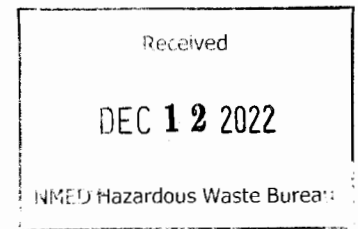




**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE CIVIL ENGINEER CENTER**



December 5, 2022

Christipher N. Gierke  
Restoration Project Manager  
AFCEC/CZOW  
Cannon AFB, NM 88101



Mr. Gabriel Acevedo  
Environmental Scientist & Specialist-Operational  
New Mexico Environmental Department  
Hazardous Waste Bureau  
2905 Rodeo Park Drive East, Bldg. 1  
Santa Fe NM 87505-6313

Dear Mr. Acevedo

Cannon AFB is pleased to provide the response letter, replacement pages including redline-strikeout, and amended CDs as requested in the 1 November 2022 *"Approval with Modifications Facility-Wide Long-Term Groundwater Monitoring Plan – Revision 1"* letter, Cannon AFB.

Cannon AFB appreciates the valued working relationship established with you and your department. If you have any further comments or questions pertaining to the referenced document, please contact me at (575) 904-6744 or email [Christipher.Gierke@us.af.mil](mailto:Christipher.Gierke@us.af.mil).

Sincerely,

C.N. GIERKE, GS-13, AFCEC  
Restoration Project Manager

Attachments:

Errata Pages Facility-Wide Long-Term Groundwater Monitoring Plan – Revision 1

## Table of Contents

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LF003	Landfill 3 (SWMU 105)
LF004	Landfill 4 (SWMU 104)
LF005	Landfill 5 (Cell 3) (SWMU 113)
LF025	Landfill 25 (SWMU 97)
LTM	long-term monitoring
m <sup>3</sup> /m	cubic meters per meter
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
msl	mean sea level
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMWQCCS	New Mexico Water Quality Control Commission Standard
No.	number
NTU	Nephelometric Turbidity Units
ORP	oxidation-reduction potential
PCB	polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SI101	Wastewater Lagoons 1 & 2 (SWMU 101)
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TS835	Former Skeet Range
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WPA	Work Plan Addendum

of 128 environmental restoration sites, referred to as SWMUs and Areas of Concern (AOCs) in the permit. The RCRA permit required compliance with the New Mexico Administrative Code (which incorporated the requirements of 40 Code of Federal Regulations (CFR) 265 and 40 CFR 264) which required the permitted facility to perform groundwater monitoring for detection, assessment and compliance. NMED issued a notice of violation in August 1989 citing that Cannon AFB violated these groundwater monitoring requirements. Cannon AFB and NMED signed a compliance agreement in July 1990 to establish a groundwater monitoring system and produce a sampling and analysis plan. In January 1996, NMED became the administrative authority for the Cannon AFB RCRA permit (AECOM 2011).

Risk assessments are performed for SWMUs/AOCs on a site by site basis in accordance with the current NMED Risk Assessment Guidance for Site Investigations and Remediation (NMED 2022). Based on the results of the risk assessments additional corrective action is recommended for the SWMUs/AOCs or they are moved to Table 2 or 3 of the Cannon AFB RCRA Permit (No. NM7572124454). There are 190 sites listed on the current (2018) Cannon AFB RCRA Permit. The current division of the sites is as follows:

- Table 1 – List of SWMU and AOC Requiring Corrective Action (corrective action may be necessary to characterize and/or remediate past releases of hazardous wastes or hazardous constituents) – 42 Sites
- Table 2 – List of SWMU and AOCs with Corrective Action Complete (CAC) with Controls Status (corrective action has been completed, and further corrective action is not currently required; controls are required) – 78 Sites
- Table 3 – List of SWMUs and AOCs with CAC without Controls Status (corrective action has been completed, and further corrective action is not currently required; no controls are required) – 70 Sites

#### **1.4.11 Extent and Distribution of Contaminants**

To support the primary mission of Cannon AFB, petroleum (fuels), oils, and lubricants; solvents; explosives used in training; fire suppressants; pesticides; herbicides; metals; and protective coatings were used resulting in waste generation (Cannon AFB 2006). These types of wastes have been generated at Cannon AFB since the beginning of industrial operations in 1942. The major industrial operations that have occurred at Cannon AFB include jet engine repair, pneumatic and hydraulic systems maintenance, aerospace ground equipment maintenance, corrosion control, vehicle maintenance shops, and the non-destructive inspection lab. Routine Air Force operations have also involved use of pesticides, herbicides, and metals. Additionally, sewage treatment and disposal of materials in landfills have occurred (discussed in **Section 2.7**). In conjunction with the conceptual site model, this information provides a basis for locating monitoring wells in addition to the present base-wide monitoring network.

