KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS
ST-106/SS-111

April 2021

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

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Prepared for
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PREFACE

This Work Plan was prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland Air Force Base (AFB) under U.S. Army Corps of Engineers Contract Number W912PP20C0020. This Work Plan provides tasks to monitor the groundwater at the Kirtland AFB Bulk Fuels Facility (BFF) at Solid Waste Management Units ST-106/SS-111, located in Albuquerque, New Mexico. The objective of this Work Plan is to detail the activities that will be implemented to collect groundwater samples from the groundwater monitoring network associated with the BFF. This Work Plan was prepared in accordance with Part 6 of the Resource Conservation and Recovery Act Hazardous Waste Treatment Facility Operating Permit Number NM9570024423 issued to Kirtland AFB and applicable federal, state, and local laws and regulations.

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ACRONYMS AND ABBREVIATIONS

%	percent
AFB	Air Force Base
amsl	above mean sea level
BFF	Bulk Fuels Facility
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CFR	Code of Federal Regulations
DL	detection limit
DoD	Department of Defense
DOE	Department of Energy
EDB	1,2-dibromoethane (ethylene dibromide)
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
ERPIMS	Environmental Resources Program Information Management System
ft	foot/feet
GWM	groundwater monitoring
GWTS	groundwater treatment system
IDW	investigation-derived waste
IM	interim measure
IMOA	Interim Measure Operational Area
JP	jet propellant
KAFB	Kirtland Air Force Base
LNAPL	light non-aqueous phase liquid
LOD	limit of detection
LOQ	limit of quantitation
MCL	maximum contaminant level
MDL	maximum detection limit
MS	matrix spike
MSD	matrix spike duplicate
NMED	New Mexico Environment Department
No.	number

Q1	First quarter
Q2	Second quarter
Q3	Third quarter
Q4	Fourth quarter
QA	quality assurance
QC	quality control
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
REI	reference elevation interval
RL	reporting limit
SE	Southeast
SWMU	Solid Waste Management Unit
USAF	U.S. Air Force
VA	Veterans Affairs
VOC	volatile organic compound
WQCC	Water Quality Control Commission

EXECUTIVE SUMMARY

This Work Plan has been prepared for continued monitoring of groundwater at the Kirtland Air Force Base (AFB) Bulk Fuels Facility Site, Solid Waste Management Units ST-106/SS-111, located in Albuquerque, New Mexico. It was prepared in accordance with Part 6 of the Resource Conservation and Recovery Act Hazardous Waste Treatment Facility Operating Permit Number NM9570024423 issued to Kirtland AFB and applicable federal, state, and local laws and regulations.

This Work Plan meets the requirements of the New Mexico Environment Department Hazardous Waste Bureau October 2, 2020 letter, Groundwater Monitoring Work Plan, Bulk Fuels Facility Spill Solid Waste Management Units ST-106 and SS-111, Kirtland AFB, New Mexico. The letter requires Kirtland AFB to consolidate the requirements of groundwater monitoring into one work plan. Previously, groundwater monitoring work scopes were included in multiple work plans as additional wells were installed and added to the monitoring program. This Work Plan provides a consolidation of groundwater monitoring tasks previously conducted under multiple work plans.

1. INTRODUCTION

The groundwater monitoring (GWM) associated with the Kirtland Air Force Base (AFB) Bulk Fuels Facility (BFF) releases (Solid Waste Management Units [SWMUs] ST-106/SS-111) is 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 Number [No.] NM9570024423 [RCRA Permit]) (New Mexico Environment Department [NMED], 2010). This Work Plan describes tasks associated with continued monitoring of the groundwater at SWMUs ST-106/SS-111, also referred to as the BFF Site (Figure 1-1), to investigate groundwater contamination from jet fuel releases at the Kirtland AFB BFF. The Kirtland AFB BFF is in active operation with aboveground infrastructure with leak detection and containment measures.

This Work Plan meets the requirements of the October 2, 2020 letter issued by the NMED Hazardous Waste Bureau, Groundwater Monitoring Work Plan, BFF Spill SWMUs ST-106 and SS-111, Kirtland AFB, New Mexico (NMED, 2020) (Appendix A-1). The letter requires Kirtland AFB to consolidate the requirements of GWM into one work plan. Previously, GWM work scopes were included in multiple work plans as additional wells were installed and added to the monitoring program. Table 1-1 presents the previously approved documents with a discussion of how each contributes to GWM at SWMUs ST-106/SS-111.

This Work Plan was prepared in accordance with Parts 6.2.2.1.1 and 6.2.4.2 of the RCRA Permit (NMED, 2010). The technical requirements discussed in this Work Plan were prepared in accordance with the criteria discussed in Parts 6.5.2 through 6.5.5, 6.5.7, 6.5.17 and 6.5.18 of the RCRA Permit (NMED, 2010). Appendix A-2 provides the cross-walk table between the RCRA Permit requirements (NMED, 2010) and this Work Plan.

The primary contaminants of potential concern are 1,2-dibromoethane (ethylene dibromide [EDB]), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Monitoring is performed for volatile organic compounds (VOCs), metals, anions, and alkalinity. Approval of the current analytical suite is documented in NMED letters dated July 17, 2015 (NMED, 2015) and January 20, 2016 (NMED, 2016) (Appendix A-1). The approved analytical suite and sampling schedule (Table 1-2) serve to monitor the impact to groundwater of jet fuel contamination from the Kirtland AFB BFF releases.

2. BACKGROUND INFORMATION

2.1 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 Kirtland AFB BFF is located within the installation boundary in the northwestern portion of Kirtland AFB and 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. The BFF continues active operation with aboveground infrastructure with leak detection and containment measures. The BFF Site, comprised of SWMUs ST106/SS-111, includes the off-Base migration of jet fuel-related constituents in the groundwater and historically as light non-aqueous phase liquid (LNAPL). The off-Base migration included dissolved-phase EDB extending north of Ridgecrest Drive SE.

2.2 Site History

2.2.1 Operational History

The BFF at Kirtland AFB became operational in 1953, and has been used over time for the storage of aviation gasoline, jet propellant (JP)-4, JP-8, and smaller amounts of diesel fuel and unleaded gasoline. Releases were discovered in November 1999 when fuel staining was observed on the ground surface at the Former Fuel Offloading Rack. Based on the chemical composition of the fuels stored and used at the BFF, the releases are estimated to have begun prior to 1975, when the BFF transitioned from aviation gasoline to JP-4. Of the fuels stored and used at the BFF, only aviation gasoline contained EDB as an additive. When the fuel releases were discovered in November 1999, the Former Fuel Offloading Rack was closed, and a temporary fuel offloading area was constructed for use while aboveground infrastructure was constructed. Replacement of the infrastructure was finished in March 2011, and includes aboveground storage tanks and pipeline with leak detection and containment measures (Kirtland AFB, 2018). The former and current infrastructure for the BFF is shown on Figure 2-1.

2.2.2 Investigation History

Groundwater investigation activities included the installation, sampling, and analysis of GWM wells beginning in 2000. Current and former well designations are provided on Table 2-1. After the discovery of the releases, existing GWM well KAFB-3411, installed as a part of an investigation of an adjacent site, was sampled quarterly during the year 2000 to initiate the groundwater investigation. An additional 172 GWM wells have been installed or added to the monitoring network since the initiation of the groundwater investigation. The wells in the GWM network as of the fourth quarter (Q4) of 2020 are provided in Figure 2-2; the six nested wells installed in Q4 2020 and the first quarter (Q1) 2021 are included on this figure in approximate locations until they can be surveyed.

As a result of the expanded monitoring program, the nature and extent of groundwater contamination became better understood. It was determined that the dissolved-phase plume containing BTEX was situated south of Ridgecrest Drive SE, while the dissolved-phase EDB plume extended further north, approximately 2,200 feet (ft) north of Gibson Boulevard SE.

In December 2008, the San-Juan Chama Drinking Water Project became operational. Since that time, the Albuquerque Bernalillo County Water Utility Authority has met its water needs with a combination of

surface water from the Rio Grande and groundwater. As groundwater withdrawal from the regional aquifer was reduced, the water table in the vicinity of SWMUs ST-106/SS-111 began to rise (Section 3). As a result, existing well screens that were installed to span the water table became fully submerged. This resulted in a reduction of unsubmerged well screen monitoring points at the water table. This was identified as a data gap, and several wells have been installed since 2015 to address this data gap.

Historically, LNAPL was observed in select wells located south of Ridgecrest Drive SE. The number of wells containing LNAPL decreased over time (Figure 2-3). During 2020, LNAPL occurrence was located on-Base and primarily within the BFF (Figure 2-3).

In 2015, an interim measure (IM) was implemented to collapse and hydraulically control the EDB plume north of Ridgecrest Drive SE. Analytical data for EDB and BTEX in 2020 are provided in Tables 2-2 and 2-3, respectively. The historical EDB plume, from the second quarter (Q2) 2016 through Q2 2020, is presented on Figure 2-4, and the current benzene plume is presented on Figure 2-5. Historically, the highest concentrations of EDB and BTEX were located on-Base within the Source Area Plume.

The current groundwater IM consists of a network of four groundwater extraction wells located within the Interim Measure Operational Area (IMOA) in the distal portion of the dissolved-phase EDB plume (Figure 2-2). The goals of the groundwater IM are to protect drinking water supply wells and collapse the EDB plume located within the IMOA. Groundwater impacted by EDB is removed by the extraction wells and conveyed to the groundwater treatment system (GWTS). The GWTS consists of two treatment trains of two 20,000-pound granular activated carbon vessels each.

3. SITE CONDITIONS

The BFF Site is located within the Albuquerque Basin of the Rio Grande Rift, which has been filled with sediments identified as the Santa Fe Group. The groundwater impacted by the BFF Site is located within an unconfined aquifer in the Upper Santa Fe Group, which is composed of deposits of the ancestral Rio Grande fluvial system that co-mingle with alluvial deposits towards the basin margins (Hawley, 1996). Nearby production wells for Kirtland AFB, the City of Albuquerque, and the Veterans Affairs (VA) Medical Center are also screened within the Upper Santa Fe Group. The Upper Santa Fe Group extends upwards into the vadose zone, with an upper depth approximately 150 feet (ft) below ground surface and is overlain by Rio Grande and Rio Puerco deposits of the late Quaternary age (Hawley, 1996). A complete discussion of site conditions, including surface conditions that are not relevant to the activities discussed in this Work Plan, was provided in the Phase I RFI Report (Kirtland AFB, 2018).

Groundwater at the BFF Site began rising in 2009, and is expected to continue rising. As of Q4 2020, depth to groundwater ranged from approximately 435 to 490 ft below ground surface across the GWM network. Since 2009, the San Juan-Chama Drinking Water Project has reduced Albuquerque Bernalillo County Water Utility Authority groundwater usage causing the groundwater elevation to rebound by approximately 3-4 ft per year (Beman, 2013). As the rebound occurred, the groundwater gradient across the GWM network began to flatten.

3.1 Groundwater Monitoring Network

3.1.1 Reference Elevation Intervals

Due to the rising groundwater, the previous well depth designations of shallow, intermediate, and deep, which were based on the initial screened interval with reference to the water table, became less meaningful for comparing comparable depths of groundwater. In 2016, GWM wells were assigned a reference elevation interval (REI). Table 2-1 gives the former depth designation and current REI assignment for each of the GWM wells. REIs are below ground surface elevations that divide the GWM network into datasets comprised of wells that are screened across their respective elevations, allowing for a vertical evaluation of groundwater parameters and contaminant locations (Figure 3-1). Currently, wells are assigned to three REIs (4857, 4838, and 4814) (Table 2-1 and Figures 3-2 through 3-4). Data collected from the three REIs are used to provide a three-dimensional view of the dissolved-phase groundwater plumes.

REI 4857 is currently the uppermost interval so named because the GWM wells comprising this dataset are screened across the elevation of 4,857 ft above mean sea level (amsl). Data collected or measured from these GWM wells are representative of the hydrogeologic conditions of this zone that is bounded on top by the water table surface and bounded on the bottom by a surface that intercepts the bottom of the REI 4857 well screens. The screen elevations for the GWM wells within this dataset range from 4,879 ft amsl down to 4,827 ft amsl.

REI 4838 directly underlies REI 4857 and is so named because all but one of the screens of the GWM wells comprising this dataset are screened across the elevation of 4,838 ft amsl. Data collected or measured from these GWM wells are representative of the hydrogeologic conditions of this zone that is bounded on top by the bottom surface of REI 4857 and bounded on the bottom by a surface that intercepts the mid-point between the REI 4838 screens and the underlying REI 4814 screens. The screen elevations for the GWM wells within this dataset range from 4,848 ft amsl down to 4,800 ft amsl.

REI 4814 directly underlies REI 4838 and currently represents the lowest elevation dataset. The screened intervals for GWM wells within this dataset cover a large vertical extent of the aquifer ranging from an elevation of 4,824 ft amsl down to an elevation of 4,720 ft amsl.

