapor concentrations interpolated across the affected vadose zone soil and pore space to estimate total LNAPL mass."

NMED Comment: The software developers of OILVOL claim that the purpose of the model is to provide a volume of mobile LNAPL and it is not recommended for accurately estimating the volume of residual LNAPL in the saturated and unsaturated zone. Disclose that, according to the developer of OILVOL, there is significant uncertainty in using this software to estimate LNAPL mass and provide justification for using it to estimate total LNAPL mass at the site. The Permittee must also state the margin of error that exists in these calculations when using OILVOL.

18. **Section 2.2, Initial Discovery of Leaked Fuel and Subsequent Investigations, page 2-4, line 9;** No response required.

    Permittee Statement: "The LNAPL mass in the vadose zone soils and vapors was converted to liquid equivalent according to jet fuel composition. The calculations estimated that approximately 48,000 gallons of LNAPL were present in soil vapor, approximately 630,000 gallons of LNAPL were present in soil pores in the vadose zone, and 5.2 million gallons of immiscible LNAPL was present for a total estimated volume of 5.9 million gallons in the subsurface."

    NMED Comment: Supporting information was not referenced in this statement and the Air Force does not know the volumes of the fuel types released over decades. Calculations and conversion factors were not presented in the text of the report or its appendices. The Permittee must not use these data for decision-making purposes.

19. **Section 6.3.3, Groundwater-Level Monitoring Results;** Response required in the Phase II RFI Report.

    Permittee Statement: "The initial depth to water at production well KAFB-3 was 407 feet measured in 1949. This well is screened from a depth of 448 feet to 900 feet bgs. The greatest depth to water measured at this well was 550 feet in 2009. Water levels were collected when KAFB-3 was not pumping, which was during the original installation and subsequent pump repair events."

    NMED Comment: The Permittee's statement indicates that KAFB-3 is a production well; however, the well is not mentioned elsewhere in the Report where the other drinking water supply wells are discussed. The Phase II RFI must provide additional detail for this well including the purpose of the water supplied from this well, whether it is currently in use, and, if not in use, KAFB's future plans for this well. If the well is currently in use, the well must be included in the groundwater monitoring program at the site and the results included in the Phase II RFI report.

20. **Section 7.8, Current and Future Water Use; page 7-8, line 6;** Response required in the

Phase II RFI Report.

Permittee Statement: "Near the Site, the aquifer supplies drinking water to the city of Albuquerque, the Raymond G. Murphy VA Medical Center, and Kirtland AFB, along with suppling private irrigation wells."

NMED Comment: The Permittee must provide tabulated data of the screened intervals for all private and production wells near the site. This information is important for the corrective measures evaluation as well as future risk management decisions.

21. **Section 4.6.2, SVE Systems, page 4-27, line 15;** No response required.

    Permittee Statement: "Based on operational hours, flow rates, and influent soil vapor [oxygen] O2 concentrations, it is estimated that approximately 209,000 gallons of fuel have biodegraded within the area influenced by SVE operation."

    NMED Comment: NMED required the Permittee to provide the calculations to support the estimate in the 2018 Draft Second NOD. Supporting information was not provided for verification of volume of fuel biodegraded that was presented in the Report.

22. **Section 6.3.2.6, Compound-Specific Isotope and Microbial Analysis Results, page 6-25, line 25;** No response required.

    Permittee Statement: "The microbial and reduced gas analyses provided evidence that microbial mediated reductive debromination of EDB is occurring in situ in the BFF plume. Conditions throughout much of the EDB-impacted area were anaerobic and electron donors and acceptors facilitating reductive debromination were present."

    NMED Comment: Supporting material was not provided in the Report to verify the statement regarding biodegradation or its effectiveness in reducing EDB concentrations throughout the contaminant plume.

23. **Section 6.3.2.6, Compound-Specific Isotope and Microbial Analysis Results, page 6-25, lines 20 and 23;** Response required in the Phase II RFI Report.

    Permittee Statements: "The lowest EDB δ13C ratios were in the benzene plume area (AOI 8), where EDB concentrations were the highest. δ13C values increased toward the downgradient portion of the EDB plume (Koster van Groos et al., 2016)."

    and

"δ13C values and EDB concentrations in the downgradient area of the plume (AOI 9) are consistent with the breakdown of EDB by the abiotic process of hydrolysis (Koster van Groos et al., 2016)."

NMED Comment: The reference provided, Koster van Groos et al., 2016, was not an independent study. This study was performed at the site, and the author is affiliated with the Permittee's contractor who was paid to perform the referenced study. In all future documents which cite this study, including the Phase II RFI report, the Permittee must clearly disclose that this study was associated with the BFFS site characterization.

24. **Section 3.2.2, Analyte Selection, page 3-2, line 35;** No response required.

    Permittee Statement: "For all environmental media, the following classes of analytes are excluded because there is no evidence of any association between these analytes and the [fuel-related analyte] FRAs. There are multiple quarters of analytical data for many of these analytes indicating that they are non-detect in addition to being unrelated to Site FRAs."

    NMED Comment: The Permittee is reminded that if a hazardous constituent is detected above its background level it is considered a contaminant of concern (COC) whether it is a "FRA" or not, and must be retained as a COC at the site. See also the definitions of hazardous waste, hazardous constituent, and extent of contamination in Permit Sections 1.8, 6.0, 6.2.3, and 6.2.3.1 of the KAFB Hazardous Waste Treatment Facility Operating Permit for the Open Detonation Unit.

25. **Section 4.5.2, Indoor Air Sampling Results, page 4-17, line 10;** Response required in the Phase II RFI Report.

    Permittee Statement: "However, potential human health impacts from soil vapor are evaluated in the Risk Assessment (USACE, 2017)."

    NMED Comment: Site characterization has continued at the site since 2016 when Phase I RFI work was been completed. Therefore, the Risk Assessment must be updated include data from 2016 through when site characterization is complete. See Comment 4 above. Additional investigation is necessary to characterize soil vapor contamination at the site, including the nature and extent of the soil vapor plume and vapor intrusion risks. Additionally, the Phase II RFI report must also present the physical parameters that will be used for future vapor intrusion risk analysis (e.g., soil type, porosity, etc. Include the physical parameters in the Phase II RFI report.

26. **Section 6.3.4.3, Aquifer Testing Results, page 6-28, line 15;** No response required.

    Permittee Statement: "The results of the analysis of the step-drawdown and constant-rate

aquifer tests were reported in the Aquifer Test Report for Groundwater Extraction Well KAFB-106228... The pumping and recovery data for KAFB-106228 were analyzed to determine aquifer characteristics."

NMED Comment: According to the Report, aquifer testing was only performed on one well and the test was unsuccessful. Aquifer tests are necessary to determine site-specific hydrologic parameters such as transmissivity, specific yield (or storativity), and hydraulic conductivity in order to obtain defensible data necessary to support groundwater modeling efforts, remedy evaluation, and remedy selection for the site. A single well test is not sufficient to determine aquifer properties at the site. At least two aquifer tests, one in the source area and one north of the leading edge of the EDB plume (e.g. at the ABCWUA Trumbull well cluster location), must be conducted. The aquifer tests must consist of step-draw down and constant discharge tests. Appreciable drawdown in observation wells must be observed before the constant discharge tests can be considered successful and to ensure that reliable and high quality data for determining transmissivity and hydraulic conductivity are obtained.

GENERAL 2020 COMMENTS on 2018 REPORT:

27. Appropriate Screening Levels; Response required in the Phase II RFI Report.

NMED Comment: All acceptable data must be compared to the corresponding screening levels in effect when investigation activities at the site are complete. These data must be included in an updated conceptual site model (CSM) presented in the Phase II RFI report

28. Risk Assessment Report; Response required in the updated Risk Assessment Report.

NMED Comment: An updated Risk Assessment Report must be submitted to NMED for review when site investigation activities are complete. The Risk Assessment Report must use the appropriate screening levels in effect at the time when site investigation activities are complete. See Comment 25 above.

29. The Nature and Extent of Soil Vapor Contaminant Concentrations and Vapor Intrusion; Response required in the Phase II RFI Report.

NMED Comment: Soil vapor contamination at the site is mentioned on page 8-2, Line 4; the Permittee states: "The nature and extent of soil vapor contamination at the site has been characterized." Soil vapor has not been adequately characterized at the site. The nature and extent of soil vapor contaminant concentrations and vapor intrusion must be addressed in the Phase II RFI report.

30. Data Not Approved for Decision-Making Purposes; Response required in the Phase II RFI Report.

NMED Comment: The following data are not approved. These data shall not be used for decision-making purposes at the site without presenting additional supporting information in the Phase II RFI report.

a. Portions of Pneulog® permeability data: The Permittee has calculated permeability of the subsurface based on flow within long screened intervals (134 to 175 feet). Data collected in this manner will indicate a decrease in permeability with depth, as flow rates are dependent on pressure. The Permittee has not discussed these issues or limitations within the Report. In the Phase II RFI report, the Permittee must discuss these limitations and remove all reference to specific permeability values or inferences thereof made from Pneulog® test results.
b. Geophysical Logs: A large portion of the geophysical logging conducted for the site is unreliable due to inaccurate calibration of the instrumentation resulting in inaccurate induction logs. These logs cannot be used to distinguish between coarser grained units, which are the predominant lithologies present throughout the site. However, the induction logs can be used qualitatively to identify clay layers and provide a means of correlating surfaces and some stratigraphic intervals across the site. The Permittee must ensure that instrumentation is properly calibrated when conducting future geophysical logging.

31. Information Presented in Cross Sections; Response required in the Phase II RFI Report.

NMED Comment: Multiple comprehensive cross sections are required in the Phase II RFI report. Cross sections must be prepared to portray a variety of critical information including, but not limited to:

a. Geologic units;
b. Top of the water table obtained from well gauging data;
c. Top of free phase LNAPL obtained from well gauging data;
d. Screened intervals of the wells used to construct the cross sections;
e. Photoionization detector (PID) data;
f. Concentrations of contaminants depicted at the sample location that the data represent;
g. Contours of contaminant concentrations to include laboratory data for soil contaminant plumes, laboratory data for vapor contaminant plumes, and laboratory data for groundwater contaminant plumes, as appropriate;
h. Indication of where cross sections intersect one another;
i. Pertinent above ground features such as roads, buildings, etc… for orientation; and

j. Vertical scales in both elevation above mean sea level and feet below ground surface.

32. Description of Regional, Sub-Regional, Local, and Site Hydrogeology; Response required a Phase II RFI Report.

NMED Comment: A more detailed description of the regional, sub-regional, local, and site-specific hydrogeology is required in the Phase II RFI report. The Permittee must better define the hydrogeology of each area to more accurately describe the extent of geologic units and explain how they affect contaminant migration at the site. This information will facilitate the understanding of the site's anisotropic conditions and how they affect contaminant migration. These descriptions will be useful when designing corrective measures for the site.

33. Changes in Groundwater Elevations and Gradient Over Time; Response required a Phase II RFI Report.

NMED Comment: The Phase II RFI Report must include a discussion of changes in the groundwater elevations and gradient over time and the causes of those changes (e.g., pumping stresses), describe current conditions at the site, and address potential impacts of possible future changes in the groundwater gradient on the dissolved phase contamination at the site (e.g., resuming, increasing, or discontinuing the use of various municipal wells in accordance with Albuquerque Bernalillo County Water Utility Authority (ABCWUA) projected plans, and seasonal use variations, at the time the report is written). Given the anticipated continual rise in groundwater levels, the Phase II RFI should discuss how recovery well pumping rates may need to change in order to account for changes in groundwater gradients toward the Ridgecrest well field.

Further, the locations where production wells exist today may remain the same over time because of well replacement and water resource management strategy needs (although pumping from Ridgecrest well field is still a worst-case scenario). Increased conservation and San Juan-Chama water dependence could shift the pumping center from its current location to another location in the basin. These factors must be discussed in the Phase II RFI as they will need to be considered when determining final corrective measures.

34. Updated Conceptual Site Model; Response required a Phase II RFI Report.

NMED Comment: The Phase II RFI report must contain an updated conceptual site model which incorporates all data collected at the site at the conclusion of investigation activities to provide an understanding of the physical, chemical, and biological processes that influence contaminant fate and transport to human and environmental receptors. Understanding these processes is critical for adequately conducting a corrective measures

evaluation for final remedy selection.

35. Reporting Requirements; Response required in the Phase II RFI Report.

NMED Comment: No revisions to the Phase I RFI Report are required. However, to facilitate shorter and more efficient NMED review times, the Phase II RFI must follow reporting requirements outlined below. These comments have also been sent to the Permittee, in a separate letter, titled "Reporting Requirements For All Document Submittals" dated September 2, 2020:

a. A complete and accurate electronic red-line strike out (RLSO) version must be included in all future revised documents. The RLSO included with this Report did not include all changes that were made. This defeats the purpose of a RLSO version and results in longer NMED review times.
b. All appendices must appropriately paginated and include tables of contents, if necessary. In addition, all tables, figures, and included pages from previous reports must be appropriately numbered, including new and correct footers, headers, and titles, relevant to the appendix where they are presented.
c. All data tables must be of a manageable size, separated into logical sections or separate tables (e.g., chronologically or by investigation) to facilitate locating information. Portable document format (PDF) tables that are several thousand pages long that are not in chronological order and/or contain no subdivisions for different investigations are not acceptable.
d. Searchable, electronic versions of all data tables (i.e., Microsoft Excel format) must also be included on compact disk with the report in accordance with Section 6.5.18, Laboratory Analyses Requirements for all Environmental Media, of the Permit. This requirement was discussed with KAFB during a May 4, 2020 conference call with NMED; KAFB indicated that they would comply.
e. Lithologic logs must not be distributed among several appendices. Appendices A, B, C, and D each contain different sets of lithologic logs. In the Phase II RFI report and future reports, all relevant lithologic logs must be compiled into one appendix. All borings for which there are lithologic logs included in an appendix must be listed in a table of contents for that appendix.
f. Well installation and development records must not be presented in one appendix. In the Phase II RFI report and future reports, well installation and development records must be included in one appendix. Each well for which well installation and development records are included must be listed in a table of contents for that appendix.
g. All geophysical logging activities must ensure that the geophysical logging equipment is properly calibrated, and calibration records must be included in all relevant reports for investigation activities performed at the site after 2015.

APPENDIX A-2

Revision Tracking/Red-Line Documents
(Provided via CD)

APPENDIX A-3

Regulatory Approval and Permits

GROUNDWATER TREATMENT SYSTEM DESIGN APPROVALS

NEW MEXICO
ENVIRONMENT DEPARTMENT

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

Harold Runnels Building
1190 Saint Francis Drive (87505)
P.O. Box 5469, Santa Fe, NM 87502-5469
Phone (505) 827-0419 Fax (505) 827-0310
www.nmenv.state.nm.us

RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

June 30, 2015

Colonel Eric H. Froehlich
Base Commander
377 ABW/CC
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5606

John Pike
Director, Environmental Management Services
377 MSG
2050 Wyoming Blvd. SE, Suite 116
Kirtland AFB, NM 87117-5270

RE: REVISED BASIS OF DESIGN – MID-PLUME PUMP AND TREAT SYSTEM,
BULK FUELS FACILITY SPILL
SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423
HWB-KAFB-15-MISC

Dear Colonel Froehlich and Mr. Pike:

The New Mexico Environment Department (NMED) is in receipt of the Kirtland Air Force Base (the Permittee) *Revised Final Basis of Design (BOD) – Mid-Plume Pump and Treat System*, dated June 12, 2015. The revised BOD addresses the issues identified in NMED's conditional BOD approval letter of April 24, 2015.

The Permittee's revised final BOD is hereby approved with the following condition:

1. The Permittee shall submit, upon completion of construction, photographic documentation that a backflow preventer or other means to prevent backflow of treated water from the force main line into well KAFB-7 has been installed.

NMED technical staff will assist you and your contractor in any way possible to achieve this interim measure.

If you have any questions, please contact me at 505-827-2855.

Sincerely,

Kathryn Roberts
Director
Resource Protection Division

KR/DM

cc: Col. T. Haught, KAFB
D. Wilson, KAFB
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB

File: KAFB 2015 Bulk Fuels Facility Spill Library and Reading File

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lt. Governor

RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

ENTERED

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 16, 2015

Colonel Eric H. Froehlich
Base Commander
377 ABW/CC
2000 Wyoming Blvd.SE
Kirtland AFB, NM 87117-5606

John Pike
Director, Environmental Management Services
377 MSG
2050 Wyoming Blvd. SE, Suite 116
Kirtland AFB, NM 87117-5270

Re: KIRTLAND AIR FORCE BASE BULK FUEL FACILITY MID-PLUME PUMP AND TREAT SYSTEM BASIS OF DESIGN – ADDENDUM #1
BULK FUELS FACILITY SPILL
SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE
EPA ID#NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Froehlich and Mr. Pike:

The New Mexico Environment Department (NMED) has received the Kirtland Air Force Base (AFB) (Permittee) *Kirtland Air Force Base Bulk Fuel Facility Mid-Plume Pump and Treat System Basis of Design – Addendum #1* dated December 13, 2015. The Mid-Plume Pump and Treat Basis of Design Addendum #1 proposes:

- The addition of a pH adjustment system to the groundwater treatment system (GWTS) in order to control the pH of treated water.
- The pH adjustment system will include the addition of National Sanitary Foundation (NSF) certified 20° Baume hydrochloric acid (32% HCl) solution to the effluent water at a rate of 2 gallons per day (or 306 milliliters per hour).
- Twice daily measurement of effluent pH, or more frequently if required, in order to monitor and adjust the HCl addition rate.

The acid addition pump will only operate if the discharge pumps are running. The GWTS has been designed to automatically shut down the discharge pump, and therefore the pH adjustment

system, if any part of the treatment system shuts down. This provides a safe-guard against the addition of acid when any part of the GWTS is not operational. The Permittee anticipates the need to adjust pH because new GAC units typically increase the pH of treated water by about 1 unit for a temporary period after system startup. The Permittee estimates that the pH adjustment system will not be required after two weeks of operation at 100 gallons per minute (gpm). It is noted that additional pH adjustment may be required when operational extraction rates increase above 100 gpm.

The Mid-Plume Pump and Treat System Basis of Design – Addendum #1 is hereby approved.

Should you have any questions regarding this letter please contact Diane Agnew of my staff at (505) 222-9555.

Sincerely,

Kathryn Roberts
Director
Resource Protection Division

KR/DA

Cc: Col. T. Haught, KAFB
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
L. Bitner, KAFB
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB
D. McQuillan, NMED
D. Agnew, NMED-HWB
S. Huddleson, NMED-GWQB
S. Reuter, NMED-PSTB

File: KAFB 2015 Bulk Fuels Facility Spill

ENTERED

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lt. Governor

RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

March 25, 2016

Colonel Eric H. Froehlich
Base Commander
377 ABW/CC
2000 Wyoming Blvd.SE
Kirtland AFB, NM 87117-5606

John Pike
Director, Environmental Management Services
377 MSG
2050 Wyoming Blvd. SE, Suite 116
Kirtland AFB, NM 87117-5270

Re: BULK FUELS FACILITY EXPANSION OF THE DISSOLVED-PHASE PLUME GROUNDWATER TREATMENT SYSTEM DESIGN
SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE
EPA ID#NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Froehlich and Mr. Pike:

The New Mexico Environment Department (NMED) is in receipt of the Kirtland Air Force Base (KAFB) (the Permittee) *Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design* (Work Plan), dated January 19, 2016. The work plan addresses activities to be performed at the Bulk Fuels Facility site, including:

- Installation of extraction well(s);
- Installation of observation and groundwater monitoring wells;
- Installation of well vaults and conveyance lines associated with new extraction well(s);
- Expansion of the existing Groundwater Treatment System (GWTS);
- Installation of regional injection well(s);
- Operation and maintenance of the GWTS; and
- Performance of groundwater monitoring.

Future revisions and updates of this Work Plan are anticipated to provide the required information on groundwater monitoring well design and installation; extraction well design and

KAFB4404

installation; vault and conveyance line construction and installation; expansion of the groundwater treatment system (GWTS) and installation; and injection well location, design, and installation. The work plan tasks, procedures, and quality control are hereby approved with the following conditions:

1. Section 3.1.5 references depths below ground surface for the tops of screens in the data gap groundwater monitoring wells. Screens should be placed relative to the depth to groundwater, and not a standard depth below ground surface, so that wells adequately screen the shallow, intermediate, and deep intervals represented by other wells in the monitoring network.
2. Aquifer testing of the new extraction well(s) is required in order to continue refinement of the site conceptual model and understanding of aquifer characteristics. The Permittee must submit a separate work plan outlining aquifer testing procedures and analysis for NMED review and approval. This work plan must be submitted a minimum of 60 days prior to the planned start of aquifer testing.
3. The Work Plan needs to be updated to provide a discussion of procedures and decision making criteria that will be followed to determine if/when additional treatment equipment is necessary to augment the current GWTS. This discussion should specifically address manganese and iron. If changes to the GWTS are required, those changes shall be documented in revisions and updates to this Work Plan, submitted to the NMED for review and approval.
4. In addition to the design and installation of injection wells and the associated conveyance line, future revisions to this Work Plan shall also include design information on the effluent manifold to be used to distribute treated groundwater to the golf course and multiple injection wells (Section 3.1.8). Additionally, future revisions shall include the engineering detail on the Golf Course Tie-In Connection referenced in Section 3.1.8.2.
5. The NMED understands that the Air Force would like to use the treated water generated by the GWTS for dust suppression on base. The Air Force shall revise the subject Work Plan to describe the dust suppression mechanisms and application areas
6. Proposal of long-term monitoring, system optimization, and exit strategy are not appropriate for an interim measure and should be completed as part of the Corrective Measures Evaluation and Corrective Measures Implementation phases of the corrective action process. The Final Report referenced in Section 3.1.9 of the Work Plan should meet the permit requirements for an Interim Measure Report (Permit Section 6.2.2.2.12.5).
7. Groundwater monitoring well water levels must be gaged on a quarterly basis and not on a semi-annual basis. This information is vital to understanding changing aquifer conditions and to evaluating performance of the dissolved-phase plume collapse interim measure.
8. Section 3.1.10 (and other sections, as appropriate) will ultimately, if not now, need to address the following items, as discussed on February 17, 2016:
    a. Discussion of discharge of treated water (e.g., land application, injection);
    b. Reference to the measurement and reporting of effluent volumes and discharge locations; and
    c. Discussion of aquifer monitoring activities associated with injection.

9. Table 3-6 shall be revised to include discharge permit DP-1839 as a regulatory driver for injection of treated groundwater.
10. Section 3.1.11.2 states that production wells will be sampled on a semiannual basis. Production wells must continue to be sampled on a monthly basis for EDB, benzene, toluene, ethylbenzene, and xylene.
11. Section 3.1.11.3 does not reflect the approved optimization of periodic monitoring. The Permittee should follow reporting requirements proposed in the *Technical Memorandum: Requested Optimization of Monitoring and Reporting, Second Phase, Bulk Fuels Facility Spill Site,* dated December 9, 2015 and approved on January 20, 2016.
12. Section 3.2.16 needs to be revised to clarify "periodic sampling" of extraction wells and to indicate that the sampling will comply with Ground Water Quality Bureau (GWQB) permit requirements.
13. The U.S. Geological Survey (USGS) is currently conducting a base-wide survey of groundwater monitoring wells. As part of the USGS survey, it is NMED understands that the USGS will develop a standard operating procedure (SOP) for the surveying of monitoring wells for KAFB. The NMED requests that the Permittee consider incorporation of the SOP into the survey procedures outlined in Section 3.2.20 of the work plan.
14. Mineralogy can be an indicator of depositional environment and a way to correlating geologic units across monitoring wells. The NMED requests that the Permittee consider including mineralogy in the geologist boring logs during groundwater monitoring well, observation well, and extraction well drilling and logging.
15. The NMED requests that the Permittee review and revise, as necessary, the investigation derived waste (IDW) categories in Section 8.1 of the work plan to better clarify the categories of waste anticipated and to better align them with the GWQB decision flow chart for disposal of IDW water. For example, based on technical discussions the NMED understands that the nonhazardous water category encompasses the following:
    a. IDW water that is nondetect for all constituents;
    b. IDW water that has detections of constituents that are below the New Mexico Water Quality Control Commission (NMWQCC) standards and/or U.S. Environmental Protection Agency (EPA) maximum contaminant levels (MCLs); and
    c. IDW water that has constituent concentrations greater than NMWQCC standards and/or EPA MCLs but are not characteristic hazardous waste.

    As written, the text in Section 8.1 does not clearly indicate these three scenarios for IDW water and the plan for disposition.
16. The nonhazardous IDW water may be treated at the GWTS for discharge, as discussed in Section 8.1.1 provided that the Permittee obtain the necessary permissions from the NMED GWQB.
17. Figure 1-1 in the Quality Assurance Project Plan shows two injection well target areas near the Golf Course. The NMED has not received sufficient data to approve these areas for injection and requires that the figure be updated to remove them.

The NMED understands that the Air Force intends for this Work Plan to be a single source for details related to work conducted under the dissolved-phase plume collapse interim measure. As

such, this Work Plan shall be updated, as necessary, to reflect changes resulting from new or modified permitting requirements; revisions to GWTS monitoring and contingency plans; and modifications to scope and detail of identified tasks. Future revisions to the work plan are subject to NMED review and approval. Please submit a revised Work Plan that addresses the conditions identified in this approval.

Should you have any questions regarding this letter please contact Ms. Diane Agnew at (505) 222-9555.

Sincerely,

Kathryn Roberts
Director
Resource Protection Division

KR/DM

cc: Col. T. Haught, KAFB
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
K. Kieling, NMED-HWB
D. McQuillan, NMED KAFB Fuel Spill Cleanup Team Leader
S. Pullen, GWQB

File: KAFB 2015 Bulk Fuels Facility Spill Library and Reading

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Acting Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

November 16, 2016

Colonel Eric H. Froehlich
Base Commander
377 ABW/CC
2000 Wyoming Blvd.SE
Kirtland AFB, NM 87117-5606

Mr. John Pike
Director, Environmental Management Services
377 MSG
2050 Wyoming Blvd. SE, Suite 116
Kirtland AFB, NM 87117-5270

Re: BULK FUELS FACILITY EXPANSION OF THE DISSOLVED-PHASE PLUME GROUNDWATER TREATMENT SYSTEM DESIGN, REVISION 1
SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE
EPA ID#NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Froehlich and Mr. Pike:

The New Mexico Environment Department (NMED) received the Kirtland Air Force Base (KAFB) (the Permittee) *Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 1* (Work Plan), dated September 20, 2016. The revised work plan addresses the conditions in the NMED conditional approval letter dated March 25, 2016 as well as additional site activities to be performed at the Bulk Fuels Facility site, including:

- Installation of External Controls for Variable Frequency Drives on Existing Skid Pumps;
- Miscellaneous Building Changes at the Groundwater Treatment Facility (GWTS); and
- GWTS Sand Filter Design.

Revisions of this Work Plan are anticipated to provide the required information on aquifer testing of existing and newly installed extraction wells; final design drawings for the pre-treatment sand filter(s); conveyance lines for future injection wells; injection well location, design, and installation; and updates to monitoring requirements in the final discharge permit for underground injection (NMED Ground Water Quality Bureau Discharge Permit [DP] 1839). The

work plan tasks, procedures, and quality control are hereby approved with the following conditions:

1. Section 3.1.4 refers to a fifth extraction well, KAFB-106240, and working group approval of the location and design of this well. The working group and NMED have not approved the location and design of a fifth extraction well. The working group decision was to wait for a year of operation of the initial four extraction wells so that site-specific data could be evaluated to determine the optimal location, pumping rate, and well design. Therefore, the proposed location and design of KAFB-106240 listed in this revision of the work plan is not approved pending additional data collection and analysis.
2. Section 3.1.4 states that extraction wells will be logged using dual resistivity, Self Potential, and gamma logging tools. The work plan must be revised to include information on what methods and practices are to be followed for borehole logging, as well as information on equipment calibration, equipment decontamination, and quality control metrics. Additionally, Appendix A must be revised to include field forms and logs to be used during geophysical borehole logging.
3. Before the start of well construction, NMED requires that the Permittee provide a PDF copy of the lithologic log on a daily basis and the proposed screen interval via email to NMED for approval, ahead of the start of well construction. The NMED will provide approval of the proposed screen within 24-hours of receipt. If the geophysical logging data is used for final design of the extraction well, NMED requests that the geophysical data be provided with the proposed screen intervals.
4. Section 3.1.5 must be revised to reflect the changes made to the groundwater monitoring well design as described in email correspondence dated October 20, 2016 (Permittee to NMED). The Permittee cites changes to the well construction design based on a *Final Constructability Review* with the contracted drilling company.
5. The proposed nested well design is approved with the understanding that adjustments may be necessary based on changed conditions in the field. NMED requests an email notification of any deviations from the submitted well design which includes the proposed well design/screen interval for NMED approval a minimum of 24 hours ahead of the start of well construction. The proposed well design can be submitted via email in PDF format. NMED requests the proposed well design be sent no sooner than 24 hours ahead of start of well construction.
6. Section 3.1.7 includes the conceptual design of sand filters for pre-treatment at the GWTS. The Permittee must provide the final sand filter design and specifications to NMED a minimum of 30 days prior to the start of construction. NMED will notify the Permittee within 2 weeks of receipt whether the design is approved or if a period of further review is required.
7. Section 3.1.7 references daily, weekly, and monthly sampling that will occur with the "shakedown and QC functions of the expanded GWTS." It is not clear how shakedown is defined and what actions will initiate the sampling frequency. Additionally, the NMED requires that the treatment system be sampled daily for one week, weekly samples for one month, and monthly samples thereafter once a new extraction well has been brought online. The Permittee shall revise the work plan to clarify shakedown and actions that will trigger the sampling frequency.

8. Section 3.1.11.1 states that 19 newly installed groundwater monitoring wells have completed the quarterly baseline sampling as of Q1 2016 and are now going to a semi-annual monitoring frequency. The Permittee has reclassified all 19 newly installed wells as "Extended Network" wells as defined in *Requested Optimization of Monitoring and Reporting, Second Phase, Bulk Fuels Facility Spill Site* dated December 9, 2015. This categorical change to reclassify the 19 wells is not approved. Eleven of the newly installed wells are in sentinel well locations and therefore meet the definition of "Downgradient Proximal Wells." The work plan and Table 3-2 shall be revised to reflect the well classification and sampling frequency below:

Well ID	Updated Well Classification	Sample Frequency
KAFB-106216	Downgradient Proximal Wells	EDB and field parameters – quarterly Metals, Anions, Alkalinity – Semi-annually VOCs – Annually
KAFB-106217		
KAFB-106218		
KAFB-106222		
KAFB-106223		
KAFB-106224		
KAFB-106231		
KAFB-106232		
KAFB-106212	Extended Network Wells	EDB, Metals, Anions, Alkalinity – Semi-annually VOCs – Annually
KAFB-106213		
KAFB-106214		
KAFB-106215		
KAFB-106219		
KAFB-106220		
KAFB-106221		
KAFB-106225		
KAFB-106226		
KAFB-106227		
KAFB-106230		

9. The Permittee shall revise Table 3-2 to indicate that the two new groundwater monitoring well nests, KAFB-106235 and KAFB-106236, will be sampled quarterly as "Newly Installed Monitoring Wells" in accordance with the approved *Requested Optimization of Monitoring and Reporting, Second Phase, Bulk Fuels Facility Spill Site* dated December 9, 2015.
10. Section 3.2.15 states that extraction well development will follow KAFB Standard Operating Procedures and a 2004 update to the Base-Wide Plans. NMED requests that these documents be made available for reference/review.
11. Conditions defined in the discharge permit DP-1839 for underground injection at KAFB-7 and future injection wells must be incorporated and addressed in the work plan. Specifically, the work plan and the Quality Assurance Project Plan must include the

permit sampling and monitoring requirements for the GWTS; requested information on the scope, purpose, location, and design of future injection wells and the associated conveyance piping; reporting requirements; and any other conditions in DP-1839 relevant to the tasks in the work plan.

Section 3.2.16.5, *Collection of Groundwater Sampling from Monitoring Wells Not Equipped with Dedicated Pumps Using Passive Sampling Techniques* is not approved at this time, and is pending NMED review and analysis of validation study data provided in the *Quarterly Report – April-June 2016, Bulk Fuels Facility, Solid Waste Management Unit ST106/SS-11, Kirtland Air Force Base, New Mexico* dated September 23, 2016.

The NMED understands that the Air Force intends for this Work Plan to be a single source for details related to work conducted under the dissolved-phase plume collapse interim measure. As such, this Work Plan shall be updated, as necessary, to reflect changes resulting from new or modified permitting requirements; revisions to GWTS monitoring and contingency plans; and modifications to scope and detail of identified tasks. Future revisions to the work plan are subject to NMED review and approval. Please submit a revised Work Plan that addresses the conditions identified in this approval.

Should you have any questions regarding this letter please contact Ms. Diane Agnew at (505) 222-9555.

Sincerely,

Kathryn Roberts
Director
Resource Protection Division

KR/DA

cc: Col. M. Harner, KAFB
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
T. Simpler, USACE
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
K. Kieling, NMED-HWB
D. McQuillan, NMED
D. Agnew, NMED-HWB

File: KAFB 2016 Bulk Fuels Facility Spill

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov

BUTCH TONGATE
Cabinet Secretary Designate
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 12, 2016

Colonel Eric. H. Froelich
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

Mr. John Pike
Director, Environmental Management Services
377 MSG
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, NM 87117-5270

RE: OPERATIONS AND MAINTENANCE PLAN, GROUNDWATER TREATMENT SYSTEM, BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Froelich and Mr. Pike:

The New Mexico Environment Department (NMED) received the Kirtland Air Force Base (KAFB) (the Permittee) *Operations and Maintenance Plan, Groundwater Treatment System*, dated August 18, 2016. The Operations and Maintenance Plan (O&M Plan) is a reference document for site personnel and includes:

- Equipment information (e.g., manufacturer-supplied O&M Plans and cut sheets);
- Operational procedures;
- Inspections and maintenance;
- Repairs;
- Recordkeeping; and
- Waste management.

Col. Froelich and Mr. Pike
December 12, 2016
Page 2

The NMED has reviewed the O&M Plan and approves the document with the following modifications.

General Comments:

1. The document shall be revised to reference NMED Ground Water Quality Bureau (GWQB), where applicable, or simply reference NMED. Issues related to failures of the treatment system to treat water to appropriate standards and issues associated with discharges of inappropriate water will be of concern to both the GWQB and Hazardous Waste Bureau (HWB).
2. The document must be revised to include a reference to Discharge Permit (DP) 1839 as finalized, where appropriate, particularly in association with the Contingency Plan and the Sampling and Analysis Plan.
3. Condition 3 of DP 1839 states, "The Permittee shall ensure that the most recent versions of the O&M Plan and the Work Plan for Dissolve-Phase Treatment System design are consistent with the requirements of [the] Discharge Permit." The Permittee shall revise the O&M Plan accordingly.
4. The O&M Plan does not identify the contaminants of concern for the Groundwater Treatment System (GWTS) and incorrectly references the Hazardous Waste Treatment Facility (HWTF) Permit in multiple locations. The document must be revised to include the list of COCs (listed below) and reference the appropriate regulatory document throughout:

   Ethylene dibromide (EDB) – 0.05 micrograms per liter (µg/L)
   Benzene – 5 µg/L
   Ethylbenzene – 700 µg/L
   Toluene – 750 µg/L
   Total xylenes – 620 µg/L
   Iron (Dissolved) – 1 milligram per liter (mg/L)
   Manganese (Dissolved) – 0.2 mg/L.

Specific Comments:

1. **Section 1, Introduction**

   The Introduction needs to be revised to reference all associated regulatory requirements, including the KAFB HWTF Permit and DP 1839.

2. **Section 1.3 Discharge Requirements**

   Permittee's Statement: "The treated groundwater discharged from the GWTS must meet the human health standard for contaminants that are listed in Section 20.6.2.3103 of the New Mexico Administrative Code (NMAC), other requirements of the NMED Ground and Surface Water Protection regulations (NMAC 20.6.2) and must comply with any additional approved federal, state, or local permits."

NMED's Comment: The O&M Plan must be revised to reference the specific standards in the HWTF Permit. The HWTF Permit, Section 6.2.3.1, *Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)*, states: "The cleanup levels for groundwater shall be the New Mexico Water Quality Control Commission (WQCC) water quality standards (20.6.2.3103 and 20.6.2.4103 NMAC) and the drinking water maximum contaminant levels (MCLs) adopted by EPA under the Federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26). If both a WQCC standard and a Maximum Contaminant Level (MCL) have been established for a contaminant, then the most stringent of the two levels shall be the cleanup level for that contaminant."

3. **Section 2.1 Operational Approach**

Permittee's Statement: "The flow rate of groundwater from each of the three extraction wells will be dynamic. As the groundwater elevations rise in the aquifer or EDB concentrations change, adjustments to the extraction well flow rates will be made to ensure plume capture."

NMED's Comment: It is not clear what data will be utilized to evaluate and confirm ethylene dibromide (EDB) plume capture or how the Permittee is defining plume capture in the context of adjustment to extraction rates. The Permittee shall revise the O&M Plan to provide additional detail to clearly explain how plume capture will be determined and how adjustments will be made to the extraction rates. Additionally, NMED must be notified of the planned adjustments, with supporting documentation, a minimum of 2-weeks prior to such changes being implemented.

4. **Section 4, Process Monitoring**

Permittee's Statement: "Analytical results will be reported to the NMED Hazardous Waste Bureau as required in any approved permit."

NMED's Comment: Both the NMED HWB and GWQB will need to receive the analytical results for review. The Permittee shall revise the document to reference NMED or specify both HWB and GWQB.

5. **Section 4.1, Extraction Wells**

NMED's Comment: In addition to monitoring the water level in the well casing, the pump status, and the groundwater flow rate, the Permittee should also monitor the height of the filter pack at each of the extraction wells, at least annually.

6. **Section 5.1, Reporting**

NMED's Comment: The first paragraph in Section 5.1 addresses quarterly and annual reports to NMED and lists the information to be included. These reports must include the

effluent discharge volumes to each discharge location. The O&M Plan must be revised accordingly.

The fourth paragraph in the section addresses the evaluation of the system performance associated with the extraction and injection systems. The evaluation and reporting must also address the discharge (i.e., injection of the treated water); the Underground Injection Control (UIC) well performance parameters; flow rates; any observed changes in groundwater chemistry; groundwater mounding; and any changes in groundwater flow direction. The O&M Plan must be revised accordingly.

7. **Section 6.2, Monitoring Well Purge Water**

Permittee's Statement: "Groundwater generated during either well development or routine groundwater monitoring events … that is non-hazardous water … will be discharged to the GWTS through the sump in the building floor."

NMED's Comment: The Permittee's application for discharge via UIC injection well(s) makes the commitment to treating and discharging groundwater from the EDB-only portion of the contaminant plume (See Part I, Subsection 6). Additionally, this limitation is a requirement in the finalized DP 1839 (See Permit Condition #8). The O&M Plan must be revised to include the same limitation in the waste management of monitoring well purge water.

8. **Section 6.3, Backwash Water**

NMED's Comment: This Section addresses the backwashing of various components of the GWTS and after settling and pre-filtration, putting the water back into the GWTS. Backwash water may contain a significant amount of undissolved manganese and iron that could, after settling and pre-filtration, result in elevated dissolved concentrations of these metals. This Section of the O&M Plan must be revised to include the sampling and analysis of filtered backwash water for dissolved phase manganese and iron, prior to adding the water into the GWTS for treatment.

9. **Section 6.4, Depleted Granulated Activated Carbon (GAC)**

Permittee's Statement: "Depleted GAC will be removed from the GAC tanks and regenerated or disposed of off-site in accordance with the NMED RCRA permit."

NMED's Comment: As stated in Section 6.5.7, *Collection and Management of Investigation Derived Waste* of the HWTF Permit, "The Permittee shall include a description of the anticipated IDW waste management process as part of any work plan submitted to the Department for approval." The amount of information provided in Section 6.4 for waste management of depleted GAC is insufficient for NMED approval. The O&M Plan must be revised to include details on the management of depleted GAC,

specifically for off-site disposal of if the GAC is not regenerated. The O&M Plan must be revised accordingly.

10. Section 6.5., GAC Adjustment Solutions

Permittee Statement: "Spent or unused agents used to condition the GAC will be characterized and handled/packaged as hazardous waste in accordance with the Kirtland AFB RCRA Permit."

NMED 's Comment: As stated in Section 6.5.7, *Collection and Management of Investigation Derived Waste* of the HWTF Permit, "The Permittee shall include a description of the anticipated IDW waste management process as part of any work plan submitted to the Department for approval." The amount of information provided in Section 6.4 for management of the GAC adjustment solutions is insufficient for NMED approval. The O&M Plan must be revised to include details on the management of the adjustment solution waste stream.

11. Appendix D, Description of GWTS, Section D.5, Treated Water Discharge

NMED 's Comment: Appendix D addresses the leak detection associated with the conveyance system between the extraction wells and the GWTS. Section D.5 in Appendix D must be revised to include the Permittee's procedures for demonstrating the structural integrity of the effluent conveyance system (Conditions 11 and 16 in DP 1839).

12. Appendix K, Contingency Plan, Section K.2, Notification Procedures

Permittee Statement: "As soon as Kirtland AFB has knowledge that effluent water quality exceeds the discharge criteria for one or more of the contaminants listed in approved permits, the NMED HWB must be notified in writing within 24 hours of discovery in accordance with Section 1.27 of the RCRA Permit."

NMED 's Comment: Issues associated with failures of the treatment system to treat water to appropriate standards and issues associated with discharges of inappropriate water will be of concern to both the GWQB and the HWB. Please revise the document to reference both GWQB and HWB or simply reference NMED.

13. Appendix K, Contingency Plan, Section K.6, Spills and Notification Procedures

Permittee Statement: "If the release or leak results in a release to the environment (outside the secondary containment area), the system will be immediately shutdown, and NMED will be notified. Notification procedures and corrective actions in accordance with Section 1.27 and 1.28 of the RCRA Permit are summarized below."

NMED 's Comment: Reference to Section 1.28 of the HWTF Permit is not appropriate in this instance. HWTF Permit Section 1.28 references Permit Attachment F, Contingency

Plan, which states, "This Contingency Plan has been prepared for the Open Detonation (OD) Unit located at the Explosive Ordnance Detonation Disposal (EOD) Range at the Kirtland Air Force Base (KAFB) Facility in compliance with 40 C.F.R. Part 264, Subpart D, as applicable" The O&M Plan must be revised to remove reference to Section 1.28 of the HWTF Permit as Attachment F is not applicable to the BFF project site.

Permittee Statement: "In the event that a release or unauthorized discharge occurs, the Kirtland AFB Compliance Coordinator will complete the following notifications:

1. NMED will be verbally notified via the Environmental Emergencies hot line (505-827-9329) within 24 hours of discovery with the following information: a. Information concerning release of any hazardous waste or constituents that may cause an endangerment to public drinking water supplies."

NMED 's Comment: The Permittee must revise the O&M Plan to state that the NMED will be notified of a release or unauthorized discharge as soon as possible after learning of a discharge but no more than 24 hours thereafter.

Reference to the hot line should be clarified that the number is only to be used during non-business hours and on weekends and holidays. The hot line contacts the New Mexico State Police Dispatch Center, which will in turn call an NMED employee tasked with responding to an after-hours phone. During business hours, the Permittee should contact an employee of either the HWB or GWQB, depending on the nature of the emergency. For spills associated with DP 1839, contact should be made with the permit reviewer directly or the GWQB can be contacted directly at 505-827-2900. The Permittee shall revise the O&M Plan accordingly.

Finally, reference to "hazardous waste or constituents" is not sufficient. The O&M Plan must be revised to include the constituents associated with the standards referenced in HWTF Permit Section 6.2.3.1 as well as those contaminants listed in Table A-1 and the toxic pollutants defined in Subsection WW of 20.6.2.7 NMAC.

14. Appendix L, Sampling and Analysis Plan, Section L.1, Discharge Requirements

Permittee Statement: "Treated groundwater discharged from the GWTS must meet the human health standard for contaminants that are listed in Section 20.6.2.3103 of the New Mexico Administrative Code (NMAC), requirements of the New Mexico Environment Department (NMED) Ground and Surface Water Protection regulations (NMAC 20.6.2), and must comply with any additional approved federal, state, or local permits. Effluent discharged from the GWTS must not exceed the following criteria as currently stipulated in permits from the aforementioned regulations:

Ethylene dibromide (EDB) – 0.05 micrograms per liter (µg/L)
Benzene – 5 µg/L
Ethylbenzene – 700 µg/L
Toluene – 750 µg/L
Total xylenes – 620 µg/L

Iron (Dissolved) – 1 milligram per liter (mg/L)
Manganese (Dissolved) – 0.2 mg/L."

NMED 's Comment: In addition to referencing the standards in NMAC 20.6.2.3103, the quoted paragraph must be revised to reference the Federal MCLs, as referenced in HWTF Permit Section 6.2.3.1, *Cleanup Levels for Contaminants in Groundwater (other than Perchlorate).*

15. Appendix L, Sampling and Analysis Plan, Section L.2.3, Effluent Monitoring

Permittee Statement: "Additional effluent monitoring following any significant change to the treatment train (e.g. addition of a new extraction well) will consist of samples taken from the outlet of the post-filters. During the first month of operation, the samples will be collected daily for 7 days and then weekly until the end of the month."

NMED 's Comment: The Permittee must revise this section to reflect the sampling requirements of the finalized DP 1839.

16. Appendix L, Sampling and Analysis Plan, Table L-1, Groundwater Treatment System Monitoring Requirements

NMED 's Comment: The Permittee must revise this table to include the annual and five-year monitoring requirements in the finalized DP 1839.

NMED understands that this is a dynamic document that will be revised at least annually to reflect actual operations and maintenance at the GWTS for the dissolve-phase EDB plume collapse. The modifications in this letter must be incorporated into the next version of the O&M Plan for submittal to the NMED. NMED requires that a revised O&M Plan be submitted within 120-days of significant changes to the GWTS, including addition of pre-treatment, new extraction well(s), new injection well(s), and expansion of the treatment capacity.

Should you have any questions, please contact Ms. Diane Agnew of my staff at 505-222-9555 or via email at diane.agnew@state.nm.us.

Sincerely,

Kathryn Roberts
Director
Resource Protection Division

cc: Col M. Harner, KAFB
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
T. Simpler, USACE
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
K. Kieling, NMED-HWB
D. McQuillan, NMED
D. Agnew, NMED-HWB
M. Hunter, NMED-GWQB
S. Pullen, NMED-GWQB

File: KAFB 2016 Bulk Fuels Facility Spill

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
Santa Fe, NM 87502-5469
Telephone (505) 827-2855 Fax (505) 827-2836
www.env.nm.gov

BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

May 31, 2017

Colonel Eric. H. Froehlich
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

Lieutenant Colonel Wayne J. Acosta
Civil Engineer Office
377 Civil Engineering Division
2050 Wyoming Blvd SE, Suite 116
Kirtland AFB, NM 87117-5270

RE: BULK FUELS FACILITY EXPANSION OF THE DISSOLVED-PHASE PLUME GROUNDWATER TREATMENT SYSTEM DESIGN, REVISION 2
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Froelich and Lt. Colonel Acosta:

The New Mexico Environment Department ("NMED") received the Kirtland Air Force Base ("KAFB" or "the Permittee") *Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2* ("Work Plan"), dated January 31, 2017. The revisions to the Work Plan address the conditions in the NMED conditional approval letter dated November 16, 2016, as well as additional site activities to be performed at the Bulk Fuels Facility ("BFF") site, including:

- Design and installation of pre-treatment sand filters at the groundwater treatment system ("GWTS");
- Equipment changes to new pump skids;
- Change to passive diffusion sampling at select groundwater monitoring wells; and
- Rehabilitation and re-development of KAFB-106233.

NMED is also in receipt of the KAFB *Technical Memorandum Maximum Concentration Limits for Kirtland BFF Groundwater Treatment System* ("Memo"), dated May 10, 2017. This Memo documents modeling completed by KAFB's contractor to determine maximum loading criteria for operations and maintenance of the groundwater treatment system, using a 6-month lead change out for the granulated activated carbon lead tank. The Memo also includes maximum concentrations of iron and manganese for the sand filter pre-treatment to be installed in Summer 2017. It is NMED's understanding that the influent criteria presented in the Memo will be part of the Operations and Maintenance Plan revisions anticipated to be formally submitted by December 31, 2017.

NMED understands that the intention of the Air Force is to make this a programmatic document and to submit revisions to add new or revised tasks. NMED's review of the current Work Plan, conducted with the Air Force, highlighted problems in making continuous revisions to an "original" document, including increased review times, inconsistencies, and a general lack of transparency. Consequently, and as discussed with the Air Force on several occasions, NMED will no longer accept revisions to the original document. Additional tasks will need to be submitted as new, stand-alone work plan documents or appendices. Changes to this Work Plan, including appendices and other Work Plan documents, made or added in response to the conditions in this letter, must be done as tracked changes and limited to the relevant text and sections.

The Work Plan, as revised, extends beyond the original scope approved in Section 1.2. Additionally, revisions to the Work Plan contain unnecessary documentation of work that has been completed which is not appropriate for a planning document such as this Work Plan. Work completed should be removed from this Work Plan and documented in the appropriate and applicable submittal document (e.g., quarterly and/or annual report, work plan, etc.).

The Work Plan tasks, procedures, and quality control are hereby approved with the following conditions:

1. The revisions to Section 3.1.5 delete what was originally proposed and approved for the groundwater monitoring well nests. Additionally, it is not clear what will be done for future groundwater monitoring wells and instead, the revised language in the Work Plan appears to document what was done for the already completed wells; the added text references specific depths and design details. This section of the Work Plan must be revised to keep the original well design language as well as details on what design will be used relative to the water table. Well completion discussion and detail should be included in the applicable and appropriate well completion report, quarterly and or annual report.

2. In Section 3.2.15.2, the Work Plan revisions indicate a deviation from KAFB Standard Operating Procedures ("SOPs") and previously approved metrics for well development specific to turbidity. The Permittee states turbidity stabilization at less than 100 NTUs is acceptable and that since "these wells were decided for passive sampling, the 0.010 slot size should minimize formation fines in these wells." There is no referenced technical justification for these statements. The Permittee must provide technical justification to

change the NTU goal for the development of groundwater monitoring well nests, particularly with respect to analysis of metals in groundwater samples using the passive sampling technique.

3. The change to the use of passive diffusion bags and dual membrane samplers is approved for the following groundwater monitoring wells located north of Ridgecrest Drive in residential areas:

KAFB-106015	KAFB-106070	KAFB-106212
KAFB-106021	KAFB-106071	KAFB-106213
KAFB-106022	KAFB-106072	KAFB-106214
KAFB-106023	KAFB-106085	KAFB-106215
KAFB-106025	KAFB-106086	KAFB-106216
KAFB-106026	KAFB-106087	KAFB-106217
KAFB-106029	KAFB-106088	KAFB-106218
KAFB-106030	KAFB-106089	KAFB-106219
KAFB-106031	KAFB-106090	KAFB-106220
KAFB-106032	KAFB-106091	KAFB-106221
KAFB-106033	KAFB-106092	KAFB-106222
KAFB-106034	KAFB-106093	KAFB-106223
KAFB-106035	KAFB-106103	KAFB-106224
KAFB-106036	KAFB-106104	KAFB-106225
KAFB-106037	KAFB-106105	KAFB-106226
KAFB-106042	KAFB-106106	KAFB-106227
KAFB-106043	KAFB-106107	KAFB-106230
KAFB-106049	KAFB-106201	KAFB-106231
KAFB-106050	KAFB-106202	KAFB-106232
KAFB-106051	KAFB-106203	KAFB-106235-463
KAFB-106052	KAFB-106204	KAFB-106235-492
KAFB-106053	KAFB-106205	KAFB-106235-521
KAFB-106054	KAFB-106206	KAFB-106236-461
KAFB-106055	KAFB-106207	KAFB-106236-490
KAFB-106057	KAFB-106208	KAFB-106236-519
KAFB-106058	KAFB-106209	

4. Appendix F appears to have been revised to include the actual well construction diagrams for completed groundwater monitoring well nests KAFB-106235 and KAFB-106236. These diagrams should be included in the applicable report(s). The Work Plan should only include the proposed well design for groundwater monitoring wells, as described in Section 3.1.5.

5. Appendix J includes an unidentified geophysical log. It is unclear if this is meant as an example of what may be generated by the proposed geophysical logging tools or if it is an

actual log from the BFF site. If the log is from the BFF site, it should be removed from this Work Plan and included in the applicable report. If the log is an example, the Permittee must revise Appendix J to clarify.

6. Appendix K, Section 2.5 details well inspection and equipment reinstallation at extraction well KAFB-106233 following completion of well rehabilitation and re-development. There is no indication on the planned sampling of influent at the GWTS following resumed operation of this extraction well. The Fourth Quarter 2016 Annual Report groundwater data shows a low-level detection of benzene (0.7 J µg/L) at groundwater monitoring well KAFB-106225, located approximately 1,500 feet northeast of extraction well KAFB-106233. Additionally, toluene was detected at a concentration of 2 µg/L in groundwater monitoring well KAFB-106025, located roughly 500 feet due north of the extraction well. These recent detections of benzene and toluene, combined with the existence of EPS in the rehabilitated extraction well, indicates a potential hydrocarbon source near the extraction well and therefore potentially changing groundwater concentrations for hydrocarbon constituents. The Permittee must therefore follow the sampling frequency for newly installed extraction wells which specifies daily sampling for 7 days, then weekly until the end of the first month, and monthly thereafter.

The following sections of the Work Plan are not approved:

1. Section 3.1.2 states that the Quality Assurance Project Plan ("QAPjP") has been updated to be a programmatic document, capturing "all activities performed by EA on the Kirtland BFF project under multiple contracts." The original QAPjP, as submitted and approved, was specific to "Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design" and in Section 2.3 of the approved QAPjP the scope of the document is stated to be:

   "The QAPjP addresses all the quality aspects of the following tasks: installation of groundwater extraction, observation, and monitoring wells in the area north of KAFB; installation of conveyance lines from extraction wellhead vaults to the GWTS building located on KAFB; expansion of the treatment train in the GWTS Building; and installation of regional injection wells and associated conveyance lines for discharge of the treated effluent on KAFB, as well as operation and maintenance of the GWTS and groundwater monitoring."

   NMED sent an email, dated December 8, 2016, to the Air Force stating that vadose zone activities must be submitted under a separate work plan, which includes the QAPjP. Expansion of the QAPjP to a programmatic scale to include vadose zone activities is not approved.

2. Bullet 2 in Section 3.1.7 on Page 3-11 under Treatment Train #2 testing reads:

   "Operational status of the Treatment Train #2 will be confirmed with weekly samples for one month, followed by monthly sampling specified in the O&M Plan (USACE, 2016a)."

This change is not approved. The Permittee must follow the sampling frequency for a new treatment train, as approved in Section L.2.2 of the Sampling and Analysis Plan (Appendix L of the O&M Plan [USACE, 2016]), which is daily sampling for 7 consecutive days, then sampling will occur once weekly until the end of the first month, and finally, sampling will occur once monthly thereafter.

3. Section 3.2.22 states that the Permittee will reduce data validation to 10 percent for all groundwater monitoring samples except for "newly installed wells," which will undergo 100 percent Stage 3 data validation for four quarters, and drinking water data which will maintain 100 percent Stage 3 data validation. This reduction of data validation is not approved.

If you have any questions regarding this letter, please contact Diane Agnew at (505) 222-9555.

Sincerely,

Juan Carlos Borrego
Deputy Secretary
Environment Department

cc: Col. M. Harner, KAFB
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
T. Simpler, USACE
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB
D. Agnew, NMED-GWQB
S. Pullen, NMED-GWQB
M. Hunter, NMED-GWQB

File: KAFB 2017 Bulk Fuels Facility Spill

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
Santa Fe, NM 87502-5469
Telephone (505) 827-2855 Fax (505) 827-2836
www.env.nm.gov

BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 20, 2018

Colonel Richard W. Gibbs
Base Commander
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

Mr. Chris Segura
Chief, Installation Support Section
AFCEC/CZOW
2050 Wyoming Blvd SE, Suite 124
Kirtland AFB, NM 87117-5270

RE: EXTRACTION WELL KAFB-106239 STARTUP, AUTHORIZATION FOR INJECTION OF TREATED WATER INTO WELL KAFB-7
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-13-MISC

Dear Colonel Gibbs and Mr. Segura:

The New Mexico Environment Department ("NMED") is in receipt of the Kirtland Air Force Base ("KAFB") ("Permittee") test results for the first two of seven daily samples collected from the extraction well KAFB-106239, and samples from groundwater treatment system influent, mid-point, and effluent in both treatment trains associated with extraction wells KAFB-106228, 106233, 106234, and 106239. Effluent samples collected on February 5 and 6, 2018 contained no detectable ethylene dibromide ("EDB") or petroleum hydrocarbons, and metals concentrations were either not detectable or within effluent standards. Test results are as follows:

Test Results for Extraction Well KAFB-106239 Startup (first two of seven daily samples).

	5-Feb-18	6-Feb-18
KAFB-106239	1 µg/L toluene	0.9 J µg/L toluene 0.018 J µg/L EDB
Train 1 Influent	0.029 µg/L EDB	0.028 µg/L EDB
Train 1 Mid-Point	All Non Detect	All Non Detect
Train 1 Effluent	All Non Detect	All Non Detect
Train 2 Influent	0.026 J µg/L EDB 0.0149 mg/L Mn	0.023 J µg/L EDB 0.0024 J mg/L Mn
Train 2 Mid-Point	0.0034 J mg/L Mn	All Non Detect
Train 2 Effluent	0.100 J mg/L Fe 0.0029 J mg/L Mn	0.0019 J mg/L Mn

DP-1839 Effluent Limits:
EDB < 0.050 µg/L
Toluene < 750 µg/L
Fe < 1.0 mg/L
Mn < 0.2 mg/L
J value quantifier means estimated concentration (greater than method detection limit, but less than limit of quantitation)

Contaminants were not detected in the trip blank, and data for matrix spikes and surrogate recoveries were within acceptable ranges. Based on the submitted test results, the Permittee is authorized to discharge treated water into injection well KAFB-7 in compliance with all conditions and monitoring requirements of the Permittee's Hazardous Waste Permit and Groundwater Discharge Permit, DP-1839.

If you have any questions regarding this letter, please contact NMED Chief Scientist, Dennis McQuillan at (505) 827-2140.

Sincerely,

Juan Carlos Borrego
Deputy Secretary
Environment Department

cc: Col. M. Harner, KAFB
K. Lynnes, KAFB
B. Renaghan, AFCEC
H. O'Grady, KAFB-AFCEC
T. Simpler, USACE
B. Faris, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB
B. Salem, NMED-HWB
S. Pullen, NMED-GWQB
P. Longmire, NMED-GWQB
M. Hunter, NMED-GWQB
D. McQuillan, NMED-OOTS

File: KAFB 2018 Bulk Fuels Facility Spill

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau
1190 South St. Francis Drive (87505)
P.O. Box 5469, Santa Fe, New Mexico 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary

J.C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

August 6, 2018

Colonel Dawn A. Nickell
Vice Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

RE: Conditional Approval of Standard Operating Procedure for Disinfection of the Groundwater Treatment System Remediation Wells and Groundwater Monitoring Wells, DP-1839

Dear Colonel Nickell:

On April 2, 2018, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received the *Standard Operating Procedure for Disinfection of the Groundwater Treatment System Remediation Wells and Groundwater Monitoring Wells* at the Kirtland Air Force Base (KAFB) groundwater treatment system (GWTS). This *Standard Operating Procedure* delineates protocols for performing well disinfection at the KAFB GWTS and associated monitoring wells without dedicated pump systems.

As explained in the *Standard Operating Procedure*, the pumping efficiency of a well and/or the flow through the filter pack may decline due to bacterial growth and biofouling. Routine disinfection (every few months) will assist in maintaining well efficiency. A remediation well (extraction or injection) with permanent equipment installed will be disinfected by providing the casing, screening, and surrounding filter pack around the well with a free chlorine residual of at least 50 milligrams per liter (mg/L), adequate mixing, and then removal from the well (American Water Works Association [AWWA], 2013). For injection wells, downhole equipment will require removal prior to disinfection to pump the well and remove the residual chlorine. The same standard

describes the chlorination of existing gravel pack in wells not installed with equipment (monitoring wells) at a concentration not less than 100 mg/L free chlorine residual (AWWA, 2013).

NMED requires KAFB ensure that all wells treated with sodium hypochlorite do not impair the aquifer with bromate, chlorite and perchlorate. To demonstrate this, NMED requires KAFB analyze all wells prior to and immediately after being treated with sodium hypochlorite for bromate, perchlorate, and chlorite to determine the presence of these compounds in groundwater.

Bromate, chlorite, and perchlorate, are known to occur in sodium hypochlorite (Greiner et al., 2008, and Asami et al., 2009). For example, Asami et al. (2009) report that concentrations of perchlorate range from 0.17 mg/L to 33 mg/L in hypochlorite solutions. The same solutions are proposed for well rehabilitation at KAFB, therefore, the potential for perchlorate added to groundwater is substantial. Analysis of chlorite and perchlorate shall be by liquid chromatography electrospray ionization mass spectrometry (EPA Method 331 or 332). Bromate shall be analyzed using inductively coupled plasma - mass spectrometry (EPA Method 321.8).

Should any of the above referenced constituents be detected above Safe Drinking Water Act maximum contaminant levels, or if perchlorate is detected above 13.8 ug/L, the KAFB shall notify NMED immediately.

This approval is contingent on the Permittee performing the procedure as described in the *Standard Operating Procedure*. A final report listing the injections and reporting the analytical results shall be submitted to NMED in the subsequent Quarterly Report.

Approval of this *Standard Operating Procedure* does not relieve the Permittee of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval does not relieve the Permittee of liability should operations associated with this *Standard Operating Procedure* result in actual pollution of ground or surface waters.

If you have any questions regarding this letter, please contact Andrew Romero at (505) 827-0076. Thank you for your cooperation.

Sincerely,

Michelle Hunter
Chief, Ground Water Quality Bureau
New Mexico Environment Department

cc (e-copies):

J. Kieling, NMED-HWB
D. McQuillan, NMED-OOTS
M. Hunter, NMED-GWQB
S. Pullen, NMED-GWQB
A. Romero, NMED-GWQB
B. Faris, COA
R. Shean, ABCWUA
B. Renaghan, AFCEC
S. Clark, AFCEC
K. Lynnes, SAF-IEE
H. O'Grady, AFCEC
T. Simpler, ASACE

References

Asami, M., Kosaka, K. and Kunikane, S., 2009, Bromate, chlorate, chlorite and perchlorate in sodium hypochlorite solution used in water supply, 2009, Journal of Water Supply: Research and Technology – AQUA-58.2 pp. 107-115.

Greiner, P., McLellan, C, Bennett, D., and Ewing, A., 2008, Occurrence of perchlorate in sodium hypochlorite, American Water Works Association, November 2008, Journal AWWA-100.11 pp. 68-74.

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

1190 St. Francis Drive / PO Box 5469
Santa Fe, NM 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

Michelle Lujan Grisham
Governor

Howie C. Morales
Lieutenant Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 28, 2020

Colonel David S. Miller, Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

RE: KAFB, Groundwater Discharge Permit DP-1839, Approval of Work Plan for Installation of Class V Underground Injection Control Well KAFB-106IN2, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-111

Dear Colonel Miller,

On December 24, 2019, the Ground Water Quality Bureau of the New Mexico Environment Department (NMED) received the above referenced Work Plan from Kirtland Air Force Base (KAFB or Permittee). The Work Plan identifies tasks associated with the installation of a Class V underground injection control (UIC) well. Condition 10 of KAFB's Groundwater Discharge Permit (DP-1839 or "Permit" associated with the Bulk Fuels Facility and the associated Ground Water Treatment System (GWTS)) requires submittal of such a Work Plan for NMED's approval, requires the Work Plan address numerous specific groundwater protection criteria, and that the Work Plan satisfy the corrective action provisions at Part 6 of the Resource Conservation and Recovery Act (RCRA) Permit.

DP-1839 authorizes the Permittee to discharge treated GWTS effluent via UIC wells not to exceed 1,440,000 gallons per day (gpd). Current effluent disposition methods for the treated effluent include irrigation of the on-Base golf course and underground placement via Class V injection well KAFB-7. A second Class V UIC injection well (KAFB-106IN2), the subject of this correspondence, will provide needed redundancy for the disposition of the treated GWTS effluent.

NMED finds the Work Plan satisfies all requirements of DP-1839 and the corrective action provisions at Part 6 of the RCRA Permit and therefore approves the Work Plan as submitted. Groundwater discharges associated with the Work Plan shall be performed in accordance with the Work Plan and are subject to all conditions of DP-1839. Prior to discharging to the new UIC well, the Permittee must submit written notification to NMED stating the date that the discharge is to commence.

In accordance with Permit Condition 4, KAFB-106IN2 will be located within the Designated UIC Area and therefore the addition of this well does not constitute a discharge permit modification as defined at 20.6.2.D(4) NMAC and does not trigger the public notice and participation requirements at 20.6.2.3108 NMAC. NMED provides a revised DP-1839 Table 1 listing the UIC wells authorized by the Permit.

Groundwater in the area near proposed KAFB-106IN2 exists in the regional aquifer. The nearest regional aquifer monitoring well (KAFB-2628) to the proposed KAFB-106IN2 is approximately 175 feet (ft) to the north-northeast and in 2018 the depth to water in the well was 499 ft below ground surface (bgs).

Groundwater in the area near proposed KAFB-106IN2 also exists variably within a perched groundwater system with depths ranging from 200 to 415 ft bgs. The perched aquifer monitoring well nearest to proposed KAFB-106IN2 having measurable groundwater is KAFB-0506. KAFB-0506 is located approximately 1,350 ft south of proposed KAFB-106IN2 and has a measured depth to groundwater of approximately 210 ft bgs. The three perched groundwater monitoring wells located most proximal to proposed KAFB-106IN2 are KAFB-2627, KAFB-2524, and KAFB-2623. These wells are located 250, 800, and 600 ft respectively south-southwest from the proposed UIC well and as of 2018 are dry at the depth of the perched aquifer.

Approval of the Work Plan does not relieve the Permittees of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations. This approval also does not relieve the Permittees of liability should operations associated with this Work Plan result in actual pollution of ground or surface waters.

If you have any questions, please contact Andrew Romero at (505) 827-0076. Thank you for your cooperation.

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:AR

Attachment: revised Permit Table 1

cc: Rebecca Roose, NMED WPD
Stephanie Stringer, NMED RPD
Dave Cobrain, NMED HWB
Steve Pullen, NMED GWQB
Melanie Sandoval, NMED GWQB
Kathryn Lynnes, SAF-IEE
Scott Clark, AFCEC/CZ

NEW MEXICO ENVIRONMENT DEPARTMENT PERMITS

Hazardous Waste Treatment Facility Operating Permit

HAZARDOUS WASTE TREATMENT FACILITY OPERATING PERMIT EPA ID No. NM9570024423

issued to

UNITED STATES AIR FORCE

for the

OPEN DETONATION UNIT

located at

KIRTLAND AIR FORCE BASE
BERNALILLO COUNTY, NEW MEXICO

issued by the

NEW MEXICO ENVIRONMENT DEPARTMENT
HAZARDOUS WASTE BUREAU
2905 RODEO PARK DRIVE EAST, BUILDING 1
SANTA FE, NEW MEXICO, 87505

July 2010

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ACRONYMS AND ABBREVIATIONS

ACM	accelerated corrective measure
AK	acceptable knowledge
AOC	area of concern
ARCH	air rotary casing hammer
ASTM	American Society for Testing and Materials
CAC	Corrective Action Complete
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
CMI	corrective measures implementation
CME	corrective measures evaluation
DQOs	data quality objectives
DOT	United States Department of Transportation
EC	Emergency Coordinator
ECO-SSLs	Ecological Soil Screening Levels (EPA)
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
GC/ECD	gas chromatograph/electron-capture device
GC/MS	gas chromatograph/mass spectrometry
HE	high explosive(s)
HI	hazard index
HWA	New Mexico Hazardous Waste Act
HWB	Hazardous Waste Bureau
HWMR	New Mexico Hazardous Waste Management Regulations
HQ	hazard quotient
ICP	inductively coupled plasma
IDW	investigation derived waste
KAFB	Kirtland Air Force Base
KCP	KAFB Command Post
kg	kilogram
LDR	land disposal restrictions
m^3	cubic meters
MCL	maximum contaminant level
mg	milligram
mg/kg	milligram per kilogram
mg/L	milligram per liter

mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
OD	open detonation
PCBs	polychlorinated biphenyls
PPE	personal protective equipment
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RPD	relative percent difference
RSL	regional screening level
SAP	sampling and analysis plan
SAR	SWMU Assessment Report
SSAP	Soil Sampling and Analysis Plan
SSL	soil screening levels
SVOC	semi-volatile organic compound
SWMU	solid waste management unit
TAG	Tijeras Arroyo Groundwater
TKN	total Kjeldahl nitrogen
TSDF	treatment, storage and disposal facility
UCL	upper confidence limit of the mean
ug	microgram
ug/L	microgram per liter
UHC	underlying hazardous constituent
U.S.C.	United States Code
UXO	unexploded ordnance
VOC	volatile organic compound
WQCC	New Mexico Water Quality Control Commission
XRF	x-ray fluorescence

PERMIT PART 1: GENERAL PERMIT REQUIREMENTS

1.0 INTRODUCTION

This Permit Part (1) contains general requirements pertaining to hazardous waste management and treatment at the Open Detonation (OD) Unit and corrective action at the Kirtland Air Force Base (KAFB) Facility (see Figures 1-1 and 1-2, of this Permit Part, for a map view of the Facility and an aerial view of the OD Unit), as permitted under the New Mexico Hazardous Waste Act (HWA), New Mexico Statutes Annotated (NMSA) 1978, §§ 74-4-1 to 74-4-14.

1.1. LEGAL AUTHORITY

Pursuant to § 74-4-10 of the HWA, the New Mexico Environment Department (the Department) issues this Permit to the U.S. Air Force, hereafter referred to as the Permittee, the owner and operator of the OD Unit, with U.S. Environmental Protection Agency (EPA) ID Number NMD9570024423, located in Bernalillo County, New Mexico.

Section 6001 of the Resource Conservation and Recovery Act (RCRA) provides, in part, that "each department, agency, and instrumentality of the executive branch of the Federal Government (1) having jurisdiction over any solid waste management facility or disposal site, or (2) engaged in any activity resulting, or which may result, in the disposal or management of solid waste or hazardous waste shall be subject to, and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural, respecting control and abatement of solid waste or hazardous waste disposal and management in the same manner, and to the same extent, as any person is subject to such requirements." [42 U.S.C. § 6961].

1.2. ENFORCEMENT

Any violation of any requirement of this Permit may subject the Permittee, and its officers, employees, successors, and assigns, to a compliance order under § 74-4-10 of the HWA or § 3008(a) of RCRA, 42 U.S.C. § 6928(a); to an injunction under § 74-4-10 of the HWA, § 3008(a) of RCRA, 42 U.S.C. § 6928(a), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to civil penalties under § 74-4-10 of the HWA, § 3008(a) and (g) of RCRA, 42 U.S.C. § 6928(a) and (g), or § 7002(a) of RCRA, 42 U.S.C. § 6972(a); to criminal penalties under § 74-4-11 of the HWA or § 3008(d), (e), and (f) of RCRA, 42 U.S.C. § 6928(d), (e), and (f); or to some combination of the foregoing. The list of authorities in this Permit Section (1.2) is not exhaustive, and the Department reserves the right to take any action authorized by the law to enforce the requirements of this Permit.

1.3. PERMITTED ACTIVITY

This Permit authorizes the Permittee to treat hazardous wastes at the OD Unit, and establishes the general and specific standards for these activities, as required by the HWA and the Hazardous Waste Management Regulations (HWMR) 20.4.1 New Mexico Administrative Code (NMAC). The OD Unit is classified as a miscellaneous unit under 40 C.F.R. Part 264 Subpart X. This Permit also establishes standards for closure and sets forth the requirements for corrective action to address releases of hazardous waste and hazardous constituents into the environment pursuant to the HWA and the HWMR.

The Permittee shall not treat, without a permit, hazardous wastes at any other location at this Facility, except as provided in 40 C.F.R. § 270.1(c)(2).

The Permittee shall not store for more than 90 days any hazardous waste at any location at this Facility except as provided in 40 C.F.R. § 262.34(b).

This Permit does not authorize the treatment of firearms or contraband that are not reactive or ignitable hazardous waste.

1.4. COMPLIANCE WITH PERMIT

Compliance with this Permit during its term constitutes compliance, for purposes of enforcement, with 40 C.F.R. Parts 264 and 268, only for those management practices specifically authorized by this Permit. The Permittee must also comply with 40 C.F.R. Parts 260 through 273 to the extent the requirements of those sections are applicable. The Permittee must also comply with all applicable self-implementing provisions imposed by statute or rule. Compliance with this Permit shall not constitute a defense to any order issued or any action brought under HWA, NMSA 1978, § 74-4-10(E), § 74-4-10.1, or § 74-4-13; RCRA § 3008(a), § 3008(h), § 3013,
§ 7002, or § 7003; the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601 to 9675, or any other law providing for protection of public health or the environment.

This Permit does not convey any property rights of any sort or any exclusive privilege, nor does this Permit authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local laws or regulations in accordance with 40 C.F.R. § 270.4(b) and (c) and § 270.30(g).

1.5. EFFECT OF INACCURACIES IN PERMIT APPLICATION

This Permit is based on the information submitted in the Part B Permit application dated December 2005 and subsequent information, referred to as the Application. Any inaccuracies found in the Application may be grounds for the termination, revocation and reissuance, or modification of this Permit pursuant to 40 C.F.R. § 270.43(a)(2). Where and when the Permittee becomes aware that it failed to submit any relevant facts in the Application, or submitted incorrect information in the Application or in any report to the Department, it shall promptly submit such facts or corrected information pursuant to 40 C.F.R. § 270.30(l)(11).

1.6. PERMIT CITATIONS

Whenever the Permit cites a provision of 20.4.1 NMAC or 40 C.F.R. or Part or Section of this Permit, the Permit shall be deemed to incorporate the citation by reference, including all subordinate provisions of the cited provision, and make binding the full text of the cited provision.

Hazardous waste management regulations are frequently cited throughout this Permit. The Federal hazardous waste management regulations, 40 C.F.R. Parts 260 through 273, are generally cited rather than the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. The Federal regulations are cited because only the Federal regulations set forth the

detailed regulatory requirements; the State regulations incorporate by reference, with certain exceptions, the Federal regulations in their entirety. Citing only the federal regulations also serves to avoid encumbering each citation with references to two sets of regulations. However, it is the State regulations that are legally applicable and enforceable. Therefore, for the purpose of this Permit, and enforcement of its terms and requirements, all references to provisions of Federal regulations that have been incorporated into the State regulations shall be deemed to include the State incorporation of those provisions.

1.7. SEVERABILITY

The provisions of the Permit are severable, and if any provision of this Permit, or any application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby.

1.8. DEFINITIONS

For purposes of this Permit, terms used herein shall have the same meanings as those in HWA, RCRA, and their implementing regulations, unless this Permit specifically provides otherwise. Where a term is not defined in HWA, RCRA, pursuant regulations, or this Permit, the meaning associated with such a term shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

"Area of Concern" (AOC) means any area of the Facility under the control or ownership of the Permittee, which is not a solid waste management unit where a release of a hazardous waste or hazardous constituent has occurred, or is suspected to have occurred regardless of the frequency or duration of the release. An area of concern includes areas and structures at which releases of hazardous waste or hazardous constituents were not fully remediated, including one time and accidental events.

"Corrective Measures" means all corrective action necessary to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit or AOC at the Facility, regardless of the time at which waste was placed in the unit, as required under § 74-4-4.2(B) of the HWA and 40 C.F.R. § 264.101. Corrective Measures may address releases to air, soil, sediment, surface water, or groundwater.

"Days" refers to calendar days unless specified otherwise in this Permit.

"Department" means the New Mexico Environment Department and any successor agencies.

"EOD" means Explosives Ordnance Disposal

"**EPA**" means the United States Environmental Protection Agency and any successor agencies.

"Extent of contamination" means the horizontal and vertical area in which the concentrations of waste or hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate, as determined by the Department.

"Facility" or "KAFB" means Kirtland Air Force Base, including all contiguous land, structures, other appurtenances, and improvements on the land. For the purpose of implementing corrective action under 40 C.F.R. § 264.101, RCRA § 3008(h), or the HWA, NMSA 1978, § 74-4-10(E),

the Facility includes all contiguous property under the control of the owner or operator seeking a permit under the HWA.

"Hazardous constituent" means any constituent identified in Appendix VIII of 40 C.F.R. Part 261, or any constituent identified in Appendix IX of 40 C.F.R. Part 264, incorporated by 20.4.1 NMAC.

"Hazardous waste" means a solid waste that is not excluded from regulation under 40 C.F.R. § 261.4(b), and that either is listed in 40 C.F.R. Part 261, Subpart D, exhibits any of the characteristics identified in 40 C.F.R. Part 261, Subpart C, or is a mixture of solid waste and one or more wastes listed in 40 C.F.R. Part 261, Subpart D. However, for purposes of corrective action, "hazardous waste" shall have the meaning set forth in the HWA, § 74-4-3(K).

"**Hazardous waste regulations**" or "**Hazardous Waste Management Regulations**" means the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC and all provisions of 40 C.F.R. Parts 260 through 273 incorporated therein.

"**Interim measures**" means actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants while long-term corrective action remedies are evaluated and, if necessary, implemented.

"NMED" means New Mexico Environment Department.

"Off-site source" means a generator of Hazardous Waste located within the United States but outside the Permittee's Facility.

"**Open Detonation**" means the treatment of ignitable or reactive hazardous waste in accordance with the requirements of this Permit. Treatment by open detonation is accomplished by the detonation of hazardous waste in open pits using a counter charge to initiate the explosion.

"**Permit**" means this Permit, issued to the Permittee for the Facility, pursuant to the HWA and the New Mexico Hazardous Waste Management Regulations to conduct corrective action and to operate the OD Unit at the Facility, EPA ID No. NM9570024423, as it may be modified or amended.

"**Permittee**" means U.S. Air Force, a part of the U.S. Department of Defense, which is a Department in the U.S. Government, and any successor.

"**RCRA**" means the Resource Conservation and Recovery Act of 1980, as amended, 42 U.S.C. §§ 6901 to 6992k.

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

"Remediation waste" means all solid and hazardous wastes, and all media (including groundwater, surface water, soil, and sediment) and debris, which contain listed hazardous wastes or which exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements. Remediation wastes may originate from releases that extend beyond the Facility boundaries.

"Secretary" means the Secretary of the New Mexico Environment Department or his designee or authorized representative.

"**Solid waste**" means a solid waste as defined in the HWA, § 74-4-3(O).

"Solid waste management unit" (**SWMU**) means any discernible 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 at which solid wastes have been routinely and systematically released.

1.9. THE COMPLETE PERMIT

The complete Permit consists of the regulations incorporated by reference into this Permit (see Permit Section 1.6), the Permit requirements in Permit Parts 1 through 6, and Permit Attachments A through L:

Part 1	-	General Permit Requirements
Part 2	-	General Facility Requirements
Part 3	-	Open Detonation Unit
Part 4	-	Closure
Part 5	-	Post Closure
Part 6	-	Corrective Action
Attachment A	-	General Facility Information
Attachment B	-	List of Authorized Hazardous Wastes
Attachment C	-	Waste Analysis Plan
Attachment D	-	Annual Soil Sampling and Analysis Plan
Attachment E	-	Inspection Plan
Attachment F	-	Contingency Plan
Attachment G	-	Personnel Training Plan
Attachment H	-	Closure Plan
Attachment I	-	Compliance Schedules
Attachment J	-	List of Hazardous Waste Management Units
Attachment K	-	List of SWMUs and AOCs for which Corrective Action is Complete
Attachment L	-	Reserved for Groundwater Sampling and Analysis Plan

1.10. TERM OF THE PERMIT

This Permit shall be effective for a fixed period of 3 years in accordance with 40 C.F.R. § 270.50(a), subject to Permit Sections 1.5, 1.12 and 1.15.

1.11. ALTERNATIVE ASSESSMENT FOR WASTE TREATMENT

The Permittee shall submit an alternative treatment assessment report to the Department no later than the first anniversary of the effective date of this Permit. The report shall document the

Permittee's evaluation of the range of possible treatment technologies for waste that is authorized for treatment by open detonation under this Permit. The assessment report shall include identification and discussion of the alternative treatment technologies and for the technologies presented models of air emissions, contaminant dispersal, and risk to human and ecological receptors. Each alternative treatment technology, including open detonation, shall be evaluated for cost and the technology's ability to protect human health and the environment to include, but not be limited to the:

1. Ability of the technology to reduce or control emissions,
2. Ability of the technology to monitor emissions,
3. Ability of the technology to control noise, and
4. Ability of the technology to control ground vibrations.

The purpose of the alternative treatment assessment shall be to phase out open detonation of hazardous waste at the Facility as soon as practicable.

1.12. PERMIT ACTIONS

1.12.1. Permit Modification, Suspension, Revocation, and Termination

1. This Permit may be modified, suspended, revoked or terminated for cause in accordance with the provisions of HWA, NMSA 1978, § 74-4-4.2 and 40 C.F.R. §§ 270.41 through 270.43. The filing of a request by the Permittee for a Permit modification or the notification of planned changes or anticipated noncompliance or, if suspension, or revocation is ordered by the Department, shall not stay any Permit requirement, in accordance with 40 C.F.R. § 270.30(f).
2. If at any time for any of the reasons specified in 40 C.F.R. § 270.41, the Department determines that modification of this Permit is necessary, the Department may initiate a Permit modification or require the Permittee to request a Permit modification.
3. The Permittee may request permit modifications in accordance with 40 C.F.R. § 270.42. All applicable requirements specified in 40 C.F.R. § 270.42 and 20.4.1.900 NMAC shall be followed.
4. Modifications to the Permit do not constitute a reissuance of the Permit.

1.12.2. Unclassified Permit Modifications

Unless a permit modification is explicitly listed in Appendix I of 40 C.F.R. 270.42 as a Class 1 or 2 permit modification, the Permittee shall not submit the proposed permit modification as a Class 1 or 2 permit modification. The Permittee may only submit such a permit modification request as a Class 3 modification, or may request a determination from the Department that the proposed permit modification be reviewed and approved as a Class 1 or 2 modification pursuant to the requirements specified in 40 C.F.R. 270.42(d)(1).

1.13. TRANSFER OF LAND OWNERSHIP

The Permittee shall submit a permit modification request, in compliance with all requirements of 40 C.F.R. § 270.42, at least 180 calendar days prior to the proposed effective date of transfer of

ownership of any land which is part of the Facility (see also Permit Section 6.1.12). The permit modification request may be submitted as a Class 3 permit modification, or the Permittee may request a determination that the modification is a Class 1 or 2 pursuant to the requirements of 40 C.F.R. § 270.42(d). In addition to the requirements of 40 C.F.R. § 270.42, a permit modification request for transfer of land that is part of the Facility shall:

1. Identify the boundaries of the land proposed for transfer;
2. Describe the location and identity of any existing or prior SWMU, AOC, or hazardous waste management unit on the land proposed for transfer;
3. Describe any known or suspected presence of hazardous waste or hazardous constituents in soil, groundwater, or any other media at any depth within the boundaries of the land proposed for transfer;
4. Describe the status of any past, present, or planned investigations or remediation of any release of hazardous waste or hazardous constituents within the boundaries of the land proposed for transfer;
5. Include a revised map of the Facility;
6. Propose and describe all provisions necessary to ensure that the Permittee can meet the corrective action obligations, the HWA, and the Hazardous Waste Management Regulations (e.g., covenants, deed restrictions, proposed replacement of monitoring wells or enforceable agreements for access to monitoring wells on transferred land) [40 C.F.R. § 264.101; 40 C.F.R. §§ 270.30(l)(1), 270.32(b) and 270.42; and 20.4.1.901 NMAC]; and
7. Describe all measures taken to comply with § 120(h) of CERCLA, 42 U.S.C. § 9620(h).

1.14. PERMIT RENEWAL

If the Permittee wishes to continue the activities authorized by this Permit after the expiration date of this Permit, in accordance with 40 C.F.R. § 270.30(b), the Permittee must apply for and obtain a new permit. The Permittee may request renewal of this Permit by submitting an application for a new permit at least 180 calendar days before the expiration date of this Permit as required by 40 C.F.R. § 270.10(h).

1.15. CONTINUATION OF EXPIRING PERMIT

Pursuant to 40 C.F.R. § 270.51, if the Permittee has submitted a timely and complete application for renewal of this Permit as specified in 40 C.F.R. §§ 270.10, 270.11, 270.12 (as applicable), and §§ 270.13 through 270.29 (as applicable), this Permit shall remain in effect until the effective date of the new permit if, through no fault of the Permittee, the Department has not issued a new permit on or before the expiration date of this Permit. [40 C.F.R. § 270.51].

1.16. TRANSFER OF PERMIT

The Permittee may only transfer this Permit after providing notice to and receiving approval from the Department. The prospective new owner or operator must file a disclosure statement with the Department as specified at HWA, NMSA 1978, § 74-4-4.7. The Department may require modification or revocation and reissuance of this Permit in accordance with 40 C.F.R.

§ 270.40(b) and § 270.41(b)(2).

Before transferring ownership or operation of the Facility or any SWMUs or AOCs during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 40 C.F.R. Part 264, and Part 270, and the HWA, pursuant to 40 C.F.R. § 264.12(c), and 40 C.F.R. § 270.30(l)(3), and shall provide the Department with a copy of this notice.

1.17. PERMIT REVIEW

The Department may review this Permit at any time after the effective date of Permit issuance, and may modify this Permit as necessary pursuant to § 74-4-4.2 of the HWA and 40 C.F.R. §§ 270.41, 270.50(b), and 270.50(d). Such modification shall not extend the effective term of this Permit as specified in requirements of Permit Section 1.10.

1.18. 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 for the Permittee to halt or reduce the permitted activities in order to maintain compliance with the terms of this Permit. [40 C.F.R. § 270.30(c)].

1.19. 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 C.F.R. § 270.30(d)].

1.20. 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 requirements 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 requirement includes the operation of back-up or auxiliary facilities or similar systems when necessary to achieve compliance with the requirements of this Permit. [40 C.F.R. § 270.30(e)].

1.21. DUTY TO PROVIDE INFORMATION

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

The Permit requirements of this Section (1.21) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.22. INSPECTION AND ENTRY

In accordance with 40 C.F.R. § 270.30(i), the Permittee shall allow the Department, or authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter at reasonable times into the Permittee's premises where the regulated facility or activity is located or conducted, or where records must be kept under the requirements of this Permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the requirements of this Permit;
3. Inspect at reasonable times the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring Permit compliance or as otherwise authorized by RCRA or HWA, any substances or parameters at any location, including waste, air, soil, sediment, surface water, and groundwater at the Facility.

The Permit requirements of this Section (1.22) shall not be construed to limit, in any manner, the Department's authority under the HWA, NMSA 1978, § 74-4-4.3, or RCRA, § 3007(a), 40 C.F.R. § 270.30(i), or any other applicable law or regulation.

1.23. MONITORING AND RECORDS

1.23.1. Representative Sampling

The Permittee shall take representative samples and measurements in accordance with the procedures in this Permit and 40 C.F.R. § 264.13(a)(1). All samples and measurements taken by the Permittee under any requirement in this Permit shall be representative of the waste, media, equipment or structure being sampled. This includes, but is not limited to, sampling and analysis of waste, treatment residues, soil, groundwater, spills, and includes sampling of media for purposes of conducting corrective action pursuant to Part 6 of this Permit. To obtain a representative sample of a waste stream the Permittee shall use an appropriate method from Appendix I of 40 C.F.R. Part 261 or an equivalent method approved by the Department. Laboratory methods must be those specified in the current edition of the EPA publication *Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846*, or an equivalent method, as specified in the *Waste Analysis Plan* in Permit Attachment C. [40 C.F.R. § 270.30(j)(1)]. At a minimum, these analyses shall contain all of the information which must be known to treat, store, or dispose of the wastes properly. [40 C.F.R § 264.73(b)].

1.23.1.1. Monitoring Records Contents

Monitoring records, including those required for corrective action under Part 6 of this Permit, shall contain:

1. The dates, exact place, and times of sampling or measurements;
2. The names of the individuals who performed the sampling or measurements;
3. The name and address of the laboratory that performed the analysis;

4. The date on which analyses were performed;
5. The analytical techniques or methods used;
6. The results of such analyses including units of measurement;
7. Calibration data;
8. Quality control data;
9. Detection limits;
10. Data qualifiers; and
11. Data validation results.

[40 C.F.R. § 270.30(j)(3)].

1.23.2. Operating Record

The Permittee shall maintain a written Operating Record at the EOD Shop and the EM Branch Office as required by 40 C.F.R. § 264.73. The Permittee shall maintain all records in the Operating Record until completion of closure and, if necessary, post closure care, unless specified otherwise in this Permit. The retention period for all records is extended automatically during the course of any unresolved enforcement action regarding the Facility, or as may be requested by the Department, as required by 40 C.F.R. § 264.74(b). The Permittee shall make the Operating Record available at all reasonable times for inspection by any officer, employee, or authorized representative of the Department or EPA, upon request, or shall furnish copies of documents within the record, as required by 40 C.F.R. § 264.74.

The following operating records and documents shall be maintained at the Facility EOD Shop:

1. A current copy of this Permit including the closure plan (Permit Attachment H);
2. A written Operating Record that describes:
    a. The type and quantity of each hazardous waste received and treated at the OD Unit, and the date the hazardous waste was treated,
    b. The location of hazardous waste at the OD Unit,
    c. The method(s) of treatment of hazardous waste,
    d. Training records for EOD personnel,
    e. Written inspection log and schedule;
3. Training records for former EOD employees (maintained for a minimum of three years from the date the employee last worked at the OD Unit);
4. Current training records (including refresher seminars) for current EOD employees;
5. Inspection logs for the last three years;
6. A copy of the Contingency Plan;
7. A copy of the Waste Analysis Plan;
8. The name(s), address(es), and telephone number(s) of the Emergency Coordinator(s) and all such information for persons designated as alternate Emergency Coordinators;
9. A list of all equipment listed in Permit Attachment F, as required by 40 C.F.R. Part 264, Subpart C; and

10. A current file of pertinent material safety data sheets and records of all wastes that have been treated at the OD Unit.

The following operating records and documents shall be maintained at the Facility EM Branch Office:

1. Treatment facility notices and certifications;
2. Storage facility notices and certifications;
3. Air emissions records;
4. Correspondence and other documents from government agencies;
5. Notices to off-site generators;
6. Waste minimization certification.
7. Manifest documents for hazardous waste shipped off-site;
8. A copy of the Hazardous Waste Biennial Report;
9. Copies of unmanifested waste reports;
10. Copy of the Contingency Plan for the OD Unit and any revisions to the plan;
11. Waste characterization information and data;
12. A copy of the Waste Analysis Plan;
13. Reports of any incidents that required activation of the Contingency Plan;
14. Records of soil and groundwater monitoring, testing, analytical data, and any corrective actions taken to prevent or mitigate releases of hazardous waste or hazardous constituents to the environment;
15. All documents related to corrective action including, but not limited to, work plans, reports, and sampling and analysis plans;
16. The Permit Application;
17. Inspection Plan set forth in Permit Attachment E;
18. Closure Plan set forth in Permit Attachment H, as required by 40 C.F.R. § 264.112(a), and this Permit; and
19. All monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation;

A current copy of the Contingency Plan shall also be maintained at the EOD Range personnel bunker, and the KAFB Command Post.

1.24. REPORTING PLANNED CHANGES

The Permittee shall give advance notice to the Department as soon as possible, but no less than one week in advance of any planned physical alterations or additions to the OD Unit. [40 C.F.R. § 270.30(l)(1)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.25. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Department as soon as possible, but no less than

one week in advance of any planned physical alterations or additions to the OD Unit or of any activities, which may result in noncompliance with the requirements of this Permit. [40 C.F.R. § 270.30(l)(2)]. Some alterations or additions may be subject to the requirements of Permit Section 1.12.

1.26. CERTIFICATION OF CONSTRUCTION OR MODIFICATION

If the OD Unit is modified, the Permittee shall not treat or analyze hazardous waste in the modified portion of the OD Unit, except as provided in 40 C.F.R. § 270.42, unless the following requirements have been satisfied:

1. The Permittee has submitted to the Department, by certified mail or hand delivery, a letter signed by the Permittee and an independent professional engineer registered in New Mexico stating that the modification meets the requirements of this Permit; and
2. The Department has:
    a. Inspected the modified or newly constructed portion of the OD Unit and finds it meets the requirements of this Permit; or
    b. Waived the inspection or, within 15 calendar days from the date of receipt of the letter required by paragraph 1, has not notified the Permittee of its intent to inspect.

[40 C.F.R. § 270.30(1)(2)].

1.27. TWENTY-FOUR HOUR AND SUBSEQUENT REPORTING

1. **Oral Report** - The Permittee shall report to the Department any noncompliance which may endanger human 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 oral report shall include:
    a. Information concerning release of any hazardous waste or constituents that may cause an endangerment to public drinking water supplies; and
    b. Any information about a release or discharge of hazardous waste or hazardous constituent or of a fire or explosion which could threaten the environment or human health including:
        i. A description of the noncompliance and its cause;
        ii. The name, address, and telephone number of the owner, operator, and name of responsible official;
        iii. The name, address, and telephone number of the Facility;
        iv. The period of the occurrence including exact date and time and, if the noncompliance has not been corrected, the anticipated time it is expected to continue;
        v. The name and quantity of materials involved;
        vi. The extent of injuries, if any;

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

viii. The estimated quantity and disposition of recovered material that resulted from the incident; and

ix. The steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

[40 C.F.R. § 270.30(l)(6)(i and ii)].