Field investigations for Environmental Restoration Program (ERP)/SWMU/AOC sites at Cannon AFB have consisted of surface and subsurface soil drilling and sampling, surface water and groundwater sample collection, and sediment sampling (where applicable). Samples were

analyzed for various chemical parameters based on the history of use for each site. The analyses performed depended on the site history and the sample location and have included, but are not limited to, volatile organic compounds (VOCs), semi-volatile organic compounds, (SVOCs), metals, polychlorinated biphenyl (PCB), pesticides, herbicides, total organic lead, metals, gasoline range organics, diesel range organics, and oil range organics (Cannon AFB 2006).

Soil has been the primary contaminated media identified for sites at Cannon AFB. Transport to groundwater is limited by the depth to the saturated zone of about 291.91 to 350.72 feet, the semiarid climate, and the presence of caliche layers. Based on the contaminated media identified at Cannon AFB, the majority of remedial actions completed at Cannon AFB are a simple “dig and haul” process. This involves removing contaminated soils from the site, disposing of the soils at an off-site facility, and backfilling the excavations with clean soils. Following the completion of the remedial process a corrective action complete proposal is submitted to NMED to demonstrate that no human health or environmental risks are present and the site qualifies for corrective action complete with controls or corrective action complete without controls status. Following state approval the site will be moved to Table 2 or 3 of the Cannon AFB RCRA permit.

The United States Geological Survey and other ERP contractors have been monitoring groundwater levels and quality through the LTM program since 1994 at Landfill 5 (SWMU 113) and the Sewage Lagoons (SWMU 101), since 1996 at Landfill 4 (SWMU 104) and Landfill 3 (SWMU 105), and since 1997 at Landfill 25 (SWMU 97). Analytes measured include: cyanide, sulfide, organic carbon, major cations, perchlorate, trace metals, organic halogens, VOCs, SVOCs, dioxins and furans, polynuclear aromatics, organochlorine pesticides, polychlorinated biphenyls, chlorinated herbicides, dissolved solids, nitrate/nitrite, and sulfate.

Based on historical groundwater monitoring data, the impact to groundwater from the chemicals of concern (COCs) sampled and analyzed for at Cannon AFB appears to have been limited to seepage from the Sewage Lagoons (SWMU 101). Groundwater monitoring indicates that this impact has dissipated. No additional corrective action is required at SWMUs 97, 104, or 105 (Landfill 25, Landfill 4, and Landfill 3) other than groundwater monitoring (NMED 2007). No further action is required for SWMU 113 (Landfill 5) with the exception of Cell 3. Results of groundwater sampling completed for these landfills is summarized in **Section 2.8**.

1,4-Dioxane is an emerging contaminant that has not historically been evaluated in the groundwater monitoring program at Cannon AFB. Under this work plan groundwater collected from the 18 monitoring wells at Cannon AFB (as described in **Section 3.1**) will also be analyzed for 1,4-Dioxane to evaluate the potential impact of historical activities.

Per- and polyfluoroalkyl substances (PFAS) is an emerging contaminant that has been investigated at Cannon AFB as part of a Site Inspection completed for Cannon AFB in 2018. This investigation recommended a Remedial Investigation be completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act at sites where PFAS was identified. Preliminary screening levels are included for select PFAS analytes in the NMED Risk Assessment Guidance for Site Investigations and Remediation (NMED 2022). The guidance states that evaluation of PFAS risks should not be used to make regulatory decisions regarding closure or corrective action at this time. The results should be used to guide future decisions about a site

This section provides a description of the field sampling plan including revisions to the FWLTGMP (AECOM 2011). All sampling will be completed in accordance with Section 4.3 of the Cannon AFB RCRA permit.

### **3.1 GROUNDWATER MONITORING SAMPLING PLAN**

NMED requested the groundwater monitoring sampling plan be revised to reflect changes in NMED's Water Quality Regulations for Ground and Surface Water Protection (20.6.2 New Mexico Administrative Code), which include adding emerging contaminant 1,4-dioxane to the analyte list. NMED also requested the frequency of groundwater sampling be increased to annually for a minimum of two years (NMED 2019).

In response to NMED's requests, groundwater samples will be collected annually from monitoring wells MW-A, MW-B, MW-Ca, MW-D, MW-E, MW-Fa, MW-Ga, MW-H, MW-Na, MW-Oa, MW-Pa, MW-Rb, MW-Sa, MW-Ta, MW-Ua, MW-V, MW-X and MW-W (see **Figure 3-1** for the location of these wells) following NMED approval of this FWLTGMP. All groundwater samples collected will be analyzed for VOCs, TAL metals (including mercury), hexavalent chromium, perchlorate, chloride, nitrate, nitrite, sulfate, ammonia, TOC, 1,4-dioxane, and field water quality parameters (pH, DO, oxidation-reduction potential [ORP], specific conductance, turbidity, and temperature). Groundwater analytical methods as well as information regarding sample containers, preservation, and hold times are included in **Tables 3-1** and **3-2**.