3.1.2 Monitoring Well Objectives

GWM wells were assigned an objective and sampling schedule based on their location within SWMUs ST-106/SS-111. The following monitoring well objectives are presented on Table 1-2:

- ***Source Area Wells***—Located south of Ridgecrest Drive SE. Sampled during Q2 and Q4 at a minimum, with some sampled every quarter. These wells monitor the higher concentrations of dissolved-phase plumes.

- ***GWM Wells***—Primarily located north of Ridgecrest Drive SE. Analytical data from these wells help to estimate the volume and mass of the EDB plume throughout the GWM network. Sampled in Q2 and Q4 at a minimum, with wells previously designated as newly added sampled every quarter.

- ***Downgradient Proximal (Seasonal) Wells***—Primarily located north of Ridgecrest Drive SE, surrounding the historical EDB plume to the north and east into the distal portion of the GWM network. One well located to the south and east of the Source Area Plume. Groundwater flow direction varies seasonally; these wells are downgradient of the EDB plume during part of each year. Analytical data for these wells have been historically below the maximum contaminant level (MCL) for EDB. Sampled every quarter. These wells assist in plume boundary definition.

- ***Former Downgradient Proximal; Current Upgradient Wells***—Primarily located north of Ridgecrest Drive SE to the west and north of the historical EDB plume. These wells were previously downgradient of the historical EDB plume; however, as groundwater flow direction has shifted, they are currently upgradient. Sampled every quarter.

- ***Signal Wells***—Three wells located along the south side of Ridgecrest Drive SE to monitor BTEX and provide an early indication if the benzene plume is migrating from the source area into the IMOA. Sampled during Q2 and Q4.

- ***Paired Wells***—Wells located near a GWM IM extraction well to assess the quality of the water entering the extraction well.

- ***Sentinel Wells***—Wells located between the contaminated groundwater and nearby production wells. Sampled every quarter. These wells serve as an early warning system to assess potential contaminant migration toward production wells.

- ***VA Proximal Wells***—Three sets of nested wells located between the Source Area Plume and the Raymond G. Murphy VA Medical Center. Sampled every quarter. These wells serve as an early warning system to assess potential contaminant migration towards the VA supply well.

The locations of the Proximal, Signal, and Sentinel Wells are presented on Figure 3-5.

As discussed in Section 2, the groundwater level is rising at the BFF Site and has submerged the screens of GWM wells. Contingency wells were added to the GWM network to account for future water table

rise. These are nested wells that were completed with or adjacent to current water table wells and have screened sections located entirely in the vadose zone. It is expected that the water table will continue to rise, fully submerging the current water table wells. As this happens, the contingency wells will become water table wells, thus preventing a potential future data gap.

3.1.3 Groundwater Monitoring Regions

In 2015, the groundwater extraction IM began. As extraction wells and the GWTS were brought online, the contaminated groundwater was divided into two regions for monitoring purposes: the IMOA and the Source Area Plume (Figure 2-2).

3.1.3.1 Interim Measure Operational Area

Extraction wells are located north of Ridgecrest Drive SE, and this region was classified as the IMOA. In the IMOA, GWM serves to observe the effectiveness of the IM groundwater extraction and monitor the collapse of the EDB plume north of Ridgecrest Drive SE. When the groundwater extraction IM began, the groundwater gradient in the IMOA shifted to radial flow patterns towards depressions in the water table, which are primarily attributable to groundwater extraction (Figure 3-6). Figure 2-4 shows the impact of IM pumping in the IMOA.

3.1.3.2 Source Area Plume

As the BTEX plume was located south of Ridgecrest Drive SE, extending north off-Base and under Bullhead Park, and determined to be relatively stable, this region was classified as the Source Area Plume. The Source Area Plume also includes the highest concentrations of EDB. In the Source Area Plume, GWM is focused on continued observation of the nature and extent of groundwater contamination., and Figure 2-5 shows the Q4 2020 footprint of the benzene plume in the Source Area Plume.

In addition, LNAPL observation has been limited to wells located in the Source Area Plume (Figure 2-3). As of Q4 2020, LNAPL was measured in only four wells located on-Base within the Source Area Plume at thicknesses ranging from 0.01 to 0.04 ft. There were 14 wells with unsubmerged screens surrounding these wells that did not indicate the presence of LNAPL in Q4 2020. These data indicate that the extent of LNAPL was bounded during Q4 2020.

4. SCOPE OF ACTIVITIES

This Work Plan consolidates monitoring requirements for the expanded GWM network that were previously discussed in multiple work plans (Table 1-1). The RCRA Permit (NMED, 2010) provides the technical requirements for the activities to be performed at the BFF Site. Example field forms are provided in Appendix B. The following activities associated with GWM are discussed in this Work Plan:

- Groundwater and LNAPL gauging will be conducted in accordance with Part 6.5.17.2 of the RCRA Permit (NMED, 2010) and is discussed in Section 6.4 of this Work Plan.

- Field parameters will be collected in accordance with Part 6.5.17.4 of the RCRA Permit (NMED, 2010) and is discussed in Section 6.6.2 of this Work Plan.

- Sample collection will be conducted in accordance with Parts 6.5.17.5, 6.5.17.6, and 6.5.5 of the RCRA Permit (NMED, 2010) and is discussed in Sections 6.6, 6.8, and 6.9 of this Work Plan.

- GWM well maintenance will be performed to the ensure the GWM wells can be accessed and used to meet the technical requirements in Part 6.5.17 of the RCRA Permit (NMED, 2010) and is discussed in Section 6.7 of this Work Plan.

- Sample analysis will be conducted in accordance with Part 6.5.18 of the RCRA Permit (NMED, 2010) and is discussed in Section 6.10 of this Work Plan.

- Reporting will be conducted in accordance with the schedule required by Appendix I of the RCRA Permit and provided in Section 7 of this Work Plan.

- Investigation-derived waste (IDW) will be managed in accordance with Part 6.5.7 of the RCRA Permit (NMED, 2010). The IDW management plan is provided as Appendix C.

5. INVESTIGATION METHODS

The initial investigation of groundwater at SWMUs ST-106/SS-111 was completed under multiple work plans beginning in November 1999. The initial investigation included multiple phases of GWM well installation, soil sampling, borehole logging, groundwater contamination characterization, aquifer testing, and LNAPL characterization. Investigations from November 11, 1999 through December 31, 2015 were discussed in detail in the Phase I RFI Report (Kirtland AFB, 2018). Investigations beginning in 2016 were conducted under the Work Plans listed in Table 1-1.

This Work Plan covers the continued monitoring and sampling of the GWM network, and the methods for these tasks are described in Section 6.

6. MONITORING AND SAMPLING

The activities discussed in this Work Plan include monitoring, maintenance, and sampling of the current GWM network in accordance with the methods described in this Work Plan and Part 6.5 of the RCRA Permit (NMED, 2010). GWM and sampling activities conform to Part 6.5.17, Technical Requirements for Groundwater Investigations, of the RCRA Permit (NMED, 2010). Sample analysis activities conform to Part 6.5.18, Laboratory Analyses Requirements for all Environment Media, of the RCRA permit (NMED, 2010).

6.1 Documentation of Field Activities

Field activities will be documented in accordance with Part 6.5.2 of the RCRA Permit (NMED, 2010) and this Work Plan. Daily field activities will be recorded on the appropriate forms, which will be maintained by Kirtland AFB and provided upon request. Appendix B includes example field forms.

Specific data management roles and responsibilities are held by the Data Management Lead and the Field Team Lead and are discussed below:

- ***Data Management Lead***—Responsible for transcription of field data to electronic data deliverable (EDD) format, loading of field and laboratory analytical EDDs to the project database, updating the database as required with current data pulls from the Environmental Resources Program Information Management System (ERPIMS) data repository, and running reports to provide current and historical data from the database. Also responsible for uploading the database with data validation qualifiers, edits resulting from data validation, and delivering the ERPIMS data deliverable to the U.S. Air Force (USAF) data management contractor.

- ***Field Team Lead***—Responsibility will be assigned for each task to qualified staff: responsible for the accuracy of all field activity-related documentation and records collected in support of the project plan implementation including all information related to field sample collection; field instrumentation and measurements; equipment decontamination; and sample management and shipping documentation, field deviation, and corrective action.

Project data will be documented and recorded using various methods, as applicable. The following field documentation and records may be generated during GWM activities:

- Air bills and sample shipping documentation
- Chain-of-custody records
- Communication logs/e-mails
- Corrective action reports
- Documentation of corrective action results
- Documentation of deviations from methods
- Documentation of internal quality assurance (QA) reviews

- Field data collection forms including field parameter logs
- Sampling notes in bound, waterproof field logbooks or on designated field forms in electronic tablet format
- Field instrumentation calibration logs
- Global Positioning System files
- Identification of quality control (QC) samples
- Photographs
- Sampling equipment decontamination records
- Sampling location figures (based on targeted and actual coordinates)
- Field deviation request forms.

These records will be created in either written (e.g., sampling notes) or electronic formats (e.g., Global Positioning System files, measurement instrument/data-logger files, field databases, etc.). All records will undergo an independent review either at the laboratory or in the field by the technical leads, QA Officer, or the Project Manager. Project data collected during the GWM field activities will be managed and stored using EQuIS™, include field sampling parameters collected during well sampling, water levels measurements, sample location information such as coordinates, etc. Field data will be recorded on the appropriate forms per Part 6.5.2 of the RCRA Permit (NMED, 2010) or electronically and reviewed and transferred to the field data EDDs as appropriate. The EDDs will be reviewed for accuracy and completeness against field records prior to being loaded into the EQuIS™ database. Field data that cannot be integrated into the database (i.e., site photographs, field logbooks, or field forms) will be stored electronically in the project-specific network folders and/or in the project files. The Field Team leads will be responsible for ensuring that all field data files are stored electronically in the project-specific network folders and paper copies (if any) are stored in the project folders.

6.2 Decontamination Procedures

The objective of field decontamination is to minimize the potential for cross-contamination. Decontamination procedures will be performed as specified in Part 6.5.3 of the RCRA Permit (NMED, 2010) and this Work Plan. Final decontamination of equipment will take place in designated decontamination areas specific to the work activity and approved by Kirtland AFB. Decontamination IDW will be managed in accordance with Appendix C.

Equipment will be decontaminated using the following procedures:

- If necessary, use a wire or other suitable brush to remove large particulate matter and rinse the equipment with potable tap water or bottled drinking water.
- Use a standard brand of phosphate-free laboratory detergent, such as liquid Liquinox® or powder Alconox® to wash the equipment.

- Rinse the equipment using potable tap water or bottled drinking water.

- Use deionized water for the final rinse of sampling equipment that has direct contact to the sampling medium (e.g., the non-dedicated pumps used to sample monitoring wells).

6.3 Field Equipment Calibration Procedures

Field equipment will be calibrated in accordance with Part 6.5.4 of the RCRA Permit (NMED, 2010) Work Plan and manufacturer specifications. Field equipment requiring calibration will be calibrated before use in the field to known standards, using the manufacturer's recommended procedures and, at a minimum, the manufacturer's recommended schedule. A bump-test, where an instrument is exposed to a known concentration of the target parameter to ensure the accuracy of the instrument, may be conducted between calibrations at the manufacturer's recommended schedule to ensure that the instrument is reading correctly. If the results of the bump-test fall outside of the required range, the instrument will be calibrated. Calibration measurements will be recorded on calibration logs (Appendix B).

6.4 Groundwater Gauging and Sampling Schedule

The schedule for gauging and sampling the GWM network is presented herein to satisfy the requirements of Parts 6.5.17.2 and 6.5.17.3 of the RCRA Permit (NMED, 2010).

The GWM network consists of 173 wells (Table 1-2). When a well is added to the GWM network, it will be sampled for eight consecutive quarters using low flow sampling methods to establish baseline concentrations. If the well does not contain LNAPL or is not adjacent to a well that contains LNAPL after eight quarters of low-flow sampling, passive sampling methods will be implemented. Each of the 173 wells in Table 1-2 is gauged quarterly.

The 173 wells presented on Table 1-2 include:

- A total of 167 wells that are sampled on the scheduled presented on Table 1-2. Sixty wells are sampled in Q1 and third quarter (Q3) of each year and 167 are sampled in Q2 and Q4 of each year (Figures 3-2 through 3-4). Sampling methods and well construction details are provided in Table 6-1. The status of baseline sampling for wells installed beginning in 2020 is presented below:

  - Six data gap wells are being completed in Q4 2020 and Q1 2021 (KAFB-106248, KAFB-106249, KAFB-106250, KAFB-106251, KAFB-106252, KAFB-106S10), which will be sampled within 10 days of development (Kirtland AFB, 2019). It is expected that these six wells will be included in the regular sampling schedule during Q2 2021.

- One well (KAFB-106211), which will be sampled once the water level rises sufficiently to conduct sampling.