2. **Non-Compliance Written Report** - The Permittee shall also submit a written report within five calendar days from the time the Permittee becomes aware of the circumstance of any noncompliance. The written report shall contain the information required for an oral report under this Permit Section (1.27).

The Department may extend the time for submitting the written report up to 15 calendar days upon written request by the Permittee prior to the end of the five calendar days allowed under Permit Section 1.27.2. [40 C.F.R. § 270.30(l)(6)(iii)].

1.28. REPORTS REQUIRED BY THE CONTINGENCY PLAN

If any incident requires implementation of the Contingency Plan provided in Permit Attachment F, the Permittee shall comply with the reporting requirements of 40 C.F.R. § 264.56(d).

1.29. CORRECTIVE ACTION

Corrective action required pursuant to 40 C.F.R. § 264.101, shall continue under this Permit for any period necessary to comply with the requirements specified in Part 6 of this Permit.

1.30. ADMISSIBILITY OF DATA

The Permittee waives any objection to the admissibility as evidence of any data required by this Permit in any administrative or judicial action to enforce a condition of this Permit.

1.31. OTHER NONCOMPLIANCE

The Permittee shall report all instances of noncompliance not otherwise required to be reported under this Permit at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Section 1.27.1. [40 C.F.R. § 270.30(l)(10)].

1.32. SIGNATORY AND CERTIFICATION REQUIREMENTS

The Permittee shall sign and certify all applications, reports, or other information submitted to the Department or required by this Permit, in accordance with 40 C.F.R. § 270.11(a)(3).

The Permittee shall provide, upon request by the Department, notification and certification statements associated with the treatment of hazardous wastes in compliance with 40 C.F.R. § 268.7 and § 268.9.

1.33. MONITORING REPORTS

The Permittee shall submit Monitoring Reports to the Department as specified in the

requirements of Permit Sections 1.23 and 1.36. [40 C.F.R. § 270.30(l)(4)].

1.34. COMPLIANCE SCHEDULES

Reports of compliance or noncompliance with this Permit, any progress reports on activities conducted under this Permit, and interim and final requirements contained in any compliance schedule of this Permit shall be submitted to the Department no later than 14 calendar days following each schedule date set forth in this Permit. [40 C.F.R. § 270.30(l)(5)].

1.35. INFORMATION REPOSITORY

Upon written notification, the Department may require the Permittee to establish and maintain an information repository at any time, based on the factors set forth in 40 C.F.R. § 124.33(b) and 40 C.F.R. § 270.30(m). The information repository shall be governed by the provisions in 40 C.F.R. § 124.33(c).

1.36. REPORTS, NOTIFICATIONS, AND INFORMATION SUBMITTALS TO THE DEPARTMENT

The Permittee shall submit to the Department by certified mail or hand delivery all reports, notifications, or other submittals that are required by this Permit to be sent or given to the Department, at the following address:

Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Telephone Number: (505) 476-6000
Facsimile Number: (505) 476-6030

Two hard (paper) copies and one electronic copy of these plans, reports, notifications, or other submissions shall be submitted to the Department.

1.37. POINTS OF CONTACT FOR THE FACILITY

Points of contact for the Facility during the term of the Permit are identified below.

Base Commander
377 ABW/CC
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5606

and

Director
Environmental Management
377 MSG/CEANR
2050 Wyoming Blvd. SE

All reports required by the permit shall be signed by a principal executive officer or their duly authorized representatives in accordance with 40 C.F.R. § 270.11(b).

The Permittee shall inform the Department in writing of changes in its principal executive officers (or their duly authorized representatives) within 30 days of the changes, and Emergency Coordinators and their telephone numbers and addresses within 15 calendar days of the changes. Changes to the principal executive officers (or their duly authorized representatives) are not permit modifications. Changes in name, address, or phone number for Emergency Coordinators are Class 1 permit modifications under 40 C.F.R § 270.42.

1.38. WORK PLANS AND OTHER DELIVERABLE DOCUMENTS

All documents that the Permittee prepares under the terms of this Permit and submits to the Department that are subject to the requirements of 20.4.2 NMAC shall be subject to the procedures set forth therein. Documents requiring Department approval that are not subject to the requirements of 20.4.2 NMAC may be reviewed and approved, approved with modifications or directions, disapproved, denied, or rejected by the Department.

Upon the Department's written approval, all submittals and associated schedules shall become enforceable under this Permit in accordance with the terms of the Department's written approval, and such documents as approved, shall control over any contrary or conflicting requirements of this Permit.

This provision does not affect any public process that is otherwise required by this Permit, the HWA, or its implementing regulations.

Failure to submit any of the work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Permit in substantial compliance with this Permit, and according to the schedules or deadlines in this Permit, may subject the Permittee to enforcement action under § 74-4-10 of the HWA, or other applicable provisions of law, which may include fines, civil penalties, or suspension or revocation of the Permit.

Any noncompliance with approved plans and schedules shall be noncompliance with this Permit. The Department may grant extensions of written requests for due dates for submittals of reports and other deliverables, provided that the Permittee includes a written justification showing good cause and a proposed schedule for submittal.

1.39. CONFIDENTIAL INFORMATION

The Permittees may claim that any information required by this Permit or otherwise submitted to the Department is confidential pursuant to the provisions of §§ 74-4-4.3(D) and (F) of the HWA and 40 CFR §§ 260.2 and 270.12.

Figure 1-1

Figure 1-2

PERMIT PART 2: GENERAL FACILITY REQUIREMENTS

2.0 INTRODUCTION

Permit Part 2 contains general requirements applicable to the Facility.

2.1. SECURITY

In order to prevent the unknowing entry and to minimize the possibility of unauthorized entry of persons into the OD Unit, the Permittee shall comply with the security provisions and procedures described in this Permit Section (2.1), and in Permit Attachment A, and as required by 40 C.F.R. § 264.14.

The entrance gate to the EOD Range (see Figure 2-1, this Permit Part) shall be locked except when EOD personnel enter the area for inspections or for treatment operations, or for purposes of conducting repairs or maintenance to the OD Unit, or for conducting military training.

Warning signs shall be posted at the entrance gate and at a maximum spacing of 300-foot intervals along the fence. The signs shall be legible from a distance of 25 feet and shall be large enough to be seen from any approach toward the EOD Range. The warning signs shall state “Danger--Explosive Disposal Range--Keep Out” in English and Spanish. A sign indicating "No Smoking" in English and Spanish shall be placed conspicuously at the entrance to the EOD Range.

During treatment operations, the gate shall remain open in case emergency vehicle access is required; however, unauthorized entry must be prevented.

2.2. INSPECTIONS

The Permittee shall inspect the OD Unit for malfunctions and deterioration, operator errors, and discharges which may cause a release of hazardous waste or hazardous constituents into the environment or a threat to human health, as required by 40 C.F.R. § 264.15, and according to the Inspection Plan (Permit Attachment E). The Permittee shall remedy any such deterioration or malfunction, operator error, or discharge, as required by 40 C.F.R. § 264.15(c). Inspections shall be conducted often enough to identify problems in time to correct them before they harm human health or the environment. The Permittee shall maintain records of all such inspections in the Operating Record, as required by 40 C.F.R. § 264.15(d).

Pursuant to the miscellaneous unit requirements found in 40 C.F.R. Part 264 Subpart X, inspections must meet the inspection requirements in 40 C.F.R. § 264.15 and the equipment testing and maintenance requirements in 40 C.F.R. § 264.33, as well as any additional requirements needed to protect human health and the environment. The OD Unit inspection procedures for communication and fire-protection equipment shall include provisions for equipment testing and maintenance to ensure that the equipment will function properly in an emergency.

If an inspection of the OD Unit reveals that a non-emergency problem has developed, remedial action, including repairs, maintenance, and replacement, shall be completed as soon as practicable to protect human health and the environment and to preclude further damage and to reduce the need for emergency repairs. If a hazard appears imminent or if a hazardous situation

already exists, operations at the OD Unit shall stop, and remedial action shall be initiated immediately. These measures to implement remedial actions shall satisfy the requirements of 40 C.F.R. § 264.15(c). Any remedial action taken pursuant to an inspection shall be noted on the inspection log in accordance with 40 C.F.R. § 264.15(d).

In accordance with 40 C.F.R. § 264.15(b)(1), a written schedule shall be followed at the OD Unit to routinely inspect for problems or potential problems with safety and emergency equipment, security devices, and operating and other equipment for preventing, detecting, or responding to hazards to the environment or human health. The Permittee shall use an inspection log based on the schedule shown in Table E-1 to document inspection of all items listed on Table E-1**.** The inspection logs shall include the date and time of the inspection, the name of the inspector, a notation of the observations made, and the date and nature of any repairs or other remedial actions taken.

2.3. PERSONNEL TRAINING

The Permittee shall follow the personnel training procedures specified in Permit Attachment G. [40 C.F.R. § 264.16].

The Permittee shall comply with 40 C.F.R. § 264.16(d) by maintaining the following documentation at the Facility: a job title for each position and the name of each employee filling each position; a written description for each position including the requisite skill, education, or other qualifications, and duties; and a written description of introductory and continuing training for each person filling each position.

2.4. PREPAREDNESS AND PREVENTION

2.4.1. Required Equipment

As required by 40 C.F.R. § 264.32, the OD Unit shall be equipped with or personnel shall have access to adequate emergency equipment, which includes an internal communication equipment or alarm system, telephone or two-way radio, fire extinguishers, and fire control, spill control, and decontamination equipment. The emergency equipment available for use at the OD Unit is summarized in Tables F-2 and F-3 in the Contingency Plan under Permit Attachment F.

An internal communications or alarm system capable of providing immediate emergency instructions (voice or signal) to Facility personnel shall be available on-site. In addition, a telephone or two-way radio capable of summoning emergency assistance shall also be available on-site. Treatment activities at the OD Unit shall be conducted only after notifying the KAFB Command Post (KCP).

All vehicles used at the OD Unit shall carry a portable fire extinguisher and a shovel. At least two portable fire extinguishers and at least two shovels shall also be kept at the EOD personnel bunker for response to fires or spills.

Appropriate personal protective equipment shall be available for use at the OD Unit to clean up spills should any occur.

Eyewash solutions shall be included in the first-aid kits carried in the vehicles used at the OD Unit.

The KAFB Fire Department shall be on call during treatment operations to provide fire fighters, tanker trucks equipped with water at adequate volume and pressure to extinguish fires at the OD Unit, and other fire-fighting equipment, if any fires should occur.

2.4.2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in the Contingency Plan in Permit Attachment F, as necessary, to assure its proper operation in time of emergency, as required by 40 C.F.R. § 264.33.

All communications systems, fire protection equipment, and decontamination equipment associated with the OD Unit shall, at a minimum, be tested and maintained according to the inspection schedule set forth in Permit Attachment E. Damaged or defective emergency equipment, communications equipment, fire protection equipment, and decontamination equipment shall be repaired or replaced immediately upon discovery.

2.4.3. Required Aisle Space

At a minimum, the Permittee shall maintain enough aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of the OD Unit, as required by 40 C.F.R. § 264.35.

2.4.4. Arrangements with Local Authorities

The Permittee shall attempt to enter into coordination agreements for emergency response, i.e., medical, ambulance, and fire protection services, with the City of Albuquerque Fire Department, the Bernalillo County Fire Department, the Albuquerque Police Department, and Albuquerque Regional Medical Center, as described in the Contingency Plan (Permit Attachment F), and as required by 40 C.F.R. § 264.37. Copies of all such agreements and documentation showing any unsuccessful attempts to enter into such an agreement shall be maintained at the Facility EM Branch Office as part of the Operating Record.

The Permittee shall provide the Chiefs of the City of Albuquerque Fire Department (AFD) and the Bernalillo County Fire Department (BCFD) with information that would ensure that emergency response personnel are at all times familiar with the potential hazards in performing their duties associated with the hazardous wastes at OD Unit. This information shall at a minimum include:

1. Waste types, *e.g.*, ignitable, reactive, corrosive;
2. Waste names that identify principle hazardous chemical constituents;
3. Approximate quantities of each waste type; and
4. General location of wastes types.

The Permittee shall annually sign a certification stating that the AFD and BCFD have been provided with this information. These certification statements shall be maintained in the Facility EOD Shop as part of the Operating Record.

2.4.5. Preventive Procedures, Structures, and Equipment

Descriptions of the preventive procedures, structures, and equipment at the OD Unit are

presented below. Adherence to the procedures and proper use of the structures and equipment shall be done to prevent hazards associated with unloading operations, prevent runoff from escaping hazardous waste management areas, prevent contamination of water supplies, mitigate the effects of equipment failures and power outages, prevent undue exposure of personnel to hazardous waste, prevent releases of hazardous wastes or hazardous constituents to soil, sediment, surface water, and groundwater, and prevent unacceptable releases of contaminants to the atmosphere.

Only properly trained personnel shall transport waste to the OD Unit for treatment. Unloading of the waste may be performed only by EOD Technicians/Specialists either manually or with appropriate heavy equipment, such as forklifts. At the OD Unit, vehicles shall park adjacent to the pit where the waste is to be treated, and the waste shall then be unloaded and placed into the pit. Additionally, personnel involved in waste management at the OD Unit shall be knowledgeable about the physical and chemical properties of the waste managed and shall take all precautions, as necessary, to ensure that wastes are managed safely.

Engineering and operational controls shall ensure that run-on and run-off are minimized to protect human health and the environment. A two-foot high earthen berm shall surround the OD Unit to prevent run-off from the OD Unit from flowing to other areas outside of the treatment area.

Because no electrical power is supplied to the EOD Range, equipment used at the OD Unit for unloading or placement of wastes (i.e., forklifts) is self-contained. If such heavy equipment experiences failure, the equipment shall be repaired or replacement equipment shall be obtained immediately.

Personnel exposure shall be minimized by restricting the handling of hazardous waste. EOD Technicians/Specialists shall wear appropriate protective clothing, which may include safety glasses. In case of exposure to the hazardous waste, first aid equipment, which includes eyewash solutions, shall be readily available.

Operations at the OD Unit shall be conducted in a manner to prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in the air as required under 40 C.F. R. § 264.601(c). Treatment at the OD Unit shall be performed under the requirements in the applicable permit obtained from the City of Albuquerque Environmental Health Department Air Pollution Control Division and under the requirements of this Permit.

The Permittee shall clear and keep clear, at all times, all combustible materials, including wood, grass, brush, and trees located within 200 feet of the OD Unit. The cleared area shall be bladed routinely to minimize fire danger, and a series of at least three concentric firebreaks (at least 20-feet wide each) shall be maintained.

2.5. CONTINGENCY PLAN

2.5.1. Implementation of the Plan

The Permittee shall immediately implement the Contingency Plan contained in Permit Attachment F, whenever there is a release of hazardous waste or hazardous constituents or there is a fire or explosion that could threaten human health or the environment, as required by

40 C.F.R. § 264.51(b).

2.5.2. Copies of the Plan

The Permittee shall maintain copies of the current Contingency Plan and all revisions and amendments to the plan at the EOD Shop and at the EOD Range bunker as required by 40 C.F.R. § 264.53(a). The Permittee shall provide copies of the current Contingency Plan and all revisions and amendments to the plan to the Department and to each entity with which the Permittee has an emergency agreement pursuant to the Permit requirements of Permit Section 2.4.4, as required by
40 C.F.R. § 264.53(b).

2.5.3. Amendments to the Plan

The Permittee shall review at least annually and immediately amend, if necessary, the Contingency Plan, as required by 40 C.F.R. § 264.54.

2.5.4. Emergency Coordinator

Either the Emergency Coordinator (EC) or an alternate EC, as specified in Permit Attachment F, shall be available at all times in case of an emergency. The EC and alternate EC shall be thoroughly familiar with the Contingency Plan and shall have the authority to commit the resources needed to implement the Contingency Plan. [40 C.F.R. § 264.55]. In the event of an imminent or actual emergency, the EC shall activate the internal emergency alarm or emergency communication device, notify the appropriate State or local government agencies and implement other procedures, as required by 40 C.F.R. § 264.56, and as described in Permit Attachment F (*Contingency Plan*).

The Permittee shall submit to the Department a revised Table F-1, Permit Attachment F, within 30 days of the issuance of this Permit. The revised table shall contain the following emergency coordinator contact information in compliance with 40 C.F.R. 264.52(d): names, office addresses, and the home and office telephone numbers of all persons qualified to act as an EC. When more than one person is listed, one must be named as the primary EC and the others must be listed in the order in which they will assume responsibility as alternates. The Permittee shall not treat any hazardous waste at the OD Unit until this Permit requirement is fully satisfied as determined by the Department.

2.6. WASTE CHARACTERIZATION

2.6.1. General Requirements

The Permittee shall not treat any hazardous waste at the OD Unit unless the hazardous waste has been characterized pursuant to the requirements of this Permit. [40 C.F.R. Part 264 and 40 C.F.R. Part 268]. The Permittee shall characterize waste as required under the Permit requirements of Permit Section 2.6.3 by sampling and analysis or by use of acceptable knowledge (AK) of the process that generated the waste, as appropriate.

2.6.2. Characterization of Waste by Acceptable Knowledge

"Acceptable Knowledge" means generator knowledge of the process that generated a waste,

including but not limited to process knowledge, waste analysis data from generators of similar wastes, and facility records of analysis that is used by a generator to characterize wastes.

Acceptable knowledge may be used as the sole method to characterize waste only when the waste is generated from a process that is consistent and well-documented. Documentation of the process must include information that meets all characterization requirements of this Permit, including the requirement to determine the status of the waste for the purposes of the RCRA Land Disposal Restrictions (LDRs) as specified in the Permit requirements of Permit Section 2.6.3.2.

The Permittee shall maintain documentation used to support acceptable knowledge of a waste stream in the Operating Record in accordance with 40 C.F.R. § 268.7(a)(6) and 40 C.F.R. § 264.73(b)(3). This documentation must be readily retrievable upon request during a Department or United States Environmental Protection Agency (EPA) inspection, and must be maintained in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility. For each waste stream characterized by acceptable knowledge, the Permittee shall maintain in the Operating Record, at a minimum, the following process knowledge information.

1. The location where the waste stream is generated,
2. The waste stream volume and time period of generation,
3. A description of the waste generating process, and
4. All material inputs or other information that identifies the chemical content, physical properties and physical form of the waste stream.

2.6.3. Characterization by Sampling and Analysis

2.6.3.1. Sampling

The Permittee shall establish and utilize a Sampling and Analysis Plan (SAP) for each waste stream for which sampling is required. The SAP shall identify the appropriate sampling methods to characterize the waste stream in accordance with the requirements of Permit Section 2.6.1. The Permittee shall maintain the SAP and all documents showing compliance with the SAP, in the Operating Record for a minimum of three years from the date the waste was last managed at the Facility.

The SAP shall identify the sample container types, preservation techniques, and holding times for each waste sampled. The SAP must conform to the most recent version of EPA's publication *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846) Chapter 9, Sampling Plan.* The SAP must ensure collection of a representative sample of waste by means that preserve its original physical form and composition, and the SAP shall ensure that sample collection meets the quality assurance objectives required in Section 1.3 of Permit Attachment D. The number of samples of each waste shall be sufficient to demonstrate that the Upper Confidence Limit of the mean (UCL), based on at least a 95% confidence level, is less than the applicable regulatory threshold.

2.6.3.2. Laboratory Analysis

The SAP shall identify the appropriate laboratory analytical methods to characterize the waste

stream in accordance with the Permit requirements of Permit Section 2.6.1. The Permittee shall perform or obtain laboratory analysis of wastes in accordance with the requirements of this Permit, and the *Waste Analysis Plan* (WAP) contained in Permit Attachment C. The SAP shall include the appropriate laboratory analytical methods, detection limits, and reporting limits. The Permittee shall maintain the SAP in the Operating Record.

To use any alternative analytical method, the Permittee must submit to the Department a petition for approval of such method in accordance with 40 C.F.R. § 260.21.

If the Permittee uses an independent contract laboratory to perform analyses, the Permittee shall inform the laboratory in writing that it must operate under the waste analysis requirements set forth in this Permit.

When using laboratory analysis as part of a hazardous waste determination, the Permittee shall require the laboratory to report concentrations of *all* hazardous constituents that the analytical test method is capable of measuring as identified in analytical method specific tables in the most current version of the EPA's *Test Method for Evaluating Solid Wastes (SW-846), Chapter 2*. When using laboratory analysis to demonstrate that the waste meets its applicable Land Disposal Restriction (LDR) treatment standard concentrations (specified at 40 C.F.R. § 268.40), the Permittee shall demonstrate that the analytical method detection limit is not higher than the treatment standard for each hazardous constituent that can reasonably be expected to be present.

2.6.3.3. Quality Assurance/Quality Control (QA/QC)

The Permittee shall perform and record all waste characterization QA/QC procedures in accordance with SW-846 for the data used to support waste characterizations required under this Permit. The precision, accuracy, completeness, comparability, and representativeness of the analytical data shall be addressed. The Permittee shall maintain a record of all QA/QC determinations in a manner traceable to specific wastes in the Operating Record.

When performing waste sampling required under this Permit, the Permittee shall use the applicable sample collection QA/QC procedures specified in EPA's *Field QA and QC Requirements Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (Publication SW-846), Chapter 1, Section 3.4,* including, but not limited to those dealing with equipment preparation and field equipment maintenance, calibration, and cleaning. The SAP shall identify and the Permittee shall collect the appropriate number of quality control samples associated with each waste sampled.

When performing laboratory analysis required under this Permit, method blanks, laboratory duplicates, and other laboratory control samples shall be analyzed to assess the quality of the data resulting from laboratory analytical programs. The results of both field and laboratory quality control data shall be reported to the Department with the results of waste characterization samples.

2.6.4. Re-evaluation of Characterization Information

The Permittee shall re-evaluate the characterization of routinely generated wastes to ensure that the characterization remains accurate and up to date for subsequent batches of waste, in compliance with 40 C.F.R. § 264.13(b)(4). The results of the re-evaluation shall be thoroughly documented and placed in the Operating Record.

The Permittee shall perform re-evaluation of a waste in accordance with these minimum requirements:

1. Re-evaluation shall be performed at least annually to verify the accuracy of initial characterization. For wastes originally characterized through sampling and analysis, re-evaluation shall be achieved using the same sampling and analysis methods used in the initial analysis unless otherwise required by the Department. For wastes characterized through acceptable knowledge of waste generation processes, re-evaluation may be achieved through a review of that information supporting acceptable knowledge.
2. Re-evaluation shall be performed whenever there is a change in waste-generating processes. Any information that indicates a change in the process that generates the waste and may affect the waste shall cause the waste to be re-characterized.
3. Re-evaluation shall be performed when the Permittee is notified by an off-site facility receiving hazardous waste from the Facility that the characterization of the waste received at the receiving facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittee shall notify the Department within 24 hours of its receipt of such a discrepancy notice.

2.6.5. Characterization of Specific Wastes

2.6.5.1. Waste Received From Off-Site

The Permittee shall obtain a detailed chemical and physical analysis of any hazardous waste received at the Facility from an off-site facility, in compliance with 40 C.F.R. § 264.13(c). This characterization may be in the form of documented acceptable knowledge if all applicable waste characterization requirements specified in this Permit are met and documented. This includes, but is not limited to, identification of underlying hazardous constituents.

The Permittee shall physically examine the shipment of waste from the off-site facility at the time of acceptance for correct documentation, including appropriate waste container identification and labeling. The Permittee shall not accept at the Facility a hazardous waste shipment from an off-site facility without Uniform Hazardous Waste Manifests and LDR Notification Forms, as applicable. If discrepancies are found for waste shipped to the Facility, the Permittee shall immediately return the waste to the generator.

2.6.5.2. Waste to Be Shipped Off-Site

Prior to shipping any hazardous waste off-site, the Permittee shall characterize the waste as necessary for treatment and disposal and to ensure proper packaging, labeling, marking, and placarding in accordance with the Department of Transportation regulations at 49 C.F.R. Parts 172, 173, 178, and 179.

2.6.5.3. Remediation Waste

The Permittee shall characterize remediation waste (as defined at 40 C.F.R. § 260.10) in compliance with all waste characterization requirements in this Permit. The characterization information shall be included in the Operating Record, shall be maintained as required under Permit Section 1.23.2, and include at a minimum: a hazardous waste determination, an identification of all applicable hazardous waste numbers, a LDR status determination, the origin

of the waste and how it was subsequently managed, the time and circumstances of the release that created the waste, and any investigation or other reports describing the release.

2.6.5.4. Additional Characterization Requirements for Containerized Waste

The Permittee shall characterize hazardous wastes placed inside containers, including over packed drums, to ensure that the wastes do not react dangerously with, decompose, or ignite sorbent material in the container, in compliance with 40 C.F.R. § 264.316(c), and to ensure that the wastes are not incompatible or reactive with one another, in compliance with 40 C.F.R. § 264.316(d) and § 264.316(e). The Permittee shall characterize laboratory packs, if they are intended to undergo the alternative treatment standards at 40 C.F.R. § 268.42(c), to determine whether they contain any prohibited hazardous wastes.

2.6.6. Records of Waste Characterization

The Permittee shall record and maintain in the Operating Record the results of waste analyses and waste determinations performed by acceptable knowledge, and sampling and analysis, as specified in this Permit Part (2) in compliance with 40 C.F.R. §§ 264.73(b)(3), (b)(7), (b)(10), (b)(15), and (b)(16), and copies of notices and certifications required in Permit Sections 2.7.2.1 and 2.7.2.2. The requirement to record and maintain in the Operating Record the results of waste analyses, waste determinations, and copies of notices and certifications applies to solid wastes even when the hazardous characteristic is removed prior to disposal, or when waste is excluded from the definition of hazardous or solid waste under 40 C.F.R. § 261.2 through § 261.6, or exempted from Subtitle C regulation, subsequent to the point of generation. [40 C.F.R. § 268.7(a)(8)].

2.7. WASTE MANAGEMENT

2.7.1. Authorized Wastes and Waste Sources

2.7.1.1. Permitted Waste

The Permittee shall not treat at the OD Unit any wastes not included in the *List of Authorized Hazardous Wastes* under Permit Attachment B.

2.7.1.2. Prohibited Waste

The Permittee shall not treat any radioactive or mixed waste, any waste containing polychlorinated biphenyls, or any other wastes not listed in the *List of Authorized Hazardous Wastes* contained in Permit Attachment B. The Permittee shall not treat hazardous wastes by any other means not authorized by this Permit.

2.7.1.3. Waste from Foreign Sources

The Permittee shall not accept hazardous wastes from a foreign source (a hazardous waste source outside the United States).

2.7.1.4. Waste from Off-site Sources

The Permittee shall receive from off-site sources only hazardous waste that are to be treated at the OD Unit and only if such receipt is in compliance with the requirements of this Permit. The

Permittee shall receive for treatment at the OD Unit only the hazardous wastes listed in Permit Attachment B (*List of Authorized Hazardous Wastes*) and only from the sources listed in Table 2-1 of this Permit Part.

2.7.1.5. Incompatible Wastes

Incompatible wastes shall not be managed at the OD Unit.

2.7.2. Provisions for Complying with LDR Requirements

The Permittee shall comply with the restrictions for land disposal at 40 C.F.R. Part 268.

The Permittee shall not arrange for the disposal at an off-site land disposal facility any hazardous waste restricted from land disposal under 40 C.F.R. Part 268, unless:

1. The waste meets treatment standards specified in 40 C.F.R. § 268.40, § 268.41, § 268.42, or § 268.43; or
2. A variance from the treatment standards has been granted pursuant to 40 C.F.R. § 268.44.

This Permit does not authorize land disposal of hazardous waste at any location at the Facility.

2.7.2.1. Generator Requirements

Generators of hazardous waste must determine, based on the characteristics of the waste at the point of generation, if the waste must be treated before it can be land disposed.

Generators are required to send a one-time written notice to the Facility for the treatment of hazardous waste at the OD Unit for each exact type of waste stream. This includes the Permittee as a "generator" of waste to be treated at the OD Unit. A copy of the one-time notice shall be maintained at the EM Branch Office. The notice shall include:

1. The applicable EPA Hazardous Waste Numbers and the manifest number of the initial shipment;
2. A statement that the waste is subject to LDRs;
3. The UHCs and their concentrations in the wastes, if any;
4. The applicable treatability group category (normally as a non-wastewater);
5. Waste code subdivisions based on waste-specific criteria, if appropriate; and
6. Waste analysis data, if appropriate.

For wastes that do not meet treatment standards, the one-time written notice shall include the generator paperwork requirements information referenced in 40 C.F.R. § 268.7(a)(2).

For wastes that meet treatment standards at the original point of generation, the one-time notice shall include the generator paperwork regulatory requirements information and the certification statement referenced in 40 C.F.R. § 268.7(a)(3).

All of the supporting data used to determine that a waste is restricted from land disposal, either based on acceptable knowledge of waste generation processes or on sampling and analysis of the waste, shall be retained at the EM Branch Office, as required in 40 C.F.R. § 268.7(a)(6).

2.7.2.2. Treatment Facility Requirements

Treatment residues generated at the OD Unit are subject to LDR requirements, as well as other applicable requirements in 40 C.F.R. Parts 261-263 and this Permit.

If an analysis indicates that a treatment residue does not fully meet the treatment standards for hazardous waste in 40 C.F.R. § 268.40 and universal treatment standards of 40 C.F.R. § 268.48, the residue shall be sent to an offsite facility for additional treatment, including any necessary treatment of UHCs to meet the applicable standards, and disposal. The Permittee must comply with the notice and certification requirements in accordance with 40 C.F.R. § 268.7(b)(5) as well as Permit Section 2.6.5.2 and any other applicable requirements of this Permit. Untreated waste that is a result of kick-out may be collected and retreated at the OD Unit.

If analysis indicates that a treatment residue meets the treatment standards, it shall be sent offsite for disposal. In accordance with 40 C.F.R. § 268.7(b)(3) and (4), a notification and certification signed by an authorized representative shall be submitted to the offsite treatment facility with the initial shipment of treatment residue.

If a waste is determined to be no longer hazardous, a one-time notification and certification shall be placed in the files at the EM Branch Office, as required by 40 C.F.R. § 268.9(d). The notification and certification shall be updated if the process or operation generating the waste changes and/or if the Subtitle D facility receiving the waste changes. The notification shall include:

1. The name and address of the Subtitle D facility receiving the waste shipment; and

2. A description of the waste (e.g., the treatment residue) as initially generated, including EPA Hazardous Waste Number(s), treatability group(s), and UHCs.

An authorized Facility representative shall sign the certification.

2.8. WASTE MINIMIZATION

The Permittee shall submit to the Department a report annually by December 1, for the year ending the previous September 30, certifying that the Permittee has a program in place to reduce the volume and toxicity of all hazardous wastes that are generated by the Facility to the degree determined to be economically practicable, and that the proposed method of treatment is the practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment [see 40 C.F.R. § 264.73(b)(9)]. This certified report must include these items:

1. Any written policy or statement that outlines goals, objectives, and methods for source reduction and recycling of hazardous waste at the Facility;
2. Any employee training or incentive programs designed to identify and implement source reduction and recycling opportunities for all hazardous wastes;
3. Any source reduction or recycling measures implemented in the last five years or planned for the near future;

4. An itemized list of the dollar amounts of capital expenditures (plant and equipment) and operating costs devoted to source reduction and recycling of hazardous waste;
5. A discussion of factors that have prevented implementation of source reduction or recycling;
6. Sources of information on source reduction or recycling received at the Facility (e.g., local government, trade associations and suppliers);
7. An investigation of additional waste minimization efforts that could be implemented at the Facility, which investigation shall analyze the potential for reducing the quantity and toxicity of each waste stream through production process change, production reformulation, recycling, and all other appropriate means, including an assessment of the technical feasibility, cost, and potential waste reduction for each option;
8. A flow chart or table detailing all hazardous wastes the Facility produces, by quantity and type, and by building or area, and program if consistent with security considerations; and
9. A demonstration of the need to use those processes which produce a particular hazardous waste due to a lack of alternative processes, available technology, or available materials that would produce less volume of hazardous waste.

The Permittee shall include the report in the Operating Record.

2.9. IMPERMISSIBLE DILUTION

The Permittee shall not dilute a restricted waste as a substitute for treatment. [40 C.F.R. § 268.3]. Impermissible dilution to avoid an applicable treatment standard includes, but is not limited to, the addition of solid waste to reduce a hazardous constituent's concentration, or an ineffective treatment method that does not destroy, remove, or permanently immobilize hazardous constituents. Aggregating or mixing wastes as part of a legitimate treatment process are not considered impermissible dilution for purposes of this Permit requirement.

2.10. DUST SUPPRESSION

The Permittee shall not use waste or used oil or any other material which is contaminated with dioxin, polychlorinated biphenyls (PCBs), or any other hazardous waste, other than a waste identified solely on the basis of ignitability, for dust suppression or road treatment. [40 C.F.R. § 266.23(b)].

2.11. IGNITABLE AND REACTIVE WASTES

The Permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes, as required by 40 C.F.R. § 264.17.

Ignitable or reactive wastes shall be located at least 50 feet from the boundary of the OD Unit at all times and shall be protected from any sources of ignition, such as open flames, or reaction with other wastes or products, and shall be separated and protected from welding activities, hot surfaces, frictional heat, and sources of sparks.

Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste to be managed shall be used to contain waste.

2.12. AIR EMISSIONS FROM THE OD UNIT

The Permittee shall comply with all air emission limitations and air monitoring requirements for the OD Unit set forth in the air quality permit for the OD Unit issued by the City of Albuquerque Environmental Health Department and as required by Permit Section 3.3. The Permittee shall also comply with the applicable requirements of 40 C.F.R. Part 264, Subpart BB. The Permittee shall maintain all records relating to the air quality permit in the Operating Record for the Facility.

2.13. OFF-SITE SHIPMENTS

Prior to shipping any hazardous waste off-site, the Permittee shall comply with all applicable generator requirements at 40 C.F.R. Part 262, as required by 40 C.F.R. §§ 262.10(h) and 264.71(c).

2.14. STORAGE OF RESTRICTED WASTE

The Permittee shall comply with 40 C.F.R. Part 268, Subpart E for any storage of hazardous waste restricted from land disposal under 40 C.F.R. Part 268, Subpart C.

2.15. MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of 40 C.F.R. § 264.71 and § 264.72. With the exception of waste shipments from conditionally exempt small quantity generators, the Permittee shall not accept for treatment any hazardous waste from an off-site source without an accompanying manifest.

If the Permittee accepts any hazardous wastes for treatment from an off-site facility without an accompanying manifest, if required, or without an accompanying shipping paper as described in 40 C.F.R. § 264.76, the Permittee shall prepare and submit an Unmanifested Waste Report to the Department within 15 calendar days after receiving the waste. The report shall include the following.

1. EPA identification number, name, and address of the off-site facility;
2. The date the Facility received the waste;
3. EPA identification number, name, and address of the generator and transporter;
4. A description and the quantity of each unmanifested hazardous waste received;
5. The method of treatment for each hazardous waste;
6. The certification signed by an authorized representative of the Facility; and
7. An explanation of why the waste was unmanifested, if known.

2.16. BIENNIAL REPORT

The Permittee shall prepare and submit to the Department two copies of a biennial report by March 1 of each even numbered year, as required by 40 C.F.R. § 264.75. The report shall document Facility activities during the previous calendar year and shall include.

1. EPA identification number, name, and address of the Facility;
2. The calendar years covered by the report;

3. A description and the quantity of each hazardous waste type the Facility received or generated that year;
4. The method of treatment for each hazardous waste type;
5. A description of the efforts undertaken during the year to reduce the volume and toxicity of waste generated;
6. A description of the changes in volume and toxicity of waste actually achieved during the year in comparison to previous years to the extent such information is available for the years prior to 1984; and
7. Treatment notices and their certifications signed by responsible Facility representatives.

2.17. LIABILITY INSURANCE REQUIREMENTS

Pursuant to 40 C.F.R. § 264.140(c), as a Federal entity, the Permittee is exempt from the requirement to have and to maintain liability coverage for sudden and accidental occurrences as specified at 40 C.F.R. § 264.147(a).

2.18. INCAPACITY OF OWNERS OR OPERATORS, GUARANTORS, OR FINANCIAL INSTITUTIONS

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to notify the Department of the commencement of bankruptcy as specified at 40 C.F.R. § 264.148.

2.19. DISCLOSURE STATEMENT

Pursuant to NMSA 1978, § 74-4-4.7(F)(1), as a department of the federal government, the Permittee is not required to file a disclosure statement.

2.20. ADDITIONAL REPORTS

In accordance with the requirements of 40 C.F.R. § 264.77, the Permittee shall also report the following to the Department.

1. Releases of hazardous waste, hazardous constituents or contaminants, or any fires at or within 0.25 mile of the OD Unit or any SWMU or AOC,
2. Manifest discrepancies that cannot be resolved within 15 calendar days after receiving the waste,
3. Occurrences, if any, when hazardous waste is transported to the OD Unit in a container in noncompliance with regulatory requirements and the requirements of this Permit,
4. Treatment unit closures (40 C.F.R. §§ 264.77(b) and 264.115).

Table 2-1 **Off-Site Generators**
New Mexico State Police
Albuquerque Police Department
Bernalillo County Sheriff's Office
Sandia National Laboratories/New Mexico
Kirtland Air Force Base
University of New Mexico
New Mexico Institute of Mining and Technology

Figure 2-1

PERMIT PART 3: OPEN DETONATION UNIT

3.0 INTRODUCTION

This Permit Part (3) contains requirements that set forth the authorized waste types and maximum quantities of hazardous waste allowed to be treated at the Open Detonation (OD) Unit. It also contains other requirements, including those related to the design, construction, and operation of the Unit, and soil and groundwater monitoring.

3.1. AUTHORIZED WASTE AND MAXIMUM QUANTITY OF WASTE

The Permittee shall not treat more than 1,500 lbs of wastes per treatment event, 18,000 lbs per calendar year, or 180,000 lbs for the term of the Permit. The Permittee shall not treat more than the above quantities, except in case of an emergency and only after authorization by the Department. The Permittee shall not treat any wastes that are not authorized under Permit Attachment B.

3.2. DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

3.2.1. General Requirements

The Permittee shall design, construct, operate, and maintain the OD Unit in accordance with the requirements of this Permit to minimize noise and the possibility of an accidental fire, explosion, or any sudden or nonsudden release of hazardous waste or hazardous constituents into air, soil, sediment, surface water, or groundwater which could threaten human health or the environment, as required by 40 C.F.R. §§ 264.31 and 264.601.

The Permittee shall mark the boundary of the OD Unit with signs or structures such that the boundary is clearly discernible.

3.2.2. Run-Off and Run-On Controls

The Permittee shall design, construct, operate, and maintain run-off control systems (protective berm) at the OD Unit to prevent precipitation run-off from leaving the Unit and the migration of hazardous waste or hazardous constituents off-Unit, as required by 40 C.F.R. § 264.601(b).

The Permittee shall design, construct, operate, and maintain run-on control systems (protective berm) at the OD Unit to prevent precipitation from entering the Unit as overland run-on, as required by 40 C.F.R. § 264.601(b).

3.2.3. Restrictions on Operations

3.2.3.1. Hours of Operation

The Permittee shall conduct treatment operations only between sunrise and sunset, except in an emergency [see 40 C.F.R. § 264.1(g)(8)(i)(D)]. If the Permittee conducts treatment operations in response to an emergency before sunrise or after sunset on a given day, the Permittee shall notify the Department of this fact in writing within 3 days of conducting such treatment.

3.2.3.2. Weather Conditions

Treatment operations shall not be conducted during adverse climatic conditions. Operations shall not be conducted if lightning is within 10 miles (16 kilometers) of the OD Unit, when the cloud ceiling is less than 1,000 feet or when visibility is less than five miles.

The Permittee shall not conduct treatment operations when wind speed exceeds 15 miles per hour (24 kilometers per hour).

The Permittee shall not conduct treatment operations when a thunderstorm is imminent or within 10 miles (16 kilometers) of the OD Unit, or during a snowstorm, a dust storm, or sandstorm.

3.2.3.3. Range Fire

The Permittee shall not conduct treatment operations when extreme fire hazard conditions exist or if a range fire has the potential to reach the boundary of the Explosive Ordnance Disposal (EOD) Range.

3.2.3.4. Other Restrictions

Wastes shall be treated promptly upon transport to and acceptance at the OD Unit.

The Permittee shall cease treatment operations immediately upon the discovery of an unsafe situation including but not limited to an aircraft in dangerous proximity to the EOD Range or loss of communication with the EOD Shop.

The Emergency Coordinator (EC) shall remain on site at the personnel bunker for the duration of the treatment operation.

Waste shall not be stored at the OD Unit and shall be present at the Unit only during a planned treatment operation.

If a treatment event at the OD Unit is aborted, the waste shall be immediately sent back to the generator.

The maximum extent of hazardous waste operations at the OD Unit shall be confined to the OD Unit.

3.2.4. Operation Safety

3.2.4.1. Personnel Safety

When escorted visitors are present to observe treatment operations, there shall be at least one EOD Technician or Specialist present for every three visitors.

The Permittee shall not conduct treatment operations if unauthorized personnel are within 1500 feet of the OD Unit. The Permittee shall ensure that at least two authorized persons are present during any treatment operation.

Following a treatment operation, no personnel shall enter the OD Unit until the explosive ordnance Team Chief/Range Safety Officer determines that it is safe to enter.

3.2.4.2. Safety Precautions

The Permittee shall conduct all treatment operations in accordance with all the safety precautions required by this Permit.

3.2.5. Maintenance

3.2.5.1. Accumulated Precipitation

The Permittee shall not allow standing water in any pit (crater). The Permittee shall remove any standing water within 24 hours after a precipitation event, or within 24 hours of when impassible access roads become passable should inclement weather preclude access to the OD Unit. The Permittee shall analyze any water removed from the OD Unit to determine whether it is a hazardous waste in accordance with the *Waste Analysis Plan* (Permit Attachment C), and shall manage it appropriately.

3.2.5.2. Untreated Waste (Kick-Out) and Treatment Residues

Within 24 hours after each treatment operation, the Permittee shall inspect the entire OD Unit area for untreated waste (kick-out) or treatment residues (such as shrapnel, metal fragments) originating from treatment operations. This inspection shall be conducted only after it has been determined that it is safe for the purpose of conducting inspections. Any untreated waste or treatment residues shall be placed in appropriate containers and managed as hazardous waste or solid waste, as appropriate. Kick-out and treatment residues shall not be stored at the OD Unit.

3.3. AIR MONITORING

The Permittee shall evaluate the potential impact of the air pollutants on human health before, during, and after treatment operations by screening and assessment, in compliance with 40 C.F.R. § 264.601(c)(5). The Permittee shall not proceed with a treatment event if meteorological conditions or ambient air quality conditions do not meet the requirements of the City of Albuquerque air quality permit for the OD Unit and the requirements of this Permit Part.

The Permittee shall specify in an annual sampling and analysis report on air quality the types and schedules of air monitoring required by the Albuquerque Environmental Health Department, and the instrumentation required. The Permittee shall submit this report to the Department and include in the report any air monitoring data from the previous calendar year, and estimated monthly emissions based on the amounts of waste treated. The report is due by March 31 of each calendar year.

3.4. SOIL MONITORING AND HUMAN RISK SCREENING

The Permittee shall conduct an annual soil sampling and analysis program in accordance with Permit Attachment D, and as required by 40 C.F.R. § 264.601(b).

In order to monitor soil contamination resulting from open detonation operations at the OD Unit, the Permittee shall implement the *Soil Sampling and Analysis Plan* (SSAP), which is described in Permit Attachment D.

3.5. GROUNDWATER MONITORING

The OD Unit is subject to the environmental performance standards of 40 C.F.R. § 264.601. Groundwater monitoring shall be conducted during the entire period of operations, including the period for closure, to ensure the protection of groundwater. Groundwater monitoring shall also be conducted during post-closure care, if post-closure care is required.

3.5.1. Installation of Monitoring Wells

The Permittee shall install at least one well upgradient at the boundary of the OD Unit, and at least three wells downgradient at the boundary of the Unit. Within 90 days after the effective date of this Permit, the Permittee shall submit to the Department for approval a proposed monitoring well installation plan as a Class 3 Permit Modification to this Permit, which, at a minimum, shall include well locations, drilling specifications, well construction specifications, well development procedures, and a schedule for implementation and completion of the well installations and submittal of a well completion report. Upon Department approval of the plan, the Permittee shall implement the monitoring well installation plan according to the approved schedule. Within 30 days of completion of well installation, the Permittee shall submit to the Department for approval a well completion report. The well completion report shall include the information required in Permit Section 6.5.17.10.8. The Department may require additional wells to be installed at the OD Unit if the Department determines that the number or function of the existing wells is insufficient.

All wells installed at the OD Unit must meet the general groundwater monitoring requirements of 40 C.F.R. §§ 264.97(a)(2), (b), and (c).

If any of the wells at the OD Unit cannot be sampled due to a declining water table or for any other reasons, the Permittee shall apply for a permit modification to modify this Permit to propose replacement wells.

3.5.2. Sampling and Analysis

Within 90 days after the effective date of this Permit, the Permittee shall submit to the Department for approval a proposed groundwater sampling and analysis plan as a Class 3 modification to this Permit. Upon approval, the groundwater sampling and analysis plan and the monitoring well installation plan of Permit Section 3.5.1 shall become Permit Attachment L (reserved).

The groundwater sampling and analysis plan shall require:

- That at least one sequence of samples be collected from each well at least semiannually.
- That samples of groundwater be collected from each of the monitoring wells and field and laboratory analysis of the samples be conducted for the parameters listed in Table 3-1 of this Permit Part (3).
- That the groundwater flow rate and direction in the uppermost aquifer be determined at least annually.
- That a report on the field and laboratory analytical data shall be submitted to the Department within 90 days after the samples have been collected.

- That a determination be made whether there is statistically significant evidence of contamination at each monitoring well after each sampling event.
- That the method used to make the statistical determination is identified.
- That the applicable groundwater investigation requirements of Permit Section 6.4.1.3 be met, including, but not limited to, the requirements for the collection and analysis of quality control samples, proper selection and use of sampling equipment, labeling, containers, preservatives, and analytical methods, use of chain-of-custody procedures, validation of analytical data, and reporting of data.

Table 3-1 Groundwater Monitoring Parameters
Volatile organic compounds
Semi-volatile organic compounds
Perchlorate
White Phosphorus
Explosives
Metals (all metals listed in Appendix IX to 40 C.F.R. Part 264, including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, tin, vanadium, and zinc)
Dioxins and Furans
General chemistry parameters in Table 6-1 of Permit Part 6, except phosphorus/phosphate, TKN, ferric/ferrous iron, dissolved CO_2, silicon, suspended sediment, stable isotopes

Upon Department approval of the plan, the Permittee shall implement the groundwater sampling and analysis plan according to the schedule in the plan. The schedule in the plan shall at a minimum set forth the time of sampling and when the data are to be reported to the Department.

If the Permittee or the Department determines that there is statistically significant evidence of contamination at any monitoring well, the Permittee shall notify the Department of this fact within 15 days of this discovery. The Department may itself make such a determination.

Should corrective action be required, the Permittee shall meet the requirements of Part 6 of this Permit, and shall implement corrective action as necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents.

If the Permittee determines that the monitoring program no longer satisfies the HWMR, the Permittee shall within 90 days submit to the Department an application for a Class 3 modification to this Permit to make any appropriate changes to the program.

3.6. ORGANIC AIR EMISSIONS REQUIREMENTS

This Permit Section contains requirements for air emissions.

3.6.1. Additional Waste Characterization Requirements for Air Emissions

The Permittee shall characterize hazardous waste to ensure compliance with applicable emission requirements of 40 C.F.R. Part 264, Subpart BB.

3.6.2. Equipment Containing or Contacting Hazardous Waste

Each piece of equipment that contains or contacts hazardous wastes with organic concentrations of at least 10 percent by weight shall be marked in such a manner that it can be distinguished readily from other pieces of equipment in accordance with 40 C.F.R. § 264.1050(d).

Pursuant to 40 C.F.R. § 264.1050(f), equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for less than 300 hours per calendar year is excluded from the requirements of 40 C.F.R. §§ 264.1052 through 264.1060 if it is identified, as required in 40 C.F.R. § 264.1064(g)(6). Such equipment shall be identified in writing in a log that shall be kept with the Operating Record in accordance with 40 C.F.R. § 264.1064(g)(6). The information required pursuant to 40 C.F.R. § 264.1064(k)(1), (2), (3) shall also be recorded in a log that is kept with the Operating Record.

The Permittee shall comply with all applicable requirements of 40 C.F.R. §§ 264.1052 through 264.1060 for any equipment that contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight for 300 or more hours per calendar year. The log shall note the total time elapsed that any equipment contains or contacts hazardous waste with an organic concentration of at least 10 percent by weight.

3.7. PRE-TREATMENT PREPARATION

Prior to a treatment operation, upon arrival at the OD Unit, an inspection of the OD Unit shall be conducted. The range flag shall be raised. The Team Chief shall then identify the designated EC and brief other EOD team members and escorted visitors (if present) on the treatment operation to be performed, required safety precautions, emergency procedures, and instruct all those present to be watchful for unsafe conditions at all times.

3.8. TRANSPORTATION OF WASTE TO THE OD UNIT AND CONTAINER SPECIFICATIONS

Hazardous wastes shall be packaged for transport to the OD Unit in appropriate containers that provide protection equivalent to U.S. Department of Transportation (DOT)-authorized containers. Appropriate containers include:

- Reinforced ammunition containers;
- Strong fiberboard boxes; or
- Strong, cleated wooden boxes.

Waste to be treated shall be transported to the OD Unit only on the day of the planned treatment event. Waste containers shall be secured to the vehicle during transport. Vehicles transporting hazardous wastes for treatment shall bear the appropriate “Explosives” placard and/or other necessary placards at the front, on both sides, and at the rear of the vehicle. These signs may be covered or removed when the vehicle no longer carries the hazardous wastes. Each transport vehicle shall, at minimum, carry one ABC-type portable fire extinguisher that is in operational

condition. Each transport vehicle shall have equipment to communicate with the KAFB Command Post and the emergency coordinator.

3.9. WASTE STAGING

Hazardous wastes shall only be transported to the OD Unit and unloaded and staged for treatment by appropriately trained EOD personnel. Wastes shall be treated as soon as possible after arrival at the OD Unit, provided the requirements of this Permit are met.

Outer waste containers are to be removed, and the waste placed into a pit (crater) for treatment by qualified EOD personnel. Outer containers may be returned to the generator for reuse. Outer and inner containers shall be managed appropriately as waste if not reusable.

If waste is placed in the OD Unit for treatment and site conditions are deemed unsafe to treat the waste, the waste shall be immediately removed and sent back to the generator.

3.10. WASTE TREATMENT

Prior to the treatment of hazardous waste, the Team Chief shall ensure that the EOD Range is clear of unauthorized personnel, that aircraft are not approaching, and that unauthorized vehicles and persons are not within or in the vicinity of the EOD Range as required under Section 3.2.4.1 of this Permit Part. The Team Chief shall also ensure that all persons at the EOD Range have relocated to the personnel bunker. In addition, the Team Chief shall obtain wind-speed information at or near the personnel bunker. The Team Chief shall also ensure that treatment operations comply with all restrictions in this Permit, including Permit Section 3.2.3.

Treatment of waste in the OD Unit shall be performed using explosives to countercharge the hazardous waste. Ignition of the explosives shall be done from the personnel bunker.

3.11. POST TREATMENT

After a treatment operation, the Permittee shall comply with the requirements of Permit Section 3.2.5.2, Permit Section 2.2, Permit Section 2.6.5.2, and any other requirement of this Permit applicable to post-treatment of waste.

The EOD Team Chief or his designee shall be responsible for clearing any misfires, should one occur. In such an event, a second qualified person shall serve as a safety backup for the EOD Team Chief.

If complete destruction of hazardous wastes is not achieved at the OD Unit, these wastes shall be treated again or shall be removed for appropriate treatment and disposed of at an off-site facility.

PERMIT PART 4: CLOSURE

4.0 GENERAL CLOSURE REQUIREMENTS

After receipt of the last hazardous waste to be treated at the OD Unit, or if required to cease operations as specified in Permit Section 1.10 and Permit Section 4.4, the Permittee shall close the OD Unit following the procedures described in the *Closure Plan* (Permit Attachment H), this Permit, and as required by 40 C.F.R. § 264.111.

4.1. SUBMITTAL OF REVISED CLOSURE PLAN

The Permittee shall submit to the Department for approval a revised Closure Plan within 60 days after discovering that a revised Closure Plan is required in accordance with this Permit, or the regulations at 40 C.F.R. § 264.112(c), or within 60 days after receiving written notification by the Department whichever is earlier. The Permittee shall amend the Closure Plan whenever changes in circumstances necessitate a modification of the Closure Plan, as required by 40 C.F.R.
§ 264.112(c). The Permittee shall amend the Closure Plan for any other reasons set forth in 40 C.F.R. 264.112(c) or if there are changes in state law that affect the Closure Plan. The Permittee shall comply with all the requirements of 40 C.F.R. 264.112(c) in amending the Closure Plan.

When amending or revising the Closure Plan, the Permittee shall submit to the Department for approval detailed, and as necessary, updated procedures and methods describing the procedures and sampling methods to verify removal of all structures and equipment and removal of treatment residues and any hazardous or solid wastes. At a minimum, the Permittee shall include in the revised Closure Plan:

1. Unit history and description, identifying, at a minimum, the following:
    a. Constituents of concern, including all hazardous waste and hazardous constituents managed at the Unit, listed by category of constituent subject to the same sampling methods,
    b. Spills or other releases of hazardous waste and hazardous constituents during operation of the Unit, and
    c. Visible staining or other conditions indicating potential release locations;
2. Proposed procedures for removal of all structures and equipment;
3. Proposed sample locations;
4. Sample methods, equipment, and procedures;
5. Analytes and analytical methods;
6. Detection limits;
7. QA/QC procedures; and
8. Sample management and preservation procedures.

4.2. CLEAN CLOSURE

The Permittee shall close the OD Unit by removing all hazardous waste residues and hazardous constituents and all structures and equipment from the OD Unit (clean closure).

However, if the OD Unit cannot be clean closed as determined by the Department, post-closure care is required and the Closure Plan shall be amended. If post-closure care is required, closure of the OD Unit shall include the construction of a final cover to be placed over the ground surface occupied by the Unit and construction of drainage structures to minimize the infiltration and percolation of water into and beneath the final cover. The final cover shall be of a design equivalent to that which would be required for a hazardous waste landfill. If groundwater is contaminated or soil contamination poses a threat to groundwater, the Permittee shall also immediately implement corrective action to remediate the contamination or prevent the contamination threat pursuant to the requirements of Part 6 of this Permit.

If a cover is required because the OD Unit cannot be clean closed, the revised Closure Plan shall meet all of the applicable closure requirements of 40 C.F.R. §§ 264.111 through 264.116 and 264.310, including the applicable closure requirements for landfills. The revised Closure Plan shall also include, at minimum:

1. The results of performance modeling of the final cover;
2. A description of the design (including engineering drawings) and material specifications for construction of the final cover and drainage structures;
3. A description of how the closure performance standards under 40 C.F.R. §§ 264.111 and 264.310(a)(1) through (5) will be met by the design;
4. A construction quality-assurance plan;
5. A description of the construction procedures and equipment to be used;
6. A description of the qualifications of those responsible for the design and oversight of the construction of the cover and the drainage structures; and
7. A schedule to construct and complete the final cover and drainage structures.

The Permittee shall implement the revised Closure Plan within 90 days after approval by the Department and shall complete construction of the final cover and drainage structures by the deadlines in the approved Closure Plan. The Permittee shall also submit to the Department a request to extend the closure period in accordance with 40 C.F.R. § 264.113(b)(1) and (c)(2).

4.3. NOTIFICATION OF CLOSURE

The Permittee shall notify the Department in writing at least 45 calendar days prior to the date on which it expects to begin closure of the OD Unit, as required by 40 C.F.R. § 264.112(d).

4.4. TIME ALLOWED FOR CLOSURE

Within 90 calendar days after the final volume of hazardous waste is received at the OD Unit, the Permittee shall remove all treatment residues and all other hazardous and solid waste from the Unit. The waste shall be sent to an off-site permitted treatment or disposal facility, as applicable. The Permittee shall complete closure activities for the Unit within 180 days, as required by
40 C.F.R. § 264.113, following the schedule and requirements in the Closure Plan, Permit Attachment H, and as required by this Permit Part.

If this Permit is terminated, or if the Facility is otherwise ordered, by judicial decree or final order under the HWA or § 3008 of RCRA, to cease treating hazardous wastes or to close the OD Unit, then the Permittee shall close the Unit in accordance with the deadlines established in 40 C.F.R. § 264.113.

4.5. DISPOSAL/DECONTAMINATION OF EQUIPMENT, STRUCTURES, AND SOILS

The Permittee shall remove and dispose of all equipment and structures, and shall decontaminate soil, as specified in the Closure Plan, Permit Attachment H. [40 C.F.R. § 264.114].

4.6. MANAGEMENT OF REMEDIATION WASTE

By removing hazardous waste or hazardous constituents or contaminated media during closure activities, the Permittee becomes a generator of hazardous waste, and shall manage that waste in accordance with all applicable requirements of 40 C.F.R. Part 262.

4.7. CERTIFICATION OF CLOSURE

Within 60 calendar days from the date of completion of closure of the OD Unit, the Permittee shall submit to the Department a final closure report and written certification signed by the Permittee and an independent professional engineer registered in the State of New Mexico, that the OD Unit was closed as required by the procedures specified in the Closure Plan (Permit Attachment H) and this Permit. [40 C.F.R. § 264.115].

4.8. FINANCIAL RESPONSIBILITY

4.8.1. Cost Estimate for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to provide a cost estimate for closure as specified at 40 C.F.R. § 264.142.

4.8.2. Financial Assurance for Closure

Pursuant to 40 C.F.R. § 264.140(c), as a department of the federal government, the Permittee is exempt from the requirement to submit a signed duplicate original of the closure financial assurance instrument as specified at 40 C.F.R. § 264.143.

PERMIT PART 5: POST CLOSURE

5.0 POST-CLOSURE CARE

The Department assumes that the OD Unit will be clean closed.

However, pursuant to 40 C.F.R. § 264.603, if any OD Unit operations release hazardous waste or hazardous constituents into soil, sediment, or groundwater that cannot be completely removed or decontaminated during closure (clean closed), then the OD Unit shall be subject to the requirements for closure and post-closure care for landfills in 40 C.F.R. §§ 264.117 through 120, and 264.310. The Permittee shall also meet the requirements of 40 C.F.R. § 264.601 during post-closure care for the OD Unit. The post-closure plan required under 40 C.F.R. § 264.118 must specify the procedures that will be used to satisfy these requirements.

PERMIT PART 6: CORRECTIVE ACTION

6.0 INTRODUCTION

Pursuant to § 3004(u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v); NMSA 1978, § 74-4-4.2(B) and 40 C.F.R. Part 264, Subparts F and G, the Permittee shall implement corrective action as necessary to protect human health and the environment from all releases of hazardous waste or hazardous constituents from operating or closed hazardous waste management units, and from any releases of hazardous waste or hazardous constituents from any Solid Waste Management Unit (SWMU) or Area of Concern (AOC) at the Facility.

6.1. GENERAL PROVISIONS

6.1.1. Offsite Access

To the extent any requirement of this Permit, including any work plan approved under this Permit, requires access to property not owned or controlled by the Permittee, the Permittee shall use its best efforts to obtain access from the present owners of such property to conduct required activities. In the event that access is not obtained when necessary, the Permittee shall immediately notify the Department in writing regarding its best efforts and its failure to obtain such access.

6.1.2. Field Activities

The Permittee shall notify the Department in writing of any field sampling or other field activities undertaken pursuant to any work plan or requirement of this Permit, and shall provide the Department the opportunity to collect split samples upon request by the Department. For such sampling or other field activities, the Permittee shall provide the Department with as much advance notice as is practicable, but no less than 15 days prior to the conduct of such sampling.

The Permittee shall notify the Department in writing a minimum of 15 days prior to the implementation of any work plan required under this Permit. Notification of sampling or other field activities may be made by email, fax, or letter.

6.1.3. Record Preservation

Until 10 years after the Permittee's receipt of the Department's written notice that corrective action has been completed for all SWMUs and AOCs listed on Table I-3 of Permit Attachment I, the Permittee shall maintain all records, documents, data, and other information that are required to be prepared under this Permit for corrective action.

6.1.4. Releases Beyond Facility Boundary

The Permittee shall notify the Department orally, within 24 hours of discovery, of any release of hazardous waste or hazardous constituent that has the potential to migrate beyond the Facility boundary or has migrated beyond the Facility boundary.

In the event that a hazardous waste or a hazardous constituent migrates beyond the Facility boundary, the Permittee shall implement corrective actions beyond the Facility property boundary as necessary to protect human health and the environment, unless the Permittee can

demonstrate to the Department that, despite the Permittee's best efforts, the Permittee is unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of any responsibility to clean up a release that has migrated beyond the Facility boundary where offsite access has been denied. On-site measures to address such releases will be determined on a case-by-case basis and will be subject to the approval of the Department.

6.1.5. Work Plans and Other Deliverable Documents

All work plans, schedules, reports, and other deliverable documents that the Permittee is required to prepare under this Part (6) shall be submitted to the Department for review and approval as detailed in Permit Section 1.38.

6.1.6. Quarterly Progress Reports

The Permittee shall submit to the Department quarterly reports summarizing all corrective action activities conducted pursuant to this Permit by January 31, April 30, July 31, and October 31 of each year. Each report shall summarize the corrective action activities for the quarter (i.e., 3 month time period) ending the month preceding the due date of the report. The content of these reports shall include the information specified in Permit Section 6.2.4.1.

6.1.7. Lists of SWMUs and AOCs and Annual Reporting of Outdoor Activities

Plate 1 is a map showing the locations of SWMUs and AOCs at the Facility. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I. Table K-1 of Permit Attachment K contains a listing of all SWMUs and AOCs for which the Department has determined that corrective action is complete without controls.

Given the need to monitor current and future activities that could lead to creation of new SWMUs and AOCs, the Permittee shall submit to the Department an annual report containing a brief summary of outdoor testing and training activities. The report shall list the name, location, and a general description of the type or types of testing (e.g., firing site, explosives testing, drop testing, burn testing) and training conducted at each outdoor area. The first annual report shall be submitted to the Department within 90 days of the effective date of this Permit; subsequent reports shall be submitted annually thereafter by March 31 of each year.

6.1.8. Newly discovered SWMUs, AOCs, and Releases

The Permittee shall notify the Department orally, within 24 hours of discovery, of any newly identified SWMU or AOC. Within 15 days after the discovery of any newly identified or suspected SWMU or AOC, the Permittee shall notify the Department in writing of such discovery. The notification shall include, at a minimum, the location of the SWMU or AOC and all available information pertaining to the nature of any release of contaminants from the SWMU or AOC, including the contaminants that were released, the magnitude of the release, and the media affected by the release.

Within 90 days after submitting such written notification, the Permittee shall submit to the Department for approval a SWMU Assessment Report (SAR) for each newly identified or suspected SWMU or AOC. At a minimum, the report shall provide the following information, to the extent available:

1. Location of each newly identified or suspected SWMU or AOC on a topographic map of appropriate scale;
2. Designation of type and function of each newly identified or suspected SWMU or AOC;
3. General dimensions, capacities and structural description of each newly identified or suspected SWMU or AOC (including any available plans and drawings);
4. Dates of operation for each newly identified or suspected SWMU or AOC;
5. Identification of all wastes that have been managed at or in each newly identified or suspected SWMU or AOC, including any available data on hazardous constituents in the waste; and
6. All available information pertaining to any release of contaminants from each newly identified or suspected SWMU or AOC, including analytical data for groundwater, soil, sediment, rock, air, and surface water.

Based on the results of the report and any other relevant information, the Department will determine the need for further investigations at the SWMUs or AOCs covered in the report, including the need for an investigation report. The Department may also require corrective measures of the SWMU or AOC, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur.

Within 15 days after the discovery of any previously unknown release of a contaminant into soil, sediment, surface water, or groundwater, the Permittee shall notify the Department in writing of such discovery. Based on the results of the report and any other relevant information, the Department may determine that further investigation of the release of contaminants is needed, including the need for an Investigation Report. The Department may also require corrective measures, based on a finding that releases of contaminants have occurred, are occurring, or are likely to occur from the unit.

6.1.9. Determination of Corrective Action Complete (No Further Action)

Based on the results of an Investigation Report or other relevant information, the Permittee may submit a request to the Department for a Class 3 permit modification under 40 C.F.R. § 270.42(c) to terminate corrective action for a specific SWMU or AOC. This permit modification request must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU or AOC at the Facility that pose a threat to human health or the environment, as well as any additional information required in 40 C.F.R. § 270.42(c).

A determination of Corrective Action Complete shall not preclude the Department from requiring continued or periodic monitoring of air, sediment, soil, groundwater, or surface water, when site-specific circumstances indicate that releases of hazardous waste or hazardous constituents may occur or have occurred, and it is necessary to protect human health or the environment.

A determination of Corrective Action Complete shall not preclude the Department from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates a release or likelihood of a release from a SWMU or AOC at the Facility that may pose a threat to human health or the environment. In such a case, the Department may initiate a modification to the Permit according to the requirements of Permit Section 1.12.1.

6.1.10. Health and Safety Plan

The Permittee shall maintain a Facility Health and Safety Plan, which shall include:

1. A description of the Facility including availability of resources such as roads, water supply, electricity and telephone service;
2. A description of the known hazards and evaluation of the risks associated with each activity conducted, including, but not limited to, on and off-site exposure to contaminants during implementation of interim or final corrective measures, site characterization, or monitoring activities;
3. A list of key personnel and alternates who are responsible for site safety, response operations, and protection of public health;
4. A delineation of the work area;
5. A description of levels of protection to be worn by personnel in the work area;
6. Procedures established to control site access;
7. Decontamination procedures for personnel and equipment;
8. Site emergency procedures;
9. Emergency medical care procedures for injuries and toxicological problems;
10. Requirements for an environmental field-monitoring program;
11. Routine and special training requirements for responders; and
12. Procedures for protecting workers from weather-related problems.

The Facility Health and Safety Plan shall be in accordance with:

1. National Institute of Occupational Safety and Health (NIOSH) Occupation Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);
2. EPA Order 1440.1 - Respiratory Protection;
3. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;
4. Facility Contingency Plans included in this Permit;
5. EPA Operating Safety Guide (1984);
6. Occupational Safety and Health Administration regulations, particularly 29 C.F.R. § 1910 and 1926;
7. State and local regulations; and
8. Other applicable EPA guidance.

6.1.11. Community Relations Plan

The Permittee shall maintain a plan for dissemination of information to the public regarding investigation and remediation activities and results. The plan shall:

1. Require the creation and maintenance of an active mailing list of interested parties, to be updated annually, including those on the official mailing list in accordance with 40 C.F.R. § 124.10;
2. Require informal meetings, including briefings and workshops as appropriate, with the public and local officials before and during the corrective action process, which shall be held at least twice every calendar year for as long as corrective action is required;
3. Require that news releases, fact sheets, work plan submittals, report submittals, and publicly available quarterly progress reports that explain the progress and conclusions of investigations and clean-ups be timely posted on the Permittee's website and timely provided to interested citizen groups and the public as requested;
4. Require the creation and maintenance of a public information repository and reading room;
5. Require that public tours and briefings be conducted to inform and to listen to public concerns, and to answer questions related to environmental monitoring, characterization, and remediation;
6. Require immediate written and, if possible, oral notification to affected parties of any discovered off-site release that could impact them; and
7. Require that interested community groups be notified of and be given opportunities to observe field data gathering activities conducted during the corrective action process (notices shall specify the time and need for any required safety and security training).

6.1.12. Land Transfer

In transferring land to another entity, the Permittee shall comply with the terms of § 120(h) of CERCLA, as amended, 42 U.S.C. § 9620(h), and as implemented in 40 C.F.R. Part 373. These provisions apply to any property owned by the Permittee on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, subject to the limitations of 40 C.F.R. § 373.2. Consistent with CERCLA § 120(h)(3)(A), the Permittee shall include in any deed that transfers property, the information required by CERCLA § 120(h)(3)(A)(i), the covenant required by CERCLA § 120(h)(3)(A)(ii), and the access clause required by CERCLA § 120(h)(3)(A)(iii). The Permittee may defer the requirement of § 120(h)(3)(A)(ii)(I), consistent with the terms of CERCLA § 120(h)(3)(C).

For any deed transferring title from the Permittee that contains a restriction on future land use, the Permittee shall, within 90 days of transfer of the property, notify the Department of the transfer and identify for the Department the location of the property that is the subject of the transfer.

6.1.13. Abandoned Septic Systems

In addition to the corrective action specified in this Permit, the Permittee shall close all abandoned septic systems in accordance with the Department's Liquid Waste Disposal System Regulations 20.7.3.307 NMAC.

6.2. SPECIAL REQUIREMENTS

6.2.1. Special Information Submittals

6.2.1.1. General Facility Information

The Permittee shall submit in a report to the Department, within 90 days of the effective date of this Permit, the following information:

1. Maps and tables indicating the surveyed coordinates and locations of all existing springs, wells, and surface water gaging stations;
2. Water-level contour map of known radii-of-effects from pumping of municipal and Facility supply wells;
3. Water level data presented graphically and in tabular format; and
4. Maps showing the boundaries of all Facility SWMUs and AOCs.

This report is a one-time submittal, unless new information becomes available; in that case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.2. Potential Human Receptors Information

The Permittee shall, within 90 days of the effective date of this Permit, submit a report to the Department describing human populations that are susceptible to contaminant exposure from the Facility. At a minimum, the following information shall be gathered and reported:

1. Local uses and possible future uses of groundwater, including:
   a). Type of use (for example., potable, domestic, agricultural, residential, industrial, municipal) and
   b). Locations of all groundwater wells, names of owners or tenants at those locations, and current use of those wells within one mile of the Facility; and
2. Human use of or access to the Facility and adjacent lands, including but not limited to recreational, residential, commercial, and industrial.

This report is a one-time submittal, unless new information becomes available; in which case, the report shall be updated and resubmitted at least annually by March 31 of each year for each case that new information becomes available.

6.2.1.3. Information on Surface Water

The Permittee shall submit a report to the Department pertaining to surface water bodies at the Facility, within 90 days of the effective date of this Permit. The report shall at minimum include:

1. A description of each surface water body, including location (Coyote Springs and associated wetlands are examples of surface water at the Facility); and
2. A description of the chemistry of the surface waters, including pH, temperature, total dissolved solids, total suspended solids, alkalinity, conductivity, dissolved oxygen, total organic carbon, and any specific contaminant concentrations.

6.2.2. Corrective Action Procedures

The corrective action process for a given SWMU or AOC begins with a site investigation to characterize any releases of contaminants. If there has been a release of hazardous waste or hazardous constituents into the environment and corrective action is necessary to protect human health or the environment from the release, corrective measures shall be conducted at the contaminated site to remove or isolate the contaminants that pose the human health or environmental risk. Verification sampling is required to determine if cleanup levels have been successfully achieved.

6.2.2.1. Site Investigations

The Permittee shall conduct a site investigation for each SWMU and AOC listed on Table I-3 of Permit Attachment I. The Department may determine that further investigation is needed at any SWMU or AOC at the Facility. If the Department determines that such further investigation is needed, it will notify the Permittee in writing.

The Permittee shall perform the site investigations only in accordance with approved Investigation Work Plans.

6.2.2.1.1. Investigation Work Plans

The Permittee shall submit to the Department for approval an Investigation Work Plan, in the format and with the content described in Permit Section 6.2.4.2, for each SWMU and AOC needing further investigation, including those listed on Table I-3 of Permit Attachment I. An individual Investigation Work Plan may cover several SWMUs or AOCs. The Investigation Work Plans shall be submitted by the date specified in the Department's written notification or in accordance with the schedule in Table I-3 of Permit Attachment I. Additional characterization required by the Department that is not already covered in an approved Investigation Work Plan, or that is not addressed during implementation of field activities conducted under an existing approved Investigation Work Plan, shall be proposed in a supplemental Investigation Work Plan submitted to the Department for approval. The supplemental Investigation Work Plan may reference a prior approved Investigation Work Plan and any corresponding Investigation Report for background information.

6.2.2.1.2. Investigation Reports

The Permittee shall submit to the Department for approval an Investigation Report, in the format and with the content described in Permit Section 6.2.4.3, that presents the results of field activities, summarizes the data collected, and presents the recommendations and conclusions of each investigation conducted pursuant to an approved Investigation Work Plan. An individual Investigation Report may cover several SWMUs or AOCs.

6.2.2.2. Corrective Measures

6.2.2.2.1. General

The Department will require corrective measures if the Department determines, based on an Investigation Report or other relevant information available to the Department, that there has been a release of hazardous waste or hazardous constituents into the environment and that corrective action is necessary to protect human health or the environment from such a release. Upon making such a determination, the Department will notify the Permittee in writing.

6.2.2.2.2. CME Work Plans

If the Department requires corrective measures, the Permittee shall submit to the Department for approval a Corrective Measures Evaluation (CME) Work Plan, in the format and with the content described in Permit Section 6.2.4.6, within 90 days of notification by the Department that a CME Work Plan is required or by such other due date as is stated in the notification. The CME Work Plan shall contain a schedule to conduct the CME. Upon approval of the CME Work Plan by the Department, the Permittee shall implement the work plan.

The CME shall evaluate potential remedial alternatives and shall recommend a preferred remedy that will be protective of human health and the environment and that will attain the appropriate cleanup levels.

6.2.2.2.3. CME Reports

The Permittee shall submit a CME Report, in the format and with the content described in Permit Section 6.2.4.7, to the Department within 90 days of completion of the CME. When the Department determines that there are no deficiencies in the CME Report, the Department will seek and consider public comment prior to selecting a remedy.

In selecting a remedy, the Department may select a remedy for a particular SWMU or AOC that encompasses several separate actions. The use of the term “remedy” refers to all such actions.

6.2.2.2.4. Cleanup Standards

The Permittee shall evaluate corrective measures and propose a preferred remedy that is capable of achieving the cleanup levels outlined in Permit Section 6.2.3 including, as applicable, any approved alternate cleanup goals established by a risk assessment.

6.2.2.2.5. Remedy Evaluation Criteria

6.2.2.2.5.1. Threshold Criteria

The Permittee shall evaluate each of the remedy alternatives against the following threshold criteria. To be selected, the remedy alternative must:

1. Be protective of human health and the environment;
2. Attain media cleanup standards within a reasonable timeframe;
3. Control the source or sources of releases so as either to reduce to the extent practicable, or to eliminate, further releases of hazardous waste or hazardous constituents that may

pose a threat to human health and the environment; and

4. Comply with applicable standards for management of wastes.

6.2.2.2.5.2. Remedial Alternative Evaluation Criteria

The Permittee shall evaluate each of the remedial alternatives for the factors described in this Permit Section (6.2.2.2.5.2). These factors shall be balanced in proposing a preferred remedy.

Long-Term Reliability and Effectiveness

The remedy shall be evaluated for long-term reliability and effectiveness. This factor includes consideration of the magnitude of risks that will remain after implementation of the remedy; the extent of long-term monitoring, or other management that will be required after implementation of the remedy; the uncertainties associated with leaving wastes in place; and the potential for failure of the remedy. The Permittee shall give preference to a remedy that reduces risks with little long-term management and that has proven effective under similar conditions.

Reduction of Toxicity, Mobility, or Volume

The remedy shall be evaluated for its effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. The Permittee shall give preference to a remedy that will more completely, permanently, and promptly reduce the toxicity, mobility, and volume of hazardous wastes and hazardous constituents.

Short-Term Effectiveness

The remedy shall be evaluated for its short-term effectiveness in reducing the toxicity, mobility, and volume of hazardous wastes and hazardous constituents. This factor includes considerations of the short-term reduction in existing risks that the remedy would achieve; the time needed to achieve that reduction; and the short-term risks that might be posed to the community, workers, and the environment during implementation of the remedy. The Permittee shall give preference to a remedy that quickly reduces short-term risks, without creating significant additional risks.

Implementability

The remedy shall be evaluated for its implementability or the difficulty of implementing the remedy. This factor includes consideration of potential installation and construction difficulties; operation and maintenance difficulties; difficulties with cleanup technology; permitting and approval requirements; and the availability of necessary equipment, services, expertise, and waste storage and disposal capacity. The Permittee shall give preference to a remedy that can be implemented quickly and easily, and poses fewer and lesser difficulties.

Cost

The remedy shall be evaluated for its cost. This factor includes a consideration of both capital costs, and operation and maintenance costs. Capital costs shall include, without limitation, construction and installation costs; equipment costs; land development costs; and indirect costs including management costs, engineering costs, legal fees, permitting fees, startup and shakedown costs, and contingency allowances. Operation and maintenance costs shall include,

without limitation, operating labor and materials costs; maintenance labor and materials costs; replacement costs; utilities; monitoring and reporting costs; administrative costs; indirect costs; and contingency allowances. All costs shall be calculated based on their net present value. The Permittee shall give preference to a remedy that is less costly, but does not sacrifice protection of human health and the environment.

6.2.2.2.6. Remedy Selection

Upon deeming the CME Report to be complete, the Department will select a proposed remedy or remedies for the SWMU or AOC. The Department may propose a different remedy from that recommended by the Permittee in the CME Report. The Department will issue a Statement of Basis for the proposed remedy, and will receive public comment on the remedy. The public comment period will extend for at least 45 days from the date of the public notice of the Statement of Basis. As provided in 20.4.1.901(A)(5)(a) through (c) and 20.4.1.901(B)(5), the Department will provide an opportunity for a public hearing on the proposed remedy, at which all interested persons will be given a reasonable chance to submit data, views or arguments orally or in writing and to examine witnesses testifying at the hearing. The comment period will automatically be extended to the close of the public hearing, if a hearing is held. The public hearing will follow the requirements under 20.4.1.901.F NMAC. The Department will select a final remedy and issue a response to public comments to all commenters, after the end of the public comment period. In selecting a remedy, the Department will follow the public participation requirements applicable to remedy selection under 20.4.1.901 NMAC and 40 C.F.R. Part 270.

6.2.2.2.7. CMI Work Plans

Within 90 days after the Department's selection of a final remedy, or as otherwise specified by the Department in writing, the Permittee shall submit to the Department for approval a Corrective Measures Implementation (CMI) Work Plan describing the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for its implementation. The CMI Work Plan shall be submitted to the Department for review in accordance with the requirements in Permit Section 1.38. Upon approval of the work plan by the Department, the Permittee shall implement the work plan.

The CMI Work Plan shall, at a minimum, include the elements found in the format provided in Permit Section 6.2.4.8.

6.2.2.2.8. Corrective Measures Implementation

The Permittee shall implement the final remedy selected by the Department according to the approved CMI Work Plan and implementation schedule.

6.2.2.2.9. Progress Reports

The Permittee shall submit to the Department progress reports in accordance with the schedule approved in the CMI Work Plan. The progress reports shall, at a minimum, include the information specified in Permit Section 6.2.4.9.

6.2.2.2.10. CMI Reports

Within 90 days after completion of a remedy, the Permittee shall submit to the Department for approval a CMI Report. The CMI Report shall include the information specified in Permit Section 6.2.4.10.

6.2.2.2.11. Accelerated Cleanup Process

6.2.2.2.11.1. General

If the Permittee identifies a corrective measure that, if implemented voluntarily, will reduce risks to human health and the environment to levels acceptable to the Department, will reduce cost or will achieve cleanup of a SWMU or AOC ahead of schedule, the Permittee may implement the corrective measure as provided in this Permit Section, in lieu of the process established in Permit Section 6.2.2.2.12.4. The accelerated cleanup process shall be used only at sites to implement presumptive remedies at small-scale and relatively simple sites where groundwater contamination is not a component of the accelerated cleanup, where the remedy is considered likely to be the final remedy for the site, and where the field work will be accomplished within 180 days of the commencement of field activities.

6.2.2.2.11.2. ACM Work Plans

The Permittee shall submit to the Department for approval a proposed Accelerated Corrective Measures (ACM) Work Plan, which shall include the following:

1. A description of the proposed remedial action, including details of the unit or activity that is subject to the requirements of this Permit;
2. An explanation of how the proposed cleanup action is consistent with the overall corrective action objectives and requirements of this Permit;
3. The sampling and analytical methods and procedures for characterization and remediation verification; and schedule for implementation and reporting on the proposed cleanup action.

The Permittee shall obtain approval of an ACM Work Plan from the Department prior to implementation of the work. The Permittee shall prepare the ACM Work Plan in accordance with the requirements of this Permit Section (6.2.2.2.11.2), and shall include a proposed implementation schedule. In accordance with Permit Section 1.38, if the Department disapproves the ACM Work Plan, the Department will notify the Permittee in writing of the work plan deficiencies and will specify a due date for submittal of a revised ACM Work Plan.

6.2.2.2.11.3. ACM Implementation

The Permittee shall implement the accelerated cleanup measure according to the approved ACM Work Plan. Within 90 days of completion of the ACM, the Permittee shall submit to the Department for approval a CMI Report that is written in a format in accordance with Permit Section 6.2.4.10. If upon review, the Department identifies any deficiencies in the CMI Report, the Department will notify the Permittee in writing and will specify a due date for submittal of a revised CMI Report.

6.2.2.2.12. Interim Measures

6.2.2.2.12.1. General

The Department may require interim measures, if the Department determines that such measures are necessary, to reduce or prevent migration of hazardous wastes or hazardous constituents that have, or may result in, an unacceptable human or environmental receptor exposure to hazardous wastes or hazardous constituents while long-term corrective action remedies are being evaluated and implemented. Upon making such determination, the Department will notify the Permittee in writing. Alternatively, the Permittee may identify the need to implement interim measures and may submit an Interim Measures Work Plan in writing to the Department for approval. The Permittee may initiate emergency interim measures without prior approval of the Department pursuant to Permit Section 6.2.2.2.12.4.

6.2.2.2.12.2. Interim Measures Work Plans

Within 60 days after receiving notification from the Department that interim measures are required, or such other period as stated in the notification, the Permittee shall submit to the Department for approval an Interim Measures Work Plan. The Interim Measures Work Plan shall include the same elements as specified in Permit Section 6.2.4.8.

6.2.2.2.12.3. Interim Measures Implementation

The Permittee shall implement the interim measures in accordance with an approved Interim Measures Work Plan and implementation schedule unless the Permittee is implementing an emergency interim measures without prior Department approval in accordance with Permit Section 6.2.2.12.4.

6.2.2.2.12.4. Emergency Interim Measures

The Permittee may determine during implementation of site investigation activities that emergency interim measures are necessary to address an immediate threat of harm to human health or the environment. The Permittee shall notify the Department within three business days of discovery of the facts giving rise to the threat, and shall propose emergency interim measures to address the threat. If the Department approves the emergency interim measures in writing, the Permittee may implement the proposed emergency interim measures without submitting an Interim Measures Work Plan. If circumstances arise resulting in an immediate threat to human health or the environment such that initiation of emergency interim measures are necessary prior to obtaining written approval from the Department, the Permittee shall notify the Department within one business day of taking the emergency interim measure. The notification shall contain a description of the emergency situation, the types and quantities of contaminants involved, the emergency interim measures taken, and contact information for the emergency coordinator who handled the situation. The notification shall also include a written statement justifying the need to take the emergency action without prior written approval from the Department.

6.2.2.2.12.5. Interim Measures Reports

Within 60 days after completion of interim measures, or as otherwise specified in the implementation schedule contained in the approved Interim Measures Work Plan, the Permittee

shall submit to the Department for approval an Interim Measures Report summarizing the results of the interim measures, that shall include copies of the results of all field screening, monitoring, sampling, analyses, and other data generated as part of the interim measures implementation. The Interim Measures Report shall include the same elements as specified in Permit Section 6.2.4.10.

6.2.3. Cleanup Levels

The Permittee shall adhere to the requirements of this Permit Section (6.2.3) for implementing and completing cleanup of groundwater, surface water, and soil at all SWMUs and AOCs at the Facility. All proposed cleanup levels will be subject to the Department's review and approval.

6.2.3.1. Cleanup Levels for Contaminants in Groundwater (other than Perchlorate)

The cleanup levels for groundwater shall be the New Mexico Water Quality Control Commission (WQCC) water quality standards (20.6.2.3103 and 20.6.2.4103 NMAC) and the drinking water maximum contaminant levels (MCLs) adopted by EPA under the Federal Safe Drinking Water Act (42 U.S.C. §§ 300f to 300j-26). If both a WQCC standard and a Maximum Contaminant Level (MCL) have been established for a contaminant, then the most stringent of the two levels shall be the cleanup level for that contaminant.

If a WQCC standard or MCL has not been established for a contaminant, the EPA Regional Screening Level (RSL) (EPA, 2009) for tap water shall be used as the cleanup level. If an RSL for tap water does not exist for a contaminant, and toxicological information is available, the Permittee shall propose a cleanup level based on a residential scenario, a total target human health excess cancer risk level of 10^{-5}, and for non-carcinogenic contaminants a HQ of one (1.0).

6.2.3.2. Cleanup Levels for Perchlorate in Groundwater

As described in Permit Section 6.4.1.4, the Permittee shall determine the nature extent, and rate of migration of any perchlorate contamination in groundwater. If the New Mexico WQCC adopts a groundwater standard for perchlorate, or if EPA adopts a MCL for perchlorate, then the standard or MCL will become the cleanup level. Pending WQCC or EPA adoption of a groundwater standard or MCL, if perchlorate is detected in groundwater at a concentration greater than or equal to 4 ug/L, the Permittee shall, through a Corrective Measures Study, propose a cleanup level based on a risk assessment using a Hazards Index of 1.0 and a residential-use scenario. The proposed cleanup level shall be subject to approval by the Department.

6.2.3.3. Cleanup Levels for Soil Contaminants (Other than PCBs and Lead)

For contaminants in soil (other than PCBs and lead), the Permittee shall propose a cleanup level based on a total human health excess cancer risk level of 10^{-5}, and for noncarcinogenic contaminants a total HQ of one (1.0) for residential land use. Alternatively, the Permittee may propose cleanup levels using the screening levels and procedures listed in the Department's most current version of "*Technical Background Document for Development of Soil Screening Levels*" (as it may be updated) for a residential land use scenario.

6.2.3.4. Cleanup Levels for Polychlorinated Biphenyls (PCBs) in Soil

For PCB contamination in soil, the Permittee shall propose a cleanup level based on the Department's Position Paper "*Risk-based Remediation of Polychlorinated Biphenyls at RCRA Corrective Action Sites*" (March 2000), as it may be updated. The soil cleanup level for PCBs is either a default concentration of 1.00 milligram per kilogram (mg/kg) or a risk-based PCB concentration level established through performing a human-health risk assessment assuming a residential land use scenario.

6.2.3.5. Cleanup Levels for Lead in Soil

The lead concentration in soil shall not exceed 400 mg/kg.

6.2.3.6. Cleanup Levels for Surface Water

The Permittee shall comply with the surface water quality standards outlined in the Clean Water Act (33 U.S.C. §§ 1251 to 1387), the New Mexico WQCC Regulations (20.6.2 NMAC), and the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC), and the procedures for alternate abatement standards (20.6.2.4103 NMAC).

6.2.3.7. Ecological Risk Evaluation and Cleanup Levels

Ecological risk shall be evaluated for any SWMU or AOC where there has been a release of contaminants. The Permittee shall evaluate ecological risk and propose a cleanup level derived using the methods in the Department's most current version of *"Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment"* (March 2000, as it may be updated). The Permittee may use EPA's ECO-SSLs (EPA, 2005) with Department approval if a substance is not addressed in the Department's guidance on ecological risk.

6.2.3.8. Requests for Variance from Cleanup Levels

The Permittee may request a variance from a particular cleanup level. The nature of the request shall differ depending on whether a WQCC standard is involved. If a WQCC standard is involved, the Permittee may request an alternative abatement standard in accordance with the process specified in the WQCC Regulations at 20.6.2.4103.E and F NMAC.

For all other instances in which the Permittee requests a variance from a cleanup level, the Permittee shall submit a demonstration to the Department that achievement of the cleanup level is impracticable. In making such demonstration, the Permittee may propose consideration of such factors as technical or physical infeasibility of the project, ineffectiveness of proposed solutions, cost of the project, potential hazards to workers or to the public, and any other basis that may support a finding of project impracticability. In addition to demonstrating the basis for its impracticability request, the Permittee's written submittal shall propose the action to be taken by the Permittee if the Department approves the impracticability demonstration. Such action shall include, but is not limited to, completion of a site-specific risk assessment and identification of alternate clean-up levels. The proposed alternative cleanup level will be subject to the Department's review and approval.

6.2.4. Reporting Requirements

The purpose of this Permit Section (6.2.4) is to provide reporting requirements for corrective action activities required under this Permit. This Permit Section is not intended to provide reporting requirements for every potential type of activity conducted at the Facility; therefore, other formats or types of reports may be necessary or better suited for some activities. Described below are general reporting requirements and formats for Quarterly Reports, Investigation Work Plans, Investigation Reports, periodic monitoring reports, risk assessment reports, CME Work Plans, CME Reports, CMI Work Plans, CMI Work Plan Progress Reports, and CMI Reports. All Work Plans and Reports shall be prepared with technical and regulatory input from the Department. All Work Plans and Reports shall be submitted to the Department in the form of one electronic copy in a format acceptable to the Department and two paper copies.

6.2.4.1. Quarterly Reporting

Quarterly reports, as specified in Permit Section 6.1.6 shall include the following information:

1. A description of the work completed and an estimate of the percentage of total planned work completed;
2. Summaries of all findings, including summaries of laboratory data;
3. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;
4. Planned work for the next reporting period;
5. Summaries of contacts pertaining to corrective action with representatives of the local community, public interest groups, or State government during the reporting period;
6. Changes in key project personnel during the reporting period;
7. Summaries of any variances from approved investigation or remediation work plans; and
8. Brief summaries of any periodic monitoring reports prepared in accordance with the requirements in Permit Section 6.2.4.4.

6.2.4.2. Investigation Work Plans

The Permittee shall prepare an Investigation Work Plan using the format set forth below. All research, locations, depths and methods of exploration, field procedures, analytical requirements, data collection methods, and schedules shall be included in a work plan. Required sections for an Investigation Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Site Conditions;
7. Scope of Activities;
8. Investigation Methods;

9. Monitoring and Sampling;
10. Schedule;
11. Tables;
12. Figures; and
13. Appendices (e.g., Investigation–Derived Waste Management Plan).

The Permittee may insert figures and tables within the text sections of a work plan instead of in a separate section.

6.2.4.3. Investigation Reports

The Permittee shall prepare an Investigation Report using the format set forth below. This Permit Section (6.2.4.3) describes the minimum requirements for reporting. All data collected during investigation of a SWMU or AOC shall be included in the Investigation Report. Requirements for an RFI report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Scope of Activities;
7. Field Investigation Results – Including, but not limited to (as applicable): surface conditions, subsurface conditions, monitoring well construction, boring or excavation abandonment, groundwater conditions, materials testing results, and pilot testing results;
8. Regulatory Criteria;
9. Site Contamination – Including as applicable, but not limited to: soil, rock and sediment sampling analytical results, soil, rock and sediment sample field screening results, groundwater sampling results, surface water sampling results, and subsurface vapor sampling results; and conclusions;
10. Conclusions and Recommendations;
11. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
12. Figures - All map figures shall include an accurate bar scale and a north arrow, other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
13. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of an investigation report instead of in a separate section.

6.2.4.4. Periodic Monitoring Reports

The Permittee shall prepare a Periodic Monitoring Report using the format set forth below. The reports shall present the results of periodic or routine groundwater and remediation system monitoring at the Facility. All data collected during each monitoring and sampling event in the reporting period shall be included in a periodic monitoring report. In general, interpretation of data should be presented only in the background, conclusions, and recommendations sections of a report. The other text sections of a report should be reserved for presentation of facts and data without interpretation or qualifications. Requirements for a Periodic Monitoring Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;
5. Scope of Activities;
6. Regulatory Criteria;
7. Monitoring Results;
8. Conclusions and Recommendations;
9. Tables - An explanation shall be provided on each table for all abbreviations, symbols, acronyms, and qualifiers;
10. Figures - All map figures shall include an accurate bar scale and a north arrow; other types of figures shall include a bar scale, if appropriate, and an explanation shall be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers; and,
11. Appendices - Including, as appropriate, field methods, boring/test pit logs and well construction diagrams, chemical analytical reports, and other appendices as required by the Department.

The Permittee may insert figures and tables within the text sections of a periodic monitoring report instead of in a separate section.

6.2.4.5. Risk Assessment Reports

The Permittee shall prepare a Risk Assessment Report using the format set forth below. Risk Assessment Reports may be appended to or combined with a CME Report or an Investigation Report to create a single document for a given SWMU or AOC. Human health and ecological risk assessments should be presented in separate sections, but the general risk assessment outline applicable to both sections is provided below. The conceptual site model shall be discussed in all risk assessments. Requirements for a Risk Assessment Report are:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;
4. Introduction;

5. Background Information -- Including site description and sampling results;
6. Conceptual Site and Risk Exposure Models;
7. Risk Screening Results;
8. Conclusions and Recommendations;
9. Tables;
10. Figures; and
11. Appendices.