While 18 monitoring wells are sampled as part of the FWLTGMP, monitoring wells MW-C, MW-F, and MW-G remain at Cannon AFB. Replacement wells (MW-Ca, MW-Fa, and MW-Ga) were installed for these wells in 2017 to ensure the screened interval coincided with the water table. When the groundwater levels decrease in the replacement wells below the screened interval or to a level within the well that prevents samples from being collected, samples will be collected from MW-C, MW-F, and MW-G as the screened interval in these wells is below the screened interval in the replacement wells. Should MW-Ca, MW-Fa, or MW-Ga become dry in the future, these wells will be abandoned in accordance with NMED regulations.

Reports documenting the results of the sampling will be generated annually to match the sampling schedule for two years. The annual sampling report documenting the results of the second year of annual sampling will evaluate the analytical results and make recommendations regarding future sampling frequency. These reports will also make recommendations regarding reductions or additions to the monitoring wells included in the basewide sampling plan based on data from the annual sampling event and other site specific investigations (if relevant to groundwater impacts).

### **3.2 WATER LEVEL MEASUREMENT**

Prior to groundwater sampling activities, a full round of water level measurements will be collected from all twenty-one monitoring wells associated with this LTM plan (**Table 2-1**) using a groundwater interface probe that is also capable of detecting and measuring non-aqueous phase liquids. Groundwater levels will continue to be collected from all 21 monitoring wells until gauging data and well evaluation indicates the monitoring well has gone dry. At that time the

- ORP  $\pm 10\%$  of reading
- Temperature  $\pm 10\%$  of reading

Dedicated pumps are currently located in monitoring wells MW-Na, MW-Oa, and MW-Pa. Therefore, these pumps do not require decontamination during sampling. Pumps utilized to sample the remaining wells will be decontaminated by placing it in a wash tub containing Alconox or low-sudsing non-phosphate detergent along with potable water and scrubbed with a bristle brush or similar utensil. Equipment will be rinsed with tap water in a second wash tub followed by a de-ionized water rinse.

Equipment blanks will be collected from sampling equipment in accordance with the Cannon AFB RCRA permit. Equipment blanks will be obtained for chemical analysis at the rate of ten percent or a minimum of one rinsate blank per sampling day. Equipment rinsate blanks shall be collected at a rate of one per sampling day if disposable sampling apparatus is used. Equipment blanks shall be generated by rinsing deionized water through unused or decontaminated sampling equipment. The sample shall then be placed in the appropriate sample container and submitted with the groundwater or surface water samples to the analytical laboratory for the appropriate analyses.

### **3.4 INVESTIGATION-DERIVED WASTE**

Investigation-derived waste (IDW) generated during groundwater sampling activities will include monitoring well purge water, decontamination water, and personal protective equipment (PPE). All wastewater generated during well purging and equipment decontamination will be placed in 55 gallon drums. The container(s) will be clearly labeled to identify the contents, date of generation, generation location, media, contact information, container number, restrictions for adding or removing contents, and the statement "Waste Classification Pending Analytical Results."

Following annual sampling, a waste characterization sample will be collected from the IDW and analyzed for Toxicity Characteristic Leaching Procedure (TCLP). TCLP regulatory limits are summarized in **Table 3-3**. The results from these analyses will be compared directly to TCLP regulatory limits. IDW will be characterized as hazardous or non-hazardous and will be sent to an off-site waste management service for disposal. Documentation of the disposal will be provided in the annual report.

PPE, decontamination plastic, and similar waste material will be consolidated into contractor trash bags and placed in a solid waste dumpster designated by Cannon AFB personnel. IDW containers will be marked with the following information:

- Installation identification (i.e., Cannon AFB)
- Site name and number
- Type of IDW (i.e., decon water)
- Pending waste analysis (if applicable)

**6.5.2 Comparison to Regulations**

Groundwater analytical results will be compared to the current USEPA MCLs, NMWQCCS (New Mexico Administrative Code (NMAC) 20.6.2.3103), and cleanup levels for toxic pollutants in NMAC 20.6.2.7.T(2). If both a USEPA MCL and NMWQCCS have been established for an analyte, the lower of the two levels will be utilized as the screening level for that substance. In the event that no evaluation criteria are listed for an analyte in the USEPA MCLs or the NMWQCCS, the results will be evaluated against the criteria specified in NMED risk assessment guidance (NMED 2022).

**6.5.3 Trend Analysis**

Trend analysis will be completed for each COC at individual monitoring wells. Trends will be developed using the most recent groundwater analytical data and comparing to previous sampling events. Trend analysis will be one tool used to determine necessary changes in the LTM well network, sampling frequency, and COCs, as well as whether a release has occurred.