- Five wells that are gauged but not sampled (KAFB-106148-484, KAFB-106150-484, KAFB-106154-484, KAFB-106155-484, and KAFB-106156-484). These wells are located in the Source Area Plume and were originally installed as part of the vadose zone investigation. Following the rise in water levels that resulted in sufficient water column in the screened interval, they were added to GWM network to supplement gauging in 2017 (Table 1-1).

6.5 Groundwater and Light Non-Aqueous Phase Liquid Gauging

Groundwater and LNAPL gauging will be conducted in accordance with Part 6.5.17.2 of the RCRA Permit (NMED, 2010) and this Work Plan. While the RCRA Permit (NMED, 2010) does not specify technical requirements for LNAPL gauging, the measurements are collected concurrent with groundwater gauging and, therefore, follow the same procedure. Groundwater and LNAPL gauging will be conducted quarterly at each of the 173 wells in the GWM program (Table 1-2). Monitoring wells will be gauged within a synoptic period of no more than 5 consecutive days (Kirtland AFB, 2017).

Depth to LNAPL (if present) and depth to water will be measured in each well using an electronic oil-water interface probe, or similar. If the monitoring well is equipped with a dedicated pump, gauging will be made through the well casing and gauging port.

The sequence of procedures used when measuring depth to water is as follows:

- Identify which wells require barricading for access and obtain the required barricade permits. As possible, schedule gauging in conjunction with sampling to minimize disruption of traffic and access for residents.

- Segregate the wells between contaminated and uncontaminated categories. Wells will be gauged with water level meters designated for "clean" or "contaminated" wells. Although water level meters are decontaminated between wells, this approach will further minimize the potential of cross-contamination.

- Don appropriate personal protective equipment. Samplers will don new sampling gloves at each well before beginning gauging.

- Check operation of measurement equipment aboveground.

- Visually examine the exterior of the monitoring well for signs of damage or tampering and record observations on the Monitoring Well Gauging Form (Appendix B).

- Unlock the well cap or outer steel casing lid. Visually examine the interior of the monitoring well for signs of damage or tampering and record observations on the Monitoring Well Gauging Form (Appendix B).

- Immediately upon opening the cap, take organic vapor readings with a photoionization detector at the well head and record information on the Monitoring Well Gauging Form (Appendix B). If concentrations greater than 5 parts per million are detected, take appropriate protective measures, including ventilating the well vault.

- Lower interface probe into the GWM well and note depth to LNAPL, if any, and depth to groundwater. Measurements will be taken from a reference mark located on either the top of the protective casing for wells with aboveground completion or from the top of the vault for wells with flush completion. Measurements are to be made to the nearest 0.01 ft.

- Record gauging information on the field form (Appendix B).

- Record the time and day of the measurement.

- Decontaminate groundwater level measurement devices before and after each use to prevent cross contamination of wells.

If a well is found to contain more than 0.02 ft of LNAPL, it will be bailed with a disposable bailer prior to sampling. The removed LNAPL will be disposed of as hazardous waste at an offsite facility, as discussed in Appendix C. Bailing will not be performed for wells than are only gauged and not sampled.

6.6 Groundwater Sampling

Groundwater sampling will be conducted in accordance with Part 6.5.17.3 of the RCRA Permit (NMED, 2010) and this Work Plan. Sampling will be performed according to the schedule presented in Table 1-2 and Figures 3-2 through 3-4, and as discussed in Section 6.4 above. Groundwater samples will be collected using either a passive sampling device or low flow techniques (Table 6-1).

Following removal of the passive sampling device or the completion of purging, samples will be collected into appropriate clean containers with the relevant preservatives. Sample aliquots that are sent to the laboratory for dissolved metals analysis will be filtered in the field in accordance with the requirements in Part 6.5.17.5 of the RCRA Permit (NMED, 2010) and this Work Plan. The following procedures will be followed:

- Prior to preservation, sample aliquots will be filtered using a disposable filter with a 0.45-micron nominal pore size.

- The sample will be filtered immediately after collection to minimize changes in the concentration of the substance of interest. Samples are only passed through the filter once and immediately preserved.

Paperwork accompanying samples to the laboratory will clearly state that the samples have been field-filtered to avoid a second filtration at the laboratory.

6.6.1 Groundwater Sample Collection Using Passive Sampling Techniques

GWM wells located north of Ridgecrest Drive SE are approved by NMED to utilize passive sampling technologies (NMED, 2017) following sampling evaluations that showed comparable analytical results in samples collected using passive and low-flow technologies. In addition, regardless of location, wells that are less than 4 inches diameter are sampled using passive technologies as the diameter is too small to accept a low-flow pump. The approval of passive sampling (NMED, 2017) meets the requirement in Part 6.5.17.4 of the RCRA Permit (NMED, 2010) that states, “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.”

Because passive sampling is not discussed in the RCRA Permit (NMED, 2010), it will be performed in accordance with the methods described in the Work Plan for the BFF Expansion of the Dissolved-Phase Plume GWTS Design (Kirtland AFB, 2017). These methods consist of:

- Donning appropriate personal protective equipment. Samplers will don new sampling gloves at each well before beginning sampling.

- Deploying passive samplers prior to sampling on a timeline in accordance with manufacturer and analyte-specific requirements to allow for adequate equilibration between the passive sampler and the groundwater. Deployments will use dedicated passive deployment equipment, including tethers.

- If the top of water measured is within the screened interval, setting the midpoint of the uppermost passive sampler 2 ft below the water level. If the top of the water is above the screened interval, setting the midpoint of the topmost passive sampler 2 ft below the top of the screened interval.

- Retrieving passive samplers from the wells and collecting the groundwater samples per the manufacturer's specifications. The required sample aliquots will be collected from their respective passive samplers. Samples collected using passive methods will be filtered directly into proper containers using new, disposable, clean 0.45-micron nominal pore size filters (see Section 6.6, above).

- Dedicated deployable equipment (tethers) will either be retained in sealed, non-reactive containers or stored down well between sampling events.

A list of the wells sampled using passive techniques is provided in Table 6-1.

6.6.2 Groundwater Sample Collection Using Low-Flow Techniques

Low-flow purging and sampling will be conducted in accordance with the requirements of Parts 6.5.17.4 and 6.5.17.5 of the RCRA Permit (NMED, 2010) and this Work Plan. Low-flow sampling may be conducted using either portable or dedicated sampling systems. Samples collected using low-flow methods will be filtered through a new disposable in-line 0.45-micron nominal filter, with the sample collected directly from the filter output (see Section 6.6, above). As dedicated Bennet pumps fail, they will not be replaced. Instead, the well will be sampled using a portable sampling system. A total of 68 wells will be sampled using a low-flow sampling system (Table 6-1). As of Q4 2020, there were 18 wells that were sampled using dedicated low-flow sample systems (KAFB-106002, KAFB-106011, KAFB-106016, KAFB-106017, KAFB-106024, KAFB-106027, KAFB-106046, KAFB-106067, KAFB-106075, KAFB-106093, KAFB-106044, KAFB-106047, KAFB-106060, KAFB-106065, KAFB-106062, KAFB-106066, KAFB-106068, and KAFB-106078). The remaining 50 wells will be sampled using a portable system.

Low-flow sampling will be conducted in order of clean to increasing contamination based on historical analytical data. When portable low-flow pumps are used, separate pumps will be used to sample "clean" wells versus "contaminated" wells. This will decrease the possibility of cross-contamination.

6.6.2.1 Well Purging

Monitoring wells will be purged in accordance with the requirements of Part 6.5.17.4 of the RCRA Permit (NMED, 2010) and this Work Plan. Groundwater will be purged continuously at a flow rate between 0.5 and 1 liter per minute, while field parameters (turbidity, temperature, dissolved oxygen, specific conductivity, pH, and oxidation reduction potential) will be measured and recorded every 5 minutes. Purging will be considered complete when the groundwater quality parameters have stabilized for three consecutive readings. Stability is defined as measurements within 10 percent (%) of each other for specific conductivity, dissolved oxygen, and temperature, within 0.5 standard units for pH, and turbidity is either below 10 nephelometric turbidity units or measurements within 10% of each other. This is a variance from the RCRA Permit, which stipulates that three quarters of a well volume be purged from

the well prior to sampling. This variance was presented in the Work Plan for the BFF Expansion of the Dissolved-Phase Plume GWTS Design (Kirtland AFB, 2017), which was approved by NMED on May 31, 2017 (NMED, 2017). The approval meets the requirement in Part 6.5.17.4 of the RCRA Permit (NMED, 2010) that states, "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." Purge information and field parameters will be recorded on the field forms (Appendix B).

The following procedures apply to the purging of monitoring wells:

- Don appropriate personal protective equipment. Samplers will don new sampling gloves at each well before beginning sampling.

- Visually examine the exterior of the monitoring well for signs of damage or tampering and record notes on the Well Purge and Sampling Log (Appendix B).

- Unlock the well cap or outer steel casing lid. Visually examine the interior of the monitoring well for signs of damage or tampering and record notes on the Well Purge and Sampling Log (Appendix B).

- Take organic vapor readings with the photoionization detector at the well head immediately upon opening the cap and record information on the Well Purge and Sampling Log (Appendix B). If concentrations greater than 5 parts per million are detected, appropriate measures will be taken, including ventilating the well vault.

- Measure the static water level and the LNAPL (if present) as described in Section 6.5 of this Work Plan. Continue to record depth to water and LNAPL during purging.

- Begin purging at a rate of approximately 0.5 liters per minute. The purge rate may be increased to a maximum flow rate of 1 liter per minute; ensuring that drawdown does not exceed a distance of 25% of the length of the saturated screened interval.

6.6.2.1.1 Purging with Dedicated Sampling Pumps

Where a dedicated sampling pump is present, an air compressor and tubing for the purge water will be connected to the dedicated equipment. The pump intake is approximately in the middle of the screened interval in wells with dedicated pumps. As of Q4 2020, there were no dedicated pumps in wells with partially submerged screened intervals.

6.6.2.1.2 Purging with Portable Sampling Pumps

Wells sampled using a portable low-flow system are designated, based on historical analytical data, as either clean, intermediate, or hazardous. Decontaminated non-dedicated tubing and portable low-flow pumps will be used to sample wells designated as clean. Dedicated tubing specific to a given well will be used for wells designated as intermediate or hazardous. The following procedures apply when sampling wells using a portable low-flow system:

- Don appropriate personal protective equipment. Samplers will don new sampling gloves at each well before beginning sampling.

- Prior to deployment, the pump and the associated tubing will be decontaminated, or dedicated tubing may be used.

- An equipment blank will be collected from non-dedicated equipment with the frequency specified in Part 6.5.17.6 of the RCRA Permit (NMED, 2010).

- If the top of water measured during the preparation for purging is within the screened interval, the pump intake will be set 2 ft below the water table. If the top of the water is above the screened interval, the pump intake will be set 2 ft above the bottom of the screened interval.

- After the pump is set, purging will be performed as described in Section 6.6.2.1 of this Work Plan.

- The entire sampling assembly will be decontaminated following use at each well.

6.7 Groundwater Monitoring Network Maintenance

GWM maintenance will be performed to ensure the GWM wells can be accessed and used to meet the technical requirements in Part 6.5.17 of the RCRA Permit (NMED, 2010). Inspection of the GWM wells will occur in conjunction with or following the quarterly gauging and sampling events to determine necessary repairs and/or part replacements. Maintenance for the GWM network will typically be performed following the quarterly sampling events. For the wells requiring City of Albuquerque barricade permits, maintenance will be performed concurrently with gauging or sampling events.

If maintenance is performed during sampling events, it will be conducted after sample bottles are filled, sealed, and placed on ice in a closed container in the vehicle to avoid cross-contamination with materials used for maintenance. Well maintenance includes, as necessary, cleaning of vault threads and bolts; painting protective bollards; and replacing worn parts such as J-plugs, vault seals, security bolts, and protective casing lids. Protective bollards are not present on wells requiring City of Albuquerque barricade permits; any painting required will be scheduled for a time separate from the sampling event. Maintenance activities will be documented for every well on field logs (Appendix B). Before and after photographs will be taken of wells where significant maintenance is conducted. The findings of the inspections, repairs, and any other changes will be documented through photographs and on the appropriate inspection logs. Summary letter reports will be prepared and maintained on file by Kirtland AFB. These reports can be provided at the request of NMED.

Annually, the total depth of wells without a dedicated pump will be measured with a weighted measuring line to assess sediment build-up in the sump of each well. If a well is found to contain 2 ft of sediment in the well screen, the well will be redeveloped. Total depth information will be reported in the Q4 Periodic Monitoring Report.