A section in the risk assessment report shall summarize the analytical results of sampling at the SWMU or AOC. It shall include a description of the history of releases of contaminants, the known and possible sources of contamination, the vertical and lateral extent of contamination present in each medium, and a discussion of any uncertainties that are associated with contaminant characterization. Sources that are no longer considered to be ongoing but represent the point of origination for contaminants transported to other locations shall be included. This section shall reference any pertinent figures, data summary tables, and references in other reports. References made to other reports shall include page number, table numbers, and figure numbers for the referenced information. Page numbers for references made to other reports may be presented in a formal reference section of a risk assessment report. Summaries of data for each contaminant shall include the maximum value detected, the detection limit, and the upper confidence limit of the mean (UCL) based on a 95% confidence level (if applicable to the data set) with a notation for the statistical method used to calculate the UCL. Background values used for comparison to inorganic constituents and discussion of how “non-detect” analytical results were handled in the statistical analysis of data shall also be included.

Another section in the report shall present the conceptual site and risk exposure models. It shall include information on the expected fate and transport of contaminants detected at the SWMU or AOC. The discussion of fate and transport shall address potential migration of each contaminant in each medium, potential breakdown products and their migration, and anticipated pathways of exposure for human or ecological receptors. Diagrammatic representations of the conceptual site and risk exposure models shall appear in the figures section of the document. For human health risk assessments, the conceptual site and risk exposure models shall include the current and foreseeable future land use (such as industrial or recreational) for all risk assessments. Cleanup levels for the Facility shall be based on a residential land-use scenario, even if the current use of the land is for other scenarios.

All values for exposure parameters and the source of those values shall be included in table format and presented in the Tables section of the document. Conceptual site and risk exposure models presented for ecological risk assessments shall identify assessment endpoints and measurement receptors for the SWMU or AOC. The discussion of the models shall explain how the measurement receptors are protective of the ecological receptors.

If risk screening is utilized, a section in the report shall present the actual screening values used for each contaminant for comparison to all applicable human health and ecological risk screening levels. Other regulatory levels that are applicable to screening the site, such as drinking water MCLs or WQCC standards shall also be included in this section.

For risk assessments a section of the report shall present risk values, HQs, and hazard indexes

(HI) for human health under projected future land use and residential scenarios and any site-specific scenarios. A similar section shall also present for each contaminant the HQ for each ecological receptor.

Finally, a section shall also be included in the report that contains a discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and provides estimates of the potential impact of the various uncertainties. Appendices may include the results of statistical analyses of data sets and comparisons of data, full sets of results of all sampling investigations at the site, or other data as appropriate.

6.2.4.6. CME Work Plans

The Permittee shall prepare a CME Work Plan using the format set forth below. Required sections for a CME Work Plan are:

1. Title Page and Signature Block (for the name, title, and organization of the preparer and the responsible Facility representative);
2. Executive Summary;
3. Table of Contents;
4. Introduction;
5. Background Information;
6. Identification of Potential Remedies;
7. Analysis of Potential Remedies;
8. Proposed Remedy;
9. Schedule to complete CME;
10. Estimated Cost to Conduct CME;
11. Qualifications of Personnel who will conduct the CME;
12. Tables;
13. Figures; and
14. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Work Plan instead of in a separate section.

6.2.4.7. CME Reports

The Permittee shall prepare a CME Report using the format set forth below. Investigation summaries, site condition descriptions, corrective action goals, corrective action options, selection criteria, and schedules shall be included in the CME Report. At a minimum, detections of contaminants encountered during site investigations shall be presented in table format with an accompanying site map showing sample locations. The required format for CME Reports is:

1. Title Page and Signature Block (for the name, title and organization of the preparer and the responsible Facility representative);
2. Executive Summary (Abstract);
3. Table of Contents;

4. Introduction;
5. Background Information;
6. Site Conditions -- Including, as appropriate, surface, subsurface, and groundwater conditions;
7. Potential Receptors -- Including sources, pathways, and receptors;
8. Regulatory Criteria;
9. Identification of Corrective Measures Options;
10. Evaluation of Corrective Measures Options -- Including the required information in Permit Section 6.2.2.2.5.2;
11. Selection of a proposed preferred remedy;
12. Design Criteria to Meet Cleanup Objectives;
13. Schedule;
14. Tables;
15. Figures; and
16. Appendices.

The Permittee may insert figures and tables within the text sections of a CME Report instead of in a separate section.

A CME Report shall include the following information:

1. A description of the location, status, and current use of the site;
2. A description of the history of site operations, including an identification of hazardous and solid wastes managed at the site, and any releases of hazardous waste or hazardous constituents;
3. A description of site surface conditions;
4. A description of site subsurface conditions;
5. A description of on-site and any off-site contamination in all affected media;
6. An identification and description of all sources of contaminants;
7. An identification and description of contaminant migration pathways;
8. An identification and description of potential contaminant receptors;
9. An identification and description of applicable cleanup standards or other regulatory criteria;
10. An identification and description of remedial alternatives;
11. Remedial alternative pilot or bench scale testing results, if applicable;
12. A detailed evaluation and rating of each of the remedial alternatives, applying the criteria set forth in Permit Section 6.2.2.2.5.2;
13. An identification of a proposed preferred remedy;
14. Basic design criteria of the proposed preferred remedy; and
15. A schedule for implementation of the proposed preferred remedy.

6.2.4.8. CMI Work Plans

The Permittee shall prepare a CMI Work Plan using the format set forth below. The CMI Work Plan shall provide details on the design, construction, operation, maintenance, and performance monitoring for the selected remedy, and a schedule for implementation. The CMI Work Plan shall, at a minimum, include as necessary depending on the type of remedy to be implemented:

1. A description of the selected remedy;
2. A description of the remediation system objectives;
3. An identification and description of the qualifications of key persons, consultants, and contractors that will be implementing the remedy;
4. Detailed engineering design drawings and systems specifications for all elements of the remedy;
5. A construction quality assurance plan;
6. An operation and maintenance plan, if applicable;
7. The results of any remedy pilot tests, such as landfill cover test plots;
8. A schedule for submission to the Administrative Authority of periodic progress reports
9. A schedule for implementation of the remedy; and
10. A health and safety plan.

6.2.4.9. CMI Work Plan Progress Reports

The Permittee shall make progress reports on the execution of the CMI Work Plan to the Department, as described in this Permit Section (6.2.4.9). At a minimum, a progress report shall include the following information:

1. A description of the remedy work completed during the reporting period;
2. A summary of problems, potential problems, or delays encountered during the reporting period;
3. A description of actions taken to eliminate or mitigate the problems, potential problems, or delays;
4. A discussion of the remedial work projected for the next reporting period, including all sampling events;
5. Copies of the results of all monitoring, including sampling and laboratory analyses, and any other data generated during the reporting period; and
6. Copies of all waste disposal records generated during the reporting period.

6.2.4.10. CMI Reports

A CMI Report shall, at a minimum, include the following information.

1. A summary of the work completed;
2. A statement, signed by a registered professional engineer, that the remedy has been completed in accordance with the Department approved CMI Work Plan for the remedy;
3. As-built drawings and specifications signed and stamped by a registered professional engineer;

4. Copies of the results of all monitoring, including sampling and laboratory analyses, and other data generated during the remedy implementation, if not previously submitted in a progress report; and
5. Copies of all waste disposal records, if not previously submitted in a progress report.

6.2.4.11. Certification

Pursuant to 40 C.F.R. § 270.11(d)(1), all corrective action documents shall include a certification, signed by a responsible official of the Facility, stating:

> I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to 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.

6.3. COMPLIANCE SCHEDULE TABLES

The Permittee shall meet the specified compliance schedules for all actions and deliverables required by this Permit. Corrective action is required for all SWMUs and AOCs identified in Table I-3 of Permit Attachment I.

6.4. SPECIAL REQUIREMENTS FOR INFORMATION SUBMITTALS AND CORRECTIVE MEASURES

6.4.1. Special Investigation Requirements

6.4.1.1. Landfills to Be Closed with Waste Left in Place

For each landfill that the Permittee proposes to leave all or a portion of the contents of the landfill in place, the Permittee shall implement the corrective action procedures set forth in Permit Section 6.2.2. Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval in accordance with Permit Section 6.2.4.6 a CME Work Plan for each such landfill unless a CME Work Plan has been previously submitted to the Department for the landfill.

6.4.1.2. Military Munitions Ranges

The Permittee has conducted operations at areas that were used to research, develop, test, and evaluate military munitions and explosives, and other ordnance, or weapons systems, or to train military personnel in their use and handling. The Facility contains numerous military ranges where explosives are and were used for the purpose of conducting military exercises, munitions testing, research development, and demonstrations. These military ranges may include firing lines and positions, maneuver areas, firing lanes, test pads, impact areas, simulator sites, training

sites, research facilities, and buffer zones.

This Permit Section (6.4.1.2) applies to military munitions that meet the statutory definition of "solid waste" in NMSA 1978, 74-4-3(M), whether or not they also meet the regulatory definition of "solid waste" in 40 C.F.R. § 261.2.

Within 90 days of the effective date of this Permit, the Permittee shall submit to the Department for approval a Military Range Assessment Report that contains the following information:

1. A list of all active, inactive, and closed military ranges located on Facility property;
2. A list of any military ranges located on property that has been transferred from the Facility to another federal, private, or other entity;
3. An identification of those military ranges that are active, inactive, or closed;
4. For each inactive and closed military range, a description of the current use of the property;
5. Maps (or a map) that clearly illustrate the boundaries of all active, inactive, and closed military ranges, including transferred ranges, and the map must also illustrate any buffer zone around the ranges;
6. A qualitative assessment of the nature and extent of contamination at each active, inactive, and closed military range, including the potential risk to human health and the environment from the military munitions and other contamination;
7. A recommendation for further investigation necessary to fully characterize the nature and extent of the contamination on each of the active, inactive, and closed military ranges; and
8. A proposed schedule for implementation of the recommended investigation.

6.4.1.3. Areas with Groundwater Contamination

Groundwater contamination or the potential for groundwater contamination has been identified at the following areas:

1. Tijeras Arroyo Groundwater (TAG) Area – trichloroethylene (TCE) and nitrate;
2. Landfills #4, #5, and #6, LF-008 (SWMU 6-4)–potential for contamination by selenium and TCE;
3. Manzano Base Groundwater – TCE;
4. Sewage Lagoons and Golf Course Pond, WP-026 – TCE, nitrate;
5. Manzano Sewage Treatment Facility, WP-16 (SWMU 6-24) – potential for contamination;
6. Monitoring well WYO-4 area – TCE;
7. McCormick Ranch -- Nitrate;
8. Bulk Fuels Facility, ST-106 and SS-111 -- Fuel (JP-4, JP-8, and Aviation Gas) Contamination; and
9. EOD Hill – perchlorate contamination.

The Permittee shall complete an Investigation Work Plan, Investigation Report, or CME Report

for each of the nine areas of groundwater contamination in accordance with the compliance schedules in Table I-3 of Permit Attachment I. The Permittee shall complete a CME Report for each area of groundwater contamination that requires remediation, as determined by the Department. In addition, Permittee shall investigate other areas of the Facility, in addition to those listed above, where the Department determines that either groundwater is contaminated or there is potential for groundwater contamination.

6.4.1.4. Perchlorate Screening in Groundwater

Monitoring for perchlorate is required for eight consecutive quarters in groundwater monitoring wells installed at the Facility after the effective date of this Permit and in the following existing wells or their replacements: KAFB-1001 through KAFB-1007 (McCormick Ranch/Range wells), KAFB-1901 through KAFB-1904 (Lake Christian wells), and EOD Hill well. The Department reserves the right to include additional wells for perchlorate monitoring. The Permittee shall report all monitoring results on January 31, April 30, July 31, and October 31 of each year for at least 8 consecutive quarters to the Department, unless the Department agrees in writing to a longer reporting period.

The Permittee shall determine the nature, extent, and rate of migration of any perchlorate contamination in groundwater at the Facility and, if necessary, down gradient of the Facility. The detection limit for the monitoring of perchlorate in groundwater shall not exceed 1 ug/L.

If perchlorate is detected in a groundwater at a concentration greater than or equal to 1 ug/L in a groundwater monitoring well, monitoring of perchlorate in such well must continue at a frequency determined by the Department. The frequency shall not exceed one year.

6.4.1.5. Sanitary Sewer Line at LF-002 (SWMU 6-2)

The sanitary sewer line that passes through LF-002 shall be removed in accordance with the Department's instructions (letters from NMED to Carl Lanz: July 16, 2004; September 13, 2004; and March 10, 2005). Instead of removing the sanitary sewer line, the Permittee may abandon the sanitary sewer line in place, provided that the sewage within the line is completely drained when the line is abandoned. The sewer line shall be taken out of service within two years of the effective date of this Permit.

Within 180 days after the effective date of this Permit, the Permittee shall submit to the Department for approval - in accordance with Permit Section 6.2.2.2.7 - a CMI Work Plan with a schedule for removing or abandoning the sewer line. After completion of the work, the Permittee shall augment the CMI Report for LF-002 by describing the removal or abandonment of the sewer line.

6.5. TECHNICAL REQUIREMENTS

The methods used to conduct investigation, remediation, and monitoring activities shall be sufficient to fulfill the requirements of this Permit, and to provide accurate and representative data for the evaluation of site conditions, the nature, concentration, rate of migration, and extent of contamination, and for remedy selection and implementation, where necessary. The methods presented in this Permit are minimum requirements for environmental investigation and sampling, and are not intended to include all methods that may be necessary to fulfill the

requirements of this Permit. The methods for conducting investigations, corrective actions, and monitoring at the Facility must be determined based on the conditions and contaminants that exist at each SWMU or AOC.

The Permittee shall provide a description of investigation, sampling or analytical methods and procedures in documents submitted to the Department that includes sufficient detail to evaluate the quality of the acquired data. The Department must approve any proposed combinations of SWMUs and AOCs that are grouped for the purpose of site investigation, remediation, and/or monitoring activities.

6.5.1. Standard Operating Procedures

The Permittee may reference relevant Facility Standard Operating Procedures, provided that copies of these procedures are also submitted to the Department for review. If any requirement or procedure in a Standard Operating Procedure is found by the Department to be unacceptable for reasons including, but not limited to, that the requirement or procedure will or could prevent the acquisition of representative and reliable sampling results, the requirement or procedure shall be replaced by the Permittee with a different requirement or procedure that is acceptable to the Department.

6.5.2. Documentation of Field Activities

Daily field activities, including observations and field procedures, shall be recorded on appropriate forms. The original field forms shall be retained at the Facility and made available to the Department upon request. Completed forms shall be maintained in a bound and sequentially numbered field file (logbook) for reference. Indelible ink shall be used to record all field activities. Photographic documentation of field activities shall be performed, as appropriate. The daily record of field activities shall include, at minimum:

1. SWMU or AOC designation;
2. Date;
3. Time of personnel arrival and departure;
4. Field investigation team members who are present, including subcontractors and visitors;
5. Weather conditions;
6. Daily activities conducted and times of performance;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log;
10. Field monitoring data, including health and safety monitoring if conditions arise that threaten worker or public safety, or the environment;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage and/or disposal; and
14. Signature of personnel completing the field record.

6.5.3. Decontamination Procedures

The objective of the decontamination procedures described below is to minimize the potential for cross-contamination. A designated area shall be established for decontamination of drilling equipment, reusable sampling equipment, and well materials. Drilling rigs and other equipment shall be decontaminated prior to entering a SWMU or AOC. Drilling equipment or other exploration equipment that may come in contact with a borehole shall be decontaminated by steam cleaning, by hot-water pressure washing, or by another method approved by the Department prior to drilling each boring.

Sampling or measurement equipment, including but not limited to, stainless steel sampling tools, split-barrel or core samplers, well development or purging equipment, groundwater quality measurement instruments, and water level measurement instruments, shall be decontaminated in accordance with the following procedures or other methods approved by the Department before each sampling event:

1. Brush equipment with a wire or other suitable brush, if necessary or practicable, to remove large particulate matter;
2. Rinse with potable tap water;
3. Wash with non-phosphate detergent or other detergent approved by the Department (e.g., Fantastik™ and Liqui-Nox®) followed by a tap water rinse;
4. Rinse with 0.1 M nitric acid to remove trace metals, if necessary, followed by a tap water rinse;
5. Rinse with methanol to remove organic compounds, if necessary;
6. Rinse with potable tap water; and
7. Double rinse with deionized water.

All decontamination solutions shall be collected and stored temporarily as Investigation Derived Waste (IDW) as described in Permit Section 6.5.7. Decontamination procedures and the cleaning agents used shall be documented in the daily field log.

6.5.4. Field Equipment Calibration Procedures

Field equipment requiring calibration shall be calibrated before use in the field to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration measurements shall be recorded in the daily field logs. If field equipment becomes inoperable, its use shall be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument shall be used.

6.5.5. Sample Handling, Shipping, and Custody Requirements

The Permittee shall follow all procedures for sampling activities that are detailed in this Permit Section.

6.5.5.1. Sample Handling

At a minimum, the following procedures shall be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves shall be worn when collecting samples. New disposable gloves shall be used to collect samples. If any glove is contaminated by touching the sampled material, or other material that could contaminate or dilute the sample, the glove shall be replaced before taking another sample;
2. All samples collected of each medium shall be transferred into clean containers with the exception of soil, rock, and sediment samples obtained in brass sleeves or in Encore™ samplers. Sample container volumes and preservation methods shall be in accordance with EPA SW-846 and established industry practices; and
3. Sample labels and documentation shall be completed for each sample following procedures included in the site-specific work plans that are to be approved by the Department. Immediately after the samples are collected, they shall be stored either in a cooler with ice or by other appropriate storage method until they are delivered to the analytical laboratory. Chain-of-custody procedures, as described in this Permit Section (6.5.5.1) and Section 1.3.2.4 of Permit Attachment C shall be followed for all samples collected. All samples shall be submitted to the laboratory in an appropriate timeframe that will allow the laboratory to conduct the specified analyses within the method holding times.

6.5.5.2. Sample Shipment Procedures

Shipment procedures shall include:

1. Individual sample containers shall be packed to prevent breakage, and transported in a sealed cooler with ice or other suitable coolant or as otherwise approved by the Department. Any drainage hole at the bottom of the cooler shall be sealed and secured to prevent leakage;
2. Each cooler or other container shall be delivered in a timely manner to the analytical laboratory;
3. Glass bottles shall be separated in the shipping container by cushioning material to prevent breakage;
4. Plastic containers shall be protected from possible puncture during shipping using cushioning material;
5. The chain-of-custody form and analytical request form shall be shipped inside the sealed storage container to be delivered to the laboratory; and
6. Chain-of-custody seals (signed and dated) shall be used to seal individual sample containers and the sample-shipping container in conformance with EPA guidance.

6.5.5.3. Sample Custody

All samples collected for analysis shall be recorded in the field report or data sheets. Chain-of-custody forms shall be completed prior to the transfer of samples off-site, and shall accompany the samples during shipment to the laboratory. Upon receipt of the samples at the laboratory, the custody seals will be broken by laboratory personnel, the chain-of-custody form shall be signed as received by the laboratory, and the conditions of the samples shall be recorded on the form. The original chain-of-custody form shall remain with the laboratory and copies shall be returned to the relinquishing party. The Permittee shall maintain copies of all chain-of-custody forms

generated as part of sampling activities. Copies of the chain-of-custody records (either paper copies or electronically scanned in PDF format) shall be included with final reports submitted to the Department.

A chain-of-custody form shall be used to track samples from collection through analysis to ensure the integrity of analytical results. A chain-of-custody form shall include:

1. Sample identification number;
2. Signature of sample collector;
3. Date and time of sample collection;
4. Location at which sample was collected;
5. Type of media sampled (e.g., soil);
6. Type of preservation;
7. Analysis required;
8. Signature of all persons that have had custody of the samples;
9. Dates and times of possession; and
10. Signature, date and time of breaking the custody seal.

An individual in custody of any sample must comply with the procedures identified in SW-846 Chapter Nine (EPA, 1986) and those included here.

6.5.5.4. Sample Labels

Sample labels or tags are necessary to prevent misidentification. Gummed paper labels or tags are adequate and shall include at a minimum:

1. Sample identification number;
2. Name or initial of collector;
3. Sample location;
4. Sample date and time;
5. Analytical method or parameter to be analyzed for (e.g., VOCs, SVOCs, metals);
6. Preservation method; and
7. Other remarks.

Labels shall be affixed to sample containers before sampling, and they shall be immediately completed with the above information after the samples are collected.

The Permittee shall adhere to the following field custody procedures:

1. When collecting samples, as few people as possible should handle them;
2. Sampling personnel are responsible for the care and custody of samples until they are transferred or properly dispatched to the laboratory in accordance with the procedures described herein; and
3. Sample tags or labels shall be completed for each sample using waterproof ink, or covered by transparent waterproof tape.

6.5.6. In-Situ Testing and Other Tests

In-situ permeability tests, remediation system pilot tests, stream flow tests, and other tests conducted to evaluate site, surface, and subsurface conditions shall be designed to accommodate specific site conditions and to achieve test objectives. The testing methods must be approved, in writing, by the Department prior to implementation. The tests shall be conducted in accordance with Department, EPA, United States Geological Survey, ASTM International (ASTM - http://www.astm.org/) or other methods generally accepted by industry that will allow information representative of site conditions to be obtained. Detailed logs of all relevant site conditions and measurements shall be made during the testing events. A summary of the general test results, including unexpected or unusual test results and equipment failures or testing limitations shall be reported to the Department. The summary shall be presented in a format acceptable to the Department and in general accordance with the report formats outlined in Permit Section 6.2.4.

6.5.7. Collection and Management of Investigation Derived Waste

IDW includes, but is not limited to, general refuse, drill cuttings, excess sample material, water (e.g., decontamination, development and purge), spent materials, and used disposable equipment generated during the course of investigation, corrective action, or monitoring activities. All IDW shall be properly characterized and disposed of in accordance with Permit Attachment C (Waste Analysis Plan) and all federal, state, and local laws and regulations for storage, labeling, handling, transport, and disposal of waste. The Permittee shall include a description of the anticipated IDW management process as part of any work plan submitted to the Department for approval.

All waste generated during sampling and decontamination activities shall be temporarily stored in containers appropriate for the waste.

6.5.8. Surveying Sample, Well, and Site Feature Locations

The horizontal and vertical coordinates of the top of each monitoring well casing and the ground surface elevation at each monitoring well location shall be determined by a registered New Mexico professional land surveyor or licensed Professional Engineer. Horizontal coordinates shall be measured in accordance with the State Plane Coordinate System (NMSA 1978, 47-1-49-56 [Repl. Pamp. 1993]). The surveys shall be conducted in accordance with 12.8.2 NMAC -- *Minimum Standards for Surveying in New Mexico*. Horizontal positions shall be measured to the nearest 0.1 foot, and vertical elevations shall be measured to the nearest 0.01 foot. The Permittee shall prepare site map(s), certified by a registered New Mexico professional land surveyor or licensed Professional Engineer, presenting all surveyed locations and elevations of wells and relevant site features and structures for submittal with all associated reports to the Department.

Site attributes (e.g., soil sample locations, sediment sample locations, springs, outfalls, pertinent structures, monitoring stations, as well as staked-out sampling grids), shall be located by using the global positioning system (GPS), an electronic total station with prism reflectors, transit with stadia rod or tape, or a combination of these surveying systems, or by a registered New Mexico Registered Land Surveyor or licensed Professional Engineer using the methods described in the paragraph above. Horizontal locations of site attributes shall be measured to the nearest 1.0-foot.

The Permittee shall provide the Department with a statement of accuracy for survey data upon request.

6.5.9. Requirements for Exploratory and Well Installation Borings and Exploratory Excavations

Borings shall be completed at locations specified in this Permit or as approved by the Department in Investigation Work Plans. The Department may require additional exploratory or well borings as needed to ensure protection of human health and the environment. Any additional boring locations will be determined, and approved, by the Department. The anticipated depths and locations of exploratory and well borings shall be specified in work plans submitted to the Department for approval prior to the start of the field activities.

Borings that are not completed as permanent groundwater or soil-vapor monitoring wells shall be properly abandoned. Borings completed as either groundwater monitoring or soil-vapor wells shall be completed in accordance with the requirements described in this Permit Section (6.5.9).

Exploratory and monitoring well borings shall be drilled using the most effective, proven, and practicable method for recovery of undisturbed samples and potential contaminants. The drilling method selected must be approved by the Department prior to the start of field activities. Based on the drilling conditions, the borings shall be completed using one of the following methods:

1. Hollow-stem auger;
2. Air rotary;
3. Mud rotary (generally will not be approved by the Department);
4. Percussion hammer;
5. Dual wall air rotary;
6. Direct Push Technology;
7. Cable tool;
8. Sonic; or
9. Air Rotary Casing Hammer (ARCH).

Hollow-stem auger or Direct Push Technology drilling methods are preferred if vapor-phase or volatile organic compound (VOC) contamination is known or suspected to be present. Air rotary, hollow stem auger, percussion hammer, dual wall air rotary, direct push technology, cable tool or sonic drilling are preferred for borings intersecting the saturated zone of any aquifer. The type of drilling fluids or additives used, if necessary, must be approved by the Department prior to the start of drilling activities. The use of drilling fluids, especially other than air and potable water, is discouraged.

All drilling equipment shall be in good working condition and capable of performing the assigned task. Drilling rigs and equipment shall be operated by properly trained, experienced, and responsible crews. The Permittee is responsible for ensuring that contaminants from another site or facility are not introduced into the SWMU or AOC under investigation due to equipment malfunction or poor equipment decontamination. Drilling equipment shall be properly decontaminated before initiation of drilling for each boring.

Exploratory borings shall be advanced to the depths specified or approved by the Department. The Permittee shall propose drilling depths in the site-specific work plans submitted for each subject area where subsurface investigations are needed. Unless otherwise specified in this Permit or approved by the Department in work plans, the borings shall be advanced to the following minimum depths (see also Permit Section 6.5.11):

1. In all borings, 25 feet below the deepest detected contamination;
2. Twenty-five feet below the base of disposal units;
3. Five feet below the base of shallow structures such as piping or building sumps, or other building structures; and
4. Depths specified by the Department based on regional, or on SWMU or AOC specific data needs.

The Permittee shall notify the Department as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the depths specified or approved by the Department so that alternative actions may be approved. Precautions shall be taken to prevent the migration of contaminants between geologic, hydrologic, or other identifiable zones during drilling and well installation activities. Contaminant zones shall be isolated from other zones encountered in the borings.

The drilling and sampling shall be conducted under the direction of a qualified engineer or geologist who shall maintain a detailed log of the materials and conditions encountered in each boring. Both sample information and visual observations of the cuttings and core samples shall be recorded on a boring log. Known site features and/or site survey grid markers shall be used as references to locate each boring prior to surveying the location. The boring locations shall be located to the nearest foot of their planned location, and locations shall be recorded on a scaled site map upon completion of each boring.

Trenching and other exploratory excavation methods shall follow the applicable general procedures outlined in this Permit. Methods proposed by the Permittee for exploratory excavation and sampling at any SWMU or AOC shall be included in a site-specific Investigation Work Plan submitted to the Department.

6.5.10. Requirements for Geophysical Surveys

Where necessary, the Permittee shall conduct geophysical surveys to locate underground utilities, pipelines, drums, debris, and other buried features, including buried waste, in the shallow subsurface. The methods used to conduct the surveys, such as magnetometer, ground penetrating radar, resistivity, or other methods, shall be selected based on the characteristics of the site and the possible or suspected underground features. Results of the surveys shall be included in Investigation Reports submitted to the Department.

The Department may require the Permittee to excavate test pits or trenches to identify targets located by geophysical surveys.

The Permittee shall conduct geophysical logging of boreholes using techniques such as acoustic televiewer, spinner flow, acoustic velocity/full wave form acoustic, density/porosity, gamma, neutron, single point resistance or electric (long/short normal or inductance) methods as required by the Department.

6.5.11. Requirements for Deep Subsurface Soil, Rock, and Sediment Sampling

Deep subsurface samples are those collected at depths that generally require the use of power equipment. Relatively undisturbed discrete soil and rock samples shall be obtained, where possible, during the advancement of each boring for the purpose of logging, field screening, and analytical testing. Generally, samples shall be collected at the following intervals and depths:

1. At five-foot intervals, ten-foot intervals, continuously, or as approved by the Department;
2. At the depth immediately below the base of the disposal unit or facility structure;
3. At the maximum depth of each boring or excavation;
4. At the depths of contacts or first encounter with geologic units of different lithology, structural or textural characteristics, or of relatively higher or lower permeability that are observed during drilling or excavating;
5. At depths where soil or rock types are more likely to sorb or retain contaminants as compared to surrounding lithologic units;
6. At the depth of the first encounter of any saturated zones;
7. At intervals suspected of being source or contaminated zones; and
8. At other intervals approved or required by the Department.

Additional samples may be obtained from any depth based on field observations. A split-barrel sampler lined with brass sleeves, a coring device, or other method approved by the Department shall be used to obtain samples during the drilling of each boring.

A split barrel sampler lined with brass sleeves is the preferred sampling method for borehole soil and sediment; a coring device is the preferred sampling method for rock sampling. The following procedures should be followed if a split barrel sampler is used. Upon recovery of the sample, the brass sleeves shall be removed from the split barrel sampler, and the open ends of the sleeves covered with Teflon tape or foil and sealed with plastic caps fastened to the sleeves with tape for shipment to an analytical laboratory. If brass sleeves are not used, a portion of the sample shall be placed in clean containers for laboratory analysis. The remaining portions of the sample shall be used for field screening and logging, as described in Permit Sections 6.5.13 and 6.5.15, respectively.

Discrete samples shall be collected for field screening and laboratory analyses. For analyses other than that for VOCs and semivolatile organic compounds (SVOCs), the Permittee may submit site-specific, alternative methods for homogenization of samples in the field to the Department for review and written approval.

Samples to be submitted for laboratory analyses shall be selected based upon: 1) the results of the field screening or mobile laboratory analyses; 2) the position of the sample relative to

groundwater, suspected releases, or site structures; 3) the sample location relative to former or altered site features or structures; 4) the stratigraphy encountered in the boring; and 5) the specific objectives and requirements of this Permit and the approved work plan for the SWMU or AOC under investigation. The proposed number of samples and analytical parameters shall be included as part of the site-specific work plan submitted to the Department for approval prior to the start of field investigation activities.

6.5.12. Surface and Shallow Subsurface Soil and Sediment Sampling Procedures

Surface soil samples are those collected at depths of 0 to 6 inches. Shallow subsurface samples are those collected at depths that do not require the use of power equipment. Surface and shallow subsurface soil and sediment samples shall be collected in accordance with the procedures described below.

Samples that are collected for analyses other than for VOCs or SVOCs shall be obtained using a hand-held stainless steel coring device, Shelby tube, thin-wall sampler, or other device approved by the Department. The samples shall be transferred to clean containers for submittal to the laboratory.

Samples obtained for VOC or SVOC analysis shall be collected using Shelby tubes, thin-wall samplers, or other device approved by the Department. The ends of the samplers shall be lined with Teflon tape or aluminum foil and sealed with plastic caps fastened to the sleeves with tape for shipment to the analytical laboratory.

6.5.13. Field Screening of Soil, Rock, and Sediment Samples

Samples shall be screened in the field for the presence of contaminants, if required by the Investigation Work Plan or other sampling and analysis plan. Field screening results shall be recorded on the exploratory boring and excavation logs or other field logs. Field screening results are used as a general guideline to determine the nature and extent of possible contamination. In addition, screening results shall be used to aid in the selection of soil, rock, sediment, and vapor-phase samples for laboratory analysis.

The primary screening methods to be used shall include:

1) Visual examination;

2) Headspace vapor screening for VOCs; and

3) Metals screening using X-ray fluorescence (XRF).

Additional screening for characteristics such as pH, high explosives, or for other specific compounds using field test kits shall be conducted where appropriate.

Headspace vapor screening shall target VOCs and shall be conducted by placing a soil, sediment, or rock sample in a plastic sample bag or a foil-sealed container, allowing head space for ambient air. The container shall be sealed and then shaken gently to expose the sample to the air trapped in the container. The sealed container shall be allowed to rest for a minimum of five minutes while vapor concentrations equilibrate. Vapor concentrations present within the headspace will then be measured by inserting the probe of the monitoring instrument into a small opening in the bag or through the foil. The maximum value and the ambient air temperature shall be recorded on the log for each sample. A photo-ionization detector equipped with a 10.6

or higher electron volt (eV) lamp, combustible gas indicator, or other instrument approved by the Department shall be used for VOC field screening. The limitations, precision, and calibration procedures of the monitoring instrument to be used for VOC field screening shall be included in the Investigation Work Plan prepared for each SWMU or AOC.

XRF shall target metals. XRF screening requires proper sample preparation and instrument calibration. Sample preparation and instrument calibration procedures shall be documented in the field logs. The methods and procedures for sample preparation and instrument calibration shall be approved by the Department prior to the start of field activities.

The Permittee shall record on the field logs all conditions capable of influencing the results of field screening. The Permittee shall submit to the Department a report detailing any conditions potentially influencing field screening results. This report shall be included in any report where the field screening results are presented.

At a minimum, the Permittee shall submit the samples with the greatest apparent degree of contamination, based on field observations and field screening, for laboratory analysis. In addition, the Permittee shall submit the samples with no or little apparent contamination, based on field screening, for laboratory analysis if the intention is to confirm that the base (or other depth interval) of a boring or other sample location is not contaminated.

6.5.14. Field Quality Control for Soil, Rock, and Sediment Sampling

The Permittee shall collect Quality Control (QC) samples to monitor the quality of sample collection and laboratory analysis.

Field duplicates shall consist of two samples either split from the same sample device or collected sequentially. Field duplicates shall be collected at a rate of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample shall always be collected and analyzed for the appropriate contaminants.

The Permittee shall prepare and analyze equipment blanks from all sampling apparatus at a frequency of at least five percent of the total number of samples submitted for analysis. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate sample container.

In the case of VOC analyses, the Permittee shall prepare and analyze field blanks at a frequency of at least one per day for each medium sampled at each SWMU, AOC, or other site.

Reagent blanks shall be prepared and analyzed if chemical analytical procedures requiring reagents are employed in the field as part of the investigation or monitoring program.

Each type of QC sample shall be submitted for laboratory analyses, and analyzed in the same batch that the environmental samples they represent.

6.5.15. Logging of Soil, Rock, and Sediment Samples

The physical characteristics of soil, rock, and sediment samples, such as mineralogy, ASTM soil classification, American Geological Institute rock classification, moisture content, texture, color, presence of stains or odors, field screening results, depth, location, method of sample collection, and other observations shall be recorded in a field log. Samples shall be visually inspected and

the soil, sediment, or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and ASTM D2488 (Standard Practice for Description and Identification of Soils), or American Geological Institute Methods for soil and rock classification or in other ways approved by the Department. Detailed logs shall be completed in the field by a qualified geologist. Additional information, such as the presence of water-bearing zones and any unusual or notable conditions encountered during drilling shall be recorded on the logs. Field boring logs, test pit logs, and field well construction diagrams shall be converted to a format acceptable for use in final reports submitted to the Department.

6.5.16. Requirements for Soil-Vapor Monitoring

Samples of subsurface vapors shall be collected from vapor monitoring points where required by the Department. The Permittee shall, as required by the Department, collect soil-vapor samples for field measurement of:

1. Percent oxygen;
2. Organic vapors (using a photo-ionization detector with a 10.6 eV lamp, a combustible vapor indicator or other method approved by the Department);
3. Percent carbon dioxide;
4. Static subsurface pressure; and
5. Other parameters, such as carbon monoxide and hydrogen sulfide.

The Permittee also shall collect soil-vapor samples for laboratory analysis of the following:

1. Percent moisture;
2. VOCs; and
3. Other analytes required by the Department.

When collecting soil-vapor samples for laboratory or field analysis, the Permittee shall continually monitor the concentrations of soil vapor from a given monitoring point with an appropriate field instrument (e.g., photoionization detector). The Permittee shall collect soil-vapor samples after the field instrument readings have stabilized and after the sampling tubing and soil-vapor monitoring well have been appropriately purged to remove all stagnant vapor. Soil-vapor samples for laboratory analysis shall be collected using SUMMA canisters[1] or other sample collection method approved by the Department. The samples shall be analyzed for VOC concentrations by EPA Method TO-15 (as it may be updated) or equivalent VOC analytical method approved by the Department.

In the field, soil-vapor measurements, the date and time of each measurement, and the type and

1 The term “SUMMA” Canister is a trademark that refers to electropolished, passivated stainless steel vacuum sampling devices, such as TO canisters, SilcoCans, MiniCans, etc, which are cleaned, evacuated, and used to collect whole-air samples for laboratory analysis

serial number of field instrument used shall be recorded in a field log book. The method used to obtain soil-vapor field measurements and samples must be approved by the Department in writing prior to the start of monitoring.

Soil vapor wells shall not be installed with the use of any fluids. Soil vapor wells may be completed by backfilling with native materials. If a soil vapor well is installed as a permanent monitoring point, the Permittee shall not sample the well before the expiration of the 24-hour equilibration period following completion of installation. Information on the design and construction of soil-vapor monitoring wells shall be recorded as for groundwater monitoring wells (Permit Section 6.5.17.10) as applicable.

Soil-vapor monitoring wells shall be designed and constructed in a manner that will yield high-quality samples. The design and depth of installation must be approved by the Department.

6.5.17. Technical Requirements for Groundwater Investigations

The Permittee shall conduct investigations of groundwater in accordance with Department approved work plans to fully characterize the nature, vertical and lateral extent, concentration, rate of migration, fate, and transport of groundwater contamination originating from the Facility to determine the need for, and scope of, corrective action. The investigation shall include an evaluation of the physical, biological, and chemical factors influencing the transport of hazardous constituents and other contaminants in groundwater. The Permittee shall implement the groundwater investigation requirements in accordance with the requirements set forth in this Permit Section (6.5.17) and in approved work plans. All data shall be collected according to Department, EPA and industry accepted methods and procedures, and in accordance with this Permit Section (6.5.17) and any other requirements of this Permit.

6.5.17.1. Objectives

The Permittee shall implement groundwater investigations to determine the following as required by the Department:

1. Nature, extent, rate of migration, and concentration of historical and current releases of contaminants to groundwater;
2. Fate and transport, including boundary conditions, of contaminants releases within groundwater;
3. The depth to groundwater, water table elevations, potentiometric surfaces, and any seasonal variations;
4. Groundwater flow directions and velocities;
5. Migration of groundwater across hydrostratigraphic and structural boundaries;
6. Watershed and regional water balance information for evaluating contaminant fate and transport including:
    - recharge and discharge locations, rates, and volumes,
    - evapotranspiration data,
    - stream-flow data;

7. Water supply well pumping influences, including data for wells not owned by the Permittee, if available;
8. Saturated and unsaturated hydraulic-conductivity ($K_{x,y,z}$), porosity, effective porosity, permeability, transmissivity, particle-size, storage coefficients, and estimated fracture/secondary porosity;
9. Contaminant concentrations in soil, rock, sediment, air, and vapor; and absorption coefficients (K_{ds});
10. Changes in groundwater chemistry and the causes;
11. Regional and perched aquifer boundaries;
12. Geologic, hydrostratigraphic, and structural relationships; and,
13. General water chemistry.

In selecting a site for a new well, the Permittee shall consider paleotopography, fracture density and orientation, source areas, contaminant characteristics, geologic structures, groundwater flow direction, and the known occurrences of groundwater. All existing and newly installed wells and piezometers shall be surveyed in accordance with the requirements described in Permit Section 6.5.8.

6.5.17.2. Groundwater Levels

The Permittee shall obtain groundwater levels in all wells from which the Permittee is collecting groundwater samples and from other wells as specified by the Department, the schedule for which shall be provided in the Investigation Work Plans or other work plans.

Groundwater levels shall be measured in monitoring wells at frequencies required by the Department and within 24 hours from the start of monitoring the water level in the first well, unless another time frame is specified in the work plan and approved by the Department. Groundwater levels also shall be obtained prior to purging for any sampling event. Measurement data and the date and time of each measurement shall be recorded on a field log. The depth to groundwater shall be measured to the nearest 0.01 foot. The depth to groundwater shall be recorded relative to the surveyed well casing rim or other surveyed datum, as appropriate.

6.5.17.3. Groundwater Sampling

Initial groundwater samples shall be obtained from newly-installed monitoring wells within 30 days after completion of well development. Subsequent groundwater monitoring and sampling shall be conducted at frequencies approved by the Department. All monitoring wells specified in a Department approved Investigation Work Plan shall be sampled within 21 calendar days from the start of the groundwater sampling event. The Permittee shall sample all groundwater in all wells as specified in a Department-approved Investigation Work Plan. Any requests for variances from the approved groundwater sampling plan or schedule shall be submitted to the Department in writing 90 days prior to the start of scheduled monitoring and sampling events.

Groundwater samples shall be collected from all saturated zones including from exploratory borings that are not intended to be completed as monitoring wells prior to abandonment of the borings.

In addition to other required analyses, water samples shall be analyzed in accordance with approved work plans for one or more of the following general chemistry parameters in Table 6-1 below. The Department will specify through approved work plans which parameters in Table 6-1 that the Permittee must analyze for in water samples.

TABLE 6-1.
Groundwater General Chemistry Parameters

nitrate/nitrite	sulfate	chloride	sodium
dissolved CO2	alkalinity	carbonate/bicarbonate	boron
fluoride	manganese	calcium	silicon
ferric/ferrous iron	ammonia	potassium	phosphorus/phosphate
strontium	lithium	magnesium	molybdenum
Total Kjeldahl Nitrogen (TKN)	total organic carbon	suspended sediment concentration*	
total dissolved solids	bromide	stable isotopes (as required by the Department)	
Other parameters indicating oxidation/reduction conditions			
Eh	pH	dissolved oxygen	specific conductivity
dissolved manganese		dissolved iron	
sulfide		alkalinity	
temperature			

*ASTM Method D3977-97 standard test for determining sediment concentration in water samples

6.5.17.4. Well Purging

All screened zones in each monitoring well shall be purged by removing groundwater prior to sampling in order to ensure that fresh formation water is sampled. Purge volumes shall be as required by the Department. Field parameters that shall be monitored while purging are: groundwater pH, specific conductance, dissolved oxygen concentrations, turbidity, redox potential, and temperature. Field parameters shall be recorded at intervals approved by the Department. Measuring instruments are to be approved by the Department and are to be specified in the Investigation Work Plan or other sampling and analysis plan. The volume of groundwater purged, the readings obtained at each interval, and the instruments used shall be recorded on the field monitoring log. Water samples shall be obtained from a well only after the measured values of purge water field parameters have stabilized to within 10 percent for three consecutive measurements and after purging at least 75 percent of one well-bore volume. A well-bore volume is herein defined as the volume of water in the saturated filter pack plus the volume of all standing water within the well screen and casing including the sump. The Permittee may submit to the Department for approval, a written request for a variance from the described method of well purging for individual wells no later than 90 days prior to scheduled

sampling activities.

6.5.17.5. Groundwater Sample Collection

Groundwater samples shall be obtained using methods approved by the Department within eight hours of the completion of well purging. Groundwater in monitoring wells with low recharge rates and that purge dry shall be sampled when the water level in the well has recovered sufficiently to collect the required samples. Sample collection methods shall be documented in field monitoring logs. The samples shall be transferred to appropriate clean containers. Sample handling and chain-of-custody procedures that shall be implemented are described in Permit Sections 6.5.5. Decontamination procedures shall be established and, implemented, for non-dedicated water sampling equipment as described in Permit Section 6.5.3.

Groundwater samples intended for metals analysis shall be submitted to the laboratory for analyses of total metals; the samples shall not be filtered in the field or laboratory, unless the Department requires analyses for dissolved metals concentrations. If dissolved metals concentrations are required by the Department, the Permittee shall obtain groundwater samples for dissolved metals analysis; said samples shall be filtered using disposable in-line filters with a 0.45 micron or other mesh size approved by the Department.

6.5.17.6. Field QC for Groundwater Sampling

Field duplicates, field blanks, equipment rinsate blanks, reagent blanks, and trip blanks (the latter required for VOC analyses only) shall be collected or prepared and analyzed for quality control purposes. The samples shall be managed as described in Permit Section 6.5.5.

Field duplicates shall consist of two samples collected sequentially. Field duplicate samples shall be collected and analyzed at a frequency of at least 10 percent of the total number of environmental samples submitted for analysis. At a minimum, one duplicate sample per sampling event shall always be collected and analyzed.

In the case of VOC analyses, field blanks shall be prepared and analyzed at a frequency of no less than one per day per SWMU or AOC. Field blanks shall be generated by filling sample containers in the field with deionized water and submitting the field blank, along with the groundwater samples, to an analytical laboratory.

Equipment blanks shall be prepared and analyzed at a rate of at least five percent of the total number of environmental samples submitted for analysis, but no less than one equipment blank per sampling day. Equipment blanks shall be generated by rinsing decontaminated sampling equipment with deionized water, and capturing the rinsate water in an appropriate clean container. The equipment blank then shall be submitted with the groundwater samples to the analytical laboratory for the same analyses as the environmental samples.

Reagent blanks may be required by the Department if chemical analyses requiring the use of chemical reagents are conducted in the field during water sampling activities. Reagent blanks shall be prepared and analyzed at a frequency of at least 10 percent of the total number of media samples, but no less than one per day per SWMU or AOC.

Trip blanks shall be prepared using deionized water. Trip blanks shall be managed exactly the same as environmental samples. Trip blanks shall accompany sampling personnel into the field

throughout sampling activities, and then shall be placed into a shipping container with environmental samples for shipment to the analytical laboratory. Trip blanks shall be analyzed at a frequency of one for each shipping container holding samples for VOC analysis.

6.5.17.7. Periodic Monitoring Report

The Permittee shall submit to the Department periodic monitoring reports providing the results of the monitoring and sampling of groundwater, surface water, and springs over the previous reporting period. The reports shall be prepared in accordance with Permit Section 6.2.4.4. The reports shall be submitted within 90 days after completion of the monitoring fieldwork or in accordance with the schedule set forth in the approved monitoring work plans.

6.5.17.8. Springs

The sampling and analysis requirements for groundwater found in this Permit shall also apply to springs. Additionally:

1. Springs shall be sampled as close to the point of discharge as possible and shall be sampled at the same locations during each sampling event. If field conditions change, the spring shall be sampled as close to the original location as possible, and the Permittee shall notify the Department in the periodic monitoring report that the sampling location for the spring has changed;
2. The sampling point for each spring shall be located in accordance with the survey methods described in Permit Section 6.5.8 or by other survey methods approved by the Department;
3. Spring water flow rates shall be measured. In addition, as required by the Department, pH, specific conductance, dissolved oxygen, turbidity, temperature, and oxidation-reduction potential of the spring water shall be measured during each sampling event;
4. Spring samples shall be submitted to an analytical laboratory for analyses of the general chemistry parameters listed in Permit Section 6.5.17.3, as required by the Department and in accordance with approved work plans; and
5. The Permittee shall perform the same field QC procedures as are described in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.9. Surface Water

Surface water samples shall be collected using methods approved by the Department. Samples shall be collected and placed into clean containers. Field parameters and the methods and instruments used to measure them shall be approved by the Department prior to conducting surface water sampling. The sampling and monitoring techniques used and the measurements obtained shall be recorded in field monitoring logs. Stream flow rates shall be measured in conjunction with surface water sampling events.

The Permittee shall perform the same field QC procedures as are detailed in Permit Section 6.5.17.6 and Section 1.3 of Permit Attachment D for groundwater.

6.5.17.10. Groundwater Monitoring Well Construction Requirements

Groundwater monitoring wells shall be designed and constructed in a manner that will yield high

quality samples, ensure that the well will last the duration of the project or other specified time period, and ensure that the well will not serve as a conduit for hazardous constituents to migrate between different stratigraphic units or aquifers. The design and construction of groundwater monitoring wells shall comply with the guidelines established in various RCRA guidance, including, but not limited to:

1. EPA, *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*, OSWER-9950.1, September, 1986; and
2. Aller, L., Bennett, T.W., Hackett, G., Petty, R.J., Lehr, J.H., Sedoris, H., Nielsen, D.M., and Denne, J.E., *Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells*, EPA 600/4-89/034, 1989.

All well construction and installation shall be conducted in accordance with this Permit Section (6.5.17.10) of this Part and in accordance with approved work plans. All monitoring and sampling shall be conducted in accordance with Permit Section 6.5.17 and in accordance with approved work plans.

The Department must approve in writing all drilling locations, monitoring well and piezometer construction and installation details, sampling depths, and abandonment activities prior to the start of these activities.

6.5.17.10.1. Drilling Methods

A variety of methods are available for drilling monitoring wells. While the selection of the drilling procedure is usually based on the site-specific geologic conditions, the following issues shall be considered:

1. Drilling shall be performed in a manner that minimizes impacts to the natural properties of the subsurface materials;
2. Drilling shall be performed in a manner that contamination and cross-contamination of groundwater and aquifer materials is avoided;
3. The drilling method shall allow for the collection of representative samples of rock, unconsolidated sediment, and soil;
4. The drilling method shall allow the Permittee to determine when the appropriate location for the screened interval(s) has been encountered;
5. The drilling method shall allow for the proper placement of a filter pack and annular sealant for each monitored zone, and the borehole diameter shall be at least four inches larger in diameter than the nominal diameter of the well casing and screen to allow adequate space for emplacement of the filter pack and annular sealants;
6. The drilling method shall also allow for the collection of representative groundwater samples, and drilling fluids, including air, shall be used only when minimal impact to the surrounding formation and groundwater can be ensured (in general the Department discourages the use of drilling mud and drilling additives for groundwater monitoring well installations); and,
7. Requirements specified in Permit Section 6.5.9.

Justification for the drilling method used must be provided in writing to the Department for approval prior to well installations.

6.5.17.10.2. Monitoring Wells and Piezometers Construction

The Permittee shall submit to the Department for approval work plans for construction of wells and piezometers that meet the following requirements:

1. If required by the Department, well and piezometer borings targeting the contact between alluvium and bedrock shall be advanced to a minimum depth of five feet below the alluvium-bedrock interface;
2. Samples of sediment, bedrock, soil, and soil vapor shall be collected as appropriate for hydraulic and soil property testing and for analysis to determine the presence of hazardous waste and constituents at depths or intervals approved by the Department;
3. Samples shall at a minimum be obtained from each boring between the ground surface and one foot below the ground surface (0.0-1.0 foot interval), at subsequent five-foot intervals, at any alluvium-bedrock contact, and at the maximum depth of each boring. For sites where drilling depths exceed 50 feet, the Permittee may propose for Department approval alternative sampling intervals in work plans;
4. Field screening and chemical analyses of collected samples shall be conducted in accordance with Permit Section 6.5.13 and in accordance with approved work plans;
5. Groundwater, soil, soil vapor, rock, and sediment samples collected during drilling activities shall be delivered to an analytical laboratory for the required analyses;
6. No borehole shall be left open or cased with temporary casing for longer than five days;
7. The Department may impose specific requirements for well construction, require borings to be extended to the regional aquifer, or require the drilling of additional borings that intersect perched saturated zones or the regional aquifer based on investigation results;
8. The proposed locations, depths and details of drilling, sampling, and well construction shall be described in work plans prepared in accordance with this Permit Section (6.5.17.10.2) and Permit Section 6.2.4.2 or other document approved by the Department prior to well installation;
9. Geophysical measurements shall be collected from the borings in accordance with Permit Section 6.5.10 and as required by the Department;
10. Where appropriate, the borings shall be monitored for the presence of vapor-phase hazardous constituents prior to well construction; and
11. Based on the results of subsurface soil-vapor monitoring, the Department may require that the Permittee construct the wells to accommodate subsurface soil-vapor monitoring in addition to groundwater monitoring and sampling.

6.5.17.10.3. Well and Piezometer Construction Materials

Well and piezometers construction materials shall be selected based on the goals and objectives of the proposed monitoring program and the geologic conditions at the site. When selecting

construction materials, the primary concern shall be selecting materials that will not contribute to or remove hazardous waste or constituents from groundwater samples. Other factors to be considered include the tensile strength, compressive strength, and collapse strength of the materials; the length of time the monitoring well or piezometer will be in service; and the material's resistance to chemical and microbiological corrosion.

6.5.17.10.4. Design and Construction of Screens and Filter Packs

Screens and filter packs shall be designed to allow accurate sampling of the saturated zone that the well is intended to sample, minimize the passage of formation materials (turbidity) into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

The filter pack shall be installed in a manner that prevents bridging and particle-size segregation. Filter packs shall be installed by the tremie pipe method. At least two inches of filter pack material shall be installed between the screen and the borehole wall, and two feet of filter pack material shall extend above the top of the screen. A minimum of six inches and a maximum of two feet of filter pack material shall also be placed under the bottom of the screen to provide a firm footing. The precise volume of filter pack material required shall be calculated and recorded before placement, and the actual volume used shall be determined and recorded during construction. Any significant discrepancy between the calculated and actual volume shall be explained. Prior to installing the filter pack annular seal, a one to two-foot layer of chemically inert fine sand shall be placed over the filter pack to prevent the intrusion of annular sealants into the filter pack. The use of pre-fabricated screens and filter packs shall be approved in advance of well installation by the Department.

6.5.17.10.5. Design and Construction of Annular Seals

The annular space between the casing and the borehole wall shall be properly sealed to prevent cross-contamination. The materials used for annular sealants shall be chemically inert with respect to the highest anticipated concentration of chemical constituents expected in the groundwater. The precise volume of annular sealant required shall be calculated and recorded before placement, and the actual volume shall be determined and recorded during construction. Any significant discrepancy between the calculated volume and the actual volume shall be explained.

During construction, an annular seal shall be placed on top of the filter pack. This seal shall normally consist of a high solids (10 to 30 percent) bentonite material in the form of bentonite pellets, granular bentonite, or bentonite chips. The seal shall be placed in the annulus through a tremie pipe. A tamping device shall be used to ensure that the seal is emplaced at the proper depth. The bentonite seal shall be placed above the filter pack with a minimum of two-foot vertical thickness. The bentonite seal shall be allowed to completely hydrate in conformance with the manufacturer's specifications prior to installing the overlying annular grout seal.

A grout seal shall be installed on top of the filter pack seal. The grout shall be placed into the annular space by the tremie pipe method, from the top of the filter pack annular seal to within a few feet of the ground surface; however, the grout shall be installed at intervals necessary to allow it time to cure and not damage the filter pack or filter pack annular seal during installation of the grout. The tremie pipe shall be equipped with a side discharge port (or bottom discharge for grouting at depths greater than 100 ft) to minimize damage to the filter pack or filter pack

annular seal during grout placement. The grout seal shall be allowed to cure for a minimum of 24 hours before the concrete surface pad is installed. All grouts shall be prepared in accordance with the manufacturer's specifications. High solids (30 percent) bentonite grouts shall have a minimum density of ten pounds per gallon (as measured by a mud balance) to ensure proper setup. Cement grouts shall be mixed using six and one-half to seven gallons of water per 94-pound bag of Type I Portland cement. Bentonite (five to 10 percent) may be added to delay the setting time and reduce the shrinkage of the grout.

6.5.17.10.6. Well and Piezometer Development Methods

All monitoring wells and piezometers shall be developed to create an effective filter pack around the screen, correct damage to the formation caused by drilling, remove residual drilling mud or other drilling additives, if present, and fine particles from the formation near the borehole, and assist in restoring the original water quality of the aquifer in the vicinity of the well or piezometer. Monitoring wells and piezometers shall be developed until the column of water in each well or piezometer is free of visible sediment, and the pH, temperature, turbidity, and specific conductance have stabilized to within 10%.

If a well or piezometer is pumped dry, the water level shall be allowed to sufficiently recover before the next development period is initiated.

Approval shall be obtained from the Department prior to introducing air, water, or other fluids into a well or piezometer for the purpose of development. If water is introduced to a borehole during drilling and completion, then at minimum the same volume of water shall be removed from the well or piezometer during development. In addition, the volume of water withdrawn from or introduced into a well or piezometer during development shall be recorded.

6.5.17.10.7. Surface Completion Methods

Monitoring wells and piezometers may be completed either as flush-mounted wells or piezometers, or as above-ground completions. A surface seal shall be installed over the grout seal and extended vertically up the well annulus to the land surface. The lower end of the surface seal shall extend a minimum of one foot below the frost line to prevent damage from frost heaving. The composition of the surface seal shall be neat cement or concrete. In above-ground completions wherein the well casing rises or sticks up above ground level, a three-foot square by four-inch thick concrete surface pad shall be installed around the well immediately after the protective casing is installed. The surface pad shall be sloped so that drainage will be off the pad and away from the protective casing. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.

Protective casing with a locking cover shall be installed around the well or piezometer casing (stickup or riser) to prevent damage or unauthorized entry. The protective casing shall be anchored in the concrete surface pad below the frost line and extend at least several inches above the casing stickup. A weep hole shall be drilled into the protective casing just above the top of the concrete surface pad to prevent water from accumulating and freezing inside the protective casing. A cap shall be placed on the well riser to prevent the entry of foreign materials into the well or piezometer, and a lock shall be installed on the cover of the protective casing to provide security against tampering. If a well or piezometer is located in an area that receives vehicular

traffic, a minimum of three bumper guards consisting of steel pipes three to four inches in diameter and a minimum of five-feet in length shall be installed next to the concrete surface pad. The bumper guards shall be installed to a minimum depth of two feet below the ground surface in a concrete footing and extend a minimum of three feet above ground surface. The pipes that form the bumper guards shall be filled with concrete to provide additional strength, and shall be painted a bright color to make them readily visible.

If flush-mounted completions are required (e.g., in active roadway areas), a protective structure such as a traffic-rated utility vault or meter box shall be installed around the casing. In addition, measures should be taken to prevent the accumulation of surface water in the protective structure and around the well or piezometer intake. These measures shall include outfitting the protective structure with a steel lid or manhole cover that has a rubber seal or gasket, and ensuring that the bond between the cement surface seal and the protective structure is watertight. A lock shall be installed on the lid or cover of the protective structure to prevent unauthorized access to the well or piezometer.

6.5.17.10.8. Well and Piezometer Completion Reports

For each monitoring well or piezometer completed under this Permit, the Permittee shall submit to the Department a completion summary report within 30 days of completing installation which shall include a construction log and diagram, a boring log, and a development log. The construction log and diagram and the boring log shall contain at a minimum the information required under Permit Section 6.5.17.10.10.Well or piezometer development must be completed within 30 days of installation.

6.5.17.10.9. Well or Piezometer Abandonment

Wells and piezometers shall be abandoned when they are no longer required to address corrective action requirements or when they are damaged beyond repair; however, no well or piezometer shall be abandoned without prior approval by the Department. Well abandonment must comply with current State Engineer well abandonment guidance (19.27.4.30 and 31 NMAC)

For wells and piezometers with small diameter casing (i.e., two-inch or less), abandonment shall be accomplished by over drilling with a large diameter hollow-stem auger. After the well or piezometer has been over drilled, the casing and grout shall be removed from the ground with a drill rig, and the remaining filter pack shall be drilled out. The open borehole shall then be pressure-grouted via the tremie pipe method from the bottom of the borehole to the ground surface. After the grout has cured, the top two feet of the borehole shall be filled with concrete to insure a secure surface seal.

For larger-diameter wells (i.e. greater than 2-inch), the Permittee may attempt to remove the well casing or grout the well in place. To abandon a well or piezometer in place, a tremie pipe shall be placed at the lowest point in the well or piezometer (i.e., at the bottom of the screen or in the sump). The entire well or piezometer shall then be pressure grouted from the bottom upward to force grout out through the screen into the filter pack and up the inside of the casing, sealing off all breaks and holes in the casing. Once the well or piezometer is grouted, the casing shall be cut off even with the ground surface and covered with concrete.

6.5.17.10.10. Well and Piezometer Construction Diagrams, Logs, and Boring Logs

Information on the design, construction, and development of each monitoring well or piezometer shall be recorded. Construction and boring logs and diagrams shall include the following information:

1. Well, boring or piezometer name/number;
2. Date/time of construction;
3. Borehole diameter and casing diameter;
4. Surveyed location coordinates;
5. Total depth, expressed both as depth below ground surface and elevation above sea level;
6. Name of drilling contractor;
7. Casing length;
8. Casing materials;
9. Casing and screen joint type;
10. Screened intervals, expressed both as depth(s) below ground surface and elevation(s) above sea level;
11. Screen materials;
12. Screen slot size and design;
13. Filter-pack material and size;
14. Filter-pack volume (calculated and actual);
15. Filter-pack placement method;
16. Filter-pack interval(s), expressed both as depth(s) below ground surface and elevation(s) above sea level;
17. Annular sealant composition;
18. Annular sealant placement method;
19. Annular sealant volume (calculated and actual);
20. Annular sealant interval, expressed both as depth below ground surface and elevation above sea level;
21. Surface sealant composition;
22. Surface seal placement method;
23. Surface sealant volume (calculated and actual);
24. Surface sealant interval, expressed both as depth below ground surface and elevation above sea level;
25. Surface seal and well apron design and construction;
26. Development procedure and turbidity measurements;
27. Well development purge volume(s) and stabilization parameter measurements;
28. Type, design, and construction of protective casing;
29. Type of cap and lock;

30. Ground surface elevation above sea level;
31. Survey reference point elevation above sea level on well casing;
32. Top of casing elevation above sea level;
33. Top of protective steel casing elevation above sea level;
34. Drilling method(s); and
35. Types, quantities, and dates/times that additives were introduced, if any.

6.5.18. Laboratory Analyses Requirements for all Environmental Media

The Permittee shall submit all samples for laboratory analysis to laboratories within the EPA Contract Laboratory Program. The laboratories shall use the most recent EPA and industry-accepted extraction and analytical methods as the testing methods for each medium sampled.

The Permittee shall submit a list of analytes and analytical methods to the Department for review and written approval as part of each site-specific investigation, corrective action, or monitoring work plan. The analyte detection limit for each analytical method shall be less than applicable background or regulatory cleanup level as applicable. Analyses conducted with detection limits that are greater than applicable background or regulatory cleanup levels as applicable shall be considered data quality exceptions, and the reasons for use of the elevated detection limits shall be reported to the Department; results based on these data quality exceptions may not be accepted by the Department. All analytical data (including non-detects, estimated values, and detects) shall be included in the electronic copy of the Investigation Report or other report in Microsoft™ Excel format with any qualifiers as attached from the analytical laboratory. The Permittee shall not censor data based on detection limits, quantitation limits, or measurement uncertainty. The Permittee shall also report whether any dilution of the sample was needed prior to laboratory analysis, and the amount of dilution, if any. The Department will not accept J-coded (estimated) results for samples requiring dilution prior to laboratory analysis.

6.5.18.1. Laboratory QA/QC Requirements

The following requirements for laboratory QA/QC procedures shall be considered the minimum QA/QC standards for the laboratories employed by the Permittee. The Permittee shall provide to the Department the names of the contract analytical laboratories within 45 days of awarding a contract for analytical services to any contract laboratory. The Permittee shall maintain copies of laboratory QA/QC manuals in the Operating Record and they shall be subject to inspection by the Department.

6.5.18.1.1. Quality Assurance

The Permittee shall ensure that contract analytical laboratories maintain internal quality assurance programs in accordance with EPA and industry-accepted practices and procedures. At a minimum, the laboratories shall use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), and other laboratory control samples to assess data quality. The laboratories shall establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories shall establish internal QA/QC procedures that meet EPA's laboratory certification requirements. Specific procedures to be completed are identified in the following sections. If a laboratory is

unable or unwilling to meet the requirements of this Permit, the Permittee shall select a different laboratory that can and will meet the requirements.

6.5.18.1.2. Equipment Calibration Procedures and Frequency

The laboratories' equipment calibration procedures, calibration frequency, and calibration standards shall be in accordance with the EPA test method requirements and documented in quality assurance and standard operating procedures manuals. All instruments and equipment used by laboratories shall be operated, calibrated, and maintained according to manufacturers' guidelines and recommendations. Operation, calibration, and maintenance shall be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance shall be kept on file at the laboratories.

6.5.18.1.3. Laboratory QC Samples

Analytical procedures shall be evaluated for quality by analyzing reagent blanks or method blanks, surrogates, MS/MSDs, and laboratory duplicates, as appropriate for each method. Laboratory QC samples and frequency of analysis are documented in EPA test methods. At a minimum, laboratories shall analyze laboratory blanks, MS/MSDs, and laboratory duplicates at a frequency of at least one in 20 for all batch runs requiring EPA test methods and at a frequency of at least one in 10 for non-EPA test methods. All laboratory quality control data reported with the Facility's sample analysis results must be related to the analysis of the Facility's samples.

6.5.18.2. Laboratory Deliverables

Laboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols. The following shall be provided in the analytical laboratory reports submitted to the Permittee either electronically or in hard (paper) copy:

1. Transmittal letter, including information about the receipt of samples, the testing methods performed, any deviations from the required procedures, any problems encountered in the analysis of samples, any data quality exceptions and qualifiers, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report;
2. Holding times and requirements;
3. Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; soil, rock, or sediment sample results in consistent units (such as mg/kg in dry-weight basis); water sample results in consistent units (such as milligrams/liter); soil-vapor sample results in consistent units (such as ug/m^3); and detection limits; results shall be reported for all samples, including field duplicates, blanks, and other QC samples;
4. Method blank results, including detection limits;
5. Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only);
6. MS/MSD concentrations, percent recoveries, relative percent differences (RPDs), and corresponding control limits;
7. Laboratory duplicate results, including RPDs and corresponding control limits;

8. Sample chain-of-custody documentation;
9. Instrument calibration; and
10. Discussion of completeness.

The following data deliverables for organic compounds shall also be required from the laboratory:

1. A cover letter referencing the analytical procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Data qualification in conformance with EPA protocol, and definition of data descriptor codes;
3. Reconstructed ion chromatograms for gas chromatograph/mass spectrometry (GC/MS) analyses for each sample and standard calibration;
4. Selected ion chromatograms and mass spectra of detected target analytes (GC/MS) for each sample and calibration with associated library/reference spectra;
5. Gas chromatograph/electron-capture device (GC/ECD) and/or gas chromatograph/flame ionization detector (GC/FID) chromatograms for each sample and standard calibration;
6. Raw data quantification reports for each sample and calibrations, including areas and retention times for analytes, surrogates, and internal standards;
7. A calibration data summary reporting calibration range used and a measure of linearity (include decafluorotriphenylphosphine and p-bromofluorobenzene spectra and compliance with tuning criteria for GC/MS);
8. Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitation limit for each analyte;
9. Analyte concentrations with reporting units identified, including data qualification in conformance with the CLP Statement of Work, including definition of data descriptor codes; and
10. Report of tentatively identified compounds with comparison of mass spectra to library/reference spectra.

The following data deliverables for inorganic compounds shall also be required from the laboratory.

1. A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported;
2. Results of all method QA/QC checks, including inductively coupled plasma (ICP) Interference Check Sample and ICP serial dilution results;
3. Raw data quantification report for each sample;
4. A calibration data summary reporting calibration range used and a measure of linearity, where appropriate; and
5. Final digestate volumes (and dilutions required), sample size, and wet-to-dry weight ratios.

The Permittee shall present summary tables of these data and Level II QC results to the Department in reports or other documents prepared in accordance with Permit Section 6.2.4. Raw analytical data, including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data for samples from this project, shall be compiled and kept on file at the Facility for reference. The Permittee shall make all data available to the Department upon request.

6.5.18.3. Review of Field and Laboratory QC Data for all Media

6.5.18.3.1. General QC Review Process

The Permittee shall require the laboratory to notify the Permittee of data quality exceptions within three working days of discovery in order to allow for sample re-analysis, if possible. The Permittee shall contact the Department within three working days of receipt of the laboratory notification of data quality exceptions to discuss the implications to the sampling data, and to determine whether the data will still be considered acceptable or if sample re-analysis or resampling is necessary. The Permittee shall summarize the results of this discussion with Department personnel in a letter. The Permittee shall submit the letter to the Department by fax or electronic mail within five working days of the conclusion of the data quality discussion and shall mail the original signed copy of the letter to the Department within 10 days of the conclusion of the data quality discussion.

The Permittee shall evaluate all sample data, and all field and laboratory QC results for acceptability. Each group of samples shall be evaluated using data validation guidelines contained in EPA guidance documents, the latest version of SW-846, and industry-accepted methods and procedures. Additionally, the Permittee shall evaluate all data for compliance with the following parameters:

1. Representativeness -- the Permittee shall implement procedures to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. The Permittee shall note any procedures or variations that may affect the collection or analysis of representative samples and shall qualify the data accordingly;
2. Comparability -- to assure comparability of data, the Permittee shall implement standard collection and analytical procedures, and shall report analytical results in appropriate units for comparison with other data (e.g., past studies, comparable sites, screening levels, and cleanup standards). Any procedure or variation that may affect comparability shall be noted, and the data shall be qualified appropriately;
3. Completeness -- the Permittee shall evaluate all laboratory data for completeness with respect to data quality objectives. The degree of completeness shall be reported with the data in any reports in which the data are referenced;
4. Accuracy -- the Permittee shall evaluate all data for accuracy with respect to percent recovered of spiked samples. Results shall be reported for each analyte in any report in which the data are cited; and
5. Precision -- the Permittee shall evaluate all data for precision with respect to RPDs of duplicate samples. Results shall be reported for each analyte in any report in which the data are cited.

6.5.18.3.2. Review of Laboratory Reporting, Documentation, Data Reduction, and Corrective Action Process

Upon receipt of each laboratory data package, the Permittee shall evaluate the data against the criteria outlined in this Permit. Any deviation from the established criteria shall be noted and the data will be qualified appropriately. A full review and discussion of QC data and all data qualifiers shall be submitted with Investigation Reports or other reports prepared in accordance with Permit Section 6.2.4. Data validation procedures for all samples shall include review of the following, as appropriate:

1. Holding times;
2. Detection limits;
3. Field equipment rinsate blanks;
4. Field blanks;
5. Field duplicates;
6. Trip blanks;
7. Reagent blanks;
8. Laboratory duplicates;
9. Laboratory blanks;
10. Laboratory matrix spikes;
11. Laboratory matrix spike duplicates;
12. Surrogate recoveries; and
13. Representativeness, comparability, completeness, accuracy, and precision as required in Permit Section 6.5.18.3.1 above.

If quality control problems are encountered, appropriate corrective action shall be implemented. All corrective action shall be defensible and the corrected data shall be qualified as appropriate or rejected.

6.5.18.3.2.1. Blanks

The analytical results of field blanks and equipment blanks shall be reviewed to evaluate ambient site conditions and the adequacy of equipment decontamination, respectively. The analytical results of trip blanks shall be reviewed to evaluate the possibility for contamination of samples resulting from improperly cleaned sample containers or transport containers. The analytical results of laboratory blanks shall be reviewed to evaluate the possibility of contamination of a sample caused by analytical procedures. If reagent blanks are required, the analytical results of reagent blanks shall be reviewed to evaluate whether the reagents were contaminated prior to use. If contaminants are detected in any blanks, the sample data shall be qualified, as appropriate.

6.5.18.3.2.2. Field and Laboratory Duplicates

RPDs for field and laboratory duplicates shall be calculated and reported.

6.5.18.3.2.3. Laboratory Spikes

Percent recovered for laboratory spikes shall be calculated and reported.

6.5.18.3.2.4. Holding Times

The Permittee shall review the sampling, extraction, and analysis dates to confirm that extraction and analyses were completed within the recommended holding times, as specified by EPA protocol. Appropriate data qualifiers shall be noted if holding times were exceeded.

REFERENCES

New Mexico Environment Department (NMED), 2000. Guidance for Assessing Ecological Risks Posed by Chemicals: Screening-Level Ecological Risk Assessment, as updated, New Mexico Environment Department, Santa Fe, New Mexico, March 2000.

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev. V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2005. Guidance for Developing Ecological Screening Levels, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., OSWER Directive 9825.7-55, Revised February 2005.

U.S. Environmental Protection Agency (EPA), 2009. Regional Screening Levels for Chemical Contaminants at Superfund Sites, December, 2009.

U.S. Environmental Protection Agency (EPA), 1996. Soil Screening Guidance: User's Guide, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA-9355.4-23, July 1996.

PERMIT ATTACHMENT A: GENERAL FACILITY INFORMATION

1.0 INTRODUCTION

This Permit Attachment (A) presents a general description of Kirtland Air Force Base (KAFB-the Facility) and KAFB's Explosive Ordnance Disposal (EOD) Range. It also presents general information on wastes treated at the Open Detonation (OD) Unit.

1.1. GENERAL DESCRIPTION OF THE FACILITY AND THE EOD RANGE

KAFB, which is owned and operated by the U.S. Department of Defense (the Permittee), is located in Bernalillo County, adjacent to Albuquerque in north-central New Mexico. An estimated 24,000 people are employed at the Facility and at the U.S. Department of Energy and with other tenants located within the Facility. The Facility comprises an area of approximately 52,233 acres (about 82 square miles). The location of KAFB is shown on Figure 1-1 (Permit Part 1). The central mission of KAFB is the administration of defense programs for the U.S. Department of Defense.

The OD Unit is located on the EOD Range in the south-central portion of KAFB. The EOD Range is southeast of the former Manzano Base, east of Demolition Range Road, and approximately two miles north of the southern perimeter of KAFB (Figure 1-1, Permit Part 1). The OD Unit is circular in shape with a diameter of 1,500 feet Figure 2-1, Permit Part 2). Typical excavations (craters, pits) where treatment takes place are rectangular and are about 30 feet long, 15 feet wide and about 12 feet deep. The EOD Range occupies generally flat, gently west-sloping land located between the Rio Grande Valley to the west and the base of the Manzano Mountains to the east. The nearest major surface water body is the Rio Grande, located about 10 miles west of the EOD Range.

1.2. PURPOSE OF THE OD TREATMENT UNIT

The Permittee treats hazardous wastes by open detonation at the OD Unit located at the EOD Range, which is located in a remote, sparsely populated area within the KAFB Facility boundary. The wastes treated at the OD Unit are assigned U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers D001 (ignitability) and/or D003 (reactivity). The wastes may also carry EPA Hazard Waste Numbers D002 (corrosivity), D005, D007, D008, and D009 (toxicity characteristic metals), D018 (benzene), D030 (2,4-dinitrotoluene), D034 (hexachloroethane), and D040 (trichloroethylene) and various underlying hazardous constituents. Wastes may be stabilized with safing fluids (i.e., a substance, such as hydraulic fluid or diesel fuel, with a specific gravity between a liquid and a solid used to desensitize explosives, making them safer to handle).

Treatment is performed by detonating explosives to countercharge hazardous wastes to remove their characteristics of reactivity and/or ignitability. The frequency of operations at the OD Unit varies, as treatment events are conducted on an as-needed basis.

All hazardous waste treated by the OD Unit has the potential to detonate or is a propellant. In accordance with 40 C.F.R. § 261.23(a)(6), the high explosive (HE) waste streams are capable of detonation if subjected to a strong initiating source or if heated under confinement. The remaining waste streams have the potential to detonate because they are explosives as defined in

49 C.F.R. §173.53, pursuant to 40 C.F.R. §261.23(a)(8). As stated in Chapter 7, Section 7.3, of SW-846 (EPA, 1986), as amended, the definition of reactivity "is intended to identify wastes that, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process."

HE, when accidentally exposed to even a small initiating source such as friction, a pinch point, electrical discharge, heat, or impact, can potentially detonate. HEs typically managed at the OD Unit have detonation velocities averaging four to six miles per second and pressures as high as 300,000 times atmospheric pressure for short periods. Fickett and Davis (1979) explain that a good solid explosive converts energy at a rate of 10^{10} watts per square centimeter at its detonation front.

1.3. ROUTES OF TRAVEL

A system of interior roads, shown on Figure 1-1 (Permit Part 1), is maintained at KAFB. About 78 total miles of roadway exist, of which about 33 miles are paved.

Traffic access to and egress from the OD Unit is along the roads shown on Figure 1-1 (Permit Part 1). The roads along which wastes are transported to the EOD Range within KAFB include Southgate Avenue, Hardin Boulevard, Pennsylvania Street, Wyoming Boulevard, Lovelace Road, and Demolition Range Road.

1.4. SECURITY

1.4.1. Introduction

The following paragraphs describe the site-wide and OD Unit-specific security provisions at the KAFB Facility that shall be implemented to prevent unknowing or unauthorized entry of persons or livestock onto the OD Unit. Additional requirements are found in Permit Section 2.1.

1.4.2. Barriers and Means to Control Entry

The OD Unit, situated within the EOD Range is located within KAFB, which has 24-hour security surveillance and controls entry at all times to the Facility through entrance gates. Access to the KAFB Facility is provided through five controlled entrance gates. Access control procedures are designed to ensure that only properly identified and authorized persons, vehicles, and property are allowed entrance to and exit from KAFB. Surveillance is provided by KAFB Security Police, who continuously monitor and control entry inside the KAFB perimeter. The major duties of the KAFB security personnel are to control vehicle, personnel, and material access/egress. KAFB is enclosed by a 7.5-foot chain-link fence and by barbed wire fence. During non-working hours, security personnel routinely patrol the KAFB perimeter fence.

A fence is also located along the perimeter of the EOD Range. A gate is located at the entrance road to the EOD Range and OD Unit. The locations of the security fence and the access gate for the EOD Range and OD Unit are shown on Figure 2-1, in Permit Part 2.

Only personnel with appropriate clearance and escorted visitors are allowed access to the EOD Range. Vehicles and personnel entering the EOD Range are subject to search by security personnel. The EOD Range and OD Unit are surrounded by a three-strand barbed-wire fence, which limits any traffic through or other access to these areas.

REFERENCES

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

W. Fickett and W. Davis, 1979. Detonation: University of California Press, Berkeley, CA.

PERMIT ATTACHMENT B: LIST OF AUTHORIZED HAZARDOUS WASTES

1.0 INTRODUCTION

Table B-1 lists the hazardous wastes that the Permittee is authorized to treat at the Open Detonation (OD) Unit. Wastes carrying Environmental Protection Agency (EPA) Hazardous Waste Numbers D002, D005, D007 through D009, D018, D030, D034, and D040 shall not be treated at the OD Unit unless, at the point of generation, the wastes are also reactive and/or ignitable. Wastes that are not reactive and/or ignitable shall not be mixed with reactive or ignitable wastes for the purpose of generating a hazardous waste that is authorized for treatment at the OD Unit. Hazardous wastes that are not authorized by this Permit for treatment shall not be accepted by the Facility for treatment and shall be returned to the generator. The Permittee shall also comply with Permit Section 2.7.

TABLE B-1
List of Hazardous Wastes Authorized to be Treated at the OD Unit

Common and/or Chemical Name – Symbol	EPA Hazardous Waste Number(s)
ALSC, HNS	D001, D003
ALSC (RDX)	D001, D003
Amatol (AN, TNT)	D001, D003
Ammonium Nitrate (AN)	D003
Ammonium Perchlorate (AP)	D003
Ammonium Picrate	D001, D003
ANFO	D001, D003
APEX 1220	D001, D003
APEX 1320	D001, D003
ARTEC (HMX-water)	D001, D003
ATX-M	D001, D003
ATX 25RM Slurry	D001, D003
AWH Shape Charge	D001, D003
Baratol (HE)	D001, D003, D005
Barium Nitrate	D001, D003, D005
Barium Peroxide	D001, D003, D005
Barium Potassium Nitrate	D001, D003, D005
Barium Soluble Compounds	D001, D003, D005
BCTK Explosives	D001, D003
Benzene	D001, D018
BKN03 Propellant	D001, D003
Black Powder (Low Explosive)	D001, D003
Blasting Agent	D001, D003
Chromium	D007
CLSC (Copper Linear Shaped Charge)	D001, D003
Composition A (HE)	D001, D003
Composition B (HE)	D001, D003
Composition B/Baratol Mixture (HE)	D001, D003, D005
Composition C4 Class 3 (HE)	D001, D003
Cordite (Double-base gum)	D001, D003
CP (2-[5-cyanotetrazolato] pentamine cobalt (III) perchlorate)	D001, D003
Cyclonite (HE, RDX)	D001, D003
Cyclotol (RDX, TNT)	D001, D003
C-1 Detasheet	D001, D003
C-3	D001, D003
C-4	D001, D003
C-6 Discs	D001, D003
DACP Powder	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Detaflex	D003
Detasheet A	D001, D003
Detasheet A4	D001, D003
Detasheet A5	D001, D003
Detasheet C	D001, D003
Detasheet C1	D001, D003
Detasheet C2	D001, D003
Detasheet C3	D001, D003
Detasheet C4	D001, D003
Detasheet C5	D001, D003
Detasheet C6	D001, D003
Detasheet D	D001, D003
Detasheet L	D001, D003
DetCord (PETN)	D001, D003
Detonators	D001, D003, D008
Detonators EBW	D001, D003
Detonators HBW, Ensign Bickford	D001, D003
Dinitrotoluene (DNT)	D001, D003, D030
Dipicrylamide	D001, D003
DBX	D003
Diazodinitrophenol (DDNP)	D003
Double Base Smokeless Powder	D001, D003
DNP	D001, D003
DNPT	D003
Dynamite	D003
Ednatol	D003
EL-506A (HE, PETN)	D001, D003
EL-506D (HE, PETN)	D001, D003
Extex 3003	D001, D003
Extex 8003	D001, D003
Explosive D	D001, D003
Explosive Piston Motors	D003
Flex Linear Shaped Charge	D001, D003, D008
Gas Pressure Generator	D001, D003
Heat Powder	D001, D003
Hexachlorethane (HC Smoke)	D034
Hexanitroazobenzene	D001, D003
HMX (octogen) High Melting Explosive	D001, D003
HNAB	D001, D003
Hexanitrostilbene (HNS)	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
HNS I	D001, D003
HNS II	D001, D003
HNS Titanium Powder	D001, D003
Holex 2506	D001, D003
Improved Military Rifle (IMR) propellant 4350	D001
IMR 4064	D001
Iremite 60	D001, D003
Iremite 80	D001, D003
Iragel	D001, D003
Ireco Booster 2-C, 3-C, 4-C	D001, D003
Iron Perchlorate	D003
Iron Potassium Perchlorate	D003
JPN Propellant	D001, D003
Kinestik Part A, B	D001, D003
Lead Azide (HE)	D001, D003, D008
Lead Case Flexible Linear Shaped Charge	D001, D003, D008
Lead Mononitraresorcinate (LMNR)	D001, D003, D008
Lead Sulfocyanate	D001, D003, D008
Lead Styphnate (HE)	D001, D003, D008
LX-04	D001, D003
LX-10	D001, D003
LX-13	D001, D003
LX-14	D001, D003
LX-15	D001, D003
LX-16	D001, D003
LX-17	D001, D003
M-6 Propellant	D001, D003
M-77 Water Gel Explosives	D001, D003, D005
MDF (RDX, HNS)	D001, D003
Mercury Fulminate (HE)	D001, D003, D009
Minol	D001, D003
N-5 Sheet Propellant	D001, D003
Nitrocellulose	D001, D003
Nitroglycerin	D001, D003
Nitroguanidine	D001, D003
Nitromethane	D001, D003
NQ	D001, D003
Octol LGE Cast	D001, D003
PBX 9010	D001, D003
PBX 9205	D001, D003
TABLE B-1	

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
PBX 9404	D001, D003
PBX 9407	D001, D003
PBX 9504	D001, D003
PBXN-5	D001, D003
PBXN-6	D001, D003
PBXN-301	D001, D003
Pentaerythritol Tetranitrate (PETN) (HE)	D001, D003
PETN/Titanium Mix	D001, D003
PETN Zirconium	D001, D003
PETRIN	D001, D003
Pentolite (PETN/TNT) (HE)	D001, D003
Photo Flash Powder (simulators)	D001, D003
Picric Acid	D001, D002, D003
Picritol	D001, D003
Plain Wave Generator (PBX 9404)	D001, D003
Plasticized White Phosphorous	D001
Plasticizer	D001, D003
Polysulfide Prepolymer	D001, D003
Potassium Chlorate	D003
Potassium Nitrate	D003
Potassium Perchlorate (initiator)	D001, D003
Primacord (PETN)	D001, D003
Propellant HPC-95, HPC-60	D001, D003
Propellant M-30, M1, M6	D001, D003
Propellant MC-1951	D001, D003
Propellant (TPH1207C)	D001, D003
RDX	D001, D003
RDX #5	D001, D003
Red Phosphorous	D001
RL-5-X Detcord	D001, D003
Rocket Motor Double Base Propellant	D001, D003
RP-2	D001
RP-87	D001
Separation Explosives (RDX)	D001, D003
Semtex	D001, D003
Smokeless Powder	D003
Sodium Azide	D001, D003
Sodium Nitrate	D003
Strontium Nitrate	D003
Strontium Peroxide	D003

TABLE B-1

(continued)	
Common and/or Chemical Name - Symbol	**EPA Hazardous Waste Number(s)**
Tetryl (HE)	D001, D003
Tetrytol	D001, D003
TH-1	D001, D003
TH-3	D001, D003
Thermite Powder	D003
TH/KP	D001, D003
Titanium Tetrachloride	D003
TPH 3442 (propellant)	D003
Titanium Boron Powder	D001
Titanium Hydride	D001
Titanium Subhydride	D001
TLX	D001, D003
Trinitrotoluene (TNT)	D001, D003
Tritonal	D001, D003
TATB Pellets, Pad	D001, D003
Toluene (nitrated forms)	D001, D003
Torpex	D003
Tovex	D003
TPH 3386 (propellant)	D003
Triaminotrinitrobenzene (TATB)	D001, D003, D018
Trichloroethylene	D040
WAK 2, TP-H12	D001, D003
XTX 8003	D001, D003
Aluminum	D001, D003
Iron	D001
Lead	D008
Lead Alloy	D008

DEFINITIONS

ALSC aluminum linear shaped charge
AN ammonium nitrate
Anfo ammonium nitrate-fuel oil
AP ammonium perchlorate
CLSC copper linear shaped charge
DDNP Diazodinitrophenol
DNT Dinitrotoluene
HC hexachlorathane
HE high explosive
HMX cyclotetramethylene-tetranitramine; octohydro-1,3,5,7-tetranitro 1,3,5,7-tetrazocine
HNS hexanitrostilbene
IMR improved military rifle
LMNR lead mononitraresorcinate
PBX plastic-bonded explosive; RDX and plasticizer
PETN nitropentaerythrite; pentaerythrite tetranitrate; pentaerythritol
RDX cyclotrimethylenetrinitramine
TATB triaminotrinitrobenzene
TNT trinitrotoluene

PERMIT ATTACHMENT C: WASTE ANALYSIS PLAN

1.0 INTRODUCTION

This Waste Analysis Plan (WAP) describes the procedures that shall be used at the Facility to characterize waste to be treated at the Open Detonation (OD) Unit.

1.1. HAZARDOUS WASTES TREATED AT THE OD UNIT

Hazardous wastes treated at the OD Unit are classified as a non-wastewater waste under the Land Disposal Restrictions (LDR) regulations at 40 C.F.R. Part 268. Knowledge of the chemical and physical properties of hazardous wastes to be treated at the OD Unit is essential for proper waste management. The hazardous wastes treated at the OD Unit exhibit the characteristic of reactivity (D003). Some of these wastes also exhibit the characteristics of ignitability (D001). These wastes may also potentially contain the following toxicity characteristic metals and organic compounds, identified by specific U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers: barium (D005), chromium (D007), lead (D008), mercury (D009), benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040). They may also contain underlying hazardous constituents (UHCs) such as chromium, lead, nickel, vanadium, and zinc. The characteristics of hazardous wastes treated at the OD Unit shall be identified using Acceptable Knowledge (AK) or sampling and analysis, as appropriate, and shall be documented in writing. Incompatible wastes shall not be accepted for treatment at the OD Unit. It may be necessary to saturate the wastes with a safing fluid (e.g., water, acetone, alcohol, hydraulic fluid) before treatment.

Categories of hazardous waste that may be accepted for treatment include, for example, explosives, propellants, and pyrotechnics in the form of pure substances and explosives-contaminated wastes. Waste that may be treated at the OD Unit shall include only the waste types authorized in Permit Attachment B. Corrosive (D002) wastes (e.g., picric acid) that are also reactive may be treated at the OD Unit. The hazardous wastes to be treated at the OD Unit are mostly in solid form, however, on occasion, wastes in liquid form (e.g., picric acid) may be treated.

Barium (D005), chromium (D007), lead (D008), and mercury (D009) are toxicity characteristic metals that may be in the wastes or in the casings surrounding the wastes to be treated. The toxicity characteristic organic compounds benzene (D018), 2,4-dinitrotoluene (D030), hexachloroethane (D034), and trichloroethylene (D040) may also be present.

1.2. WASTE ANALYSIS PARAMETERS

Explosive Ordnance Disposal (EOD) personnel shall review characterization information to ensure that hazardous wastes are properly characterized for their physical and chemical properties and can be managed safely and in accordance with the requirements of this Permit. AK shall only be used in lieu of sampling and analysis when the composition and physical characteristics of the waste are exactly known and well controlled.

Waste characterization information must include all necessary information on the presence of toxicity characteristic metals and organic compounds, as defined in 40 C.F.R. Part 261, Subpart C, and data on the presence of any UHCs listed in 40 C.F.R. § 268.48 in accordance with 40 C.F.R. § 268.9(a).

1.3. WASTE CHARACTERIZATION PROCEDURES

The approach to characterization shall be based on the chemical and physical nature of the waste. Characterization procedures used at the Facility require all generators to provide AK, related technical information, and/or sampling and analysis results (including information on UHCs) as appropriate. Accurate characterization is necessary for appropriate waste classification and assignment of EPA Hazardous Waste Numbers, in the preparation of LDR documentation, and ensuring proper management of waste.

1.3.1. Characterization Strategy

The characterization strategy for hazardous wastes to be treated at the OD Unit is described below.

1.3.1.1. Wastes to be Treated

Prior to accepting waste for treatment at the OD Unit, a detailed chemical and physical description of the waste shall be provided by the generator.

Ensuring that detailed and accurate waste characterization exists shall include the steps outlined below in Permit Sections 1.3.1.2 through 1.3.1.4. Hazardous waste destined for treatment shall be packaged in containers; both the waste and the containers shall be inspected before acceptance for treatment and again before loading the waste into the treatment unit.

1.3.1.2. Verification

All waste shipments to the OD Unit shall be verified in two phases prior to treatment to ensure that the waste is authorized for treatment in accordance with Permit Attachment B. Phase 1 will be conducted to ensure shipping documentation completeness, and Phase 2 is to ensure that the waste delivered corresponds to the documentation provided for that waste. Waste shall not be accepted for treatment until all verification is complete.

1.3.1.3. Phase 1 Verification

Screening is performed by the appointed EOD Team Chief. Documentation may include, but is not limited to, a completed Ammunition Disposition Request (ADR), a hazardous waste manifest, a material safety data sheet, a description of the process generating the waste, and sampling and analysis data.

Upon receipt of a waste shipment at the OD Unit, a determination of shipping documentation (hazardous waste manifest) completeness shall be made by EOD personnel. Each shipping document that accompanies an off-site waste shipment shall be checked to ensure that the following information is present and complete:

- The shipment identification number.

- The proper U.S. Department of Transportation basic description.
- The quantity (weight) of waste in the shipment.
- The number and type of containers in the shipment.
- A signed and dated certification of the shipment's content.
- The shipment labels and placards which match the shipping document.

If documentation is incomplete or inadequate, EOD personnel shall contact the generator for clarification and require that the generator correct the situation. Only waste that meets the requirements of this Permit shall be transported to the OD Unit for treatment.

Containers will be visually examined for defects such as dents, cracks, and corrosion. Conditionally exempt small quantity generators do not need a hazardous waste manifest. If there are discrepancies, they shall be resolved by contacting the generator before EOD personnel sign the shipping document. If the discrepancies cannot be resolved, EOD personnel shall reject the shipment. Rejected waste shall be returned to the generator.

1.3.1.4. Phase 2 Verification

The EOD Team Chief, with assistance from other EOD personnel, shall compare the contents of waste shipments received with the description on the documentation provided by the generator to ensure that they match. The visual inspection shall include content identification and quantity estimation. If any waste fails verification, it shall be returned to the generator to resolve the discrepancy.

1.3.2. Sampling and Analysis of Waste

Sampling and analysis of waste for purposes of characterization shall be conducted in accordance with the procedures outlined in Sections 1.3.2.1 through 1.3.2.4 of this Permit Attachment (C) and Permit Section 2.6.3.

1.3.2.1. Sampling Equipment

Each sample of waste requiring sampling and analysis shall be collected using appropriate sampling equipment, as recommended in SW-846 (EPA, 1986) or other Department-approved sampling guidance.

1.3.2.2. Equipment Decontamination

Disposable, clean equipment shall be used to eliminate the potential for cross contamination during sampling. Therefore, maintaining and decontaminating sampling equipment will not be necessary.

1.3.2.3. Sample Preservation and Storage

Waste samples shall be collected in clean containers and preserved, as appropriate, to ensure that their integrity remains intact prior to, during, and after transport to the analytical laboratory. Container types, preservation techniques, and holding times for expected analytes of interest are presented in Table C-1.

1.3.2.4. Quality Assurance/Quality Control

The Permittee shall implement a quality assurance (QA) process designed to obtain high quality data. Quality control (QC) procedures shall be employed to measure the degree to which this QA objective is fulfilled. At a minimum, the QA process shall meet the requirements of Permit Sections 6.5.17.6, 6.5.18.1, and 6.5.18.3.

QC samples shall be collected as part of sampling activities. Duplicates shall be collected and analyzed for all constituents of concern. A chain-of-custody form shall be completed and shall include the type of sample collected; the names and signatures of the sampler(s); sample identification numbers, date, and time of collection; the designation as a grab or composite sample; the names, dates, times, and signatures of any persons involved in transferring samples; and the shipping number. Personnel shall be properly trained in the use of sampling equipment, sample containers, and sampling methods to ensure that sampling activities are conducted appropriately.