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## Appendix C - Reference Limits and Evaluation Table

Matrix: Aqueous

Analytical Group: VOCs (USEPA Method 8260C) & TCLP VOCs (USEPA Method 8260C)

Concentration Level: Low to High

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
<b>VOCs (USEPA Method 8260C)</b>							
1,1,1,2-Tetrachloroethane	630-20-6	5.74E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,1,1-Trichloroethane	71-55-6	2.00E+02	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,1,2,2-Tetrachloroethane	79-34-5	7.57E-01	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,1,2-Trichloroethane	79-00-5	4.15E-01	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,1-Dichloroethane	75-34-3	2.50E+01	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,1-Dichloroethene	75-35-4	7.00E+00	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,1-Dichloropropene	563-58-6	--	--	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,2,3-Trichlorobenzene	87-61-6	--	--	1.00E+00	1.50E-01	3.00E-01	1.00E+00
1,2,4-Trichlorobenzene	120-82-1	3.98E+00	NMED	1.00E+00	1.50E-01	3.00E-01	1.00E+00
1,2,4-Trimethylbenzene	95-63-6	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
1,2-Dibromoethane	106-93-4	5.00E-02	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,2-Dichlorobenzene	95-50-1	3.02E+02	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,2-Dichloroethane	107-06-2	1.71E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,2-Dichloropropane	78-87-5	4.38E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,3,5-Trimethylbenzene	108-67-8	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
1,3-Dichlorobenzene	541-73-1	--	--	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,3-Dichloropropane	142-28-9	--	--	1.00E+00	1.00E-01	2.00E-01	1.00E+00
1,4-Dichlorobenzene	106-46-7	4.82E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
2,2-Dichloropropane	590-20-7	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
2-Butanone	78-93-3	5.56E+03	NMED	2.00E+01	5.00E+00	1.00E+01	2.00E+01
2-Chlorotoluene	95-49-8	2.33E+02	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
4-Chlorotoluene	106-43-4	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00

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Concentration Level: Low to High

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
4-Methyl-2-Pentanone	108-10-1	1.24E+03	NMED	2.00E+01	5.00E+00	1.00E+01	2.00E+01
Acetone	67-64-1	1.41E+04	NMED	2.00E+01	5.00E+00	1.00E+01	2.00E+01
Benzene	71-43-2	4.55E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Bromobenzene	108-86-1	--	--	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Bromodichloromethane	75-27-4	1.34E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Bromoform	75-25-2	3.29E+01	NMED	1.00E+00	1.50E-01	3.00E-01	1.00E+00
Bromomethane	74-83-9	7.54E+00	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Carbon tetrachloride	56-23-5	4.55E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Chlorobenzene	108-90-7	7.76E+01	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Chloroethane	75-00-3	2.09E+04	NMED	2.00E+00	5.00E-01	1.00E+00	2.00E+00
Chloroform	67-66-3	2.29E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Chloromethane	74-87-3	2.03E+01	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
cis-1,2-Dichloroethene	156-59-2	3.65E+01	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
cis-1,3-Dichloropropene	10061-01-5	--	--	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Dichlorodifluoromethane	75-71-8	1.97E+02	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Ethylbenzene	100-41-4	1.50E+01	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Isopropylbenzene	98-82-8	4.47E+02	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
m/p-Xylenes	136777-61-2	1.93E+02	NMED	2.00E+00	2.10E-01	5.00E-01	2.00E+00
Methylene chloride	75-09-2	5.00E+00	NMGWQS	2.00E+00	5.00E-01	1.00E+00	2.00E+00
Methyl tert-butyl ether	1634-04-4	1.43E+02	NMED	1.00E+00	1.50E-01	3.00E-01	1.00E+00
Naphthalene	91-20-3	1.17E+00	NMED	2.00E+00	5.00E-01	1.00E+00	2.00E+00
n-Butylbenzene	104-51-8	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
n-Propylbenzene	103-65-1	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00

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Concentration Level: Low to High