6.8 Field Quality Control for Groundwater Sampling

Field QC will be conducted in accordance with Part 6.5.17.6 of the RCRA Permit (NMED, 2010) and this Work Plan. Field duplicates, matrix spike (MS)/matrix spike duplicate (MSD) samples, trip blanks, equipment rinsate blanks, and field blanks will be collected or prepared and analyzed for QC purposes. Field QC samples will be collected at the following minimum frequencies:

- Field duplicate samples will be collected immediately following the primary sample. Field duplicate samples will be collected and analyzed at a frequency of at least one per 10 environmental samples (10%).

- MS/MSDs will be collected at a frequency of at least one per 20 environmental samples (5%).

- Trip blanks will be prepared at a frequency of one per shipping container containing samples for VOC analysis.

- Equipment rinsate blanks will be collected at a frequency of once per day when non-dedicated equipment is used, or as determined necessary to assess the thoroughness of equipment decontamination procedures if implemented.

- Field blanks will be associated with samples for VOCs, and will be collected as determined necessary based on site conditions to assess potential field sampling contamination.

6.9 Sample Handling, Shipping, and Custody

Sample handling, shipping, and custody requirements are designed to maintain sample integrity from the time a sample is collected until it is received at the analytical laboratory. Samples will be handled and shipped in accordance with Part 6.5.5 of the RCRA Permit (NMED, 2010) and this Work Plan.

6.9.1 Sample Handling

Samples will be handled in accordance with the requirements in Part 6.5.5.1 of the RCRA Permit (NMED, 2010) and this Work Plan. The following procedures will be followed:

- Protective gloves, such as nitrile gloves, will be worn while collecting samples. New disposable gloves will be worn for each sample.

- Samples will be collected in new laboratory-provided glass or plasticware containing the required preservatives for the analytical method. Table 6-2 provides information regarding the containers, preservatives, and holding times.

- Samples will be immediately placed on ice where required by the analytical method.

- Sample labels will be completed and applied (Section 6.9.4), field documentation will be completed, and sample custody will be maintained (Section 6.9.3).

- Samples will be placed in appropriate protective bags (i.e., bubble bags) to prevent breakage or puncture during shipping.

6.9.2 Sample Shipment

Sample packing and shipping will be conducted in accordance with the requirements in Part 6.5.5.2 of the RCRA Permit (NMED, 2010) and this Work Plan. Specific procedures for packaging and shipping of environmental samples are presented below:

- New disposable nitrile gloves will be worn when preparing samples for shipping.
- A sample label, completed with indelible ink, will be attached to the sample bottle (Section 6.9.4).
- A cooler will typically be used as a shipping container.
- In preparation for shipping samples, the drain plug will be taped shut so that no fluids (i.e., melted ice) will drain out of the cooler during shipment. A large plastic bag may be used as a liner for the cooler. Packing material (i.e., bubble wrap) will be placed in the bottom of the liner. Ice will be placed at the bottom of the cooler.
- The containers will be placed in the lined cooler. Cardboard separators or bubble wrap may be placed between the containers at the discretion of the shipper.
- All samples for chemical analysis must be shipped cooled to ≤6 degrees Celsius with ice. All samples will require icing before shipment. A temperature blank will be included in each shipment of water samples.
- The liner will be taped closed, if used, and sufficient packing material will be used to prevent sample containers from making contact or rolling around during shipment.
- The chain-of-custody form, including the analytical request form, will be placed inside the cooler (Section 6.9.3).
- The cooler will be closed and taped shut with packing tape.
- Custody seals will be placed on the cooler. Clear tape will be placed over the custody seals to help prevent them from being accidentally torn or ripped off.
- The cooler of samples will be submitted to the laboratory in an appropriate timeframe based on the hold time and temperature requirements (i.e., shipped via an overnight carrier). A copy of the shipping bill will be retained for the field records and sent electronically to the project chemist.

6.9.3 Sample Custody

Sample custody will be maintained in accordance with the requirements in Part 6.5.5.3 of the RCRA Permit (NMED, 2010) and this Work Plan. Samples collected for analysis will be recorded on field sample collection logs and chain-of-custody forms (Appendix B). Chain-of-custody forms will be placed in the cooler or other shipping container. Custody seals will be applied to the cooler or other shipping container. Upon receipt of the samples at the laboratory, custody seals will be broken, the chain-of-custody forms will be signed as received by laboratory personnel, and the conditions of the samples will be recorded on the form. Copies will be returned and Kirtland AFB will maintain copies of chain-of-custody forms.

Chain-of-custody forms will include at a minimum:

- Sample identification number

- Signature of sample collector
- Date and time of sample collection
- Location at which the sample was collected
- Type of media sampled
- Preservatives used
- Analysis required
- Signature of all persons that had custody of the samples
- Dates and times of possession
- Signature, date, and time of breaking the custody seal by the laboratory.

6.9.4 Sample Labels

Sample labels will be prepared in accordance with the requirements in Part 6.5.5.4 of the RCRA Permit (NMED, 2010) and this Work Plan (Table 1-1). Labels will be affixed to each sample container and will be completed immediately following sampling using indelible ink. Labels may be covered by transparent waterproof tape to maintain legibility. At a minimum, labels will include the following:

- Sample identification number
- Name or initials of sample collector
- Sample location
- Sample date and time
- Analytical parameter and method requested
- Preservation method.

6.10 Laboratory Analytical Requirements

The laboratory providing analytical testing services for regular GWM samples will meet the requirements specified in Part 6.5.18 of the RCRA Permit (NMED, 2010) and maintain Department of Defense (DoD) Environmental Laboratory Accreditation Program certification. The analytical laboratory must have the analytical expertise to perform the analyses required for this contract in accordance with DoD Quality Systems Manual (QSM) Version 5.3 (DoD and Department of Energy [DOE], 2019) and U.S. Environmental Protection Agency (EPA) or other industry standard analytical methodologies. Laboratory certifications can be provided to NMED upon request. The laboratory reporting limits will achieve Project Standards and Screening Criteria specified in Section 6.10.2 below. The analytes included in this GWM program, including the relevant general chemistry parameters discussed in Part 6.5.17.3 of the RCRA Permit (NMED, 2010), are provided on Table 6-3 along with their screening levels.

6.10.1 Project Standards and Screening Criteria

Samples collected in support of GWM will be analyzed in accordance with DoD Environmental Laboratory Accreditation Program and the DoD QSM Version 5.3 as applicable (DoD and DOE, 2019). Analytical data will be reported in accordance with QSM requirements. DoD QSM reporting limit requirements include (1) detection limit (DL), (2) limit of detection (LOD) and (3) limit of quantitation (LOQ) where the DL is less than LOD, which is less than LOQ. The DoD DL is most commonly associated with the EPA method detection limit (MDL), the lowest concentration that an analyte can be detected per the analytical method. The DoD LOD is commonly associated with the EPA sample-specific reporting limit (RL), the limit at which the detected analyte is reported with 99% confidence. The DoD LOQ is associated with the EPA practical quantitation limit, the limit an analyte can be reported at 100% confidence and within method precision and accuracy. Per DoD QSM reporting requirements, sample results below the LOQ and above the DL are reported with a "J" qualifier, signifying estimated data. Non-detect sample results are reported with a "U" qualifier at the LOD. The analytical methods used for the primary contaminants of potential concern at SWMUs ST-106/SS-111 are capable of detecting the analytes at or below the relevant screening levels as required by Part 6.5.18 of the RCRA Permit (NMED, 2010) (Table 6-3).

The primary contaminants of potential concern are EDB and BTEX. Monitoring is performed for VOCs, metals, anions, and alkalinity. The project screening levels for hazardous constituents listed in 40 Code of Federal Regulations (CFR) Part 261, Appendix VIII or 40 CFR Part 264, Appendix IX were selected to satisfy the requirements of the Kirtland AFB RCRA Permit (NMED, 2010) as the lower of:

- New Mexico Water Quality Control Commission (WQCC) standards per the New Mexico Administrative Code, Title 20.6.2.3103, Standards for Groundwater of 10,000 milligrams per liter Total Dissolved Solids Concentration or Less (New Mexico Administrative Code, 2018). For metals, the NMWQCC standard applies to dissolved metals and total mercury.

- EPA National Primary Drinking Water Regulations, MCLs and secondary MCLs, and Title 40 CFR Parts 141 and 143.

- If no MCL or New Mexico WQCC standard existed for an analyte, the Project Screening Level used was the EPA Residential Tap Water Regional Screening Level (EPA, 2020).

Groundwater project screening levels for the approved analytical suite are provided in Table 6-3. The DLs meet the project screening levels for all fuel-related analytes.

6.10.2 Laboratory Quality Assurance/Quality Control Requirements

The laboratory QA/QC requirements are in accordance with Part 6.5.18.1 of the RCRA Permit (NMED, 2010) and this Work Plan.

6.10.2.1 Quality Assurance

The laboratory providing analytical testing services will maintain internal QA programs in accordance with EPA and industry-accepted practices and procedures. At a minimum, the laboratory will use a combination of standards, blanks, surrogates, duplicates, MS/MSDs, and other laboratory control samples to assess data quality.

6.10.2.2 Equipment Calibration Procedures and Frequency

The laboratory's equipment calibration procedures, frequencies, and standards will be in accordance with the EPA test method requirements and documented in QA and standard operating procedure manuals. Instruments and equipment used by the laboratory will be operated, calibrated, and maintained in accordance with manufacturers' guidelines and recommendations. A routine schedule and record of instrument calibration and maintenance will be kept on file at the laboratory.

6.10.2.3 Laboratory QC Samples

Analytical procedures will 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 will be conducted in accordance with the requirements and frequency documented in EPA test methods. At a minimum, the laboratory will analyze laboratory blanks, MS/MSDs, and laboratory duplicates at a frequency of at least one in 20 (5%) for all batch runs requiring EPA test methods and at a frequency of at least one in 10 (10%) for non-EPA test methods.

6.10.3 Laboratory Deliverables

The laboratory will provide analytical data packages in accordance with the requirements in Part 6.5.18.2 of the RCRA Permit (NMED, 2010). Chemical analytical data will include sample results from groundwater samples generated by the laboratory subcontractor. For all chemical analytical data, the laboratory will provide an EQuIS™- and ERPIMS-formatted EDD, and a Level II- and Level IV EPA-type data package (unless otherwise specified).

The laboratory is responsible for ensuring that all analytical data reported in the electronic copy and portable document format data report are consistent and accurate in accordance with their scope. Verification of EDD formatting and completeness will be performed by the EA project chemist and data management personnel during data review and upload. EDDs and data reports received from the laboratory that contain errors will be returned to the laboratory for correction and resubmittal. Chemical analytical data except for IDW data will be uploaded to the USAF data repository.

Per Part 6.5.18.2 of the RCRA Permit, laboratory analytical data packages will be prepared in accordance with EPA-established Level II and Level IV analytical data reporting protocols. Level II analytical data packages include the analytical sample results, laboratory QC sample results associated with the project samples, chain-of-custody and sample login documentation, and a sample group case narrative documenting analyses performed and including any deviations or exceptions. Level IV analytical data packages include all elements of the level II packages in addition to instrument raw analytical data including calibration curves, instrument calibration data, data calculation work sheets, and other laboratory supporting data required per Part 6.5.18.2 of the RCRA Permit (NMED, 2010). Level II analytical data packages will be included with quarterly GWM reports. Level IV analytical data packages will be used for the independent data validation process and maintained at Kirtland AFB to be made available upon NMED request.

Data management staff will review data and records received from the subcontractor laboratories using the following process to ensure accuracy:

- Record-by-record review of hard copy compared to electronic data transmittals from laboratories to data validators against the records loaded in the database for 100% of validated results.

- 100% check on revised sample result concentrations based on data qualification.

Laboratories will be required to submit their results in ERPIMS and EQuIS™ EDD formats. As one or more delivery groups are completed, deliverables will be transmitted electronically to the Data Management Lead or obtained from the laboratory secure website. Designated data management personnel will check and load the EDDs into the EQuIS™ project database. Any errors in the EDD for a given sample delivery group will prevent loading of data from that sample delivery group and the issue will be communicated to the Laboratory Project Manager for correction and resubmission. Analytical data will be managed in EQuIS™ for validation and reporting purposes. The ERPIMS data deliverables will be submitted to the USAF data management subcontractor and processed for upload to the USAF data repository.

6.10.4 Review of Field and Laboratory Quality Control Data

Field and laboratory QC data will be reviewed in accordance with Part 6.5.18.3 of the RCRA Permit (NMED, 2010). Kirtland AFB will evaluate sample data and field and laboratory QC results for acceptability.

Data verification and data validation are sequential steps in a data review process that can be performed by either the party collecting the data or an independent third-party subcontractor. Data verification is performed on a data set to ensure method, procedural, and contractual compliance with project-specific requirements. Data validation is an analyte- and sample-specific process that extends the evaluation of analytical data beyond the data verification process to determine the analytical quality of a specific data set. Data verification will be performed by qualified project team personnel at the completion of quarterly GWM sampling and analysis.