1.4. ANALYTICAL LABORATORY AND TESTING/ANALYTICAL METHODS SELECTION

An EPA-certified analytical laboratory shall be selected to perform laboratory analysis of waste. The laboratory shall be required to have a comprehensive QA/QC program, technical analytical expertise, and an effective information management system.

The selection of analytical testing methods for waste is based on the following.

- The physical state of the waste.
- The analytes of interest.
- The required detection limits (i.e., regulatory thresholds).
- Information requirements (e.g., to ensure compliance with LDR treatment standards).

1.5. WASTE RE-EVALUATION FREQUENCIES

A re-evaluation of waste characterization data shall be conducted as necessary but at least annually to ensure that data are accurate, in accordance with 40 C.F.R. § 264.13(a)(3). Updates of waste characterization information are required when:

- A change occurs in the process or operation generating the hazardous waste, and
- Hazardous waste received from an off-site facility does not match the waste specified on the accompanying manifest or shipping papers.

Waste characterization data for the wastes treated at the OD Unit shall be re-evaluated at least annually. This information shall be used to determine if waste characterization data are accurate and to determine the appropriateness of current waste management practices and characterization methods, and shall be documented in the Operating Record.

REFERENCE

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

TABLE C-1
Sample Containers, Preservation Methods, and Holding Times for Analysis of Waste[a]

Sample Type	Container Type[b]	Preservation Method	Holding Time
Volatile Organics	4 oz glass jar with Teflon cap	Cool to 4 ºC	14 days
Semivolatile Organics	4 oz glass jar with Teflon cap	Cool to 4ºC	14 days
Metals (except hexavalent chromium and mercury)	4 oz glass jar with Teflon cap	Cool to 4ºC	180 days
(Hexavalent chromium)	4 oz glass jar with Teflon cap		28 days
(Mercury)	4 oz glass jar with Teflon cap		28 days

a. Containers, methods and holding times from most current version of SW-846 (EPA, 1986)
b. Other container types may be used depending upon the laboratory or the method, with prior NMED approval.

DEFINITIONS
NMED New Mexico Environment Department
oz ounces
ºC degrees Celsius

PERMIT ATTACHMENT D: ANNUAL SOIL SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

The purpose of this sampling and analysis plan is to ensure that accurate data are collected to determine whether a release of hazardous waste or hazardous constituents has occurred during the operating period of the Open Detonation (OD) Unit that may pose a threat to human health. Any corrective action that may be required for the OD Unit shall be conducted in accordance with Part 6 of this Permit.

The OD Unit is located at the Kirtland Air Force Base (KAFB) Explosive Ordnance Disposal (EOD) Range and is permitted as a Resource Conservation and Recovery Act (RCRA) Subpart X miscellaneous unit. The OD Unit is used to treat hazardous waste to remove the hazardous characteristics of reactivity and ignitability. The Permittee shall perform soil monitoring at the OD Unit during operations to assess whether or not contaminants are being released to soil at levels that could endanger human health. This soil sampling and analysis shall be performed on an annual basis in accordance with the procedures described in this Annual Soil Sampling and Analysis Plan (SSAP).

1.1. SAMPLING PROCEDURES

This Section (1.1) describes procedures and methods for sampling soil at the OD Unit. Other applicable procedures or methods provided in the most current version of *SW-846* (EPA, 1986) may be used if conditions or experience show the alternate method(s) to be more appropriate and if approved by the Department. All sampling procedures used will be documented in a field logbook. Sampling shall be performed in accordance with procedures given in *Samplers and Sampling Procedures for Hazardous Waste Streams* (EPA, 1980), or SW-846, and in accordance with this SSAP.

1.1.1. Sampling Schedule and Frequency

Soil samples shall be collected annually at the OD Unit during the month of June. Sampling shall be conducted at the OD Unit before any backfilling, excavation, or grading is performed at the site since the last treatment event. If no treatment events have occurred during a particular annual period, annual sampling will not be conducted for that annual period. The Department shall be notified if this circumstance occurs.

1.1.2. Sampling Strategy and Analytical Parameters

For the OD Unit, four soil samples shall be collected from the zero- to six-inch depth and analyzed for total metals, explosives and other constituents listed in Table D-1. The sampling location strategy depends on the physical characteristics of the OD Unit. If only one crater (pit) is present during the sampling event, then four soil samples shall be taken from the walls of the crater at each of the four primary compass directions (Figure D-1). If more than one crater is present, a grid (with a minimum of 100 possible locations) that encompasses all of the craters shall be established, and four random sample locations within the grid will be selected for the sampling event (Figure D-2). The grid will be square in shape and its overall maximum size shall be established using the maximum distance between the walls of the craters that are present

at the site. If no craters are present, then a 150-foot by 150-foot grid shall be established at the center of the cleared area which composes the OD Unit, and four soil sample locations shall be randomly selected from within the grid.

Each sample location shall be located by reference to a surveyed grid datum, prominent site features, or from some documented reference point that can be located in the field. Sample locations shall be recorded in the field logbook, and shall be shown on a figure depicting the OD Unit in the annual reports (see Section 1.7 of this Permit Attachment).

1.1.3. Sample Collection

Qualified personnel shall collect soil samples. Sample collection procedures, types of containers and storage procedures specific to each SW-846 method shall be strictly adhered to. Prior to collecting a soil sample, sampling personnel shall scrape aside loose materials (e.g., rocks, litter) from the sampling location. Personnel shall collect soil samples using metal or plastic scoops, wooden or disposable plastic hand trowels, or similar equipment. Non-sparking equipment shall be used whenever required by EOD personnel for worker safety. Excess soil generated at each soil sampling location may be used as backfill. Samples shall be representative of the site. Cross-contamination of samples shall be prevented. Sample collection activities shall also conform to these requirements:

1. Personnel shall schedule sampling activities with EOD Range Control;
2. Personnel shall obtain clearance from an EOD Technician/Specialist for the selected location of each sample;
3. Personnel shall wear clean gloves before collecting each individual sample;
4. Personnel shall use clean sampling equipment to collect soil samples. (Note: A disposable sampler may be presumed clean if it is still in a factory-sealed wrapper. Reusable samplers will be scraped to remove any loose material, washed with a detergent and water solution, rinsed several times with tap water, rinsed with deionized water, drained of excess water, and air-dried or wiped dry.);
5. Personnel shall clear each sample for shipment to the analytical laboratory by an EOD Technician/Specialist; and
6. Personnel shall check out with EOD Range Control when sampling has been completed.

Samples collected for analysis of white phosphorous must the follow the special sample collection procedures in SW-846, Method 7580.

1.1.3.1. Sample Containers and Preservatives

Samples shall be placed in appropriate containers, compatible with the intended analysis. All containers shall be new and certified clean to ensure the integrity of samples collected. Samples shall be properly prepared and preserved as necessary to maintain sample integrity. Table D-1 lists the proper container, preservative, and holding time for each chemical parameter of interest.

1.1.3.2. Sample Identification

Sample identification numbers shall be assigned by alpha/numeric characters corresponding to the last two digits of the calendar year (YY), two digits of the month (MM), two digits of the day

of the month (DD), a code indicating soil sample (SS), and a unique number (##) designating the sample location. Thus, a complete format of a sample identification number is: YYMMDDSS##. For example, soil sample number two collected on 3rd of June 2007 would be labeled: 070603SS02.

1.1.3.3. Sample Handling, Documentation, and Custody Procedures

Chain-of-custody procedures shall be followed in accordance with Permit Section 6.5.5.3. Labels shall be affixed to sample containers in accordance with Permit Section 6.5.5.4.

The chain-of-custody form shall be signed upon receipt at the laboratory, and the original or a copy returned to the KAFB Environmental Management (EM) Branch Office for inclusion in the Operating Record. The Chain-of-custody form shall include or be accompanied by a request-for-analysis form that lists all analyses to be performed for the samples and all special instructions related to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

The sample container shall be sealed with a gummed paper seal or tag attached to the container in such a way that the seal must be broken in order to open the container.

A field logbook shall be kept and shall contain information pertinent to field surveys and sampling. Entries in the logbook shall be conducted in accordance with Permit Section 6.5.2.

The analytical laboratory shall be required to have procedures for minimizing cross contamination of samples and securing sample custody within the laboratory.

Samples relinquished to the laboratory shall be subject to the following procedures for transfer of custody and shipment.

1. When transferring the possession of samples, the individuals relinquishing and receiving them shall sign, date, and note the time on the Chain-of-custody form.
2. Shipping containers such as coolers shall be custody-sealed for shipment to the laboratory.

Laboratory personnel shall verify that samples are correctly labeled, that documentation is correct, and shall inspect the physical condition of the containers. Any discrepancies are to be resolved between laboratory and sampling personnel at this time. The laboratory portion of the form shall be completed by the laboratory personnel and shall include at a minimum:

1. The name of the person receiving the sample,
2. Laboratory accession (identification) number,
3. The date and time of sample receipt, and
4. Sample condition

1.1.3.4. Sample Shipping

Sample shipment shall be conducted in accordance with Permit Section 6.5.5.2.

1.2. INVESTIGATION-DERIVED WASTE

Investigation–derived waste shall be managed in accordance with Permit Section 6.5.7.

1.3. QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

Because important decisions will be based on the data collected as part of this SSAP, a program to ensure that data are of high quality is essential. The Permittee shall follow a quality assurance/quality control (QA/QC) program that mandates documentation of the precision and accuracy of laboratory analyses as well as other aspects of quality assurance.

1.3.1. Quality Control Targets

For metals, quality control targets for accuracy and precision shall be 75-125% recovered and ±35% relative percent difference (RPD), respectively. The laboratory reporting limits for metals shall be at or below the respective background level for each metal subject to analysis.
For high explosives (HE), quality control targets for accuracy and precision shall be 20-120% recovered and ±50% RPD, respectively. The laboratory reporting limits for HE compounds shall be at or below the appropriate human risk industrial screening level for each HE compound (NMED, 2009).

1.3.2. Field Quality Control

Field quality control shall be conducted in accordance with Permit Section 6.5.14 and Table D-2 of this Permit Attachment.

1.4. LABORATORY ANALYSIS

Laboratory analysis shall be conducted in accordance with Permit Section 6.5.18.

1.5. DATA VALIDATION

Data validation shall be conducted in accordance with Permit Section 6.5.18.3.

1.6. HUMAN RISK SCREENING

If a sample result for a metal exceeds the applicable background level listed in Table D-4, the result shall be compared to the most current EPA Regional Screening Levels (RSLs) and Department soil screening levels (SSLs-NMED, 2009) for an industrial land use scenario. The industrial land use scenario shall only apply to risk screening under this SSAP, and not for purposes of closure or corrective action. Analytical results for explosives and SVOCs shall be compared to the SSLs. EPA RSLs and Department SSLs for industrial scenarios are presented in Table D-4 for the metals, SVOCs, and HE compounds that are to be evaluated.

Sample results for arsenic shall be compared with the approved background level because the natural background concentration of arsenic in this area exceeds the EPA human health medium-specific screening level. Additionally, the screening level for thallium shall be set equal to the Department soil screening level for this constituent.

If a Department SSL or EPA RSL does not exist for a substance, the Permittee shall calculate a screening level based on an industrial scenario and a cancer risk of 10^{-5} for carcinogens, and a hazard quotient (HQ) of 1.0 for noncarcinogens. This calculated screening level shall be subject to Department approval and shall be revised if determined by the Department not to be protective of human health.

Any exceedance of an EPA RSL, Department SSL, or calculated screening level shall be

reported to the Department in writing within 15 calendar days. The Department will review the information and, at its discretion, may require additional site characterization to protect the health and safety of site workers. If the Department requires additional site characterization, the Permittee shall prepare a sampling and analysis plan (SAP) for Department approval. The SAP shall be prepared and submitted to the Department within 60 calendar days of the request. Upon Department approval of the SAP, the Permittee shall implement the plan within 30 days. Upon completion of the field investigation, the Permittee shall report the results of the additional site characterization effort in writing to the Department within 90 calendar days. The Department will then determine if additional sampling is required, if the site must be remediated immediately to protect workers, or if no corrective action is required.

1.7. REPORTING

The Permittee shall submit two copies of each annual report to the Department within 90 days of completion of each sampling event. Each annual report shall include:

1. A summary cover letter.
2. Copies of all laboratory reports associated with the sampling event, including the analytical results for each sample.
3. A summary of any constituents detected at concentrations exceeding human risk levels including any exceeding a screening level calculated by the Permittee when a Department SSL or EPA RSL is unavailable. The method and data used by the Permittee to calculate a screening level must also be reported.
4. A summary of field and laboratory QC sample results.
5. A summary of whether the data meet the data quality objectives listed in this Permit Attachment. And,
6. A scaled, oriented map showing the location of the OD Unit sampling grid (if any), craters (if any), and all sample locations.

REFERENCES

New Mexico Environment Department (NMED), 2009. Technical Background Document for Development of Soil Screening Levels, Rev, V, New Mexico Environment Department, Santa Fe, New Mexico, December 2009.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 2002. RCRA Waste Sampling Draft Technical Guidance; Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C., EPA530-D-002, August 2002.

Table D-1
Analytical Parameters and Methods, Container Types, Preservation Methods, and Holding Times for Soil Samples[a]

Parameter	Analytical Method[b]	Container Type and Preservation Method[c]	Holding Time
Total Metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium (total), Cobalt, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, Zinc	6010C or 7000 Series	4 oz plastic or glass jar, stored at <4ºC	180 days; 28 days for Mercury and Chromium
High Explosives (HEs): 1,3,5-Trinitrobenzene; 1,3-Dinitrobenzene; TNT (2,4,6-trinitrotoluene); 2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-Dinitrotoluene; 4-Amino-2,6-Dinitrotoluene; HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine); 2-Nitrotoluene; Nitrobenzene; 3-Nitrotoluene; 4-Nitrotoluene; Tetryl; RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), 3,5-Dinitroaniline, PETN (pentaerythritol nitrate), nitroglycerine	8330B	4 oz glass jar, stored at <4ºC	14 days
White Phosphorous	7580	4 oz glass jar with PTFE lid, fill to top to minimize air in jar, stored at <4ºC	Indefinite (if preserved at <4ºC, kept in dark and tightly sealed)
Dioxins and Furans	8280B or 8290A	250 mL wide mouth amber glass jar with PTFE lid, stored at <4ºC	30 days
Perchlorate	6850	4 oz glass jar, stored at <4ºC	28 days

a. Analytical methods, preservation methods, and holding times are from most current version of Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (EPA, 1986).
b. Another applicable or newer method may be used with prior NMED approval.
c. Other container types may be used depending upon the laboratory or the method used with prior NMED approval.

DEFINITIONS:

mL	milliliters
NMED	New Mexico Environment Department
oz	ounces
PTFE	polytetrafluoroethylene
ºC	degrees Celsius
<	less than

TABLE D-2
Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analytes	Frequency	Purpose
Field duplicate	Soil	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per sampling event	Document precision of the sampling process
Equipment blank	Water	Metals, HE, White Phosphorus, Perchlorate, Dioxins and Furans	One sample per day (if using non-disposable equipment)	Document if equipment is being properly decontaminated between samples

DEFINITION
HE high explosive

TABLE D-3
Background Concentrations Of Naturally Occurring Metals in Soil at Kirtland Air Force Base

Metal	Surface Soil (mg/kg)
Antimony	3.9
Arsenic	5.6
Barium	130
Beryllium	0.65
Cadmium	<1
Chromium (total)	17.3
Cobalt	5.2
Copper	15.4
Lead	21.4
Mercury	<0.25
Nickel	11.5
Selenium	<1
Silver	<1
Thallium	<1.1
Tin	<10
Vanadium	20.4
Zinc	62

DEFINITIONS
mg/kg milligrams per kilogram
< less than

TABLE D-4
List of Analytical Parameters and Industrial Soil Screening Levels

Analytical Parameters	EPA Regional RSL[a] (mg/kg)	NMED SSL[b] (mg/kg)
Metals		
Antimony	410	454
Arsenic	1.6	17.7
Barium	190,000	224,000
Beryllium	2,000	2,260
Cadmium	810	1,120
Chromium (Total)	1,400	Not established
Cobalt	300	20,500
Copper	41,000	45,400
Lead	800	800
Mercury (methyl)	100	114
Nickel	20,000	22,700
Selenium	5,100	5,680
Silver	5,100	5,680
Thallium	66	74.9
Tin	610,000	Not established
Vanadium	5,200	5,680
Zinc	310,000	341,000
High Explosives (HE)		
1,3,5-Trinitrobenzene	27,000	Not established
1,3-Dinitrobenzene	62	Not established
TNT (2,4,6-Trinitrotoluene)	79	469
2,4-Dinitrotoluene	1,200	103
2,6-Dinitrotoluene	620	687
2-Amino-4,6-Dinitrotoluene	2,000	Not established
4-Amino-2,6-Dinitrotoluene	1,900	Not established
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	49,000	34,200
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	24	174
m-Nitrotoluene	12,000	22,700
Nitrobenzene	280	277
o-Nitrotoluene	13	145
p-Nitrotoluene	110	1,200
Tetryl	2,500	2,740
3,5-Dinitroaniline	Not established	Not established
PETN (pentaerythritol tetranitrate)	Not established	Not established
Nitroglycerine	62	68.4
Other Analytes		
White phosphorous	20	Not established
Perchlorate	720	795
Dioxins and Furans (in TEQ TCDD)	0.000018	0.000204

a. Values from "Regional Screening Levels for Chemical Contaminants at Superfund Sites" (EPA, 2009).

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration-table/index.htm
b. Values from "Technical Background Document for Development of Soil Screening Levels", Rev. 5 (NMED, 2009).
c. The toxicity of dioxins and furans will be measured in relation to the most toxic form of dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin [TCDD]) by calculating the toxic equivalent (TEQ).

DEFINITIONS

mg/kg	milligram per kilogram
NMED	New Mexico Environment Department
RSL	Regional Screening Level
SSL	soil screening level

Figure D-1

Figure D-2

PERMIT ATTACHMENT E: INSPECTION PLAN

1.0 INTRODUCTION

This Permit Attachment addresses general inspection requirements of 40 C.F.R. § 264.15.

1.1. INSPECTION SCHEDULE

The inspection schedule is presented in Table E-1 and shall be maintained at the Explosive Ordnance Disposal (EOD) Shop, as required by 40 C.F.R. § 264.15(b)(2).

1.2. SCOPE OF INSPECTIONS

At a minimum, the items listed in Table E-1 shall be inspected at the indicated frequencies.

1.3. FREQUENCY OF INSPECTIONS

Items listed in Table E-1 shall be inspected at the frequencies indicated in the table.

TABLE E-1
Inspection Schedule for the OD Unit

Item Number	Inspected For	Frequency
1	Are warning signs posted on the Explosive Ordnance Disposal Range boundary fence at 300-foot intervals?	Monthly
2	Is the EOD Range flag serviceable/posted?	Immediately before treatment operations
3	Are all combustibles clear of the OD Unit to 200 feet, including vegetation?	Immediately before treatment operations
4	Are firebreaks clear of combustibles, including vegetation?	Within 24 hours before treatment operations
5	Is a first-aid kit available?	Immediately before treatment operations
6	Is the OD Unit clear of explosives from previous treatment activities including the loading and unloading areas?	Immediately before treatment operations and within 24 hours after treatment operations
7	Are the EOD Range gates working properly?	Monthly
8	Is the Contingency Plan available at the EOD Range personnel bunker?	Immediately before treatment operations
9	Are all fire-protection and communication equipment operational?	Immediately before treatment operations
10	Is the OD Unit area in good condition?	Monthly and within 24 hours before treatment operations
11	Are metal fragments cleaned up?	Monthly and within 24 hours after treatment operations
12	Is the EOD Range boundary fence in good condition?	Monthly
13	Are the EOD Range roads and firebreaks in good condition?	Monthly
14	Is the personnel bunker in good condition?	Monthly
15	Is the runoff berm around the OD Unit in good condition?	Monthly
16	Is there standing water in a pit or crater at the OD Unit?	Immediately before treatment operations and within 24 hours of a precipitation event
17	Is there kick out or treatment residues following OD operations?	Within 24 hours after treatment operations

PERMIT ATTACHMENT F: CONTINGENCY PLAN

1.0 INTRODUCTION

This Contingency Plan has been prepared for the Open Detonation (OD) Unit located at the Explosive Ordnance Disposal (EOD) Range at the Kirtland Air Force Base (KAFB) Facility in compliance with 40 C.F.R. Part 264, Subpart D, as applicable. This plan consists of emergency response procedures and activities specific to the OD Unit.

1.1. PURPOSE AND IMPLEMENTATION

The purpose of this Contingency Plan is to define the responsibilities and provide for coordination of activities to minimize hazards to human health or the environment from fires, explosions, or any sudden or non-sudden release of hazardous waste or hazardous constituents. In accordance with 40 C.F.R. § 264.51(b), the provisions of this plan shall be carried out immediately whenever there is a fire, explosion, or a release of hazardous waste or hazardous constituents that could threaten human health or the environment.

In the case of major incidents or emergencies that cannot be controlled with EOD Range resources, the Emergency Coordinator (EC) shall notify the KAFB Fire Department and the KAFB Command Post (KCP). The KCP shall assume primary responsibility for response coordination in the case of such major incidents or emergencies or delegate that responsibility to the KAFB Fire Chief. Once the KCP or KAFB Fire Chief completes its response, the EC shall assume responsibility to ensure compliance with all the provisions of this Contingency Plan, including post-emergency inspections and reporting.

1.2. DISTRIBUTION

To assure proper implementation, this Contingency Plan shall be studied and understood by all personnel involved in the management of hazardous waste at the OD Unit and by all personnel required to respond to emergency situations at the OD Unit.

A copy of this Contingency Plan and any subsequent revisions to the plan shall be maintained at the Environmental Management (EM) Branch Office and a current copy shall be maintained at the KCP, and at the personnel bunker at the EOD Range. Copies and subsequent revisions shall be distributed to the KAFB Fire Department, the Albuquerque Fire Department, and the New Mexico Environment Department in the event that they are called upon to assist with or provide emergency services.

1.3. CHARACTERISTICS OF WASTES MANAGED AT THE OD UNIT

The Permittee treats reactive (D003) and ignitable (D001) hazardous wastes. These hazardous wastes include explosives, propellants, and pyrotechnics.

1.4. SUPPORT AGREEMENTS WITH OUTSIDE FACILITIES

The Permittee shall maintain support agreements in accordance with Permit Section 2.4.4.

1.5. EMERGENCY COORDINATOR

An EC (see Table F-1 of this Permit Attachment) shall be on site during treatment activities to coordinate emergency response measures. The EC shall be thoroughly familiar with this Contingency Plan, this Permit, characteristics of the hazardous wastes managed at the OD Unit, the hazardous waste management operations and activities conducted at the OD Unit, the location of hazardous wastes managed at the OD Unit when treatment operations are in progress, the location of the Operating Record at the Facility, and the EOD Range layout. The Base Civil Engineer shall also serve as the functional equivalent of an alternate EC. If the Base Civil Engineer becomes the EC (because the primary EC is not available), the Base Civil Engineer shall be present at the OD Unit for the entire duration of the treatment event.

The EC shall ensure that personnel assigned to the EOD Range are trained in the location and use of eyewash solutions, fire extinguishers, and emergency protective clothing; in emergency procedures; and in evacuation procedures before starting any treatment operations.

The EC has three primary responsibilities. They are:

1. Assess the situation. By observing the scene, interviewing personnel, and/or reviewing records, the EC shall gather information relevant to the response, such as the type of event, quantity and type of released material, and actual or potential hazards to human health or the environment.
2. Protect personnel. The EC shall take reasonable measures to ensure the safety of personnel, such as accounting for EOD Range personnel, attending to injuries, or coordinating the evacuation of EOD Range personnel, if necessary. If evacuation is indicated for personnel, the KCP shall be informed.
3. Contain or mitigate the hazards. The EC shall take reasonable measures to ensure that fires, explosions, or releases do not occur, recur, or spread.

1.6. RESPONSE PROCEDURES

When the EC is notified of an incident or emergency, he shall first determine the scale of the incident or emergency and decide if the incident or emergency is minor or major. In the case of minor incidents or emergencies, the EC shall coordinate the response. In the case of major incidents, the EC shall relinquish control to the KCP, which may in turn relinquish control to the KAFB Fire Chief when he arrives to handle the emergency; however, the EC shall remain available to provide technical guidance and information.

If necessary to protect human health, personnel shall evacuate the OD Unit during an emergency in accordance with the requirements of Section 1.6.5 of this Permit Attachment.

In the event that the EC determines an incident to be minor, a person shall be assigned to stand by at a safe distance with a two-way radio. At the first indication of an escalation in the degree of the incident, the standby person shall be instructed to notify the KCP.

The EC or EM Branch Chief of Compliance shall notify the National Response Center (1-800-424-8802 or current phone number) and the Department with the details of the incident or emergency as soon as possible after being notified of the incident or emergency.

After any incident or emergency, the EC shall ensure that the OD Unit and emergency

equipment are cleaned, waste is properly managed and disposed of, and the OD Unit is safe to resume operation. Before operations are resumed, the EC shall contact the EM Branch Chief of Compliance, who shall inform the appropriate agencies. The EC shall also ensure that the emergency recovery inspections and activities described in Section 1.8.1 of this Permit Attachment are conducted. The EC shall also be responsible for preparing post-emergency or post-incident reports, as presented below in Section 1.8.2 of this Permit Attachment.

1.6.1. Spills

The first priority in dealing with any spill is protection of personnel. If any hazardous waste is spilled during transfer to a treatment unit, transfer of the waste shall be discontinued immediately. The Range Supervisor shall notify the EC, proper personal protective equipment (PPE) shall be donned, and the spilled material and potentially contaminated media (e.g., soil) shall be contained, removed, and managed appropriately as solid or hazardous waste. Wastes not authorized for treatment at the OD Unit shall be removed and treated or disposed of at an off-site facility, as appropriate. If appropriate, the waste shall be saturated (e.g., with water) as a precautionary measure. The incident, including details of the spill and cleanup, shall be noted in the Operating Record.

1.6.2. Personnel Exposure

In the event of personnel exposure to hazardous waste, including, but not limited to, irritation of the eyes, breathing passages, or skin; difficulty in breathing; and/or nausea, light-headedness, vertigo, or blurred vision, personnel shall immediately take the following measures.

1. Notify the EC immediately.
2. The EC shall attempt to ascertain what, if any, chemical exposure occurred and what corrective measures are appropriate.
3. Transport the affected person to a medical facility for evaluation.
4. Evacuate and barricade the area to prevent unauthorized entry.

1.6.3. Explosion and/or Fire Involving Ordnance

EOD personnel shall implement operating practices designed to minimize the risk of fires and explosions that endanger human health or the environment at the OD Unit.

1.6.4. Natural Disasters

After any natural disaster in the vicinity of the OD Unit (e.g., earthquake, floods, lightning strike), the EC shall inspect the OD Unit for any signs of damage, leakage, and land movement and initiate any necessary corrective measures to rectify potential or actual problems. Inspection findings and corrective measures shall be recorded in the Operating Record.

1.6.5. Evacuation

Personnel shall evacuate the EOD Range upon voice command or by notification over two-way radio or other communication device.

1.6.5.1. Evacuation Procedure

The following procedure shall be implemented for evacuation:

1. When an evacuation is announced, stop work.
2. Assist injured personnel to evacuate, if possible.
3. Report to the designated assembly area outside the EOD Range personnel bunker for roll call to be taken by the EC or his designee.
4. Be continually cognizant of wind directions (stay upwind, if possible) and emergency equipment.
5. Do not reenter the affected area until the EC or KAFB Fire Chief authorizes reentry.

1.6.5.2. Evacuation Route

The EC shall be responsible for ensuring that all EOD personnel and site visitors are familiar with evacuation procedures and routes. A map showing the evacuation route is provided as Figure F-1. The map shall be posted at the EOD Range personnel bunker and carried by the EC on all treatment operations.

1.7. EMERGENCY EQUIPMENT

Emergency equipment shall be available for use at the OD Unit. The emergency equipment listed in Table F-2 shall be repaired, replaced, and/or upgraded with functionally equivalent components and equipment, as necessary.

1.8. EMERGENCY AND INCIDENT RECOVERY PROCEDURES

The recovery procedures that shall be followed after a minor or major incident or emergency at the OD Unit are described below.

1.8.1. Post-Emergency Inspections and Activities

The following post-emergency incident inspections and activities shall be conducted:

1. The EC will assure that the time, date, and details of any incident or emergency are noted in the Operating Record in accordance with 40 C.F.R. § 264.56(i).
2. The EC shall inspect the premises for leaks or ruptures of equipment, and shall ensure that all recovered material and waste is managed properly. The results of the inspection shall be recorded in the Operating Record. Only containers made of or lined with materials that will not react with and are otherwise compatible with the waste resulting from cleanup procedures shall be used.
3. Emergency response equipment shall be carefully inspected and the equipment decontaminated, replaced, or refurbished, if needed. Fire extinguishers shall be checked for adequate charge. PPE shall be checked for contamination. Remedial equipment shall be inspected for contamination and proper operation. The supply of eyewash solution and other expendable items used for first aid or cleanup shall be checked and replaced, as necessary.

4. Within 24 hours of an emergency or incident, fire extinguishers shall be replaced or recharged and PPE decontaminated, repaired, or replaced as necessary.
5. Within three days of an emergency or incident, other equipment and structures shall be decontaminated. Decontamination wastes shall be collected and managed appropriately. Appropriate PPE shall be worn during decontamination procedures.
6. Within 30 days of an emergency or incident, other equipment shall be repaired or replaced as necessary.

1.8.2. Post-Emergency or Incident Reports

The following post-emergency or incident reports shall be made:

1. A verbal report of any incident or emergency shall be reported promptly to the EM Branch Chief of Compliance if he was not informed during its occurrence.
2. A written emergency or incident report shall be prepared jointly by the EC and the EM Branch Chief of Compliance and forwarded to the Department within 15 working days, as required by 40 C.F.R. § 264.56(i). The written report shall include, at a minimum, the following.
    a. Name, address, and telephone number of the Commander of KAFB, the EC, and the EM Branch Chief of Compliance;
    b. Name, address, and telephone number of the responsible official;
    c. Date, time, and the type of emergency or incident;
    d. Name and quantity of material and waste involved;
    e. Extent of injuries, if any;
    f. Assessment of actual or potential hazards to human health or the environment; and
    g. Estimated quantity and disposition of recovered material and waste.
3. Before operations are resumed at the OD Unit, the Department shall be notified that the OD Unit is in compliance with 40 C.F.R. §§ 264.56(h) and 264.56(i) and the requirements of this Permit. The notification shall address the fact that no new waste shall be treated that may be incompatible with released material and waste until cleanup procedures are completed and that all emergency equipment is cleaned and fit for its intended use.

1.8.3. Emergency/Incident Response Evaluation

The Permittee shall be responsible for annual evaluations of the KAFB Facility emergency response plans and for evaluation of the response to any incident or emergency. If these evaluations reveal that changes to the emergency response plans are necessary, they shall be amended by the Permittee and distributed to the appropriate organizations.

This Contingency Plan shall be reviewed and, if necessary, amended by the Permittee whenever:

1. The Permit, or applicable regulations, is revised.
2. The plan fails in an incident or emergency.

3. The design, construction, operation, and/or maintenance of the OD Unit or other circumstances change in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous constituents, or changes the response necessary in an incident or emergency.
4. The list of emergency equipment changes.

Whenever any of the EC contact information in Table F-1 changes, a revised table shall be provided to the Department and distributed to all Contingency Plan holders. A copy of the revised table shall also be maintained at the EOD Range personnel bunker. A revision of Table F-1 constitutes an amendment to this Contingency Plan. The Permittee shall request a modification to this Permit should it become necessary to amend this Contingency Plan for any reason.

TABLE F-1
Emergency Coordinator Contact Information for the OD Unit

Contact or Name	Address	Office Phone	Home Phone
D. Brent Wilson, Base Civil Engineer	Building 20684, KAFB, NM 87117	846-7911 or 846-0411	281-5857

TABLE F-2
Type and Location of Emergency Equipment Available for Use at the OD Unit

Emergency Item or Equipment	Description	Location	Contact
Emergency Vehicles	Emergency Response Vehicle: Mobile Command Post equipped with communications equipment.	KAFB Civil Engineer Readiness	846-9196
	Ambulances	KAFB Fire Department	911 or 846-8069
	Security Vehicles: Vans and trucks equipped with communications equipment and utilized for transportation of personnel and equipment.	KAFB Security Police	846-7926
	Fire Trucks: Fire-fighting vehicles outfitted with equipment for fighting fires and with self-contained breathing apparatuses (SCBAs).	KAFB Fire Department	911 or 846-8069
	Helicopter: Rotary-wing aircraft for transportation of personnel to or from site.	KAFB Command Post	846-3777
Medical Supplies	First aid kit	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Stretchers/Stokes Litter: Equipment for movement of injured personnel.	KAFB Fire Department	846-8069
	Blankets: Normal blankets.		
	Medical Kits: Emergency first-aid supplies.		
	Oxygen: Medical grade oxygen in compressed cylinders equipped for personnel use.		
Safety Supplies	Fire Extinguisher (ABC)	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Eye Wash Kit		
	Spill Containment Kit		
	Decontamination Kit		
	Air Packs: SCBAs equipped with positive pressure mode for use by personnel entering hazardous atmospheres.	KAFB Fire Department	846-8069
	Monitoring Instruments		
General Supplies	Two-Way Radio	EOD Range personnel bunker or vehicle	EC or Range Safety Officer
	Shovels		
	Hand Tools		
	Broom(s)		
Transportation	Tractor-trailer combinations,	KAFB Logistics Readiness Squadron	853-7843
	Flat-bed trucks		
	Enclosed panel vans		
	Passenger vehicles, including sedans and vans		
	Passenger buses		

DEFINITIONS
SCBA self contained breathing apparatus

Figure F-1

PERMIT ATTACHMENT G: PERSONNEL TRAINING PLAN

1.0 INTRODUCTION

The primary objective of the Explosives Ordnance Disposal (EOD) training program shall be to prepare personnel to conduct operations at the Open Detonation (OD) Unit in a safe and environmentally sound manner and in compliance with this Permit and the New Mexico Hazardous Waste Management Regulations (HWMR), 20.4.1 NMAC. To achieve this objective, the program provides personnel with training relevant to their positions.

All personnel shall complete initial training within six months of assignment to EOD Range duty. Personnel shall not work at the OD Unit until they have completed training on the Contingency Plan (Permit Attachment F). Personnel shall be given, at a minimum, a basic understanding of the regulatory requirements of hazardous waste management, this Permit, and emergency response procedures. Personnel shall receive additional classroom and on-the-job training designed specifically to teach them how to perform their duties safely and in conformance with regulatory requirements and this Permit. All personnel shall receive the required training prior to being allowed to work unsupervised.

1.1. TRAINING PROGRAM

Training for personnel is the overall responsibility of the EOD Flight Chief. All training shall be conducted by qualified EOD Technicians and includes formal classroom sessions, on-the-job training, and review of written procedures and plans. A summary of the training program for personnel is shown in Table G-1.

1.1.1. Job Title/Job Description

As required by 40 C.F.R. § 264.16(d)(1) and (2), records of each job title related to hazardous waste management at the OD Unit, a list of employees for each job title, and job descriptions for each job title shall be maintained at the EOD Shop. Job descriptions shall include hazardous waste management duties, and required skills, experience, and education.

Records relating to the training program shall be maintained at the EOD Shop. The records shall also include a list of courses required for each position, course descriptions, documentation that each employee has received and completed appropriate training, and information regarding qualifications.

1.1.2. Relevance of Training to Job Position

The training program shall provide employees with training to respond effectively to emergencies at the OD Unit. Personnel shall receive relevant training on the requirements of this Permit (including Contingency Plan implementation), OD Unit operations (including emergency procedures, equipment, and systems), and in management of hazardous wastes.

1.1.3. Training Content, Frequency, and Techniques

The training program shall include a comprehensive combination of internal training courses and on-the-job training. Each training course shall be developed carefully to support the goal of safe and environmentally sound operations at the OD Unit in compliance with this Permit and the

HWMR. Course outlines shall be maintained in the Training Section at the EOD Shop. The general training content and frequency of training are presented in Table G-1.

1.2. TRAINING DIRECTOR

The Training Director (EOD Flight Chief) shall direct the training program and shall be responsible for establishing training requirements for personnel. The EOD Flight Chief shall be required to be knowledgeable of the applicable hazardous waste management regulations and specific processes employed at the OD Unit, pursuant to the HWMR and this Permit.

1.3. IMPLEMENTATION OF TRAINING PROGRAM

The training program shall be implemented to ensure that all personnel who work at the OD Unit receive the training indicated in Table G-1. All personnel shall participate annually in a training refresher. Visitors shall be provided instruction commensurate with the nature of their visit.

TABLE G-1
Training Program for the OD Unit

Course	Content	Frequency
Basic EOD Course	Covers all aspects of positions and duties associated with EOD and OD Unit operations	Initial
Explosive Safety	General Safety Requirements, Motor Vehicle Transportation, Disposal Range Requirements, Disposal Range Procedures, Range Safety, Standard Safety Guidelines, Site Entry, Site Control, Personal Protective Equipment, Contingency Plan, Implementation, Procedures for Using Emergency Equipment, Procedures for Shutdown of Operations, Responses(s) to Emergencies, Emergency Coordinator(s), Evacuation Route and Procedures, Post-emergency Procedures	Initial/Annual
Relevant In-House Training	General Overview of Procedures to Perform Operations at the EOD Range and OD Unit; Waste Analysis Plan; Identification of Waste to be Managed; Waste Screening and Verification; Range Operation; Safety Practices; Security; Range Inspections; Preventive Procedures, Structures, and Equipment; Prevention of Reaction of Reactive Waste, Ignitable and Incompatible Waste; Authorized Wastes	Initial/Annual
Resource Conservation and Recovery Act Training	Hazardous Waste Management and Regulations – Overview, Hazardous Substances and Properties, General Facility Standards, Preparedness and Prevention, Contingency Plan and Emergency Procedures, Record Keeping and Reporting	Initial/Annual

PERMIT ATTACHMENT H: CLOSURE PLAN

1.0 INTRODUCTION

This Closure Plan describes the activities necessary to close the Open Detonation (OD) Unit at the Explosive Ordnance Disposal (EOD) Range, Kirtland Air Force Base (KAFB). Until final closure is complete in accordance with the New Mexico Hazardous Waste Management Regulations and certification of closure has been approved by the Department, a copy of the approved Closure Plan and all approved revisions shall be maintained in the Operating Record. This Closure Plan and any revisions thereof shall be made available, upon request, to the Department.

If the OD Unit can not be cleaned closed, the Permittee shall amend this plan in accordance with Permit Section 4.2 and implement the new plan upon obtaining approval from the Department.

1.1. GENERAL CLOSURE INFORMATION

This Closure Plan has been prepared in accordance with the requirements of 40 C.F.R. § 270.14(b)(13), and 40 C.F.R. Part 264, Subparts G and X.

1.1.1. Closure Performance Standard

The OD Unit shall be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to ground or surface waters or to the atmosphere; and
- Comply with the requirements of 40 C.F.R Subpart G and § 264.601.

1.1.2. Final Closure Activities

The Permittee shall notify the Department, in writing, at least 45 calendar days before the date on which final closure of the OD Unit will commence. Partial closure (i.e., closure of just one part of the Unit) shall not occur unless directed otherwise by the Department.

Final closure shall consist of:

1. Removing all structures and equipment used at the OD Unit;
2. Removing soil and debris that have contaminant concentrations that pose unacceptable risk to human health or the environment; and
3. Sending for treatment and disposal any solid and hazardous waste, including any treatment residues, to a permitted treatment, storage, or disposal facility (TSDF) in accordance with applicable regulatory requirements.

Final closure shall be complete when:

1. All solid and hazardous waste have been treated and disposed of off-site as required by law;

2. All structures and all equipment have been removed from the OD Unit;
3. Sampling demonstrates that no unacceptable risk to human health or the environment exists in soil or groundwater at the OD Unit and surrounding areas of the EOD Range that was caused by contamination from the OD Unit;
4. A Certification of Closure and Closure Report have been submitted to the Department; and
5. The Department has approved the Closure Report and Certification of Closure.

1.1.3. Maximum Extent of Operations

Closure activities and any corrective action that may be required shall not be limited to the OD Unit if contamination occurs or could occur beyond the boundary.

1.1.4. Schedule for Closure

Closure of the OD Unit shall comply with the schedule presented in Table H-1.

1.2. CLOSURE REPORT

Upon completion of the closure activities, a Closure Report shall be submitted to the Department with a Certification of Closure (see Permit Section 4.7). The Closure Report shall document the closure activities conducted and contain, at a minimum, the following information:

1. The certification described in Permit Section 4.7;
2. A summary of closure activities;
3. Any significant variance from the approved plan and the reason for the variance;
4. A summary of all sampling data associated with the closure, including analytical results for all field and laboratory quality control samples;
5. A statement indicating whether the quality of data is adequate to support closure in accordance with the Performance Standards of this Closure Plan (see Section 1.1.1 of this Permit Attachment);
6. The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data); and
7. Disposal location of all solid and hazardous waste, including decommissioned equipment and structures and any contaminated debris and soil, and any treatment residues.

1.3. CLOSURE PROCEDURES

All hazardous waste present at the OD Unit shall be treated before closure activities commence, provided such waste is authorized to be treated at the OD Unit or, the waste shall be treated and disposed of at an offsite facility as permitted by law. Structures and equipment shall be removed. Structures and equipment shall be dismantled, placed into containers, and managed as solid or hazardous waste, as applicable, and disposed of as permitted by law.

The first phase of closure shall consist of a hazards survey of the OD Unit conducted by qualified health physics and industrial hygiene personnel. The purpose of the survey shall be to locate and remove any “kick-out” (untreated waste, waste fragments, or unexploded ordnance)

and to identify potential contamination concerns that may present hazards to workers during closure activities and to specify any control measures necessary to reduce worker risk. This survey shall provide the information necessary for health physics and industrial hygiene personnel to identify worker qualifications, personal protective equipment (PPE), safety awareness, work permits, exposure control programs, and emergency coordination that may be required to perform closure activities. All workers involved in the closure activities shall be required to have training and medical monitoring, in accordance with applicable regulations. Personnel performing closure activities shall be required to wear PPE as specified by health physics and industrial hygiene personnel.

Surface and subsurface soil and any debris at the OD Unit shall be characterized by sampling and analysis. Soil sampling shall follow the procedures described in Section 1.4 of this Permit Attachment (H). Soil shall be analyzed for the parameters listed in Tables H-2, H-3, and H-4. If sampling and analysis of soil indicates the presence of hazardous waste or hazardous constituents above background levels, a risk assessment shall be conducted based on a residential land-use scenario to determine whether the contaminants pose an unacceptable risk to human health or the environment. In lieu of a baseline risk assessment, the Permittee may compare the soil sampling results to the soil screening levels using the procedures listed in the Department's most current version of "Technical Background Document for Development of Soil Screening Levels" (as it may be updated), provided the soil screening levels are based on a residential land use scenario. If the risk assessment demonstrates that the level of contamination is unacceptable, the contaminated soil exhibiting unacceptable risk shall be subject to corrective action under Permit Part 6 and shall be excavated and removed. The excavated soil shall be collected, transferred to containers, and, if applicable, managed and disposed of as hazardous waste.

The Permittee shall conduct corrective action activities at the OD Unit using the cleanup levels in Permit Section 6.2.3 if corrective action is necessary. Clean up levels shall be based on a residential land use scenario.

Background soil concentrations for metals are those approved by the Department for the KAFB Facility, and are listed in Table D-4 of Permit Attachment D.

1.4. SAMPLING, DECONTAMINATION PROCEDURES, AND PPE

This Section describes procedures and methods for sampling soil and liquid. Other applicable procedures or methods given in the most current version of *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA, 1986) and all approved updates) may be used at the time of actual closure if conditions or experience show the alternate method(s) to be more appropriate, and if approved by the Department. All sampling methods and procedures used shall be described in the Closure Report. Sampling of waste shall be conducted in accordance with procedures given below in this Permit Attachment (H) and in *Samplers and Sampling Procedures for Hazardous Waste Streams (EPA, 1980)* or *SW-846*.

Reusable tools and equipment shall be scraped as necessary to remove any contaminated soil, debris, or residue; cleaned with detergent and water solution; and rinsed with clean water. The wash and rinse water shall be collected and sampled and analyzed for characterization as waste.

All PPE worn by personnel performing closure activities will be disposable and after use shall be placed into containers and managed as solid or hazardous waste, as applicable.

1.4.1. Soil Sampling

Soil samples shall be collected on a 25-foot by 25-foot grid spacing from the surface to 15-feet below ground surface at five-foot intervals (total of four samples per location). At a minimum, the 25-foot by 25-foot grid shall encompass all portions of the OD Unit that have hosted or may have hosted a pit or crater used for the treatment of hazardous waste. Any areas at the OD Unit used for training shall be considered a part of the OD Unit for purposes of establishing the sampling grid.

The samples shall be analyzed for the parameters listed in Tables H-2, H-3, and H-4, which include the general types of hazardous wastes managed at the OD Unit.

Surface soil samples (zero to six inches depth) shall be collected with a wooden or Teflon™ trowel or scoop. To collect deeper samples, a Veihmeyer soil sampler, auger drill, direct push technology, or other appropriate method shall be used. Only discrete grab samples shall be collected; no samples shall be composited.

Clean sampling equipment shall be used to collect each sample. Unused, disposable sampling equipment may be presumed clean if still in a factory-sealed wrapper prior to use. Reusable sampling equipment shall be decontaminated after each use by scraping to remove any loose material, washing with a detergent and water solution, rinsing several times with tap water, rinsing with deionized water, and drained of excess water, and air-dried or wiped dry.

1.4.2. Liquid Sampling

A Coliwasa sampler or similar device shall be used to sample liquids (for example, rinse water). As an alternative to the Coliwasa, glass tubes or similar devices may be used to sample liquids.

1.4.3. Sample Containers and Preservatives

Samples shall be placed in clean containers compatible with the intended analysis and shall be properly prepared, preserved, documented, labeled, handled, and secured to maintain sample integrity (see Tables H-5 and H-6).

1.4.4. Sample Handling and Documentation

Each sample shall be labeled, sealed, and accompanied by a chain-of-custody form and a request-for-analysis form. A chain-of-custody form shall be used to track samples from collection through analysis to ensure that the integrity of the samples is protected. The sample handling and documentation procedures shall be equivalent to those in the most current version of *SW-846*.

A chain-of-custody form shall be prepared for all samples collected for laboratory analyses. The form shall include at a minimum:

1. Sample identification number.
2. Name and signature of sample collector.
3. Date and time of sample collection.
4. Location at which sample was collected.
5. Type of sample (e.g., soil, liquid).

6. Signatures of persons who have had the samples in their possession.
7. Dates and times of possession.

The form shall be completed upon receipt at the laboratory and the original returned to the Permittee for inclusion in the Operating Record. The request-for-analysis form shall list all analyses to be performed for the samples and all special instructions relating to sample management or analysis. Any potential hazards posed by the samples shall be listed on the request-for-analysis form.

Sample containers shall be sealed with gummed paper seals attached to the containers in such a way that the seals must be broken in order to open the containers. Seals and sample labels shall be completed with a waterproof pen or marker. Sample labels are necessary to prevent misidentification of samples and shall include at minimum the following information:

1. A unique sample identification number.
2. Name or initials of sample collector.
3. Sample collection date and time.
4. Sample location.
5. Sample type, depth, and description.

A field logbook shall be kept and shall contain information pertinent to field surveys and sampling. Sufficient information shall be recorded so that a person can reasonably reconstruct what occurred at a sampling event without relying on a collector's memory. Entries in the logbook for a given sampling event shall, at a minimum, include:

1. Purpose of sampling.
2. Sample locations.
3. Name and business address of person making log entry.
4. Numbers, types, and volumes of samples, including field QC samples.
5. Description of sampling method and equipment used.
6. Date and time of sample collection.
7. Sample destination and transporter's name (for example, name of laboratory, United Parcel Service).
8. Map or photograph of the sampling site.
9. Field observations (for example, ambient temperature, sky conditions, past 24-hour precipitation).
10. Listing of sample identification number(s).
11. Signature of person responsible for the log entry.

1.4.5. Sample Shipping

Samples shall be packaged and shipped to the laboratory in accordance with DOT shipping requirements and in a manner to ensure that the integrity of the samples is protected. The sample containers shall be cushioned to protect against breakage or puncture.

1.4.6. Sample Analysis

Samples shall be analyzed at an EPA-certified commercial laboratory. Test methods for analysis of all samples shall be performed according to procedures documented in *SW-846* or other methods approved by the Department. Constituents in the hazardous wastes treated at the OD Unit are to be included in these analyses. Analytical methods and detection limits are listed in Tables H-2 through H-4.

Calibration, operation, QC (bias, precision, blank and matrix effects), and requirements for laboratory analyses shall be performed as listed in the individual analytical methods of *SW-846*. All laboratory analyst notebooks, log-sheets, instrument printouts, charts, and calculations relevant to analyses of these samples shall be identified and remain accessible. This information may be requested by the Department for independent review and validation. If requested by the Department, the information shall be provided by the Permittee to the Department.

The analytical laboratory shall have procedures for minimizing cross-contamination of samples and securing sample custody within the laboratory.

1.4.7. Quality Assurance (QA)/Quality Control (QC)

Because decisions about closure activities shall be based, in part, on analyses of samples, a program to ensure data are of high quality is mandatory. The Permittee shall ensure the high quality of data by documenting sample collection and management. The Permittee shall accomplish this also by following a QA/QC program that mandates documentation of the precision and accuracy of all laboratory analyses, as well as data completeness, representativeness, and comparability.

Sampling activities shall include the collection of field QC samples and their documentation. QC samples to be collected include equipment blanks, trip blanks, field blanks, and duplicate samples. Table H-7 of this Permit Attachment (H) summarizes the field QC sample requirements.

Blanks and duplicate samples shall be prepared or collected to monitor the performance of the data collection and analysis process, beginning with sampling and continuing through transportation, storage, and analysis. To document adequate decontamination of sampling equipment, equipment blanks (consisting of deionized water rinsate captured from decontaminated sampling equipment) shall be prepared and analyzed if reusable sampling equipment is employed.

In the case of samples to be analyzed for volatile organic compounds, in order to document cross-contamination attributable to shipping and handling procedures, trip blanks (consisting of deionized water) shall be prepared, taken to the sampling site, and then shipped to the laboratory along with the other samples to be analyzed for VOCs.

In the case of samples to be analyzed for volatile organic compounds, field blanks shall also be prepared to document cross-contamination attributable to field conditions. Field blanks (consisting of deionized water) shall be prepared, taken to the sampling site, their containers opened during the sampling of environmental media, and then shipped to the laboratory along with the samples to be analyzed for volatile organic compounds.

Equipment blanks shall be collected at a frequency of one per sampling day per media type. Duplicate samples shall be collected at a frequency of at least one per every twenty environmental samples per media type. Field and trip blanks shall be collected at a frequency of at least one each per sampling day. Acceptance criteria for QA/QC sample analyses shall be consistent with those for environmental samples as specified in Permit Attachment D, Section 1.3.

The Permittee shall require that the analytical laboratory operate under a QA Program Plan (QAPP) that meets the requirements of *SW-846*. QC procedures at the analytical laboratory are to be guided by the laboratory's QAPP. Laboratory QC samples are required to evaluate the accuracy and precision of analytical data. The laboratory must analyze and report to the Permittee the results of the following types of laboratory quality control samples: method blanks, duplicates, spikes, matrix spikes and matrix spike duplicates.

The Permittee shall also validate the data following the procedures in Permit Section 6.5.18.3.

1.5. MANAGEMENT OF WASTE FROM CLOSURE ACTIVITIES

Wastes that will be generated during closure activities at the OD Unit include decommissioned structures and equipment, excess soil from sampling, decontamination water, PPE, and possibly contaminated soil and debris and treatment residues.

1.5.1. Waste Management

Wastes associated with closure activities at the OD Unit shall also be managed as follows:

1. Wastes shall be stored in appropriate containers that are compatible with the wastes and that are in good condition.
2. If hazardous or potentially hazardous, the containers shall be labeled as hazardous waste or shall be labeled with the contents of the container. If potentially hazardous waste is determined not to be hazardous waste, the container label shall be changed to indicate that the waste is not hazardous waste.
3. Hazardous waste shall be managed in accordance with all applicable regulations in 40 C.F.R. 261-268.
4. Waste containers shall remain under the control of the personnel generating the waste.
5. Waste containers shall be segregated according to compatibility and chemical waste type.
6. Wastes shall be stored in containers that remain closed, except when adding or removing wastes.
7. Waste containers bearing free liquid shall be provided with secondary containment of sufficient volume to prevent spilled liquids from being released onto the ground.
8. Waste containers shall be managed in such a way as to prevent ruptures and leaks.

9. Waste containers shall be labeled appropriately, pending receipt of analytical results. Labels shall be marked using a permanent marker or pen. In addition to that required by item #2 of this Section, label information shall include waste source, depth (if appropriate), the date on which accumulation began, and the name and contact information of the generator.

1.5.2. Waste Characterization

Characterization of waste generated during closure activities shall be based upon the results of sampling and analysis.

1.5.3. Waste Disposal

All wastes from closure activities determined to be hazardous shall be managed in accordance with the Hazardous Waste Management Regulations (HWMR) from the time of generation. Hazardous waste shall be shipped off-site for treatment and disposal at a permitted RCRA Subtitle C facility. Wastes characterized as non-hazardous shall also be managed and disposed of in accordance with applicable law.

1.6. GROUNDWATER MONITORING WELLS

Groundwater monitoring wells shall be properly plugged and abandoned in accordance with all regulations and Department guidance, provided groundwater contamination has not occurred. If groundwater contamination has occurred, monitoring wells shall be maintained for the purpose of implementing corrective action. If corrective action is required by the Department, the Permittee shall immediately implement corrective action pursuant to Part 6 of this Permit.

REFERENCES

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods; 3rd edition, update 3, SW-846, Office of Solid waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1980. Samplers and Sampling Procedures for Hazardous Waste Streams; Municipal and Environmental Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio, EPA-600/2-80-018, January 1980.

"U.S. Environmental Protection Agency Contract Laboratory Program Statement of Work for Inorganic and Organic Analysis" (EPA, 1990).

TABLE H-1
Closure Schedule

Activity	Time Required
Advertise for proposals.	-90 Days
Notify the Department of receiving final volume of hazardous waste.	-45 Days
Receive proposals.	-30 Days
Select contractor and award contract.	-10 Days
Begin closure activities—field investigation.	Day 0
OD Unit structure and equipment removal.	Day 10
Conduct soil sampling.	Day 50
Obtain analysis of soil samples.	Day 80
Soil excavation (if necessary) and verification sampling.	Day 100
Final decontamination activities and soil removal (if necessary).	Day 130
Submit final report and Closure Certification to the Department.	180 days after receiving final volume of hazardous waste

Note: The schedule above indicates calendar days from the beginning of closure activities by which the listed activities shall be completed. Some activities may be conducted simultaneously.

TABLE H-2
Maximum Detection Limits and Analytical Methods for Analysis of Metals

Analyte	Maximum Detection Limit		EPA *SW-846*[c] Analytical Method[d]
	Water (ug/L)[a]	Soil (mg/kg)[b]	
Arsenic	1.0	1.0	6010C, 7000B, 7061A
Antimony	2.0	6.0	6010C, 7000B
Barium	2.0	20.0	6010C, 7000B
Beryllium	0.20	0.50	6010C, 7000B
Cadmium	0.10	0.5	6010C, 7000B
Chromium	1.0	1.0	6010C, 7000B, 7195, 7196A, 7197
Cobalt	1.0	5.0	6010C, 7000B
Copper	2.0	2.5	6010C, 7470A, 7471B
Lead	1.0	1.0	6010C, 7000B
Mercury	0.2	0.1	7000B, 7470A, 7471B
Nickel	1.0	4.0	6010C, 7000B
Selenium	2.0	3.5	6010C, 7000B, 7741B, 7742
Silver	0.20	1.0	6010C, 7000B
Thallium	1.0	2.5	6010C, 7000B
Tin	5.0	5.0	6010C, 7000B
Vanadium	1.0	5.0	6010C, 7000B
Zinc	2.0	5.0	6010C, 7000B

a ug/L = micrograms per liter;

b mg/kg = milligrams per kilogram (non-aqueous detection limit);

c U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, *SW-846"*.

d Another applicable or newer method may be used with prior NMED approval.

TABLE H-3
Maximum Detection Limits and Analytical Methods for Analysis of VOCs and SVOCs

Analyte	Media (Maximum Detection Limit)	
	Water (ug/L)[1]	Soil (ug/kg)[2]
Volatile Organic Compounds (VOCs)		
Method SW-846-8260B		
Acetone	5.0	10
Benzene	0.50	5.0
Bromochloromethane	0.50	5.0
Bromodichloromethane	0.50	5.0
Bromoform	0.50	5.0
Bromomethane	0.50	5.0
Carbon disulfide	0.50	5.0
Carbon tetrachloride	0.50	5.0
Chlorobenzene	0.50	5.0
Chloroethane	0.50	5.0
Chloroform	0.50	5.0
Chloromethane	0.50	5.0
cis-1,2-Dichloroethene	0.50	5.0
cis-1,3-Dichloropropene	0.50	5.0
Cyclohexane	0.50	5.0
Dibromochloromethane	0.50	5.0
Dichlorodifluoromethane	0.50	5.0
Ethylbenzene	0.50	5.0
Isopropylbenzene	0.50	5.0
Methyl acetate	0.50	5.0
Methylcyclohexane	0.50	5.0
Methylene chloride	0.50	5.0
Methyl tert-butyl ether (MTBE)	0.50	5.0
4-Methyl-2-pentanone	5.0	10
Styrene	0.50	5.0
Toluene	0.50	5.0
trans-1,2-Dichloroethene	0.50	5.0
trans-1,3-Dichloropropene	0.50	5.0
Trichloroethene (TCE)	0.50	5.0
Trichlorofluoromethane	0.50	5.0
Tetrachloroethene	0.50	5.0
m,p-Xylene	0.50	5.0
o-Xylene	0.50	5.0
Vinyl chloride	0.50	5.0
1,2-Dibromo-3-chloropropane	0.50	5.0
1,2-Dichlorobenzene	0.50	5.0
1,3-Dichlorobenzene	0.50	5.0
1,4-Dichlorobenzene	0.50	5.0
1,1-Dichloroethane	0.50	5.0

Table H-3 (Continued)		
Analyte	**Media**	
	Water (ug/L)	**Soil (ug/kg)**
1,2-Dibromoethane	0.50	5.0
1,2-Dichloroethane	0.50	5.0
1,1-Dichloroethene	0.50	5.0
1,2-Dichloropropane	0.50	5.0
1,4-Dioxane	1.0	100
1,1,2,2-Tetrachloroethane	0.50	5.0
1,2,3-Trichlorobenzene	0.50	5.0
1,2,4-Trichlorobenzene		5.0
1,1,1-Trichloroethane	0.50	5.0
1,1,2-Trichloroethane	0.50	5.0
1,1,2-Trichloro-1,2,2-trifluoroethane	0.50	5.0
1,2,3-Trichloropropane	na	10.0
1,2,4-Trimethylbenzene	na	na
1,3,5-Trimethylbenzene	na	na
2-Butanone	5.0	10
2-Hexanone	5.0	10
Method SW-846-8011		
Ethylene dibromide	0.02	na
1,2-dibromo-3-chloropropane	0.02	na
Semi-Volatile Organic Compounds (SVOCs)		
Method SW-846-8270C		
Benzaldehyde	5.0	170
Phenol	5.0	170
Bis(2-chloroethyl) ether	5.0	170
2-Chlorophenol	5.0	170
2-Methylphenol	5.0	170
2,2'-Oxybis(1-choloropropane)	5.0	170
Acetophenone	5.0	170
4-Methylphenol	5.0	170
N-Nitroso-di-n propylamine	5.0	170
Hexachloroethane	5.0	170
Nitrobenzene	5.0	170
Isophorone	5.0	170
2-Nitrophenol	5.0	170
2,4-Dimethylphenol	5.0	170
Bis(2-chloroethoxy) methane	5.0	170
2,4-Dichlorophenol	5.0	170
Naphthalene	5.0	170
4-Chloroaniline	5.0	170
Hexachlorobutadiene	5.0	170
Caprolactam	5.0	170
4-Chloro-3-methylphenol	5.0	170
2-Methylnaphthalene	5.0	170
Hexachlorocyclopentadiene	5.0	170
2,4,6-Trichlorophenol	5.0	170
2,4,5-Trichlorophenol	5.0	170
1,1'-Biphenyl	5.0	170
2-Chloronaphthalene	5.0	170

Table H-3
(Continued)

Analyte	Media	
	Water (ug/L)	**Soil (ug/kg)**
2-Nitroaniline	10	330
Dimethylphthalate	5.0	170
2,6-Dinitrotoluene	5.0	170
Acenaphthylene	5.0	170
3-Nitroaniline	10	330
Acenaphthene	5.0	170
2,4-Dinitrophenol	10	330
4-Nitrophenol	10	330
Dibenzofuran	5.0	170
2,4-Dinitrotoluene	5.0	170
Diethyl phthalate	5.0	170
Fluorene	5.0	170
4-Chlorophenyl-phenyl ether	5.0	170
4-Nitroaniline	10	330
4,6-Dinitro-2-methylphenol	10	330
N-Nitrosodiphenylamine	5.0	170
1,2,4,5-Tetrachlorobenzene	5.0	170
4-Bromophenyl-phenylether	5.0	170
Hexachlorobenzene	5.0	170
Atrazine	5.0	170
Pentachlorophenol	5.0	330
Phenanthrene	5.0	170
Anthracene	5.0	170
Carbazole	5.0	170
Di-n-butyl phthalate	5.0	170
Fluoranthene	5.0	170
Pyrene	5.0	170
Butyl benzyl phthalate	5.0	170
3,3'-dicholorobenzidine	5.0	170
Benzo(a)anthracene	5.0	170
Chrysene	5.0	170
Bis(2-ethylhexyl) phthalate	5.0	170
Di-n-octyl phthalate	5.0	170
Benzo(b) fluoranthene	5.0	170
Benzo(k) fluoranthene	5.0	170
Benzo(a) pyrene	5.0	170
Indeno(1,2,3,-cd) pyrene	5.0	170
Dibenzo(a,h) anthracene	5.0	170
Benzo(g,h,i)perylene	5.0	170

1. Micrograms per liter = parts per billion
2. Micrograms per kilogram = parts per billion
3. not applicable

TABLE H-4
Maximum Detection Limits and Analytical Methods for Analysis of High Explosives and Other Compounds

Analyte (Group)	Maximum Detection Limits[a]		Analytical Method EPA *SW-846*[b]
	Soil (mg/kg)	Water (ug/L)	
1,3,5-Trinitrobenzene	0.25	7.3	8330B
1,3-Dinitrobenzene	0.25	4.0	"
2,4,6-Trinitrotoluene (TNT)	0.25	6.9	"
2,4-Dinitrotoluene	0.25	5.7	"
2,6-Dinitrotoluene	0.26	9.4	"
2-Amino-4,6-Dinitrotoluene	0.25	--	"
4-Amino-2,6-Dinitrotoluene	0.25	--	"
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.22	13.0	"
2-Nitrotoluene	0.25	12.0	"
Nitrobenzene	0.26	6.4	"
3-Nitrotoluene	0.25	7.9	"
4-Nitrotoluene	0.25	8.5	"
Tetryl	0.65	4.0	"
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1.0	14.0	"
Nitroglycerin (NG)	6.1	3.65	"
Perchlorate	0.010	0.53	6850
White phosphorus	0.43	0.008	7580
Dioxins and Furans	0.50	0.005	8280B or 8290A

a. mg/kg = milligrams per kilogram; ug/L = micrograms per liter.

b. U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, *SW-846"*.

TABLE H-5
Sample Containers, Preservation Methods, and Holding Times for Soil Samples

Analyte Group	Container Type[a]	Preservation Method	Holding Time[b]
Metals[c] (except mercury and hexavalent chromium)	4 oz glass jar with PTFE[d] cap	Cool to 4 degrees Celsius (°C)	180 days
Mercury	4 oz glass jar with PTFE cap	Cool to 4°C	28 days
Hexavalent chromium	4 oz glass jar with PTFE cap	Cool to 4°C	28 days
Volatile organic compounds[c]	4 oz glass jar with PTFE cap	Cool to 4°C	14 days
Semivolatile organic compounds[c]	4 oz glass jar with PTFE cap	Cool to 4°C	14 days
High explosives[c]	4 oz glass jar with PTFE cap	Cool to 4°C	14 days
Perchlorate	4 oz glass jar with PTFE cap	Cool to 4°C	28 days
White Phosphorus	4 oz glass jar with PTFE cap	Cool to 4°C	Indefinite (if preserved at or below 4°C, kept in the dark, and tightly sealed)
Dioxins and Furans	250 mL wide mouth amber glass jar with PTFE lid	Cool to 4°C	30 days

a. Other container types may be used depending upon the laboratory or the method used and with prior NMED approval.

b. Holding time information from U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

c. Volatile and semivolatile organic compounds, metals, and high explosives are listed by respective test method numbers in U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

d. Polytetrafluoroethylene (Teflon™)

TABLE H-6
Sample Containers, Preservation Methods and Holding Times for Liquid Samples

Analyte Group	Container Type[a]	Preservation Method	Holding Time[b]
Metals[c] (except mercury and hexavalent chromium)	1-liter Polyethylene bottle with PTFE[d] lined cap	HNO_3[e] to pH <2 and cool to 4 degrees Celsius (°C)	180 days
Mercury	1-liter Polyethylene or Glass bottle with PTFE-lined lid	HNO_3 to pH <2	28 days
Hexavalent chromium	1-liter Amber Glass jar with PTFE lined cap	Cool to 4°C	24 hours
Volatile organic compounds[c]	3 x 40 mL Glass vials with PTFE-lined septum caps	HCl[f] Cool to 4°C	14 days
Semivolatile organic compounds[c]1 Liter	2 x 1-liter Amber Glass with PTFE-lined lid	Cool to 4°C	7 days
High explosives[c]	1-liter Amber Glass with PTFE-lined lid	Cool to 4°C	7 days
Perchlorate	125-mL Polyethylene bottle with PTFE-lined lid	Cool to 4°C	28 days
White Phosphorus	500-mL Polyethylene bottle with PTFE-lined lid	Cool to 4°C, kept in dark storage	5 days
Dioxins and Furans	4 x 1-liter Amber Glass with PTFE-lined lid	Cool to 4°C	30 days

a. Other container types may be used depending upon the laboratory or the method used and with prior NMED approval.

b. Holding time information from U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846.*

c. Volatile and semivolatile organic compounds, metals, and high explosives are listed by respective test method numbers in U.S. Environmental Protection Agency, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846.*

d. Polytetrafluoroethylene (Teflon™)

e. HNO_3 = Nitric acid

f HCl = Hydrochloric acid

TABLE H-7
Field Quality Control Samples

Quality Control Sample Type	Sample Matrix	Applicable Analyses	Frequency	Purpose
Trip blank	Water/Soil	VOCs[a]	One per day	Document any contamination attributable to shipping and field handling procedures
Field blank	Soil/Water	VOCs	One per day	Document any contamination attributable to field conditions
Field duplicate	Soil/Water	VOCs, SVOCs[b], metals, HE[c] Dioxins and Furans White Phosphorus Perchlorate	Minimum of one per 20 environmental samples per media type	Document precision of the sampling/analysis process
Equipment blank	Water	VOCs, SVOCs, metals, HE Dioxins and Furans White Phosphorus Perchlorate	One sample per day per media type	Document whether decontamination of sampling equipment was adequate

a VOCs = volatile organic compounds.

b SVOCs = semivolatile organic compounds.

c. HE = High Explosives

PERMIT ATTACHMENT I: COMPLIANCE SCHEDULES

1.0 INTRODUCTION

The Permittee shall meet the due dates in the compliance schedules of Tables I-1 through I-3 of this Permit Attachment (I), as well as any other due dates specified in this Permit that are not included in the tables of Permit Attachment I. Table I-1 contains a list of general submittals and their due dates. Table I-2 lists various submittals related to corrective action and their due dates, whereas, Table I-3 lists submittals for corrective action related to specific SWMUs and AOCs and their associated due dates.

Table I-1
General Submittals[a]

Facility Submission Requirements	Due Date
Biennial Report (Permit Section 2.16)	March 1 of every even-numbered year
Waste Minimization Program Certified Report (Permit Section 2.8)	Annually, by December 1
Annual Sampling and Analysis Report for Air (Permit Section 3.3)	Annually by March 31
Permit renewal (Permit Section 1.14)	180 days before Permit expiration
Non-Compliance Oral Report (Permit Section 1.27, item 1)	Within 24 hours of non-compliance activity
Non-Compliance Written Report (Permit Section 1.27, item 2)	Within five days of non-compliance activity
Certification of Construction or Modification (Permit Section 1.26)	Prior to treatment or storage of hazardous waste in the modified portion of the permitted unit
Revised Closure Plan (Permit Sections 4.1 and 4.2)	Within 60 days after discovering that a revised Closure Plan is required in accordance with this Permit, or within 60 days after receiving written notification by the Department whichever is earlier
Notification of Closure (Permit Section 4.3)	45 days prior to closure
Final Closure Report and written Closure Certification (Permit Section 4.7)	Within 60 calendar days from the date of completion of closure of the OD Unit.
Human Risk Screening: Exceedances of SSLs (Permit Attachment D, Section 1.6)	Within 15 days of exceedance
Annual Soil Sampling Report (Permit Attachment D, Section 1.7)	Within 90 days of completion of each sampling event
Monitoring Well Installation Plan (Permit Section 3.5.1)	Within 90 days of the effective date of this Permit
Well Completion Report (Permit Section 3.5.1)	Within 30 days of completing well installation
Groundwater Sampling and Analysis Plan (Permit Section 3.5.2)	Within 90 days of the effective date of this Permit

a. Not necessarily all-inclusive listing of required submittals under this Permit

TABLE I-2 Submittal Requirements for Corrective Action	
TYPE OF SUBMITTAL	**DUE DATE**
ANNUAL REPORTS	
Annual Report: Outdoor Testing and Training Activities (Permit Section 6.1.7)	90 days from effective date of this Permit and annually thereafter by March 31 of each year
Quarterly Reports	
Quarterly Progress Reports (Permit Section 6.1.6)	January 31, April 30, July 31, and October 31 of each calendar year
Quarterly Perchlorate Screening Reports (Permit Section 6.4.1.4)	January 31, April 30, July 31, and October 31 of each year for at least 8 consecutive quarters
Other Reports/Submittals	
Offsite Access (Permit Section 6.1.1)	Immediately upon discovery
Field Sampling/Activities (Permit Section 6.1.2)	At least 15 days prior to field sampling or activity
Verbal notification of newly-discovered releases, SWMUs or AOCs (Permit Section 6.1.8)	Within 24 hours after release discovery
Written notification of newly-discovered releases, SWMUs or AOCs (Permit Section 6.1.8)	Within 15 days after release discovery
SWMU Assessment Report (SAR) (Permit Section 6.1.8)	Within 90 days after submitting written notification of a newly-discovered SWMU/AOC
Notification of Land Transfer (Permit Section 6.1.12)	Within 90 days of transfer of the property
Investigation Work Plan (Permit Section 6.2.2.1.1)	Date specified in Table I-3
Investigation Report (Permit Section 6.2.2.1.2)	Schedule provided in Table I-3
Corrective Measures Evaluation (CME) Work Plan (Permit Section 6.2.2.2.2)	Within 90 days of notification by the Department
Corrective Measures Evaluation (CME) Report (Permit Section 6.2.2.2.3)	Within 90 days of completion of CME
Risk Assessment Report (Permit Section 6.2.4.5)	Appended to or in combination with a CME or Investigation Report, or as otherwise specified in a work plan or by the Department in writing
CMI Work Plan (Permit Section 6.2.2.2.7)	Within ninety (90) days after the Department's selection of a final remedy, or as otherwise specified by the Department in writing
CMI Work Plan Progress Report (Permit Section 6.2.2.2.9)	In accordance with the schedule approved in the CMI Work Plan
CMI Report (Permit Section 6.2.2.2.10)	Within 90 days of completion of remedy or ACM
Accelerated Corrective Measures (ACM) Work Plan (Permit Section 6.2.2.2.11.2)	Prior to ACM initiation
ACM CMI Report (Permit Section 6.2.2.2.11.3)	Within ninety (90) days of completion of ACM

Table I-2 (continued)	
Interim Measures Work Plan (Permit Section 6.2.2.2.12.2)	Within 60 days after receiving notification from the Department that interim measures are required, or such other period as stated in the notification
Emergency Interim Measures (Permit Section 6.2.2.2.12.4)	Within three (3) days of discovery that Emergency IM are required
Interim Measures Report (Permit Section 6.2.2.2.12.5)	60 days after completion of Interim Measure or as otherwise specified in the Interim Measures Work Plan
Periodic Monitoring Reports (Permit Section 6.5.17.7	Within 90 days of completion of monitoring fieldwork or in accordance with work plan schedules
General Facility Information (Permit Section 6.2.1.1)	Within 90 days from effective date of this Permit and annually thereafter by March 31 if update needed
Report on Potential Receptors (Permit Section 6.2.1.2)	Within 90 days from effective date of this Permit and no later than March 31 of subsequent years if an update is needed
Surface Water Contamination Assessment Report (Permit Section 6.2.1.3)	Within 90 days after effective date of Permit
Corrective Measures Evaluation (CME) Work Plan: Landfills with contents not removed (Permit Section 6.4.1.1**)**	Within 180 days after effective date of this Permit
CME Report: Landfills with contents not removed (Permit Section 6.2.2.2.3)	Within 90 days of completion of CME
Military Range Assessment Report (Permit Section 6.4.1.2)	Within 90 days after effective date of Permit

TABLE I-3
Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs)
Requiring Corrective Action

SWMU/ AOC	IRP SITE	DESCRIPTION	REQUIRED SUBMITTAL	
			TYPE	DUE DATE
6-1	LF-001	Landfill #1	Long Term Monitoring and Maintenance Plan	submitted
6-2	LF-002	Landfill #2	Corrective Measures Implementation Report for Cover Construction	submitted
			Corrective Measures Implementation Work Plan for Sewer Line Removal or Abandonment	180 days after effective date of Permit
			Long Term Monitoring and Maintenance Plan	submitted
6-4	LF-008	Landfills #4, 5 and 6	Investigation Work Plan (groundwater selenium)	3/31/11
			Long Term Monitoring and Maintenance Plan	submitted
6-19	OT-029	Open Burn Pit on EOD Range	Investigation Report	12/28/11
6-24	WP-016	Manzano Sewage Treatment Facility	Investigation Report (groundwater)	submitted
MBG	MBG	Manzano Base Groundwater	Investigation Work Plan	3/31/11
6-30	RW-006	Radioactive Burial 11	Investigation Report	submitted
10-2-A	ST-325	Corrosion Control Shop Storm Drain Bldg. 482	Investigation Report	12/28/10
10-2-B	ST-220	Paint Shop, Storm Drain	Investigation Report	12/28/10
10-2-C	ST-220	Plating & Anodizing Bldg. 1001	Investigation Report	submitted
10-2-D	ST-329	Propulsion Branch Floor Drain Bldg. 336	Investigation Report	submitted
10-2-F	ST-325	H-3/H-53 Phase Dock Bldg. 1000 Floor Drains	Investigation Report	12/28/10
10-2-G	ST-331	C-130 Maintenance Shop Bldg. 1009 Storm Sewer	Investigation Report	12/28/10
10-2-H	ST-285	West Storm Sewer System	Investigation Report	12/28/12
10-2-I	ST-286	East Storm Sewer System	Investigation Report	12/28/12
10-7-V	ST-267	Oil/Water Separator Bldg. 57007	Investigation Report	submitted
10-21-B	ST-288	Septic System Bldg. 614	Investigation Report	12/31/12
	ST-289	Septic System Bldg. 617 & 620	Investigation Report	12/31/12
	ST-291	Septic System Bldg. 617	Investigation Report	12/31/12
10-21-C	ST-294	Septic System Bldg. 633	Investigation Report	12/31/12
	ST-298	Septic System Bldg. 730 &734	Investigation Report	12/31/12
	ST-299	Septic System Bldg. 751	Investigation Report	12/31/12

Table I-3
(continued)

SWMU/ AOC	IRP SITE	DESCRIPTION	REQUIRED SUBMITTAL	
			TYPE	DUE DATE
10-21-M	ST-309	Septic System Bldg. 37504	Investigation Report	12/31/12
10-21-N	ST-310	Septic System Bldgs. 37507, 37508 & 37513	Investigation Report	12/31/12
	ST-322	Septic System Bldgs. 37507, 37508 & 37513	Investigation Report	12/31/12
10-21-O	ST-311	Septic System Plant 1 & Bldg. 37501	Investigation Report	12/31/12
10-21-P	ST-312	Septic System Plant 2 & Bldg. 37503	Investigation Report	12/31/12
10-21-Q	ST-313	Septic System Bldgs. 37529 & 37530	Investigation Report	12/31/12
10-21-R	ST-293	Septic System Bldg. 37570	Investigation Report	12/31/12
10-21-S	ST-314	Septic System Bldgs. 48056 & 48059	Investigation Report	12/31/12
10-21-T	ST-316	Septic System CERF Bldgs. 57003 & 57012	Investigation Report	12/31/12
	ST-340	Septic System CERF Bldgs. 57001 & 57002	Investigation Report	submitted
10-21-U	ST-318	Septic System Bldg. 37200	Investigation Report	6/30/13
10-21-V	ST-319	Septic System Bldg. 37541	Investigation Report	6/30/13
10-21-Z	ST-330	Septic System Bldg. 1032	Investigation Report	6/30/13
10-21-AA	ST-333	Septic System SOR Bldg. 66001	Investigation Report	6/30/13
	ST-343	Septic System SOR Bldgs. 66000 & 66008	Investigation Report	6/30/13
	ST-344	Septic System SOR Bldgs. 66042	Investigation Report	6/30/13
ST-70-A	ST-202 & 203	Oil/Water Separator & Sediment Trap Bldgs. 333/334	Investigation Report	submitted
ST-70-B	ST-210	Oil/Water Separator Tank & Drying Rack Bldg. 377	Investigation Report	submitted
ST-70-C	ST-211	Oil/Water Separator Bldg. 381	Investigation Report	submitted
ST-70-D	ST-215 & 216	Oil/Water Separators (2) Bldg. 471	Investigation Report	submitted
ST-70-E	ST-219	Oil/Water Separator Bldgs. 481/482	Investigation Report	submitted
ST-70-F	ST-247	Oil/Water Separator Bldg. 2637	Investigation Report	submitted
ST-70-G	ST-248	Oil/Water Separator Bldg. 20205	Investigation Report	submitted
ST-70-H	ST-258	Oil/Water Separator Bldg. 20375	Investigation Report	submitted
ST-70-I	ST-260	Oil/Water Separator Bldg. 20442	Investigation Report	submitted

Table I-3
(continued)

SWMU/ AOC	IRP SITE	DESCRIPTION	REQUIRED SUBMITTAL	
			TYPE	DUE DATE
ST-73	ST-073	CERF Drain	Investigation Report	submitted
ST-106 and SS-111	ST-106 and SS-111	Bulk Fuels Facility Spill	CME Report	180 days after NMED approves site characterization
DP-067	DP-067	Three Mine Shafts	Investigation Report	6/16/11
DP-088	DP-088	Trestle Site Disposal Area	Investigation Report	6/16/11
WP-026	WP-026	Sewage Lagoons and Golf Course Pond	Investigation Report	submitted
SS-102	SS-102	ARES Test Facility	Investigation Report	6/30/11
RW-68	RW-68	Radium Dump/Slag Pile and Cratering Area	Investigation Report	submitted
TAG	TAG	Tijeras Arroyo Groundwater Area	Investigation Report	submitted
Monitoring Well WYO-4 Area	WYO-4 Well Ground -water Area	TCE contaminated groundwater	Investigation Work Plan	3/31/11
EOD Hill	EOD Hill	Perchlorate contaminated groundwater	Investigation Work Plan	submitted
McCormick Ranch	McCor-mick Ranch	Nitrate contaminated groundwater	Investigation Work Plan	3/31/11

PERMIT ATTACHMENT J: LIST OF HAZARDOUS WASTE MANAGEMENT UNITS

1.0 INTRODUCTION

Table J-1 lists the operating and closed hazardous waste management units at the Facility.

TABLE J-1 Hazardous Waste Management Units
Operating Hazardous Waste Management Units
Open Burn (OB) Treatment Unit (pending closure)
Open Detonation (OD) Treatment Unit
Closed Hazardous Waste Management Units
Hazardous Waste Container Storage Unit (CSU) / Defense Reutilization and Marketing Office Building 1024

PERMIT ATTACHMENT K: LIST OF SWMUS AND AOCS FOR WHICH CORRECTIVE ACTION IS COMPLETE

1.0 INTRODUCTION

Table K-1 lists SWMUs and AOCs for which corrective action is complete without controls.

TABLE K-1
Solid Waste Management Units (SWMUS) and Areas of Concern (AOCS) for which Corrective Action is Complete Without Controls
(Granted No Further Action Status)

SWMUs/AOCs			
SWMU/AOC	**IRP SITE**	**DESCRIPTION**	**DATE OF APPROVAL**
6-7	LF-018	Landfill A	8/28/03
6-10	LF-009	Abandoned Landfill	8/28/03
6-15	LF-045	Unnamed Dump	8/28/03
6-16	FT-013	Kirtland Fire Training Area	8/28/03
8-53	ST-335	Paint Shop Floor Drain, Bldg. 20681	8/28/03
8-58	ST-321	Battery Storage Area, Bldg. 57007	8/28/03
10-3	ST-249	Waste Oil Storage Tank, Bldg. 20205	8/28/03
ST-66	ST-066	Trestle Facility Oil Water Separator and Pit	8/28/03
SS-76	SS-076	Fuel Tank Burn Area	8/28/03
SS-83	SS-083	Skeet Range and Landfill Road	8/28/03
ST-326	ST-326	Waste Oil Storage Tank, Bldg. 20375	8/28/03
ST-328	ST-328	Blast Overpressure Site Cesspools	8/28/03
6-A1	RW-021	Radioactive Burial 7	8/03/05
8-49	SS-061	Fuel Shop Waste Battery Storage, Bldg. 20667	8/03/05
LF-56	LF-056	Landfill D	8/03/05
OT-086	OT-086	Former Small Arms Range	8/03/05
RW-085	RW-085	Manzano Maintenance Building	8/03/05
SS-65	SS-065	Horizontal Dipole Drum Rack	8/03/05
SS-082	SS-082	ALECS Facility	8/03/05
SS-103	SS-103	Jet Engine Test Fuel Line	8/03/05
ST-59	ST-059	ART Drum	8/03/05
ST-60	ST-060	ART Pit	8/03/05
6-A2-A	RW-004	Radioactive Holding Tank 4	9/21/05
6-A2-B	RW-005	Radioactive Holding Tank 5	9/21/05
6-A2-C	RW-017	Radioactive Holding Tank 6	9/21/05
6-A2-D	RW-019	Radioactive Holding Tank 8	9/21/05
6-A2-E	RW-023	Radioactive Holding Tank 9	9/21/05

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
6-8	LF-015	Landfill B	9/21/05
6-29	LF-020	Manzano Landfill	9/21/05
8-13	ST-071	Bldg. 1000/1001 Oil/Water Separator	9/21/05
9-14	ST-270	Buried Caustic Drain Line Bldg. 617	9/21/05
9-15	ST-271	Neutralization Pit Bldg. 617	9/21/05
9-16	ST-272	Evaporation/Infiltration Pond Bldg. 617	9/21/05
10-21-S	ST-353	Bldg. 48057 Septic Tank	9/21/05
	ST-354	Sheep Grooming Septic Tank	9/21/05
SS-69	SS-069	Drum Storage Area	9/21/05
ST-100	ST-100	Coyote Springs Cesspool	9/21/05
ST-341	ST-341	Condensate Tank Bldg. 1033	9/21/05
WP-58	WP-058	East Laundry Bldg. 20451	9/21/05
10-21-OO	ST-355	Riding Stables Residence [Domestic Sewage]	9/21/05
OT-010	OT-010	Radiation Training Sites 5-8	9/21/05
RW-075	RW-075	South Tijeras Radiation Trench	9/21/05
10-7-A	ST-204	Sediment Trap Bldg. 333	11/29/05
	ST-205	Oil/Water Separator Bldg. 333	11/29/05
10-7-B	ST-206	Oil/Water Separator Bldg. 336	11/29/05
	ST-207	Oil/Water Separator Bldg. 336	11/29/05
	ST-208	Oil/Water Separator Bldg. 336	11/29/05
	ST-209	Catch Basin Bldg. 336	11/29/05
10-7-C	ST-212	Oil/Water Separator Bldg. 381	11/29/05
	ST-213	Area Drain Bldg. 381	11/29/05
10-7-D	ST-217	Oil/Water Separator Bldg. 481	11/29/05
10-7-E	ST-218	Oil/Water Separator Bldg. 482	11/29/05
10-7-F	ST-222	Oil/Water Separator Bldg. 1031	11/29/05
	ST-223	Sewage Ejector Unit Bldg. 1031	11/29/05
	ST-224	Area Drain Bldg. 1031	11/29/05
	ST-225	Holding Tank Bldg. 1031	11/29/05
10-7-G	ST-226	Oil/Water Separator Bldg. 1037	11/29/05
	ST-227	Holding Tank Building 1037	11/29/05
10-7-H	ST-228	Area Drain Bldg. 1040	11/29/05
10-7-I	ST-229	Sewage Ejector Unit Bldg. 1043	11/29/05
10-7-J	ST-230	Oil/Water Separator Bldg. 1046	11/29/05
	ST-231	Holding Tank Bldg. 1046	11/29/05
	ST-232	Sewage Ejector Unit Bldg. 1046	11/29/05
	ST-233	Area Drain Bldg. 1046	11/29/05

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
10-7-K	ST-234	Oil/Water Separator Bldg. 1051	11/29/05
	ST-235	Oil/Water Separator Bldg. 1051	11/29/05
	ST-236	Oil/Water Separator Bldg. 1051	11/29/05
	ST-237	Area Drain Bldg. 1051	11/29/05
10-7-L	ST-238	Oil/Water Separator Bldg. 1056	11/29/05
	ST-239	Oil/Water Separator Bldg. 1056	11/29/05
10-7-M	ST-240	Holding Tank Bldg. 1058	11/29/05
10-7-N	ST-241	Oil/Water Separator Bldg. 1061	11/29/05
10-7-O	ST-244	Oil/Water Separator Bldg. 1064	11/29/05
	ST-245	Holding Tank Bldg. 1064	11/29/05
10-7-P	ST-246	Oil/Water Separator Bldg. 1070	11/29/05
10-7-Q	ST-254	Oil/Water Separator Bldg. 20365	11/29/05
10-7-R	ST-255	Oil/Water Separator Bldg. 20375	11/29/05
	ST-256	Oil/Water Separator Bldg. 20375	11/29/05
	ST-257	Oil/Water Separator Bldg. 20375	11/29/05
10-7-S	ST-259	Oil/Water Separator Bldg. 20422	11/29/05
10-7-T	ST-263	Oil/Water Separator Bldg. 23226	11/29/05
10-7-U	ST-264	Oil/Water Separator Bldg. 30142	11/29/05
6-14	ST-051	Sewage Effluent Line	2/27/06
8-5	ST-201	Oil/Water Separator Bldg. 255	2/27/06
8-6	WP-047	Silver Recovery Unit	2/27/06
8-26	ST-242	Oil/Water Separator Bldg. 1063	2/27/06
	ST-243	Oil/Water Separator Bldg. 1063	2/27/06
8-28	ST-250	Oil/Water Separator Bldg. 20338	2/27/06
8-29	ST-251	Oil/Water Separator Bldg. 20344	2/27/06
8-31-A	ST-252	Oil/Water Separator Bldg. 20348	2/27/06
8-31-B	ST-253	Oil/Water Separator Bldg. 20348	2/27/06
8-41	ST-274	Waste Battery Storage Area Bldg. 20423	2/27/06
8-47	ST-261	Oil/Water Separator (OW/S) Bldg. 20423	2/27/06
8-55	ST-262	Oil/Water Separator CE Bldg. 20698	2/27/06
10-1-A	ST-278	Sanitary Sewer System A	2/27/06
10-1-B	ST-279	Sanitary Sewer System B	2/27/06
10-1-C	ST-280	Sanitary Sewer System C	2/27/06
10-1-D	ST-281	Sanitary Sewer System D	2/27/06
10-1-E	ST-282	Sanitary Sewer System E	2/27/06
10-1-F	ST-283	Sanitary Sewer System F	2/27/06
10-1-G	ST-284	Sanitary Sewer System G	2/27/06
10-1-H	ST-327	Manzano Sanitary Sewer System	2/27/06

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
6-31	OT-028	McCormick Ranch Range	6/02/06
9-4	ST-276	Waste Accumulation Area Bldg. 617	6/02/06
9-20	SS-062	Waste Accumulation Area Bldg. 909	6/02/06
10-21-B	ST-273	Septic System Bldg. 618	6/02/06
	ST-351	Building 635 Septic Tank	6/02/06
	ST-352	Building 613/614 Septic Tank	6/02/06
DP-099	DP-099	Disposal Pit Bldg. 29015	6/02/06
DP-101	DP-101	Old EOD Disposal Pits	6/02/06
FT-015	FT-015	NMERI Fire Suppression Test Area	6/02/06
LF-268	LF-268	Active Landfill	6/02/06
OT-74	OT-074	Pistol Range Sites	6/02/06
OT-091	OT-091	South Coyote Firing Site	6/02/06
RW-084	RW-084	Manzano Burial Site	6/02/06
SD-090	SD-090	JATO Rocket Motor Disposal Site	6/02/06
SS-078	SS-078	Water Tower Soils	6/02/06
SS-079	SS-079	Building 381 Spill Site	6/02/06
SS-081	SS-081	Detention Pond and Yard Bldg. 907	6/02/06
SS-089	SS-089	Transportation Yard	6/02/06
ST-72	ST-072	MWSA Security Garage Oil/Water Separator, Bldg. 30146	6/02/06
ST-080	ST-080	Auto Hobby Shop Bldg. 30124	6/02/06
ST-347	ST-347	Building 29015 Cesspool	6/02/06
WP-087	WP-087	Grab Site Waste Pile	6/02/06
WP-339	WP-339	Contractor Yard West of Bldg. 20423	6/02/06
6-11	LF-044	Fill Area Southeast of Old Sewage Lagoons (Former LF-044)	7/17/07
ST-064	ST-064	Corps of Engineers (COE) Vehicle Maintenance Yard, (Former ST-337)	7/17/07
ST-108	ST-108	Abandoned JP-4 Fuel Line (ST-108)	7/17/07
SS-77	SS-77	Abandoned Railroad Spur	7/17/07
6-32	FT-014	Manzano Fire Training Area (Former FT-14)	7/17/07
8-35	ST-214	Waste Oil Storage Tank, Building 471 (Former ST-214)	7/17/07
10-21-B	ST-348	Site ST-348, Building 610 Septic Tank	7/17/07
10-21-B	ST-349	Site ST-349, Building 626 Septic Tank	7/17/07
10-2-E	SS-063	Jet Engine Test Cell (Former ST-336)	7/17/07
6-22	OT-046	Lake Christian	7/17/07
LF-107	ST-107	Veterans Administration Demolition Debris Landfill (LF-107)	7/17/07
SS-78-B	SS-078	Water Tower Soils (WT-21871)	7/17/07

TABLE K-1
(Continued)

SWMU/AOC	IRP SITE	DESCRIPTION	DATE OF APPROVAL
SS-78-C	SS-078	Water Tower Soils (WT-2474)	7/17/07
SS-78-D	SS-078	Water Tower Soils (ITRI WTs)	7/17/07
10-21-A	ST-287	Building 525 Septic System	4/29/08
10-21-B	ST-290	Building 619 Septic System	4/29/08
10-21-B	ST-292	Building 622 Septic System	4/29/08
10-21-C	ST-295	Building 638 Septic System	4/29/08
10-21-D	ST-296	Building 702 Septic System	4/29/08
10-21-D	ST-297	Building 707 Septic System	4/29/08
10-21-E	ST-300	Building 20199 Septic System	4/29/08
10-21-F	ST-301	Building 20560 Septic System	4/29/08
10-21-G	ST-302	Building 20599 Septic System	4/29/08
10-21-H	ST-303	Building 20749 Septic System	4/29/08
10-21-I	ST-304	Building 20797 Septic System	4/29/08
10-21-J	ST-305	Building 28054 Septic System	4/29/08
10-21-J	ST-306	Building 28050 Septic System	4/29/08
10-21-K	ST-307	Building 30101 Septic System	4/29/08
10-21-L	ST-308	Building 37511 Septic System	4/29/08
10-21-K	ST-315	Building 30102 Septic System	4/29/08
10-21-T	ST-317	Building 57011 Septic System	4/29/08
10-21-W	ST-320	Building 20149 Septic System	4/29/08
10-21-X	ST-323	Building 29042 Septic System	4/29/08
10-21-Y	ST-324	Building 29051 Septic System	4/29/08
10-21-AA	ST-342	SOR Building 66029 Septic System	4/29/08
10-21-AA	ST-345	SOR Building 66006 Septic System	4/29/08
10-21-BB	ST-346	Trestle Site Septic System	4/29/08
6-3	LF-007	Landfill 3	4/29/08
ST-356	ST-356	Skeet Range Septic Tank [Domestic Sewage]	4/29/08
10-21-X	ST-350	600 Area Field Office Septic Tank [Domestic Sewage]	4/29/08

PERMIT ATTACHMENT L (RESERVED)

(Reserved for Groundwater Sampling and Analysis Plan)

DISCHARGE PERMITS

DP-1770 Modification Application and Termination

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive (87505)
PO Box 5469, Santa Fe, NM 87502-5469
Phone (505) 827-2990 Fax (505) 827-1628
www.env.nm.gov

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lt. Governor

RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 4, 2016

Mr. L. Wayne Bitner
Chief, Environmental Restoration
2050 Wyoming Blvd SE
Kirtland AFB, New Mexico 87117-5600

RE: DP-1770 Modification Application and Termination

Dear Mr. Bitner:

On December 4, 2015, the New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) received Kirtland Air Force Base's (KAFB) application (Application) to modify Discharge Permit 1770 (DP-1770). The Application requested authorization to apply treated groundwater as an irrigation source to the KAFB Tijeras Arroyo Golf Course (Golf Course), to utilize the treated groundwater for dust suppression, and to infiltrate a portion of the water. The source of this discharge is groundwater contaminated with ethylene dibromide (EDB) extracted from wells KAFB-106228R, KAFB-106233 and KAFB-106234, which is then treated using granular activated carbon (GAC) for EDB removal to below the constituent's 0.05 µg/L Maximum Contaminant Level prior to discharge. KAFB has established a treatment goal for the GAC system of non-detectable EDB. The proposed discharge is on or near the northwest edge of the Golf Course, Kirtland Air Force Base, Albuquerque in Section 9, Township 9N, Range 4E, Bernalillo County, New Mexico.