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
o-Xylene	95-47-6	1.93E+02	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
sec-Butylbenzene	135-98-8	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Styrene	100-42-5	1.00E+02	NMGWQS	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Tetrachloroethene	127-18-4	5.00E+00	NMGWQS	1.00E+00	1.50E-01	3.00E-01	1.00E+00
Toluene	108-88-3	1.00E+03	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Trans-1,2-Dichloroethene	156-60-5	6.79E+01	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Trans-1,3-Dichloropropene	10061-02-6	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Trichloroethene	79-01-6	2.59E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Trichlorofluoromethane	75-69-4	1.14E+03	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Vinyl chloride	75-01-4	3.24E-01	NMED	1.00E+00	1.10E-01	3.00E-01	1.00E+00
<b>TCLP VOCs (USEPA Method 8260C)</b>							
1,1-Dichloroethene	75-35-4	7.00E+00	NMGWQS	5.00E+01	1.00E+01	2.00E+01	5.00E+01
1,2-Dichloroethane	107-06-2	1.71E+00	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
1,4-Dichlorobenzene	106-46-7	4.82E+00	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
2-Butanone	78-93-3	5.56E+03	NMED	2.00E+02	5.00E+01	1.00E+02	2.00E+02
Benzene	71-43-2	4.55E+00	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
Carbon Tetrachloride	56-23-5	4.55E+00	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
Chlorobenzene	108-90-7	7.76E+01	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
Chloroform	67-66-3	2.29E+00	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
Tetrachloroethene	127-18-4	5.00E+00	NMGWQS	5.00E+01	1.00E+01	2.00E+01	5.00E+01
Trichloroethene	79-01-6	2.59E+00	NMED	5.00E+01	1.00E+01	2.00E+01	5.00E+01
Vinyl Chloride	75-01-4	3.24E-01	NMED	1.00E+02	2.00E+01	5.00E+01	1.00E+02

<sup>1</sup> Achievable DLs, LODs, and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method.

NMED is from the New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program, Risk Assessment Guidance for Site Investigations and Remediation, Soil Screening Levels, Appendix A, June 2022.

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Contract No. FA8903-13-C-0008

--- = No value  
µg/L = microgram per liter  
CAS = Chemical Abstract Service  
DL = Detection Limit  
LOD = Limit of Detection  
LOQ = Limit of Quantitation  
NMED = New Mexico Environment Department  
NMGWQS = New Mexico Groundwater Quality Standard  
TCLP = Toxicity Characteristic Leaching Procedure  
USEPA = United States Environmental Protection Agency  
VOC = volatile organic compound

## Appendix C - Reference Limits and Evaluation Table

**Matrix:** Aqueous

**Analytical Group:** TCLP SVOC (USEPA Method 8270D)

**Concentration Level:** Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
2,4,5-Trichlorophenol	95-95-4	1.17E+03	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
2,4,6-Trichlorophenol	88-06-2	1.19E+01	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
2,4-Dinitrotoluene	121-14-2	2.37E+00	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
2-Methylphenol	95-48-7	--	--	1.00E+02	2.50E+01	5.00E+01	1.00E+02
4-Methylphenol	106-44-5	--	--	1.00E+02	2.50E+01	5.00E+01	1.00E+02
Hexachlorobenzene	118-74-1	9.76E-02	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
Hexachlorobutadiene	87-68-3	1.39E+00	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
Hexachloroethane	67-72-1	3.28E+00	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
Nitrobenzene	98-95-3	1.40E+00	NMED	1.00E+02	2.50E+01	5.00E+01	1.00E+02
Pentachlorophenol	87-86-5	4.13E-01	NMED	2.00E+02	2.50E+01	5.00E+01	2.00E+02
Pyridine	110-86-1	1.17E+03	NMED	4.00E+02	1.00E+02	2.00E+02	4.00E+02

<sup>1</sup> Achievable DLs, LODs, and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method.

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--- = No value

µg/L = microgram per liter

CAS = Chemical Abstract Service

DL = Detection Limit

LOD = Limit of Detection

LOQ = Limit of Quantitation

NMED = New Mexico Environment Department

SVOC = semivolatile organic compound

TCLP = Toxicity Characteristic Leaching Procedure

USEPA = United States Environmental Protection Agency

## Appendix C - Reference Limits and Evaluation Table

**Matrix:** Aqueous

**Analytical Group:** TCLP Pesticides (USEPA Method 8081B)

**Concentration Level:** Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
alpha-Chlordane	5103-71-9	4.48E-01	NMED	2.00E-03	3.00E-04	8.00E-04	2.00E-03
Endrin	72-20-8	2.00E+00	MCL	2.00E-03	3.00E-04	8.00E-04	2.00E-03
gamma-BHC (Lindane)	58-89-9	2.00E-01	MCL	2.00E-03	3.00E-04	8.00E-04	2.00E-03
gamma-Chlordane	5566-34-7	4.48E-01	NMED	2.00E-03	3.00E-04	8.00E-04	2.00E-03
Heptachlor	76-44-8	2.21E-02	NMED	2.00E-03	3.00E-04	8.00E-04	2.00E-03
Heptachlor epoxide	1024-57-3	2.21E-02 <sup>2</sup>	NMED	2.00E-03	3.00E-04	8.00E-04	2.00E-03
Methoxychlor	72-43-5	4.00E+01	MCL	1.00E-02	2.00E-03	4.00E-03	1.00E-02
Toxaphene	8001-35-2	1.58E-01	NMED	5.00E-02	1.50E-02	3.00E-02	5.00E-02

<sup>1</sup> Achievable DLs, LODs and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method

<sup>2</sup> = As Heptachlor

MCL is from the USEPA MCL (November 2022)

NMED is from the New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program, Risk Assessment Guidance for Site Investigations and Remediation, Soil Screening Levels, Appendix A, June 2022.