Analytical data generated in support of GWM activities will undergo data validation by an independent third-party validation subcontractor to ensure compliance with data quality and project objectives per Part 6.5.18.3.2 of the RCRA Permit (NMED, 2010). Validation will incorporate the verification process and further evaluate data quality based on analytical method-specific QC criteria and DoD QSM requirements. The validation subcontractor will use established data validation procedures to perform 100% EPA Stage 2B data validation on the Level IV data package provided by the laboratory for all analytical data collected in support of the GWM program. The IDW analytical data will be reviewed for completeness and compliance to analytical requirements and will not undergo data validation.

Data validation qualifiers will be uploaded to the project database prior to finalizing data for use in project reports. Results of the data verification and validation efforts will be documented by the validation subcontractor in the data validation report and summarized in a data quality evaluation report to be included with the periodic monitoring reports. Data validation will be conducted in accordance with the requirements presented in Part 6.5.18.3 of the RCRA Permit (NMED, 2010) and the DoD Data Validation Guidelines (DoD and DOE, 2019 and updates).

7. PROJECT SCHEDULE

GWM activities will occur quarterly, and a periodic monitoring report will be submitted for each quarter. Quarter designations are aligned with calendar year quarters.

7.1 Quarterly Groundwater Monitoring Schedule

The sampling and gauging requirements for each quarter and provided in Table 1-2, and will be conducted on the following schedule:

- Q1: First quarter of the year, January 1 through March 31
- Q2: Second quarter of the year, April 1 through June 30
- Q3: Third quarter of the year, July 1 through September 30
- Q4: Fourth quarter of the year, October 1 through December 31.

7.2 Periodic Monitoring Report Schedule

Periodic monitoring reports will be submitted to NMED for each quarter of monitoring in accordance with the schedule provided in Table I-2 in Appendix I of the RCRA Permit (NMED, 2010) or a schedule approved by NMED:

- Q1 report will be submitted by June 30 of each calendar year.
- Q2 report will be submitted by September 30 of each calendar year.
- Q3 report will be submitted by December 31 of each calendar year.
- Q4 report will be submitted by March 31 of the following calendar year.

Monitoring and reporting schedules may be adjusted in future monitoring work plans or with approval by NMED.

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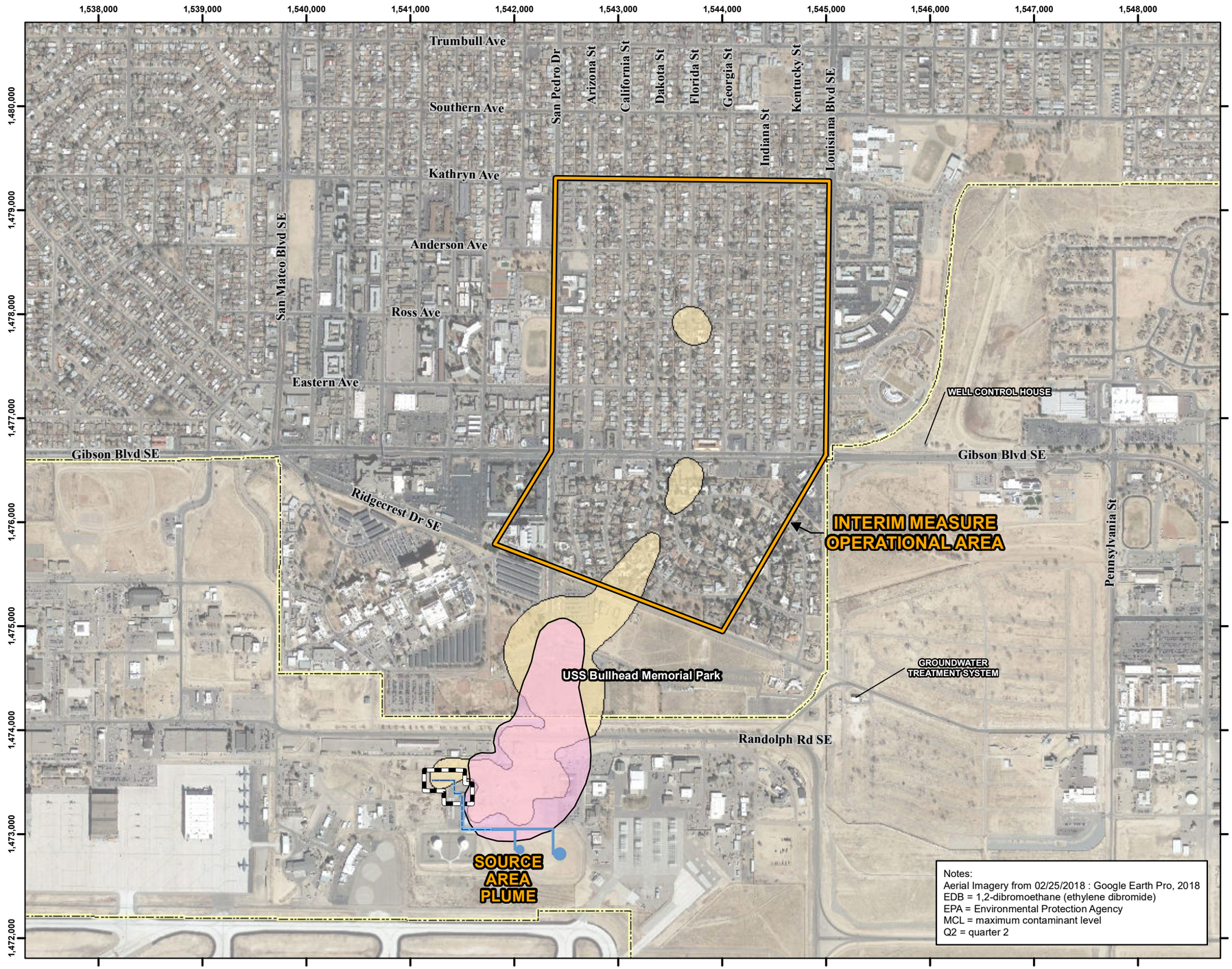
NMED. 2015. Letter from Kathryn Roberts, Director, Resource Protection Division NMED to Colonel Eric H. Froehlich, Base Commander and John Pike, Director of Environmental Management Services, Kirtland Air Force Base; Proposed Changes to Quarterly Pre-Remedy Monitoring and Site Investigations Reports. July 17.

NMED. 2016. Correspondence from Kathryn Roberts, Director, Resource Protection Division NMED to Colonel Eric H. Froehlich, Base Commander and John Pike, Director of Environmental Management Services, Kirtland Air Force Base; Technical Memorandum: Requested Optimization of Monitoring and Reporting, Second Phase, Bulk Fuels Facility Spill Site. January 20.

NMED. 2017. Correspondence from Juan Carlos Borrego, Deputy Secretary, Environment Department to Colonel Eric H. Froehlich, Base Commander, Kirtland AFB, New Mexico, and Lieutenant Colonel Wayne J. Acosta, Civil Engineer Office, Kirtland AFB, New Mexico, regarding the *Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2, Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base, EPA ID No. NM9570024423, HWB-KAFB-13-MISC*. May 31.

NMED. 2020. Correspondence from Mr. Kevin M. Pierard, Chief, Hazardous Waste Bureau, New Mexico Environment Department to Colonel David S. Miller, Base Commander, 377 ABW/CC, Kirtland AFB, New Mexico and Lt. Colonel Wayne J. Acosta, Civil Engineer Office, 377 Civil Engineer Division, 377 ABW/CC, Kirtland AFB, New Mexico regarding *Groundwater Monitoring Work Plan, Bulk Fuels Facility Spill Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, New Mexico, EPA ID# NM6213820974* [sic], *HWB-KAFB-BFFS-MISC*. October 2.

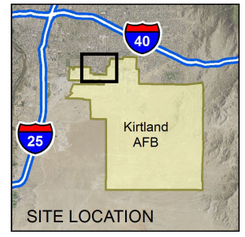
FIGURES



Notes:
Aerial Imagery from 02/25/2018 : Google Earth Pro, 2018
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA = Environmental Protection Agency
MCL = maximum contaminant level
Q2 = quarter 2

Legend

- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Installation Fence Boundary
- Interim Measure Operational Area
- Q4 2020 Benzene Plume Concentration >0.05 µg/L (EPA MCL)
- Q4 2020 EDB Plume Concentration >0.05 µg/L (EPA MCL)
- Source Area



N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-1

SITE MAP

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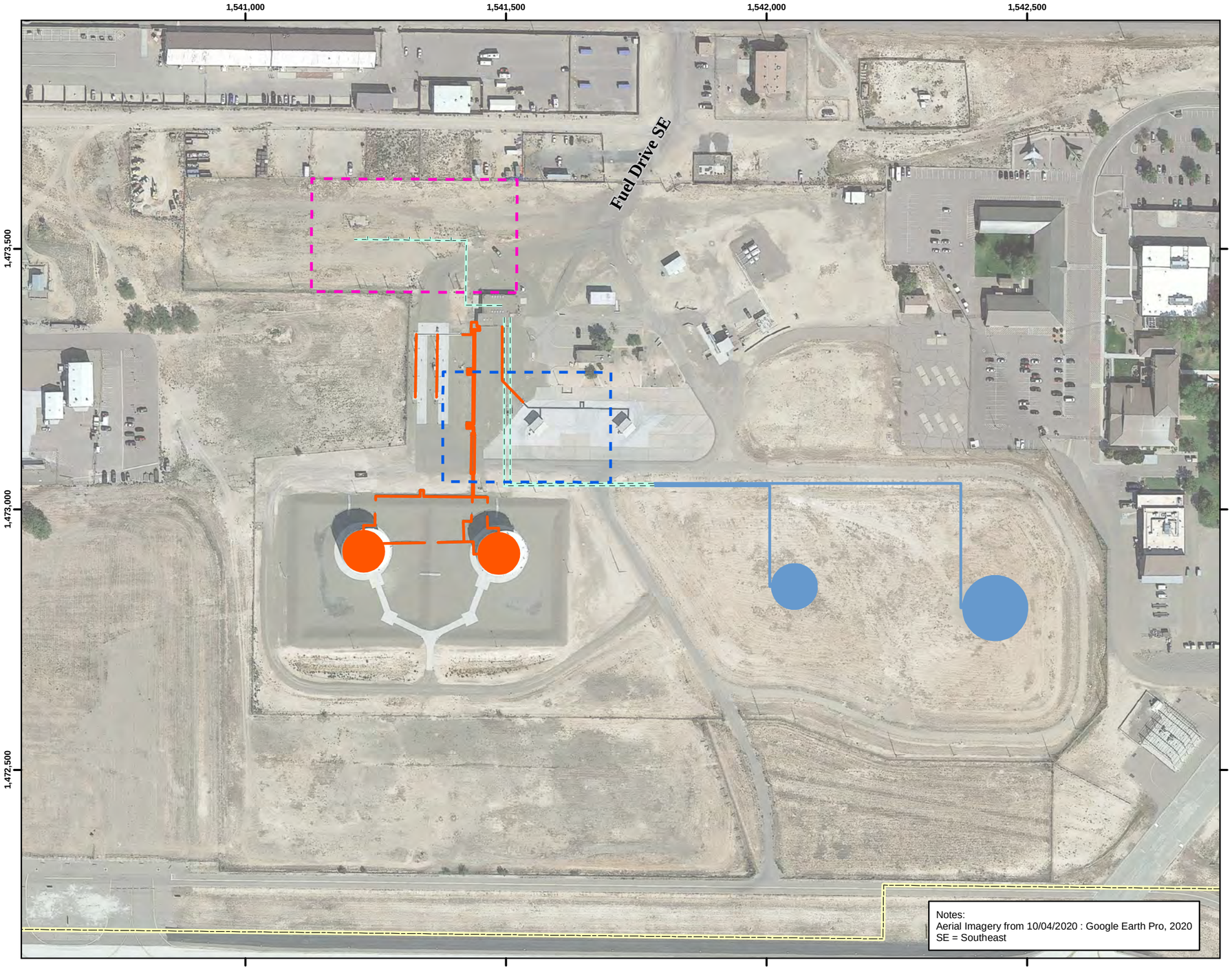
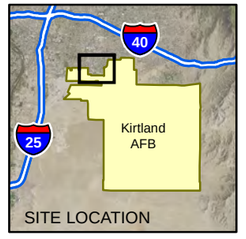


Legend

- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Former Fuel Offloading Rack
- Former Temporary Fueling Pad
- Current Above Ground Storage Tank
- Current Aboveground Fuel Transfer Line
- Installation Boundary