In addition to the land application procedures addressed in the Application, KAFB has requested authorization to utilize underground injection wells as a means to dispose of the treated groundwater in a separate discharge permit application (DP-1839). The groundwater that is the subject of DP-1770 is undergoing remediation, *i.e.*, extracted and treated, pursuant to KAFB's Hazardous Waste Treatment Facility Operating Permit, EPA ID No. NM9570024423, and meets Federal Drinking Water Standards. The GWQB also notes that KAFB has been irrigating the Golf Course with water of similar chemistry and quality for over fifteen years, with no adverse effects to public health or the environment.

KAFB is abating water pollution under Resource Conservation and Recovery Act (RCRA) authority delegated to NMED, pursuant to a hazardous waste permit and the Hazardous Waste Management Regulations, 20.4.1 NMAC. Therefore, KAFB is exempt from abatement plan requirements for this activity pursuant to 20.6.2.4105.A(2) and (3) NMAC. As would be the case if the abatement was occurring strictly under an abatement plan approved pursuant to the Ground and Surface Water Protection Regulations, 20.6.2 NMAC, a discharge permit for land application of treated effluent is not required. Therefore, the GWQB hereby terminates DP-1770 as it is not required for the activity of irrigating the Golf Course with treated effluent regulated pursuant to Hazardous Waste Permit No. NM9570024423.

Should any of these circumstances change, please contact NMED immediately so that we may re-evaluate the regulatory status of this activity. DP-1839 is not impacted by this determination.

If you have any questions, please contact Steve Pullen of the Ground Water Quality Bureau's Pollution Prevention Section at (505) 827-2962.

Sincerely,

Trais Kliphuis, Director
Water Protection Division

Cc: (via e-mail)
Kathryn Roberts, NMED Resource Protection Division
Dennis McQuillan, NMED Chief Scientist
Michelle Hunter, NMED Ground Water Quality Bureau
John Kieling, NMED Hazardous Waste Bureau
Steve Huddleson, NMED Ground Water Quality Bureau
Steve Pullen, NMED Ground Water Quality Bureau
Jennifer Hower, NMED Office of General Counsel
John Verheul, NMED Office of General Counsel

DP-1839, Kirtland Air Force Base

NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau
1190 South St. Francis Drive (87505)
P.O. Box 5469, Santa Fe, New Mexico 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.env.nm.gov

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary

J.C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 28, 2017

Colonel Eric H. Froelich, Commander
337 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5606

RE: Discharge Permit Issuance, DP-1839, Kirtland Air Force Base

Dear Col. Froelich:

The New Mexico Environment Department (NMED) issues the enclosed Discharge Permit, DP-1839, to Kirtland Air Force Base (Permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Ground and Surface Water Protection Regulations, 20.6.2 NMAC, under the authority of the New Mexico Water Quality Control Commission (WQCC).

The Discharge Permit contains terms and conditions that shall be complied with by the Permittee and are enforceable by NMED pursuant to Section 20.6.2.3104 NMAC, WQA, NMSA 1978 §74-6-5 and §74-6-10. Please be aware that this Discharge Permit may contain conditions that require the Permittee to implement operational, monitoring or closure actions by a specified deadline. Such conditions are listed at the beginning of the operational, monitoring and closure plans of this Discharge Permit.

Issuance of this Discharge Permit does not relieve the Permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state, and/or local laws, regulations, zoning requirements, and nuisance ordinances.

Pursuant to Paragraph (4) of 20.6.2.3109.H NMAC, the term of the Discharge Permit shall be five years from the effective date. The term of this Discharge Permit will end on April 28, 2022.

NMED requests that the Permittee submit an application for renewal (or renewal and modification) at least 180 days prior to the date the Discharge Permit term ends.

An invoice for the Discharge Permit Fee of $1,600.00 is being sent under separate cover. Payment of the Discharge Permit Fee must be received by NMED within 30 days of the date the Discharge Permit is issued.

If you have any questions, please contact Steve Pullen at (505) 827-2962. Thank you for your cooperation during this Discharge Permit review.

Sincerely,

Michelle Hunter, Chief
Ground Water Quality Bureau

MH:sdp

Encs: Discharge Permit, DP-1839

cc (electronic w/enclosure):
J. Kieling, NMED-HWB
D. Agnew, NMED-GWQB
S. Pullen, NMED-GWQB
L. King, EPA-Region 6 (6PD-N)
S. Clark, AFCEC-CZOW
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
T. Simpler, USACE

file:
Read File
DP1839 File

GROUND WATER DISCHARGE PERMIT
Kirtland Air Force Base
Underground Injection Control Wells
DP-1839

I. INTRODUCTION

The New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) issues this Discharge Permit (DP-1839) for discharges via Class V underground injection control (UIC) well(s) to Kirtland Air Force Base (KAFB or Permittee) pursuant to the New Mexico Water Quality Act (WQA), New Mexico Statutes Annotated (NMSA) 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 New Mexico Administrative Code (NMAC).

The discharge that is covered by this Discharge Permit is limited to groundwater associated with the KAFB's Bulk Fuel Facility (BFF) corrective action. The groundwater is specifically the dissolved-phase portion of the contaminant plume within the regional aquifer that is elevated above the standards of 20.6.2.3103 NMAC and investigation derived waste (IDW) that meets the design parameters of the treatment system. This groundwater is being treated as an interim measure implemented pursuant to the corrective action provisions in Part 6 of KAFB's Hazardous Waste Treatment Facility Operating Permit (HWTF Permit No. NM9570024423 – "RCRA Permit").

The NMED GWQB's purpose in issuing this Discharge Permit, and in imposing the requirements and conditions specified herein, is to control the discharge of water contaminants so as to protect groundwater for present and potential future use as domestic and agricultural water supply and other uses and to protect public health. In issuing this Discharge Permit, NMED has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been or will be met. Pursuant with Section 20.6.2.3104 NMAC, it is the responsibility of the Permittee to comply with the terms and conditions of this Discharge Permit; failure to do so may result in an enforcement action(s) by NMED (20.6.2.1220 NMAC).

The NMED's Hazardous Waste Bureau (HWB) and GWQB both provide regulatory oversight at the BFF project site. The HWB regulates the evaluation and remediation of the KAFB BFF dissolved-phase plume and the associated groundwater treatment system (GWTS). The GWQB regulates the procedures that ensure treated groundwater discharged from the GWTS to UIC well(s) meet Discharge Permit requirements. This Discharge Permit is not intended to conflict or supersede the remedial actions selected for the BFF under the Resource Conservation and Recovery Act (RCRA), any implementing agreements, or the corrective action provisions of the RCRA Permit.

In the event that an associated comprehensive Work Plan or report is submitted to the NMED, NMED's HWB and GWQB will coordinate review of the comprehensive documents to ensure there is no conflict with any agency response. Associated documents will be submitted to the apparent lead bureau, copied to the other bureau, and NMED will determine which bureau will respond.

The activities which produce the discharge, the location of the discharge, and the quantity, quality, and flow characteristics of the discharge are described as follows.

The constituents of concern (CoC) within the dissolved-phase portion of the contaminant plume have been extensively investigated at the KAFB BFF under the RCRA Permit and have been narrowed to seven CoCs based on groundwater monitoring of the dissolved-phase portion of the contaminant plume within the regional aquifer. These seven CoCs have been identified as being present in untreated groundwater at concentrations potentially exceeding their respective regulatory action levels, and include ethylene dibromide (EDB), benzene, toluene, ethylbenzene, total xylenes, dissolved iron, and dissolved manganese. The CoCs and their respective effluent standards are listed in Table 2. The term "effluent standard" is used in this Discharge Permit to refer to the New Mexico Water Quality Control Commission (WQCC) groundwater standard or the federal Environmental Protection Agency (EPA) maximum contaminant level (MCL); whichever is more stringent.

Under the RCRA interim measure, contaminated groundwater is pumped from extraction wells and distributed through a piping system to a GWTS. Contaminated groundwater may also originate from groundwater monitoring or newly installed extraction wells within the dissolved-phase portion of the contaminant plume undergoing development, testing, or sampling. This liquid IDW will be transported by truck to the GWTS and added to the influent stream for treatment. This work is being completed in accordance with Work Plans approved by the NMED HWB.

The GWTS consists of a series of lead-lag granulated activated carbon (GAC) treatment vessels designed to adsorb the groundwater organic CoCs, thus reducing contaminant concentrations to at or below the effluent standards cited in Permit Condition #6 and identified in Permit Table #2. Adherence to the numeric standards will be assured by sampling the associated fluids at numerous stages of plume delineation, extraction, and treatment. Sampling associated with treatment is conducted at the influent to the GWTS, between the lead-lag GAC tanks, and at the effluent port prior to discharge to the UIC well(s). Samples collected between the lead-lag GAC tanks will notify operators when breakthrough is beginning to occur and replacement of the lead GAC tank is needed. The treatment capacity of the GWTS will be doubled in 2017 by adding a second treatment train to support the increased volume (not to exceed the permitted volume) that will be produced as additional extraction wells are installed and begin operation. Additional design changes are also planned to add additional pre-treatment and to optimize operations. This expansion/optimization of the treatment system will include two additional lead-lag GAC tanks, sand filters, and/or equipment and piping upgrades to the GWTS.

Treated effluent will be conveyed to UIC wells as defined by 20.6.2.5002.B(5)(d)(i) NMAC, including the well identified as KAFB-7 and up to four additional wells, for injection into the regional aquifer within the KAFB facility boundary. This Discharge Permit authorizes the discharge of a maximum of 1,440,000 gallons per day (gpd) via the NMED approved UIC well(s). Treated effluent is pumped from the GWTS through single-walled piping and distributed to the UIC well(s). Appendix A includes the specifics of a typical UIC well design. Final design plans will be submitted for NMED approval prior to mobilization for drilling and installation of new UIC well(s). Total discharge volume will be metered at the GWTS effluent port and at the UIC

well(s). The combined treated effluent rate of discharge employed by the Permittee will not exceed 1,000 gallons per minute (gpm), which is the maximum design treatment rate of the GWTS.

Monitoring of the extraction, treatment, and injection systems will be performed to ensure proper system operation using an automated monitoring system with a centrally located programmable logic controller (PLC) or an equivalent system. The PLC allows the operator to evaluate and control operations to maintain GWTS efficiency and effectiveness in treating the CoCs, and ensure proper discharge to the UIC well(s). Incoming data includes flowrates, pressures (*i.e.*, hydraulic head), liquid levels, groundwater levels, pump status, and alarms from the system sites. The treated effluent pumped to the UIC well(s) will be controlled via monitoring devices (*i.e.*, water level transducers and pressure head gauges) to prevent overfilling of the UIC well(s), to keep the down-hole discharge injection pipe(s) filled, and to prevent cascading of the effluent water into the UIC well(s). Effluent water will enter the UIC well casing and gravity flow through the well screen into the formation. The PLC will be programmed to alarm the operator in the event that the water level within the UIC well casing reaches the high-level set point.

The discharge, including all activities associated with the extraction and treatment of contaminated groundwater, and all associated procedures to maintain regulatory compliance with the RCRA Permit, are described in the Permittee's *Operation and Maintenance Plan* (O&M Plan). The O&M Plan is a HWB approved document that provides the procedures for management of the contaminated groundwater extraction and conveyance systems, the GWTS, and the sampling and quality assurance requirements. The O&M Plan also complies with the requirements in this Discharge Permit.

A Contingency Plan, which describes the actions that the Permittee will take in the event of a failure of the system that generates and discharges the treated effluent to a UIC well(s), is attached to this Discharge Permit at Appendix C.

KAFB is located southeast of Albuquerque in Bernalillo County. The discharge authorized by this Discharge Permit is located within the Designated UIC Area in Section 01 of T9N R3E, Sections 05, 06, 07, 08, and 09 of T9N R4E, and Section 31 of T10N R4E in the southern portion of the facility proximal to the groundwater monitoring wells associated with the existing nitrate plume (SWMU ST-105). Permit Appendix B identifies the Designated UIC Area and the current footprint of the 10 milligrams per liter (mg/L) nitrate plume within the regional aquifer. Additional UIC wells and associated infrastructure installed within the Designated UIC Area are subject to the conditions of this Discharge Permit and would not require a permit modification in accordance with 20.6.2.7(P) NMAC.

The nitrate plume is being remediated under the *Site ST-105 Stage 2 Abatement Plan for Nitrate Contaminated Water* (Abatement Plan) dated October 2007, which was approved by the GWQB Remediation Oversight Section in correspondence dated September 26, 2008. The most current version of the approved Abatement Plan may be viewed at the GWQB's web site at https://www.env.nm.gov/gwb/RemediationOversight.htm.

The regional groundwater beneath the SWMU ST-105 where KAFB-7 and the proposed UIC well(s) are located ranges from a depth of 202 to 709 feet (ft) below ground surface (bgs) with an average of 434 ft bgs and has a total dissolved solids (TDS) concentration ranging from 160 to 1200 mg/L with an average of 345 mg/L.

The application consists of the *Discharge Permit Application* (Application) submitted by the Permittee on December 4, 2015, a revised Application submitted by the Permittee on September 28, 2016, and additional information submitted as requested by NMED. The discharge shall be managed in accordance with all conditions and requirements of this Discharge Permit.

Pursuant to Section 20.6.2.3109 NMAC, NMED reserves the right to require a discharge permit modification in the event NMED determines that the requirements of 20.6.2 NMAC are being or may be violated or the standards of Section 20.6.2.3103 NMAC are being or may be violated. This may include a determination that structural controls and/or management practices approved under this Discharge Permit are not protective of groundwater quality and that more stringent requirements to protect groundwater quality may be required by NMED. Though conformance with this Discharge Permit and the RCRA Permit would result in a very low probability of there being a discharge causing groundwater contamination above applicable standards, NMED reserves the right to require remediation of such a discharge.

Issuance of this Discharge Permit does not relieve the Permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state, and/or local laws, regulations, zoning requirements, and nuisance ordinances.

The following acronyms and abbreviations may be used in this Discharge Permit:

Abbreviation	Explanation	Abbreviation	Explanation
bgs	below ground surface	MCL	maximum contaminant level
BFF	Bulk Fuels Facility	mg/L	milligrams per liter
CFR	Code of Federal Regulations	mL	milliliters
CoCs	constituents of concern	NMAC	New Mexico Administrative Code
DP	Discharge Permit	NMED	New Mexico Environment Department
EDB	ethylene dibromide	NMSA	New Mexico Statutes Annotated
EPA	United States Environmental Protection Agency	NO_3-N	nitrate-nitrogen
GAC	granulated activated carbon	O&M Plan	Operation and Maintenance Plan
gpd	gallons per day	PLC	programmable logic controller
gpm	gallons per minute	RCRA	Resource Conservation and Recovery Act
GWTS	groundwater treatment system	SWMU	solid waste management unit
GWQB	Ground Water Quality Bureau	TDS	total dissolved solids
ft	feet	total nitrogen	= TKN + NO_3-N
HWB	Hazardous Waste Bureau	UIC	underground injection control
HWTF	Hazardous Waste Treatment Facility	VOC	volatile organic carbon
IDW	investigation derived waste	WQA	New Mexico Water Quality Act
KAFB	Kirtland Air Force Base	WQCC	Water Quality Control Commission

II. FINDINGS

In issuing this Discharge Permit, NMED finds the following:

1. The Permittee is discharging effluent treated to at or below regulatory standards from the facility so that such effluent may move directly or indirectly into groundwater within the meaning of Section 20.6.2.3104 NMAC.

2. The Permittee is discharging effluent from the facility so that such effluent may move into groundwater of the State of New Mexico which has an existing concentration of 10,000 mg/L or less of TDS within the meaning of 20.6.2.3101(A) NMAC.

3. The discharge from the facility is not subject to any of the exemptions of Section 20.6.2.3105 NMAC.

4. The Permittee is operating UIC recharge well(s) within the meaning of 20.6.2.5002(A)(1) and 20.6.2.5002(B)(5)(d)(i) NMAC which is subject to the prohibitions listed under 20.6.2.5004(A)(4) NMAC.

III. AUTHORIZATION TO DISCHARGE

Pursuant to 20.6.2.3104 NMAC, it is the responsibility of the Permittee to ensure that discharges authorized by this Discharge Permit are consistent with the terms and conditions herein.

The Permittee is authorized to discharge up to 1,440,000 gpd of treated effluent via a maximum of five UIC wells to the groundwater aquifer within the Designated UIC Area in Section 01 of T9N R3E (KAFB-7), Sections 05, 06, 07, 08, and 09 of T9N R4E, and Section 31 of T10N R4E, Bernalillo County, NM. The Designated UIC Area is identified in Appendix B. UIC wells currently authorized by this Discharge Permit are identified in Table 1. Up to four additional UIC wells may be proposed pursuant to Permit Condition #11 of this Discharge Permit.

[20.6.2.3104 NMAC, 20.6.2.3106(C) NMAC, 20.6.2.3109(C) NMAC]

IV. CONDITIONS

The following conditions shall be complied with by the Permittee and are enforceable by NMED. Any reference in this Discharge Permit to communication with NMED shall be inferred to mean communication with the Bureau Chiefs of the GWQB and the HWB. The Permittee is authorized to discharge treated effluent subject to the following conditions.

A. OPERATIONAL PLAN

#	Terms and Conditions
1.	The Permittee shall implement the following operational plan to ensure compliance with Title 20, Chapter 6, Parts 2 and 4 NMAC. [20.6.2.3109.C NMAC]
2.	The Permittee shall operate in a manner such that standards and requirements of Sections 20.6.2.3101 and 20.6.2.3103 NMAC are not violated. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]
3.	The Permittee shall ensure that the most recent versions of all Work Plans associated with the GWTS, the effluent conveyance pipeline, and the UIC well(s) are consistent with the requirements of this Discharge Permit. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]
4.	The Permittee shall ensure all discharges associated with this Discharge Permit are located within the Designated UIC Area within Section 01 of T9N R3E, Sections 05, 06, 07, 08, and 09 of T9N R4E, and Section 31 of T10N R4E (See Appendix B). [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]
5.	The Permittee shall ensure that proposed UIC well locations (see Appendix B) and associated discharges are consistent with the most recent approved Stage 2 Abatement Plan for SWMU ST-105. [20.6.2.3101 NMAC, 20.6.2.3103 NMAC, 20.6.2.3109(C) NMAC]
6.	The Permittee shall ensure that discharged groundwater effluent is less than or equal to the effluent standards for all constituents referenced in 20.6.2.3103 NMAC. The term "effluent standard" is used in this Discharge Permit to refer to the New Mexico Water Quality Control Commission (WQCC) groundwater standard or the federal Environmental Protection Agency (EPA) maximum contaminant level (MCL); whichever is more stringent.

#	**Terms and Conditions**
	[20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]
7.	The Permittee shall ensure that GWTS influent chemistry is consistent with the design basis of the GWTS. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]
8.	The Permittee is authorized to install and operate not more than five UIC wells. Authorized UIC wells are listed in Table 1. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]
9.	The Permittee shall ensure that the total discharge from the facility via UIC wells does not exceed 1,440,000 gpd. [20.6.2.3109(C) NMAC, 20.7.10.100 NMAC]
10.	Prior to the installation of a new UIC well, the Permittee shall submit a Work Plan for NMED approval that satisfies the requirements of this Discharge Permit and the corrective action provisions at Part 6 of the RCRA Permit. This Work Plan shall, at a minimum, include the following information unless the Permittee can demonstrate to NMED that an item is not applicable or appropriate under the proposed activity or if an item has been provided separately under another submission: a. A statement of purpose and need for the additional UIC well(s); b. A list of groundwater monitoring wells which may be added to the monitoring program to effectively monitor performance of the new UIC well(s); c. A map showing the location of the proposed UIC well(s) and the location of all associated monitoring well(s); d. The geographic coordinates of the location of the UIC well(s) including township/range and section; e. A map showing the location of the nearest production well; f. A proposal of how the structural integrity of the treated effluent conveyance system between the GWTS and the new well will be demonstrated; g. Existing data showing the depth to water and general groundwater quality at the proposed new UIC well discharge location; h. A detailed description of groundwater flow modeling (numeric or analytical) predicting the effect of injection on the groundwater flow direction at the discharge location; i. A detailed description of geochemical modeling (numeric or analytical) evaluating the interaction between the treated effluent and receiving groundwater. Prior to any such geochemical modeling the treated effluent and receiving groundwater shall be

#	**Terms and Conditions**
	tested for the analytes listed in Table 5 unless the Permittee can demonstrate that testing for a particular analyte is unnecessary; j. A detailed description of the impact that the proposed injection will have on any known groundwater contaminant plumes, e.g., the nitrate plume(s) addressed in the Site ST-105 Stage 2 Abatement Plan for Nitrate Contaminated Water; k. Maximum estimated monthly discharge volume to the UIC well(s); l. Project schedule, including the date the discharge is to commence and the anticipated duration; and m. Necessary changes to this Discharge Permit's language should the proposal be approved, *e.g.*, the listing of authorized injection wells and associated monitoring wells in Table 1. These Work Plans shall be submitted for NMED approval at least 90 days prior to the scheduled installation of any UIC well. Proposed changes to this Discharge Permit constituting a "permit modification" as defined at 20.6.2.7.P NMAC shall not be submitted as a Work Plan, but shall instead be submitted as a discharge permit modification request as specified at 20.6.2.3109.G NMAC. A proposal to locate a discharge at a location outside the areas specified in Permit Condition #4 shall be considered a permit modification. A proposal to locate a UIC well at a location within the Designated UIC Area shall not be considered a permit modification unless the discharge quality or quantity is modified from that permitted herein. The Permittee shall post the approved Work Plan to the appropriate web site, *i.e.*, KAFB/Environment/Kirtland AFB Fuel Plume Project Documents. [20.6.2.7(P) NMAC, 20.6.2.3107(A) NMAC, 20.6.2.3109(G) NMAC, 20.6.2.5003 NMAC]
11.	Prior to discharging to a newly installed UIC well, the Permittee shall submit written notification to NMED stating the date that the discharge is to commence. [20.6.2.3107(A) NMAC]
12.	The Permittee shall ensure that the GWTS is secured to control access by the general public. [20.6.2.3109(B) and(C) NMAC, NMSA 1978, §74-6-5(D)]
13.	The Permittee shall maintain signs in English and Spanish (unless otherwise prohibited by KAFB policy) at appropriate locations indicating that the GWTS effluent is non-potable. Signs shall be posted at the UIC wellheads, at the GWTS, and any associated UIC well-related infrastructure.

#	**Terms and Conditions**
	[20.6.2.3109(B) and(C) NMAC, NMSA 1978, § 74-6-5(D)]
14.	The Permittee shall ensure that the UIC well(s) include monitoring devices, *i.e.,* water level and pressure head transducers, to prevent overfilling of the well. The Permittee shall measure the volume of treated effluent discharged to each UIC well and maintain a record of these volumes. [20.6.2.3107 and 20.6.2.3109(C)(3)(c)(i) NMAC]
15.	The Permittee shall ensure the treated effluent conveyance system, *i.e.*, piping, between the GWTS and the UIC well(s) does not leak and shall report any such leakage to the NMED GWQB in accordance with 20.6.2.1203(A) NMAC and copy the NMED HWB. Within one year of the effective date of this Discharge Permit, the Permittee shall demonstrate the structural integrity of the treated effluent conveyance system between the GWTS and KAFB-7. Prior to testing, the Permittee shall propose for NMED approval the test method to be used. The results of the mechanical integrity testing shall be submitted to NMED within 60 days of test completion. The Permittee shall integrity test the treated effluent conveyance system between GWTS and the UIC well(s) prior to submitting a permit renewal application. [20.6.2.3106(C) NMAC, 20.6.2.3107(A) NMAC]
16.	Prior to an initial discharge from the GWTS of treated effluent associated with a new extraction well, the Permittee shall submit documentation to NMED demonstrating that the treated effluent is at or below the effluent standards specified for the CoCs listed in Table 2. [20.6.2.1202(A) and (C) NMAC, 20.6.2.3109(C) NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]

B. MONITORING, REPORTING, AND OTHER REQUIREMENTS

#	**Terms and Conditions**
17.	The Permittee shall conduct the monitoring, operations, and reporting listed below. Unless otherwise specified, all periodic monitoring results or general information obtained shall be reported in the forthcoming quarterly report. [20.6.2.3107 NMAC]

#	**Terms and Conditions**
18.	Unless otherwise approved by NMED, the Permittee shall conduct sampling in accordance with standard industry practice. Sampling in accordance with the most current version of the GWTS Sampling and Analysis Plan (Appendix L of the O&M Plan), which includes sampling locations, procedures, field measurements, quality control samples, handling and custody, analytical methods, quality control, analytical validation, and reporting requirements, satisfies this Condition. [20.6.2.3107(B) NMAC]
19.	The Permittee shall submit quarterly and annual reports to NMED pursuant to the most recent NMED HWB approved Work Plans. The Permittee shall identify the portions of these reports pertaining to this Discharge Permit with a table in the reports that identifies those portions. Quarterly reports shall be submitted as specified below unless otherwise authorized by NMED: • January 1st through March 31st – due by June 30th • April 1st through June 30th – due by September 30th • July 1st through September 30th – due by December 31st • October 1st through December 31st – due by March 31st Annual reporting requirements for the previous year, i.e., January 1st through December 31st, shall be reported in the March 31st quarterly report. [20.6.2.3107(A) NMAC]
20.	The Permittee shall monitor the concentration of all CoCs listed on Table 2 in GWTS treated effluent. Associated sampling and analysis shall be performed monthly at a minimum. When groundwater from a new extraction well is first introduced to the GWTS, CoC monitoring of the GWTS treated effluent shall occur daily for the first week of treatment, weekly for the first month of treatment, and monthly thereafter. If alterations to, or conditions at, the GWTS result in a potential impact to effluent quality, the Permittee will repeat this sampling sequence as directed by NMED. A representative sample of GWTS influent and effluent shall be analyzed annually for the constituents identified in Table 3. A representative sample of GWTS influent and effluent shall be analyzed every five years for the constituents identified in Table 4. The first analysis of the five-year constituent list shall occur in July 2017. Any newly identified constituents detected during the five-years sampling events will be added to the annual sampling constituent list in Table 3.

#	**Terms and Conditions**
	All analysis of GWTS influent and effluent shall utilize analytical methods with detection limits that are sufficiently low to allow comparison to the standards included in the above referenced state and federal regulations. All sampling, analysis, and reporting shall comply with the most recent approved Work Plans. [20.6.2.3107(A) NMAC and 20.6.2.3107(B) NMAC]
21.	The Permittee shall report the volume of treated GWTS effluent discharged to each UIC well each quarter. This report shall include the following: a. Monthly average, maximum, and minimum values for flow rate and volume of treated effluent transferred to each UIC well; b. The totalized monthly volume of treated effluent transferred to all UIC wells; and c. Monthly average, maximum, and minimum head values of injection water for each UIC well. The Permittee shall monitor the GWTS effluent volume utilizing an effluent flow meter installed on the effluent pump skid after the GAC units. Each UIC well shall have a dedicated flow meter. Flow meters shall be inspected and calibrated in accordance with the associated manufacturer's recommendations. [20.6.2.3107 NMAC]
22.	The Permittee shall include the following results and general information in quarterly reports to NMED: a. Any mechanical integrity conducted on either the GWTS or a UIC well; b. Any replacement of GAC media and the associated data that initiated the decision to replace the media; c. Any UIC well rehabilitation conducted; d. Any malfunction, repair, or replacement of a flow meter; and e. Any additional operational changes with the potential to affect the discharge. [20.6.2.3107 NMAC]
23.	The Permittee shall monitor the groundwater wells in the vicinity of KAFB-7 and in the vicinity of any newly installed UIC well(s) to determine any change to aquifer chemistry that may be the result of injection. This monitoring shall be performed annually, shall conform to the procedures of the most current approved Work Plan, and shall measure the CoCs listed in Table 2. This chemistry will be reported in the Annual Report for BFF. ST-105 Annual Report includes elevation contour mapping and analytical parameters identified in the Stage 2 Abatement Plan.

#	Terms and Conditions
	The Permittee shall develop a groundwater elevation contour map depicting the groundwater flow direction in the vicinity of each UIC well and report it in the ST-105 Annual Report. If the chemical quality of the treated groundwater being injected changes over time, NMED may require the Permittee to repeat geochemical modeling (numeric or analytical) to predict the interaction between the treated effluent and receiving groundwater. [20.6.2.3107 NMAC]
24.	The Permittee shall post all reports required by this Discharge Permit on KAFB's most current web site (e.g., https://kirtlandafb.tlisolutions.com/main.aspx.) [20.6.2.3107(A) NMAC]

C. CONTINGENCY PLAN

#	Terms and Conditions
25.	If the automated monitoring system records a system alarm indicating a threat condition to a UIC well, and that threat condition is confirmed, at a minimum the affected UIC well will be taken off-line. If the alarm condition is confirmed during the response investigation, the UIC well(s) will be taken off-line and the discharge to the UIC well(s) will not be resumed until the problem is identified and corrected. [20.6.2.3107(A) NMAC]
26.	In accordance with this Discharge Permit, if the discharge to a UIC well exceeds effluent standards, the Permittee shall enact the Contingency Plan (Appendix C). The Permittee may be required to remediate water pollution in accordance with the corrective action provisions in Part 6 of the RCRA Permit except as provided in 20.6.2.4105(B) NMAC. [20.6.2.3107(A) NMAC, 20.6.2.3109(E) NMAC, 20.6.2.4105(A)(2) and (3) NMAC]
27.	In the event that a release or a spill occurs that is not authorized under this Discharge Permit, the Permittee shall notify the NMED GWQB in accordance with 20.6.2.1203(A) NMAC, shall include any additional reporting requirements specified at RCRA Permit Section 1.27, and shall copy the NMED HWB. The Permittee shall also take measures to mitigate damage from the unauthorized discharge and initiate corrective actions specified in the Contingency Plan (Appendix C). The Permittee may be required to remediate water pollution in accordance with the corrective action provisions in Part 6 of the RCRA Permit except as provided in 20.6.2.4105(B) NMAC.

#	Terms and Conditions
	Nothing in this condition shall be construed as relieving the Permittee of the obligation to comply with all requirements of Section 20.6.2.1203 NMAC. [20.6.2.1203 NMAC, 20.6.2.4105(A)(2) and (3) NMAC]
28.	In the event that information indicates that a UIC well referenced at Table 1 is not constructed in a manner consistent with its intended use or is not completed in a manner that is protective of groundwater quality, the Permittee shall submit a Work Plan to the NMED with a proposal for well rehabilitation, abandonment only, or abandonment and replacement. This Work Plan shall include a project schedule and shall be submitted for NMED approval within 120 days following confirmation of the above referenced problems. The Permittee may propose an alternate use for the well. The UIC well requiring replacement shall be properly plugged and abandoned in accordance with Part 6.5.17.10.9 of the RCRA permit. [20.6.2.3107(A) NMAC, 20.6.2.5005 NMAC]
29.	In the event that NMED or the Permittee identifies any failures of the Application or this Discharge Permit not specifically noted herein, NMED may require the Permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failures. Additionally, NMED may require a modification to this Discharge Permit to achieve compliance with 20.6.2 NMAC. [20.6.2.3107(A) NMAC, 20.6.2.3109(E) NMAC]

D. CLOSURE PLAN

#	Terms and Conditions
30.	Upon permanent cessation of discharge to a UIC well(s), the Permittee shall perform the following closure measures upon NMED approval, unless UIC well(s) and/or conveyance pipelines are needed for another use: a) Cap, plug, or remove all conveyance pipelines to prevent the discharge of GWTS treated effluent to all UIC well(s); b) Abandon UIC well(s) in accordance with Part 6.5.17.10.9 of the RCRA permit, which reference OSE regulation 19.27.4.30 and 31 NMAC and associated well abandonment guidance; and c) Appropriately dispose of any wastes associated with UIC well plugging and abandonment. The Permittee may, instead of abandoning a UIC well, propose an alternate use for the well.

	Upon cessation of the closure measures, the Permittee shall perform the following post-closure measures: a) Continue monitoring CoCs in groundwater for at least two years, or as appropriate and in concurrence with NMED; and b) Enact the release notification requirements of the Contingency Plan if groundwater standards are exceeded. The Permittee may be required to remediate water pollution in accordance with the corrective action provisions in Part 6 of the RCRA Permit except as provided in 20.6.2.4105(B) NMAC. When all post-closure requirements have been met, the Permittee may request to terminate the Discharge Permit. [20.6.2.3107 (A)11 NMAC]

E. GENERAL TERMS AND CONDITIONS

#	Terms and Conditions
31.	The Permittee shall maintain a written record of the following information: a) Information and data used to complete the Application for this Discharge Permit; b) Records of any releases or spills not authorized under this Discharge Permit and reports submitted pursuant to 20.6.2.1203 NMAC; c) Records of the operation, maintenance, and repair of all facilities/equipment used to treat, store, or inject the treated groundwater; d) Facility record drawings (plans and specifications) showing the actual construction of the facility and that the construction complies with all applicable statutes, regulations, and codes including applicable Department of Defense Engineering Standards; e) Copies of quarterly reports completed and/or submitted to NMED pursuant to this Discharge Permit; f) The volume of treated water discharged pursuant to this Discharge Permit; g) Groundwater quality and injected water quality data collected pursuant to this Discharge Permit; h) Copies of construction records and well logs for all groundwater monitoring wells required to be sampled pursuant to this Discharge Permit; i) Records of the maintenance, repair, replacement, or calibration of any monitoring equipment or flow measurement devices required by this Discharge Permit; and j) Data and information related to field measurements, sampling, and analysis conducted pursuant to this Discharge Permit. The following information shall be recorded and made available to NMED upon request: i) The dates, location, and times of sampling or field measurements; ii) The sample analysis date of each sample; iii) The name and address of the laboratory, and the name of the signatory authority for the laboratory analysis;

#	**Terms and Conditions**
	iv) The analytical technique or method used to analyze each sample or collect each field measurement; v) The results of each analysis or field measurement; vi) The results of any split, spiked, duplicate or repeat sample; and vii) A copy of the laboratory analysis chain-of-custody as well as a description of the quality assurance and quality control procedures used. The written record shall be maintained by the Permittee so that it is accessible within a reasonable time period during or following a facility inspection by NMED through the post-closure period and shall be made available to NMED upon request. [20.6.2.3107(A) and (C) NMAC]
32.	The Permittee shall allow NMED representatives to inspect the facility and its operations which are subject to this Discharge Permit and the WQCC regulations. NMED representatives may, upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which any records are located regarding this discharge permit or related discharges required to be maintained by regulations of the federal government or the WQCC. The Permittee shall allow NMED representatives to have access to any copy of the records, and to perform assessments, sampling, or monitoring during an inspection for the purpose of evaluating compliance with this Discharge Permit and the WQCC regulations. Nothing in this Discharge Permit shall be construed as limiting in any way the inspection and entry authority of NMED under the WQA, the WQCC Regulations, or any other local, state, or federal regulations. [20.6.2.3107(D) NMAC, NMSA 1978, §§ 74-6-9(B) and 74-6-9(E)]
33.	The Permittee shall, upon NMED's request, allow for NMED's duplication of records required by this Discharge Permit and/or furnish to NMED electronic copies of such records. [20.6.2.3107(D) NMAC]
34.	In the event the Permittee proposes a change to the facility or the facility's discharge that would result in a change in the volume discharged; the location of the discharge; or in the amount or character of water contaminants received, treated, or discharged by the facility that differs from the terms and conditions in this Discharge Permit, the Permittee shall notify NMED prior to implementing such changes. The Permittee shall obtain approval (which may require modification of this Discharge Permit) by NMED prior to implementing such changes.

#	**Terms and Conditions**
	[20.6.2.7(P) NMAC, 20.6.2.3107(C) NMAC, 20.6.2.3109(E) and (G) NMAC]
35.	In the event the Permittee proposes to construct or change an existing system such that the quantity or quality of the discharge will change substantially from that authorized by this Discharge Permit, the Permittee shall submit construction plans and specifications to NMED for the proposed system or process unit prior to the commencement of construction. In the event the Permittee implements changes to an existing system authorized by this Discharge Permit which will result in only a minor effect on the quality of the discharge, the Permittee shall report such changes (including the submission of record drawings, where applicable) in the next quarterly report to NMED. [20.6.2.1202(A) and (C) NMAC, NMSA 1978, §§ 61-23-1 through 61-23-32]
36.	Any violation of the requirements and conditions of this Discharge Permit, including any failure to allow properly credentialed NMED staff to enter and inspect records or facilities, or any refusal or failure to provide NMED with records or information required to be maintained by this Discharge Permit or related regulation may subject the Permittee to a civil enforcement action. Pursuant to WQA 74-6-10(A) and (B), such action may include a compliance order requiring compliance immediately or in a specified time, assessing a civil penalty, modifying or terminating the Discharge Permit, or any combination of the foregoing; or an action in district court seeking injunctive relief, civil penalties, or both. Pursuant to WQA 74-6-10(C) and 74-6-10.1, civil penalties of up to $15,000 per day of noncompliance may be assessed for each violation of the WQA 74-6-5, the WQCC Regulations, or this Discharge Permit, and civil penalties of up to $10,000 per day of noncompliance may be assessed for each violation of any other provision of the WQA, or any regulation, standard, or order adopted pursuant to such other provision. In any action to enforce this Discharge Permit, the Permittee waives any objection to the admissibility as evidence of any data generated pursuant to this Discharge Permit. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10 and 74-6-10.1]
37.	No person shall: 1) make any false material statement, representation, certification, or omission of material fact in an application, record, report, plan, or other document filed, submitted, or required to be maintained under the WQA; 2) falsify, tamper with, or render inaccurate any monitoring device, method, or record required to be maintained under the WQA; or 3) fail to monitor, sample, or report as required by a permit issued pursuant to a state or federal law or regulation.

#	**Terms and Conditions**
	Any person who knowingly violates or knowingly causes or allows another person to violate the requirements of this condition is guilty of a fourth degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who is convicted of a second or subsequent violation of the requirements of this condition is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition or knowingly causes another person to violate the requirements of this condition and thereby causes a substantial adverse environmental impact is guilty of a third degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. Any person who knowingly violates the requirements of this condition and knows at the time of the violation that he is creating a substantial danger of death or serious bodily injury to any other person is guilty of a second degree felony and shall be sentenced in accordance with the provisions of NMSA 1978, § 31-18-15. [20.6.2.1220 NMAC, NMSA 1978, §§ 74-6-10.2(A) through 74-6-10.2.F]
38.	Nothing in this Discharge Permit shall be construed in any way as relieving the Permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits, or orders. [NMSA 1978, § 74-6-5.L]
39.	The Permittee may file a petition for review before the WQCC on this Discharge Permit. Such petition shall be in writing to the WQCC within thirty days of the receipt of postal notice of this Discharge Permit and shall include a statement of the issues to be raised and the relief sought. Unless a timely petition for review is made, the decision of NMED shall be final and not subject to judicial review. [20.6.2.3112 NMAC, NMSA 1978, § 74-6-5.O]
40.	Prior to the transfer of any ownership, control, or possession of this facility or any portion thereof, the Permittee shall: 1) notify the proposed transferee in writing of the existence of this Discharge Permit; 2) include a copy of this Discharge Permit with the notice; and 3) Deliver or send by certified mail to NMED a copy of the notification and proof that such notification has been received by the proposed transferee. Until both ownership and possession of the facility have been transferred to the transferee, the Permittee shall continue to be responsible for any discharge from the facility. [20.6.2.3111 NMAC]

#	**Terms and Conditions**
41.	Payment of permit fees is due at the time of Discharge Permit approval. Permit fees shall be paid in a single payment or shall be paid in equal installments on a yearly basis over the term of the Discharge Permit. Single payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date. Initial installment payments shall be remitted to NMED no later than 30 days after the Discharge Permit effective date; subsequent installment payments shall be remitted to NMED no later than the anniversary of the Discharge Permit effective date. Permit fees are associated with issuance of this Discharge Permit. Nothing in this Discharge Permit shall be construed as relieving the Permittee of the obligation to pay all permit fees assessed by NMED. A Permittee that ceases discharging or does not commence discharging from the facility during the term of the Discharge Permit shall pay all permit fees assessed by NMED. An approved discharge permit shall be suspended or terminated if the facility fails to remit an installment payment by its due date. [20.6.2.3114(F) NMAC, NMSA 1978, § 74-6-5(K)]

TABLE 1 - Authorized Underground Injection Control Wells

Well Identifier	Well Location	Associated Monitoring Wells
KAFB-7	Latitude 35° 02' 31.41" N Longitude 106° 34' 10.79" W Section 01 of T9N R3E	KAFB-0505, KAFB-0507, KAFB-0508

TABLE 2 - Constituents of Concern (CoCs)

(Constituents measured in the dissolved-phase portion of BFF plume at concentrations exceeding effluent standards.)

Constituent	Effluent Standards
Ethylene dibromide (EDB)	0.05 µg/L
Benzene	5.0 µg/L
Ethylbenzene	700 µg/L
Toluene	750 µg/L
Total xylenes	620 µg/L
Iron	1,000 µg/L
Manganese	200 µg/L

TABLE 3 - Annual Monitoring Constituent List

(Constituents having 20.6.2.3103 NMAC Human Health Standards and Federal Drinking Water Primary Maximum Contaminant Levels (MCLs) that have ever been detected within KAFB BFF site wells. Permittee may petition NMED to change a constituent monitoring frequency from annual to once every five years, i.e., move to Table 4, if after eight consecutive quarters of monitoring the constituent is not detected in any BFF site wells.)

Category	Constituent
Anions	
	chloride
	nitrogen (nitrate-nitrite)
	sulfate
Organic compounds	
	1,1,2,2-tetrachloroethane
	1,1,2,2-tetrachloroethylene (PCE)
	1,1,2-trichloroethane
	1,1,2-trichloroethylene (TCE)
	1,2-dichloroethane (EDC)
	1,1-dichloroethane
	1,2-dibromomethane
	bis(2-ethylhexyl) phthalate
	Chloroform
	cis-1,2-dichloroethylene
	Dibromochloromethane
	Methylene chloride
	Naphthalenes
	Phenols
	Pyrene

TABLE 4 – Five-year Monitoring Constituent List

(Constituents with 20.6.2.3103 NMAC action levels and Federal Drinking Water maximum contaminant levels (MCLs) – this list is not meant to be redundant with Table 3)

Category	Constituent
Anion	
	Fluoride
Metals	
	Aluminum
	Antimony
	Arsenic
	Barium
	Beryllium
	Cadmium
	Chromium
	Copper
	Cyanide (as free Cyanide)
	Lead
	Manganese
	Mercury (total)
	Selenium
	Silver
	Thallium
	Uranium
	Zinc
Organic compounds	
	Dichloromethane
	Methyl tertiary butyl ether (MTBE)

TABLE 5 – Geochemical Modeling Analyte List

Analyte
Calcium
Magnesium
Sodium
Potassium
Chloride
Sulfate
Total Carbonate Alkalinity
Silica
Iron
Manganese
Dissolved Organic Carbon
Aluminum
Arsenic
Barium
Nitrate-Nitrite(N)
Strontium
Temperature (°C)
pH
ORP (mV), Eh (mV)
DO
Charge Balance (%)

PERMIT TERM & SIGNATURE

EFFECTIVE DATE: April 28, 2017
EXPIRATION DATE: April 28, 2022

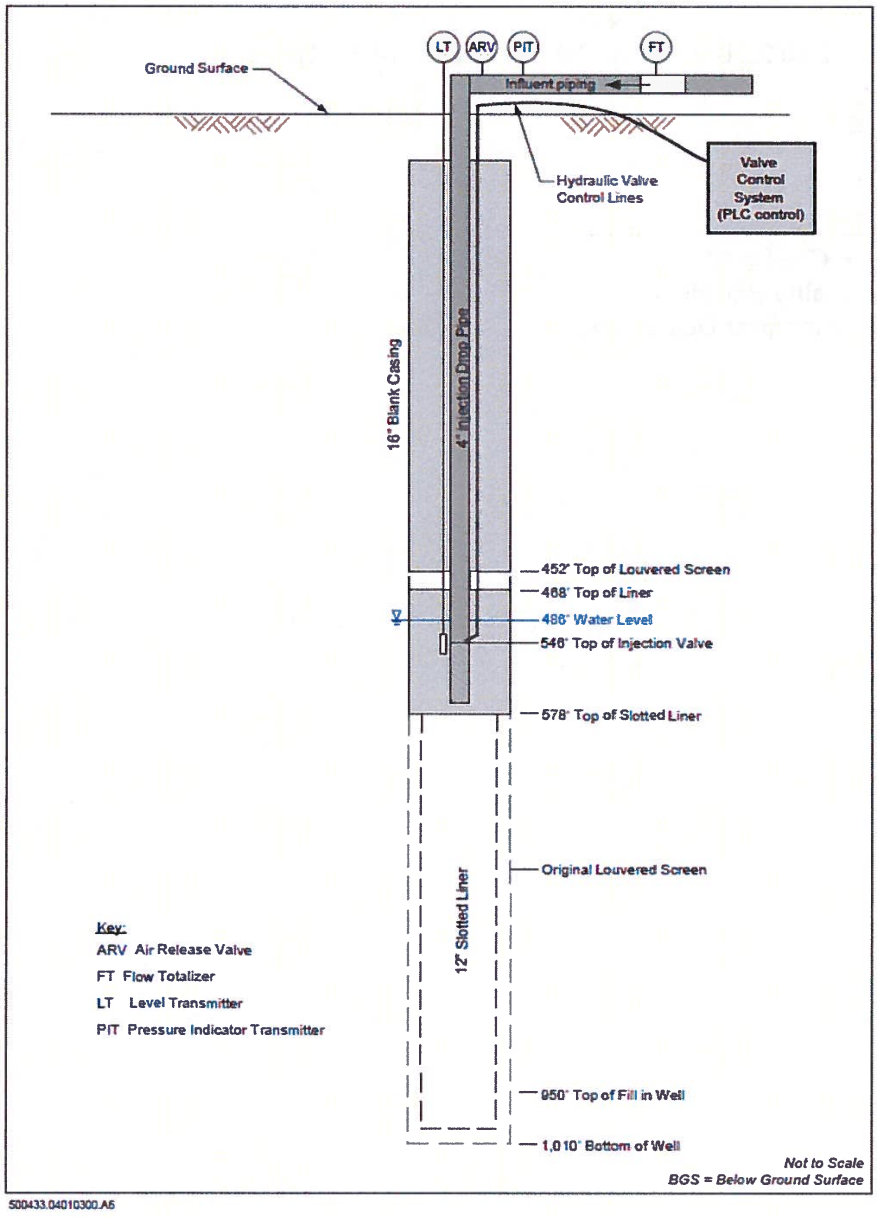
[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]

Michelle Hunter, Chief
Ground Water Quality Bureau
New Mexico Environment Department

Kirtland Air Force Base; **DP-1839**
April 28, 2017
Page 24

Appendix A

Injection Well Configuration (KAFB-7)



Appendix B

Designated UIC Area and Nitrate Plume

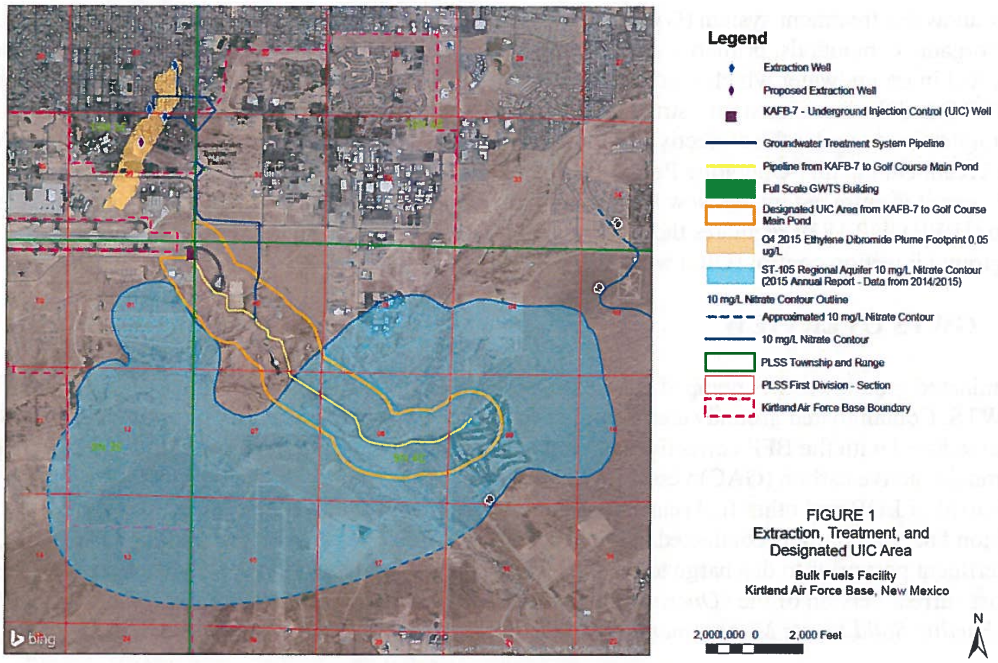


FIGURE 1
Extraction, Treatment, and Designated UIC Area
Bulk Fuels Facility
Kirtland Air Force Base, New Mexico

Appendix C

Contingency Plan

This Contingency Plan (Plan) has been developed for DP-1839 pursuant to 20.6.2.3107(A)(10) NMAC to cope with a failure of the Discharge Permit or system. This Plan describes the actions that Kirtland Air Force Base (AFB) will take in the event of a failure of Discharge Permit 1839 (DP-1839) or the systems that generates and discharges the treated effluent that is the subject of DP-1839. The provisions of this Plan will be carried out immediately whenever there is a release which could threaten human health or the environment.

1.0 BACKGROUND

The groundwater treatment system (GWTS) treats groundwater that contains low concentrations of fuel-related organic compounds, primarily ethylene dibromide (EDB), from a historic leak of aviation gasoline and jet fuel in groundwater which is conveyed to the GWTS from the extraction well network off-base. The GWTS and the associated infrastructure are part of an interim measure pump and treat system that is being implemented under the corrective action provisions in Part 6.2.2.2.12 of Kirtland AFB's Hazardous Waste Treatment Facility Operating Permit (HWTF Permit No. NM9570024423 –"RCRA Permit"). The RCRA permit is enforced by the New Mexico Environment Department's (NMED's) Hazardous Waste Bureau (HWB). DP-1839 regulates the discharge of treated effluent from the GWTS to one or more underground injection control (UIC) wells.

2.0 GWTS OVERVIEW

Contaminated groundwater is pumped from extraction wells and distributed through a piping system to the GWTS. Contaminated groundwater may also originate from groundwater monitoring or extraction wells associated with the BFF corrective action that are undergoing development, testing, or sampling. The granular active carbon (GAC) vessels are arranged in series to provide the contact time required for the removal of EDB and other fuel related organic compounds to achieve the effluent standards in Condition #6. Sampling is conducted at the influent to the GWTS, between the lead-lag GAC tanks, and at the effluent port prior to discharge to the UIC well(s) in accordance with the frequencies established in the most current version of the "*Operations and Maintenance Plan Groundwater Treatment System Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111*" that has been approved by the NMED HWB.

To ensure that the treated effluent meets all applicable effluent standards in DP-1839, Kirtland AFB has conservatively defined breakthrough as contaminant removal of equal to 90% of the applicable effluent standard as measured between the GAC vessels. If contaminant breakthrough occurs in the lead GAC vessel, the vessels are switched in the lead-lag position and GAC change-out is scheduled. Sampling frequency is increased for any GWTS system change (i.e., new extraction wells added to system).

Samples are collected from the GTWS effluent pipe on a monthly basis. Sampling frequency is increased for any GWTS system change (i.e., new extraction wells added to system). In the unlikely event that the GWTS cannot achieve all applicable effluent standards, the affected treatment train will be shut-down until system modifications can be approved and implemented.

The GWTS is designed and instrumented to efficiently operate 24-hours per day with minimal operator attention. A control system and operator interface panel is installed to allow remote control of the GWTS

and the extraction and injection well network. The control system includes telemetry and web access to alert operators of off-hour alarm conditions. Subcontractor staff are scheduled for on-call responses on weekends and after hours for any emergency response if alarm conditions warrant.

3.0 CONTINGENCY PLAN OVERVIEW

In the event of a spill, leak or unplanned release to the environment associated with the treated effluent from the GWTS or the treated effluent conveyance system, Kirtland AFB will assess possible hazards to human health and/or the environment and will implement this Plan. Possible failures of DP-1839 or the treatment system include the following:

- Treated effluent exceeds one of more of the effluent standards in Condition # 6.
- A leak from the treated effluent conveyance system.
- UIC well is not constructed in a manner consistent with its intended use or completed in a manner that is protective of groundwater.
- The automated monitoring system records a system alarm that indicates a possible threat to a UIC well.

The Permittee's planned response to each of these possible contingencies is described below.

3.1 Treated effluent exceeds one or more effluent standards

As discussed above, the GWTS is operated very conservatively to ensure that effluent standards are never exceeded between the two lead-lag GAC vessels. This is done to ensure that there will be no effluent standard exceedances at the effluent discharge point. In the unlikely event that treated effluent that exceeds one or more effluent standards is discharged to a permitted UIC well, the Permittee will submit a "Notification of Discharge-Removal" to the NMED Groundwater Quality Bureau (GWQB) pursuant to 20.6.2.1203(A) NMAC as required in Condition # 27. The Permittee will copy the NMED HWB on the initial and all subsequent release reports.

In the event of such an exceedance, one or both treatment trains at the GWTS will be promptly shut-down as necessary until system modifications can be approved by the NMED HWB and implemented. If the exceedance is related to concentrations of one or more contaminants in the influent, the Permittees will submit a work plan to the NMED HWB to sample one or more extraction wells. If necessary, an extraction well with an exceedance will be taken off line until the problem is addressed and the NMED HWB authorizes the well to begin pumping again. If plant adjustments are necessary, the Permittee will make the necessary changes. If the required corrective actions are considered to be outside the scope of work for plant operations, one or both treatment trains at the GWTS will be shut down and Kirtland AFB will submit a corrective action plan to the NMED HWB and copy the GWQB. One or both treatment trains at the GWTS will remain shut down pending the approval of the corrective action plan from the NMED HWB.

Following the necessary changes, the effluent groundwater will be re-tested, and the GWTS monitoring frequency will be increased as required in Discharge Permit (i.e., daily for the first week and weekly for three additional weeks). After 4 consecutive weeks of analytical results below the applicable effluent standards, monitoring will return to a monthly frequency.

If necessary, Kirtland AFB will sample groundwater associated with the affected UIC well(s) for all relevant constituents and will provide the data to the NMED HWB and GWQB. Any groundwater

corrective actions will be implemented pursuant to Part 6.2.2 of the RCRA Permit. The Permittee will copy the NMED GWQB on all documents related to the corrective action required in Condition # 26.

3.2 Leak from treated effluent conveyance system

As discussed above, the treated effluent meets all applicable effluent standards in Condition #6. In the event there is a leak from the treated effluent conveyance system that transports the treated effluent to a UIC well, the Permittee will conservatively submit a "Notification of Discharge-Removal" to the NMED GWQB pursuant to 20.6.2.1203(A) NMAC, which includes an estimate of the volumes released, the location of the release and the likely cause of the failure. The Permittee will copy the NMED HWB on the initial and all subsequent release reports.

If necessary, corrective actions will be implemented pursuant to Part 6.2.2 of the RCRA Permit. The Permittee will copy the NMED GWQB on all documents related to the corrective action as required in Condition # 27.

3.3 UIC well is not constructed in a manner consistent with its intended use or not completed in a manner that is protective of groundwater

The design of any new UIC well installed under DP-1839 is subject to approval in accordance with Condition #10. In the unlikely event that a well is not constructed or completed to meet the approved specifications and a design change has not been approved by NMED, the Permittee will submit a work plan to NMED with a proposal for well rehabilitation, abandonment only or abandonment and replacement as detailed in Condition #28.

3.4 The automated monitoring system records a system alarm that indicates a possible threat to a UIC well

Alarms may be activated in the UIC well either due to pressure reading in the discharge pipe or a fluid level in the well casing outside of the operating parameters. Both alarms automatically shut-down the GWTS. Operators will be notified immediately by email of the alarm condition, and proceed to investigate the alarms through the human machine interface (HMI) at the site or remote access after-hours to determine if the alarm represents actual field conditions. Corrective action and subsequent reporting will depend on the condition causing the alarm condition.

4.0 RELEASE NOTIFICATION REQUIREMENTS

4.1 External Notification Procedures

In the event of a spill, leak or unplanned release to the environment associated with the treated effluent from the GWTS or the treated effluent conveyance system, Kirtland AFB will follow the release reporting requirements in 20.6.2.1203(A) NMAC. These requirements are fundamentally equivalent to the "Twenty-Four Hour and Subsequent Reporting" requirements in Part 1.27 of the RCRA Permit. The NMED HWB will be copied on all notifications and any subsequent reports.

4.2 Internal Notification Procedures

GWTS Operators/Contractor staff notify the Chief of Environmental Restoration Program at Kirtland AFB by telephone and by email immediately following any accidental releases of untreated/treated water

at the GWTS, immediately upon having knowledge of a non-compliance event (i.e., sampling results), or if the GWTS operation has to be shut down continuously for more than 24 hours (may include normal maintenance, equipment repairs, or alarm investigations).

Effluent Line Integrity Testing Report - April 2018

**EFFLUENT CONVEYANCE LINE INTEGRITY TESTING SUMMARY
FROM THE GROUNDWATER TREATMENT SYSTEM TO KAFB-7
APRIL 4, 2018**

The groundwater treatment system (GWTS) conveys treated effluent water to two discharge locations, the Tijeras Arroyo Golf Course Main Pond and the gravity-fed injection well KAFB-7. Discharge into KAFB-7 is performed in accordance with the New Mexico Environment Department (NMED) Discharge Permit DP-1839 (NMED, 2017). Condition Number (No.) 15 of DP-1839 states the following:

> *The Permittee shall ensure the treated effluent conveyance system, i.e., piping, between the GWTS and the UIC well(s) does not leak and shall report any such leakage to the NMED GWQB in accordance with 20.6.2.1203(A) NMAC and copy the NMED HWB. Within 1 year of the effective date of this Discharge Permit, the Permittee shall demonstrate the structural integrity of the treated effluent conveyance system between the GWTS and KAFB-7. Prior to testing, the Permittee shall propose for NMED approval the test method to be used. The results of the mechanical integrity testing shall be submitted to NMED within 60 days of test completion. The Permittee shall integrity test the treated effluent conveyance system between GWTS and the UIC well(s) prior to submitting a permit renewal application.*

This test report summarizes the results of testing performed on April 4, 2018, in compliance with the year one testing requirement.

TESTING SETUP AND PROCEDURE

All testing was performed in accordance with the NMED approved Standard Operating Procedure for Effluent Conveyance Line Integrity Testing (U.S. Army Corps of Engineers [USACE], 2018) and the GWTS Operations and Maintenance Plan (USACE, 2016).

TESTING RESULTS

Initial Test: GWTS to KAFB-7

The entire effluent conveyance line between the GWTS facility and KAFB-7 was isolated and hydrostatically pressurized up to 50 pounds per square inch (psi). After initial pressurization, the KAFB-7 well head was visually inspected for leaks during the 30-minute makeup period. During the inspection, the KAFB-7 well head pressure transducer, located downstream of the effluent isolation valve (Figure 1), was reading 56 psi indicating that the isolation valve was not functioning properly. It is believed that the valve malfunction was caused by fine sediment buildup within the valve seat causing the valve to remain open.

Several unsuccessful attempts were made to re-seat the valve. The sediment cannot be manually removed from the valve as it is located below grade and was inserted directly into the pipeline. Additionally, as a result of the March 14, 2018 failure of the hydraulic lines that control the functioning of the downhole V-smart valve in KAFB-7, pressurized flow through the line cannot not be used to scour sediment from the isolation valve until the V-smart valve is repaired.

Therefore, the test of the section of conveyance line between the changeover valves and the wellhead could not be completed per the Standard Operating Procedure (SOP) specifications as utilization of the V-smart valve as an isolation point could not be maintained for the full 90 minutes required in the SOP due to potential damage to the V-smart valve or the well from sustaining pressure in the downhole drop pipe. However, the section of the conveyance line from the GWTS to KAFB-7 held 56 psi (KAFB-7) for

approximately 25 minutes before the testing was aborted and there was minimal indication of pressure loss from the line. The section of line will be retested (Figure 1) following repairs to the KAFB-7 injection system.

Second Test: GWTS to Changeover Valves

Prior to starting the second test, the conveyance line pressure was relieved to the Tijeras Arroyo Golf Course main pond. Once the pressure had been relieved, the second test was initiated on the conveyance line between the GWTS facility and the changeover valves (Figure 1). Hydrostatic testing of this section was completed within the SOP specifications. The hydrostatic test on this section began with the 30-minute expansion makeup period initiated at 1130. Makeup water was added at two intervals during this period at 1145 and 1155. The initial pressure reading of 50.00 psi was collected at 1200 and successive readings were collected at 5-minute intervals thereafter until 1300. The pressure versus time profile is provided in Figure 2. The final pressure reading collected was 49.12 psi, resulting in an overall loss of pressure of 0.88 psi, or less than 2 percent (%) of the initial pressure. This 2% difference in pressure is within the acceptable range of ±30% as provided in the SOP specifications (USACE, 2018). No leaks were observed along any of the exposed piping. The field testing form is provided in Attachment 1, and a photographic log is provided in Attachment 2.

FINDINGS AND RECOMMENDATIONS

1. The section of conveyance line piping from the GWTS to the changeover valves was hydrostatically tested in conformance with the SOP and found acceptable.

2. The section of the conveyance line pipe from the changeover valves to KAFB-7 held pressure, but could not be tested in full conformance with the SOP due to faulty seating of the isolation valve upstream of the V-smart valve and possible damage to the V-smart valve if the test was continued.

3. The section of the conveyance line pipe from the changeover valves to KAFB-7 should be re-tested following completion of repairs to the V-smart valve assembly.

REFERENCES

New Mexico Environment Department (NMED). 2017. Correspondence from Michelle Hunter, Chief, Ground Water Quality Bureau to Colonel Eric. H. Froehlich, Base Commander, Kirtland Air Force Base, New Mexico, Regarding Discharge Permit Issuance, DP-1839, Kirtland Air Force Base. April 28.

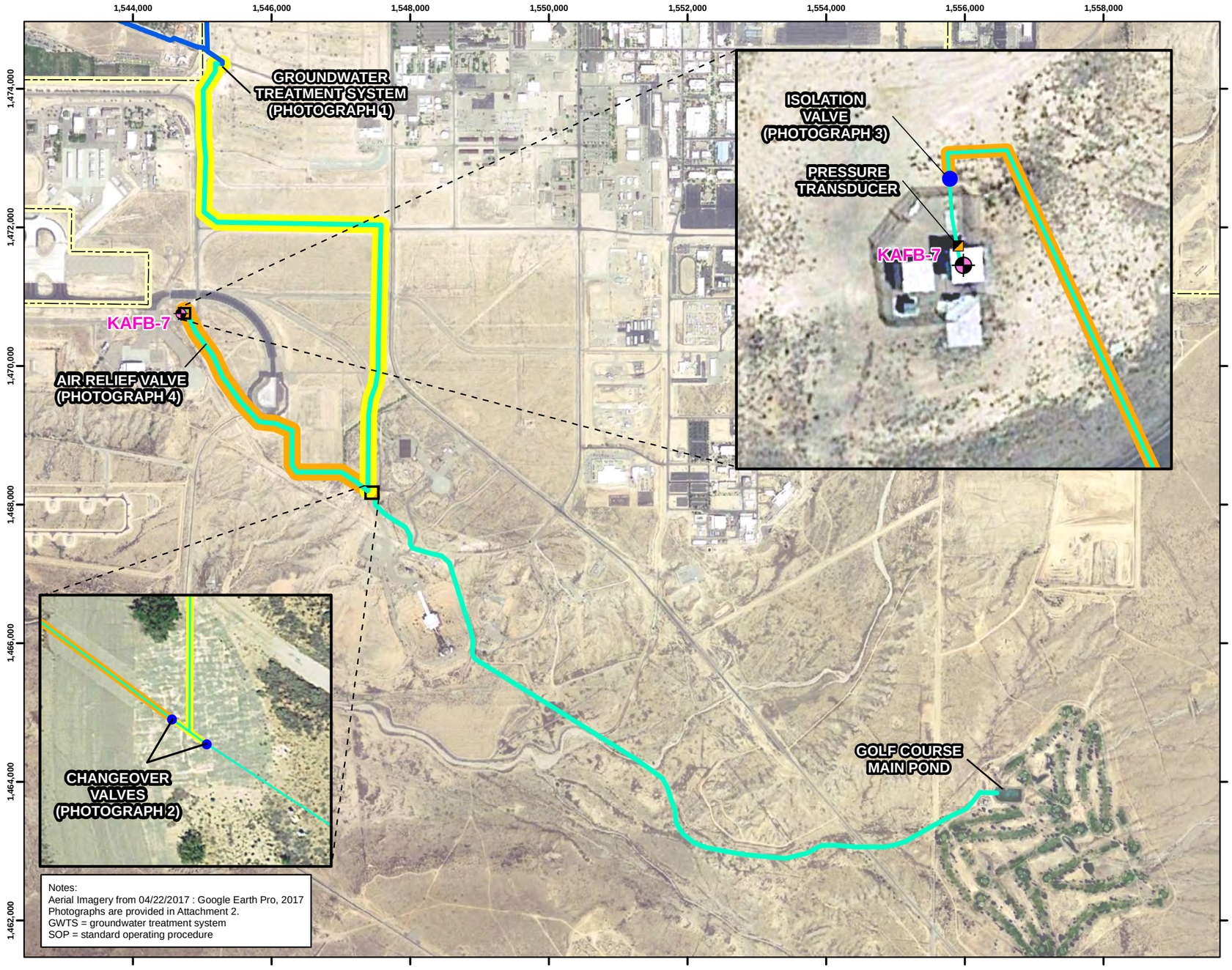
U.S. Army Corps of Engineers (USACE). 2016. *Operations and Maintenance Plan, Groundwater Treatment System – Annual Update, Bulk Fuels Facility, SWMU ST-106/SS-111, Kirtland Air Force Base, New Mexico.* Prepared by EA Engineering, Science, and Technology, Inc., PBC for the USACE–Albuquerque District under USACE Contract No. W912DR-12-D-0006. August.

USACE. 2018. *Standard Operating Procedure for Effluent Conveyance Line Integrity Testing of the Groundwater Treatment System.* Prepared by EA Engineering, Science, and Technology, Inc., PBC for the USACE–Albuquerque District under USACE Contract No. W912DR-12-D-0006. March.

Figures

Attachments

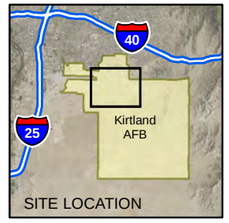
FIGURES



P:\gis\Projects\Kirtland\Figures\GWTS Effluent Line Integrity Testing SOP.mxd 4/18/2018 EA eomalia

Legend

- Injection Well
- GWTS Effluent Piping that Completed Testing within SOP Specifications
- GWTS Effluent Piping to be Retested Following Repairs to KAFB-7
- GWTS Effluent Piping
- GWTS Influent Piping
- Installation Boundary



N

0 750 1,500 3,000

Feet

1 inch = 1,500 feet

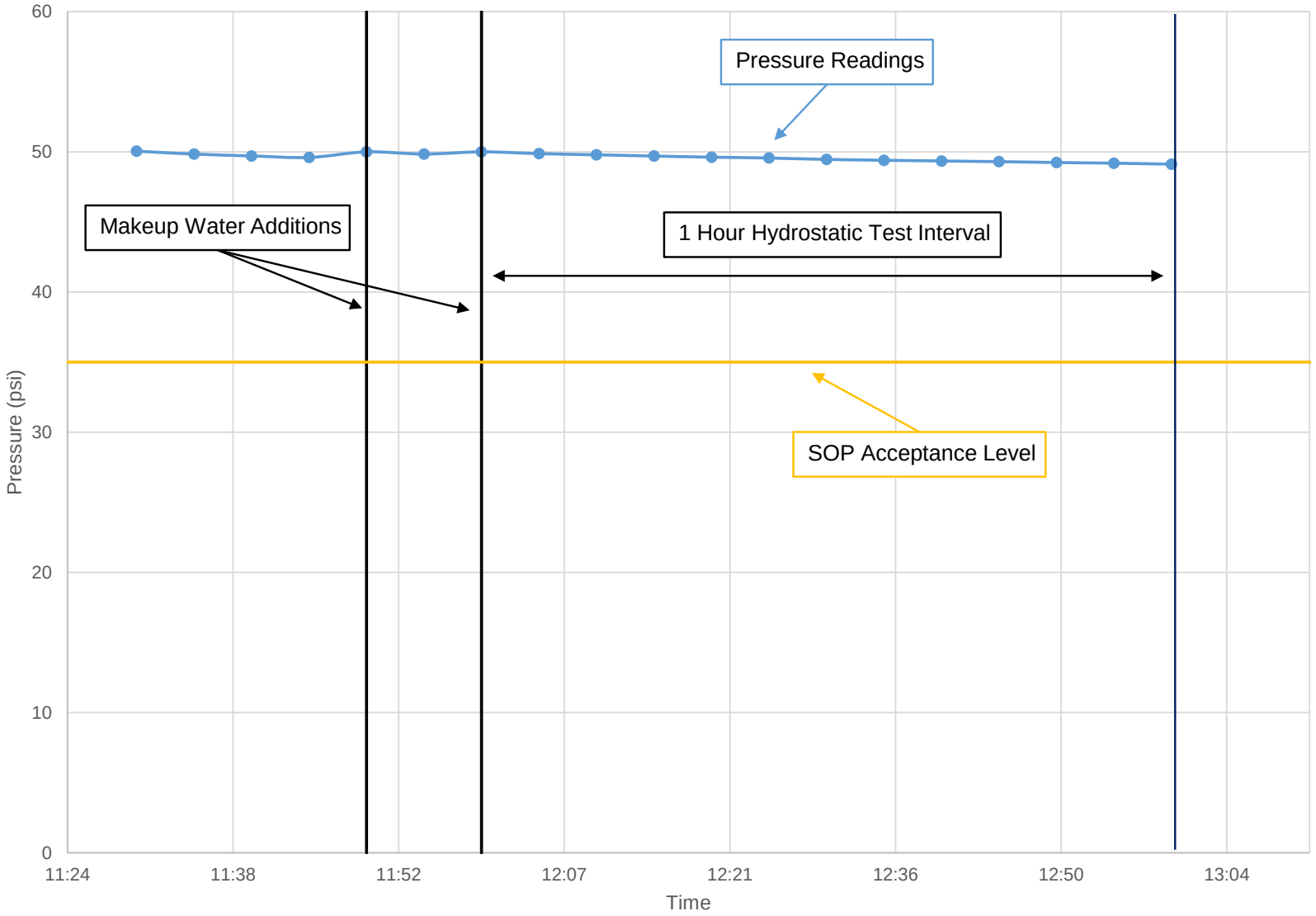
Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

EFFLUENT LINE INTEGRITY TESTING REPORT
OF THE GROUNDWATER TREATMENT SYSTEM
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1

EFFLUENT CONVEYANCE LINE TEST SECTION AND ISOLATION VALVES

Figure 2. Periodic Hydrostatic Test Readings



ATTACHMENT 1

HYDROSTATIC PRESSURE TESTING FORMS

HYDROSTATIC PRESSURE TESTING FORM

Project: GWTS Effluent Conveyance Line
EA Project No: 62599DM01
Air Temperature: 52°F
Length of Pipe Tested: GWTS to KAFB-7 Iso. Valve
Location of Pipe Tested: Kirtland BFF

Date: 04/04/18
Time: 0930
Type of Pipe Tested: HDPE

Hydrostatic specified test pressure (STP) is recommended at 150 percent (%) of operating pressure per American Society of Mechanical Engineers B31.3 Part 345 and will be measured at gauge PI-3208 on the effluent skid No. 2. The current operating pressure in the effluent conveyance line is approximately 12 pounds per square inch (psi) with a high pressure alarm at 45 psi; thus, an STP of 50 psi has been specified for this test (10% higher than the high pressure alarm set point). The final pressure will be compared to the STP at the end of the test period. ASTM International F2164 – 13 defines a hydrostatic pressure test as acceptable if the final pressure does not deviate by more than 30% from the STP reading (± 15 psi for this test). The results of the hydrostatic test will be included in the test report. Although the ASTM International F2164 – 13 method requires an air volume and rebound assessment for the installation of new, uniform piping, these assessments will not be performed due to the varying pipe thicknesses, types, and age of the pipes that comprise the effluent conveyance line.

Testing Procedure

Piping shall be vented and then brought to the STP and held at the STP by providing successive injections of makeup water. Piping shall then be subjected for 1 hour to a hydrostatic test pressure of 50 psi. No additional makeup water will be added during this period. Exposed pipe, joints, fittings, and valves shall be carefully examined for leaks. Record testing results below and compare the final pressure to the STP.

Testing Results

Initial pressure reading after 30-minute makeup period: NA

Pressure reading after 1 hour: NA

Difference in pressure: NA

Final Pressure within 30% of STP? NA

Are there any leaks present? KAFB-7 isolation valve could not be seated.

Additional testing comments: Pressure detected downstream of KAFB-7 isolation valve. Test could not be completed.

Signature:

Tyler Curley
Testing Operator

4-4-18
Date

HYDROSTATIC PRESSURE TESTING FORM

Project: GWTS Effluent Conveyance Line
EA Project No: 62599DM01
Air Temperature: 59°
Length of Pipe Tested: GWTS to Changeover
Location of Pipe Tested: Kirtland BFF

Date: 04/04/18
Time: 11:30
Type of Pipe Tested: HDPE

Hydrostatic specified test pressure (STP) is recommended at 150 percent (%) of operating pressure per American Society of Mechanical Engineers B31.3 Part 345 and will be measured at gauge PI-3208 on the effluent skid No. 2. The current operating pressure in the effluent conveyance line is approximately 12 pounds per square inch (psi) with a high pressure alarm at 45 psi; thus, an STP of 50 psi has been specified for this test (10% higher than the high pressure alarm set point). The final pressure will be compared to the STP at the end of the test period. ASTM International F2164 – 13 defines a hydrostatic pressure test as acceptable if the final pressure does not deviate by more than 30% from the STP reading (± 15 psi for this test). The results of the hydrostatic test will be included in the test report. Although the ASTM International F2164 – 13 method requires an air volume and rebound assessment for the installation of new, uniform piping, these assessments will not be performed due to the varying pipe thicknesses, types, and age of the pipes that comprise the effluent conveyance line.

Testing Procedure

Piping shall be vented and then brought to the STP and held at the STP by providing successive injections of makeup water. Piping shall then be subjected for 1 hour to a hydrostatic test pressure of 50 psi. No additional makeup water will be added during this period. Exposed pipe, joints, fittings, and valves shall be carefully examined for leaks. Record testing results below and compare the final pressure to the STP.

Testing Results

Initial pressure reading after 30-minute makeup period: 50.05 psi makeup, 5000 psi initial.

Pressure reading after 1 hour: 49.12 psi

Difference in pressure: 0.88 psi

Final Pressure within 30% of STP? Yes

Are there any leaks present? None observed

Additional testing comments: None

Signature:

Tyler Curley
Testing Operator

4-4-18
Date

ATTACHMENT 2

PHOTOGRAPHIC LOG

Location: Effluent Pipe Tree at the GWTS (Photograph 1 on Figure 1)
Description: Effluent Pressure Gauge at 13:10 (Post Test)
Date: April 04, 2018 Direction: West

Location: Changeover Valves (Photograph 2 on Figure 1)
Description: Post Indicators for the Changeover Valves
Date: April 04, 2018 Direction: South

Location: KAFB-7 (Photograph 3 on Figure 1)
Description: Newly Installed Isolation Valve
Date: April 04, 2018 Direction: Down

Location: Along Effluent Conveyance Line (Photograph 4 on Figure 1)
Description: Air Relief Valve
Date: April 04, 2018 Direction: Down

Effluent Line Integrity Test - July 2020

HYDROSTATIC PRESSURE TESTING FORM

Project: GWTS Effluent Conveyance Line
EA Project No: 62599DM01
Air Temperature: 88°F
Length of Pipe Tested: 8500 feet
Location of Pipe Tested: GWTS effluent to changeover tee

Date: 7/14/2020
Time: 1400
Type of Pipe Tested: HDPE

Hydrostatic specified test pressure (STP) is recommended at 150 percent (%) of operating pressure per American Society of Mechanical Engineers B31.3 Part 345 and will be measured at gauge PI-3208 on the effluent skid No. 2. The current operating pressure in the effluent conveyance line is approximately 12 pounds per square inch (psi) with a high pressure alarm at 45 psi; thus, an STP of 50 psi has been specified for this test (10% higher than the high pressure alarm set point). The final pressure will be compared to the STP at the end of the test period. ASTM International F2164 – 13 defines a hydrostatic pressure test as acceptable if the final pressure does not deviate by more than 30% from the STP reading (± 15 psi for this test). The results of the hydrostatic test will be included in the test report. Although the ASTM International F2164 – 13 method requires an air volume and rebound assessment for the installation of new, uniform piping, these assessments will not be performed due to the varying pipe thicknesses, types, and age of the pipes that comprise the effluent conveyance line.

Testing Procedure

Piping shall be vented and then brought to the STP and held at the STP by providing successive injections of makeup water. Piping shall then be subjected for 1 hour to a hydrostatic test pressure of 50 psi. No additional makeup water will be added during this period. Exposed pipe, joints, fittings, and valves shall be carefully examined for leaks. Record testing results below and compare the final pressure to the STP.

Testing Results

Initial pressure reading after 30-minute makeup period: 49.95

Pressure reading after 1 hour: 48.15

Difference in pressure: 1.80

Final Pressure within 30% of STP? Yes - Test PASSED

Are there any leaks present? No leaks detected

Additional testing comments: Initial reading of 49.80 psi at 1420.

Signature:

Testing Operator

7/14/2020
Date

HYDROSTATIC PRESSURE TESTING FORM

Project: GWTS Effluent Conveyance Line
EA Project No: 62599DM01
Air Temperature: ~9.3°F
Length of Pipe Tested: ~12,000
Location of Pipe Tested: GWTS effluent to KAFB-7 valve

Date: 7/14/2020
Time: 1700
Type of Pipe Tested: HDPE

Hydrostatic specified test pressure (STP) is recommended at 150 percent (%) of operating pressure per American Society of Mechanical Engineers B31.3 Part 345 and will be measured at gauge PI-3208 on the effluent skid No. 2. The current operating pressure in the effluent conveyance line is approximately 12 pounds per square inch (psi) with a high pressure alarm at 45 psi; thus, an STP of 50 psi has been specified for this test (10% higher than the high pressure alarm set point). The final pressure will be compared to the STP at the end of the test period. ASTM International F2164 – 13 defines a hydrostatic pressure test as acceptable if the final pressure does not deviate by more than 30% from the STP reading (± 15 psi for this test). The results of the hydrostatic test will be included in the test report. Although the ASTM International F2164 – 13 method requires an air volume and rebound assessment for the installation of new, uniform piping, these assessments will not be performed due to the varying pipe thicknesses, types, and age of the pipes that comprise the effluent conveyance line.

Testing Procedure

Piping shall be vented and then brought to the STP and held at the STP by providing successive injections of makeup water. Piping shall then be subjected for 1 hour to a hydrostatic test pressure of 50 psi. No additional makeup water will be added during this period. Exposed pipe, joints, fittings, and valves shall be carefully examined for leaks. Record testing results below and compare the final pressure to the STP.

Testing Results

Initial pressure reading after 30-minute makeup period: 50.02 psi

Pressure reading after 1 hour: 42.76 psi

Difference in pressure: 7.26 psi

Final Pressure within 30% of STP? Yes - Test PASSED

Are there any leaks present? No leaks detected

Additional testing comments: Initial reading of 49.75 psi at 1713.

Signature:

Testing Operator

7/14/2020
Date

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER PERMITS

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT 1

TOM BLAINE, P.E.
NEW MEXICO STATE ENGINEER

5550 San Antonio Drive, N.E.
Albuquerque, NM 87109 (505) 383-4000

December 10, 2015

File No.: RG-1587

Kirtland Air Force Base
Attn: Wayne Bitner, Chief, Environmental Restoration
AFCEC/Kirtland AFB IST; Bldg 20685
2050 Wyoming Blvd, SE
Kirtland AFB, NM 87117-5270

RE: Permit No. RG-1587

Greetings,

Your copy of the above numbered permit, which has been approved subject to the conditions set forth on the approval page, is enclosed.

Please review the Conditions of Approval for any required submittals. If submittals are not made by the date(s) indicated in the conditions, your rights under this permit are subject to expiration unless a request for an Extension of Time is received in the District Office of the State Engineer by that date, and that Extension of Time is subsequently approved.

Appropriate forms can be downloaded from the OSE website at www.ose.state.nm.us/WR/forms.php or will be mailed to you upon request.

Sincerely,

Christopher Burrus
Water Resource Specialist
Albuquerque, OSE, District 1

C: CB/cb

HC1-54235
$50

File No. RG-1587

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO CHANGE AN EXISTING WATER RIGHT

(Non 72-12-1)

(check applicable boxes):

For fees, see State Engineer website: http://www.ose.state.nm.us/

☒ Change Purpose of Use ☒ Groundwater ☐ Surface Water ☐ Change Place of Use ☐ Groundwater ☐ Surface Water	☐ Change Point of Diversion (POD): From: ☐ Groundwater ☐ Surface Water To: ☐ Groundwater ☐ Surface Water	☐ Additional Groundwater Point of Diversion (POD) ☐ Additional Surface Water Point of Diversion (POD)
☐ Temporary Change, NMSA 1978, § 72-12-7(B) Requested Start Date: (Not to Exceed 3 ac-ft in One Year)		Requested End Date:
☐ Water Use Lease, NMSA 1978, §§ 72-6-1 to-7 Requested Start Date:		Requested End Date:

1. APPLICANT(S) (Required) Note: water-right owner must be listed as an applicant.

Name: **Kirtland Air Force Base**	Name: **N/A**
Contact or Agent: check here if Agent ☒ **Wayne Bitner**	Contact or Agent: check here if Agent ☐ **N/A**
Mailing Address: **Chief Environmental Restoration 2050 Wyoming Blvd SE**	Mailing Address: **N/A**
City: **Albuquerque**	City:
State: **NM** Zip Code: **87117-5270**	State: Zip Code:
Phone: **N/A** ☐ Home ☐ Cell Phone (Work): **505-853-3484**	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional): **Ludie.Bitner@us.af.mil**	E-mail (optional):

STATE ENGINEER OFFICE ALBUQUERQUE, NEW MEXICO 2015 SEP 17 PM 4:15

2. CURRENT OSE FILE INFORMATION (Required)

OSE File No(s):	Priority Date (if known):	Subfile/Cause No. (if applicable):

3. CURRENT PURPOSE OF USE AND AMOUNT OF WATER (Required)

☐ Domestic ☐ Livestock ☒ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): _____ Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): **extraction/production well**	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: **See comments** Consumptive Use: **See comments** Other (include units): **see comments**

FOR OSE INTERNAL USE

Application for Permit, Form wr-06, Rev 9/26/12

File No.: RG-1587	Trn. No.:	Receipt No.: 1-54235 $50
Trans Description (optional):		Sub-Basin:
PCW/LOG Due Date:	PBU Due Date:	

4. COUNTY WHERE WATER RIGHT IS CURRENTLY USED (Required)

Bernalillo

5. ADDITIONAL STATEMENTS CONCERNING THE CURRENT WATER RIGHT

RG-1587 (KAFB-7) is an existing well included in Kirtland AFB's water right as described in District Court order: United States District Court, District of New Mexico, State of New Mexico State Engineer vs. Kirtland Air Force, dated November 27, 1973. See court order included as Attachment 1. The Kirtland AFB water rights allow for diversion and consumptive use of up to 4,500 acre feet per anum. The well is currently used as an extraction well for nitrate abatement at SWMU ST-105. This application does not seek to increase the allowable groundwater diversion described for RG-1587, but seeks to change the purpose of use to pollution control, recovery, and irrigation, including both injection and extraction of groundwater

6. CURRENT or MOVE-FROM POINT(S) OF DIVERSION (POD) (Required)

☐ **Surface POD** **OR** ☒ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course: | Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☐ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☐ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☒ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
RG-1587	106 34 6.06	35 2 23.68	NW 1/4, NW 1/4, Sec 6, T 9N, R 4E

2015 SEP 17 PM 4:16

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional point of diversion descriptions are attached: ☐ Yes ☐ No If yes, how many_____

Point of Diversion is on Land Owned by:

Other description relating point of diversion to common landmarks, streets, or other:

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG -1587 | Trn Number:

Page 2 of 7

7. CURRENT or MOVE-FROM PLACE(S) OF USE (Required)

The land is legally described by (check all that apply):

☒ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
RG-1587--NW 1/4, NW 1/4,	**S6**	**T9N**	**R3E**		
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other: **RG 1587 (KAFB-7) is an existing well included Kirtland AFB's water right as descibed in Attachment 1. This application seeks to change the purpose of use to pollution control, recovery, and irrigation, including both injection and extraction**

Place of use is on land owned by (required):

Are there other sources of water for these lands? No ☒ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

2015 SEP 17 PM 4:15

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1587	Trn Number:

Page 3 of 7

8. MOVE-TO PURPOSE OF USE AND AMOUNT OF WATER (Complete this section ONLY if the purpose of use is changing)

☐ Domestic ☐ Livestock ☒ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): **Pollution Control and Recovery** Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): **Injection and Extraction of groundwater**	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: _____ Consumptive Use: _____ Other (include units): **see comments**

9. MOVE-TO POINT(S) OF DIVERSION (POD) (Complete this section ONLY if adding or replacing a POD)

☐ **Surface POD OR** ☒ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course: | Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-7 (RG-1587)	1544679.14	1470794.81	NW 1/4, NW 1/4, Sec 6, T 9N, R 4E

2015 SEP 17 PM 4:15

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional POD descriptions are attached: ☐ **Yes** ☒ **No** **If yes, how many** _____

Other description relating point(s) of diversion to common landmarks, streets, or other: **KAFB-7 is located on Kirtland AFB just south of Kirtland Road between Ammo Road and Ordnance Street.**

Point of Diversion is on Land Owned by: **Kirtland Afb**

Note: The following information is for wells only. If more than one (1) well needs to be described, provide attachment.

Approximate depth of well (feet): **1,000.00** | Outside diameter of well casing (inches): **16.00**

Driller Name: **NA** | Driller License Number: **NA**

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG.1587 | Trn Number:

Page 4 of 7

If replacing the current well, is the current well to be plugged? ☐ Yes ☐ No ☒ Not Applicable If No, state for what use it is retained:

10. MOVE-TO PLACE(S) OF USE (Complete this section ONLY if adding or changing a place of use)
List each individually

The land is legally described by (check all that apply):

☐ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other:

Place of use is on land owned by (required):

Are there other sources of water for these lands? No ☐ Yes ☐ describe by OSE file number:

2015 SEP 17 PM 4:15

Note: If on Federal or State Land, please provide copy of lease.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1587 | Trn Number:

11. ADDITIONAL STATEMENTS OR EXPLANATIONS

RG-1587 (KAFB-7) is an existing well included in Kirtland AFB's water right as described in District Court order: United States District Court, District of New Mexico, State of New Mexico State Engineer vs. Kirtland Air Force, dated November 27, 1973. See court order included as Attachment 1. The Kirtland AFB water rights allow for diversion and consumptive use of up to 4,500 acre feet per anum. The well is currently used as an extraction well for nitrate abatement at SWMU ST-105. This application does not seek to increase the allowable groundwater diversion described for RG-1587, but seeks to change the purpose of use to pollution control, recovery, and irrigation, including both injection and extraction of groundwater

ACKNOWLEDGEMENT

I, We (name of applicant(s)), **Eric H. Froehlich**
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☒ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

2015 SEP 17 PM 4:17

STATE ENGINEER OFFICE ALBUQUERQUE, NEW MEXICO

Witness my hand and seal this 10th day of December 2015, for the State Engineer,

Tom Blaine, P.E.
State Engineer

, State Engineer

By: _____
Signature

Jeffrey L. Peterson
Print

Title: Water Resource Supervisor
Print

FOR OSE INTERNAL USE

Application for Permit, Form wr-06

File Number: RG-1587	Trn Number:

Page 7 of 7

CONDITIONS OF APPROVAL

1. This application is approved as follows:

Permittee:	Kirtland Air Force Base
Permit No:	RG-1587
Application File Date:	September 17, 2015
Notice for Publication Issued:	October 13, 2015
Affidavit of Publication Filed:	November 4, 2015, The Albuquerque Journal published on October 16, 23, and 30, 2015
Priority:	March 1, 1949
Source:	Groundwater
Point of Diversion:	
RG-1587:	Located at a point where X=1,544,731.13 feet and Y=1,470,756.22 feet, NMSPCS, Central Zone, NAD 83, on land owned by the Kirtland Air Force Base, Bernalillo County, New Mexico.
Purpose of Use:	Extraction/Production, Injection, and Irrigation
Place of Use:	NE ¼ NE ¼, Section 1, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico, and under permits RG-1579 through RG-1589 the applicant will discharge treated groundwater into the Tijeras Arroyo Golf Course main pond, infiltration galleries located adjacent to the golf course, and injection wells on land owned by the Kirtland Air Force Base.

2. The total diversion of water from well RG-1587 under this permit shall not exceed 4,500 acre-feet per annum.

3. The total injection of water from well RG-1587 under this permit shall not exceed 2,000 acre-feet per annum.

RG-1587
Page 2 of 2

4. Well RG-1587 shall be equipped with a totalizing meter of a type, at location(s) approved by, and installed in a manner acceptable to the State Engineer. Records of the amount of water pumped and injected shall be submitted, in writing, to the District 1 Office of the State Engineer on or before the 10th day of January, April, July and October of each year. No water shall be diverted from any well unless equipped with a functional totalizing meter. The Permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.