-- = No value

µg/L = microgram per liter

CAS = Chemical Abstract Service

DL = Detection Limit

LOD = Limit of Detection

LOQ = Limit of Quantitation

MCL = maximum contaminant level

NMED = New Mexico Environment Department

TCLP = Toxicity Characteristic Leaching Procedure

USEPA= United States Environmental Protection Agency

## Appendix C - Reference Limits and Evaluation Table

**Matrix:** Aqueous

**Analytical Group:** TCLP Herbicides (USEPA Method 8151A)

**Concentration Level:** Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
2,4,5-TP (Silvex)	93-76-5	--	--	1.00E+01	1.00E+00	2.00E+00	1.00E+01
2,4-D	94-75-7	7.00E+01	MCL	1.00E+01	1.00E+00	2.00E+00	1.00E+01

<sup>1</sup> Achievable DLs, LODs and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method

MCL is from the USEPA MCL (November 2022)

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µg/L = microgram per liter

CAS = Chemical Abstract Service

DL = Detection Limit

LOD = Limit of Detection

LOQ = Limit of Quantitation

MCL = maximum contaminant level

TCLP = Toxicity Characteristic Leaching Procedure

USEPA= United States Environmental Protection Agency



## Appendix C - Reference Limits and Evaluation Table

Matrix: Aqueous

Analytical Group: TAL Metals (USEPA Method 6020A & 7470A), Hexavalent Chromium (USEPA Method 218.6), and TCLP RCRA Metals (USEPA Method 6020A & 7470A)

Concentration Level: Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
<b>TAL Metals (USEPA Method 6020A &amp; 7470A) and Hexavalent Chromium (USEPA Method 218.6)</b>							
Aluminum	7429-90-5	1.99E+04	NMED	1.00E+02	2.00E+01	5.00E+01	1.00E+02
Antimony	7440-36-0	6.00E+00	NMGWQS	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Arsenic	7440-38-2	8.55E-01	NMED	1.00E+00	1.25E-01	2.50E-01	1.00E+00
Barium	7440-39-3	2.00E+03	NMGWQS	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Beryllium	7440-41-7	4.00E+00	NMGWQS	5.00E-01	1.00E-01	2.00E-01	5.00E-01
Cadmium	7440-43-9	5.00E+00	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Calcium	7440-70-2	--	--	2.00E+02	5.00E+01	1.00E+02	2.00E+02
Chromium	7440-47-3	5.70E+00	NMED	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Chromium, hexavalent	18540-29-9	5.01E-01	NMED	2.00E-01	5.00E-02	1.00E-01	2.00E-01
Cobalt	7440-48-4	5.98E+00	NMED	7.50E-01	1.00E-01	2.00E-01	7.50E-01
Copper	7440-50-8	7.90E+02	NMED	2.00E+00	5.00E-01	1.00E+00	2.00E+00
Iron	7439-89-6	1.38E+04	NMED	2.00E+02	2.50E+01	5.00E+01	2.00E+02
Lead	7439-92-1	1.50E+01	NMGWQS	1.00E+00	5.00E-02	1.00E-01	1.00E+00
Magnesium	7439-95-4	--	--	1.00E+02	2.00E+01	5.00E+01	1.00E+02
Manganese	7439-96-5	2.02E+03	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Mercury	7439-97-6	6.26E-01	NMED	5.00E-01	1.00E-01	2.00E-01	5.00E-01
Nickel	7440-02-0	3.72E+02	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Potassium	7440-09-7	--	--	2.00E+02	5.00E+01	1.00E+02	2.00E+02
Selenium	7782-49-2	5.00E+01	NMGWQS	1.00E+00	1.50E-01	3.00E-01	1.00E+00
Silver	7440-22-4	5.00E+01	NMGWQS	1.00E+00	1.00E-01	2.00E-01	1.00E+00
Sodium	7440-23-5	--	--	2.00E+02	5.00E+01	1.00E+02	2.00E+02

## Appendix C - Reference Limits and Evaluation Table

**Matrix:** Aqueous

**Analytical Group:** TAL Metals (USEPA Method 6020A & 7470A), Hexavalent Chromium (USEPA Method 218.6), and TCLP RCRA Metals (USEPA Method 6020A & 7470A)