N

0 100 200 400

Feet

1 inch = 200 feet

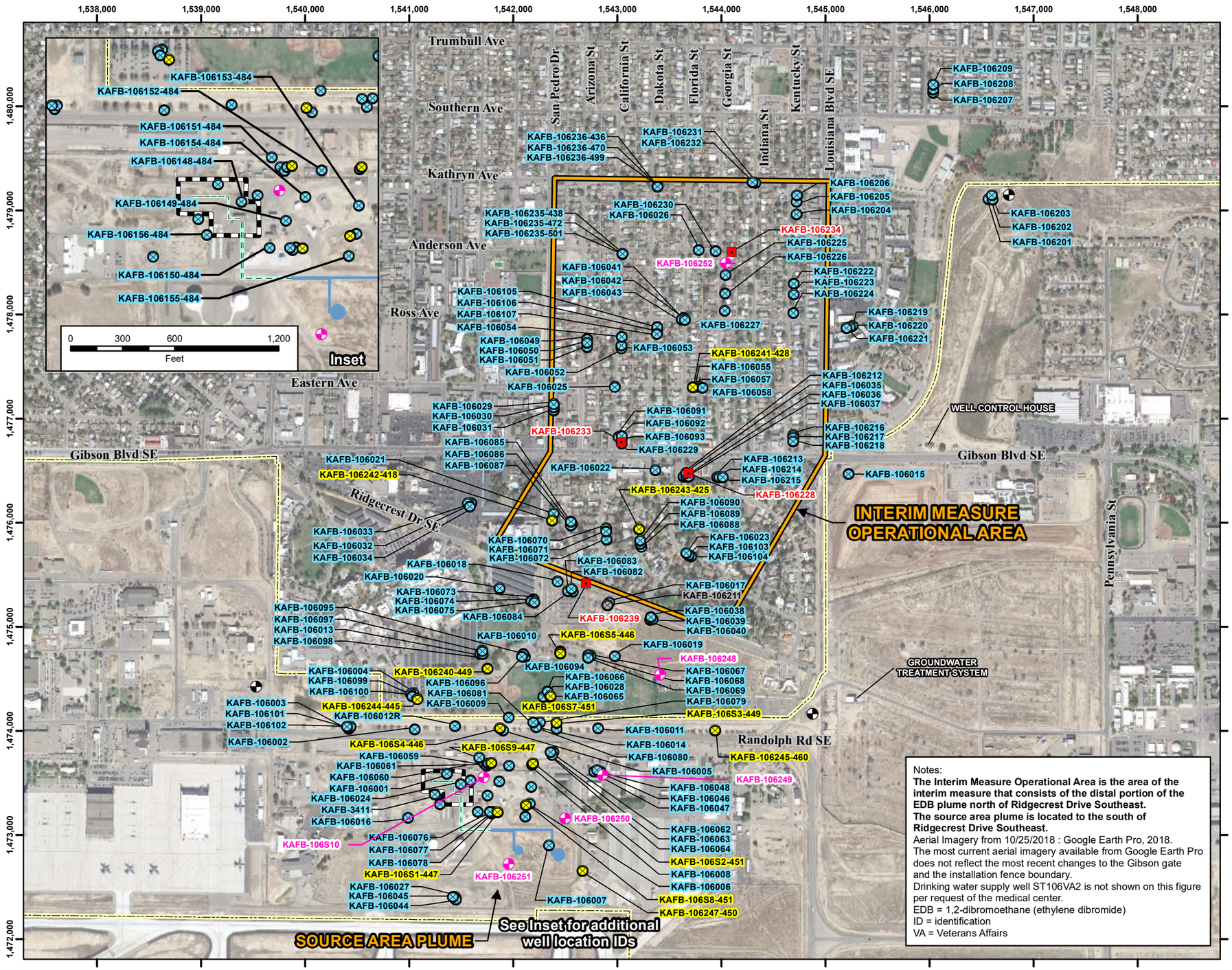
Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-1

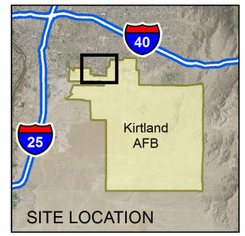
CURRENT AND FORMER SITE INFRASTRUCTURE

P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\2-1_WP_R4_Current and Former Site Infrastructure.mxd 2/20/2021 EA ecarpio



Legend

- Groundwater Monitoring Well
- Extraction Well
- Drinking Water Supply Well
- Monitoring Well (pending water table rise)
- Data Gap Wells Installed in 2018 and 2019
- Approximate Locations of Newly Installed Wells
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Interim Measure Operational Area
- Installation Fence Boundary
- Source Area



N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

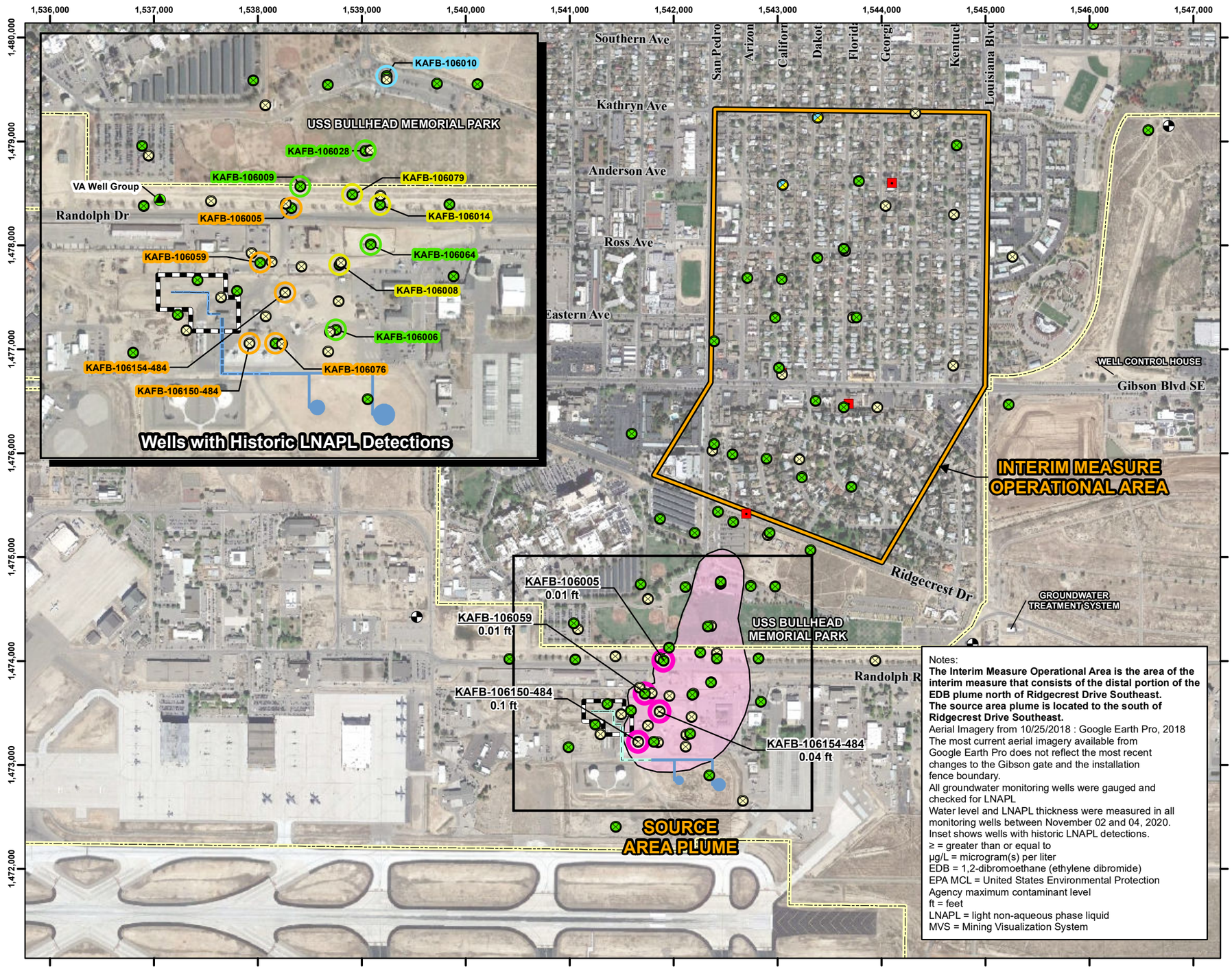
Notes:
The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018.
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
Drinking water supply well ST106VA2 is not shown on this figure per request of the medical center.
EDB = 1,2-dibromoethane (ethylene dibromide)
ID = identification
VA = Veterans Affairs

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-2

GROUNDWATER MONITORING NETWORK, DRINKING WATER SUPPLY WELL, AND EXTRACTION WELL LOCATIONS

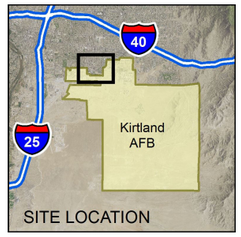
P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\2-2_WP_R4_Well Map.mxd 4/2/2021 EA ecarpio



Legend

- Monitoring Well with Confirmed LNAPL in Q4 2020
- Wells with measurable LNAPL in 2020 (Inset Map)
- Wells with LNAPL last measured between 1 and 5 years ago (Inset Map)
- Wells with LNAPL last measured between 5 and 10 years ago (Inset Map)
- Wells with LNAPL last measured greater than 10 years ago (Inset Map)
- Reference Elevation Interval 4857 Groundwater Monitoring Wells with top of screen unsubmerged
- Reference Elevation Interval 4857 and 4857/4838 Groundwater Monitoring Wells with fully submerged screens
- Nested Groundwater Monitoring Well
- Extraction Well
- Drinking Water Supply Well
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer
- Installation Fence Boundary
- Interim Measure Operational
- Benzene Plume, Q4 2020 ≥5 µg/L (EPA MCL) in the Source Area Plume
- Source Area

Well Location ID
LNAPL Thickness (ft)



Notes:
The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
All groundwater monitoring wells were gauged and checked for LNAPL
Water level and LNAPL thickness were measured in all monitoring wells between November 02 and 04, 2020.
Inset shows wells with historic LNAPL detections.
≥ = greater than or equal to
µg/L = microgram(s) per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA MCL = United States Environmental Protection Agency maximum contaminant level
ft = feet
LNAPL = light non-aqueous phase liquid
MVS = Mining Visualization System

N

0 500 1,000 2,000
Feet
1 inch = 1,000 feet

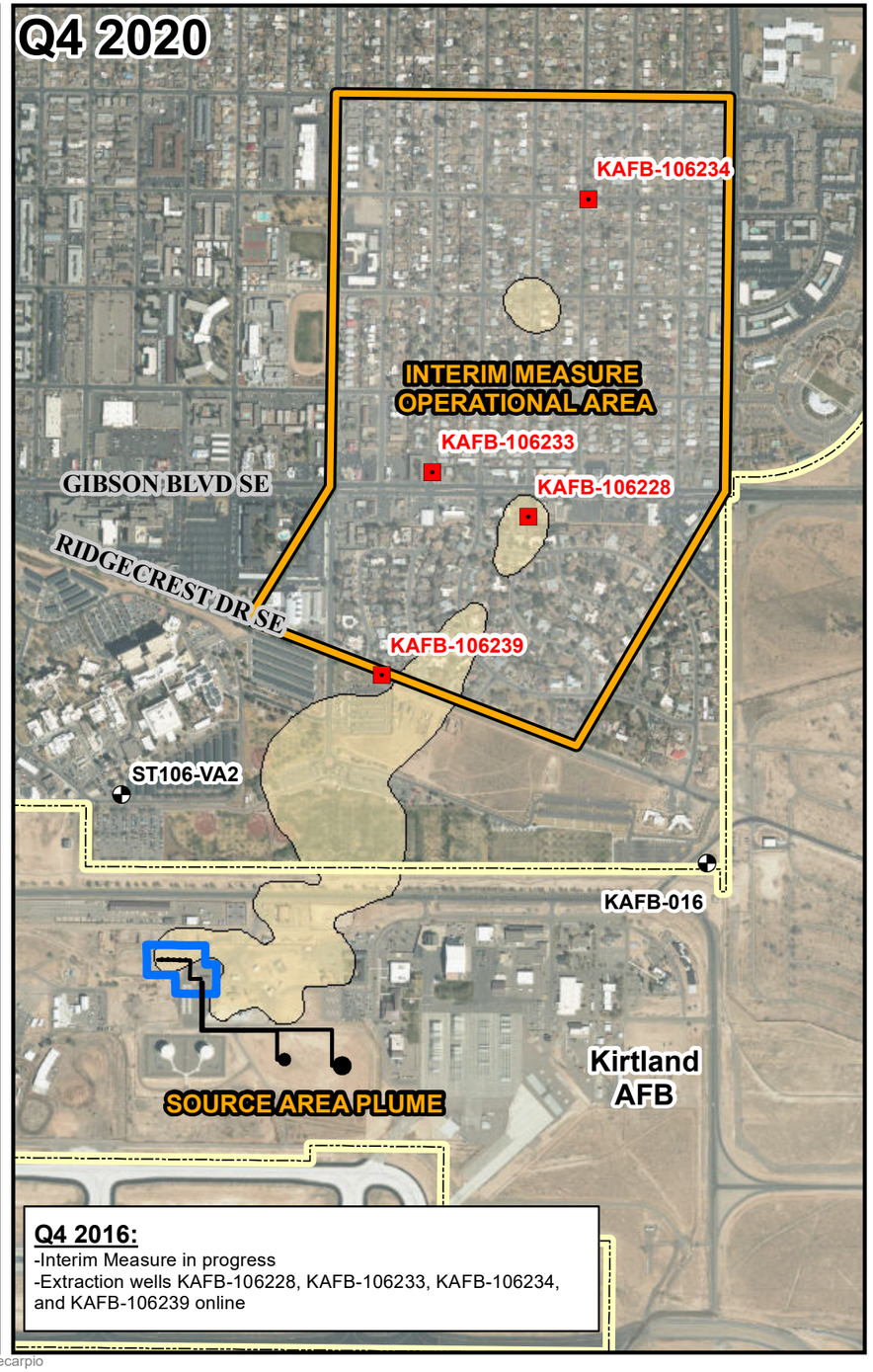
Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-3