5. The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.

6. This Permit will expire on December 1, 2025.

Witness my hand and seal this 10th day of December, A.D., 2015

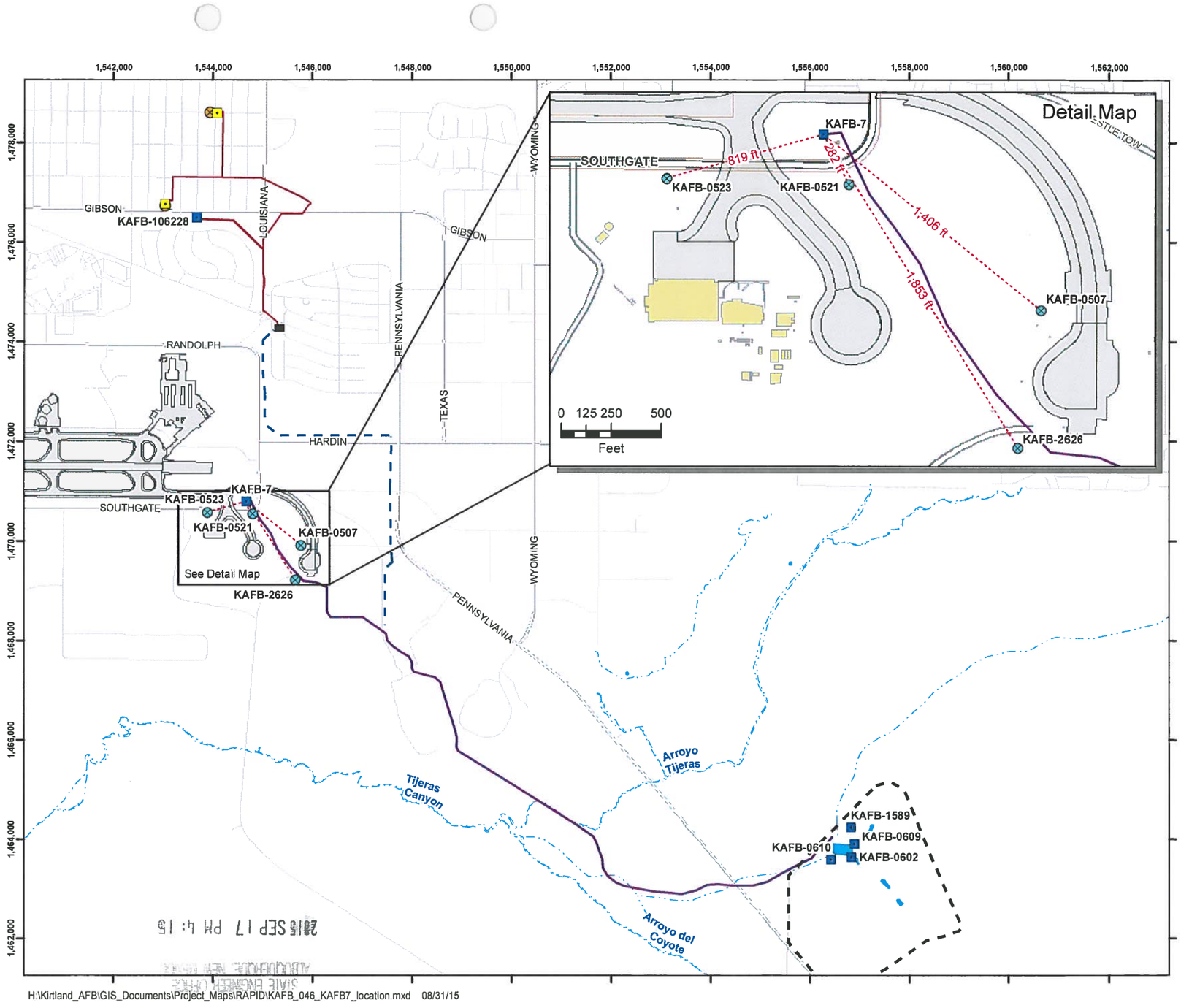
Tom Blaine, P.E.
NEW MEXICO STATE ENGINEER

By: _____
Jeffrey L. Peterson
Water Resource Supervisor
District I

CB:cb
cc: WRAB

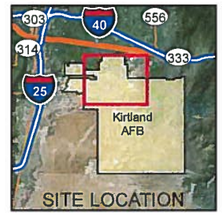
FIGURE 1

KAFB-7 LOCATION



Legend

- Monitoring Well
- Proposed Monitoring Well
- Existing Extraction Well
- Proposed Extraction Well
- Distance Line from KAFB-7
- Influent Pipeline
- Permanent Effluent Pipeline
- Pipe from KAFB-7
- Ephemeral Stream
- Permanent Groundwater Treatment System
- Tijeras Arroyo Golf Course
- Pond



Revision Date: 08/31/15

N

0 1,000 2,000 4,000

Feet

1 inch = 2,000 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

RAPID RESPONSE
OSE PERMIT APPLICATION
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1

KAFB-7 LOCATION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

CERTIFIED RETURN-RECEIPT REQUESTED

2015 SEP 17 PM 4:14
STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO

Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5600

Office of the State Engineer
c/o Jeffrey L. Peterson, Water Rights Division
5550 San Antonio Blvd. NE
Albuquerque, New Mexico 87109

Dear Mr. Peterson

Kirtland Air Force Base (KAFB) is submitting herein one "Application for Permit to Change an Existing Water Right" with supporting documents to add an additional purpose of use for existing well RG-1587 (KAFB-7). This application seeks to change the purpose of use of RG-1587 to pollution control, recovery, and irrigation, which will include extraction and injection of groundwater. This application does not seek to increase the allowable groundwater diversion described for RG-1587, but it does seek to credit any injected water towards KAFB's consumptive water use. RG-1587 is an existing well included in the KAFB water right as described in District Court order: United States District Court, District of New Mexico, State of New Mexico State Engineer vs. Kirtland Air Force, dated November 27, 1973 (Attachment 1). The KAFB water right allows for diversion and consumptive use of up to 4,500 acre feet per annum. The well is currently used as an extraction well for nitrate abatement at Solid Waste Management Unit (SWMU) ST-105.

To prevent spreading of contaminated groundwater into the Albuquerque municipal water supply and expedite the collapse of the downgradient portion of the SWMU SS-111 dissolved-phase ethylene dibromide (EDB) plume, KAFB plans to install up to eight extraction wells. One well, KAFB-106228 (RG-1579 POD 292) is currently installed and actively extracting water from the aquifer. Two additional extraction wells, KAFB-106233 and KAFB-106234 (RG-1579 POD 309 and 310) are currently being installed and will be operational by winter 2015. Up to five more extraction wells may be installed in subsequent years to extract up to 1,200 gallons per minute (gpm) total (approximately 2,000 acre feet per year) when the well network is completed, and will be will be supplemental to the wells described in KAFB file No. RG-1579 through RG-1589. Extracted water is treated using a granular activated carbon groundwater treatment system (GWTS), and is discharged to the KAFB Golf Course Pond (GCMP) in accordance with the temporary permission to discharge approved by the New Mexico Environment Department (NMED) Groundwater Quality Bureau (GWQB) in a letter dated June 1, 2015.

During winter months the KAFB GCMP will not have the capacity to accept the entirety of the water extracted from the existing and proposed extraction wells. As a result, this application seeks to change the purpose of use for RG-1587 to include injection of treated water, and to credit any injected water up to the entire extracted amount of 2000 acre feet per year towards KAFB's consumptive use. The GWTS could operate for up to ten years; however, it is possible that the GWTS could be operational for a longer or shorter period of time. Construction details for KAFB-7 are included as Attachment 2 to this application. Existing downhole apparatus for KAFB-7 will be replaced or upgraded as necessary to allow for injection of treated groundwater.

The specific requirements for pollution control and recovery will apply to RG-1587 and are as follows:

- The need for the pollution control or recovery operation:
  - SWMU SS-111 is groundwater impacted by jet fuel. The New Mexico Environment Department has directed KAFB to implement Interim Measures to address the groundwater contamination. Existing and proposed extraction wells will extract contaminated water and treat it to concentrations below applicable Environmental Protection Agency maximum contaminant levels and New Mexico Water Quality Control Commission standards. Treated water will be injected back into the aquifer via RG-1587.

- The estimated maximum period of time for completion of the operation:
  - 10 years.

- The annual diversion amount for each well:
  - This application does not seek to increase the allowable diversion amount of 4,500 acre feet per annum included under the KAFB water right.

- The annual consumptive use for each well:
  - This application does not seek to increase the allowable consumptive use of 4,500 acre feet per annum included under the KAFB water right.

- The maximum amount of water to be diverted for the duration of the operation:
  - This application does not seek to increase the allowable diversion amount of 4,500 acre feet per annum included under the KAFB water right.
  - Up to 2,000 acre feet per annum will be injected into the aquifer via existing well RG1587 (KAFB-7) and will be credited to KAFB's consumptive use.

- The method and place of discharge
  - Water extracted from SWMU SS-111 will be discharged to the GCMP, or infiltration galleries. In addition, this application seeks to permit RG-1587 for pollution control, recovery, and irrigation, which will include injection of treated groundwater.

- The method of measurement of water produced and discharged:
  - Water will be metered as it is extracted from the individual extraction wells and treated by the GWTS.

- The source of water to be injected:
  - Injected water will be extracted from existing and proposed extraction wells installed to expedite the collapse of the downgradient portion of the SWMU SS-111 dissolved-phase EDB plume. The extracted water will be treated through a granular-activated carbon system prior to injection.

- The method of measurement of water injected:
  - Treated water will be metered as it is discharged to RG-1587.

- The characteristics of the aquifer:
  - The aquifer is primarily comprised of unconsolidated sand and gravel, with an average hydraulic conductivity of 63 feet/day.

- The method of determining the resulting annual consumptive use of water and depletion from any related stream system:
  - The groundwater from KAFB-106233 and KAFB-106234 are projected to be extracted at a rate of up to 200 gpm (323 acre-feet per year per well) and groundwater from KAFB-106228 is currently permitted to extracted at a rate of 250 gpm (403 acre-feet per year). Once the five additional extraction wells are added to the treatment network, the eight extraction wells are estimated to extract up to 1,200 gpm total (approximately 2,000 acre feet per year). The groundwater will be metered from each extraction well as it is extracted from the aquifer and pumped to the KAFB GWTS. Treated water will be metered as the groundwater is discharged to the GCMP and infiltration galleries. These metered locations will be used to determine the annual consumptive use.
  - Treated water will also be discharged via injection to RG-1587. A flow meter will be installed at RG-1587 to measure the volume of treated water injected into the aquifer. Treated water will be injected into RG-1587 during periods in which the GCMP and infiltration galleries are non-operational, so the volume removed from the extraction wells will essentially equal the amount discharged to the aquifer. Injected water will be created to KAFB's consumptive use.

- Proof of any permit required from the NMED:
  - KAFB is working with the NMED – Hazardous Waste Bureau and GWQB to identify necessary permits. These include the following:
    a. Discharge Permit
    b. Temporary Discharge Permit
  - A Modification to Discharge Permit DP-1770 has been submitted to the NMED GWQB and the first Public Notice has been issued. Additional information regarding the KAFB-7 injection well will be submitted to the NMED GWQB to include in the permit modification.
  - Temporary permission to discharge treated groundwater to the GCMP was issued by the NMED in a letter dated June 1, 2015.

- An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located:
  - KAFB is the owner of the land on which RG-1587 is located.

In addition to the application, this packet contains figure illustrating the location of KAFB-7 (RG-1587), the Kirtland AFB water rights file, and well construction details for KAFB-7. Please contact Mr. L. Wayne Bitner at 505.853.3484 or at ludie.bitner@us.af.mil or Ms. Victoria R. Branson at 505.846.6362 or at victoria.branson@us.af.mil if you have any questions.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

Attachment: WR06 Application for Permit to Change an Existing Water Right

cc:
AFCEC-CZRX (Bodour)
USACE-Omaha District Office (Ellender)
USACE-ABQ District Office (Simpler, Phaneuf)
Public Info Repository, AR/IR, and File

2015 SEP 17 PM 4:15
STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO

ATTACHMENT 1

KIRTLAND WATER RIGHT

73 DEC 3 A8:26
ALBUQUERQUE, N. MEX. OFFICE

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

STATE OF NEW MEXICO, ex rel, S. E. REYNOLDS, State Engineer.	)	ORIGINAL FILED IN MY OFFICE NOV 27 1973 L. G. KANALY CLERK
Plaintiff	)	
vs.	)	
JOHN McLUCAS, Secretary of the Air Force, THOMAS W. MORGAN, Commander, Air Force Special Weapons Center, and JAMES B. MYERS, Base Commander, Kirtland Air Force Base	)	
Defendants.	)	

JUDGMENT AND ORDER

THIS MATTER coming on to be heard upon the Stipulation of the parties, and the Court having considered the same and being otherwise fully advised in the premises, finds that the Court has jurisdiction of the parties and the subject matter and that the said Stipulation should be approved and incorporated in the final judgment of this Court.

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED that the Stipulation of the parties is hereby approved and incorporated in this judgment as if set out in full herein.

IT IS FURTHER ORDERED that the defendants, their employees, agents, assigns and successors in interest be and they are hereby permanently enjoined and restrained from any diversion and/or use of water from the Rio Grande Underground Water BAsin in and for Kirtland Air Force BAse except in strict conformity with this final judgment.

2015 SEP 17 PM 4:15
STATE ENGINEER OFFICE ALBUQUERQUE, NEW MEXICO

HOWARD BRATTON

JUDGE OF THE U. S. DISTRICT COURT

PLIS

J Gael

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

STATE OF NEW MEXICO, ex rel, S. E. REYNOLDS, State Engineer,

Plaintiff

vs.

JOHN McLUCAS, Secretary of the Air Force, THOMAS W. MORGAN, Commander, Air Force Special Weapons Center, and JAMES B. MYERS, Base Commander, Kirtland Air Force Base

Defendants.

STIPULATION

COME NOW the Plaintiff and Defendants herein, by and through their attorneys, and hereby mutually stipulate and agree that final judgment may enter in this cause in the following terms:

1. The United States of America, acting through and by means of the United States Air Force, owns and operates that certain complex of military facilities known as Kirtland Air Force Base within Bernalillo County, New Mexico, which Base includes the former Sandia Base, a Military installation heretofore operated by the United States Army. That area heretofore known as Sandia Base shall be designated in this stipulation as Kirtland East and that area known as Kirtland Air Force Base prior to the merger of the two installations shall be designated as Kirtland West.

2. On November 29, 1956, the Plaintiff, S. E. Reynolds, State Engineer, duly and lawfully declared the Rio Grande Underground Water Basin, an underground reservoir of public waters of the State of New Mexico having reasonably ascertainable boundaries.

3. All of Kirtland East and Kirtland West were, on November 29, 1956, and have continued to the present time to be within the exterior boundaries of the said Rio Grande Underground Water Basin.

4. On November 29, 1956, the United States of America owned within Kirtland East a water supply system consisting of 9 completed and operating wells, together with associated water storage and delivery works, and had prior to that date diverted and used underground waters of the Rio Grande Underground Water Basin by means of each and every of the said 9 wells for the lawful purposes of the said military installation.

5. The said nine wells in the Kirtland East water supply system were duly declared by an authorized representative of the United States of America in the office of the Plaintiff on the 4th day of October, 1957, and have been since that date designated in the files of the State Engineer as wells No. RG-1581 through RG-1589. The respective locations and priorities of the said 9 wells, as declared by the United States of America, are as follows:

RG-1581 NW1/4SE1/4, Sec. 31 T. 10 N., R. 4 E. March 1, 1949

RG-1582 NW1/4NW1/4, Sec. 1 T. 9 N., R. 3 E. August, 1949

RG-1583 NW1/4SW1/4, Sec. 30, T. 10 N., R. 4 E. August, 1949

RG-1584 NE1/4SW1/4, Sec. 6, T. 9 N., R. 4 E. August, 1949

RG-1585 NE1/4SW1/4, Sec. 29, T. 10 N., R. 4 E. July, 1952

RG-1586 SW1/4SE1/4, Sec. 32, T. 10 N., R. 4 E. July, 1952

RG-1587 NW1/4NW1/4, Sec. 6, T. 9 N., R. 4 E. Feb., 1955

RG-1588 SW1/4SW1/4, Sec. 5, T. 9 N., R. 4 E. Feb., 1955

RG-1589 SW1/4SW1/4, Sec. 15, T. 9 N., R. 4 E. Feb., 1949

6. Between November 1, 1958, and May 27, 1959, the United States of America drilled or caused to be drilled, in the NW1/4NE1/4 of Sec. 20, T. 9 N., R. 4 E., an additional water well which was thereafter made a part of the water supply system of Kirtland East. This well is designated in the files of the State Engineer as RG-1581 through RG-1589-S. By means of the said well, the United States of America has thereafter continually diverted and beneficially used public underground waters of the Rio Grande Underground Water Basin, as a supplemental point of diversion in and for Kirtland East.

7. In 1972, the United States of America drilled or caused to be drilled an additional water well within Kirtland East in the NW1/4NE1/4 of Sec. 4, T. 9 N., R. 4 E., which well has been completed except for the installation of a pump and has not yet been put to beneficial use, and which is hereby designated RG-1581 through RG-1589-S-2. The said well was drilled for the purpose of serving as a supplemental well for the water supply system of Kirtland East

8. The United States of America owns, under the Constitution and laws of the State of New Mexico, the right to divert the public underground waters of the Rio Grande Underground Water Basin, through and by means of the said eleven wells set forth in paragraphs 5, 6 and 7, in an amount not to exceed an annual quantity of four thousand five hundred (4,500) acre-feet, and to apply the same to beneficial use for the purposes of Kirtland Air Force Base. The priorities of the said eleven wells composing the water supply system of Kirtland East are as set forth

above in paragraphs 5, 6 and 7. The defendants stipulate that the United States Air Force has no right to divert any of the underground waters of the Rio Grande Underground Water Basin, by means of the said 11 wells or otherwise, for the purposes of Kirtland Air Force Base, except as set forth in this Stipulation, provided, however, that the United States shall enjoy the same right as any other appropriator in the State of New Mexico to make application hereafter to the Plaintiff, State Engineer, for permit to drill supplemental well(s) (i.e., make partial or total change in point of diversion or place or purpose of use) or to effect the transfer of valid and existing water rights for the purposes of Kirtland Air Force Base.

9. On November 29, 1956, the United States of America owned a water supply system in and for Kirtland West consisting of two water wells whose respective locations and priorities were declared in the Office of the State Engineer, by a duly authorized representative of the United States on the 4th day of October, 1957, to be as follows:

RG-1579 NW1/4NW1/4, Sec. 35, T. 10 N., R. 3 E., Oct. 9, 1952

RG-1580 SE1/4NW1/4, Sec. 34, T. 10 N., R. 3 E., Mar. 6, 1956

10. In 1969, the United States of America drilled or caused to be drilled an additional well in and for the Kirtland West water supply system, designated in the records of the State Engineer as RG-1579 and RG-1580 Combined-S, which well was thereafter made a part of the Kirtland West water supply system as a supplemental well.

11. The United States of America owns, under the Constitution and laws of the State of New Mexico, the right to divert

the public underground waters of the Rio Grande Underground Water Basin by means of the three wells set out in paragraphs 9 and 10 above in an amount not to exceed an annual quantity of 1,898 acre-feet for the purposes of Kirtland Air Force Base. The defendants stipulate that the United States Air Force has no right to divert or use the underground waters of the Rio Grande Underground Water Basin for the purposes of Kirtland Air Force Base, except as set forth in this Stipulation, by means of the said three wells or otherwise, provided, however, that the United States of America shall enjoy the same right as any other appropriator of public water in the State of New Mexico to make application to the Plaintiff, State Engineer, hereafter for permit to drill and use supplemental well(s) (i.e., make partial or total change in point of diversion or place or purpose of use) or to effect the transfer of existing valid water rights for the purposes of Kirtland Air Force Base.

12. The United States of America also owns the right under the Constitution and laws of the State of New Mexico to divert public underground waters of the Rio Grande Underground Water Basin in an amount not to exceed three acre-feet per year by and from each of the following three domestic wells located and existing within, and for the purposes of Kirtland Air Force Base:

Location	Priorities
RG-1578 SE1/4NW1/4, Sec. 35, T. 9 N., R. 4 E.	1945
RG-1590 SE1/4NW1/4, Sec. 35, T. 9 N., R. 4 E.	1945
RG-1591 NE1/4SE1/4, Sec. 24, T. 9 N., R. 4 E.	1948

13. The defendants stipulate that the United States Air Force will not after the entry of final judgment herein drill

or cause or allow to be drilled any water well(s) within the boundaries of the Rio Grande Underground Water Basin, within and/or for the purposes of Kirtland Air Force Base (including Kirtland East and Kirtland West), except when and to the extent that it will have fully complied with the laws of the State of New Mexico and the Rules and Regulations of the State Engineer in respect to obtaining from the State Engineer permit(s) to drill water wells and/or produce public waters therefrom for any purpose.

14. The defendants stipulate that they will make on behalf of the United States accurate monthly reports to the Plaintiff, State Engineer, of the total metered quantities of underground water diverted by means of any and all of the wells composing the Kirtland East and Kirtland West water supply systems, provided, however, that the United States of America shall not be required to make application for, or obtain permit authorizing the physical combination of the two water supply systems so long as the total annual metered diversion from each system is within the respective limit established in paragraphs 8 and 11. The defendants further agree that they will, within 60 days of the date of entry of final judgment herein, file in the Office of the Plaintiff, State Engineer, on forms to be supplied by the Plaintiff, applications on behalf of the United States seeking the right to divert and use public underground waters of the Rio Grande Underground Water Basin by means of those two certain wells RG-1581 through RG-1589-S-2 and RG-1579 and RG-1580 Combined-S, within the respective limits set forth in paragraphs 8 and 11 above. The State of New Mexico agrees that together

with the terms of judgment entered in this cause pursuant to this Stipulation, the said applications shall be administratively recognized as evidencing the right of the United States to use the said two wells within the terms of this Stipulation and the Order of the Court entered pursuant thereto, without any further requirement for advertisement or hearing.

PAUL L. BLOOM
Special Assistant Attorney General
State of New Mexico

s/ Victor Ortega
United States Attorney

ATTACHMENT 2

KAFB-7 WELL CONSTRUCTION INFORMATION

7

DATA WELL NO. 7 KIRTLAND EAST

ELEVATION (FT)	LOCATION	DATE CONSTR ENDED
5349.0	NE¼-NE¼-NE¼=SEC 1-T9N-R3E	February 1955

WELL

TYPE		
Rotary Drilled, Gravel Packed, 3/4" Gravel		
DEPTH	**DIAMETER**	**PUMPSETTING DEPTH**
1010'	28" Hole 16" Casing	475'
ORIGINAL STATIC LEVEL	**DRAWDOWN**	**RECOVERY TIME**
395'	22'	

TEST DATA		AIR LINE AND GAGES			SPECIFIC CAPACITY (GAL) PER (FT)
WELL CAPACITY	PUMPING LEVEL	YES	NO	LENGTH	GPM / DRAWDOWN = 64 GPM/FT
1400GPM	417'	X		475'	

WELL PUMPING EQUIPMENT

PUMP

TYPE AND MAKE		CAPACITY
Submersible, Byron-Jackson		1150 GPM
SUCTION (FT)	**SIZE AND LENGTH**	**COLUMN**
N/A	N/A	10" w/check valve at water level

HEAD			NUMBER BOWLS	SIZE AND TYPE	NO. STAGES
ABOVE GRD	BELOW GRD	TOTAL			
161'	425'	586'		12" 3CK	7

MOTOR

SERIAL NO.	TYPE	MAKE	HP	RPM	FRAME	PHASE	CYCLES	VOLTAGE
	14" H Submersible	B&J	200	1750		3	60	440

STAND BY POWER	MAKE	SIZE
440 volt	Cummins Installed 1970	300KW

HP	RPM	DESCRIPTION
	1800	Diesel powered generator

CASING AND WELL SCREENING MATERIAL USED		SETTING DEPTH	LENGTH EACH
16" O.D.	Blank Casing	448	448
16" O.D.	¼" Shutter Screen casing	856	408
16" O.D.	Blank Casing	880	24
16" O.D.	¼" Shutter screen casing	976	96
16" O,D	Blank Casing	1,010	34

AF FORM 996

PAGE 1 OF 2 PAGES

FORMATIONS ENCOUNTERED DURING DRILLING #7(KE)	DEPTH (FT)	STRATUM
Top soil, sand and gravel	35	35
Sand, gravel and clay	95	60
Course sand and gravel	125	30
Sandy clay and gravel	190	65
Sand and gravel	240	50
Coarse sand and gravel	275	35
Sand, gravel and streaks of clay	215	40
Sand, gravel and boulders	465	250
Sand, gravel and streaks of clay	525	60
Sand, gravel and boulders	740	215
Coarse sand and boulders	855	115
Sandy clay	945	90
Coarse sandy clay and boulders	1,000	55

CHANGES MADE FROM ORIGINAL DATA

1961: Motor failed,equipment removed. Well bailed and surged and added 40 CY of gravel (3/4") and removed 30 CY of 1/4" gravel. Installed new pump and motor identical to original. Static level 418 feet.

1967: Pump failed to operate, equipment removed. Well bailed, surged and caged. 80 CY of 1/4 inch gravel removed and 100 CY of 3/4 inch gravel added. Installed new identical equipment. Static level 420 feet.

1970: Equipment failed, removed. Installed Johnson pump and 250 HP GE submersible motor, 1400 GPM @ 615' head. Static level 425 feet.

1973: Equipment failed, removed. Installed 7 stage Fairbanks-Morse lineshaft pump w/250 HP Westinghouse hollowshaft motor, 1400 GPM @ 560' head. Static level 425 feet.

1976: Motor burned out, replaced w/250 HP GE hollowshaft. (Jan-Apr) $6,171.03
Sand sampler installed

1976: July, replaced water meter and installed drawdown recorder. $4,600.00
September, replaced seal and bearings in motor. $1,800.00

1977: March, Motor Overhauled (Shops). $1,500.00

DRILLING COMPANY: MOSCOE MOSS CO | LOCATION: LOS ANGELES, CALIFORNIA

AF FORM 006 PAGE 2 OF 2 PAGES

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT I

JOHN R. D'ANTONIO, JR., P.E.
STATE ENGINEER

5550 San Antonio Drive NE
Albuquerque, NM 87109-4127
(505) 383-4000

January 9, 2020

Kirtland Airforce Base
C/o EA Engineering
Attn: Bernard Bockisch
320 Gold Avenue SW, Suite 1300
Albuquerque, NM 87102

Permit No.: RG-1579 POD 376-379

Greetings:

The Office of the State Engineer has approved the above-referenced permit subject to the attached Conditions of Approval. Also attached are the well tags for all wells, which must be attached to each well using a metal band.

Pursuant to Section 72-2-16, NMSA 1978, if you are aggrieved by this decision you may submit a request to this office asking for a hearing to be held. The request must be in writing and must be submitted no later than 30 days after receipt of this letter. Failure to request a hearing by such time will waive your right to request a hearing on this decision.

In accordance with Subsection B of 19.25.2.10 NMAC, you will be required to pay a hearing fee when the hearing is announced by the OSE Hearings Unit.

Aggrieval of the permit or any of the conditions of approval suspends the permit. **No water may be diverted** under an aggrieved permit until final resolution of the aggrieval with the Office of the State Engineer. Any water diverted while the aggrieval is pending will have to be repaid.

You may also submit additional evidence in support of your application for this Office to reconsider your application. This office will give full consideration to any additional evidence.

Requesting a hearing does not preclude you from submitting additional evidence at any time before or after such request. However, please note that any submissions of additional evidence do not alter the thirty-day deadline to request a hearing, and if an application is deemed final, no further evidence will be considered.

If you have any questions or comments, please contact this office.

Sincerely,

Jeffrey Falance
Water Resources Professional I, District 1

Enclosures

HC 1-59372
$100

File No.

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO CHANGE AN EXISTING WATER RIGHT

(Non 72-12-1)

(check applicable boxes):

For fees, see State Engineer website: http://www.ose.state.nm.us/

☒ Change Purpose of Use ☒ Groundwater ☐ Surface Water ☐ Change Place of Use ☐ Groundwater ☐ Surface Water	☐ Change Point of Diversion (POD): From: ☐ Groundwater ☐ Surface Water To: ☐ Groundwater ☐ Surface Water	☒ Additional Groundwater Point of Diversion (POD) ☐ Additional Surface Water Point of Diversion (POD)

☐ Temporary Change, NMSA 1978, § 72-12-7(B) Requested Start Date: Requested End Date:
(Not to Exceed 3 ac-ft in One Year)
☐ Water Use Lease, NMSA 1978, §§ 72-6-1 to-7 Requested Start Date: Requested End Date:
☐ Temporary Change (other) Requested Start Date: Requested End Date:

1. APPLICANT(S) (Required) Note: water-right owner must be listed as an applicant.

Name: Kirtland Air Force Base	Name: N/A
Contact or Agent: check here if Agent ☐ Mr. Scott Clark	Contact or Agent: check here if Agent ☐ N/A
Mailing Address: Bldg 20685; 2050 Wyoming Blvd. SE	Mailing Address:
City: Kirtland Airforce Base	City:
State: Zip Code: New Mexico 87117-5270	State: Zip Code:
Phone: ☐ Home ☐ Cell Phone (Work): (505) 846-9017	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional): scott.clark@us.af.mil	E-mail (optional):

STATE ENGINEER'S OFFICE ALBUQUERQUE, NM
2019 AUG 29 PM 2:06

2. CURRENT OSE FILE INFORMATION (Required)

OSE File No(s): RG-1579 Through RG-1589	Priority Date (if known): March 1, 1949	Subfile/Cause No. (if applicable):

3. CURRENT PURPOSE OF USE AND AMOUNT OF WATER (Required)

☐ Domestic ☐ Livestock ☐ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): Kirtland AFB Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): Remediation of groundwater and reinjection.	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: See Table 1 Consumptive Use: See Table 1 Other (include units): See Table 1

FOR OSE INTERNAL USE — Application for Permit, Form wr-06, Rev 4/04/17

File No.:	Trn. No.:	Receipt No.:
Trans Description (optional):		Sub-Basin:
Well Tag ID No. (if applicable):	PCW/LOG Due Date:	PBU Due Date:

4. COUNTY WHERE WATER RIGHT IS CURRENTLY USED (Required)

Bernalillo

5. ADDITIONAL STATEMENTS CONCERNING THE CURRENT WATER RIGHT

The Kirtland AFB water rights allow for diversion and consumptive use of up to 4,500 acre feet per annum. The proposed injection wells will be used for the reinjection of groundwater treated through the Groundwater Treatment System (GWTS) to meet the standards of 20.6.2.3103 NMAC. Treated water is either sent to the Golf Course main pond (summer months) or injection well KAFB-7 (winter months and GCMP upset conditions, OSE file number RG-1587). KAFB-7 is a retrofitted groundwater production well and has experienced biofouling and current screen conditions limit rehabilitation. The new injection wells will provide an additional option for the conservation of treated groundwater. A location map for KAFB-106IN2 is present as Figure 1. The proposed construction detail of the injection wells is provided in Figure 2. The remaining wells will be located as shown below on page 4. A Pollution Control and/or Recovery Plan Summary is presented as Table 1. A Well Construction Plan is included as Attachment 1. NMED DP-1839 is included as Attachment 2.

6. CURRENT or MOVE-FROM POINT(S) OF DIVERSION (POD) (Required)

☐ **Surface POD** **OR** ■ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course: | Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

■ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
■ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
RG-1579 through RG-1589	-	-	See District Court Order Dated Nov. 27, 1973 (attachment 3)

STATE ENGINEER'S OFFICE ALBUQUERQUE, NEW MEXICO 2017 AUG 29 PM 2:06

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional point of diversion descriptions are attached: ☐ **Yes** ■ **No** **If yes, how many**_____

Point of Diversion is on Land Owned by: Kirtland Air Force Base (KAFB-7) and City of Albuquerque (KAFB-106228, 233, 234, and 239).

Other description relating point of diversion to common landmarks, streets, or other:
KAFB-7 is currently being used for injection of groundwater from the GWTS. Water may be diverted from this location to the proposed injection wells (KAFB-106IN2 thru 5). KAFB-106228, 233, 234, and 239 are currently being used for extraction of impacted groundwater.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: | Trn Number:

Page 2 of 7

7. CURRENT or MOVE-FROM PLACE(S) OF USE (Required)

The land is legally described by (check all that apply):

☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

■ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
Kirtland Air Force Base					
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other:

Place of use is on land owned by (required):
Kirtland Air Force Base

Are there other sources of water for these lands? No ■ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

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FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number:	Trn Number:

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8. MOVE-TO PURPOSE OF USE AND AMOUNT OF WATER (Complete this section ONLY if the purpose of use is changing)

Check all that apply:	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section.
☐ Domestic ☐ Livestock ☐ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): Pollution Control and Recovery Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): Remediation of groundwater and reinjection.	Diversion: See Comments Consumptive Use: See Comments Other (include units): See Comments

9. MOVE-TO POINT(S) OF DIVERSION (POD) (Complete this section ONLY if adding or replacing a POD)

☐ **Surface POD OR** ☒ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course:	Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106IN2 (No POD No.)	1547415	1470053	NE1/4, NW1/4, Section 6, Township 9N, Range 4E
KAFB-106IN3 (no POD No.)	TBD	TBD	To be installed within UIC area. See Fig 1 of attached DP-1839
KAFB-106IN4 (no POD No.)	TBD	TBD	To be installed within UIC area. See Fig 1 of attached DP-1839
KAFB-106IN5 (no POD No.)	TBD	TBD	To be installed within UIC area. See Fig 1 of attached DP-1839

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional POD descriptions are attached: ☐ **Yes** ☑ **No** **If yes, how many**_____

Other description relating point(s) of diversion to common landmarks, streets, or other:

Point of Diversion is on Land Owned by: Kirtland Air Force Base

Note: The following information is for wells only. If more than one (1) well needs to be described, provide attachment.

Approximate depth of well (feet): 905 ft bgs	Outside diameter of well casing (inches): Up to 14.5-inch
Driller Name: To be determined.	Driller License Number: To be provided prior to drilling.

If replacing the current well, is the current well to be plugged? ☐ Yes ☒ No ☐ Not Applicable
If No, state for what use it is retained: KAFB-7 will be retained as a backup well in the event that the new wells are not available.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number:	Trn Number:

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10. MOVE-TO PLACE(S) OF USE **(Complete this section ONLY if adding or changing a place of use)**
List each individually

The land is legally described by (check all that apply):

☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

■ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
NE1/4, NW1/4	6	9N	4E		
Proposed Injection wells to be installed within					
the UIC area shown on Figure 1 in the attached					
Discharge Permit - DP-1839					
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other:

Place of use is on land owned by (required): Kirtland Air Force Base

Are there other sources of water for these lands? No ■ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

STATE ENGINEER'S OFFICE
ALBUQUERQUE, NEW MEXICO
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File Number:	Trn Number:

11. ACEQUIA OR COMMUNITY DITCH REQUIREMENTS

☒ A. The water right is not within a Community Ditch or Acequia

☐ B. The water right is within a Community Ditch or Acequia. **If you checked box B you must:**

1) Attach documentary evidence provided by commissioners of the Community Ditch or Acequia confirming applicant's compliance with any applicable requirement for the change adopted by the Community Ditch or Acequia **or**

2) Attach an affidavit from the commissioners of the Community Ditch or Acequia stating that no such requirement has been adopted by the relevant association bylaws.

This documentation is required pursuant to NMSA 1978 § 72-5-24.1.

12. ADDITIONAL STATEMENTS OR EXPLANATIONS

A location map for KAFB-106IN2 is present as Figure 1 and a well construction summary is provided as Attachment 1. The Remaining Proposed Injection Wells (KAFB-106IN3 through KAFB-106IN5) will be installed within the UIC area depicted on Figure 1 in Attachment 2, NMED discharge permit (DP-1839). The proposed injection well construction detail is provided in Figure 2.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number:	Trn Number:

ACKNOWLEDGEMENT

I, We (name of applicant(s)), David S. Miller, Colonel, USAF Commander
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☒ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 8 day of January 20 20, for

JOHN R. D'ANTONIO, JR. P.E.
STATE ENGINEER

, New Mexico State Engineer

By: Signature Jeffrey Falance Print

Title: Water Resources Professional I
Print

STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO
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☐ Check here if a new well is to be drilled under this permit.

FOR OSE INTERNAL USE

Well Tag ID Issued? ☐ Yes ☐ No

Application for Permit, Form wr-06

File No.:	Trn No.:	Well ID Tag No.:

Page 7 of 7

NEW MEXICO OFFICE OF THE STATE ENGINEER
CONDITIONS OF APPROVAL

1. This Application is approved as follows:

Permittee: Kirtland Air Force Base
Bldg 20685
2050 Wyoming Blvd. SE
Kirtland Air Force Base, NM 87117-5270

Permit Number: RG-1579 PODS 376-379

Application File Date: August 26, 2019

Notice for Publication Issued: September 30, 2019

Affidavit of Publication Filed: December 6, 2019 The Albuquerque Journal published on October 4, 11, and 18, 2019

Priority: March 1, 1949

Source: Groundwater

Purpose of Use: Pollution Control and Recovery/Remediation

Additional Points of Diversion (PODs):

OSE POD No.	Other Well ID No.	Locations (NM Central Zone, NAD83)
RG-1579 POD376	KAFB-106IN2	X: 1547415 feet Y: 1470053 feet, also described at NE1/4, NW1/4, Section 6, Township 9 North, Range 4 East, NMPM

OSE POD No.	Other Well ID No.	Locations (PLSS)
RG-1579 POD377	KAFB-106IN3	To be installed within the Underground Injection Control area. Township 9 North, Range 4 East, or Township 9 North, Range 3 East, or Township 10 North Range 4 East, NMPM
RG-1579 POD378	KAFB-106IN4	
RG-1579 POD379	KAFB-106IN5	

To be installed on land owned by Kirtland Air Force Base within the Underground Injection Control (UIC) area, KAFB, Bernalillo County, New Mexico. All wells to be supplemental to permitted wells under permits RG-1579 through RG-1589 et al.

Place of Use: UIC area associated with the Ground Water Treatment System (GWTS), for the remediation of the historic jet fuel spill at KAFB, further described as being located within Township 9 North, Range 4 East, Township 9 North, Range 3 East, and

NEW MEXICO OFFICE OF THE STATE ENGINEER
CONDITIONS OF APPROVAL

Township 10 North Range4 East, Bernalillo County, New Mexico.

2. The total diversion of water from all wells combined, under this permit and previous permits shall not exceed 4,500 acre-feet per annum.

3. The wells shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 NMSA and the wells shall be constructed in accordance with 19.27.4 NMAC.

4. All wells shall be equipped with a totalizing meter, or meters, of a type and at a location(s) approved by and installed in a manner acceptable to the State Engineer. Records of the total amount of water diverted from all wells shall be submitted to the District 1 Office via mail, e-mail, or facsimile on or before the 10th day of January, April, July and October for the preceding three calendar months, i.e. *quarterly*. No water shall be diverted from any well unless equipped with a functional totalizing meter. The Permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.

5. The State Engineer shall supply well identification tags for the well driller to firmly affix to the well casing or cap with a steel band upon completion in accordance with Subsection M of 19.27.4.29 NMAC. The permit holder is responsible for maintaining the well identification tag. Well tag ID Numbers associated with this permit: POD 376-105F0, POD 377-105F2, POD 378-105F3, and POD 378-105F4.

6. Upon completion of permitted use, wells shall be plugged under State Engineer-approved Plugging Plans, and Plugging Records shall be filed with the State Engineer within thirty (30) days after the wells are plugged in accordance with Subsection C of 19.27.4.30 NMAC.

7. Pursuant to Section 72-8-1 NMSA, the permittee shall allow the State Engineer and his representatives entry upon private property for the performance of their respective duties, including but not limited to field checks for permit compliance and access to the well(s) for meter reading and water level measurement.

8. The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.

9. The State Engineer retains jurisdiction to cancel this permit if the Conditions of Approval are not met or if the actions of the permittee(s) are not in accordance with this permit.

Witness my hand and seal this 8 day of January, 2020.

John R. D'Antonio, Jr., P.E., State Engineer

By: _____ Jeffrey Falance, Water Resource Professional I

Page 2 of 2

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT I

JOHN R. D'ANTONIO, JR., P.E.
STATE ENGINEER

5550 San Antonio Dr. NE
Albuquerque, NM 87109-4127
(505) 383-4000

July 3, 2019

Permit No: RG-1579 POD 376

Kirtland Air Force Base
C/o Bernard Bockisch, PMP
320 Gold Avenue SW, Suite 1300
Albuquerque, NM 87102

Greetings:

Your copy of Permit to Drill an Exploratory Well, which has been approved in accordance with the attached Conditions of Approval, is enclosed. If you have any questions, please don't hesitate to contact me.

Sincerely,

Jeffrey Falance
Water Resource Professional I

Enclosures

WR-07 Application for Permit to Drill A Well With No Water Right

HC1-59128 $5.00

File No. RG-01579

NEW MEXICO OFFICE OF THE STATE ENGINEER

WR-07 APPLICATION FOR PERMIT TO DRILL

A WELL WITH NO WATER RIGHT

(check applicable box):

HCL-59128
$5.00

For fees, see State Engineer website: http://www.ose.state.nm.us/

Purpose:	☒ Pollution Control And/Or Recovery	☐ Ground Source Heat Pump
☒ Exploratory Well (Pump test)	☐ Construction Site/Public Works Dewatering	☐ Other(Describe):
☐ Monitoring Well	☐ Mine Dewatering	

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

☐ Temporary Request - Requested Start Date: Requested End Date:

Plugging Plan of Operations Submitted? ☐ Yes ☒ No

1. APPLICANT(S)

Name: Kirtland Air Force Base	Name: N/A
Contact or Agent: Scott Clark, Chief Env. Restoration — check here if Agent ☐	Contact or Agent: N/A — check here if Agent ☐
Mailing Address: AFCEC/CZO, Kirtland IST, 2050 Wyoming Blvd. SE	Mailing Address: N/A
City: Albuquerque	City: N/A
State: NM Zip Code: 87117-5270	State: N/A Zip Code: N/A
Phone: N/A Phone (Work): 505.846.9017 ☐ Home ☐ Cell	Phone: N/A Phone (Work): ☐ Home ☐ Cell
E-mail (optional): scott.clark@us.af.mil	E-mail (optional):

STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
2019 JUN 26 PM 2:34

FOR OSE INTERNAL USE — Application for Permit, Form WR-07, Rev 11/17/16

File No.: RG-1579	Trn. No.:	Receipt No.:
Trans Description (optional): POD ~~376~~ JF 376		
Sub-Basin:	PCW/LOG Due Date:	

Page 1 of 3

2. WELL(S) Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106IN2	1547415 (approx.)	1470053 (approx.)	NE1/4,NW1/4, Section 6, Township 9N, Range 4E

NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional well descriptions are attached: ☐ **Yes** ☒ **No** **If yes, how many**_____

Other description relating well to common landmarks, streets, or other:

See attached Figure 1, Exploratory Well Location Map (Final well location survey data will be provided to NMOSE upon completion).

Well is on land owned by: Kirtland Air Force Base

Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ **Yes** ☒ **No**
If yes, how many_____

Approximate depth of well (feet): up to 920 ft bgs	Outside diameter of well casing (inches): up to 14.5-inch
Driller Name: To be determined.	Driller License Number: To be determined

STATE ENGINEER'S OFFICE
ALBUQUERQUE, NEW MEXICO
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3. ADDITIONAL STATEMENTS OR EXPLANATIONS

The purpose of this well is to test aquifer conditions for suitability for clean water injection. The exploratory well may be used in the future as an injection well for the conservation of groundwater treated at the Kirtland AFB Bulk Fuels Facility (BFF) Groundwater Treatment System (GWTS). The GWTS treats groundwater extracted from an area historically impacted by releases from the BFF. The proposed exploratory well location is provided as Figure 1. The final well location will be located within the designated section. The proposed construction of the exploratory well is provided in Figure 2. A Pollution Control and/or Recovery Plan Summary is presented as Table 1. A Well Construction Plan is included as Attachment 1. Final well construction specifications are subject to pending regulatory approval.

FOR OSE INTERNAL USE — Application for Permit, Form WR-07

File No.:	Trn No.:

Page 2 of 3

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory:	**Pollution Control and/or Recovery:**	**Construction De-Watering:**	**Mine De-Watering:**
■ Include a description of any proposed pump test, if applicable.	■ Include a plan for pollution control/recovery, that includes the following: ■ A description of the need for the pollution control or recovery operation. ■ The estimated maximum period of time for completion of the operation. ■ The annual diversion amount. ■ The annual consumptive use amount. ■ The maximum amount of water to be diverted and injected for the duration of the operation. ■ The method and place of discharge.	☐ Include a description of the proposed dewatering operation, ☐ The estimated duration of the operation, ☐ The maximum amount of water to be diverted, ☐ A description of the need for the dewatering operation, and, ☐ A description of how the diverted water will be disposed of.	☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for mine dewatering. ☐ The estimated maximum period of time for completion of the operation. ☐ The source(s) of the water to be diverted. ☐ The geohydrologic characteristics of the aquifer(s). ☐ The maximum amount of water to be diverted per annum. ☐ The maximum amount of water to be diverted for the duration of the operation. ☐ The quality of the water. ☐ The method of measurement of water diverted. ☐ The recharge of water to the aquifer. ☐ Description of the estimated area of hydrologic effect of the project. ☐ The method and place of discharge. ☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. ☐ A description of the methods employed to estimate effects on surface water rights and underground water rights. ☐ Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.
Monitoring: ☐ Include the reason for the monitoring well, and, ☐ The duration of the planned monitoring.	■ The method of measurement of water produced and discharged. ■ The source of water to be injected. ■ The method of measurement of water injected. ■ The characteristics of the aquifer. ■ The method of determining the resulting annual consumptive use of water and depletion from any related stream system. ■ Proof of any permit required from the New Mexico Environment Department. ☐ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	**Ground Source Heat Pump:** ☐ Include a description of the geothermal heat exchange project, ☐ The number of boreholes for the completed project and required depths. ☐ The time frame for constructing the geothermal heat exchange project, and, ☐ The duration of the project. ☐ Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	

ACKNOWLEDGEMENT

I, We (name of applicant(s)), RICHARD W. GIBBS, COLONEL, USAF, 377 ABW COMMANDER
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Richard W. Gibbs
Applicant Signature

Applicant Signature

STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
2019 JUN 26 PM 2:34

ACTION OF THE STATE ENGINEER

This application is:

☒ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 3rd day of July 20 19, for the State Engineer,

JOHN R. D'ANTONIO, JR. P.E.
STATE ENGINEER
, State Engineer

By: Jeff Fal
Signature

Jeffrey Falance
Print

Title: Water Resource Professional I
Print

FOR OSE INTERNAL USE — Application for Permit, Form WR-07

File No.:	Trn No.:

NEW MEXICO OFFICE OF THE STATE ENGINEER
PERMIT TO DRILL EXPLORATORY AND
POLLUTION CONTROL AND/OR RECOVERY WELL
CONDITIONS OF APPROVAL

This Application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the following conditions of approval:

Permittee: Kirtland Air Force Base
AFCEC/CZO, Kirtland IST, 2050 Wyoming Blvd, SE
Albuquerque, NM 87117-5270

Permit Number: RG-1579 POD 376

Exploratory Well/Point of Diversion (POD):

OSE POD No.	Other Well ID No.	NAD 83 State Plane Central Zone (feet)
RG-1579 POD376	KAFB-106IN2	X: 1547415 (approx.) Y: 1470053 (approx.)

1. No water shall be appropriated and beneficially used under this permit.

2. Water shall be used from well RG-1579 POD376 for exploratory and pollution control and/or recovery purposes only, unless and until a permit for a specific use has been issued by the State Engineer.

3. The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 NMSA and the well shall be constructed in accordance with 19.27.4 NMAC.

4. No water shall be diverted from the well except for testing purposes which shall not exceed ten (10) cumulative days, and the well shall be plugged or capped in accordance with Subsection C of 19.27.4.30 NMAC, unless a permit to use water from the well is acquired from the Office of the State Engineer.

5. Test data shall be filed not later than twenty (20) days after completion of the aquifer/pump test(s).

6. If artesian water is encountered, the Permittee and driller shall comply with Subsection C of 19.27.4.31 NMAC, and an artesian plan of operations shall be submitted to the State Engineer.

7. The well shall be drilled and completed within one year of issuance of this permit. A Well Record shall be filed no later than thirty (30) days after completion of well in accordance with Subsection N of 19.27.4.29 NMAC (i.e. due by August 3, 2020).

NEW MEXICO OFFICE OF THE STATE ENGINEER
PERMIT TO DRILL EXPLORATORY AND
POLLUTION CONTROL AND/OR RECOVERY WELL
CONDITIONS OF APPROVAL

8. Pursuant to Section 72-8-1 NMSA, the permittee shall allow the State Engineer and his representatives entry upon private property for the performance of their respective duties.

9. The State Engineer retains jurisdiction over this permit.

Witness my hand and seal this 3rd day of July 2019.

John R. D'Antonio, Jr., P.E., State Engineer

By: _____ Jeffrey Falance, Water Resource Professional I

HCl- 53067
#25

File No. RG-1573 POD 292

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO CHANGE AN EXISTING WATER RIGHT
(Non 72-12-1)
(check applicable boxes):

For fees, see State Engineer website: http://www.ose.state.nm.us/

☒ Change Purpose of Use ☒ Groundwater ☐ Surface Water ☒ Change Place of Use ☒ Groundwater ☐ Surface Water	☐ Change Point of Diversion (POD): From: ☐ Groundwater ☐ Surface Water To: ☐ Groundwater ☐ Surface Water	☒ Additional Groundwater Point of Diversion (POD) ☐ Additional Surface Water Point of Diversion (POD)
☐ Temporary Change, NMSA 1978, § 72-12-7(B) Requested Start Date: (Not to Exceed 3 ac-ft in One Year)		Requested End Date:
☐ Water Use Lease, NMSA 1978, §§ 72-6-1 to-7 Requested Start Date:		Requested End Date:

1.APPLICANT(S) (Required) Note: water-right owner must be listed as an applicant.

Name: **Kirtland Air Force Base**	Name: **N/A**
Contact or Agent: **Wayne Bitner** check here if Agent	Contact or Agent: **N/A** check here if Agent
Mailing Address: **Chief Environmental Restoration AFCEC/CZO, Kirtland IST 2050 Wyoming Blvd SE**	Mailing Address: **N/A**
City: **Albuquerque**	City:
State: **NM** Zip Code: **87117-5270**	State: Zip Code:
Phone: **N/A** ☐ Home Cell Phone (Work): **505-853-3484**	Phone: ☐ Home Cell Phone (Work):
E-mail (optional): **ludie.bitner@us.af.mil**	E-mail (optional):

2. CURRENT OSE FILE INFORMATION (Required)

OSE File No(s): **RG-1579 through RG-1589**	Priority Date (if known):	Subfile/Cause No. (if applicable):

3. CURRENT PURPOSE OF USE AND AMOUNT OF WATER (Required)

☐ Domestic ☐ Livestock ☒ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): **Pollution Control and Recovery** Describe a specific use if applicable (i.e. sand & gravel washing, dairy etc): **Extraction of groundwater for remediation**	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: **up to 403** Consumptive Use: **up to 403** Other (include units): **see comments**

FOR OSE INTERNAL USE — Application for Permit, Form wr-06, Rev 9/26/12

File No.: RG-1573 POD 292	Trn. No.:	Receipt No.: HCl- 53067

4. COUNTY WHERE WATER RIGHT IS CURRENTLY USED (Required)

Bernalillo

5. ADDITIONAL STATEMENTS CONCERNING THE CURRENT WATER RIGHT

Extraction well KAFB-106228 will be supplimental to the wells described in Kirtland AFB file No. RG 1579 through RG-1589. The application does not request to increase the allowable groundwater diversion described in RG-1579 through 1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add a place of use not currently described in RG-1579 through RG-1589.

6. CURRENT or MOVE-FROM POINT(S) OF DIVERSION (POD) (Required)

☐ Surface POD OR ☒ Ground Water POD (Well)

Name of ditch, acequia, or spring:

Stream or water course: | Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106228	1543617	1476456	

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional point of diversion descriptions are attached: ☐ Yes ☒ No If yes, how many

Point of Diversion is on Land Owned by: The Albuquerque Christ United Methodist Church

Other description relating point of diversion to common landmarks, streets, or other: South of Gibson Blvd. SE, west of Louisiana Blvd., east of Dakota St. SE, and north of Mitchell St. SE. See attached Figure 1.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD252 | Trn Number:

Page 2 of 7

7. CURRENT or MOVE-FROM PLACE(S) OF USE (Required)

The land is legally described by (check all that apply):

☒ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
RG-1579	**36**	**10 N**	**3 E**		
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other: **Kirtland AFB as described in District Court order: United States District Court, District of New Mexico, State of New Mexico State Engineer vs. Kirtland Air Force, dated November 27, 1973. See court order attached.**

Place of use is on land owned by (required): **Kirtland Air Force Base**

Are there other sources of water for these lands? No ☒ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD 292 | Trn Number:

Page 3 of 7

8. MOVE-TO PURPOSE OF USE AND AMOUNT OF WATER (Complete this section ONLY if the purpose of use is changing)

☐ Domestic ☐ Livestock ☒ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): **Pollution Control and Recovery** Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): **Extraction of groundwater for remediation**	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: **up to 403** Consumptive Use: **up to 403** Other (include units): **see comments**

9. MOVE-TO POINT(S) OF DIVERSION (POD) (Complete this section ONLY if adding or replacing a POD)

☐ **Surface POD OR** ☒ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course: | Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106228	1543617	1476456	

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional POD descriptions are attached: ☐ **Yes** ☒ **No** **If yes, how many**

Other description relating point(s) of diversion to common landmarks, streets, or other: **South of Gibson Blvd. SE, west of Louisiana Blvd., east of Dakota St. SE, and north of Mitchell St. SE. See attached Figure 1.**

Point of Diversion is on Land Owned by: **Albuquerque Christ United Methodist Church**

Note: The following information is for wells only. If more than one (1) well needs to be described, provide attachment.

Approximate depth of well (feet): 530 to 600, not to exceed 700 ft | Outside diameter of well casing (inches): 8 -12, not to exceed 12

Driller Name: **NA** | Driller License Number: **NA**

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: R6-1573 POD2S2 | Trn Number:

Page 4 of 7

If replacing the current well, is the current well to be plugged? ☐ Yes ☐ No ☒ Not Applicable
If No, state for what use it is retained:

FOR OSE INTERNAL USE | Application for Permit, Form wr-06

File Number: RG-1579 POD292 | Trn Number:

Page 5 of 7

10. MOVE-TO PLACE(S) OF USE (Complete this section ONLY if adding or changing a place of use)
List each individually

The land is legally described by (check all that apply):

☒ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
NE1/4 NE1/4	**36**	**10 N**	**3 E**		
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other: **South of Gibson Blvd. SE, west of Louisiana Blvd., east Dakota St. SE, and north of Mitchell St. SE. See attached Figure 1.**

Place of use is on land owned by (required): **Albuquerque Christ United Methodist Church**

Are there other sources of water for these lands? No ☒ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1573 POD2 | Trn Number:

Page 6 of 7

11. ADDITIONAL STATEMENTS OR EXPLANATIONS

This application seeks to use well KAFB-106228 for a groundwater extraction pilot implementation plan suplemental to the Kirtland AFB water rights (RG-1579 through 1589). The applicaton does not request to increase the allowable groundwater diversion described in RG-1579 through RG-1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add a place of use not currently described in RG-1579 through RG1589. The well will extract groundwater up to 403 acre feet per year (250 gallons per minute) for 10 years. The extracted groundwater will be treated and discharged at Kirtland AFB's infiltration gallery and a reclaimed wastewater system.

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Tom D. Miller, Colonel USAF
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Tom D. Miller SEP 2 9 2014
Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☒ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 17th day of June 2015, for the State Engineer,

Tom Blaine, P.E.
State Engineer
, State Engineer

By: Wayne G. Canon
Signature Print

Title: Water Resource Supervisor
Print

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD 252	Trn Number:

Page 7 of 7

CONDITIONS OF APPROVAL

Permit No.: RG-1579 POD 292
Permittee: Kirtland Air Force Base
Page 1 of 2

1. This application is approved as follows:

Permittee:	Kirtland Air Force Base
Permit Number:	RG-1579 POD 292
Application File Date:	November 13, 2014
Notice for Publication:	February 10, 2015
Affidavit of Publication:	May 1, 2015 from the *Albuquerque Journal*
Priority:	March 1, 1949
Source:	Groundwater
Points of Diversion:	RG-1581 POD 292, located at a point where X=1,543,677 feet and Y=1,476,476 feet, NMSPCS, Central Zone, NAD 83, within the NE ¼ NE ¼ of Section 36, Township 10 North, Range 3 East, NMPM, Bernalillo County New Mexico.
Purpose of Use:	Pollution control and recovery, specifically extraction of groundwater for remediation
Place of Use:	Land within Kirtland Air Force Base, and land within Section 36, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico.
Amount of Water:	403 acre-feet per annum

2. The total diversion of groundwater from well RG-1579 POD 292 shall be limited to 403 acre-feet per annum, measured at the well, a portion of the 6,398 acre-feet per annum which includes the water right of 4,500 acre-feet per annum from well No.s RG-1581 through RG-1589 (Kirtland East), and 1,898 acre-feet per annum from No.s RG-1579, RG-1580 and RG-1579 and RG-1580 Combined-S (Kirtland West).

3. The total amount of water pumped from well RG-1579 POD 292 shall be measured by a totalizing meter of a type, at a location, and installed in a manner acceptable to the State Engineer. The Permittee shall provide the make, model, serial number, initial reading, units, multiplier, data of installation, and dates of recalibration to the State Engineer prior to any diversion of water under this permit.

CONDITIONS OF APPROVAL

Permit No.: RG-1579 POD 292
Permittee: Kirtland Air Force Base
Page 2 of 2

4. Records of the quantity of water diverted from well RG-1579 POD 292 shall be submitted to the District 1 Office via mail, e-mail, or facsimile on or before the 10th day of the months of January, April, July and October for the preceding three calendar months, i.e. quarterly.

6. The Permittee shall utilize the highest and best technology available to assure conservation of water to the maximum extent practical.

7. This permit shall automatically expire on June 15, 2025 or upon completion of the intended purpose of use. If the intended purpose of use is completed prior to June 15, 2025, the permittee shall notify the State Engineer by certified letter.

8. Proof of Completion of Well shall be filed on or before June 15, 2017.

Witness my hand and seal this 17th day of June, A.D. 2015.

TOM BLAINE, P.E.
NEW MEXICO STATE ENGINEER

By: W Canon
Wayne G. Canon
Water Resource Supervisor, District 1

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT 1

TOM BLAINE, P.E.
NEW MEXICO STATE ENGINEER

5550 San Antonio Drive, N.E.
Albuquerque, NM 87109 (505) 383-4000

October 29, 2015

File No.: RG-1579

Kirtland Air Force Base
Attn: Wayne Bitner, Chief, Environmental Restoration
AFCEC/Kirtland AFB IST; Bldg 20685
2050 Wyoming Blvd, SE
Kirtland AFB, NM 87117-5270

RE: Permit No. RG-1579 POD309 and 310

Greetings,

Your copy of the above numbered permit, which has been approved subject to the conditions set forth on the approval page, is enclosed.

Please review the Conditions of Approval for any required submittals. If submittals are not made by the date(s) indicated in the conditions, your rights under this permit are subject to expiration unless a request for an Extension of Time is received in the District Office of the State Engineer by that date, and that Extension of Time is subsequently approved.

Appropriate forms can be downloaded from the OSE website at www.ose.state.nm.us/WR/forms.php or will be mailed to you upon request.

Sincerely,

Christopher Burrus
Water Resource Specialist
Albuquerque, OSE, District 1

C: CB/cb

HCI-53980
$130.00

File No. RG 1579

POD 309 - 310

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO CHANGE AN EXISTING WATER RIGHT

(Non 72-12-1)

(check applicable boxes):

For fees, see State Engineer website: http://www.ose.state.nm.us/

☒ Change Purpose of Use ☒ Groundwater ☐ Surface Water ☒ Change Place of Use ☒ Groundwater ☐ Surface Water	☐ Change Point of Diversion (POD): From: ☐ Groundwater ☐ Surface Water To: ☐ Groundwater ☐ Surface Water	☒ Additional Groundwater Point of Diversion (POD) ☐ Additional Surface Water Point of Diversion (POD)
☐ Temporary Change, NMSA 1978, § 72-12-7(B) Requested Start Date: (Not to Exceed 3 ac-ft in One Year)		Requested End Date:
☐ Water Use Lease, NMSA 1978, §§ 72-6-1 to-7 Requested Start Date:		Requested End Date:

1. APPLICANT(S) (Required) Note: water-right owner must be listed as an applicant.

Name: **Kirtland Air Force Base**	Name: **N/A**
Contact or Agent: check here if Agent ☒ **Wayne Bitner, Chief, Environmental Restoration**	Contact or Agent: check here if Agent ☐ **N/A** Mailing Address: **N/A**
Mailing Address: **AFCEC/Kirtland AFB IST; Bldg 20685; 2050 Wyoming Blvd SE**	
City: Kirtland AFB	City:
State: **NM** Zip Code: **87117-5270**	State: Zip Code:
Phone: **N/A** ☐ Home ☐ Cell Phone (Work): **505-853-3484**	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional): **Ludie.Bitner@us..af.mil**	E-mail (optional):

2. CURRENT OSE FILE INFORMATION (Required)

OSE File No(s): **RG-1579 THROUGH RG-1589**	Priority Date (if known):	Subfile/Cause No. (if applicable):

3. CURRENT PURPOSE OF USE AND AMOUNT OF WATER (Required)

☐ Domestic ☐ Livestock ☒ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): **Pollution Control and Recovery** Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): **Extraction of groundwater for remediation**	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: **up to 646** Consumptive Use: **up to 646** Other (include units): **see comments**

STATE ENGINEER ALBUQUERQUE, NM 2015 JUL 13 PM 3:02

FOR OSE INTERNAL USE — Application for Permit, Form wr-06, Rev 9/26/12

File No.: RG-1579	Trn. No.:	Receipt No.: 1-53980 $130
Trans Description (optional): POD 309 + 310		Sub-Basin:
PCW/LOG Due Date:	PBU Due Date:	

4. COUNTY WHERE WATER RIGHT IS CURRENTLY USED (Required)

Bernalillo

5. ADDITIONAL STATEMENTS CONCERNING THE CURRENT WATER RIGHT

Extraction wells KAFB-106233 and KAFB-106234 will be supplimental to the wells described in Kirtland AFB file No. RG 1579 through RG-1589. The application does not request to increase the allowable groundwater diversion described in RG-1579 through 1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add a place of use not currently described in RG-1579 through RG-1589.

6. CURRENT or MOVE-FROM POINT(S) OF DIVERSION (POD) (Required)

☐ **Surface POD** **OR** ☒ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course:	Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106233 POD 309	1543061	1476824	
KAFB-106234 POD 310	1544083	1478577	

2015 JUL 10 PM 3:0
STATE ENGINEER OFFICE ALBUQUERQUE, NM

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional point of diversion descriptions are attached: ☐ **Yes** ☒ **No** **If yes, how many**

Point of Diversion is on Land Owned by: **City Of Albuquerque**

Other description relating point of diversion to common landmarks, streets, or other: **Extraction Well KAFB-106233 will be located near Gibson Blvd SE and California St SE. Extraction Well KAFB-106234 will be located near the intersection of Anderson Ave and Georgia St SE**

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG 1579 POD 309-310	Trn Number:

Page 2 of 7

7. CURRENT or MOVE-FROM PLACE(S) OF USE (Required)

The land is legally described by (check all that apply):

☒ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
RG-1579	**36**	**10 N**	**3 E**		
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other: **Kirtland AFB as described in District Court order: United States District Court, District of New Mexico, State of New Mexico State Engineer vs. Kirtland Air Force, dated November 27, 1973. See court order attached.**

Place of use is on land owned by (required): **Kirtland Air Force Base**

Are there other sources of water for these lands? No ☒ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

STATE ENGINEER OFFICE ALBUQUERQUE, NEW MEXICO
2015 JUL 10 PM 01

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD 309+310 | Trn Number:

8. MOVE-TO PURPOSE OF USE AND AMOUNT OF WATER (Complete this section ONLY if the purpose of use is changing)

☐ Domestic ☐ Livestock ☒ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ☒ Other Use (specify): **Pollution Control and Recovery** Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): **Extraction of groundwater for remediation**	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: **up to 646** Consumptive Use: **up to 646** Other (include units): **see comments**

9. MOVE-TO POINT(S) OF DIVERSION (POD) (Complete this section ONLY if adding or replacing a POD)

☐ **Surface POD** **OR** ☒ **Ground Water POD (Well)**

Name of ditch, acequia, or spring:

Stream or water course: | Tributary of:

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

☒ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
☒ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106233	1543061	1476824	
KAFB-106234	1544083	1478577	

2015 JUL 10 PM 3:01 STATE ENGINEER OFFICE ALBUQUERQUE, NEW MEXICO

NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional POD descriptions are attached: ☐ **Yes** ☒ **No** **If yes, how many**

Other description relating point(s) of diversion to common landmarks, streets, or other: **KAFB-106233 will be located near Gibson Blvd SE and California St SE. KAFB-106234 will be located near the intersection of Anderson Ave and Georgia St SE**

Point of Diversion is on Land Owned by: **City Of Albuquerque**

Note: The following information is for wells only. If more than one (1) well needs to be described, provide attachment.

Approximate depth of well (feet): **~535.00** | Outside diameter of well casing (inches): **8.00**

Driller Name: **NA** | Driller License Number: **NA**

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: 2G 1579 POD 3 of 3 | Trn Number:

Page 4 of 7

If replacing the current well, is the current well to be plugged? ☐ Yes ☐ No ☒ Not Applicable
If No, state for what use it is retained:

STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO
2015 JUL 10 PM 3:01

FOR OSE INTERNAL USE | Application for Permit, Form wr-06

File Number: RG 1579 - POD3A - 3/0 | Trn Number:

Page 5 of 7

10. MOVE-TO PLACE(S) OF USE (Complete this section ONLY if adding or changing a place of use)
List each individually

The land is legally described by (check all that apply):

☒ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
SE 1/4 SE 1/4	**25**	**10 N**	**3 E**		
NE 1/4 SE 1/4	**25**	**10 N**	**3 E**		
			Total Acres:		

2015 JUL 10 PM 3:01

Other description relating place of use to common landmarks, streets, or other: **KAFB-106233 will be located near Gibson Blvd SE and California St SE. KAFB-106234 will be located near the intersection of Anderson Ave and Georgia St SE**

Place of use is on land owned by (required): **City of Albuquerque**

Are there other sources of water for these lands? No ☒ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: LG 1579 7003094310 | Trn Number:

Page 6 of 7

11. ADDITIONAL STATEMENTS OR EXPLANATIONS

This application seeks to use wells KAFB-106233 and KAFB-106234 for a groundwater extraction and treatment system supplemental to the Kirtland AFB water rights (RG-1579 through 1589). The application does not request to increase the allowable groundwater diversion described in RG-1579 through RG-1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add places of use not currently described in RG-1579 through RG1589. The wells will extract groundwater up to 323 acre feet per year (200 gallons per minute) per well (646 acre feet per year total), for 10 years. The extracted groundwater will be treated and discharged to the Golf Course Main Pond and Infiltration Galleries on Kirtland AFB

ACKNOWLEDGEMENT

I, We (name of applicant(s)), ERIC H. FROELICH, Colonel, USAF Commander
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☐ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

STATE ENGINEER OFFICE
ALBUQUERQUE, NM
2015 JUL 10 P 3:01

Witness my hand and seal this _____ day of _____ 20 _____ , for the State Engineer,

_____, State Engineer

By: _____
Signature

_____
Print

Title: _____
Print

FOR OSE INTERNAL USE

Application for Permit, Form wr-06

File Number: RG 1579 POD 309+310	Trn Number:

Page 7 of 7

11. ADDITIONAL STATEMENTS OR EXPLANATIONS

This application seeks to use wells KAFB-106233 and KAFB-106234 for a groundwater extraction and treatment system supplemental to the Kirtland AFB water rights (RG-1579 through 1589). The application does not request to increase the allowable groundwater diversion described in RG-1579 through RG-1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add places of use not currently described in RG-1579 through RG1589. The wells will extract groundwater up to 323 acre feet per year (200 gallons per minute) per well (646 acre feet per year total), for 10 years. The extracted groundwater will be treated and discharged to the Golf Course Main Pond and Infiltration Galleries on Kirtland AFB

ACKNOWLEDGEMEN

T I, We (name of applicant(s)), ERIC H. FROEHLICH, Colonel, USAF
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☒ approved ☐ partially approved ☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO
2015 JUL 10 PM 3:02

Witness my hand and seal this 29th day of October 2015, for the State Engineer,

Tom Blaine, P.E.
State Engineer, State Engineer

By: Signature

Jeffrey L. Peterson
Print

Title: Water Resource Supervisor
Print

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD 309 + 310 | Trn Number:

Page 7 of 7

CONDITIONS OF APPROVAL

1. This application is approved as follows:

Permittee:	Kirtland Air Force Base
Permit No:	RG-1579 POD 309 and POD 310
Application File Date:	July 10, 2015
Notice for Publication Issued:	August 25, 2015
Affidavit of Publication Filed:	September 14, 2015, The Albuquerque Journal published on August 28, September 5, and September 11, 2015
Priority:	March 1, 1949
Source:	Groundwater
Point of Diversion:	
RG-1579 POD 309:	Located at a point where X=1,543,061 feet and Y=1,476,824 feet, NMSPCS, Central Zone, NAD 83, on land owned by the City of Albuquerque, Bernalillo County, New Mexico.
RG-1579 POD 310:	Located at a point where X=1,544,083 feet and Y=1,478,577 feet, NMSPCS, Central Zone, NAD 83, on land owned by the City of Albuquerque, Bernalillo County, New Mexico.
Purpose of Use:	Pollution Control and Recovery, and Irrigation

Place of Use:
SE ¼ SE ¼, Section 25, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico, and under permits RG-1579 through RG-1589 the applicant will discharge treated groundwater into the Tijeras Arroyo Golf Course main pond, infiltration galleries located adjacent to the golf course, and injection wells on land owned by the Kirtland Air Force Base.

2. The total diversion of water from wells RG-1579 POD309 and RG-1579 POD310 under this permit shall not exceed 636 acre-feet per annum.

3. Wells RG-1579 POD309 and RG-1579 POD310 shall be equipped with a totalizing meter of a type, at location(s) approved by, and installed in a manner acceptable to the State Engineer. Records of the amount of water pumped shall be submitted, in writing, to the District 1 Office of the State Engineer on or before the 10th day of January, April, July and October of each year. No water shall be diverted from any well unless equipped with a functional totalizing meter. The Permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.

4. The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.

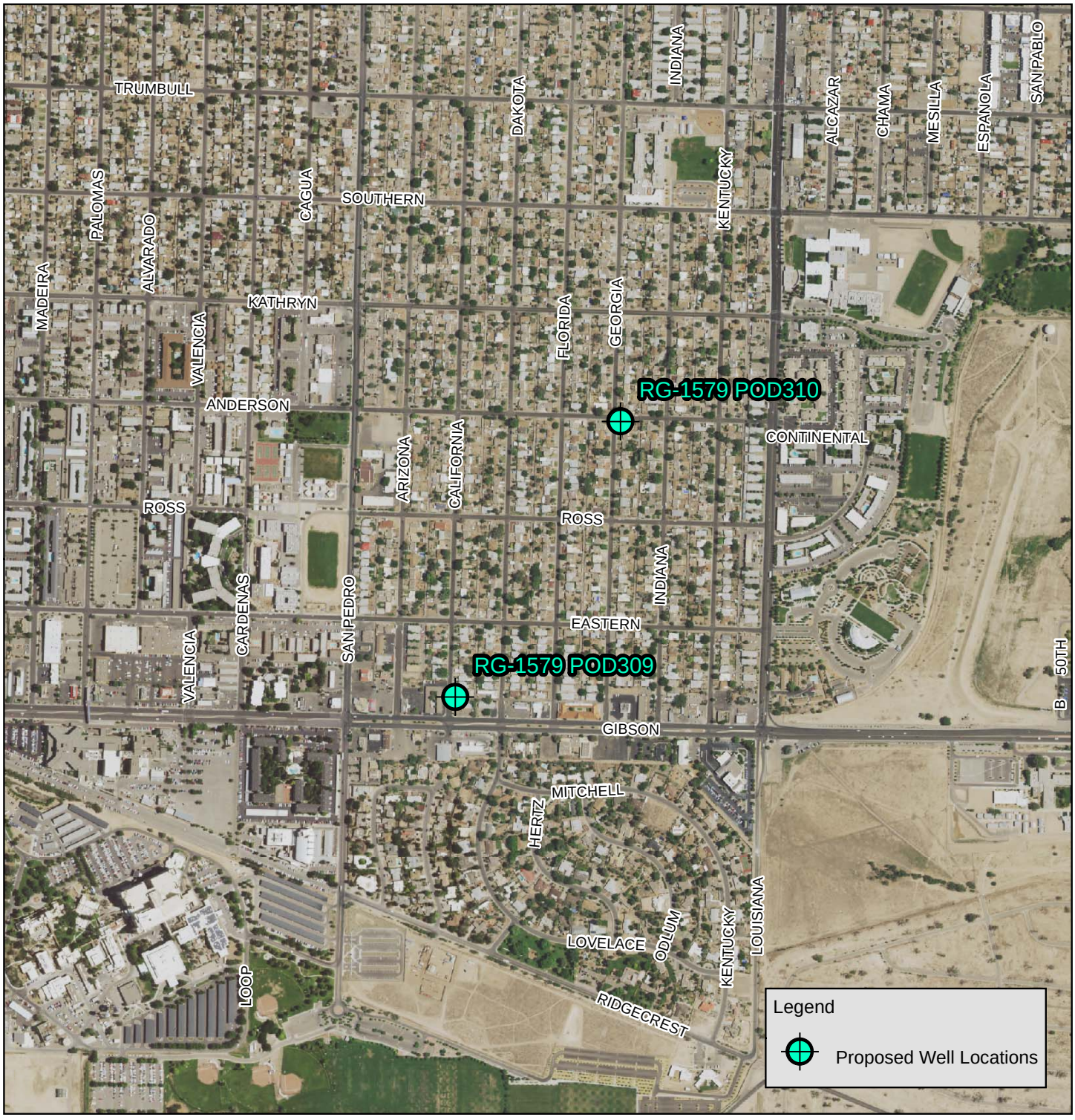
5. This Permit will expire on November 1, 2025.

Witness my hand and seal this 29th day of October, A.D., 2015

Tom Blaine, P.E.
NEW MEXICO STATE ENGINEER

By: _____
Jeffery L. Peterson
Water Resource Supervisor
District I

CB:cb
cc: WRAB



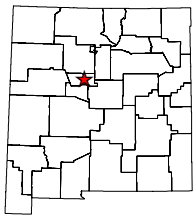
N

Absolute Scale 1:10,000

Coordinate System:
NAD 1983 UTM Meters

0 500 1,000 Feet

0 100 200 Meters



RG-1579
POD309 and POD310

Location

Conditions of Approval

State of New Mexico
Office of the State Engineer
District 1
5550 San Antonio Dr NE
Albuquerque, NM 87109

Tom Blaine, P.E. State Engineer

Created by C.Burrus

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

CERTIFIED RETURN-RECEIPT REQUESTED

Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB, NM 87117-5600

JUL 09 2015

Office of the State Engineer
c/o Jeffrey L. Peterson, Water Rights Division
5550 San Antonio Blvd. NE
Albuquerque, New Mexico 87109

Dear Mr. Peterson

Kirtland Air Force Base (AFB) is submitting herein one "Application for Permit to Change an Existing Water Right" with supporting documents for extraction wells. This application seeks to permit the exploratory wells KAFB-106233 and KAFB-106234 as supplemental wells to Kirtland AFB water rights RG-1579 through RG-1589 by changing the purpose of use to pollution control, recovery, and irrigation and by adding places of use not currently described in water rights RG-1579 through RG-1589. The extraction wells (KAFB-106233 and KAFB-106234) are to be advanced into the water table and screened to extract water from the Shallow, Intermediate, and Deep aquifer zones to aid in the treatment of contaminated groundwater as part of the existing ethylene dibromide (EDB) pump and treat system at Kirtland AFB Bulk Fuels Facility SWMUs ST-106 and SS-111. These wells are proposed to be advanced on City of Albuquerque property.

To prevent spreading of contaminated groundwater into the Albuquerque municipal water supply and expedite the collapse of the downgradient portion of the dissolved-phase EDB plume, Kirtland AFB plans to install extraction wells KAFB-106233 and KAFB-106234. Groundwater from the two extraction wells will be pumped through high-density polyethylene pipelines to the groundwater treatment system (GWTS) located just east of Louisiana Boulevard on Kirtland AFB property. The GWTS will remediate dissolved phase EDB and petroleum-related contaminants of concern to concentrations below the Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) and New Mexico Water Quality Control standards.

Treated water will be discharged to two locations on Kirtland AFB: the Golf Course Main Pond (GCMP) to irrigate the Tijeras Arroyo Golf Course, and infiltration galleries to be located adjacent to the Golf Course. Treated groundwater will be discharged to the unlined infiltration galleries located adjacent to the Tijeras Arroyo Golf Course during winter months, or if the discharge volume exceeds GCMP capacity. The infiltration galleries will be designed to provide sufficient surface area for the treated water to percolate into the vadose zone soil. KAFB-106233 and KAFB-106234 will extract groundwater up to 323 acre feet per year (200 gallons per minute) for each well. Initially, all treated water will be discharged to the GCMP until the

- The source of water to be injected:
  - No water will be injected into the water table during this operation.

- The method of measurement of water injected:
  - No water will be injected into the water table during this operation.

- The characteristics of the aquifer:
  - The aquifer is primarily comprised of unconsolidated sand and gravel, with an average hydraulic conductivity of 63 feet/day.

- The method of determining the resulting annual consumptive use of water and depletion from any related stream system:
  - The groundwater from KAFB-106233 and KAFB-106234 are projected to be extracted at a rate of up to 200 gallons per minute equivalent to 323 acre-feet per year per well. The groundwater will be metered as it is extracted from the aquifer and pumped to the Kirtland AFB water treatment system and will be metered as the groundwater is discharged to the GCMP and infiltration galleries. These metered locations will be used to determine the annual consumptive use.

- Proof of any permit required from the New Mexico Environment Department:
  - Kirtland AFB is working with the New Mexico Environment Department – Hazardous Waste Bureau and Groundwater Quality Bureau to identify necessary permits. These include any of the following:
    a. Discharge Permit
    b. Temporary Discharge Permit

  - KAFB-106233 and KAFB-106234 will be included under the modification to discharge permit (DP)-1770. In the meantime, temporary permission to discharge to the GCMP has been granted for 120 days.

- An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located:
  - Kirtland AFB is currently updating existing access agreements for KAFB-106233 and KAFB-106234. Once updated, Kirtland AFB will submit the access agreements to the Office of the State Engineer.

In addition to the application, this packet contains a summary of the well construction KAFB-106233 and KAFB-106234, and one figure showing the well locations. The well construction details may be subject to change depending on the EDB vertical extent that will be characterized by observations wells to be installed prior to the installation of extraction wells.

number and location of the infiltration galleries are determined. The extracted, treated, and injected groundwater will have no additional diversion to Kirtland AFB's water rights. The GWTS could operate for up to ten years; however, it is possible that the GWTS could be operational for a longer or shorter period of time.

Extraction wells KAFB-106233 and KAFB-106234 will be supplemental to the wells described in Kirtland AFB file No. RG-1579 through RG-1589. The application does not request to increase the allowable groundwater diversion described in RG-1579 through RG-1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add a place of use not currently described in RG-1579 through RG-1589. The current places of use for wells KAFB-106233 and KAFB-106234 are on the City of Albuquerque property; this application seeks to add Kirtland AFB as a place of use to the water rights RG-1579 through RG-1589.

The specific requirements for pollution control and recovery will apply to the exploratory wells KAFB-106233 and KAFB-106234, and are as follows:

- The need for the pollution control or recovery operation:
  - The KAFB-106233 and KAFB-106234 wells are currently categorized as exploratory wells at SWMU SS-111, which is groundwater impacted by jet fuel. The New Mexico Environment Department has directed Kirtland AFB to implement Interim Measures to address the groundwater contamination.KAFB-106233 and KAFB-106234 will expand the current treatment system, which is extracted water from KAFB-106228

- The estimated maximum period of time for completion of the operation:
  - 10 years.

- The annual diversion amount for each well:
  - Up to 323 acre-feet per year.

- The annual consumptive use for each well:
  - Up to 323 acre-feet per year.

- The maximum amount of water to be diverted for the duration of the operation:
  - Up to 3,230 acre-feet.
  - No water will be injected in the water table during this operation.

- The method and place of discharge
  - The groundwater from wells KAFB-106233 and KAFB-106234 will be discharged at the GCMP at Tijeras Arroyo Golf Course, or at infiltration galleries.

- The method of measurement of water produced and discharged:
  - Any extracted water will be metered as it is extracted from the aquifer and as it is discharged from the GWTS.

Please contact Mr. L. Wayne Bitner at 505.853.3484 or at ludie.bitner@us.af.mil or Ms. Victoria R. Branson at 505.846.6362 or at victoria.branson@us.af.mil if you have any questions.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

Attachment: WR06 Application for Permit to Change an Existing Water Right

cc:
AFCEC-CZRX (Bodour)
USACE-Omaha District Office (Ellender)
USACE-ABQ District Office (Simpler, Phaneuf)
Public Info Repository, AR/IR, and File

FIGURE 1

PROPOSED WELL LOCATIONS

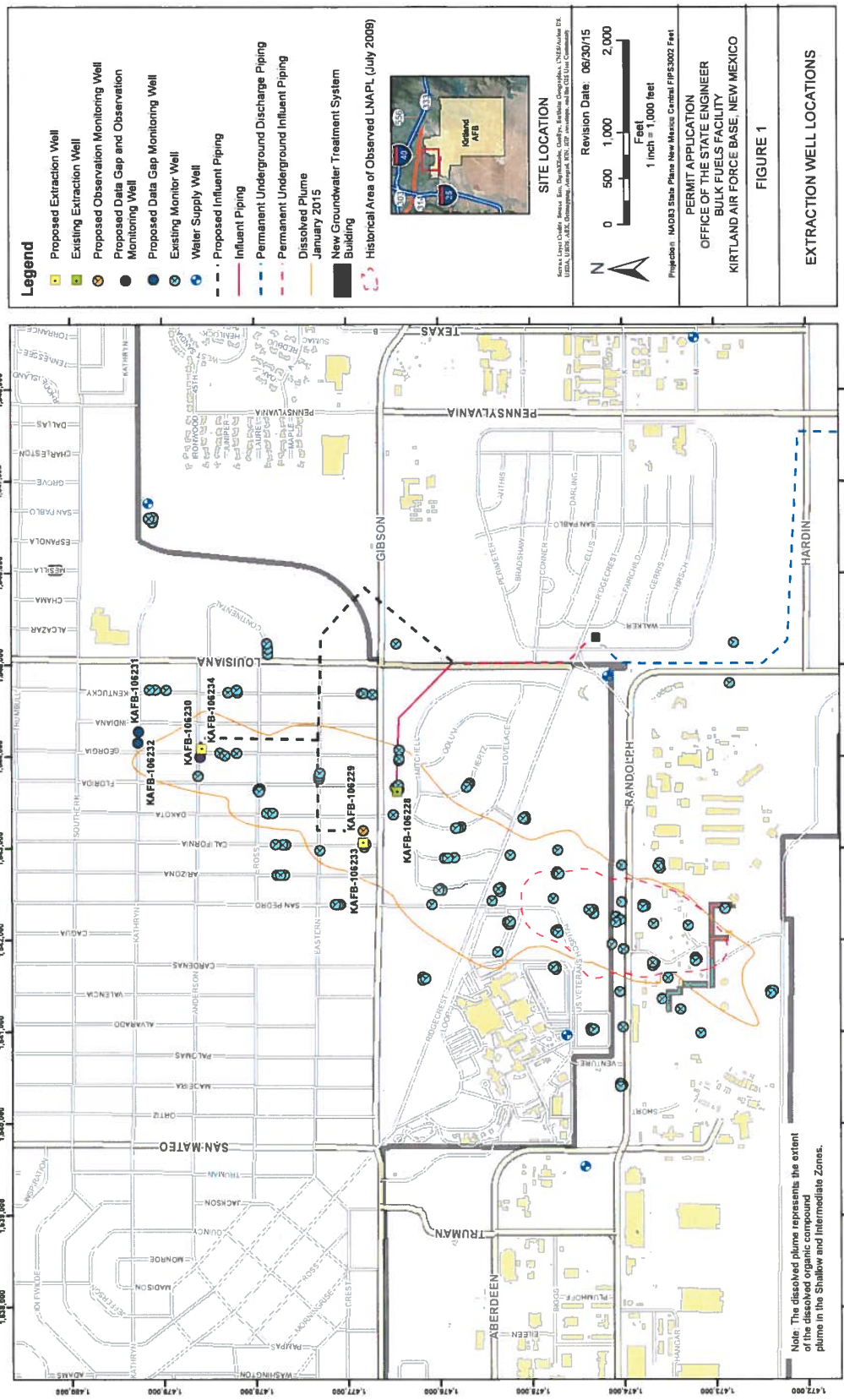
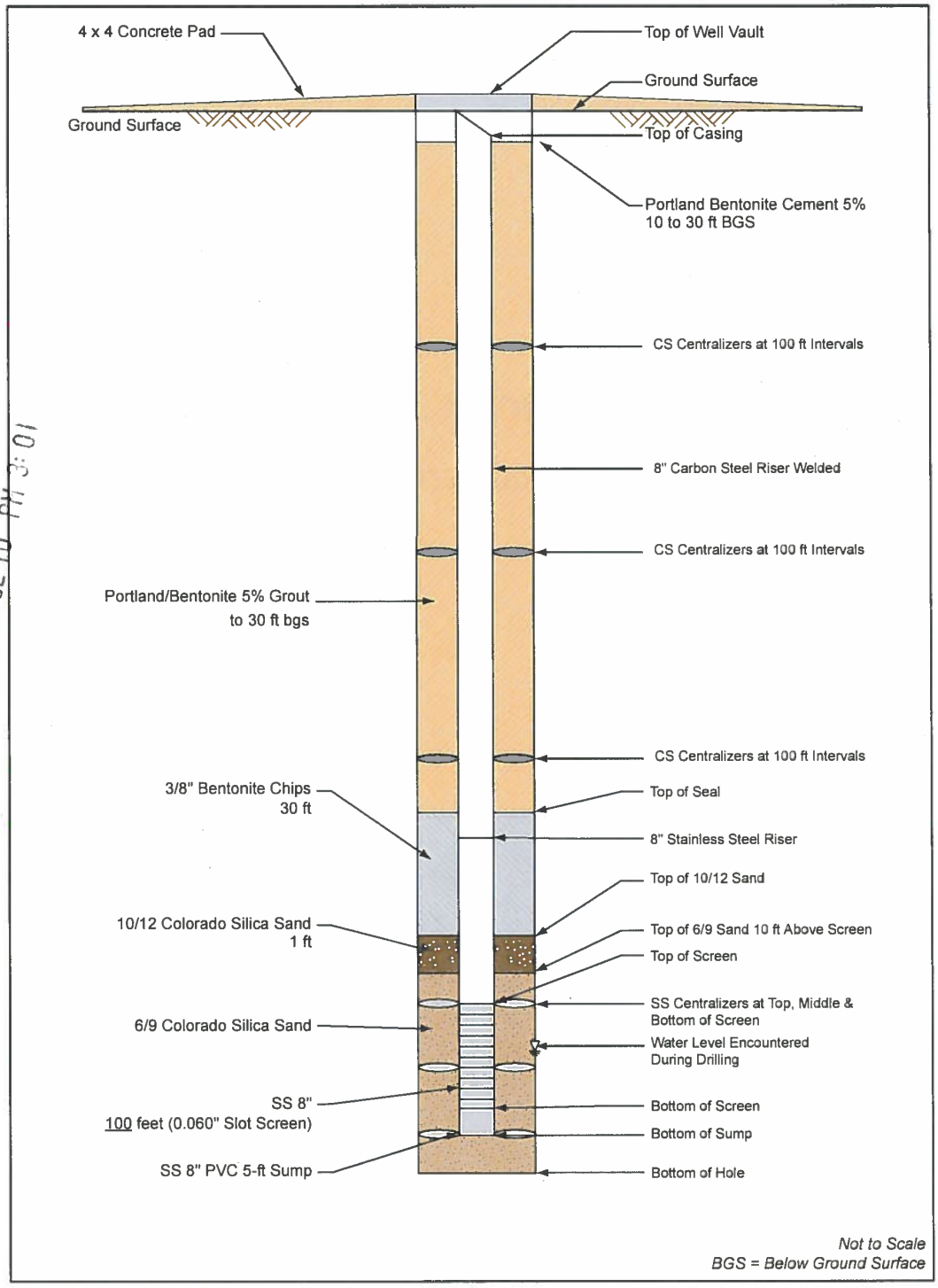


FIGURE 2

EXTRACTION WELL CONSTRUCTION DIAGRAM

Extraction Well Construction Diagram



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ATTACHMENT 1

WELL SUMMARY

KIRTLAND AIR FORCE BASE
BULK FUELS FACILITY SPILL
WELL SUMMARY

Extraction Well

Extraction wells KAFB-106233 and 106234 will be screened to extract water from the top 80 feet of the aquifer. The final well design will be based on model results and lithologic data from nearby groundwater monitoring wells to capture the maximum radius of influence and have at least 70 percent efficiency. Extraction wells will be installed in accordance with the *Rapid Response Action, Additional Data Gap Groundwater Monitoring Wells and Expansion of Groundwater Extraction Work Plan* (USACE, 2015a) and additional correspondence between Kirtland AFB and NMED pertaining to extraction well installation (USACE, 2015b; 2015c).

The extraction wells will be drilled using mud rotary drilling technology. The wells will be constructed using 8-inch diameter casing, screened at an interval extending from 80-feet below current groundwater, upwards to a level at the site of 20-feet above groundwater level, or approximately 100-feet total screened interval. A moderately aggressive filter pack and 50 to 60 slot screen size will be used. The well string will be composed of nominal 8-inch steel pipe from ground surface to 20 feet above the water table encountered during drilling bgs, followed by stainless steel wire wrap screen to a depth of 80 feet below the water table encountered during drilling, and finally stainless pipe and cap extending to 5 feet below the screen. Following placement of the well screen and riser pipe, filter pack (sand) will be placed adjacent to the well screen followed by a fine sand seal and bentonite chip seal. A cement/bentonite grout will extend from the bentonite chip seal to near ground surface. The bentonite chip seal will be hydrated in lifts using a "clean" water source.

- The appropriate depth of the boring will be determined in the field and is dependent on the occurrence of significant water. If significant groundwater is encountered during drilling, drilling will cease, and the hole will be allowed to equilibrate for approximately 1 hour to determine the water table elevation.
- If the boring is over drilled beyond the bottom of the proposed sump elevation by more than 10 feet, the borehole will be backfilled with filter pack material to an elevation approximately 5 feet below the proposed bottom of sump elevation.
- The well will be constructed within the borehole using a 5-foot stainless-steel sump; 304 Stainless steel wire wrap with a 50 to 60 slotted screen size; and 8-inch steel casing. The sump will extend 5 feet below the bottom of the screened interval.

- While slowly removing the drill casing from the borehole, the borehole annular space will be backfilled with a filter pack. The filter pack will be placed using a tremie pipe to avoid bridging and ensure a continuous filter pack throughout the screened interval of the well. The well may be gently surged to breakup bridging and ensure complete placement of the filter pack around the well screen. A gravel tube will be installed within the annulus between the well string and the borehole from 10 feet above the top of screen extending upward to the surface, and will be welded to the steel riser pipe. The gravel tube will be 2 ½ inches inner diameter, and will be composed of the same materials as the adjacent riser pipe. The gravel tube will be installed free of sand.

- A 30 to 40-foot hydrated bentonite seal will be emplaced above the sand filter pack, incrementally hydrated with potable water in 1-foot lifts for the first 10 feet.

- A high solids (20 wt%) bentonite grout will be emplaced by tremie pipe to within 30 feet of the surface, and a cement/bentonite grout will be emplaced to the ground surface.

- To the surface, a cement/bentonite grout mixture will be installed over the high-solids bentonite grout using a tremie pipe. The mixture will consist of 94 pounds of Portland cement to 7 gallons of approved water and 3 percent by weight of sodium bentonite powder.

- A three-foot square by four-inch thick concrete surface pad shall be installed around the well immediately after the protective casing is installed. The surface pad shall be sloped so that drainage will be off the pad and away from the protective casing. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.

- Protective casing with a locking cover shall be installed around the well casing (flush to the street) to prevent damage or unauthorized entry. The protective casing shall be anchored in the concrete surface pad below the frost line.

Final well design details will be determined based on installation of surrounding monitoring wells and during drilling of the borehole at this location.

References

USACE. 2015a. *Rapid Response Action, Additional Data Gap Groundwater Monitoring Wells and Expansion of Groundwater Extraction Work Plan, Bulk Fuels Facility, Kirtland Air Force Base, New Mexico.* Prepared by CB&I Federal Services, Inc. for the USACE Albuquerque District under USACE Contract No. W912DY-10- D-0014, Delivery Order 0002. June.

USACE. 2015b.*Groundwater Extraction Pilot Implementation and Additional Plume Characterization Letter Work Plan Addendum #3 Bulk Fuels Facility (BFF) Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico.* Prepared by CB&I Federal Services, Inc. for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. March.

USACE. 2015c.*Groundwater Extraction Pilot Implementation and Additional Plume Characterization Letter Work Plan Addendum #4 Bulk Fuels Facility (BFF) Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico.* Prepared by CB&I Federal Services, Inc. for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002.May.

ATTACHMENT 2

KIRTLAND WATER RIGHT

73 DEC 3 A8:26
ALBUQ... N. MEX.

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

STATE OF NEW MEXICO, ex rel,)
S. E. REYNOLDS, State Engineer.)
)
Plaintiff)
)
vs.)
)
JOHN McLUCAS, Secretary of the)
Air Force, THOMAS W. MORGAN,)
Commander, Air Force Special Weapons)
Center, and JAMES B. MYERS, Base)
Commander, Kirtland Air Force Base)
)
Defendants.)

ORIGINAL
FILED IN MY OFFICE
NOV 27 1973
L. G. KANALY
CLERK

2015 JUL 10 PM 3:02
STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO

JUDGMENT AND ORDER

THIS MATTER coming on to be heard upon the Stipulation of the parties, and the Court having considered the same and being otherwise fully advised in the premises, finds that the Court has jurisdiction of the parties and the subject matter and that the said Stipulation should be approved and incorporated in the final judgment of this Court.

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED that the Stipulation of the parties is hereby approved and incorporated in this judgment as if set out in full herein.

IT IS FURTHER ORDERED that the defendants, their employees, agents, assigns and successors in interest be and they are hereby permanently enjoined and restrained from any diversion and/or use of water from the Rio Grande Underground Water BAsin in and for Kirtland Air Force BAse except in strict conformity with this final judgment.

HOWARD BRATTON

JUDGE OF THE U. S. DISTRICT COURT

Approved:
Phis
J Gaul

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

STATE OF NEW MEXICO, ex rel, S. E. REYNOLDS, State Engineer.

Plaintiff

vs.

JOHN McLUCAS, Secretary of the Air Force, THOMAS W. MORGAN, Commander, Air Force Special Weapons Center, and JAMES B. MYERS, Base Commander, Kirtland Air Force Base

Defendants.