**Concentration Level:** Low

Analyte	CAS Number	Project Action Limit (µg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (µg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous		
					DLs (µg/L)	LODs (µg/L)	LOQs (µg/L)
Thallium	7440-28-0	1.97E-01	NMED	5.00E-01	1.00E-01	2.00E-01	5.00E-01
Vanadium	7440-62-2	6.31E+01	NMED	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Zinc	7440-66-6	5.96E+03	NMED	2.00E+01	5.00E+00	1.00E+01	2.00E+01
<b>TCLP RCRA Metals (USEPA Method 6020A &amp; 7470A)</b>							
Arsenic	7440-38-2	8.55E-01	NMED	1.00E-02	1.25E-03	2.50E-03	1.00E-02
Barium	7440-39-3	2.00E+03	NMGWQS	1.00E-02	2.50E-03	5.00E-03	1.00E-02
Cadmium	7440-43-9	5.00E+00	NMGWQS	1.00E-02	1.00E-03	2.00E-03	1.00E-02
Chromium	7440-47-3	5.70E+00	NMED	1.00E-02	1.00E-03	2.00E-03	1.00E-02
Lead	7439-92-1	1.50E+01	NMGWQS	1.00E-02	5.00E-04	1.00E-03	1.00E-02
Mercury	7439-97-6	6.26E-01	NMED	5.00E-03	1.00E-03	2.00E-03	5.00E-03
Selenium	7782-49-2	5.00E+01	NMGWQS	1.00E-02	1.50E-03	3.00E-03	1.00E-02
Silver	7440-22-4	5.00E+01	NMGWQS	1.00E-02	1.00E-03	2.00E-03	1.00E-02

<sup>1</sup> Achievable DLs, LODs and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method

NMED is from the New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program, Risk Assessment Guidance for Site Investigations and Remediation, Soil Screening Levels, Appendix A, June 2022.

NMGWQS is from the New Mexico Groundwater Quality Standards, New Mexico Standards for Groundwater of 10,000 mg/L Total Dissolved Solids Concentration or Less (20 New Mexico Administrative Code 6.2), 2004

-- = No value

µg/L = microgram per liter

CAS = Chemical Abstract Service

DL = Detection Limit

LOD = Limit of Detection

LOQ = Limit of Quantitation

NMED = New Mexico Environment Department

NMGWQS = New Mexico Groundwater Quality Standard

RCRA = Resource Conservation and Recovery Act

TAL = Target Analyte List

TCLP = Toxicity characteristic leaching procedure

USEPA = United States Environmental Protection Agency

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Contract No. FA8903-13-C-0008

## Appendix C - Reference Limits and Evaluation Table

**Matrix:** Aqueous / Soil

**Analytical Group:** Other Parameters

**Concentration Level:** Low to High

Analyte	CAS Number	Project Action Limit (mg/L)	Project Action Limit Reference	Project Quantitation Limit Goal (mg/L)	Achievable Laboratory Limits <sup>1</sup>		
					Aqueous/Soil		
					DLs (mg/L)	LODs (mg/L)	LOQs (mg/L)
Ammonia as N (SM4500-NH3)	7664-41-7	--	--	1.00E-01	3.00E-02	6.00E-02	1.00E-01
Chloride (9056A)	16887-00-6	--	--	2.00E-01	5.00E-02	1.00E-01	2.00E-01
Nitrate (9056A)	84145-82-4	1.0E+01	NMGWQS	1.00E-01	2.50E-02	5.00E-02	1.00E-01
Nitrite (9056A)	14797-65-0	1.0E+00	NMGWQS	1.00E-01	3.00E-02	6.00E-02	1.00E-01
Perchlorate (6850)	14797-73-0	1.38E+01	NMED	5.00E-04	1.00E-04	2.00E-04	5.00E-04
Sulfate (9056A)	18785-72-3	6.0E+02	NMGWQS	5.00E-01	1.30E-01	2.50E-01	5.00E-01
Total Organic Carbon (9060A)	7440-44-0	--	--	1.00E+00	2.50E-01	5.00E-01	1.00E+00
Total Organic Carbon (Walkley Black)	7440-44-0	--	--	6.00E+02 (mg/kg)	6.00E+02 (mg/kg)	6.00E+02 (mg/kg)	6.00E+02 (mg/kg)

<sup>1</sup> Achievable DLs, LODs and LOQs are limits that an individual laboratory can achieve when performing a specific analytical method.

NMED is from the New Mexico Environment Department Hazardous Waste Bureau and Groundwater Quality Bureau Voluntary Remediation Program, Risk Assessment Guidance for Site Investigations and Remediation, Soil Screening Levels, Appendix A, June 2022.

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CAS = Chemical Abstract Service

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LOD = Limit of Detection

LOQ = Limit of Quantitation

mg/kg = milligram per kilogram

mg/L = milligram per liter

NMED = New Mexico Environment Department

NMGWQS = New Mexico Groundwater Quality Standards

**RESPONSES TO NEW MEXICO ENVIRONMENT DEPARTMENT COMMENTS  
APPROVAL WITH MODIFICATIONS  
FACILITY-WIDE LONG TERM GROUNDWATER MONITORING PLAN-REVISION 1  
CANNON AFB, NEW MEXICO**

Comments by Rick Shean, dated November 1, 2022.