GROUNDWATER MONITORING WELLS WITH MEASURABLE LNAPL

P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\2-3_WP_R4_GWM with Measurable LNAPL.mxd 4/2/2021 EA ecarpio



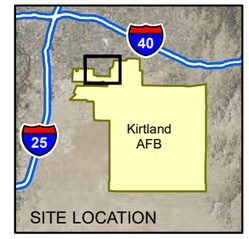
P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\2-4_WP_R4_Progress on EDB Collapse_Q216-Q220_REV1.mxd 4/2/2021 EA ecarpio

Legend

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

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

Acronym(s):
≥ = greater than or equal to
AFB = Air Force Base
AMSL = above mean sea level
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA MCL = Environmental Protection Agency maximum contaminant level
REI = reference elevation interval in feet
SWMU = solid waste management unit
µg/L = microgram(s) per liter
Q2 = quarter 2
Q4 = quarter 4



N

0 500 1,000 2,000

Feet

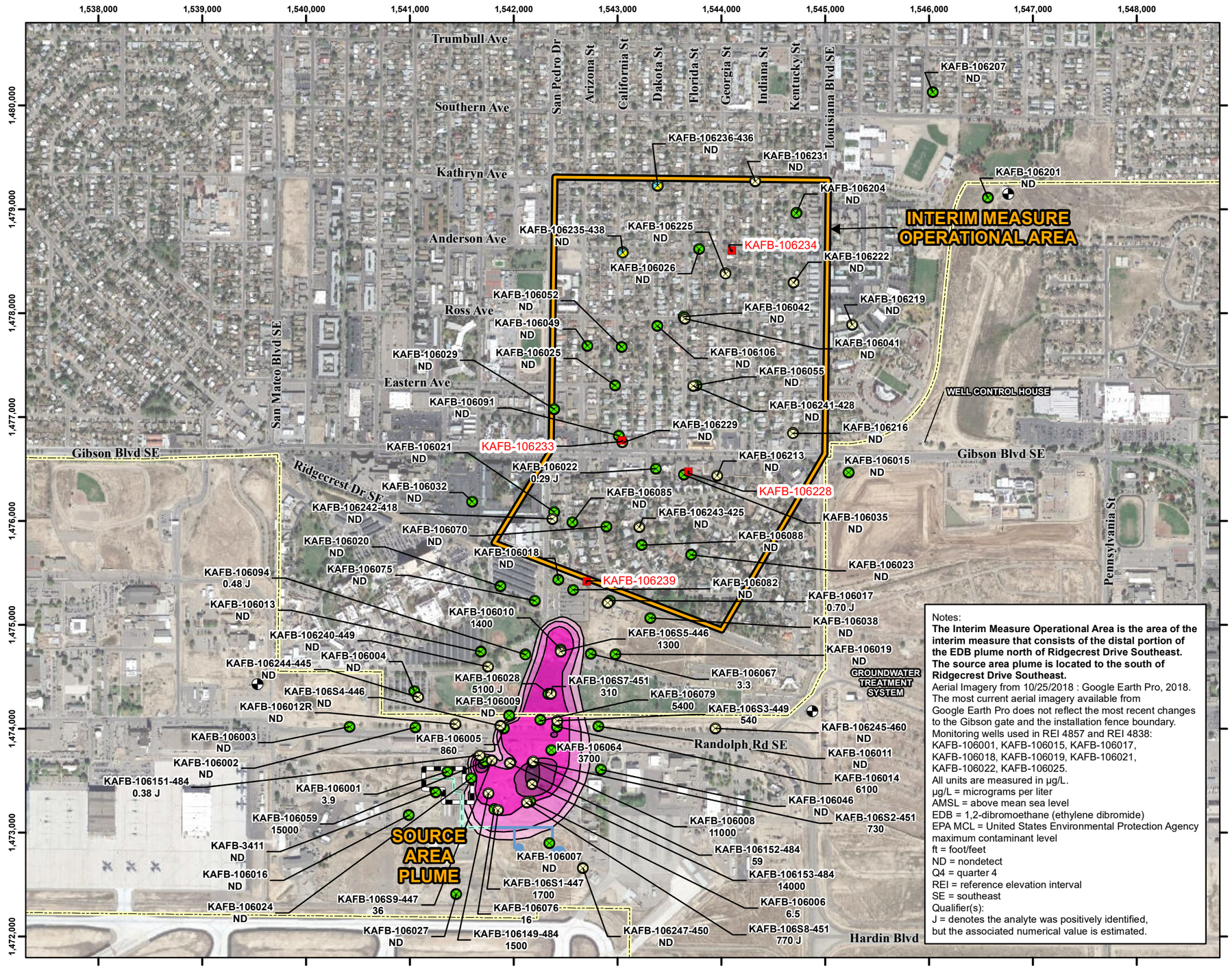
Reference Scale: 1:12,000

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-4

PROGRESS OF DISSOLVED-PHASE EDB COLLAPSE IN THE INTERIM MEASURE OPERATIONAL AREA



Legend

- Reference Elevation Interval 4857 Monitoring Well (Screen Not Submerged)
- Reference Elevation Interval 4857 and 4857/4838 Monitoring Well (Screen Submerged)
- Nested Groundwater Monitoring Well
- Extraction Well
- Drinking Water Supply Well
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Installation Fence Boundary
- Benzene Concentration Isocontour (µg/L)
- Interim Measure Operational Area
- Source Area

Benzene Concentration Range

- 5.0 (EPA MCL) - 50 µg/L
- 50 - 500 µg/L
- 500 - 5,000 µg/L
- 5,000 - 10,000 µg/L
- > 10,000 µg/L

Notes:

The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast. The source area plume is located to the south of Ridgecrest Drive Southeast.

Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018. The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.

Monitoring wells used in REI 4857 and REI 4838: KAFB-106001, KAFB-106015, KAFB-106017, KAFB-106018, KAFB-106019, KAFB-106021, KAFB-106022, KAFB-106025.

All units are measured in µg/L.

µg/L = micrograms per liter

AMSL = above mean sea level

EDB = 1,2-dibromoethane (ethylene dibromide)

EPA MCL = United States Environmental Protection Agency maximum contaminant level

ft = foot/feet

ND = nondetect

Q4 = quarter 4

REI = reference elevation interval

SE = southeast

Qualifier(s):

J = denotes the analyte was positively identified, but the associated numerical value is estimated.

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

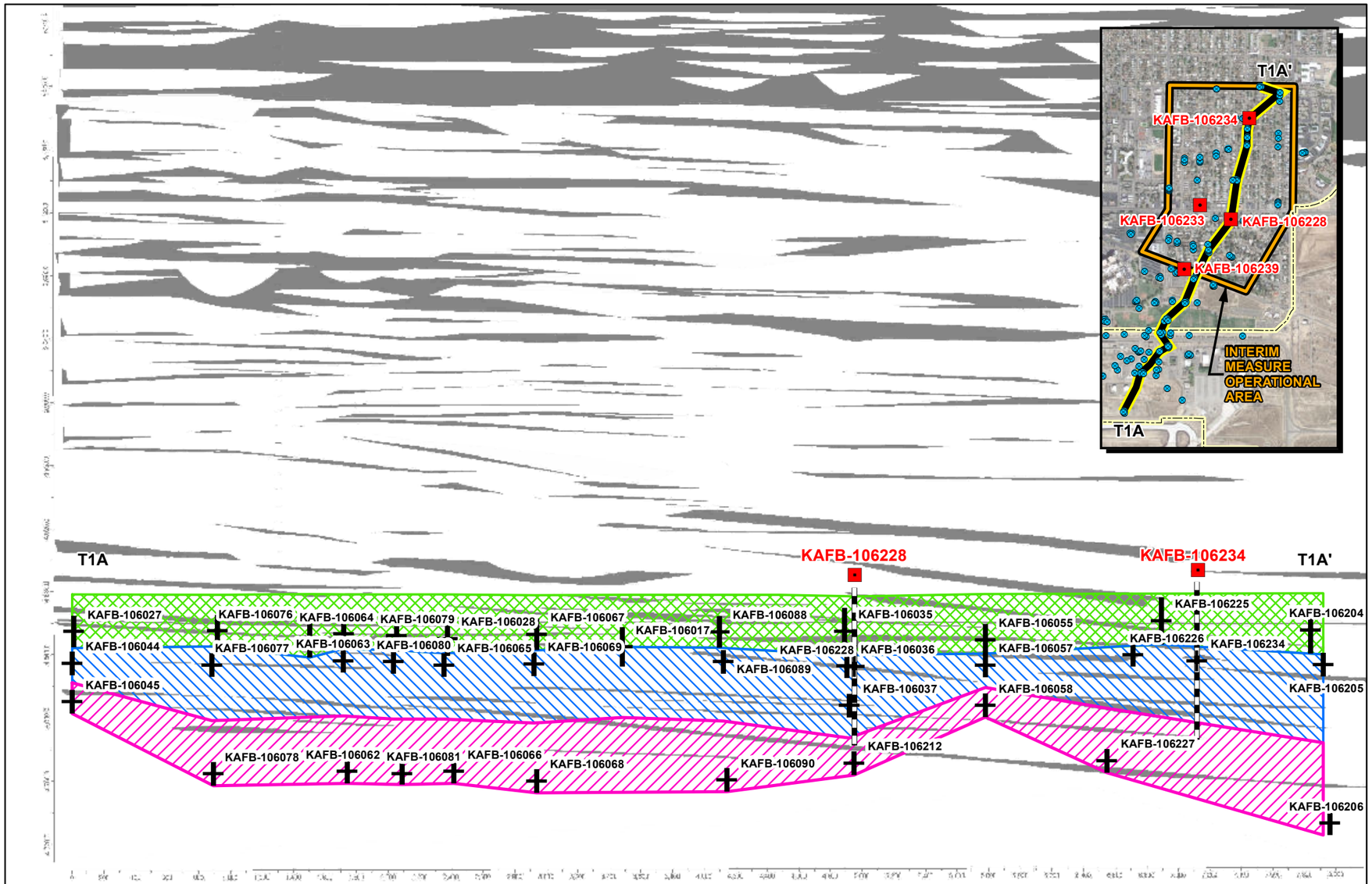
Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-5

BENZENE CONCENTRATIONS IN GROUNDWATER REFERENCE ELEVATION INTERVAL 4857, Q4 2020

P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\2-5_WP_R4_Interval 4857 Benzene.mxd 4/2/2021 EA ecarpio



Stratigraphy along T1A transect

Legend

- Groundwater Monitoring Well Screen (With Midpoint)
- Extraction Well Screen
- Extraction Well
- Groundwater Monitoring Well
- T1A Transect
- Fine Grained Lithology
- Interim Measure Operational Area

Reference Elevation Intervals

- 4857 (ft AMSL)
- 4838 (ft AMSL)
- 4814 (ft AMSL)