STIPULATION

COME NOW the Plaintiff and Defendants herein, by and through their attorneys, and hereby mutually stipulate and agree that final judgment may enter in this cause in the following terms:

1. The United States of America, acting through and by means of the United States Air Force, owns and operates that certain complex of military facilities known as Kirtland Air Force Base within Bernalillo County, New Mexico, which Base includes the former Sandia Base, a Military installation heretofore operated by the United States Army. That area heretofore known as Sandia Base shall be designated in this stipulation as Kirtland East and that area known as Kirtland Air Force Base prior to the merger of the two installations shall be designated as Kirtland West.

2. On November 29, 1956, the Plaintiff, S. E. Reynolds, State Engineer, duly and lawfully declared the Rio Grande Underground Water Basin, an underground reservoir of public waters of the State of New Mexico having reasonably ascertainable boundaries.

3. All of Kirtland East and Kirtland West were, on November 29, 1956, and have continued to the present time to be within the exterior boundaries of the said Rio Grande Underground Water Basin.

4. On November 29, 1956, the United States of America owned within Kirtland East a water supply system consisting of 9 completed and operating wells, together with associated water storage and delivery works, and had prior to that date diverted and used underground waters of the Rio Grande Underground Water Basin by means of each and every of the said 9 wells for the lawful purposes of the said military installation.

5. The said nine wells in the Kirtland East water supply system were duly declared by an authorized representative of the United States of America in the office of the Plaintiff on the 4th day of October, 1957, and have been since that date designated in the files of the State Engineer as wells No. RG-1581 through RG-1589. The respective locations and priorities of the said 9 wells, as declared by the United States of America, are as follows:

RG-1581 NW1/4SE1/4, Sec. 31 T. 10 N., R. 4 E. March 1, 1949
RG-1582 NW1/4NW1/4, Sec. 1 T. 9 N., R. 3 E. August, 1949
RG-1583 NW1/4SW1/4, Sec. 30, T. 10 N., R. 4 E. August, 1949
RG-1584 NE1/4SW1/4, Sec. 6, T. 9 N., R. 4 E. August, 1949
RG-1585 NE1/4SW1/4, Sec. 29, T. 10 N., R. 4 E. July, 1952
RG-1586 SW1/4SE1/4, Sec. 32, T. 10 N., R. 4 E. July, 1952
RG-1587 NW1/4NW1/4, Sec. 6, T. 9 N., R. 4 E. Feb., 1955
RG-1588 SW1/4SW1/4, Sec. 5, T. 9 N., R. 4 E. Feb., 1955
RG-1589 SW1/4SW1/4, Sec. 15, T. 9 N., R. 4 E. Feb., 1949

6. Between November 1, 1958, and May 27, 1959, the United States of America drilled or caused to be drilled, in the NW1/4NE1/4 of Sec. 20, T. 9 N., R. 4 E., an additional water well which was thereafter made a part of the water supply system of Kirtland East. This well is designated in the files of the State Engineer as RG-1581 through RG-1589-S. By means of the said well, the United States of America has thereafter continually diverted and beneficially used public underground waters of the Rio Grande Underground Water Basin, as a supplemental point of diversion in and for Kirtland East.

7. In 1972, the United States of America drilled or caused to be drilled an additional water well within Kirtland East in the NW1/4NE1/4 of Sec. 4, T. 9 N., R. 4 E., which well has been completed except for the installation of a pump and has not yet been put to beneficial use, and which is hereby designated RG-1581 through RG-1589-S-2. The said well was drilled for the purpose of serving as a supplemental well for the water supply system of Kirtland East

8. The United States of America owns, under the Constitution and laws of the State of New Mexico, the right to divert the public underground waters of the Rio Grande Underground Water Basin, through and by means of the said eleven wells set forth in paragraphs 5, 6 and 7, in an amount not to exceed an annual quantity of four thousand five hundred (4,500) acre-feet, and to apply the same to beneficial use for the purposes of Kirtland Air Force Base. The priorities of the said eleven wells composing the water supply system of Kirtland East are as set forth

above in paragraphs 5, 6 and 7. The defendants stipulate that the United States Air Force has no right to divert any of the underground waters of the Rio Grande Underground Water Basin, by means of the said 11 wells or otherwise, for the purposes of Kirtland Air Force Base, except as set forth in this Stipulation, provided, however, that the United States shall enjoy the same right as any other appropriator in the State of New Mexico to make application hereafter to the Plaintiff, State Engineer, for permit to drill supplemental well(s) (i.e., make partial or total change in point of diversion or place or purpose of use) or to effect the transfer of valid and existing water rights for the purposes of Kirtland Air Force Base.

9. On November 29, 1956, the United States of America owned a water supply system in and for Kirtland West consisting of two water wells whose respective locations and priorities were declared in the Office of the State Engineer, by a duly authorized representative of the United States on the 4th day of October, 1957, to be as follows:
RG-1579 NW1/4NW1/4, Sec. 35, T. 10 N., R. 3 E., Oct. 9, 1952
RG-1580 SE1/4NW1/4, Sec. 34, T. 10 N., R. 3 E., Mar. 6, 1956

10. In 1969, the United States of America drilled or caused to be drilled an additional well in and for the Kirtland West water supply system, designated in the records of the State Engineer as RG-1579 and RG-1580 Combined-S, which well was thereafter made a part of the Kirtland West water supply system as a supplemental well.

11. The United States of America owns, under the Constitution and laws of the State of New Mexico, the right to divert

the public underground waters of the Rio Grande Underground Water Basin by means of the three wells set out in paragraphs 9 and 10 above in an amount not to exceed an annual quantity of 1,898 acre-feet for the purposes of Kirtland Air Force Base. The defendants stipulate that the United States Air Force has no right to divert or use the underground waters of the Rio Grande Underground Water Basin for the purposes of Kirtland Air Force Base, except as set forth in this Stipulation, by means of the said three wells or otherwise, provided, however, that the United States of America shall enjoy the same right as any other appropriator of public water in the State of New Mexico to make application to the Plaintiff, State Engineer, hereafter for permit to drill and use supplemental well(s) (i.e., make partial or total change in point of diversion or place or purpose of use) or to effect the transfer of existing valid water rights for the purposes of Kirtland Air Force Base.

12. The United States of America also owns the right under the Constitution and laws of the State of New Mexico to divert public underground waters of the Rio Grande Underground Water Basin in an amount not to exceed three acre-feet per year by and from each of the following three domestic wells located and existing within, and for the purposes of Kirtland Air Force Base:

Location	Priorities
RG-1578 SE1/4NW1/4, Sec. 35, T. 9 N., R. 4 E.	1945
RG-1590 SE1/4NW1/4, Sec. 35, T. 9 N., R. 4 E.	1945
RG-1591 NE1/4SE1/4, Sec. 24, T. 9 N., R. 4 E.	1948

13. The defendants stipulate that the United States Air Force will not after the entry of final judgment herein drill

or cause or allow to be drilled any water well(s) within the boundaries of the Rio Grande Underground Water Basin, within and/or for the purposes of Kirtland Air Force Base (including Kirtland East and Kirtland West), except when and to the extent that it will have fully complied with the laws of the State of New Mexico and the Rules and Regulations of the State Engineer in respect to obtaining from the State Engineer permit(s) to drill water wells and/or produce public waters therefrom for any purpose.

14. The defendants stipulate that they will make on behalf of the United States accurate monthly reports to the Plaintiff, State Engineer, of the total metered quantities of underground water diverted by means of any and all of the wells composing the Kirtland East and Kirtland West water supply systems, provided, however, that the United States of America shall not be required to make application for, or obtain permit authorizing the physical combination of the two water supply systems so long as the total annual metered diversion from each system is within the respective limit established in paragraphs 8 and 11. The defendants further agree that they will, within 60 days of the date of entry of final judgment herein, file in the Office of the Plaintiff, State Engineer, on forms to be supplied by the Plaintiff, applications on behalf of the United States seeking the right to divert and use public underground waters of the Rio Grande Underground Water Basin by means of those two certain wells RG-1581 through RG-1589-S-2 and RG-1579 and RG-1580 Combined-S, within the respective limits set forth in paragraphs 8 and 11 above. The State of New Mexico agrees that together

with the terms of judgment entered in this cause pursuant to this Stipulation, the said applications shall be administratively recognized as evidencing the right of the United States to use the said two wells within the terms of this Stipulation and the Order of the Court entered pursuant thereto, without any further requirement for advertisement or hearing.

PAUL L. BLOOM
Special Assistant Attorney General
State of New Mexico

s/ Victor Ortega
United States Attorney

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

DISTRICT 1

TOM BLAINE, P.E.
NEW MEXICO STATE ENGINEER

5550 San Antonio Drive, N.E.
Albuquerque, NM 87109 (505) 383-4000

December 7, 2016

File No.: RG-1579

Kirtland Air Force Base
Attn: Wayne Bitner, Chief, Environmental Restoration
AFCEC/Kirtland AFB IST; Bldg 20685
2050 Wyoming Blvd, SE
Kirtland AFB, NM 87117-5270

RE: Permit No. RG-1579 POD319

Greetings,

Your copy of the above numbered permit, which has been approved subject to the conditions set forth on the approval page, is enclosed.

Please review the Conditions of Approval for any required submittals. If submittals are not made by the date(s) indicated in the conditions, your rights under this permit are subject to expiration unless a request for an Extension of Time is received in the District Office of the State Engineer by that date, and that Extension of Time is subsequently approved.

Appropriate forms can be downloaded from the OSE website at www.ose.state.nm.us/WR/forms.php or will be mailed to you upon request.

Sincerely,

Christopher Burrus
Water Resource Specialist
Albuquerque, OSE, District 1

C: CB/cb

1-5574 04
$50

File No. RG-1579 POD 319

NEW MEXICO OFFICE OF THE STATE ENGINEER

APPLICATION FOR PERMIT TO CHANGE AN EXISTING WATER RIGHT

(Non 72-12-1)

(check applicable boxes):

For fees, see State Engineer website: http://www.ose.state.nm.us/

☒ Change Purpose of Use ☒ Groundwater ☐ Surface Water ☒ Change Place of Use ☒ Groundwater ☐ Surface Water	☐ Change Point of Diversion (POD): From: ☐ Groundwater ☐ Surface Water To: ☐ Groundwater ☐ Surface Water	☒ Additional Groundwater Point of Diversion (POD) ☐ Additional Surface Water Point of Diversion (POD)
☐ Temporary Change, NMSA 1978, § 72-12-7(B) Requested Start Date: (Not to Exceed 3 ac-ft in One Year)		Requested End Date:
☐ Water Use Lease, NMSA 1978, §§ 72-6-1 to-7 Requested Start Date:		Requested End Date:

1. APPLICANT(S) (Required) Note: water-right owner must be listed as an applicant.

Name: Kirtland Air Force Base	Name: N/A
Contact or Agent: check here if Agent ☒ Wayne Bitner, Chief, Environmental Restoration	Contact or Agent: check here if Agent ☐ N/A
Mailing Address: AFCEC/Kirtland AFB IST; Bldg 20685; 2050 Wyoming Blvd SE	Mailing Address:
City: Kirtland AFB	City:
State: NM Zip Code: 87117-5270	State: Zip Code:
Phone: N/A ☐ Home ☐ Cell Phone (Work): 505-853-3484	Phone: ☐ Home ☐ Cell Phone (Work):
E-mail (optional): ludie.bitner@us.af.mil	E-mail (optional):

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2. CURRENT OSE FILE INFORMATION (Required)

OSE File No(s): RG-1579 through RG-1589	Priority Date (if known): March 1, 1949	Subfile/Cause No. (if applicable):

3. CURRENT PURPOSE OF USE AND AMOUNT OF WATER (Required)

☒ Domestic ☐ Livestock ☒ Irrigation ☒ Municipal ☒ Industrial ☐ Commercial ☒ Other Use (specify): Kirtland Air Force Base Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc):	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: 323 (partial) Consumptive Use: up to 323 Other (include units):

FOR OSE INTERNAL USE — Application for Permit, Form wr-06, Rev 3/07/16

File No.: RG 1579	Trn. No.:	Receipt No.:
Trans Description (optional): POD 319		Sub-Basin:
PCW/LOG Due Date:	PBU Due Date:	

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4. COUNTY WHERE WATER RIGHT IS CURRENTLY USED (Required)

Bernalillo

5. ADDITIONAL STATEMENTS CONCERNING THE CURRENT WATER RIGHT

Extraction well KAFB-106239 will be supplemental to existing wells described in OSE file No. RG-1579 through RG-1589. The application will not increase the allowable groundwater diversion described in RG-1579 through 1589, but seeks to make a change to the purpose of use to include pollution control, recovery, and irrigation and a change in point of diversion to include a location that is not currently described in RG-1579 through RG-1589.

6. CURRENT or MOVE-FROM POINT(S) OF DIVERSION (POD) (Required)

☐ **Surface POD** OR ■ **Ground Water POD (Well)**

Name of ditch, acequia, or spring: N/A

Stream or water course: N/A | Tributary of: N/A

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

■ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
■ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
RG-1579 through RG-1589	–	–	See District Court Order dated Nov. 27, 1973 (attached)

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NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional point of diversion descriptions are attached: ■ Yes ☐ No **If yes, how many** 11

Point of Diversion is on Land Owned by: Kirtland Air Force Base

Other description relating point of diversion to common landmarks, streets, or other: See attached District Court Order dated November 27, 1973.

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File Number: RG-1579 POD319 | Trn Number:

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7. CURRENT or MOVE-FROM PLACE(S) OF USE (Required)

The land is legally described by (check all that apply):

☐ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
Kirtland Air Force Base					
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other:

Place of use is on land owned by (required):
Kirtland Air Force Base

Are there other sources of water for these lands? No ■ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

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8. MOVE-TO PURPOSE OF USE AND AMOUNT OF WATER (Complete this section ONLY if the purpose of use is changing)

☐ Domestic ☐ Livestock ■ Irrigation ☐ Municipal ☐ Industrial ☐ Commercial ■ Other Use (specify): Pollution Control/Recovery Describe a specific use If applicable (i.e. sand & gravel washing, dairy etc): Groundwater remediation	Amount of Water (acre-feet per annum): If more details are needed, type "See Comments" in "Other" field below, and explain in Additional Statements Section. Diversion: 323 Consumptive Use: Up to 323 Other (include units):

9. MOVE-TO POINT(S) OF DIVERSION (POD) (Complete this section ONLY if adding or replacing a POD)

☐ **Surface POD OR** ■ **Ground Water POD (Well)**

Name of ditch, acequia, or spring: N/A

Stream or water course: N/A | Tributary of: N/A

If application proposes a new point of diversion involving a diversion dam, storage dam, main canal, and/or pipeline, complete Attachment 2. ☐ Check here if Attachment 2 is included in this application packet.

POD Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84).
District II (Roswell) & District VII (Cimarron) customers, provide a PLSS location in addition to above.

■ NM State Plane (NAD83) (Feet)
☐ NM West Zone
☐ NM East Zone
■ NM Central Zone

☐ UTM (NAD83) (Meters)
☐ Zone 12N
☐ Zone 13N

☐ Lat/Long (WGS84) (to the nearest 1/10th of second)

POD Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (*Quarters or Halves , Section, Township, Range*) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
KAFB-106239	1542707.9	1475412.0	

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NOTE: If more PODS need to be described, complete form WR-08 (Attachment 1 – POD Descriptions)
Additional POD descriptions are attached: ☐ **Yes** ■ **No** **If yes, how many** _____

Other description relating point(s) of diversion to common landmarks, streets, or other: East of San Pedro Dr. along southside of Ridgecrest Dr.

Point of Diversion is on Land Owned by: City of Albuquerque

Note: The following information is for wells only. If more than one (1) well needs to be described, provide attachment.

Approximate depth of well (feet): 575 | Outside diameter of well casing (inches): 8

Driller Name: To be determined | Driller License Number: To be determined

If replacing the current well, is the current well to be plugged? ☐ Yes ☐ No ■ Not Applicable
If No, state for what use it is retained:

FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD3 19 | Trn Number:

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10. MOVE-TO PLACE(S) OF USE (Complete this section ONLY if adding or changing a place of use)
List each individually

The land is legally described by (check all that apply):

☐ Public Land Survey System (PLSS) (quarters, section, township, range)
☐ Irrigation or Conservation District Map
☐ Hydrographic Survey Report or Map
☐ Subdivision
☐ Grant

Complete the blocks below for all tracts of land (more than one description can be provided for a tract if available):

PLSS Quarters or Halves, **and/or** Name of Hydrographic Survey, **and/or** Name of Irrigation or Conservation District, **and/or** Name and County of Subdivision **and/or** Grant	PLSS Section **and/or** Map No. **and/or** Lot No.	PLSS Township **and/or** Tract No. (Please list each tract individually) **and/or** Block No.	PLSS Range	Acres	Priority
No changes to place of use.					
			Total Acres:		

Other description relating place of use to common landmarks, streets, or other:

Place of use is on land owned by (required):
Kirtland Air Force Base

Are there other sources of water for these lands? No ■ Yes ☐ describe by OSE file number:

Note: If on Federal or State Land, please provide copy of lease.

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FOR OSE INTERNAL USE | Application for Permit, Form wr-06

File Number: RG-1579 POD 3/9 | Trn Number:

11. ACEQUIA OR COMMUNITY DITCH REQUIREMENTS

☒ A. The water right is not within a Community Ditch or Acequia.

☐ B. The water right is within a Community Ditch or Acequia. **If you checked box B you must:**

1) Attach documentary evidence provided by commissioners of the Community Ditch or Acequia confirming applicant's compliance with any applicable requirement for the change adopted by the Community Ditch or Acequia **or**

2) Attach an affidavit from the commissioners of the Community Ditch or Acequia stating that no such requirement has been adopted by the relevant association bylaws.

This documentation is required pursuant to NMSA 1978 § 72-5-24.1.

12. ADDITIONAL STATEMENTS OR EXPLANATIONS

This application seeks to add a new point of diversion (KAFB-106239) for groundwater extraction supplemental to the Kirtland AFB water rights (OSE file no. RG-1579 through 1589). The application does not request to increase the allowable groundwater diversion described in RG-1579 through RG-1589, but seeks to change the purpose of use to pollution control, recovery, and irrigation and to add a new point of diversion that is not currently described in RG-1579 through RG1589.

KAFB-106239 will extract groundwater up to 323 acre feet per year (200 gallons per minute), for approximately 10 years. The extracted groundwater will be treated and discharged to the Golf Course Main Pond and Infiltration Galleries on Kirtland AFB, and/or injected back into the aquifer through KAFB-7 (OSE file no. RG-1587).

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FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD 3/9	Trn Number:

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ACKNOWLEDGEMENT

I, We (name of applicant(s)), Eric H. Froehlich, COLONEL, USAF, 377 ABW COMMANDER
Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☑ approved ☐ ~~partially approved~~ ☐ ~~denied~~

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 7 day of December 20 16, for the State Engineer,

Tom Blaine, P.E.
State Engineer, State Engineer

By: Signature CHRISTOPHER BURRUS Print

Title: Water Resource Specialist Print

STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
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FOR OSE INTERNAL USE — Application for Permit, Form wr-06

File Number: RG-1579 POD3 19 | Trn Number:

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CONDITIONS OF APPROVAL

1. This application is approved as follows:

Permittee:	Kirtland Air Force Base
Permit No:	RG-1579 POD319
Application File Date:	August 25, 2016
Notice for Publication Issued:	September 14, 2016
Affidavit of Publication Filed:	October 6, 2016, The Albuquerque Journal published on September 18, 25, and October 2, 2016
Priority:	March 1, 1949 through March 6, 1956
Source:	Groundwater
Point of Diversion:	
RG-1579 POD319:	(KAFB-106239) Located at a point where X=1,542,707.9 feet and Y=1,475,412 feet, NAD 83, SPCS, Central Zone, on land owned by the City of Albuquerque, Bernalillo County, New Mexico.
Purpose of Use:	Pollution Control and Recovery
Place of Use:	SE ¼ SE ¼, Section 25, Township 10 North, Range 3 East, NMPM, Bernalillo County, New Mexico, and under permits RG-1579 through RG-1589 the applicant will discharge treated groundwater into the Tijeras Arroyo Golf Course main pond, infiltration galleries located adjacent to the golf course, and injection well, RG-1587, on land owned by Kirtland Air Force Base.

2. The total diversion of water from well RG-1579 POD319 under this permit shall not exceed 323 acre-feet per annum consumptive use.

3. The new well shall be drilled by a well driller licensed in the State of New Mexico, and a well record for new well RG-1579 POD319 shall be filed with the Office of the State Engineer within twenty (20) days of drilling the well.

4. Well RG-1579 POD319 shall be equipped with a totalizing meter of a type, at location(s) approved by, and installed in a manner acceptable to the State Engineer. Records of the amount of water pumped shall be submitted, in writing, to the District 1 Office of the State Engineer on or before the 10th day of each month. No water shall be diverted from any well unless equipped with a functional totalizing meter. The Permittee shall provide in writing the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of each meter and any replacement meter.

5. The Permittee shall utilize the highest and best technology to ensure conservation of water to the maximum extent practical.

6. This Permit will expire on December 1, 2025.

7. The State Engineer retains jurisdiction over this permit.

8. Pursuant to Section 72-8-1 NMSA, the permittee shall allow the state engineer and his representative's entry upon private property for the performance of their respective duties, including access to the wells for meter readings and water level measurements.

Witness my hand and seal this 7 day of December, A.D., 2016

Tom Blaine, P.E.
NEW MEXICO STATE ENGINEER

By: _____

Christopher Burrus
Water Resource Specialist
District I
CB:cb
cc: WRAB

Application for Permit to Change an Existing Water Right

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

Colonel Eric H. Froehlich
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

AUG 24 2016

STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
2016 AUG 25 PM 3:54

Office of the State Engineer
c/o Jeffery L. Peterson, Water Rights Division
5550 San Antonio Blvd NE
Albuquerque New Mexico 87109

Dear Mr. Peterson

Kirtland Air Force Base (AFB) is submitting herein one "Application for Permit to Change an Existing Water Right" with supporting documents for a proposed extraction well (KAFB-106239) to be located on City of Albuquerque property near the intersection of San Pedro Drive and Ridgecrest Drive. This application seeks to permit KAFB-106239 under existing Kirtland AFB water rights described under OSE file number RG-1579 through RG-1589. The application requests a change in purpose to include pollution control, recovery, and irrigation and addition of the supplemental point of diversion currently not described within OSE file number RG-1579 through RG-1589.

KAFB-106239 will be used for the extraction and treatment of contaminated groundwater at the Kirtland AFB Bulk Fuels Facility SWMUs ST-106 and SS-111. The extraction well will be constructed from 8-inch diameter galvanized and stainless steel. A 100-foot stainless steel wire-wrap screen will extend below the water table so that contaminated groundwater can be extracted from the shallow aquifer. Stainless steel centralizers shall be placed at the top, center, and bottom of the screen, and at 100 foot intervals along the casing. All casing sections will be joined with weld rings. The borehole annulus will be filled with a silica sand filter pack (#10-20), followed by bentonite and portland cement seals to near ground surface.

Extraction well KAFB-106239 will divert groundwater up to 323 acre feet per year for treatment and use. The extracted groundwater will be pumped through high-density polyethylene pipelines to the groundwater treatment system located just east of Louisiana Boulevard on Kirtland AFB property. The system will remediate dissolved phase ethylene dibromide and petroleum-related contaminants of concern to concentrations below the Environmental Protection Agency maximum contaminant levels and New Mexico Water Quality Control standards.

Treated water will be discharged to multiple locations on Kirtland AFB: The Golf Course Main Pond to irrigate the Tijeras Arroyo Golf Course or direct injection at KAFB-7 (OSE file number RG-1587).

Attached to the application are the pollution control and/or recovery plan summary, figures showing the proposed extraction well location and construction plan details, a narrative summary of the proposed well construction plan, and Kirtland AFB water right summary.

If you have any question or concerns, please contact Mr. Wayne Bitner at (505) 853-3484 or at ludie.bitner@us.af.mil.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

Attachment:
WR-06 Application for Permit to Change an Existing Water Right

cc:
NMED-EHD (Roberts, McQuillan)
NMED-HWB (Agnew)
NMED-GWQB (Hunter, Pullen)
EPA Region 6 (King, Ellinger)
AFCEC/CZ (Bodour, Bitner, Clark)
USACE-ABQ District Office (Simpler, Phaneuf, Dreeland; Sanchez; Salazar)
Public Info Repository, Administrative Record/Information Repository (AR/IR) and File

TABLE 1

POLLUTION CONTROL AND/OR RECOVERY PLAN SUMMARY, KAFB-106239

Table 1. Pollution Control and/or Recovery Plan Summary, Extraction Well KAFB-106239

Item	Comments
Description of need	The New Mexico Environment Department has directed Kirtland AFB to implement Interim Measures to address the groundwater contamination. Extraction well KAFB-106239 will aid in the remediation of the contaminated groundwater.
Estimated maximum time for completion of operation	10 years
Annual diversion amount	Instantaneous flow rate of 200 gallons per minute equates to maximum diversion of 323 acre-feet per year
Annual consumptive use amount	Up to 323 acre-feet per year
Maximum amount of water to be diverted and injected for duration of operation	Maximum diversion is 323 acre-feet per year. No injection is planned for this location.
Method and place of discharge	Extracted groundwater will be treated and discharged to the Golf Course Main Pond or KAFB-7 (OSE-File number RG-1587).
Method of measurement of water produced and discharged	Extracted water will be metered at the point of diversion and at the point of discharge.
Source of water to be injected	Not applicable
Method of measurement of water injected	Not applicable
Characteristics of aquifer	Unconsolidated sand and gravel sediments of the Middle Rio Grande Basin aquifer. An average hydraulic conductivity value for the area is 63 feet/day.
Method of determining resulting annual consumptive use of water and depletion from any related steam system.	Not applicable.
Proof of any permit required from the New Mexico Environment Department.	Kirtland AFB is working with the New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau to identify necessary permits. Extraction well KAFB-106239 will be included under Discharge Permit (DP)-1839 when discharging to KAFB-7. NMED determined that there is no DP required for discharge to the Golf Course Main Pond.
An access agreement if the applicant is not owner of the land on which the pollution plume control or recovery well is to be located.	Kirtland AFB is currently updating the existing access agreements with the City of Albuquerque for KAFB-106239. Once updated, Kirtland AFB will submit the access agreements to the Office of the State Engineer.

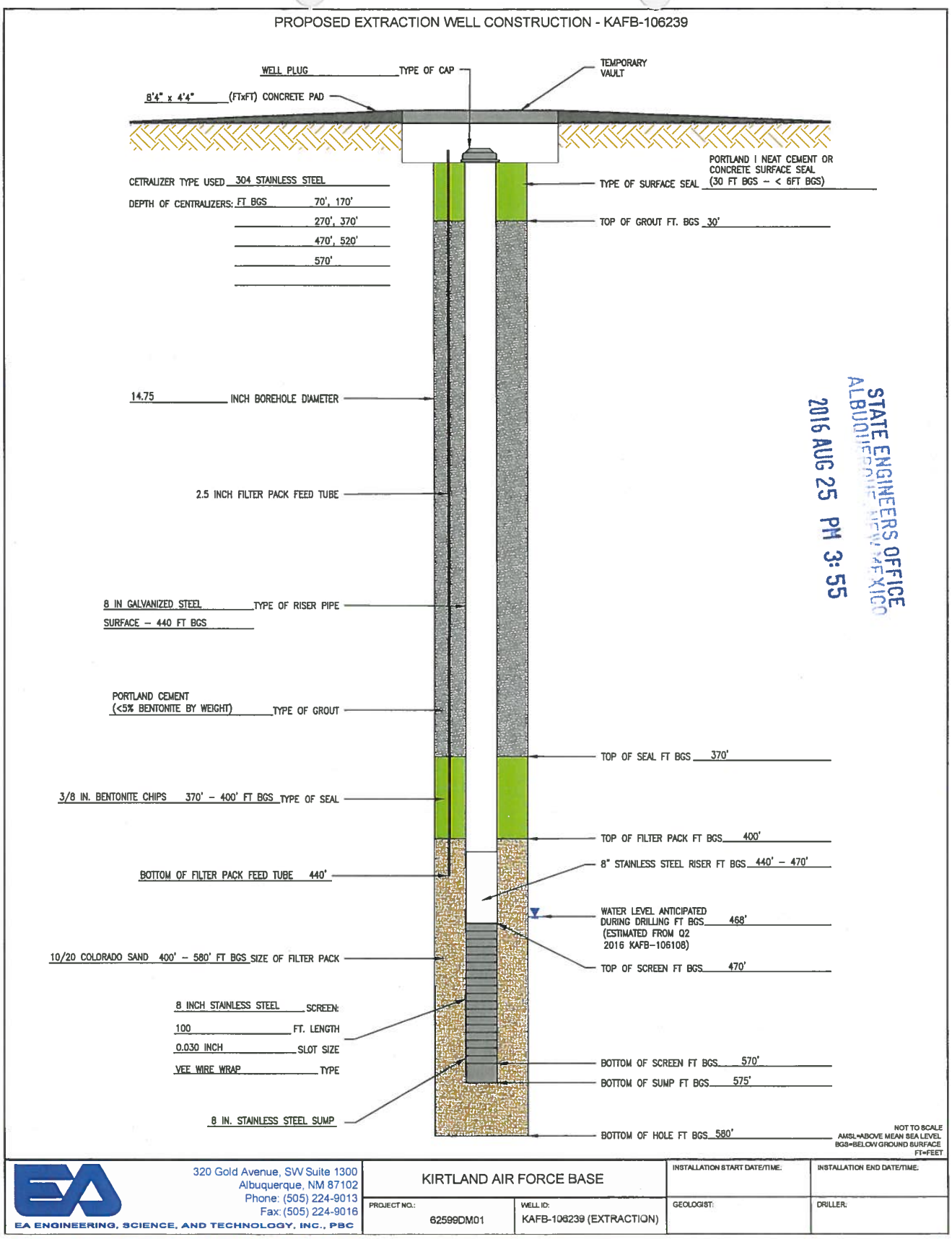
FIGURE 1

LOCATION FOR EXTRACTION WELL KAFB-106239

2016 AUG 25 PM 3:55
STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO

FIGURE 2

EXTRACTION WELL CONSTRUCTION DIAGRAM


PROPOSED EXTRACTION WELL CONSTRUCTION - KAFB-106239
WELL PLUG
TYPE OF CAP
TEMPORARY VAULT
8'4" x 4'4" (FTxFT) CONCRETE PAD
CETRALIZER TYPE USED 304 STAINLESS STEEL
DEPTH OF CENTRALIZERS: FT BGS 70', 170'
270', 370'
470', 520'
570'
PORTLAND I NEAT CEMENT OR CONCRETE SURFACE SEAL (30 FT BGS – < 6FT BGS)
TYPE OF SURFACE SEAL
TOP OF GROUT FT. BGS 30'
14.75 INCH BOREHOLE DIAMETER
2.5 INCH FILTER PACK FEED TUBE
8 IN GALVANIZED STEEL TYPE OF RISER PIPE
SURFACE – 440 FT BGS
PORTLAND CEMENT (<5% BENTONITE BY WEIGHT) TYPE OF GROUT
TOP OF SEAL FT BGS 370'
3/8 IN. BENTONITE CHIPS 370' – 400' FT BGS TYPE OF SEAL
TOP OF FILTER PACK FT BGS 400'
BOTTOM OF FILTER PACK FEED TUBE 440'
8" STAINLESS STEEL RISER FT BGS 440' – 470'
WATER LEVEL ANTICIPATED DURING DRILLING FT BGS 468'
(ESTIMATED FROM Q2 2016 KAFB-106108)
10/20 COLORADO SAND 400' – 580' FT BGS SIZE OF FILTER PACK
TOP OF SCREEN FT BGS 470'
8 INCH STAINLESS STEEL SCREEN:
100 FT. LENGTH
0.030 INCH SLOT SIZE
VEE WIRE WRAP TYPE
BOTTOM OF SCREEN FT BGS 570'
BOTTOM OF SUMP FT BGS 575'
8 IN. STAINLESS STEEL SUMP
BOTTOM OF HOLE FT BGS 580'
NOT TO SCALE
AMSL=ABOVE MEAN SEA LEVEL
BGS=BELOW GROUND SURFACE
FT=FEET
STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
2016 AUG 25 PM 3:55
FILE PATH: F:\FEDERAL\DOD\AFCEC\PROJECTS\62599DM01 - KIRTLAND BFF\CADD\FIGURES\EXTRACTION WELLS-NM\APRIL 2016\EXTRACTION WELL COMPLETION DIAGRAM-KAFB-106239.DWG [EXTRACTION WELL] MATHER, JASON 7/25/2016 10:29 AM
320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC
KIRTLAND AIR FORCE BASE
INSTALLATION START DATE/TIME:
INSTALLATION END DATE/TIME:
PROJECT NO.: 62599DM01
WELL ID: KAFB-106239 (EXTRACTION)
GEOLOGIST:
DRILLER:

ATTACHMENT 1

WELL CONSTRUCTION PLAN

KIRTLAND AIR FORCE BASE BULK FUELS FACILITY SPILL

WELL CONSTRUCTION PLAN FOR KAFB-106239

Extraction well KAFB-106239 will be installed and developed in accordance with the NMED-approved *Work Plan for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Solid Waste Management Unit St-106/SS-111* (USACE 2016) with completion details provided in the attached Technical Memorandum dated 3 May 2016.

A 14.75-inch borehole will be advanced using mud rotary drilling methods to approximately 580 feet below ground surface (ft bgs) for construction of the extraction well. The 8-inch steel casing string will be composed of galvanized steel from ground surface to 440 ft bgs, then 304 Stainless steel from 440 to 470 ft bgs, followed by 304 Stainless steel wire wrap screen from 470 to 570 ft bgs, and finally 304 Stainless steel from 560 to 565 ft bgs.

Following placement of the well screen and riser pipe, the filter pack (silica sand) will be placed adjacent to the well screen. A bentonite chip and cement/bentonite grout will extend from the filter pack to near ground surface. Additional construction details are provided below.

- If the boring is over drilled beyond the bottom of the proposed sump elevation by more than 10 feet, the borehole will be backfilled with filter pack material to an elevation approximately 5 feet below the proposed bottom of sump elevation.
- The filter pack will be placed using a tremie pipe to avoid bridging and ensure a continuous filter pack throughout the screened interval of the well. The well may be gently surged to breakup bridging and ensure complete placement of the filter pack around the well screen.
- A 30 to 40-foot hydrated bentonite seal will be emplaced above the sand filter pack, incrementally hydrated with potable water.
- A high-solids bentonite grout will be emplaced by tremie pipe to within 30 feet of the surface, and a cement/bentonite grout will be emplaced to the ground surface.
- To the surface, a cement/bentonite grout mixture will be installed over the high-solids bentonite grout using a tremie pipe. The mixture will consist of 94 pounds of Portland cement to 7 gallons of approved water and 3 percent by weight of sodium bentonite powder.
- An approximate eight-foot by 4-foot by four-inch thick concrete surface pad shall be installed around the well immediately after the protective casing is installed. The surface pad shall be sloped so that drainage will be off the pad and away from the protective casing. In addition, a minimum of one inch of the finished pad shall be below grade or ground elevation to prevent washing and undermining by soil erosion.

Final well construction details will be determined in the field based on observed conditions at this location.

References

USACE. 2016. *Work Plan for the Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Solid Waste Management Unit ST-106/SS-111.* Prepared by EA Engineering, Science, and Technology, Inc., PBC for USACE–Albuquerque District. 21 January.

EA Engineering, Science, & Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, New Mexico 87102
Phone: (505) 224-9013

3 May 2016

Mr. Trent Simpler, PE
USACE Albuquerque District
4101 Jefferson Plaza NE
Albuquerque, NM 87109

RE: Design Memorandum for Filter Pack and Screen Extraction Well KAFB-106239
Bulk Fuels Facility Project, Albuquerque, New Mexico

Dear Mr. Simpler,

The proposed extraction well KAFB-106239 has been designed to meet the current and future needs of the Kirtland Bulk Fuels Facility (BFF) Pump and Treat (P&T) system. This Design Memorandum provides basis and specification of filter pack and slot size for KAFB-106239 to meet the performance objectives of the remedial design.

PROJECT OVERVIEW

Three groundwater extraction wells are currently pumping and providing system performance data at the BFF P&T system. A fourth well location has been determined by groundwater flow modeling to be necessary for plume containment and collapse. Current models of the Kirtland BFF Pump and Treat system indicate the process may take up to a decade to completely collapse the ethylene dibromide (EDB) plume. The proposed location of the extraction well KAFB-106239 has been selected by the BFF Project Modeling Working Group comprised of stakeholders from government and private industry. Changes in EDB concentration within the plume over time, or a change in pump and treat strategy may require a larger extraction volume than presently considered. This Design Memorandum provides basis and specification of filter pack and slot size for KAFB-106239 that allows a wide range of pumping rates to facilitate varying system operation to meet current and future project goals.

DESIGN CRITERIA

The filter pack and slot size for KAFB-106239 has been designed with the following goals:

- Provide a wide range of well yield based on formation capacity and well hydraulics to allow variation in pumping stresses and account for loss of well efficiency due to fouling between well maintenance;
- Provide low groundwater entrance velocity through the screen for efficient performance;
- Minimize or eliminate sediment pumping via proper filter sizing and low entrance velocities.

REFERENCES

Colorado Sand - Typical Specifications and Properties, retrieved from www.premiersilica.com on April 22, 2016.

Driscoll, F.G.. (1986). Groundwater and Wells 2nd Edition. St. Paul, Minnesota: Johnson Filtration Systems Inc. pg. 441-443, 451, 951.

Stainless Steel Well Screens and Accessories, Johnson Screens, pg. 8, retrieved from www.groundwatersupply.net on April 22, 2016.

The Engineering ToolBox. Sieve Size and Mesh Designation. Located retrieved from http://www.engineeringtoolbox.com/sieve-numbers-openings-d_1645.html on May 2, 2016.

FILTER PACK AND SCREEN DESIGN

Filter Pack Sizing

The filter pack was designed using the method described by Driscoll 1986. Grain size distribution curves from wells KAFB-106212 and KAFB-106229 were used to determine representative aquifer matrix grain size distribution. The grain-size distribution curves for the finest grained sediments in each borehole were utilized to determine the appropriate range of filter packs. Following Driscoll, the 70% retained (d_{70}) grain size (0.35 mm) was multiplied by a factor of 5 which is appropriate for uniform aquifers with a 40% retained sediment size 0.010 inches or less, which our formation grain sizes satisfy. For each grain size distribution curve, a parallel coarser filter pack curve representing a uniformity coefficient of approximately 2.5 was constructed through the d_{70} grain size multiplied by the factor of 5. The resultant filter pack d_{70} values are 1.85 and 1.75 mm, respectively, for the fine fraction in KAFB-106212 and KAFB-106229.

The uniformity coefficient is the ratio of the 60% finer by weight grain size to the 10% finer by weight grain sizes. The uniformity coefficient (CU):

$$CU = \frac{D60}{D10} \quad \text{Equation 1}$$

A line with CU approximately equal to 2.5 was constructed through the d_{70} values of 1.85 and 1.75 mm (Attachment 1). These curves represent the range of grain sizes in an ideal filter pack for the fine portion of aquifer. Based on the design filter pack curves in Attachment 1, the filter pack should be composed of grain sizes between 3.0 and 0.5 mm (equivalent to #7 to #32 sieve sizes [Attachment 2]). Using this criterion for filter pack, a range of screen slot sizes can be selected, including 10, 20, 30 and 40 slot.

Selecting Slot Screen Size

For design purposes, the extraction well KAFB-106239 will be constructed with 8 inch pipe size stainless steel vee-wire continuous wrap screen. The Johnson Screens "Free-Flow" 304 stainless steel screens technical information (Attachment 3) was used to estimate the transmitting capacity of a range of slot screen sizes. Casing strength of 1,000 foot maximum depth with a hanging weight of 20,800 pounds was used to resist collapse. The transmitting capacities for various slot sizes were calculated from the respective intake areas from Attachment 3 to determine the maximum production rate of the well. Transmitting Capacity was calculated as follows (Attachment 3):

$$\text{Transmitting Capacity}\left[\frac{gpm}{ft\ screen}\right] = \text{Intake Area } (IN^2/\text{Ft screen}) * 0.31 \left[\frac{gpm}{ft\ screen}\right] \quad \text{Equation 2}$$

The transmitting capacity for 80 feet of submerged 20, 30, and 40 slot screen were considered as shown in Table 1 The total screen length will be 100 feet with 10 feet unsubmerged and approximately 10 feet of drawdown in the well. Therefore, 80 feet of effective screen length was used in the design.

Table 1. Analysis of Well Yield for Various Slot Sizes

Slot Size	Open Area (in^2/ft)	Transmitting Capacity (gpm/ft)	Total Discharge (gpm)
20 (0.020 in)	39	12.1	968
30 (0.030 in)	55	17.0	1,360
40 (0.040 in)	70	21.7	1,736

Theoretical Maximum Well Yield

EA anticipates the operational well yield to be around 100 gpm; however, to accommodate future flow modification, a design flow rate of up to 300 gpm is considered appropriate. Moreover, the theoretical well yield in areas of high permeability (e.g., 200 ft/day) is much higher, on order of 94 gpm per foot of drawdown:

$$Specific\ Capacity = \frac{Q}{\Delta S} \approx T = K * b = 200\frac{ft}{day} * 90\ ft * 7.48\frac{gallons}{ft^3} * \frac{day}{1{,}440\ min} = 94\frac{gpm}{ft} \quad \text{Equation 3}$$

Q = well yield (ft^3/sec)
ΔS = drawdown in well (ft)
T = Transmissivity (ft^2/day and gpm/ft)
K = hydraulic conductivity (ft/day)
b = aquifer thickness (estimated as submerged screen length – 90 ft)

The empirical relationship between specific capacity and transmissivity is provided in Driscoll 1986:

$$T \cong 1500\ \frac{Q}{\Delta S} \quad \text{Equation 4}$$

In equation 4, Q is in gpm and T gallons per day per foot (gpd/ft) versus gpm/ft, but the relationship between T, Q and drawdown is demonstrated. Based on transmissivity and considerations discussed above, a 30-slot screen will meet all the design criteria and objectives listed above.

Entrance Velocity

The entrance velocity of the water flowing into the well was considered. It is customary to design wells with an entrance velocity of 0.1 feet per second or less (Attachment 3). Wells with entrance velocities greater than 0.1 feet per second have a greater tendency to entrain sediment, lower well efficiency, and attendant higher lifting costs. The entrance velocity ($V_{entrance}$) was calculated as:

$$V_{entrance} = \frac{Q\left(\frac{ft^3}{sec}\right)}{A\ (ft^2)} = \frac{300\ gpm}{(7.48\ \frac{gpm}{ft^3} * 60\ \frac{sec}{min})} * \frac{1}{\left(\frac{55}{144}\frac{ft^2}{ft} * 80\ ft\right)} = 0.022\ \frac{ft}{sec} \quad \text{Equation 4}$$

The 30 slot screen size will yield the maximum anticipated discharge of 300 gpm at 22 percent (0.022/0.1) of the Johnson Screen design entrance velocity of 0.1 ft/sec. The low entrance velocity will provide an efficient well and will further protect against sediment entrainment.

Selected Filter Pack

A 30 slot screen size has an opening size of 0.030 inches. The # 20 sieve has an opening of 0.0331 inches and the # 25 sieve size has an opening of 0.0278 inches. Using the Colorado Sand typical specifications and properties chart (Attachment 4), EA selected a filter pack with a retention rate greater than 90%. EA estimates than approximately half of all material passed by a #20 sieve but retained by a #25 sieve would pass through the screen. Therefore, the 10/20 mesh filter pack is expected to retain 97 to 98 percent of the filter pack.

Summary

In summary, a continuous vee-wire stainless steel 30 slot screen is selected with a 10/20 mesh filter pack. This design will achieve a wide range of flow rates at low to moderate entrance velocities, provide an efficient design, and mitigate or eliminate altogether sediment pumping.

If you have any questions or would need additional information, please do not hesitate to call me at (505) 400-7125.

Sincerely,

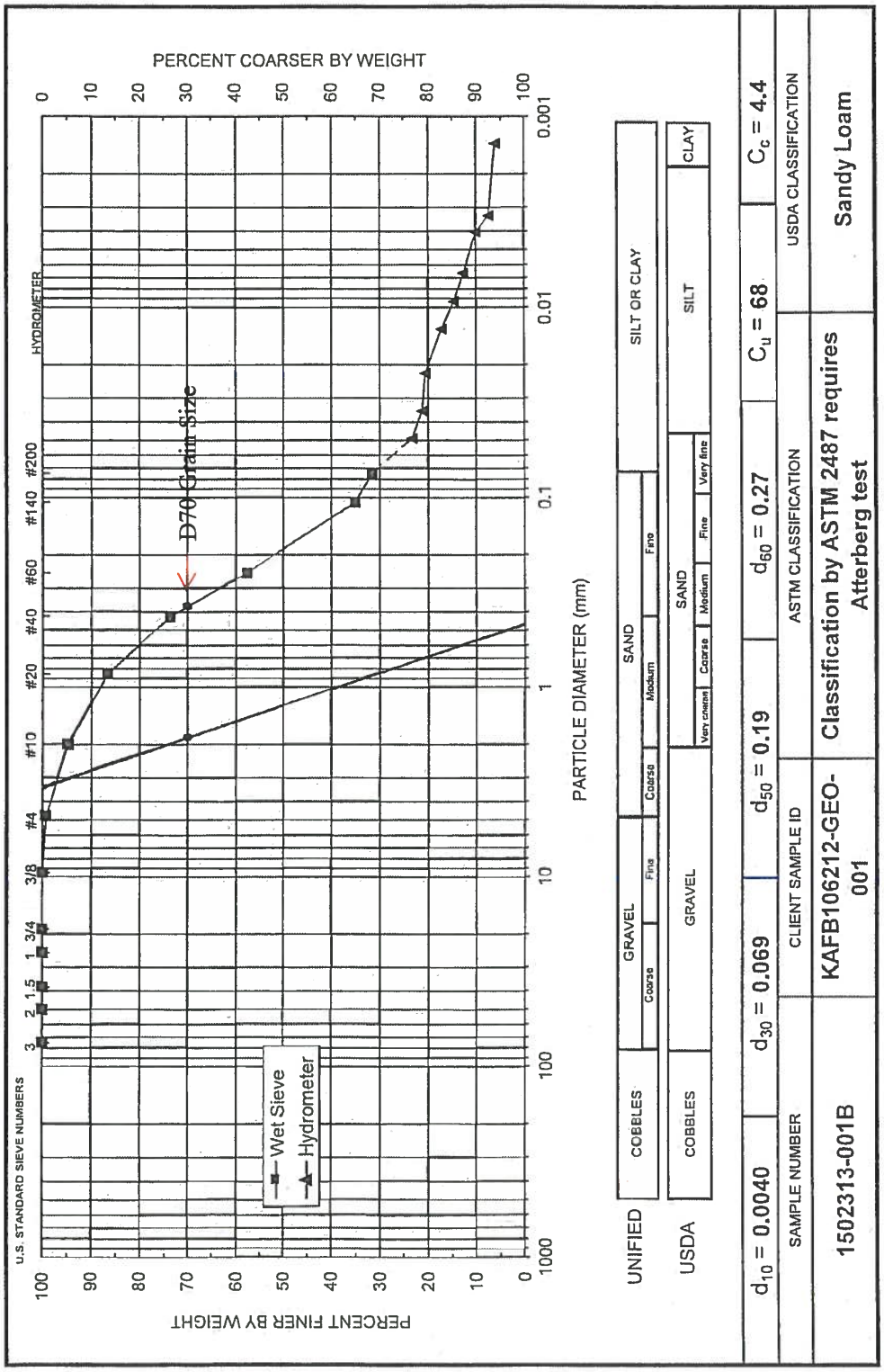
Jay T. Snyder, PG, CHg, EI
Senior Hydrogeologist

CC: Devon Jercinovic, PMP. PG, Project Manager
Lee Becker P.E., Project Engineer

Attachments:
1 Filter Design
2 Sieve and Mesh Dimensions
3 Stainless Steel Well Screens and Accessories
4 Colorado Sand - Typical Specifications & Properties

ATTACHMENT 1

FILTER DESIGN



d_{10} = 0.0040	d_{30} = 0.069	d_{50} = 0.19	d_{60} = 0.27	C_u = 68	C_c = 4.4
SAMPLE NUMBER	CLIENT SAMPLE ID	ASTM CLASSIFICATION		USDA CLASSIFICATION	
1502313-001B	KAFB106212-GEO-001	Classification by ASTM 2487 requires Atterberg test		Sandy Loam	

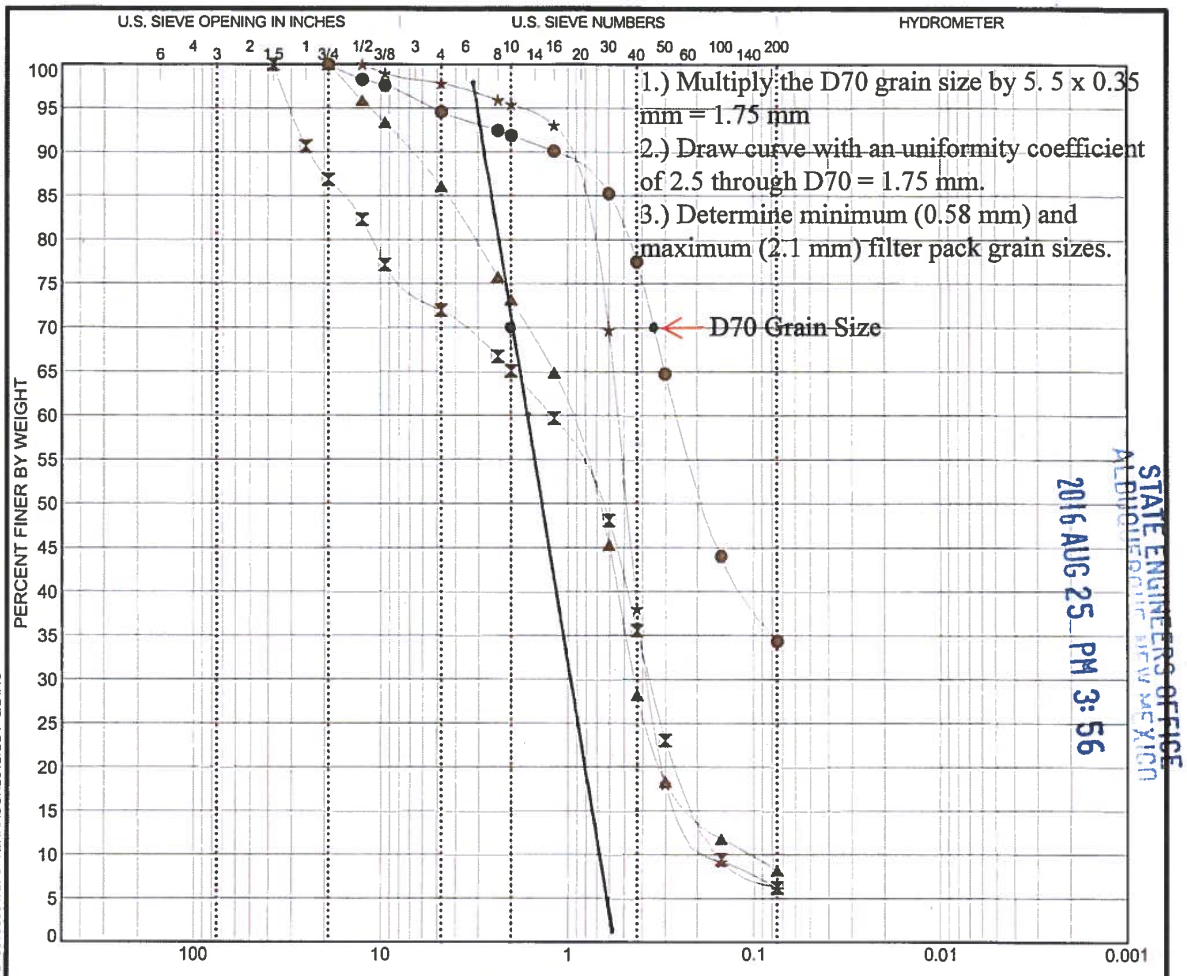
Daniel B. Stephens & Associates, Inc.

1.) Multiply the D70 grain size by 5. 5 x 0.37 mm = 1.85 mm
2.) Draw curve with an uniformity coefficient of 2.5 through D70 = 1.85 mm.
3.) Determine minimum (0.46 mm) and maximum (3.1 mm) filter pack grain sizes.

41

GRAIN SIZE DISTRIBUTION

ASTM D422



STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
2016 AUG 25 PM 3:56

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	LL	PL	PI	Cc	Cu
●	106229 - 452 to 454	0	SILTY SAND(SM)	NP	NP	NP		
⧗	106229 - 465 to 470	0	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP	0.71	7.84
▲	106229 - 490 to 495	0	WELL-GRADED SAND with SILT(SW-SM)	NP	NP	NP	1.85	9.46
★	106229 - 517 to 525	0	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	1.58	3.38

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Fines
●	106229 - 452 to 454	0	19	0.256			5.4	60.2	34.4
⧗	106229 - 465 to 470	0	37.5	1.209	0.364	0.154	28.0	65.7	6.3
▲	106229 - 490 to 495	0	19	0.995	0.44	0.105	13.9	77.9	8.2
★	106229 - 517 to 525	0	12.5	0.54	0.369	0.16	2.2	91.7	6.2

PROJECT: KAFB Nov Response -Geotech Lab Testing

SITE: KAFB
Albuquerque, NM

Terracon
4905 Hawkins, NE
Albuquerque, New Mexico

PROJECT NUMBER: 66155064

CLIENT: CB&I Federal Services
Albuquerque, NM

EXHIBIT: B-1

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 66155064.GPJ TERRACON2012.GDT 8/24/15

ATTACHMENT 2

SIEVE AND MESH DIMENSIONS

Attachment 2. Sieve and Mesh Dimensions from The Engneering ToolBox

Commonly used US Standard commercial sieve and mesh dimensions:

Sieve size	Opening		Standard Mesh
(mm)	*(in)*	*(10^{-6} m)*	*US*
11.2	0.438	11200	7/16"
6.35	0.250	6350	1/4"
5.6	0.223		3.5
4.75	0.187		4
4.0	0.157		5
3.35	0.132		6
2.80	0.110		7
2.36	0.0937		8
2.0	0.0787		10
1.7	0.0661		12
1.4	0.0555		14
1.18	0.0469		16
1.0	0.0394		18
0.841	0.0331	841	20
0.71	0.0278		25
0.595	0.0232	595	30
0.50	0.0197		35
0.400	0.0165	400	40
0.355	0.0139		45
0.30	0.0117		50
0.250	0.0098	250	60
0.210	0.0083	210	70
0.177	0.0070	177	80
0.149	0.0059	149	100
0.125	0.0049	125	120
0.105	0.0041	105	140
0.088	0.0035	88	170
0.074	0.0029	74	200
0.063	0.0024	63	230
0.053	0.0021	53	270
0.044	0.0017	44	325
0.037	0.0015	37	400
0.025	0.0010		500
0.020	0.0008		632

ATTACHMENT 3

STAINLESS STEEL WELL SCREENS AND ACCESSORIES

TECHNICAL INFORMATION: JOHNSON SCREENS® FREE-FLOW® 304 STAINLESS STEEL SCREENS

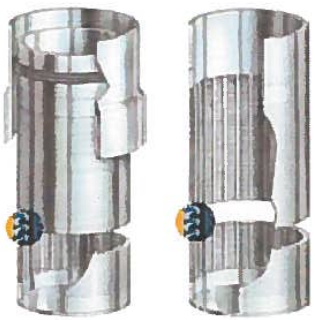
JOHNSON SCREENS LARGE DIAMETER *FREE-FLOW* SCREENS: SIZES 6P - 16T

Size In.	Max Depth: ft	OD: In.	ID: In.	Weight[1]: lbs/ft	Recom. Hang Weight[2]: lbs	Collapse Strength[1]: PSI	Intake Area[3] - In²/ft of Screen							
							Screen Slot Size in Thousandths of an Inch							
							10	20	30	40	50	60	80	100
6" P	100	6.5	6.0	4.4	4,300	87	35	61	82	98	111	123	140	153
	250	6.6	6.0	4.8	4,300	194	20	37	51	64	75	85	102	115
	600	6.7	5.9	6.0	8,800	185	20	37	52	65	76	86	103	117
	1,000	6.8	5.9	7.6	8,800	677	16	30	43	54	64	73	89	103
8" T	250	7.6	6.7	7.0	11,000	127	23	42	59	73	86	98	117	133
	1,000	7.7	6.7	8.9	11,000	468	18	34	48	61	73	83	101	116
8" P	250	8.7	7.9	7.9	12,100	85	26	48	67	84	99	112	134	152
	1,000	8.8	7.9	10.1	20,800	314	21	39	55	70	83	95	115	133
10" T	250	9.5	8.6	8.3	12,100	65	28	53	74	92	108	122	146	166
	1,000	9.6	8.6	10.7	12,100	242	23	43	60	76	90	103	126	143
10" P	600	10.8	9.8	12.6	15,400	170	25	48	68	86	102	116	142	162
	1,000	10.8	9.8	17.8	15,400	226	25	48	68	86	102	116	142	162
12" T	600	11.4	10.4	13.6	17,600	145	27	51	72	90	107	123	149	169
	1,000	11.4	10.4	19.0	17,600	192	27	51	72	90	107	123	149	169
12" P	250	12.8	11.8	14.8	17,600	103	30	57	80	102	121	138	168	193
	600	12.8	11.8	20.9	17,600	136	30	57	80	102	121	138	168	193
	1,000	12.9	11.8	25.2	17,600	193	29	55	78	98	117	134	163	188
14" T	250	12.6	11.6	13.6	14,300	108	30	56	79	100	119	136	165	190
	600	12.6	11.6	19.6	14,300	143	30	56	79	100	119	136	165	190
	1,000	12.6	11.6	24.0	14,300	207	28	53	76	96	114	131	160	184
14" P / 16" T	250	14.1	13.1	15.5	17,100	77	33	63	89	112	133	152	185	213
	600	14.1	13.1	22.2	17,100	102	33	63	89	112	133	152	185	213
	1,000	14.1	13.1	27.2	17,100	148	32	60	85	107	128	146	179	206

NOTES:

- Screens are available in up to 40 foot lengths of continuously wrapped screen with no mid-weld
- 316 stainless steel screen technical information is available upon request
- P - pipe size, T - telescope

1. Based on 0.030 In. slot size (collapse values contain no safety factor)
2. Recommended hang weight is 50 percent of the calculated tensile strength
3. Transmitting capacity in gpm/ft of screen = open area x 0.31



Telescope size screens (left) install through the casing and usually have a Figure K packer as upper fitting. Pipe size screens (right) usually have weld rings at each end and attach directly to the casing.

ATTACHMENT 4

COLORADO SAND - TYPICAL SPECIFICATIONS & PROPERTIES

Attachment 4. Grain Size Distribution for Various Colorado Silica Sand products

Colorado Sand - Typical Specifications & Properties																						
	Sieves																					
Products	5	6	7	8	10	12	14	16	18	20	25	30	35	40	45	50	60	70	100	140	200	Pan
6/9	0-5	0-5	10-20	49-59	10-25	0-3																0-1
8/12		0-1		0-5	20-40	32-42	0-10	0-1														0-1
8/16				0-5	15-30	30-50	15-30	5-15	0-5													0-1
10/16				0-1	0-5	25-50	15-50	10-20	0-1													0-1
10/20				0-1	0-5	3-18	30-40	30-45	10-25	0-5	0-1											0-1
12/20					0-1	5-15	30-50	20-40	10-20	0-5	0-1											0-1
16/30							0-1	0-5	25-45	23-33	15-20	5-15	0-5									0-1
20/40								0-1		0-1	0-10	28-57	30-40	15-27	5-10							0-1
30/70											0-1	0-5		5-20		40-70	10-30	5-10	0-10			0-1
100 Mesh														15-40		5-15	10-20	5-10	10-20	0-10	0-5	0-1
Traction Sand												50-70		0-40		0-30	5-20	5-15	5-10			0-1
Retrieved from www.premiersilica.com on April 22, 2016																						

ATTACHMENT 2

KAFB WATER RIGHTS

73 DEC 3 A8:26
ALBUQ... N. MEX. ...FICE

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

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NOV 27 1973
L. G. KANALY
CLERK

STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO
2016 AUG 25 PM 3:56
2015 JUL 10 PM 3:02

STATE OF NEW MEXICO, ex rel, S. E. REYNOLDS, State Engineer.

Plaintiff

vs.

JOHN McLUCAS, Secretary of the Air Force, THOMAS W. MORGAN, Commander, Air Force Special Weapons Center, and JAMES B. MYERS, Base Commander, Kirtland Air Force Base

Defendants.

JUDGMENT AND ORDER

THIS MATTER coming on to be heard upon the Stipulation of the parties, and the Court having considered the same and being otherwise fully advised in the premises, finds that the Court has jurisdiction of the parties and the subject matter and that the said Stipulation should be approved and incorporated in the final judgment of this Court.

IT IS THEREFORE ORDERED, ADJUDGED AND DECREED that the Stipulation of the parties is hereby approved and incorporated in this judgment as if set out in full herein.

IT IS FURTHER ORDERED that the defendants, their employees, agents, assigns and successors in interest be and they are hereby permanently enjoined and restrained from any diversion and/or use of water from the Rio Grande Underground Water BAsin in and for Kirtland Air Force BAse except in strict conformity with this final judgment.

HOWARD BRATTON

JUDGE OF THE U. S. DISTRICT COURT

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF NEW MEXICO

73 DEC 3 AM 8:

ORIGINAL FILED IN MY OFFICE

NOV 27 1973

L. G. KANALY
CLERK

STATE OF NEW MEXICO, ex rel, S. E. REYNOLDS, State Engineer,

Plaintiff

vs.

JOHN McLUCAS, Secretary of the Air Force, THOMAS W. MORGAN, Commander, Air Force Special Weapons Center, and JAMES B. MYERS, Base Commander, Kirtland Air Force Base

Defendants.

STIPULATION

COME NOW the Plaintiff and Defendants herein, by and through their attorneys, and hereby mutually stipulate and agree that final judgment may enter in this cause in the following terms:

1. The United States of America, acting through and by means of the United States Air Force, owns and operates that certain complex of military facilities known as Kirtland Air Force Base within Bernalillo County, New Mexico, which Base includes the former Sandia Base, a Military installation heretofore operated by the United States Army. That area heretofore known as Sandia Base shall be designated in this stipulation as Kirtland East and that area known as Kirtland Air Force Base prior to the merger of the two installations shall be designated as Kirtland West.

2. On November 29, 1956, the Plaintiff, S. E. Reynolds, State Engineer, duly and lawfully declared the Rio Grande Underground Water Basin, an underground reservoir of public waters of the State of New Mexico having reasonably ascertainable boundaries.

STATE ENGINEERS OFFICE
ALBUQUERQUE, NEW MEXICO
2016 AUG 25 PM 3:56

STATE ENGINEER OFFICE
ALBUQUERQUE, NEW MEXICO
2015 JUL 10 PM 3:02

3. All of Kirtland East and Kirtland West were, on November 29, 1956, and have continued to the present time to be within the exterior boundaries of the said Rio Grande Underground Water Basin.

4. On November 29, 1956, the United States of America owned within Kirtland East a water supply system consisting of 9 completed and operating wells, together with associated water storage and delivery works, and had prior to that date diverted and used underground waters of the Rio Grande Underground Water Basin by means of each and every of the said 9 wells for the lawful purposes of the said military installation.

5. The said nine wells in the Kirtland East water supply system were duly declared by an authorized representative of the United States of America in the office of the Plaintiff on the 4th day of October, 1957, and have been since that date designated in the files of the State Engineer as wells No. RG-1581 through RG-1589. The respective locations and priorities of the said 9 wells, as declared by the United States of America, are as follows:

RG-1581 NW1/4SE1/4, Sec. 31 T. 10 N., R. 4 E. March 1, 1949

RG-1582 NW1/4NW1/4, Sec. 1 T. 9 N., R. 3 E. August, 1949

RG-1583 NW1/4SW1/4, Sec. 30, T. 10 N., R. 4 E. August, 1949

RG-1584 NE1/4SW1/4, Sec. 6, T. 9 N., R. 4 E. August, 1949

RG-1585 NE1/4SW1/4, Sec. 29, T. 10 N., R. 4 E. July, 1952

RG-1586 SW1/4SE1/4, Sec. 32, T. 10 N., R. 4 E. July, 1952

RG-1587 NW1/4NW1/4, Sec. 6, T. 9 N., R. 4 E. Feb., 1955

RG-1588 SW1/4SW1/4, Sec. 5, T. 9 N., R. 4 E. Feb., 1955

RG-1589 SW1/4SW1/4, Sec. 15, T. 9 N., R. 4 E. Feb., 1949

6. Between November 1, 1958, and May 27, 1959, the United States of America drilled or caused to be drilled, in the NW1/4NE1/4 of Sec. 20, T. 9 N., R. 4 E., an additional water well which was thereafter made a part of the water supply system of Kirtland East. This well is designated in the files of the State Engineer as RG-1581 through RG-1589-S. By means of the said well, the United States of America has thereafter continually diverted and beneficially used public underground waters of the Rio Grande Underground Water Basin, as a supplemental point of diversion in and for Kirtland East.

7. In 1972, the United States of America drilled or caused to be drilled an additional water well within Kirtland East in the NW1/4NE1/4 of Sec. 4, T. 9 N., R. 4 E., which well has been completed except for the installation of a pump and has not yet been put to beneficial use, and which is hereby designated RG-1581 through RG-1589-S-2. The said well was drilled for the purpose of serving as a supplemental well for the water supply system of Kirtland East

8. The United States of America owns, under the Constitution and laws of the State of New Mexico, the right to divert the public underground waters of the Rio Grande Underground Water Basin, through and by means of the said eleven wells set forth in paragraphs 5, 6 and 7, in an amount not to exceed an annual quantity of four thousand five hundred (4,500) acre-feet, and to apply the same to beneficial use for the purposes of Kirtland Air Force Base. The priorities of the said eleven wells composing the water supply system of Kirtland East are as set forth

above in paragraphs 5, 6 and 7. The defendants stipulate that the United States Air Force has no right to divert any of the underground waters of the Rio Grande Underground Water Basin, by means of the said 11 wells or otherwise, for the purposes of Kirtland Air Force Base, except as set forth in this Stipulation, provided, however, that the United States shall enjoy the same right as any other appropriator in the State of New Mexico to make application hereafter to the Plaintiff, State Engineer, for permit to drill supplemental well(s) (i.e., make partial or total change in point of diversion or place or purpose of use) or to effect the transfer of valid and existing water rights for the purposes of Kirtland Air Force Base.

9. On November 29, 1956, the United States of America owned a water supply system in and for Kirtland West consisting of two water wells whose respective locations and priorities were declared in the Office of the State Engineer, by a duly authorized representative of the United States on the 4th day of October, 1957, to be as follows:
RG-1579 NW1/4NW1/4, Sec. 35, T. 10 N., R. 3 E., Oct. 9, 1952
RG-1580 SE1/4NW1/4, Sec. 34, T. 10 N., R. 3 E., Mar. 6, 1956

10. In 1969, the United States of America drilled or caused to be drilled an additional well in and for the Kirtland West water supply system, designated in the records of the State Engineer as RG-1579 and RG-1580 Combined-S, which well was thereafter made a part of the Kirtland West water supply system as a supplemental well.

11. The United States of America owns, under the Constitution and laws of the State of New Mexico, the right to divert

the public underground waters of the Rio Grande Underground Water Basin by means of the three wells set out in paragraphs 9 and 10 above in an amount not to exceed an annual quantity of 1,898 acre-feet for the purposes of Kirtland Air Force Base. The defendants stipulate that the United States Air Force has no right to divert or use the underground waters of the Rio Grande Underground Water Basin for the purposes of Kirtland Air Force Base, except as set forth in this Stipulation, by means of the said three wells or otherwise, provided, however, that the United States of America shall enjoy the same right as any other appropriator of public water in the State of New Mexico to make application to the Plaintiff, State Engineer, hereafter for permit to drill and use supplemental well(s) (i.e., make partial or total change in point of diversion or place or purpose of use) or to effect the transfer of existing valid water rights for the purposes of Kirtland Air Force Base.

12. The United States of America also owns the right under the Constitution and laws of the State of New Mexico to divert public underground waters of the Rio Grande Underground Water Basin in an amount not to exceed three acre-feet per year by and from each of the following three domestic wells located and existing within, and for the purposes of Kirtland Air Force Base:

Location	Priorities
RG-1578 SE1/4NW1/4, Sec. 35, T. 9 N., R. 4 E.	1945
RG-1590 SE1/4NW1/4, Sec. 35, T. 9 N., R. 4 E.	1945
RG-1591 NE1/4SE1/4, Sec. 24, T. 9 N., R. 4 E.	1948

13. The defendants stipulate that the United States Air Force will not after the entry of final judgment herein drill

or cause or allow to be drilled any water well(s) within the boundaries of the Rio Grande Underground Water Basin, within and/or for the purposes of Kirtland Air Force Base (including Kirtland East and Kirtland West), except when and to the extent that it will have fully complied with the laws of the State of New Mexico and the Rules and Regulations of the State Engineer in respect to obtaining from the State Engineer permit(s) to drill water wells and/or produce public waters therefrom for any purpose.

14. The defendants stipulate that they will make on behalf of the United States accurate monthly reports to the Plaintiff, State Engineer, of the total metered quantities of underground water diverted by means of any and all of the wells composing the Kirtland East and Kirtland West water supply systems, provided, however, that the United States of America shall not be required to make application for, or obtain permit authorizing the physical combination of the two water supply systems so long as the total annual metered diversion from each system is within the respective limit established in paragraphs 8 and 11. The defendants further agree that they will, within 60 days of the date of entry of final judgment herein, file in the Office of the Plaintiff, State Engineer, on forms to be supplied by the Plaintiff, applications on behalf of the United States seeking the right to divert and use public underground waters of the Rio Grande Underground Water Basin by means of those two certain wells RG-1581 through RG-1589-S-2 and RG-1579 and RG-1580 Combined-S, within the respective limits set forth in paragraphs 8 and 11 above. The State of New Mexico agrees that together

with the terms of judgment entered in this cause pursuant to this Stipulation, the said applications shall be administratively recognized as evidencing the right of the United States to use the said two wells within the terms of this Stipulation and the Order of the Court entered pursuant thereto, without any further requirement for advertisement or hearing.

PAUL L. BLOOM
Special Assistant Attorney General
State of New Mexico

s/Victor Ortega
United States Attorney

U.S. ENVIRONMENTAL PROTECTION AGENTCY PERMITS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270-2102

SEP 3 0 2019

CERTIFIED MAIL: RETURN RECEIPT REQUESTED (7015 1520 0003 4072 4991)

Received
10/11/19
SWQB
SB

REPLY TO: 6WQ-NP

Colonel David S. Miller, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

Re: NPDES Permit No. NM0031216 – Kirtland Air Force Base

Dear Colonel Miller:

This package constitutes EPA's final permit decision for the above referenced facility. Enclosed are the responses to comments received during the public comment period and the final permit. According to EPA regulations at 40 CFR 124.19, within 30 days after a final permit decision has been issued, any person who filed comments on the draft permit or participated in the public hearing may petition the Environmental Appeals Board to review any condition of the permit decision.

Should you have any questions regarding the final permit, please feel free to contact Quang Nguyen of the Permitting and Water Quality Branch at the above address or by telephone: (214) 665-7238, by fax: (214) 665-2191, or by E-mail: Nguyen.quang@epa.gov. Should you have any questions regarding compliance with the conditions of this permit, please contact the Water Enforcement Branch at the above address or by telephone: (214) 665 6468.

Sincerely yours,

Charles W. Maguire
Director
Water Division

Enclosures
cc w/enclosures:
Sarah Holcomb, NMED
Pueblo of Isleta

NPDES PERMIT NO. NM0031216
RESPONSE TO COMMENTS

RECEIVED ON THE SUBJECT DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT IN ACCORDANCE WITH REGULATIONS LISTED AT 40 CFR 124.17

APPLICANT: Kirtland Air Force Base
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

ISSUING OFFICE: U.S. Environmental Protection Agency
Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270

PREPARED BY: Quang Nguyen
Environmental Engineer
Permitting and Water Quality Branch
Water Division
VOICE: 214-665-7238
FAX: 214-665-2191
EMAIL:Nguyen.Quang@epa.gov

PERMIT ACTION: Final permit decision and response to comments received on the proposed NPDES permit publicly noticed on March 23, 2019.

DATE PREPARED: September 1, 2019

Unless otherwise stated, citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations, revised as of September 28, 2015.

DOCUMENT ABBREVIATIONS

In the document that follows, various abbreviations are used. They are as follows:

4Q3	Lowest four-day average flow rate expected to occur once every three years
BAT	Best available technology economically achievable
BCT	Best conventional pollutant control technology
BPT	Best practicable control technology currently available
BMP	Best management plan
BOD	Biochemical oxygen demand (five-day unless noted otherwise)
BPJ	Best professional judgment
CBOD	Carbonaceous biochemical oxygen demand (five-day unless noted otherwise)
CD	Critical dilution
CFR	Code of Federal Regulations
Cfs	Cubic feet per second
COD	Chemical oxygen demand
COE	United States Corp of Engineers
CWA	Clean Water Act
DMR	Discharge monitoring report
ELG	Effluent limitations guidelines
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FCB	Fecal coliform bacteria
F&WS	United States Fish and Wildlife Service
mg/L	Milligrams per liter
µg/L	Micrograms per liter
MGD	million gallons per day
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMIP	New Mexico NPDES Permit Implementation Procedures
NMWQS	New Mexico State Standards for Interstate and Intrastate Surface Waters
NPDES	National Pollutant Discharge Elimination System
MQL	Minimum quantification level
O&G	Oil and grease
PCB	Polychlorinated Biphenyl
POTW	Public owned treatment works
RP	Reasonable potential
SIC	Standard industrial classification
s.u.	Standard units (for parameter pH)
SWQB	Surface Water Quality Bureau
TDS	Total dissolved solids
TMDL	Total maximum daily load
TRC	Total residual chlorine
TSS	Total suspended solids
UAA	Use attainability analysis
USGS	United States Geological Service
WLA	Wasteload allocation
WET	Whole effluent toxicity
WQCC	New Mexico Water Quality Control Commission
WQMP	Water Quality Management Plan
WWTP	Wastewater treatment plant

In this document, references to State WQS and/or rules shall collectively mean either or both the State of New Mexico and/or the Pueblo of Taos.

SUBSTANTIAL CHANGES FROM DRAFT PERMIT

1. Removing reporting requirements for following pollutants: Zinc, PCBs, Nickel, Antimony, Selenium, Tetrachloroethylene, Benzo(a)pyrene, Hexachlorobenzene, 4,4'-DDT and derivatives, Toxaphene, Heptachlor epoxide, 2,3,7,8-TCDD (Dioxin), Aldrin, Mercury, Arsenic, Thallium, Chlordane, and Dieldrin;
2. Adding Heptachlor reporting requirements;
3. Adding a permit modification/reopener clause on facility operation alteration, and;
4. Adding Best Management Practice conditions/requirements under Part II of the final permit.

STATE CERTIFICATION

In a letter from Ms. Shelly Lemon, Bureau Chief, SWQB, to Mr. David Gray, Acting Regional Administrator dated July 26, 2019, the NMED certified that the discharge will comply with the applicable provisions of Section 208(e), 301, 301, 303, 306 and 307 of the Clean Water Act and with appropriate requirements of State law.

The NMED stated that in order to meet the requirements of State law, including water quality standards and appropriate basin plan as may be amended by the water quality management plan, each of the conditions cited in the draft permit and the State certification shall not be made less stringent.

The State also stated that it reserves the right to amend or revoke this certification if such action is necessary to ensure compliance with the State's water quality standards and water quality management plan.

Comments that are not Conditions of Certification

Comment No. 1:

The New Mexico Implementation Procedure (NMIP) considers the type of facility as well as the ephemeral nature of the watercourse when determining the frequency of WET testing. USAF submitted WET testing results during the comment period that indicated 95% survivability of invertebrate at 100% effluent. NMED has not yet received Reasonable Potential (RP) results from EPA, but if the WET testing monitoring results indicate RP, the 1/year monitoring requirement from the NMIP should apply.

Response No. 1:

The permittee submitted WET testing results for 2 samples collected on May 22, 2019 and June 5, 2019 during the comment period. The results indicate they have passed both tests, and no

Reasonable Potential exists. Therefore, no WET limits will be imposed in the permit. However, the WET testing which is required to comply with the New Mexico narrative Water Quality Standard will remain in the permit. No changes were made to the draft permit in response to these comments.

Comment No. 2:

If monitoring submitted during the public comment period showed no RP for the required human health constituents, NMED supports removal of 3x week monitoring for those pollutants. Otherwise, the permit does not include a specific restriction on how long of a time the facility may discharge as an intermittent discharge and therefore includes monitoring requirements from the NMIP for daily discharge. Testing is only required in the case that the discharge occurs to the watercourse. Groundwater requirements are not relevant to the proposed surface water discharge.

Response No. 2:

The EPA has re-evaluated submitted data (i.e., Zinc, PCBs, Nickel, Antimony, Selenium, Tetrachloroethylene, Benzo(a)pyrene, Hexachlorobenzene, 4,4'-DDT and derivatives, Toxaphene, Heptachlor epoxide, 2,3,7,8-TCDD (Dioxin), Aldrin, Mercury, Arsenic, Thallium, Chlordane, and Dieldrin) for reasonable potential (RP) to cause or contribute to WQS exceedances. The results of the RP reevaluation analysis indicate no RPs exist for mentioned pollutants (see Appendix 1). For final permit, EPA will remove report requirements for Zinc, PCBs, Nickel, Antimony, Selenium, Tetrachloroethylene, Benzo(a)pyrene, Hexachlorobenzene, 4,4'-DDT and derivatives, Toxaphene, Heptachlor epoxide, 2,3,7,8-TCDD (Dioxin), Aldrin, Mercury, Arsenic, Thallium, Chlordane, and Dieldrin constituents.

Comment No. 3:

NMED requests that EPA retain the monitoring requirement for per- and polyfluoroalkyl substances (PFAS) in the permit. Sources of PFAS such as Aqueous Film Forming Foam (AFFF) were present at KAFB in the past. Though the USAF states PFAS is not present in the effluent, they did not submit any documentation that the influent or treated discharge has been sampled for PFAS and that those potential contaminants are not present. Inclusion of a monitoring requirement will provide information about whether these contaminants are present. Due to the characteristics of these contaminants (persistence in the environment and the human body, and evidence that exposure to PFAS can lead to adverse human health effects), NMED advocates taking a proactive approach to assuring the health and safety of the Tijeras Arroyo and the Rio Grande. If a limitation is needed based on monitoring data, NMED will work with EPA according to regulations provided in 20.6.4 NMAC and the New Mexico Implementation Plan (NMIP) to develop an appropriate and protective limitation for inclusion in the permit.

Response No. 3: Comment is noted. The PFAS reporting requirement will be remained in the final permit. No changes made in the final permit.

COMMENTS RECEIVED AT PUBLIC HEARING

Comments #4 through #10 were provided by participants at the public hearing held at New Mexico's Veterans Memorial located at 1100 Louisiana Blvd SE., Albuquerque, NM 87108 on June 26, 2019.

Comment No. 4:

Our concerns about the NPDES permit are that there's no detailed environmental, economic, and programmatic justification for the project.

Response No. 4: Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. Note that no justification for having a discharge is required from applicants for a NPDES permit (see 40 CFR 122.21). Accordingly, no changes were made to the draft permit in response to these comments.

Comment No. 5:

There's currently no coordination with the Resource Conservation Recovery Facility Act. There's been no facility investigation for the – both field spill and coordination with this project.

Response No. 5: This comment is presumed to be referring to the Resource Conservation and Recovery Act. Comments regarding coordination with the Resource Conservation and Recovery Act are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 6:

Kirtland AFB has an unused permit for five undeveloped underground injection wells, and they have only put in place one underground well. When do they intend to put in these other injection wells, and how much are they going to cost, and how much is this pipeline going to cost? There is no economic discussion of – of any of that.

Response No. 6: Comments regarding injection well cost and development are outside the scope of the NPDES permitting action, as is projected cost of the proposed NPDES permitted project. No changes were made to the draft permit in response to these comments.

Comment No. 7:

It's supposed to be for episodic use only, but there's no real definition of 'episodic."

Response No. 7

Kirtland AFB has two approved discharge locations (i.e., Golf Course Main Pond (GCMP) and Injection well KAFB-7) for its treated effluent. An occasional discharge of process effluent to Tijeras Arroyo may occur when infrastructure fails at underground Injection well KAFB-7 and GCMP and is necessary to ensure the uninterrupted operations of the Interim Measure. The Kirtland final permit is a non-continuous discharge permit, which has been referred to as an "episodic" discharge permit. Since it will be on an "as needed" rather than a normal batch discharge basis, EPA will not include any specific restriction on the frequency and/or how long of a time the facility may discharge its treated effluent to Tijeras Arroyo in the permit. The effluent limitations, conditions and monitoring requirements currently in Kirtland AFB permit were conservatively designed as if the facility discharges daily. In addition, EPA requires the permittee to notify EPA and NMED as soon as it knows or plans to change to continuous from its current non-continuous discharge mode. The permit could be reopened and modified accordingly based upon the notification.

Furthermore, EPA has included the following Best Management Practice conditions/requirements under Part II of the final permit to ensure that Kirtland AFB will maximize the usage of their primary disposal sites to minimize and/or prevent discharges, if feasible, to Tijeras Arroyo:

> *Permittee shall develop and implement Best Management Practice plans that incorporate all reasonable steps to minimize infrastructure failures at the Injection well KAFB-7 and GCMP. Through implementation of the managment plans, the Permittee must prevent and/or minimize the number of discharge events to Tijeras Arroyo.*
>
> *Permittee shall conduct monthly inspection with periodic cleaning and repair, as needed, on the conveyance effluent line running between the GWTS and GCMP and Injection well KAFB-7 to prevent biofoulings, irons and calcareous materials build-up.*
>
> *Proper operation and maintenance to ensure steady operation and to extend the life of equipment shall include but are not limited to: Transducers, flowmeters, control valves, alarm systems, pump, stadia rod, etc.*
>
> *If system shut down at the one of the disposal sites is needed for routine maintenance, non-routine maintenance, or any other nonemergency reason, the permittee will maximize the usage of the other sites for disposing treated effluent prior to discharging treated effluent to Tijeras Arroyo. Volume discharge to disposal sites and Tijeras Arroyo shall be logged and recorded.*
>
> *The permittee shall have the burden of proof that the discharge of treated effluent to Tijeras Arroyo is necessary. This includes logs that document and record all routine, non-routine maintenance activities and all volumes discharged to disposal sites (i.e.,*

GCMP and Injection well KAFB-7) and Tijeras Arroyo.

The Permittee shall, as soon as possible, but no later than thirty (30) days prior to discharging to Tijeras Arroyo, provide written notice to EPA and NMED of any planned physical shut down at both the Injection well KAFB-7 and GCMP discharge locations which is believed to last more than 1 week. Such notice shall include: (i) Description of and justification for the need for the anticipated discharge; (ii) the period of discharge, including anticipated dates and times; (iii) an estimate of discharge volume.

The Permittee shall, within 24 hours from the time of the discharge to Tijeras Arroyo due to infrastructure failures at both the Injection well KAFB-7 and GCMP discharge locations, notify EPA and NMED followed by a written report in five days.

The Permittee, if discharging to Tijeras Arroyo, shall limit the discharge rate so it will not cause erosion of Tijeras Arroyo or structural damage to culverts and their entrances or exits.

Comment No. 8:

Kirtland intends not to construct the underground injection wells, and simply use the pipeline for disposal. There's no engineering design for the public to review for this pipeline. The location for the disposal is not clearly identified for the public. There's no pictures for the intended disposal area. There's no tour of the disposal area available to the public. There's no safety plan.

Response No. 8:

Comments regarding the permittee's intent to construct injection wells state an opinion and do not reference specific sections of the draft permit. Accordingly, no changes were made to the draft permit in response to these comments. The outfall location is identified in the application and permit as (Latitude 35° 1' 28.86" North, and Longitude 106° 32' 55.32 West). Outfall structures are regulated under the Corps of Engineers Nationwide Permit 7 - Outfall Structures and Associated Intake Structures and are outside the scope of the NPDES permitting action. Comments regarding providing public tour of the disposal area and having a safety plan are outside the scope of the NPDES permitting action. The permittee submitted the operations and maintenance plan for the groundwater treatment system as a part of the NPDES permit application. This plan includes a health and safety plan. No changes were made to the draft permit in response to these comments.

Comment No. 9:

I'd like to see a copy of the fish and wildlife letter.

Response No. 9:

Comment noted. EPA attached a copy of the MEMORANDUM FOR ENDANGERED SPECIES ACT REQUIREMENTS in Appendix 2.

Comment No. 10:

The classification of Tijeras Arroyo as an ephemeral stream is okay. But you do have periods of time when it can handle a large snow melt, and it is going to go all the way to the Rio Grande, including the stormwater runoff, and what other contaminants in there. I haven't seen any discussion of what the relationship of this is to the Gultin [phonetic] facility that contaminated Tijeras arroyo with TCE. It may be that there's too narrow a scope for the contaminants that are being measured in relation to all the contaminants that were spilled in the jet fuel spill. For example, I don't see any reference to 1,2 DCA, which is clearly a contaminant that was present.

Response No. 10:

To be protective, Reasonable Potential analysis is done at the critical low flow where there is less dilution available in the receiving water, in this case 100% effluent. The 1,2 DCA and TCE constituents, as indicated in the application, were reported non-detect in the treated effluent and was determined to not have Reasonable Potential to exceed the water quality standards. The submitted WET testing results for 2 samples collected on May 22, 2019, and June 5, 2019 during the comment period also indicate Reasonable Potential to cause toxicity does not exist. In addition, the final permit requires the facility to conduct WET tests, which measure treated effluent's effects on specific test organisms' ability to survive, grow and reproduce, to ensure no discharge of toxic pollutants in toxic amount. No changes were made to the draft permit in response to these comments.

OTHER COMMENTS RECEIVED ON DRAFT PERMIT

Comment #11 provided in the Commissioner Charlene E. Pyskoty, District 5 in Bernalillo County, New Mexico letter to Ms. Evelyn Rosborough on July 9, 2019.

Comment #11 provided in the Commissioner Steven Michael Quezada, District 2, in Bernalillo County, New Mexico letter to Ms. Evelyn Rosborough on July 10, 2019.

Comments #12 through #22 provided in the email from Eric Nuttal, Ph.D., Emeritus to Ms. Evelyn Rosborough and Quang Nguyen on June 20, 2019.

Comments #23 through #39 and #46 provided in the email from David McCoy to Ms. Evelyn Rosborough on April 3, 2019.

Comments #40 through #45 provided in the Colonel David S. Miller, Department of the Air Force, 377th Air Base Wing (the permittee) letter to Ms. Evelyn Rosborough on June 26, 2019 and July 12, 2019.

Comment No. 11:

The Commissioners request that the U.S. Environmental Protection Agency (EPA) define "episodic" with stated limitations before issuing the permit. Also, the EPA and the applicant must ensure that they are using the highest standards and best practices for any water the Kirtland Air Force Base releases into the Tijeras Arroyo that may negatively affect Bernalillo County and its residents.

Response No. 11:

Please see response to comments No.7 and 28.

Comment No. 12:

Discharging the large quantities of water (800 gpm) to the Tijeras Arroyo is a lost water benefit. This concept is pump and waste which is counter to New Mexico State Law for beneficial water use. Beneficial uses of water for domestic and municipal uses can include: industrial uses; irrigation; mining; hydroelectric power; navigation; recreation; public parks; wildlife, and; game preserves. None of these examples of practicable alternatives for beneficial uses are considered or met by the proposed discharge that could reach over one million gallons per day on a continual basis. The Permit Application gives no indication of the duration for discharge. There is no analysis for why the Underground Injection Control Wells (DP-1839, April28, 2017) that could receive 1,440,000 gallons per day would not meet the needs of interim measures. Hence the duration of the release period should be minimized!

Response No. 12:

The permit only addresses the discharge of the processed water into the receiving stream and resulting impacts on the designated uses of those waters. The permit does not convey any other rights other than the authorization to discharge into waters of the United States. Beneficial use requirements under New Mexico state law are outside the scope of review for this NPDES permit application, so issues of water rights are outside the scope of the NPDES permitting action. See response No. 7 regarding restricting use of the surface water discharge to times when the primary and secondary disposal options are not available.

Comment No. 13:

There is no guarantee that the treated effluent from four up to eight groundwater extraction wells will not travel off Kirtland AFB from Tijeras Arroyo that is a tributary of the Rio Grande River, a navigable body of water Discharge of over one million gallons per day is a substantial quantity of water and coupled with potential storm events including microbursts, snow melt, and urban runoff has not been analyzed for perennial transport to the Rio Grande River. No Tracer Dye Study has been conducted to examine the hydrological connection between the Tijeras Arroyo and Rio Grande for the effect of over one million gallons per day disposal of effluent.

Response No. 13:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. The authorized discharge is to Tijeras Arroyo, which is a tributary to the Rio Grande. It is likely that discharges to the Tijeras Arroyo will leave Kirtland Air Force Base Property under certain weather conditions, as noted in the comment, but the permit was written to be protective of water quality standards applicable to the receiving waters (both Tijeras Arroyo and the Rio Grande) and received a Clean Water Act Section 401 Certification from the New Mexico Environment Department. In addition, the Tijeras Arroyo is an ephemeral stream from which water does not always reach the Rio Grande. If all 800 GPM actually reached the Rio Grande, for those days of discharge the Critical Dilution would be 1% or less depending on other flows in the Arroyo and losses along the route. No changes were made to the draft permit in response to these comments.

Comment No. 14:

There is need for an environmental impact statement. Tijeras Arroyo is described as a nutrient impaired waterway subject to an anti-degradation policy of New Mexico. https://www. env. nm.gov/wp-content/uploads/2016/03/EPA Approved-TIJERAS-ARROYO- TMDL 101217. pdf An EIS is needed to fully assess the potential impact of an accidental EDB release and increased flow of contaminants. Tijeras Arroyo is an area of biological concern having habitat that is critical for threatened or endangered species and/or has a significant nexus that can significantly affect the chemical, physical, and biological integrity of the Rio Grande. Habitat for environmentally sensitive species are present such as, Bank Swallow (Riparia riparia) and Burrowing Owl (Athene cuculria). Tijeras Arroyo also contains habitat for several species including migratory birds. The Albuquerque International Sunport Airport and U.S. Air Force Kirtland Air Force Base is located on the north boundary of the review area, which contributes pollutants from fuels, lubricants, and other chemicals from airport/air force base operations to the Tijeras Arroyo watershed. The capacity to carry pollutants or flood waters by additional flow to the Rio Grande River is not analyzed for those contaminants such as ammonia, phosphorus, nitrates, nitrites, and orthophosphates, pesticide organics such as 1,4-dichlorobenzene, diazinon, atrazine, and thiabendazole; and radio chemicals such as uranium.

Response No. 14:

The environmental impact reviews required by the National Environmental Policy Act do not apply to the Kirtland AFB NPDES permit since it is not subject to New Source Performance Standards (40 CFR 122.29(c)). The receiving water segment Tijeras Arroyo (Rio Grande to Four Hills Bridge) is not on the EPA approved 2016-2018 State of New Mexico 303(d) list for Assessed Stream and River Reaches, and there are no applicable approved TMDLs. NMED, as part of the Antidegradation Review, requires the facility to comply with Tier I antidegradation requirements. The facility must meet or exceed water quality standards at the "end of pipe"

discharge point and use best available technology as required by permit conditions. The permit authorizes discharges subject to the limitations and conditions contained therein. The permit requirements and the limits are protective of the assimilative capacity of the receiving water, which is protective of the designated uses of that water, NMAC Section 20.6.4.8.A.2. Note that any pollutants already in Tijeras Arroyo are also subject to movement due to natural storm and snow melt events and would fall under the Non-point Source Load Allocation and not the Point Source Wasteload Allocation components of a TMDL, if developed in the future.

Comment No. 15:

The City of Albuquerque Draft "Tijeras Arroyo Biological Zone (Bio-Zone) Open Space Resource Management Plan" (Plan), dated 2007 and prepared by Marron and Associates, Inc., describes Tijeras Arroyo as the main waterway for most of the snow melt and rain flows from Tijeras Canyon and portions of the East Mountains to the Rio Grande and that it is one of the largest arroyos in the Albuquerque area. The Plan describes Tijeras Arroyo hydrology as a significant source of local aquifer recharge due to the soils well drained and excessively drained qualities and that hydrologic issues primarily concern flash flooding, surface water runoff from surrounding developments and storm drains, and contamination from pollutants. The Plan states that Albuquerque's storm water management system in areas adjacent to Tijeras Arroyo is designed to convey storm water runoff directly to the Tijeras Arroyo and then on to the Rio Grande. The Plan further states that water from municipal storm water management systems contain high levels of automotive pollutants and debris, and agricultural contaminates.

Response No. 15:

Comments regarding municipal storm water discharges are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 16:

There needs to be daily monitoring of the EDB effluent concentrations to minimize the potential impact of an accidental EDB effluent release.

Response No. 16:

For consistency with the NMIP, the EDB monitoring frequency of 3 times per week will be retained in the final permit. The commenter did not provide, nor is EPA aware of, evidence that there is an elevated risk of releases of EDB above the non-detect levels provided in the permit application and considered in development of the permit. No reasonable potential to cause an exceedance of water quality standards was found for EDB. No changes were made to the draft permit in response to this comment.