**Comment 1. Required Permittee Certification Statement**

**NMED Comment:** The Permittee must submit a signature page signed by the Permittee with the replacement pages required by this letter that include the 40 Code of Federal Regulations (CFR) 270.11(d)(1) certification statement as required by December 2018 *Cannon Air Force Base Resource Conservation and Recovery Act Permit* (Permit), Section 1.16, Signatory Requirements:

*“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.”*

Provide a signed signature page with the requirement replacement pages specified in this letter, as well as with all subsequent reports and work plans.

**Response:** Agree. The requested text is included in the transmittal letter provided with the document by Cannon AFB. Due to the routing and signature requirements of Cannon AFB, the requested text must be submitted separately through the chain of command for signature. To address the comment, Cannon AFB will provide the signed transmittal letter with the errata pages so that it can be added to the final document when assembled by NMED.

**Comment 2. Section 1.4.11, Extent and Distribution of Contaminants, Page 1-9 through 1-11**

**Permittee Statement:** “PFAS [per-and polyfluoroalkyl substances] impacts have been identified in on-site and off-site groundwater. However, PFAS are emerging contaminants that are being addressed by USAF [United States Air Force] under CERCLA [Comprehensive Environmental Response Compensation and Liability Act] process at Cannon AFB [Air Force Base]. The human health/ecological risks from PFAS will be evaluated via the remedial investigations completed under CERCLA. PFAS fate and transport evaluations are not included in this FWLTGMP [Facility-Wide Long-Term Groundwater Monitoring Plan].

**NMED Comment:** NMED does not agree that PFAS contamination at Cannon AFB is subject to the CERCLA-like process used by non-RCRA-permitted Department of Defense facilities. Cannon AFB is subject to regulation under the New Mexico Hazardous Waste Act (HWA) and the Permit. PFAS meets the statutory definition for hazardous waste defined in HWA Section 74-4-3-K, Section 1004(5) of the Solid Waste Disposal Act, and Section 6903(5) of the Resource Conservation and Recovery Act and are defined as such in the Permit as required by 40 CFR 270.32(b)(2) for protection of human health and the environment.

Additionally, PFAS constituents perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorohexane sulfonic acid (PFHxS) are listed as toxic pollutants in 20.6.2.7.T(2) New Mexico Administrative Code (NMAC) as authorized by the New Mexico Water Quality Control Commission; therefore, applicable State of New Mexico regulations established by NMAC 20.6.2 that are incorporated in the Permit apply (see Section 3.3.1, Groundwater Cleanup Levels).

Regularly updated guidance for appropriate risk assessment for contaminants of concern including PFAS have been established in NMED's June 2022 *Risk Assessment Guidance for Site Investigations and Remediation* (RA Guidance). The RA Guidance currently requires that PFAS be addressed in risk assessments quantitatively (see RA Guidance Summary of Changes table) with respective screening levels provided in RA Guidance Table A-1, NMED Screening Levels. A current list of PFAS constituents that must be evaluated when sampling environmental media is outlined in RA Guidance Section 5.4, PFAS (See Table 5-21, PFAS Analyte List). RA Guidance Table A-1 currently includes applicable screening levels for the evaluation of soil, the soil-to-groundwater pathway, and the tap water for twelve of twenty-four PFAS listed on RA Guidance Table 5-2, and it is expected that regulatory screening levels and guidance will be updated as additional toxicity data become available.

The Permittee's intent to continue PFAS investigation at Cannon AFB under a "CERCLA-like process" may result in the collection of data which will not be acceptable for use in the evaluation of risk required for corrective action status determinations for solid waste management units (SWMUs), areas of concern (AOCs), and any impacted media contaminated by releases from these sites.

However, with consideration for the current regulatory situation for PFAS and the need to collect data for evaluation of other potential groundwater contaminant of concern issues, the Permittee may proceed with the scope of work proposed in FLGMP-Revision 1.

Revise the FLGMP to cite the updated RA Guidance as the applicable guidance document for any necessary site and screening level evaluations and provide all respective replacement pages.

Failure to revise the FLGMP in accordance with this letter and to address prior direction provided by NMED in response to the initial drafts of the FLGMP may result in an enforcement action specified in Permit Section 1.7, Enforcement.

**Response: Agree. The reference for the NMED guidance document was updated in the text and Appendix C to June 2022. The screening levels included in Appendix C were updated to reflect the current guidance documents.**

### **Comment 3. Section 3.3, Groundwater Sample Collection, Pages 3-2 and 3-3**

**NMED Comment:** Groundwater quality parameter data proposed for collection during proposed low-flow groundwater sampling must also include the collection of oxidation-reduction potential (ORP) data in addition to proposed data for turbidity, pH, specific conductance, dissolved oxygen, and temperature. Revise all affected FLGMP sections accordingly and provide respective replacement pages.

**Response: Agree. ORP was added to the list of groundwater quality parameters in Sections 3.1 and 3.3.**