Comment No. 17:

Ideally the effluent water should be held in tanks/ponds and EDB concentrations measured prior to water discharge to the Tijeras Arroyo. Consideration for seasonal variation in watershed conditions and pollutant loading must be made. 40 CFR § 130.7(c)(l).

Response No. 17:

As indicated in the application, the facility is equipped with a tank having 6000-gallon capacity for treated water storage prior to disposal. The final permit requires, when discharging occurs, monitoring frequency for EDB of three times per week after the last treatment unit prior to discharge. The EDB monitoring requirement is included in the final permit to gather information for future permitting decisions consistent with 40 CFR 122.41(h). The 40 CFR § 130.7(c)(l) refers to the development of TMDLs and individual water quality based effluent limitations. The receiving water segment Tijeras Arroyo (Rio Grande to Four Hills Bridge) is currently not on the State of New Mexico 303(d) list. No TMDL has been developed for EDB for this water segment. No changes were made to the draft permit in response to these comments.

Comment No. 18:

All underground piping should be double lined to detect piping leaks. Major accidents and costly, severe impacts to human health and the environment have occurred because piping lacked double liners with leak detection. The KAFB multi-million gallon jet fuel/aviation gas spill is a prime example. The Kinder Morgan 200,000 gallon gasoline spill near Berino, New Mexico contaminated the Elephant Butte Irrigation District, requiring evacuation of families, and purchase of their properties. (See attached news article). Blowout at natural gas well due to corroded piping in Aliso Canyo, California sickened thousands of residents for nearly four months who moved out of their homes. (See attached news article).

Response No. 18: This comment contains opinions and does not reference specific sections of the draft permit. Comments about potential releases from underground piping or past releases from pipelines carrying fuels and hydrocarbons are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 19:

There are no guarantees that accidental release of EDB will not occur and no analysis for such potential accidents and possible consequences is in place. Accidents happen as is obvious from the Bulk Fuels Facility release that totals millions of gallons of fuel contaminating the Albuquerque aquifer.

Response No. 19: Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. Comments about accidental releases from bulk

storage tanks or Kirtland AFB in general are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 20:

There is a need for a comprehensive health and safety plan for workers and the public.

Response No. 20:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. Worker and public health and safety plans are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to this comment.

Comment No. 21:

There is a need for a comprehensive accident response plan.

Response No. 21:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. Comprehensive accident response plans for Kirtland AFB are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to this comment.

Comment No. 22:

There is the need for an engineering design for the point of disposal.

Response No. 22:

The requirement for an engineering design for the point of disposal is outside the scope of the NPDES permitting action. Construction of outfall structures may be regulated under CWA Section 404. The U.S. Army Corps of Engineers Albuquerque District is the agency responsible for reviewing and issuing CWA Section 404 permits in New Mexico. No changes were made to the draft permit in response to this comment.

Comment No. 23:

CANM requests a public hearing for the NPDES Permit No NM0031216 prior to its approval. Also an Environmental Assessment ("EA") and probably an Environmental Impact Statement ("EIS") should be performed prior to approval of the NPDES Permit.

Response No. 23:

EPA held a public hearing at New Mexico's Veterans Memorial located at 1100 Louisiana Blvd SE., Albuquerque, NM 87108 on June 26, 2019. The environmental impact reviews required by the National Environmental Policy Act do not apply to the Kirtland AFB NPDES permit since it is not subject to New Source Performance Standards (40 CFR 122.29(c)).

Comment No. 24:

The occurrence of the KAFB jet fuel/aviation gasoline spill spreading Ethylene Dibromide (EDB) and petroleum hydrocarbons throughout Albuquerque's sole source drinking water aquifer is prima facie evidence of the incompetence of the U.S. Air Force to protect the environment from serious accidents in its management of hazardous chemicals.

Response No. 25:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. No changes were made to the draft permit in response to these comments.

Comment No. 25:

How does the NPDES Permit function in conjunction with RCRA requirements? KAFB has not completed a RCRA Facility Investigation ("RFI") that is competent to set a path forward for long-term remediation of the aquifer. Only interim measures have been introduced. There is no apparent co-ordination between the RCRA aspects of the NPDES draft permit or strategic plans, the need for an RFI between interim measures or what would be effective long-term remedies if an RFI were approved. There is no mention of implementing an NPDES discharge in the NMED 2019 Strategy Plan.

Response No. 25:

This comment includes opinions and does not reference specific sections of the draft permit. Requirements of the Resource Conservation and Recovery Act and any associated Strategy Plans developed by the New Mexico Environment Department are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 26:

Citizen Action has repeatedly requested Strategy Plans and the RFI to contain the following items that still are missing to develop a Conceptual Site Model for the RFI:

1.Total estimated mass of EDB in each zone, i.e. vadose, LNAPL, and leading EDB GW plumes.

2.Total volume of fuel spilled (estimate) for aviation gas and jet fuel.

3.Flow direction and velocity at leading edge of the EDB plume.

4.Present effect on plume movement cause by pumping well/wells.

5.A summary of the various EDB remediation technologies.

6.The capital and annual operating cost for the remediation of the EDB.

7.Discuss the likelihood of EDB reaching the Ridge Crest or other municipal wells.

8. Discuss the comprehensive total cleanup plan for the Kirtland BFF spill (vadose, NAPL, EDB).

Response No. 26:

Comments related to requirements of the Resource Conservation and Recovery Act and any associated Strategy Plans developed by the New Mexico Environment Department are outside the scope of this NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 27:

The NPDES Permit would allow 800 gallons per minute to be released into the Tijeras Arroyo that enters the Rio Grande River. On a daily basis that would be 1,152,000 gpd and 420,000,000 gpy. The permit would allow that amount of release for what could be decades into the future.

Response No. 27: The permitted discharge is expected to occur only when the both golf course and injection well disposal options are not available at the same time. A daily discharge for an entire year is not anticipated. The permit only addresses the discharge of pollutants in the processed water into the receiving stream and resulting impacts on the designated uses of those waters. The permit does not convey any rights other than the authorization, subject to permit limitations and conditions, to discharge into waters of the United States. No changes were made to the draft permit in response to these comments. (see also Response No. 7)

Comment No. 28:

What is the Safety Plan? There is no consideration of accidents and the risks that could result for direct exposure to the human environment and aquatic environment (fish, animal, plant life) downstream from the discharge location that might occur from, e.g., accidental release of water contaminated with EDB that might bypass a plugged filter. A comprehensive risk analysis should be performed giving how comprehensive monitoring will be achieved for potential causes for accidental discharges, consequences and how there will be prevention and cleanup. Further contamination of the above ground water resource is simply unacceptable. Extracted groundwater should be placed in barrels to prevent constant flow into a treatment system that may be compromised.

Response No. 28:

This comment poses questions and states opinions beyond the scope of this permit action and does not reference specific sections of the draft permit. The permit does not authorize accidental releases or releases that are not in compliance with the permit. Part III.A.2 of the final permit imposes a duty to comply with the limitations and conditions of the permit. Part III.B.3 of the final permit requires proper operation maintenance operation and maintenance of all facilities and treatment and controls (and related appurtenances) which are installed or used by permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit. Part III.B.4 of the final permit prohibits bypass of any treatment unit. No changes were made to the draft permit in response to these comments.

Comment No. 29:

Environmental justice issues have not been considered in the event of accident scenarios especially involving EDB. The South Valley of Albuquerque that has a minority, low income population and could be exposed to accidental spills of EDB contaminated discharges is already the location of Superfund sites for TCE. The Isleta Pueblo water supply is downstream from the Tijeras Arroyo.

Response No. 29:

EPA disagrees. All members of the public were invited to provide comments on the proposed permit and attend the Public Hearing held at New Mexico's Veterans Memorial located at 1100 Louisiana Blvd SE., Albuquerque, NM 87108 on June 26, 2019. Kirtland AFB provided a list of approximately 46 interested parties that was also notified directly by e-mail about the permit notice, public meeting and public hearing. A Spanish version of the Public Notices was also provided. When developing the permit limits for this permit, EPA ensured that both the New Mexico and Isleta Pueblo WQS and/or designated uses of its receiving are protected, and those water quality standards are protective of all citizens. In February 2019, EPA also offered Pueblo of Isleta an opportunity to engage in government-to-government consultation on the Kirtland AFB permit issuance action. The commenter did not identify the source of the accidental EDB releases making it impossible to determine if they would even be within the scope of the NPDES permitting action. The final permit requires monitoring for EDB, but at this time no reasonable potential to require a limit was found. See also response No. 28.

Comment No. 30:

There needs to be consideration for contamination already present in the Tijeras Arroyo and whether that current or future contamination can be spread further by the discharge under the NPDES Permit. For example: former Gulton Manufacturing is a former computer chip manufacturing company that has contaminated the relatively shallow groundwater in the Tijeras Canyon area with chlorinated solvents such as TCE. Tijeras Arroyo Groundwater at Sandia National Laboratories Technical Area V is contaminated with TCE and Nitrates. What is the potential for that contamination to be spread by the NPDES Permit?

Response No. 30:

Comments related to this theme generally pose questions, state an opinion and do not reference specific sections of the draft permit. The receiving water segment Tijeras Arroyo (Rio Grande to Four Hills Bridge) is not an impaired stream for chlorinated solvents (i.e., TCE) nor on the EPA approved 2016-2018 State of New Mexico 303(d) list for Assessed Stream and River Reaches. There are no applicable approved TMDLs for the receiving water segment. The NMAC, Section 20.6.4.8 "Antidegradation Policy and Implementation Plan" sets forth the requirements to protect designated uses through implementation of the State water quality standards. The limitations and monitoring requirements set forth in the proposed permit are developed from the State water quality standards. They are protective of the assimilative capacity of the receiving water, which is protective of the designated uses of that water, NMAC Section 20.6.4.8.A.2. Pollutants in streambed sediments are legacy pollutants past the point of regulation for the NPDES permit and usually fall under Non-point Source or RCRA/CERCLA authority. No changes were made to the draft permit in response to these comments. (See also Response No. 14)

Comment No. 31:

The fact is that accidental unauthorized discharge can and has occurred at KAFB. (See, Corrective Action Report for Unauthorized Discharge at the Bulk Fuel Facility Temporary Groundwater Treatment Facility, Kirtland Air Force Base, NM,) https://hwbdocuments.env.nm.gov/Kirtland%20AFB/KAFB4341.pdf

Response No. 31:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. See also responses no. 28. and 29. No changes were made to the draft permit in response to this comment.

Comment No. 32:

The justification for the NPDES Permit is lacking. There is already discharge to the KAFB Golf Course Pond for Golf Course irrigation use. There is a KAFB #7 injection well near to the Tijeras Arroyo. Other locations for injection wells have been proposed or were under

consideration for discharge. Why should they not be used?

Response No. 32:

Kirtland AFB has two approved discharge locations (i.e., Golf Course Main Pond (GCMP) and Injection well KAFB-7) for its treated effluent. The facility has and will maximize usage of their primary disposal locations. According to the application, the only time that facility will discharge its process effluent to Tijeras Arroyo (TA) is when infrastructure failures occur at underground Injection well KAFB-7 and GCMP and is necessary to ensure the uninterrupted operations of the Interim Measure (i.e., pump and treatment of contaminated groundwater). The NPDES permit is designed to ensure the facility will continue to use their primary disposal sites to the extent as feasible. See also response No.7.

Comment No. 33:

Justification is not presented for simply shutting down the pump and treat system until the underground injection problem is fixed. Currently the P & T system is operated under interim measures! There is no requirement to keep the system running and no reason provided for why "It is imperative to ... ensure the uninterrupted operation of this Interim Measure."

Response No. 33:

Decisions on how the GWTS should be operated are outside the scope of the NPDES permitting action. While the need to halt or reduce an activity is not a defense for violation of permit limits or conditions (40 CFR 122.41(c)), there is no requirement under the NPDES program to halt an activity when the discharge is in compliance with the permit. Decisions regarding the need to continuously operate the groundwater capture wells is outside the scope of the NPDES permitting action. An occasional discharge of treated effluent to Tijeras Arroyo may occur when infrastructure fails at underground Injection well KAFB-7 and GCMP and is necessary to ensure the uninterrupted operations of the Interim Measure. No changes were made to the draft permit in response to these comments.

Comment No. 34:

There is no information given for the costs of the various segmented actions taking place at KAFB. The Pump and Treat remedy is extremely expensive and is questionable when extraction of over 3,000,000 gallons of water is required for removal of one gram of EDB. NMED and KAFB have not addressed the earlier studies by both EPA and the National Academies of Science regarding the lack of effectiveness and high cost of Pump and Treat.

Response No. 34:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. Decisions on the installation of the GWTS at the Kirtland AFB as an interim measure to collapse and contain the ethylene dibromide groundwater plume from the BFF site, in order to protect Albuquerque, Kirtland Air Force Base, and the U.S. Department of Veterans Affairs Medical Center drinking water supply wells, are outside the scope of the NPDES permitting action. No changes were made to the draft permit in response to these comments.

Comment No. 35:

Current maximum extraction rate of water for treatment at KAFB is 400 gpm. Allowing an NPDES Permit for twice that volume does not make sense unless there are plans for more extraction wells that have not been ordered or revealed to the public.

Response No. 35:

NPDES permits are written based on the application, which anticipates a discharge of up to 800 gpm. No changes were made to the draft permit in response to these comments.

Comment No. 36:

Since KAFB refuses to provide the mass balance of EDB in the aquifer, it is unknown if the extraction well is having any effect on the EDB plume. Shallow groundwater monitoring wells have been submerged so that an accurate assessment cannot be made for the spread and volume of EDB contamination remaining in relation to the need for the NPDES Permit.

Response No. 36:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. See also response No.1. No changes were made to the draft permit in response to these comments.

Comment No. 37:

The NPDES Permit gives KAFB authority to squander more of Albuquerque's precious drinking water source after the fact that KAFB has already contaminated the aquifer -- and not only at the Bulk Fuels Facility. The NPDES Permit will allow the non-economic waste of potable treated water that costs the taxpayer for electricity, treatment, pipelines, etc. without any consideration for entities that may be willing to either pay for the treated water or accept it on a voluntary basis. There should be public noticed solicitation of those entities that could use treated water. The discharge costs and waste can be multiplied by decades.

Response No. 37:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. The facility is using treated effluent for golf course irrigation during warmer months or recharging the regional aquifer under a Class V Underground Injection Control permit as the current facility's deposition methods for the treated water. An occasional discharge of treated effluent to Tijeras Arroyo may occur when infrastructure fails at underground Injection well KAFB-7 and when infrastructure failures or weather conditions prevent use of the GCMP and is necessary to ensure the uninterrupted operations of the Interim Measure. See also response No. 12. No changes were made to the draft permit in response to these comments.

Comment No. 38:

There is no consideration of "green alternatives" to provide the energy for the pumping and treatment of the water. Just how big is the Pump & Treat operation going to become at KAFB? Still no RFI to guide the remediation projects.

Response No. 38:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. See also response No. 34. No changes were made to the draft permit in response to these comments.

Comment No. 39:

By and large the planning for remediation of the KAFB fuel spill have been haphazard, uncoordinated and the issuance of the NPDES Permit would be a continuation of lack of comprehensive planning that is sorely in need of independent oversight.

Response No. 39:

Comments related to this theme generally state an opinion and do not reference specific sections of the draft permit. See also response No. 34. No changes were made to the draft permit in response to these comments.

Comment No. 40:

Pursuant to EPA and USAF discussions during the public hearing held on June 26, 2019, the USAF respectfully requests that the sample be collected at the Ground Water Treatment System (GWTS) facility effluent discharge point. The proposed location will have the same characteristics for sampling at the end of the discharge pipe.

Response No. 40:

The selected sampling points must provide a representative sample of the effluent, where the monitoring point should be in order to be representative of the effluent after the last treatment unit and are safely accessible to staff. Water flows from the GWTS facility to Tijeras Arroyo via a pipe. The characteristics of the effluents sampled at the GWTS facility effluent discharge point after the last treatment unit are expected to be representative of results at the discharge point to Tijeras Arroyo. Sample collection at the Ground Water Treatment System facility effluent discharge point location is acceptable. No change to the Permit was made as a result of this comment.

Comment No. 41:

Whole Effluent Toxicity (WET) Testing (48 Hour Acute no-observed-effect concentration (NOEC) Freshwater). The Tijeras Arroyo is a dry watercourse that is ephemeral in nature and only sees flow during heavy precipitation events. The Tijeras Arroyo does eventually flow into the Rio Grande River, although it is approximately 5-6 miles from the proposed discharge point in this NPDES permit.

The USAF does not believe WET testing is warranted in this particular instance and respectfully requests that this requirement be removed prior to issuing the final NPDES permit. The ephemeral nature of Tijeras Arroyo, as outlined above, is highly unlikely to be changed by this discharge. As stated in the USAF's NPDES application, this NPDES outfall would only be used to discharge treated, non-hazardous groundwater in the unlikely event the two primary disposal methods, golf course irrigation and underground injection, are temporarily unavailable.

In the unlikely event that conditions change, the proposed NPDES permit has the reopener clause in Part II (C) that allows EPA to require additional monitoring and/or testing.

Response No. 41:

The WET testing is a requirement of State implementation procedure to comply with the New Mexico narrative Water Quality Standard. EPA cannot grant the request to remove WET testing requirement. No change to the Permit was made as a result of these comments.

Comment No. 42:

The table in Part I (A)(1) "*Final Effluent Limits*" contains numerous constituents that are not present in the effluent from the groundwater treatment plant based upon process knowledge, extensive analytical data collected pursuant to the RCRA Permit and DP-1839 and the attached analytical data from effluent samples collected on 22 May 2019 and 31 May 2019, Section V(C)(5)(C-Toxics) of the Fact Sheet states " that there is a reasonable potential for the following pollutants to be present in the effluent: Antimony, Arsenic, Nickel, Selenium, Thallium, Zinc, Mercury, 4,4'- DDT and derivatives, Toxaphene, Heptachlor, Heptachlor epoxide, Aldrin,

Dieldrin, 2,3,7,8-TCDD (Dioxin), PCB's, Benzo(a)pyrene, Chlordane, Hexachlorobenzene, Ethylene dibromide, per-and polyflouroalkyl substances (PFAS) and Tetrachloroethylene." EPA has included these constituents, along with numerous others, in Part I (A)(I) of the draft permit.

The USAF respectfully objects to the inclusion of the above referenced constituents on the analytical list (with the exception of the constituents in Table 2 "*Constituents of Concern*" in DP-1839, specifically ethylene dibromide, benzene, ethylbenzene, toluene, total xylene, iron and manganese) and the proposed sampling frequencies contained within the referenced section of the draft permit. Alternatively, the USAF proposes that samples for these contaminants be collected only once within the first two years to verify the contaminants meet discharge standards. For consistency, the USAF proposes that the sampling of ethylene dibromide, benzene, ethylbenzene, toluene, total xylene, iron and manganese coincide with the sampling frequency of the state issued DP-1839 permit with sample collection occurring monthly when discharge to the NPDES outfall occurs.

Response No. 42:

The EPA has re-evaluated Zinc, PCBs, Nickel, Antimony, Selenium, Tetrachloroethylene, Benzo(a)pyrene, Hexachlorobenzene, 4,4'-DDT and derivatives, Toxaphene, Heptachlor epoxide, 2,3,7,8-TCDD (Dioxin), Aldrin, Mercury, Arsenic, Thallium, Chlordane, and Dieldrin pollutants for reasonable potential (RP) to cause or contribute to WQS exceedances. For the reevaluation analysis, EPA used the combination of data provided during the comment period. The results of the RP reevaluation analysis indicate no RPs exist for mentioned pollutants (see Appendix 1). For final permit, EPA will remove report requirements for Zinc, PCBs, Nickel, Antimony, Selenium, Tetrachloroethylene, Benzo(a)pyrene, Hexachlorobenzene, 4,4'-DDT and derivatives, Toxaphene, Heptachlor epoxide, 2,3,7,8-TCDD (Dioxin), Aldrin, Mercury, Arsenic, Thallium, Chlordane, and Dieldrin.

EPA cannot grant the request of removing the PFAS report requirement. No submitted documentation indicated that PFAS constituents are not present. Because PFAS compounds are persistence in the environment and the human body, and evidence that exposure to PFAS can lead to adverse human health effects, the PFAS reporting requirement will be remained in the final permit to determine if these compounds are present and for the health and safety of the Tijeras Arroyo and the Rio Grande. See also comment No. 3 where NMED specifically requested continued monitoring for PFAS in the final permit.

In addition, for consistency with NMIP, EPA cannot the grant the request of changing sampling frequency to monthly (when discharging occurs) for the rest of constituents listed in the table in Part I (A)(1) "*Final Effluent Limits*" in the final permit.

Comment No. 43:

In accordance with the letter from NMED to EPA, the USAF has obtained samples for the referenced pollutants from the effluent of the groundwater treatment plant and request that EPA consider the sampling requirement for these pollutants (with the exception of Ethylene dibromide) to be satisfied and the conditions removed prior to the issuances of the final permit. The attached analytical data from effluent samples collected on 22 May 2019 and 31 May 2019 demonstrate that these pollutants are all below their respective regulatory standards for surface water discharge. As such, there is no reasonable expectation that these constituents would affect water quality in the receiving waters or their designated uses.

Response No. 43:

Please see the response to comment No. 2.

Comment No. 44:

The Fact Sheet provided with the Draft Permit does not provide any basis or explanation for inclusion of a PFAS anti-degradation sampling requirement. As such, the USAF has not been provided an adequate fact-based rationale for the requirement. Fact sheets "shall" contain an explanation of the reason "that such conditions are applicable", 40 CFR 124.56(b).

Response No. 44:

Comment noted. During the comment period, NMED requested the monitoring requirement for PFAS to be included in the permit (Comment No. 3). The permittee collected treated water samples in December 2016, September 2017, May 22, 2019 and May 31, 2019. These samples were analyzed for more than 90 different chemical compounds, but not for PFAS compounds. No submitted documentation indicated that those potential contaminants are not present or that materials containing PFAS (e.g. firefighting foam) were not used at KAFB. Because PFAS compounds are persistence in the environment and the human body, and evidence that exposure to PFAS can lead to adverse human health effects, EPA included the reporting requirement in the permit to determine if these contaminants are present and to gather information for use in subsequent permitting actions regarding the authorized discharge. Note that 40 CFR 122.41(h) establishes a duty to provide information to the Director to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit.

Comment No. 45:

The anti-degradation sampling requirement for PFAS is arbitrary. PFAS compounds are not present in the effluent and; therefore, do not pose a reasonable potential to cause or contribute to an exceedance of a water quality standard.

The New Mexico certifications requirement for PFAS is outside the scope of the State Certification authority under 40 CFR 124.53 and should not be incorporated as a NPDES permit requirement. PFAS is an unregulated contaminant for which there is currently no Federal standard. New Mexico recently adopted PFOA and PFOS as a toxic pollutant standard pursuant to 20.6.2 NMAC Groundwater and Surface Water Protection Standards in December of 2018. However, water quality standards must be approved by EPA before they are used in NPDES permitting 40 CFR 131.21.

Response No. 45:

No submitted documentation indicated that PFAS constituents are not present in the treated effluent. The final permit, which does not include PFAS limits at this time, requires monitoring to gather information for future permitting decisions consistent with 40 CFR 122.41(h). See also comment No. 3, where NMED requested (but did not make a Condition of Certification) the monitoring requirement for PFAS to be included in the permit. No changes were made to the draft permit in response to these comments.

Comment No. 46:

Mr. McCoy representing Citizen Action of New Mexico submitted a report titled "*Hidden from the Public – Secret Document About the Flawed Investigation of The Kirtland Air Force Base (FAFB) Jet Fuel and Aviation Gas Contamination of the Albuquerque Drinking Water Aquifer*" as comments on the proposed NPDES permit for Kirtland AFB.

Response No. 46:

This comment poses questions and contains statements and opinions about issues which are outside the scope of authority of the NPDES permitting program and do not reference specific sections of the draft permit. No changes were made to the draft permit in response to these comments.

EPA Permit Review Edits: In reviewing the permit as a result of comments provided during the comment period, EPA found a typo where the monitor and report requirements for Heptachlor were not included in the draft permit. The fact sheet stated "*The preliminary toxic analysis shows RPs exist for Toxaphene, Heptachlor, Heptachlor epoxide, Aldrin, and Dieldrin. Because the permittee has not met the sufficient sensitive test requirement per 40 CFR 122.21(e)(3), EPA proposes facility to monitor for these parameters along with…*" EPA will correct the typographical error in the final permit and add Heptachlor reporting requirements to the table in Part 1 Section A. 1 of the final permit.

APPENDIX 1

REASONABLE POTENTIAL SCREENING ANALYSIS

CALCULATIONS OF NEW MEXICO WATER QUALITY-BASED EFFLUENT LIMITATIONS

NMAC 20.6.4	(EPA approved site-specific criteria for aluminum, cadmium, and zinc on April 30, 2012)		
Calculations Specifications	Excel	**Revised as of July 10, 2012**	
Repared By		Quang Nguyen	
STEP 1:	REFERENCE IMPLEMENTATION PROCEDURES	**Revised**	
	INPUT FACILITY AND RECEIVING STREAM DATA		
	LIST SOURCE OF DATA INPUT		
IMPLEMENTATION PROCEDURES			
The State of New Mexico Standards for Interstate and Intrastate Surface Waters are implemented in this spreadsheet by using procedures established in the current "Procedures for Implementing NPDES Permits in New Mexico"			
FACILITY		DATA INPUT	
Permittee		Kirtland AFB	
NPDES Permit No		NM0031216	
Outfall No (s)		1	
Plant Effluent Flow (MGD)		1.152	For industrial and federal facility, use the highest monthly average flow
Plant Effluent Flow (cfs)		1.7856	for the past 24 months. For POTWs, use the design flow
RECEIVING STREAM		DATA INPUT	
Receiving Stream Name		Tijeras Arroyo	
Basin Name		Rio Grande Basin	
Waterbody Segment Code No		20.6.4.98	
Is a publicly owned lake or reservoir (enter "1" if it's a lake, "0" if not)		0	
Are acute aquatic life criteria considered (1= yes, 0= no)	(MUST enter "1" for 2005 Standards)	1	
Are chronic aquatic life criteria considered (1= yes, 0=no)		1	
Are domestic water supply criteria considered (1= yes, 0=no)		0	
Are irrigation water supply criteria considered (1= yes, 0=no)		0	
Livestock watering and wildlife habitat criteria applied to all streams			
USGS Flow Station		USGS	
WQ Monitoring Station No		SJR	
Receiving Stream TSS (mg/l)		1	For intermittent stream, enter effluent TSS
Receiving Stream Hardness (mg/l as CaCO3)	RANGE 0 - 400	20	For intermittent stream, enter effluent Hardness (if no data, 20 mg/l is used)
Receiving Stream Critical Low Flow (4Q3) (cfs)		0	Enter "0" for intermittent stream and lake
Receiving Stream Harmonic Mean Flow (cfs)		0	Enter harmonic mean or modified harmonic mean flow data or 0.001 if no data is available
Avg. Receiving Water Temperature (C)		21.55	
pH (Avg), Receiving Stream		8.5	
Fraction of stream allowed for mixing (F)		1	Enter 1, if stream morphology data is not available or for intermittent streams
Fraction of Critical Low Flow		0	

STEP 2: INPUT AMBIENT AND EFFLUENT DATA

CALCULATE IN-STREAM WASTE CONCENTRATIONS

DATA INPUT

Input pollutant geometric mean concentration as micro-gram per liter (ug/l or ppb)
unless other unit is specified for the parameter.
Effluent value reported as "< detection level" (DL) but the DL is greater than MQL, input "1/2 DL" for calculation.
Effluent value reported as "< detection level" (DL) and the DL is smaller than MQL, no data is inputted
If a less than MQL value is reported, input either the reported value or "0" for calculation

The following formular is used to calculate the Instream Waste Concentration (Cd)
See the current "Procedures for Implementing NPDES Permits in New Mexico"
Cd = [(F*Ca*Ca) + (Qe*2.13*Ce)] / (F*Ca + Qe)
Where
Cd = Instream Waste Concentration
F = Fraction of stream allowed for mixing (see "Procedures for Implementing NPDES Permits in New Mexico")
Ce = Reported concentration in effluent
Ca = Ambient stream concentration upstream of discharge
Qe = Plant effluent flow
Qa = Critical low flow of stream at discharge point expressed as the 4Q3 or harmonic mean flow for human health criteria

The following formular convert metals reported in total form to dissolved form if criteria are in dissolved form
See the current "Procedures for Implementing NPDES Permits in New Mexico"
Kp = Kpo * (TSS^a) — Kp = Linear partition coefficient. Kpo and a can be found in table below
C/Ct = 1/ (1 + Kp*TSS* 10^-6) — TSS = Total suspended solids concentration found in receiving stream (or in effluent for intermittent stream)
Total Metal Criteria (Ct) = Cr / (C/Ct) — C/Ct = Fraction of metal dissolved, and Cr = Dissolved criteria value

		Stream Linear Partition Coefficient					Lake Linear Partition Coefficient				
Total Metals	Total Value	Kpo	alpha (a)	Kp	C/Ct	Dissolved Value in Stream	Kpo	alpha (a)	Kp	C/Ct	Dissolved Value in Lake
Arsenic	0.87	480000	-0.73	480000	0.675675676	0.58783784	480000	-0.73	480000	0.675675676	0.5878378
Chromium III	21	3360000	-0.93	3360000	0.229357798	0.48165138	2170000	-0.27	2170000	0.315457413	0.6624606
Copper	51	1040000	-0.74	1040000	0.490196078	2.5	2850000	-0.9	2850000	0.25974026	1.3246753
Lead	0	2800000	-0.8	2800000	0.263157895	0	2040000	-0.53	2040000	0.328947368	0
Nickel	0	490000	-0.57	490000	0.67114094	0	2210000	-0.76	2210000	0.31152648	0
Silver	5	2390000	-1.03	2390000	0.294985251	1.47492625	2390000	-1.03	2390000	0.294985251	1.4749263
Zinc	0.023	1250000	-0.7	1250000	0.444444444	0.01022222	3340000	-0.68	3340000	0.230414747	0.0052995

The following formular is used to calculate hardness dependent criteria
(Please refer to State Water Quality Standards for details)

			Dissolved WQC (ug/l)	
Aluminum (T)	Acute	e(1.3695[ln(hardness)]+1.8308)	377.4565069	If Stream pH < 6.5, enter 750 in cell O113
	Chronic	e(1.3695[ln(hardness)]+0.9161)	151.2229657	If Stream pH < 6.5, enter 87 in cell P113
Cadmium (D)	Acute	e(0.8968[ln(hardness)]-3.5699)*CF1	0.418091688	CF1 = 1.136672 - 0.041838*ln(hardness)
	Chronic	e(0.7647[ln(hardness)]-4.2180)*CF2	0.142116028	CF2 = 1.101672 - 0.041838*ln(hardness)

			Dissolved WQC (ug/l)	
Chromium III (D)	Acute	0.316 e(0.819[ln(hardness)]+3.7256)	152.4888787	
	Chronic	0.860 e(0.819[ln(hardness)]+0.6848)	19.8356702	
Copper (D)	Acute	0.960 e(0.9422[ln(hardness)]-1.700)	2.949857764	
	Chronic	0.960 e(0.8545[ln(hardness)]-1.702)	2.263769249	
Lead (D)	Acute	e(1.273[ln(hardness)]-1.46) *CF3	10.79154489	CF3 = 1.46203 - 0.145712*ln(hardness)
	Chronic	e(1.273[ln(hardness)]-4.705)*CF4	0.420531012	CF4 = 1.46203 - 0.145712*ln(hardness)
Manganese (D)	Acute	e(0.3331[ln(hardness)]+6.4676)	1746.691001	
	Chronic	e(0.3331[ln(hardness)]+5.8743)	965.048559	
Nickel (D)	Acute	0.998 e(0.846[ln(hardness)]+2.255)	119.9874916	
	Chronic	0.997 e(0.846[ln(hardness)]+0.0584)	13.32690594	
Silver (D)	Acute	0.85 e(1.72[ln(hardness)]-6.59)	0.201924903	
Zinc (D)	Acute	0.978 e(0.9094[ln(hardness)]+0.9095)	370.2425804	
	Chronic	0.986 e(0.90947[ln(hardness)]-0.6235)	280.4834719	

POLLUTANTS	CAS No	MQL	Ambient Conc Ca (ug/l)	Effluent Conc Ce (ug/l)	Instream Waste Concentration Acute Aquatic 2.13*Ce	Domestic Supply Cd dom (ug/l)	Chronic Aquatic Cd (ug/l)	Human Health Cd hh (ug/l)	Domestic Criteria ug/l	Irrigation Criteria ug/l	Livestock & Wildlife Criteria ug/l	Acute Aquatic Criteria ug/l	Chronic Aquatic Criteria ug/l	Human Health Criteria ug/l	Need TMDL
Radioactivity, Nutrients, and Chlorine															
Aluminum, total	7429-90-5	2.5			#VALUE!	#VALUE!	#VALUE!	#VALUE!	1E+100	5000	1E+100	377.4565069	151.22297	1E+100	NA
Barium, dissolved	7440-39-3	100		100	213	#VALUE!	#VALUE!	#VALUE!	2000	1E+100	1E+100	1E+100	1E+100	1E+100	Need TMDL
Boron, dissolved	7440-42-8	100			0	0	0	0	1E+100	750	5000	1E+100	1E+100	1E+100	NA
Cobalt, dissolved	7440-48-4	50			0	0	0	0	1E+100	50	1000	1E+100	1E+100	1E+100	NA
Uranium, dissolved	7440-61-1	0.1		1.8	3.834	#VALUE!	#VALUE!	#VALUE!	30	1E+100	1E+100	1E+100	1E+100.	1E+100	Need TMDL
Vanadium, dissolved	7440-62-2	50			0	0	0	0	1E+100	100	100	1E+100	1E+100	1E+100	NA
Ra-226 and Ra-228 (pCi/l)				0.793	1.68909	1.68909	1.68909	1.68909	5	1E+100	30	1E+100	1E+100	1E+100	NA
Strontium (pCi/l)					#VALUE!	#VALUE!	#VALUE!	#VALUE!	8	1E+100	1E+100	1E+100	1E+100	1E+100	Need TMDL
Tritium (pCi/l)					0	0	0	0	20000	1E+100	20000	1E+100	1E+100	1E+100	NA
Gross Alpha (pCi/l)				2.45	5.2185	5.2185	5.2185	5.2185	15	1E+100	15	1E+100	1E+100	1E+100	NA
Asbestos (fibers/l)					0	0	0	0	7000000	1E+100	1E+100	1E+100	1E+100	1E+100	NA
Total Residual Chlorine	7782-50-5	33			0	0	0	0	1E+100	1E+100	11	19	11	1E+100	NA
Nitrate as N (mg/l)					0	0	0	0	10	1E+100	1E+100	1E+100	1E+100	1E+100	NA
Nitrite + Nitrate (mg/l)				0.58	1.2354	#VALUE!	#VALUE!	#VALUE!	1E+100	1E+100	132	1E+100	1E+100	1E+100	Need TMDL
METALS AND CYANIDE															
Antimony, dissolved (P)	7440-36-0	60		0	0	0	0	0	6	1E+100	1E+100	1E+100	1E+100	640	NA
Arsenic, dissolved (P)	7440-38-2	0.5		0.587837838	1.252094595	1.25209459	1.25209459	1.25209459	10	100	200	340	150	9	NA
Beryllium, dissolved	7440-41-7	0.5		2	4.26	#VALUE!	#VALUE!	#VALUE!	4	1E+100	1E+100	1E+100	1E+100	1E+100	Need TMDL
Cadmium, dissolved	7440-43-9	1		0	0	0	0	0	5	10	50	0.418091688	0.142116	1E+100	NA
Chromium (III), dissolved	16065-83-1	10			0	0	0	0	1E+100	1E+100	1E+100	152.4888787	19.83567	1E+100	NA
Chromium (VI), dissolved	18540-29-9	10			0	0	0	0	1E+100	1E+100	1E+100	16	11	1E+100	NA
Chromium, dissolved	7440-47-3				0	0	0	0	100	100	1000	1E+100	1E+100	1E+100	NA
Copper, dissolved	7440-50-8	0.5		2.5	5.325	#VALUE!	#VALUE!	#VALUE!	1300	200	500	2.949857764	2.2637692	1E+100	Need TMDL
Lead, dissolved	7439-92-1	0.5		0	0	#VALUE!	#VALUE!	#VALUE!	15	5000	100	10.79154489	0.420531	1E+100	Need TMDL
Manganese, dissolved	7439-96-5				0	0	0	0	1E+100	1E+100	1E+100	1746.691001	965.04856	1E+100	NA

					In-stream Waste Concentration				Livestock &	Acute	Chronic	Human	Need		
POLLUTANTS	CAS No	MDL	Ambient Conc Ca (ug/l)	Effluent Conc Ce (ug/l)	Acute Aquatic 2.13*Ce	Domestic Supply Cd,dom (ug/l)	Chronic Aquatic Cd (ug/l)	Human Health Cd hh (ug/l)	Domestic Criteria ug/l	Irrigation Criteria ug/l	Wildlife Criteria ug/l	Aquatic Criteria ug/l	Aquatic Criteria ug/l	Health Criteria ug/l	TMDL
Mercury, dissolved	7439-97-6	0.005			0	0	0	0	1E+100	1E+100	1E+100	1.4	0.77	1E+100	N/A
Mercury, total	7439-97-6	0.005		0.038	0.08094	#VALUE!	#VALUE!	#VALUE!	2	1E+100	0.77	1E+100	1E+100	1E+100	Need TMDL
Molybdenum, dissolved	7439-98-7				0	0	0	0	1E+100	1000	1E+100	1E+100	1E+100	1E+100	N/A
Molybdenum, total recoverable	7439-98-7				0	0	0	0	1E+100	1E+100	1E+100	7920	1895	1E+100	N/A
Nickel, dissolved (P)	7440-02-0	0.5		0	0	0	0	0	700	1E+100	1E+100	1199.874916	133.26906	4600	N/A
Selenium, dissolved (P)	7782-49-2	5		0.47	1.0011	1.0011	1.0011	1.0011	50	130	50	1E+100	1E+100	4200	N/A
Selenium, dis (SO4 >500 mg/l)		5			0	0	0	0	50	250	50	1E+100	1E+100	4200	N/A
Selenium, total recoverable	7782-49-2	5			0	0	0	0	1E+100	1E+100	5	20	5	1E+100	N/A
Silver, dissolved	7440-22-4	0.5		1.474926254	3.14159292	3.14159292	3.14159292	3.14159292	1E+100	1E+100	1E+100	0.201924903	1E+100	1E+100	N/A
Thallium, dissolved (P)	7440-28-0	0.5		0	0	0	0	0	2	1E+100	1E+100	1E+100	1E+100	0.47	N/A
Zinc, dissolved	7440-66-6	20		0.010222222	0.021773333	#VALUE!	#VALUE!	#VALUE!	10500	2000	25000	37.02425804	28.048347	26000	Need TMDL
Cyanide, total recoverable	57-12-5	10			0	0	0	0	200	1E+100	5.2	22	5.2	140	N/A
Dioxin	1764-01-6	0.00001		0	0	0	0	0	3.00E-05	1E+100	1E+100	1E+100	1E+100	5.1E-08	N/A
VOLATILE COMPOUNDS															
Acrolein	107-02-8	50			0	0	0	0	18	1E+100	1E+100	1E+100	1E+100	9	N/A
Acrylonitrile	107-13-0	20			0	0	0	0	0.65	1E+100	1E+100	1E+100	1E+100	2.5	N/A
Benzene	71-43-2	10			0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	510	N/A
Bromoform	75-25-2	10			0	0	0	0	44	1E+100	1E+100	1E+100	1E+100	1400	N/A
Carbon Tetrachloride	56-23-5	2			0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	16	N/A
Chlorobenzene	108-90-7	10			0	0	0	0	100	1E+100	1E+100	1E+100	1E+100	1600	N/A
Clorodibromomethane	124-48-1	10			0	0	0	0	4.2	1E+100	1E+100	1E+100	1E+100	130	N/A
Chloroform	67-66-3	50		0	0	0	0	0	57	1E+100	1E+100	1E+100	1E+100	4700	N/A
Dichlorobromomethane	75-27-4	10			0	0	0	0	5.6	1E+100	1E+100	1E+100	1E+100	170	N/A
1,2-Dichloroethane	107-06-2	10			#VALUE!	#VALUE!	#VALUE!	#VALUE!	5	1E+100	1E+100	1E+100	1E+100	370	N/A
1,1-Dichloroethylene	75-35-4	10			0	0	0	0	7	1E+100	1E+100	1E+100	1E+100	7100	N/A
1,2-Dichloropropane	78-87-5	10			0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	150	N/A
1,3-Dichloropropylene	542-75-6	10			0	0	0	0	3.5	1E+100	1E+100	1E+100	1E+100	210	N/A
Ethylbenzene	100-41-4	10			0	0	0	0	700	1E+100	1E+100	1E+100	1E+100	2100	N/A
Methyl Bromide	74-83-9	50			0	0	0	0	49	1E+100	1E+100	1E+100	1E+100	1500	N/A
Methylene Chloride	75-09-2	20			0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	5900	N/A
1,1,2,2-Tetrachloroethane	79-34-5	10			0	0	0	0	1.8	1E+100	1E+100	1E+100	1E+100	40	N/A
Tetrachloroethylene	127-18-4	10		0	0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	33	N/A
Tolune	108-88-3	10			0	0	0	0	1000	1E+100	1E+100	1E+100	1E+100	15000	N/A
1,2-trans-Dichloroethylene	156-60-5	10			0	0	0	0	100	1E+100	1E+100	1E+100	1E+100	10000	N/A
1,1,1-Trichloroethane	71-55-6				0	0	0	0	200	1E+100	1E+100	1E+100	1E+100	1E+100	N/A
1,1,2-Trichloroethane	79-00-5	10			0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	160	N/A
Trichloroethylene	79-01-6	10			0	0	0	0	5	1E+100	1E+100	1E+100	1E+100	300	N/A
Vinyl Chloride	75-01-4	10			0	0	0	0	2	1E+100	1E+100	1E+100	1E+100	24	N/A
ACID COMPOUNDS															
2-Chlorophenol	95-57-8	10			0	0	0	0	175	1E+100	1E+100	1E+100	1E+100	150	N/A
2,4-Dichlorophenol	120-83-2	10			0	0	0	0	105	1E+100	1E+100	1E+100	1E+100	290	N/A
2,4-Dimethylphenol	105-67-9	10			0	0	0	0	700	1E+100	1E+100	1E+100	1E+100	850	N/A
4,6-Dinitro-o-Cresol	534-52-1	50			0	0	0	0	14	1E+100	1E+100	1E+100	1E+100	280	N/A

POLLUTANTS	CAS No	MDL	Ambient Conc Ca (ug/l)	Effluent Conc Ce (ug/l)	Instream Waste Concentration: Acute Aquatic 2.13*Ce	Domestic Supply Cd,dom (ug/l)	Chronic Aquatic Cd (ug/l)	Human Health Cd,hh (ug/l)	Domestic Criteria ug/l	Irrigation Criteria ug/l	Livestock & Wildlife Criteria ug/l	Acute Aquatic Criteria ug/l	Chronic Aquatic Criteria ug/l	Human Health Criteria ug/l	Need TMDL
2,4-Dinitrophenol	51-28-5	50			0	0	0	0	70	1E+100	1E+100	1E+100	1E+100	5300	N/A
Pentachlorophenol	87-86-5	50			0	0	0	0	1	1E+100	1E+100	19	15	30	N/A
Phenol	108-95-2	10			0	0	0	0	10500	1E+100	1E+100	1E+100	1E+100	860000	N/A
2,4,6-Trichlorophenol	88-06-2	10			0	0	0	0	32	1E+100	1E+100	1E+100	1E+100	24	N/A
BASE/NEUTRAL															
Acenaphthene	83-32-9	10			0	0	0	0	2100	1E+100	1E+100	1E+100	1E+100	990	N/A
Anthracene	120-12-7	10			0	0	0	0	10500	1E+100	1E+100	1E+100	1E+100	40000	N/A
Benzidine	92-87-5	50			0	0	0	0	0.0015	1E+100	1E+100	1E+100	1E+100	0.002	N/A
Benzo(a)anthracene	56-55-3	5			0	0	0	0	0.048	1E+100	1E+100	1E+100	1E+100	0.18	N/A
Benzo(a)pyrene	50-32-8	5			0	0	0	0	0.2	1E+100	1E+100	1E+100	1E+100	0.18	N/A
3,4-Benzofluoranthene	205-99-2	10			0	0	0	0	0.048	1E+100	1E+100	1E+100	1E+100	0.18	N/A
Benzo(k)fluoranthene	207-08-9	5			0	0	0	0	0.048	1E+100	1E+100	1E+100	1E+100	0.18	N/A
Bis(2-chloroethyl)Ether	111-44-4	10			0	0	0	0	0.3	1E+100	1E+100	1E+100	1E+100	5.3	N/A
Bis(2-chloroisopropyl)Ether	108-60-1	10			0	0	0	0	1400	1E+100	1E+100	1E+100	1E+100	65000	N/A
Bis(2-ethylhexyl)Phthalate	117-81-7	10			#VALUE!	#VALUE!	#VALUE!	#VALUE!	6	1E+100	1E+100	1E+100	1E+100	22	N/A
Butyl Benzyl Phthalate	85-68-7	10			0	0	0	0	7000	1E+100	1E+100	1E+100	1E+100	1900	N/A
2-Chloronaphalene	91-58-7	10			#VALUE!	#VALUE!	#VALUE!	#VALUE!	2800	1E+100	1E+100	1E+100	1E+100	1600	N/A
Chrysene	218-01-9	5			0	0	0	0	0.048	1E+100	1E+100	1E+100	1E+100	0.18	N/A
Dibenzo(a,h)anthracene	53-70-3	5			0	0	0	0	0.048	1E+100	1E+100	1E+100	1E+100	0.18	N/A
1,2-Dichlorobenzene	95-50-1	10			0	0	0	0	600	1E+100	1E+100	1E+100	1E+100	1300	N/A
1,3-Dichlorobenzene	541-73-1	10			0	0	0	0	469	1E+100	1E+100	1E+100	1E+100	960	N/A
1,4-Dichlorobenzene	106-46-7	10		1	2.13	2.13	2.13	2.13	75	1E+100	1E+100	1E+100	1E+100	190	N/A
3,3-Dichlorobenzidine	91-94-1	5			0	0	0	0	0.78	1E+100	1E+100	1E+100	1E+100	0.28	N/A
Diethyl Phthalate	84-66-2	10			0	0	0	0	28000	1E+100	1E+100	1E+100	1E+100	44000	N/A
Dimethyl Phthalate	131-11-3	10			0	0	0	0	350000	1E+100	1E+100	1E+100	1E+100	1100000	N/A
Di-n-Butyl Phthalate	84-74-2	10			0	0	0	0	3500	1E+100	1E+100	1E+100	1E+100	4500	N/A
2,4-Dinitrotoluene	121-14-2	10			0	0	0	0	1.1	1E+100	1E+100	1E+100	1E+100	34	N/A
1,2-Diphenylhydrazine	122-66-7	20			0	0	0	0	0.44	1E+100	1E+100	1E+100	1E+100	2	N/A
Fluoranthene	206-44-0	10			0	0	0	0	1400	1E+100	1E+100	1E+100	1E+100	140	N/A
Fluorene	86-73-7	10			0	0	0	0	1400	1E+100	1E+100	1E+100	1E+100	5300	N/A
Hexachlorobenzene	118-74-1	5			0	0	0	0	1	1E+100	1E+100	1E+100	1E+100	0.0029	N/A
Hexachlorobutadiene	87-68-3	10			0	0	0	0	4.5	1E+100	1E+100	1E+100	1E+100	180	N/A
Hexachlorocyclopentadiene	77-47-4	10			0	0	0	0	50	1E+100	1E+100	1E+100	1E+100	1100	N/A
Hexachloroethane	67-72-1	20			0	0	0	0	25	1E+100	1E+100	1E+100	1E+100	33	N/A
Indeno(1,2,3-cd)Pyrene	193-39-5	5			0	0	0	0	0.048	1E+100	1E+100	1E+100	1E+100	0.18	N/A
Isophorone	78-59-1	10			0	0	0	0	368	1E+100	1E+100	1E+100	1E+100	9600	N/A
Nitrobenzene	98-95-3	10			0	0	0	0	18	1E+100	1E+100	1E+100	1E+100	690	N/A
n-Nitrosodimethylamine	62-75-9	50			0	0	0	0	0.0069	1E+100	1E+100	1E+100	1E+100	30	N/A
n-Nitrosodi-n-Propylamine	621-64-7	20			0	0	0	0	0.05	1E+100	1E+100	1E+100	1E+100	5.1	N/A
n-Nitrosodiphenylamine	86-30-6	20			0	0	0	0	71	1E+100	1E+100	1E+100	1E+100	60	N/A
Nonylphenol	84852-15-3				0	0	0	0	1E+100	1E+100	1E+100	28	6.6	1E+100	N/A
Pyrene	129-00-0	10			0	0	0	0	1050	1E+100	1E+100	1E+100	1E+100	4000	N/A
1,2,4-Trichlorobenzene	120-82-1	10			0	0	0	0	70	1E+100	1E+100	1E+100	1E+100	70	N/A

POLLUTANTS	CAS No	MDL	Instream/Waste Concentration: Ambient Conc Ca (ug/l)	Effluent Conc Ce (ug/l)	Acute Aquatic 2.13*Ce	Domestic Supply Cd,dom (ug/l)	Chronic Aquatic Cd (ug/l)	Human Health Cd,hh (ug/l)	Domestic Criteria ug/l	Irrigation Criteria ug/l	Livestock & Wildlife Criteria ug/l	Acute Aquatic Criteria ug/l	Chronic Aquatic Criteria ug/l	Human Health Criteria ug/l	Need TMDL
PESTICIDES AND PCBS															
Aldrin	309-00-2	0.01		0	0	0	0	0	0.021	1E+100	1E+100	3	1E+100	0.0005	N/A
Alpha-BHC	319-84-6	0.05			0	0	0	0	0.056	1E+100	1E+100	1E+100	1E+100	0.049	N/A
Beta-BHC	319-85-7	0.05			0	0	0	0	0.091	1E+100	1E+100	1E+100	1E+100	0.17	N/A
Gamma-BHC	58-89-9	0.05			0	0	0	0	0.2	1E+100	1E+100	0.95	1E+100	1.8	N/A
Chlordane	57-74-9	0.2		0	0	0	0	0	2	1E+100	1E+100	2.4	0.0043	0.0081	N/A
4,4'-DDT and derivatives	50-29-3	0.02		0	0	0	0	0	1	1E+100	0.001	1.1	0.001	0.0022	N/A
Dieldrin	60-57-1	0.02		0	0	0	0	0	0.022	1E+100	1E+100	0.24	0.056	0.00054	N/A
Diazinon	333-41-5				0	0	0	0	1E+100	1E+100	1E+100	0.17	0.17	1E+100	N/A
Alpha-Endosulfan	959-98-8	0.01			0	0	0	0	62	1E+100	1E+100	0.22	0.056	89	N/A
Beta-Endosulfan	33213-65-9	0.02			0	0	0	0	62	1E+100	1E+100	0.22	0.056	89	N/A
Endosulfan sulfate	1031-7-8	0.1			0	0	0	0	62	1E+100	1E+100	1E+100	1E+100	89	N/A
Endrin	72-20-8	0.02			0	0	0	0	2	1E+100	1E+100	0.086	0.036	0.06	N/A
Endrin Aldehyde	7421-93-4	0.1			0	0	0	0	10.5	1E+100	1E+100	1E+100	1E+100	0.3	N/A
Heptachlor	76-44-8	0.01		0.04	0.0852	0.0852	0.0852	0.0852	0.4	1E+100	1E+100	0.52	0.0038	0.00079	N/A
Heptachlor Epoxide	1024-57-3	0.01		0	0	0	0	0	0.2	1E+100	1E+100	0.52	0.0038	0.00039	N/A
PCBs	1336-36-3	0.2		0	0	0	0	0	0.5	1E+100	0.014	2	0.014	0.00064	N/A
Toxaphene	8001-35-2	0.3		0	0	0	0	0	3	1E+100	1E+100	0.73	0.0002	0.0028	N/A

STEP 3: SCAN POTENTIAL INSTREAM/WASTE CONCENTRATIONS AGAINST WATER QUALITY CRITERIA AND ESTABLISH EFFLUENT LIMITATIONS FOR ALL APPLICABLE PARAMETERS

No limits are established if the receiving stream is not designated for the particular uses

No limits are established if the potential instream waste concentrations are less than the chronic water quality criteria

The most applicable stringent criteria are used to establish effluent limitations for a given parameter

Water quality criteria apply at the end-of-pipe for acute aquatic life criteria and discharges to public lakes

If background concentration exceeds the water quality criteria, water quality criteria apply And "Need TMDL" shown in the next column of Avg Mass

Monthly avg concentration = daily max / 1.5

APPLICABLE WATER QUALITY-BASED LIMITS

The following formular is used to calculate the allowable daily maximum effluent concentration — See the current "Procedures for Implementing NPDES Permits in New Mexico"

Daily Max Conc = Cs + (Cs - Ca)(F*Qa/Qe) — Monthly Avg Conc = Daily Max Conc / 1.5

Where Cs = Applicable water quality standard

Ca = Ambient stream concentration

F = Fraction of stream allowed for mixing (1.0 is assigned to domestic water supply and human health uses)

Qe = Plant effluent flow

Qa = Criteria Low flow (4Q3) or Harmonic Mean flow for Human Health Criteria

POLLUTANTS	CAS No.	STORET	Domestic Limits	Irrigation Limits	Livestock or Wildlife Limits	Acute Aquatic Limits	Chronic Aquatic Limits	Human Health Limits	Daily Max Conc ug/l	Monthly Avg Conc ug/l	Daily Max Total ug/l	Mon. Avg Total ug/l	Daily Max Load lb/day	Monthly Avg Load lb/day
Radioactivity, Nutrients, and Chlorine, as Total														
Aluminum, Total	7429-90-5	01105	NA	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Barium, Total	7440-39-3	01007	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Boron, Total	7440-42-8	01022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Total	7440-48-4	01037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Uranium, Total	7440-61-1	22706	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Vanadium, Total	7440-62-2	01087	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ra-226 and Ra-228 (pCi/l)		11503	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Strontium (pCi/l)		13501	NA	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Tritium (pCi/l)		04124	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gross Alpha (pCi/l)		80029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Asbestos (fibers/l)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Residual Chlorine	7782-50-5	50060	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N (mg/l)		00620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite + Nitrate (mg/l)		00630	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
METALS AND CYANIDE, as Total														
Antimony, Total (P)	7440-36-0	01097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Total (P)	7440-38-2	1002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Total	7440-41-7	01012	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Cadmium, Total	7440-43-9	01027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (III), dissolved	16065-83-1	01033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (VI), dissolved	18540-29-9	01034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Total	7440-47-3	01034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Total	7440-50-8	01042	NA	NA	#VALUE!	2.94985776	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Lead, Total	7439-92-1	01051	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Manganese, dissolved	7439-96-5	01056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Total	7439-97-6	71900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Total	7439-97-6	71900	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Molybdenum, dissolved	7439-98-7	1060	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Molybdenum, total recoverable	7439-98-7	01062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Total (P)	7440-02-0	01067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Total (P)	7782-49-2	01147	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Total (SO4 >500 mg/l)		01147	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Total recoverable	7782-49-2	01147	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver, Total	7440-22-4	01077	NA	NA	NA	0.2019249	NA	NA	0.201924903	0.201924903	0.684525421	0.6845254	0.0065767	0.006576701
Thallium, Total (P)	7440-28-0	01059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Total	7440-66-6	1092	NA	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Cyanide, total recoverable	57-12-5	00720	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DIOXIN														0
2,3,7,8-TCDD	1764-01-6	34675	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOLATILE COMPOUNDS														
Acrolein	107-02-8	34210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	107-13-0	34215	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	71-43-2	34030	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	75-25-2	32104	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	56-23-5	32102	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

POLLUTANTS	CAS No	STORET	Domestic Limits	Irrigation Limits	Livestock or Wildlife Limits	Acute Aquatic Limits	Chronic Aquatic Limits	Human Health Limits	Daily Max Conc ug/l	Monthly Avg Conc ug/l	Daily Max Total ug/l	Mon. Avg Total ug/l	Daily Max Load lb/day	Monthly Avg Load lb/day
Chlorobenzene	108-90-7	34301	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Clorodibromomethane	124-48-1	32105	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	67-66-3	32106	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dichlorobromomethane	75-27-4	32101	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethane	107-06-2	34531	N/A	N/A	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE
1,1-Dichloroethylene	75-35-4	34501	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloropropane	78-87-5	34541	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,3-Dichloropropylene	542-75-6	34561	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethylbenzene	100-41-4	34371	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methyl Bromide	74-83-9	34413	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylene Chloride	75-09-2	34423	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	79-34-5	34516	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethylene	127-18-4	34475	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	108-88-3	34010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-trans-Dichloroethylene	156-60-5	34546	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1,1-Trichloroethane	71-55-6		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2-Trichloroethane	79-00-5	34511	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Trichloroethylene	79-01-6	39180	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vinyl Chloride	75-01-4	39175	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ACID COMPOUNDS														
2-Chlorophenol	95-57-8	34586	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	120-83-2	34601	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dimethylphenol	105-67-9	34606	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,6-Dinitro-o-Cresol	534-52-1	34657	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrophenol	51-28-5	34616	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pentachlorophenol	87-86-5	39032	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phenol	108-95-2	34694	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4,6-Trichlorophenol	88-06-2	34621	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BASE/NEUTRAL														
Acenaphthene	83-32-9	34205	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Anthracene	120-12-7	34220	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzidine	92-87-5	39120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)anthracene	56-55-3	34526	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene	50-32-8	34247	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3,4-Benzofluoranthene	205-99-2	34230	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzo(k)fluoranthene	207-08-9	34242	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bis(2-chloroethyl)Ether	111-44-4	34273	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bis(2-chloroisopropyl)Ether	108-60-1	34283	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bis(2-ethylhexyl)Phthalate	117-81-7	39100	N/A	N/A	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE
Butyl Benzyl Phthalate	85-68-7	34292	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2-Chloronapthalene	91-58-7	34581	N/A	N/A	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE	#VALUE
Chrysene	218-01-9	34320	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenzo(a,h)anthracene	53-70-3	34556	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichlorobenzene	95-50-1	34536	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

POLLUTANTS	CAS No	STORET	Domestic Limits	Irrigation Limits	Livestock or Wildlife Limits	Acute Aquatic Limits	Chronic Aquatic Limits	Human Health Limits	Daily Max Conc ug/l	Monthly Avg Conc ug/l	Daily Max Total ug/l	Mon. Avg Total ug/l	Daily Max Load lb/day	Daily Avg Load lb/day
1,3-Dichlorobenzene	541-73-1	34566	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,4-Dichlorobenzene	106-46-7	34571	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3,3-Dichlorobenzidine	91-94-1	34631	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Diethyl Phthalate	84-66-2	34336	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dimethyl Phthalate	131-11-3	34341	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Di-n-Butyl Phthalate	84-74-2	39110	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dinitrotoluene	121-14-2	34611	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Diphenylhydrazine	122-66-7	34346	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fluoranthene	206-44-0	34376	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fluorene	86-73-7	34381	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobenzene	118-74-1	39700	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorobutadiene	87-68-3	34391	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachlorocyclopentadiene	77-47-4	34386	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Hexachloroethane	67-72-1	34396	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indeno(1,2,3-cd)Pyrene	193-39-5	34403	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Isophorone	78-59-1	34408	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nitrobenzene	98-95-3	34447	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitrosodimethylamine	62-75-9	34438	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitrosodi-n-Propylamine	621-64-7	34428	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
n-Nitrosodiphenylamine	86-30-6	34433	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nonylphenol	84852-15-3		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pyrene	129-00-0	34469	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2,4-Trichlorobenzene	120-82-1	34551	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PESTICIDES AND PCBS														
Aldrin	309-00-2	39330	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alpha-BHC	319-84-6	39337	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beta-BHC	319-85-7	39338	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gamma-BHC	58-89-9	39340	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chlordane	57-74-9	39350	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4,4'-DDT and derivatives	50-29-3	39300	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dieldrin	60-57-1	39380	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Diazinon	333-41-5	39570	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alpha-Endosulfan	959-98-8	34361	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Beta-Endosulfan	33213-65-9	34356	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Endosulfan sulfate	1031-7-8	34351	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Endrin	72-20-8	39390	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Endrin Aldehyde	7421-93-4	34366	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Heptachlor	76-44-8	39410	N/A	N/A	N/A	N/A	0.0038	0.00079	0.00079	0.00079	0.00079	0.00079	7.5901E-06	7.59007E-06
Heptachlor Epoxide	1024-57-3	39420	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCBs	1336-36-3	39516	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toxaphene	8001-35-2	39400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX 2

MEMORANDUM FOR ENDANGERED SPECIES ACT REQUIREMENTS

DEPARTMENT OF THE AIR FORCE
377TH MISSION SUPPORT GROUP (AFGSC)

17 December 2018

MEMORANDUM FOR ENDANGERED SPECIES ACT REQUIREMENTS

FROM: 377 MSG/CEIE
2050 Wyoming Blvd SE
Kirtland AFB NM 87117

SUBJECT: Endangered Species Act (ESA) Selected Criteria – BFF Outfall Structure (Application NM0031216 – Kirtland Air Force base)

1. The Kirtland AFB Natural Resources Program Manager (NRPM) has determined the *BFF Outfall Structure Project* will not affect ESA listed species and/or designated critical habitat.

The USFWS and NMDGF maintain lists of plant and animal species that have been classified as federally threatened or endangered or state listed by the NMDGF. Of those species known to occur in the county, no federal threatened or endangered species and two state threatened species occur on Kirtland AFB.

The five federally listed species that could occur on the installation, New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), Mexican spotted owl (*Strix occidentalis lucida*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), and Rio Grande silvery minnow (*Hybognathus amarus*) do not have suitable habitat and have not been identified on the installation). New Mexico meadow jumping mouse prefers large wet meadows within floodplains. Previous surveys conducted at Kirtland AFB did not detect the mouse or find desirable habitat for the species. Mexican spotted owl, southwestern willow flycatcher, and yellow-billed cuckoo prefer riparian and forested habitat not found on Kirtland AFB. Rio Grande silvery minnow is a riverine fish that prefers low-gradient creeks and small to large rivers with slow to moderate flow. It is only found in one reach of

Critical Habitat: Neither the NMDGF nor the USFWS has designated or identified any critical habitat on Kirtland AFB.

2. A biological survey will be conducted prior to construction. The pre-construction survey will be performed in order to ensure no Federally-listed threatened or endangered (T&E) species or their designated critical habitat(s) are active in or near the site's "action area".

3. If during construction any T&E species are inadvertently discovered, all activities shall halt and the NRPM must be notified immediately, in accordance with the Integrated Natural Resource Management Plan and the ESA. If you have any questions, please contact NRPM at 846-0226 or david.reynolds.37 @us.af.mil.

REYNOLDS.DAVID.HILL.1408909402 Digitally signed by REYNOLDS.DAVID.HILL.1408909402 Date: 2019.01.10 14:56:46 -07'00'

David H. Reynolds
Natural Resources Program Manager

Attachment:
USFWS Species List

REGION 6
1201 Elm Street, Suite 500
DALLAS, TEXAS 75270

NPDES Permit No NM0031216

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

United States Air Force
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

is authorized to discharge from the facility, Kirtland Air Force Base 377 ABW located at 2000 Wyoming Blvd SE, Bernalillo County, NM. The discharge will be to receiving waters named Tijeras Arroyo in Segment No. 20.6.4.98 of the Rio Grande Basin,

the discharges are located on that water at the following coordinates:

Outfall 001: Latitude 35° 1' 28.86" North, Longitude 106° 32' 55.32 West,

in accordance with this cover page and the effluent limitations, monitoring requirements, and other conditions set forth in Part I, Part II, and Part III hereof.

This a first-time permit, prepared by Quang Nguyen, Environmental Engineer, Permitting Section (6WQ-PP), shall become effective on November 1, 2019

This permit and the authorization to discharge shall expire at midnight, October 31, 2024

Issued on September 30, 2019

Charles W. Maguire
Director
Water Division (6WQ)

PART I – REQUIREMENTS FOR NPDES PERMITS

SECTION A. LIMITATIONS AND MONITORING REQUIREMENTS

1. FINAL Effluent Limits – 800 GPM Design Flow

During the period beginning the initial discharge of new facility with design flow at 800 gpm and lasting through the expiration date of the permit (unless otherwise noted), the permittee is authorized to discharge treated water to Tijeras Arroyo, in Segment Number 20.6.4.098, from Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below:

POLLUTANT	MINIMUM	MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH	6.6 s.u.	9.0 s.u.	Daily (*1)	Grab

POLLUTANT (*7)	30-DAY AVG	DAILY MAX	30-DAY AVG	DAILY MAX	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow to Tijeras Arroyo	Report (MGD)	Report (MGD)	***	***	Daily (*1)	Estimate (*2)
Flow to On-base Golf Course	Report (MGD)	Report (MGD)	***	***	Daily	Estimate (*2)
Flow to Regional Aquifer	Report (MGD)	Report (MGD)	***	***	Daily	Estimate (*2)
Temperature	***	***	Report (° C)	Report (° C)	Daily (*1)	Grab
Ethylene dibromide (EDB) CAS Number 106-93-4	Report (lbs/day)	Report (lbs/day)	Report (ug/L)	Report (ug/L)	3/Week (*1)	Grab
Total Residual Chlorine	***	***	***	11 ug/L	1/Week (*1)	Grab (*6)
Total Suspended Solids (TSS)	***	***	21 mg/L	33 mg/L	3/Week (*1)	Grab
Chemical Oxygen Demand	***	***	Report (mg/L)	Report (mg/L)	1/Week (*1)	Grab
BOD	***	***	26 (mg/L)	48 (mg/L)	3/Week (*1)	Grab
Oil and grease	***	***	8 (mg/L)	15 (mg/L)	3/Week (*1)	Grab
Nitrogen (NO3-NO2)	***	***	Report (mg/L)	Report (mg/L)	1/Week (*1)	Grab
Ammonia (as N)	***	***	Report (mg/L)	Report (mg/L)	1/Week (*1)	Grab
Heptachlor	***	***	Report (ug/L)	Report (ug/L)	3/Week (*1)	Grab
per- and polyfluoroalkyl substances (PFAS)	***	***	Report (ug/L)	Report (ug/L)	3/Week (*1)	Grab

WHOLE EFFLUENT TOXICITY TESTING (48-HOUR ACUTE NOEC FRESHWATER) (*3)	30-DAY AVG MINIMUM	48-HR MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Daphnia Pulex	Report	Report	Once/Year (*1)(*4)(*5)	Grab

Footnotes

*1 When discharging occurs.

*2 "Estimate" flow measurements shall not be subject to the accuracy provisions established at Part III.C.6. Flow may be estimated using sound analytical techniques.

*3 Monitoring and reporting requirements begin on the effective date of this permit. See Part II, Whole Effluent Toxicity Testing Requirements for additional WET monitoring and reporting conditions.

*4 This permit does not establish requirements to automatically increase the WET testing frequency after a test failure, or to begin a toxicity reduction evaluation (TRE) in the event of multiple test failures. However, upon failure of any WET test, the permittee must report the test results to EPA and NMED, Surface Water Quality Bureau, in writing, within 5 business days of notification of the test failure. EPA and NMED will review the test results and determine the appropriate action necessary, if any. See Part II of the permit for WET testing requirements.

*5 The discharge shall be tested between November 1 and April 30 after the permit effective date.

*6 The effluent limitation for TRC is the instantaneous maximum grab sample taken during periods of chlorine use and cannot be averaged for reporting purposes. Instantaneous maximum is defined in 40 CFR Part 136 as being measured within 15 minutes of sampling.

*7 See Appendix A of Part II of the permit for minimum quantification limits.

FLOATING SOLIDS, VISIBLE FOAM, GREASE AND/OR OILS

There shall be no discharge of oils, scum, grease and other floating materials that would cause the formation of a visible sheen or visible deposits on the bottom or shoreline, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit prior to the receiving stream.

B. SCHEDULE OF COMPLIANCE

None

C. MONITORING AND REPORTING

1. Discharge Monitoring Report (DMR) results shall be electronically reported to EPA per 40 CFR 127.16. To submit electronically, access the NetDMR website at https://netdmr.epa.gov. Until approved for Net DMR, the permittee shall request temporary or emergency waivers from electronic reporting. To obtain a waiver, please contact: U.S. EPA-Region 6, Water Enforcement Branch, New Mexico State Coordinator (6EN-WC), (214) 665-7179. If paper reporting is granted temporarily, the permittee shall submit the original DMR signed and certified as required by Part III.D.11 and all other reports required by Part III.D. to the EPA and copies to NMED, as required (See Part III.D.IV of the permit). Reports shall be submitted monthly

2. Reporting periods shall end on the last day of the months.

3. The first Discharge Monitoring Report(s) shall represent facility operations from the effective date of the permit through the last day of the current reporting period.

4. Thereafter, the permittee is required to submit regular monthly reports as described above postmarked no later than the 15th day of the month following each reporting period.

5. NO DISCHARGE REPORTING - If there is no discharge from any outfall during the sampling month, place an "X" in the NO DISCHARGE box located in the upper right corner of the Discharge Monitoring Report.

6. If any daily maximum or monthly average value exceeds the effluent limitations specified in Part I. A, the permittee shall report the excursion in accordance with the requirements of Part III. D.

7. Any daily maximum or monthly average value reported in the required Discharge Monitoring Report which is in excess of the effluent limitation specified in Part I. A shall constitute evidence of violation of such effluent limitation and of this permit.

PART II - OTHER CONDITIONS

A. OPERATION AND MAINTENANCE

Permittee shall develop and implement Best Management Practice plans which incorporate all reasonable steps to minimize infrastructure failures at the Injection well KAFB-7 and GCMP. Through implementation of the managment plans, the Permittee must prevent and/or minimize the number of discharge events to Tijeras Arroyo.

Conduct monthly inspection with periodic cleaning and repair, as needed, on the conveyance effluent line running between the GWTS and GCMP and Injection well KAFB-7 to prevent biofoulings, irons and calcareous materials build-up.

Proper operation and maintenance to ensure steady operation and to extend the life of equipment shall include but are not limited to: Transducers, flowmeters, control valves, alarm systems, pump, stadia rod, etc.

If system shut down at the one of the disposal sites is needed for routine, non-routine maintenance, or any other nonemergency reason, the permittee will maximize the usage of the other sites for disposing treated effluent prior to discharging treated effluent to Tijeras Arroyo. Volume discharge to disposal sites and Tijeras Arroyo shall be logged and recorded.

The permittee shall have the burden of proof that the discharge of treated effluent to Tijeras Arroyo is necessary. This includes logs that document and record all routine, non-routine maintenance activities and all volumes discharged to disposal sites (i.e., GCMP and Injection well KAFB-7) and Tijeras Arroyo.

The Permittee shall, as soon as possible, but no later than thirty (30) days prior to discharging to Tijeras Arroyo, provide written notice to EPA and NMED of any planned physical shut down at both the Injection well KAFB-7 and GCMP discharge locations which is believed to last more than 1 week. Such notice shall include: (i) Description of the need for the discharge; (ii) the period of discharge, including anticipated dates and times; (iii) an estimate of discharge volume.

The Permittee shall, within 24 hours from the time of the discharge to Tijeras Arroyo due to infrastructure failures at both the Injection well KAFB-7 and GCMP discharge locations, notify EPA and NMED followed by a written report in five days.

The Permittee, if discharging to Tijeras Arroyo, shall limit the discharge rate so it will not cause erosion of Tijeras Arroyo or structural damage to culverts and their entrances or exits.

B. MINIMUM QUANTIFICATION LEVEL (MQL) & SUFFICIENTLY SENSITIVE METHODS

EPA-approved test procedures (methods) for the analysis and quantification of pollutants or pollutant parameters, including for the purposes of compliance monitoring/DMR reporting, permit renewal applications, or any other reporting that may be required as a condition of this

permit, shall be sufficiently sensitive. A method is "sufficiently sensitive" when (1) the method minimum level (ML) of quantification is at or below the level of the applicable effluent limit for the measured pollutant or pollutant parameter; or (2) if there is no EPA-approved analytical method with a published ML at or below the effluent limit (see table below), then the method has the lowest published ML (is the most sensitive) of the analytical methods approved under 40 CFR Part 136 or required under 40 CFR Chapter I, Subchapters N or O, for the measured pollutant or pollutant parameter; or (3) the method is specified in this permit or has been otherwise approved in writing by the permitting authority (EPA Region 6) for the measured pollutant or pollutant parameter. The Permittee has the option of developing and submitting a report to justify the use of matrix or sample-specific MLs rather than the published levels. Upon written approval by EPA Region 6 the matrix or sample-specific MLs may be utilized by the Permittee for all future Discharge Monitoring Report (DMR) reporting requirements.

Current EPA Region 6 minimum quantification levels (MQLs) for reporting and compliance are provided in Appendix A of Part II of this permit. The following pollutants may not have EPA-approved methods with a published ML at or below the effluent limit, if specified:

POLLUTANT	CAS Number	STORET Code
Total Residual Chlorine	7782-50-5	50060
Cadmium	7440-43-9	01027
Silver	7440-22-4	01077
Thallium	7440-28-0	01059
Cyanide	57-12-5	78248
Dioxin (2,3,7,8-TCDD)	1764-01-6	34675
4,6-Dinitro-O-Cresol	534-52-1	34657
Pentachlorophenol	87-86-5	39032
Benzidine	92-87-5	39120
Chrysene	218-01-9	34320
Hexachlorobenzene	118-74-1	39700
N-Nitrosodimethylamine	62-75-9	34438
Aldrin	309-00-2	39330
Chlordane	57-74-9	39350
Dieldrin	60-57-1	39380
Heptachlor	76-44-8	39410
Heptachlor epoxide	1024-57-3	39420
Toxaphene	8001-35-2	39400

Unless otherwise indicated in this permit, if the EPA Region 6 MQL for a pollutant or pollutant parameter is sufficiently sensitive (as defined above) and the analytical test result is less than the MQL, then a value of zero (0) may be used for reporting purposes on DMRs. Furthermore, if the EPA Region 6 MQL for a pollutant or parameter is not sufficiently sensitive, but the analytical test result is less than the published ML from a sufficiently sensitive method, then a value of zero (0) may be used for reporting purposes on DMRs.

C. 24-HOUR ORAL REPORTING: DAILY MAXIMUM LIMITATION VIOLATIONS

Under the provisions of Part III.D.7.b.(3) of this permit, violations of daily maximum limitations for the following pollutants shall be reported orally to EPA Region 6, Compliance and Assurance Division, Water Enforcement Branch (6EN-W), Dallas, Texas, and NMED within 24 hours from the time the permittee becomes aware of the violation followed by a written report in five days.

None

D. PERMIT MODIFICATION AND REOPENER

In accordance with 40 CFR Part 122.44(d), the permit may be reopened and modified during the life of the permit if relevant portions of New Mexico's Water Quality Standards for Interstate and Intrastate Streams are revised, or new water quality standards are established and/or remanded.

The permittee is required to notify EPA and NMED as soon as it knows or plans to change to continuous from its current non-continuous discharge mode. In accordance with 40 CFR Part 122.62(a)(1), the permit may be reopened and modified if there are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit.

In accordance with 40 CFR Part 122.62(a)(2), the permit may be reopened and modified if new information is received that was not available at the time of permit issuance that would have justified the application of different permit conditions at the time of permit issuance. Permit modifications shall reflect the results of any of these actions and shall follow regulations listed at 40 CFR Part 124.5.

E. WHOLE EFFLUENT TOXICITY TESTING (48-HOUR ACUTE NOEC FRESHWATER)

It is unlawful and a violation of this permit for a permittee or his designated agent, to manipulate test samples in any manner, to delay sample shipment, or to terminate or to cause to terminate a toxicity test. Once initiated, all toxicity tests must be completed unless specific authority has been granted by EPA Region 6 or the State NPDES permitting authority.

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL(S):	001
REPORTED ON DMR AS FINAL OUTFALL:	001
CRITICAL DILUTION (%):	100%
EFFLUENT DILUTION SERIES (%):	32%, 42%, 56%, 75%, 100%
COMPOSITE SAMPLE TYPE:	Defined at PART I
TEST SPECIES/METHODS:	40 CFR Part 136

Daphnia pulex acute static renewal 48-hour definitive toxicity test using EPA 821 R 02 012 or the latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. The NOEC (No Observed Lethal Effect Concentration) is defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Acute test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution.

c. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

d. Test failure is defined as a demonstration of statistically significant lethal effects to a test species at or below the effluent critical dilution.

e. This permit does not establish requirements to automatically increase the WET testing frequency after a test failure, or to begin a toxicity reduction

evaluation (TRE) in the event of multiple test failures. However, upon failure of any WET test, the permittee must report the test results to EPA and NMED, Surface Water Quality Bureau, in writing, within 5 business days of notification the test failure. EPA and NMED will review the test results and determine the appropriate action necessary, if any.

2. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

- Each toxicity test control (0% effluent) must have a survival equal to or greater than 90%.
- The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent).
- The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal effects are exhibited.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

The statistical analyses used to determine if there is a statistically significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA 821 R 02 012 or the most recent update thereof.

If the conditions of Test Acceptability are met in Item 2.a above and the percent survival of the test organism is equal to or greater than 90% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report a NOEC of not less than the critical dilution for the reporting requirements found in Item 3 below.

c. Dilution Water

- Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water for;

- toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and
- toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.

- If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 2.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

  - a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;

  - the test indicating receiving water toxicity has been carried out to completion (i.e., 48 hours);

- the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 3 below; and

- the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

- The permittee shall collect two **grab** samples from the outfall(s) listed at Item 1.a above.

- The permittee shall collect a second **grab** sample for use during the 24-hour renewal of each dilution concentration for the tests. The permittee must collect the **grab** samples so that the maximum holding time for any effluent sample shall not exceed 36 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first **grab** sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.

- The permittee must collect the **grab** samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

- If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent **grab**

sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days. The effluent **grab** sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 3 of this section.

1. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this Part in accordance with the Report Preparation Section of EPA 821 R 02 012, for every valid or invalid toxicity test initiated, whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.3 of this permit. The permittee shall submit full reports upon the specific request of the Agency. For any test which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for agency review.

b. A valid test for each species must be reported during each reporting period specified in PART I of this permit unless the permittee is performing a TRE which may increase the frequency of testing and reporting. Only ONE set of biomonitoring data for each species is to be recorded for each reporting period. The data submitted should reflect the LOWEST Survival results for each species during the reporting period. All invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached for EPA review.

c. The permittee shall report the following results of each valid toxicity test. Submit retest information, if required, clearly marked as such. Only results of valid tests are to be reported.

Daphnia pulex

- If the NOEC for survival is less than the critical dilution, enter a "1"; otherwise, enter a "0" for Parameter No. TEM3D.
- Report the NOEC value for survival, Parameter No. TOM3D.
- Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQM3D.

d. If retests are required by EPA, enter the following codes:

- For retest number 1, Parameter 22415, enter a "1" if the NOEC for survival is less than the critical dilution; otherwise, enter a "0."
- For retest number 2, Parameter 22416, enter a "1" if the NOEC for survival is less than the critical dilution; otherwise, enter a "0."

APPENDIX A of PART II

The following Minimum Quantification Levels (MQL's) are to be used for reporting pollutant data for NPDES permit applications and/or compliance reporting.

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
METALS, RADIOACTIVITY, CYANIDE and CHLORINE			
Aluminum	2.5	Molybdenum	10
Antimony	60	Nickel	0.5
Arsenic	0.5	Selenium	5
Barium	100	Silver	0.5
Beryllium	0.5	Thalllium	0.5
Boron	100	Uranium	0.1
Cadmium	1	Vanadium	50
Chromium	10	Zinc	20
Cobalt	50	Cyanide	10
Copper	0.5	Cyanide, weak acid dissociable	10
Lead	0.5	Total Residual Chlorine	33
Mercury *1	0.0005		
	0.005		
DIOXIN			
2,3,7,8-TCDD	0.00001		
VOLATILE COMPOUNDS			
Acrolein	50	1,3-Dichloropropylene	10
Acrylonitrile	20	Ethylbenzene	10
Benzene	10	Methyl Bromide	50
Bromoform	10	Methylene Chloride	20
Carbon Tetrachloride	2	1,1,2,2-Tetrachloroethane	10
Chlorobenzene	10	Tetrachloroethylene	10
Clorodibromomethane	10	Toluene	10
Chloroform	50	1,2-trans-Dichloroethylene	10
Dichlorobromomethane	10	1,1,2-Trichloroethane	10
1,2-Dichloroethane	10	Trichloroethylene	10
1,1-Dichloroethylene	10	Vinyl Chloride	10
1,2-Dichloropropane	10		
ACID COMPOUNDS			
2-Chlorophenol	10	2,4-Dinitrophenol	50
2,4-Dichlorophenol	10	Pentachlorophenol	5
2,4-Dimethylphenol	10	Phenol	10
4,6-Dinitro-o-Cresol	50	2,4,6-Trichlorophenol	10

POLLUTANTS	MQL µg/l	POLLUTANTS	MQL µg/l
	BASE/NEUTRAL		
Acenaphthene	10	Dimethyl Phthalate	10
Anthracene	10	Di-n-Butyl Phthalate	10
Benzidine	50	2,4-Dinitrotoluene	10
Benzo(a)anthracene	5	1,2-Diphenylhydrazine	20
Benzo(a)pyrene	5	Fluoranthene	10
3,4-Benzofluoranthene	10	Fluorene	10
Benzo(k)fluoranthene	5	Hexachlorobenzene	5
Bis(2-chloroethyl)Ether	10	Hexachlorobutadiene	10
Bis(2-chloroisopropyl)Ether	10	Hexachlorocyclopentadiene	10
Bis(2-ethylhexyl)Phthalate	10	Hexachloroethane	20
Butyl Benzyl Phthalate	10	Indeno(1,2,3-cd)Pyrene	5
2-Chloronapthalene	10	Isophorone	10
Chrysene	5	Nitrobenzene	10
Dibenzo(a,h)anthracene	5	n-Nitrosodimethylamine	50
1,2-Dichlorobenzene	10	n-Nitrosodi-n-Propylamine	20
1,3-Dichlorobenzene	10	n-Nitrosodiphenylamine	20
1,4-Dichlorobenzene	10	Pyrene	10
3,3'-Dichlorobenzidine	5	1,2,4-Trichlorobenzene	10
Diethyl Phthalate	10		
	PESTICIDES AND PCBS		
Aldrin	0.01	Beta-Endosulfan	0.02
Alpha-BHC	0.05	Endosulfan sulfate	0.02
Beta-BHC	0.05	Endrin	0.02
Gamma-BHC	0.05	Endrin Aldehyde	0.1
Chlordane	0.2	Heptachlor	0.01
4,4'-DDT and derivatives	0.02	Heptachlor Epoxide	0.01
Dieldrin	0.02	PCBs *2	0.2
Alpha-Endosulfan	0.01	Toxaphene	0.3

(MQL's Revised November 1, 2007)

Footnotes:

*1 Default MQL for Mercury is 0.005 unless Part I of your permit requires the more sensitive Method 1631 (Oxidation / Purge and Trap / Cold vapor Atomic Fluorescence Spectrometry), then the MQL shall be 0.0005.

*2 PCBs generally must be tested using Method 1668A as requested by NMED: Chlorinated Biphenyl Congeners in Water, Soil, Sediment and Tissue by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) [EPA-821-R-00-002].

PART III - STANDARD CONDITIONS FOR NPDES PERMITS

A. GENERAL CONDITIONS

1. INTRODUCTION
In accordance with the provisions of 40 CFR Part 122.41, et. seq., this permit incorporates by reference ALL conditions and requirements applicable to NPDES Permits set forth in the Clean Water Act, as amended, (hereinafter known as the "Act") as well as ALL applicable regulations.

2. DUTY TO COMPLY
The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. TOXIC POLLUTANTS

   a. Notwithstanding Part III.A.5, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

   b. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

4. DUTY TO REAPPLY
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR Part 122.6 and any subsequent amendments.

5. PERMIT FLEXIBILITY
This permit may be modified, revoked and reissued, or terminated for cause in accordance with 40 CFR 122.62-64. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. PROPERTY RIGHTS
This permit does not convey any property rights of any sort, or any exclusive privilege.

7. DUTY TO PROVIDE INFORMATION
The permittee shall furnish to the Director, within a reasonable time, any information which the 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 Director, upon request, copies of records required to be kept by this permit.

8. CRIMINAL AND CIVIL LIABILITY
Except as provided in permit conditions on "Bypassing" and "Upsets", nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

9. OIL AND HAZARDOUS SUBSTANCE LIABILITY
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

10. STATE LAWS
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

11. 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 circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

B. PROPER OPERATION AND MAINTENANCE

1. NEED TO HALT OR REDUCE NOT A DEFENSE
It shall not be a defense for a 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. The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators or retention of inadequately treated effluent.

2. DUTY TO MITIGATE
The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3. PROPER OPERATION AND MAINTENANCE

a. 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 permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

4. BYPASS OF TREATMENT FACILITIES

a. BYPASS NOT EXCEEDING LIMITATIONS
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.B.4.b. and 4.c.

b. NOTICE

(1)ANTICIPATED BYPASS
If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2)UNANTICIPATED BYPASS
The permittee shall, within 24 hours, submit notice of an unanticipated bypass as required in Part III.D.7.

c. PROHIBITION OF BYPASS

(1) Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(c) The permittee submitted notices as required by Part III.B.4.b.

(2) The Director may allow an anticipated bypass after considering its adverse effects, if the Director determines that it will meet the three conditions listed at Part III.B.4.c(1).

5. UPSET CONDITIONS

a. EFFECT OF AN UPSET
An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Part III.B.5.b. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. CONDITIONS NECESSARY FOR A DEMONSTRATION OF UPSET
A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated;

(3) The permittee submitted notice of the upset as required by Part III.D.7; and,

(4) The permittee complied with any remedial measures required by Part III.B.2.

c. BURDEN OF PROOF
In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. REMOVED SUBSTANCES
Unless otherwise authorized, solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. PERCENT REMOVAL (PUBLICLY OWNED TREATMENT WORKS)
For publicly owned treatment works, the 30-day average (or Monthly Average) percent removal for Biochemical Oxygen Demand and Total Suspended Solids shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR 133.103.

C. MONITORING AND RECORDS

1. INSPECTION AND ENTRY
The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by the law to:

a. Enter 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;

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

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

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

2. REPRESENTATIVE SAMPLING
Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

3. RETENTION OF RECORDS
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 required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

4. RECORD CONTENTS
Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;

c. The date(s) and time(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

5. MONITORING PROCEDURES

a. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.

b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.

c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory.

6. FLOW MEASUREMENTS
Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes.

D. REPORTING REQUIREMENTS

1. PLANNED CHANGES

a. INDUSTRIAL PERMITS
The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR Part 122.29(b); or,

(2) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements listed at Part III.D.10.a.

b. MUNICIPAL PERMITS
Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges of pollutants) must be reported to the permitting authority. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. ANTICIPATED NONCOMPLIANCE
The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. TRANSFERS
This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

4. DISCHARGE MONITORING REPORTS AND OTHER REPORTS
Monitoring results must be reported to EPA on either the electronic or paper Discharge Monitoring Report (DMR) approved formats. Monitoring results can be submitted electronically in lieu of the paper DMR Form. To submit electronically, access the NetDMR website at www.epa.gov/netdmr and contact the R6NetDMR.epa.gov in-box for further instructions. Until you are approved for Net DMR, you must report on the Discharge Monitoring Report (DMR) Form EPA. No. 3320-1 in accordance with the "General Instructions" provided on the form. No additional copies are needed if reporting electronically, however when submitting paper form EPA No. 3320-1, the permittee shall submit the original DMR signed and certified as required by Part III.D.11 and all other reports required by Part III.D. to the EPA at the address below. Duplicate copies of paper DMR's and all other reports shall be submitted to the appropriate State agency (ies) at the following address (es):

EPA:
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

New Mexico:
Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

5. ADDITIONAL MONITORING BY THE PERMITTEE
If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

6. AVERAGING OF MEASUREMENTS
Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

7. TWENTY-FOUR HOUR REPORTING

a. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall be provided within 5 days of the time the permittee becomes aware of the circumstances. The report shall contain the following information:

(1) A description of the noncompliance and its cause;

(2) The period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,

(3) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. The following shall be included as information which must be reported within 24 hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit;

(2) Any upset which exceeds any effluent limitation in the permit; and,

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part II (industrial permits only) of the permit to be reported within 24 hours.

c. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

8. OTHER NONCOMPLIANCE
The permittee shall report all instances of noncompliance not reported under Parts III.D.4 and D.7 and Part I.B (for industrial permits only) at the time monitoring reports are submitted. The reports shall contain the information listed at Part III.D.7.

9. OTHER INFORMATION
Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

10. CHANGES IN DISCHARGES OF TOXIC SUBSTANCES
All existing manufacturing, commercial, mining, and silvacultural permittees shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) One hundred micrograms per liter (100 µg/L);
(2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2, 4-dinitro-phenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

(3) Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Director.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1) Five hundred micrograms per liter (500 µg/L);

(2) One milligram per liter (1 mg/L) for antimony;

(3) Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

(4) The level established by the Director.

11. SIGNATORY REQUIREMENTS
All applications, reports, or information submitted to the Director shall be signed and certified.

a. ALL PERMIT APPLICATIONS shall be signed as follows:

(1) FOR A CORPORATION - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a)A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

(b)The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) FOR A PARTNERSHIP OR SOLE PROPRIETORSHIP - by a general partner or the proprietor, respectively.

(3) FOR A MUNICIPALITY, STATE, FEDERAL, OR OTHER PUBLIC AGENCY - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(a)The chief executive officer of the agency, or

(b)A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. ALL REPORTS required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

(3) The written authorization is submitted to the Director.

c. CERTIFICATION
Any person signing a document under this section shall make the following 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 have no personal knowledge that the information submitted is other than 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."

12. AVAILABILITY OF REPORTS
Except for applications, effluent data permits, and other data specified in 40 CFR 122.7, any information submitted pursuant to this permit may be claimed as confidential by the submitter. If no claim is made at the time of submission, information may be made available to the public without further notice.

E. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

1. CRIMINAL

a. NEGLIGENT VIOLATIONS
The Act provides that any person who negligently violates permit conditions implementing Section 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

b. KNOWING VIOLATIONS
The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. KNOWING ENDANGERMENT
The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both.

d. FALSE STATEMENTS
The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or by both. (See Section 309.c.4 of the Clean Water Act)

2. CIVIL PENALTIES
The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

3. ADMINISTRATIVE PENALTIES
The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

a. CLASS I PENALTY
Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

b. CLASS II PENALTY
Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

F. DEFINITIONS
All definitions contained in Section 502 of the Act shall apply to this permit and are incorporated herein by reference. Unless otherwise specified in this permit, additional definitions of words or phrases used in this permit are as follows:

1. ACT means the Clean Water Act (33 U.S.C. 1251 et. seq.), as amended.

2. ADMINISTRATOR means the Administrator of the U.S. Environmental Protection Agency.

3. APPLICABLE EFFLUENT STANDARDS AND LIMITATIONS means all state and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards or performance, toxic effluent standards and prohibitions, and pretreatment standards.

4. APPLICABLE WATER QUALITY STANDARDS means all water quality standards to which a discharge is subject under the Act.

5. BYPASS means the intentional diversion of waste streams from any portion of a treatment facility.

6. DAILY DISCHARGE means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the sampling day. "Daily discharge" determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be arithmetic average (weighted by flow value) of all samples collected during that sampling day.

7. DAILY MAXIMUM discharge limitation means the highest allowable "daily discharge" during the calendar month.

8. DIRECTOR means the U.S. Environmental Protection Agency Regional Administrator or an authorized representative.

9. ENVIRONMENTAL PROTECTION AGENCY means the U.S. Environmental Protection Agency.

10. GRAB SAMPLE means an individual sample collected in less than 15 minutes.

11. INDUSTRIAL USER means a non-domestic discharger, as identified in 40 CFR 403, introducing pollutants to a publicly owned treatment works.

12. MONTHLY AVERAGE (also known as DAILY AVERAGE) discharge limitations means the highest allowable average of "daily discharge(s)" over a calendar month, calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes daily average concentration effluent limitations or conditions, the daily average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily concentration, F = daily flow, and n = number of daily samples; daily average discharge =

$$\frac{C_1F_1 + C_2F_2 + \ldots + C_nF_n}{F_1 + F_2 + \ldots + F_n}$$

13. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Act.

14. SEVERE PROPERTY DAMAGE means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

15. SEWAGE SLUDGE means the solids, residues, and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff that are discharged to or otherwise enter a publicly owned treatment works.

16. TREATMENT WORKS means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement Section 201 of the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

17. UPSET means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

18. FOR FECAL COLIFORM BACTERIA, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

19. The term "MGD" shall mean million gallons per day.

20. The term "mg/L" shall mean milligrams per liter or parts per million (ppm).

21. The term "µg/L" shall mean micrograms per liter or parts per billion (ppb).

22. MUNICIPAL TERMS

    a. 7-DAY AVERAGE or WEEKLY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The 7-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

    b. 30-DAY AVERAGE or MONTHLY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The 30-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

    c. 24-HOUR COMPOSITE SAMPLE consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

    d. 12-HOUR COMPOSITE SAMPLE consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

    e. 6-HOUR COMPOSITE SAMPLE consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

    f. 3-HOUR COMPOSITE SAMPLE consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.