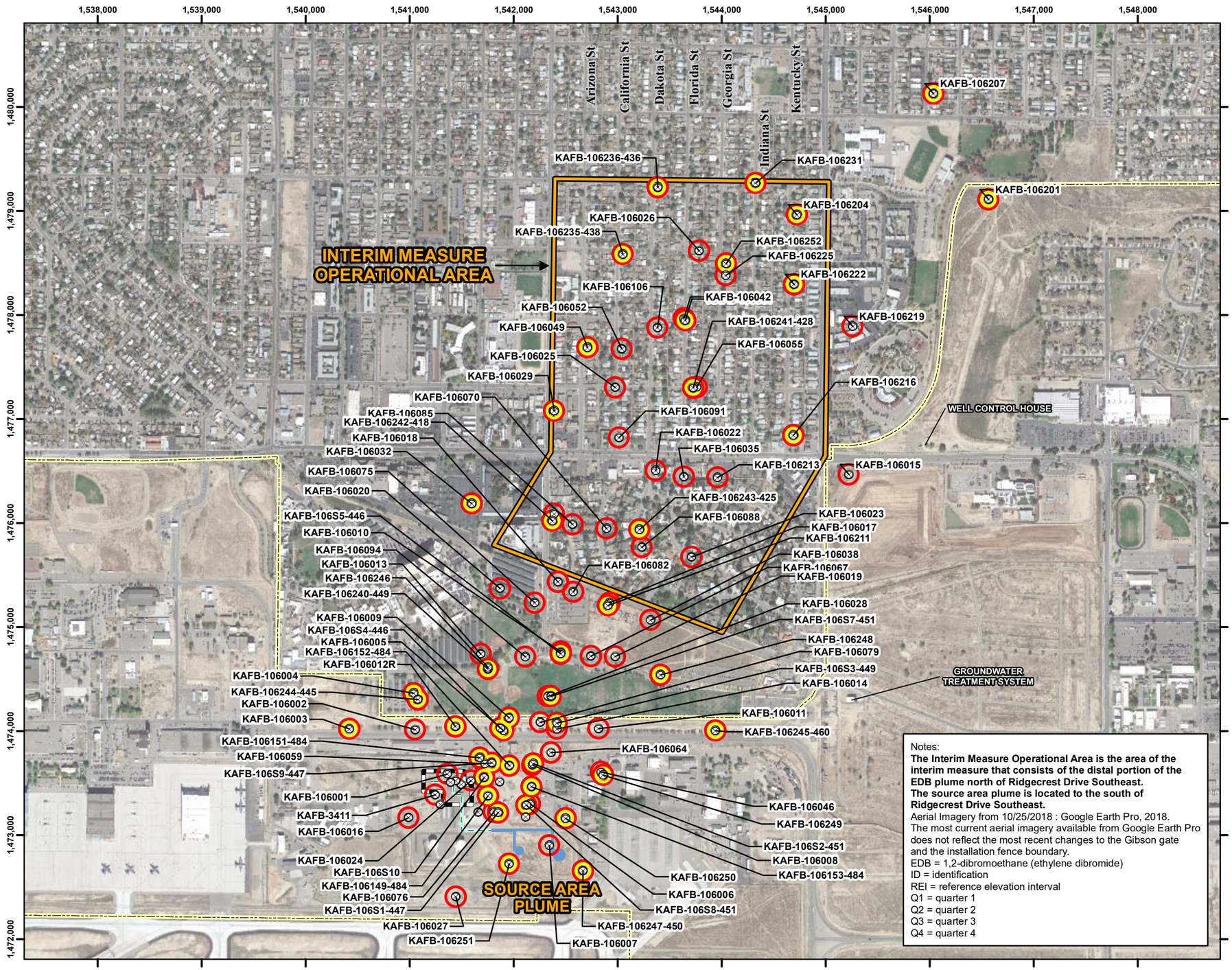
Notes:
EDB plume interpolation generated with C-Tech MVS Premier Version 9.94
> = greater than
ft AMSL = feet above mean sea level
µg/L = micrograms per liter
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA MCL = United States Environmental Protection Agency Maximum Contaminant Level
MVS = Mining Visualization System
Q4 = quarter 4

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-1

REFERENCE ELEVATION INTERVALS

P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\3-1_WP_R4_Reference Elevation Intervals.mxd 4/6/2021 EA ecarpio



Legend

- Monitoring Well

Q1, Q3 Sampling Schedule

- Q1 (January - March), Q3 (July - September)

Q2, Q4 Sampling Schedule

- Q2 (April - June), Q4 (October - December)
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer
- Interim Measure Operational
- Installation Fence Boundary
- Source Area

Notes:
The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018.
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
EDB = 1,2-dibromoethane (ethylene dibromide)
ID = identification
REI = reference elevation interval
Q1 = quarter 1
Q2 = quarter 2
Q3 = quarter 3
Q4 = quarter 4

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-2

REI 4857
MONITORING WELLS

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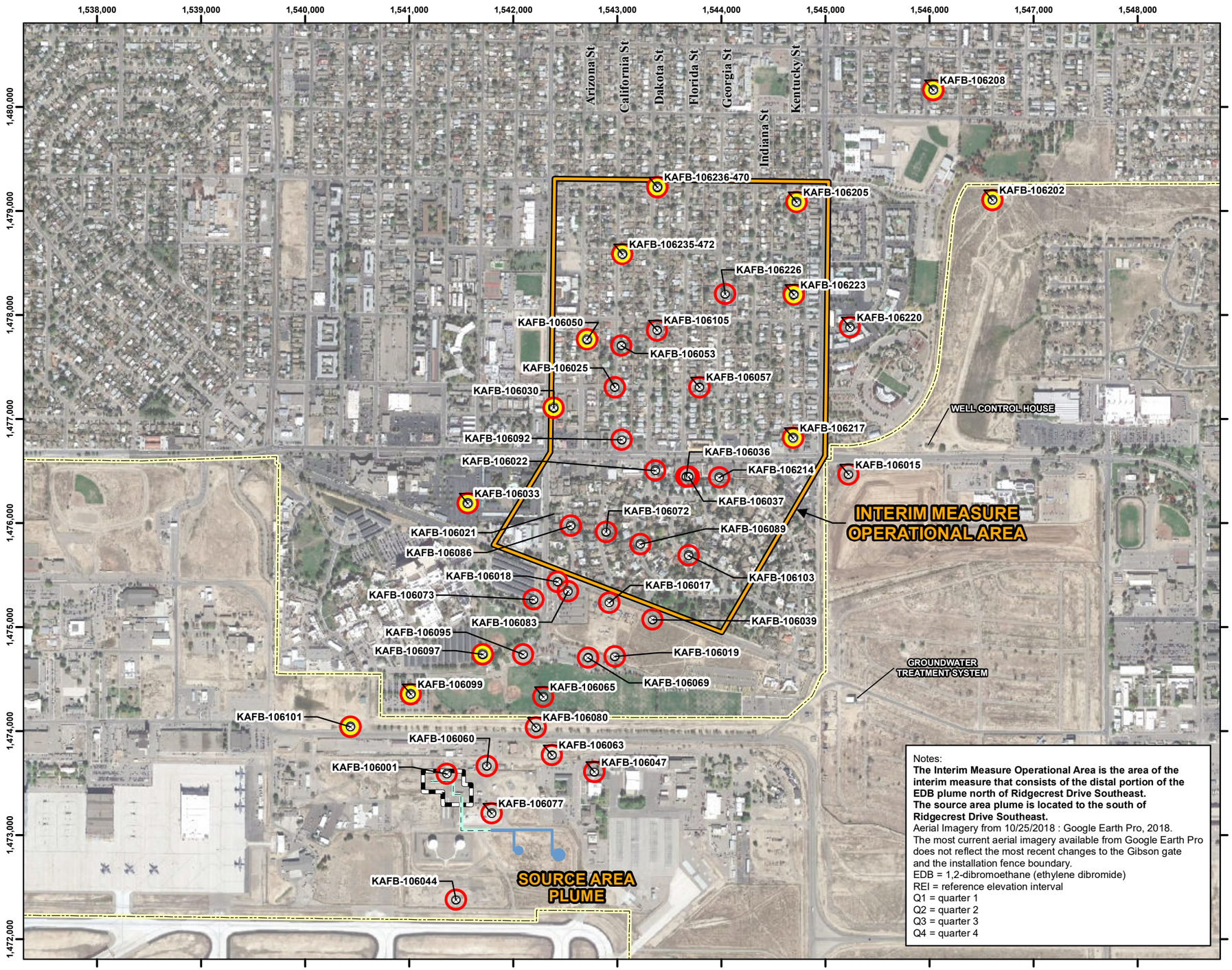


Legend

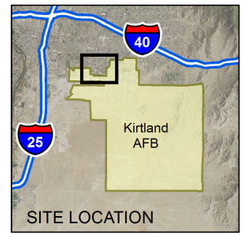
- Monitoring Well

Q1, Q3 Sampling Schedule

- Q1 (January - March), Q3 (July - September)

Q2, Q4 Sampling Schedule

- Q2 (April - June), Q4 (October - December)
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer
- Interim Measure Operational
- Installation Fence Boundary
- Source Area



Notes:
The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018.
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
EDB = 1,2-dibromoethane (ethylene dibromide)
REI = reference elevation interval
Q1 = quarter 1
Q2 = quarter 2
Q3 = quarter 3
Q4 = quarter 4

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-3

REI 4838
MONITORING WELLS

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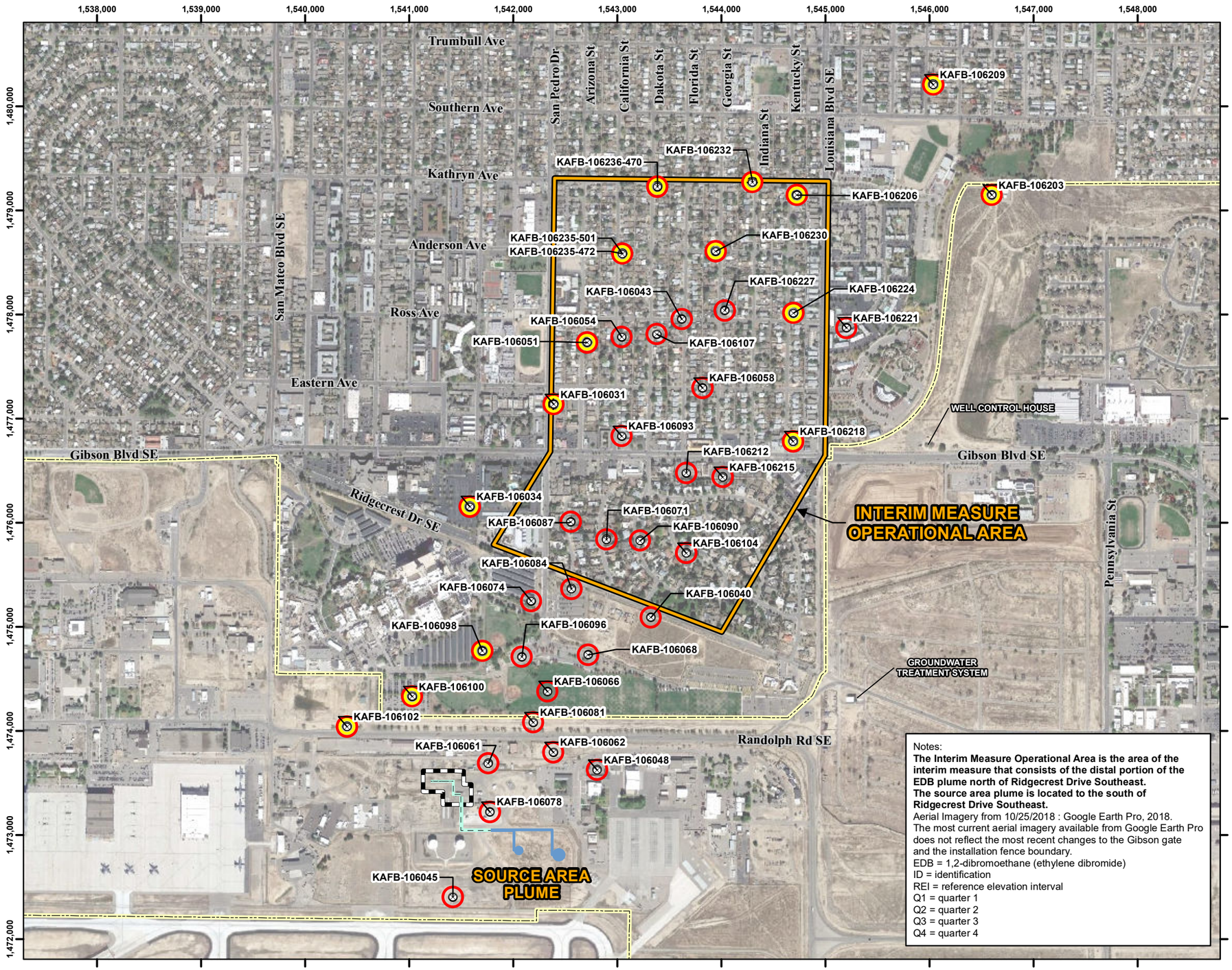


Legend

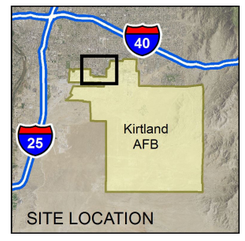
- Monitoring Well

Q1, Q3 Sampling Schedule

- Q1 (January - March), Q3 (July - September)

Q2, Q4 Sampling Schedule

- Q2 (April - June), Q4 (October - December)
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer
- Interim Measure Operational
- Installation Fence Boundary
- Source Area



N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

Notes:

The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018.
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
EDB = 1,2-dibromoethane (ethylene dibromide)
ID = identification
REI = reference elevation interval
Q1 = quarter 1
Q2 = quarter 2
Q3 = quarter 3
Q4 = quarter 4

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-4

REI 4814
MONITORING WELLS

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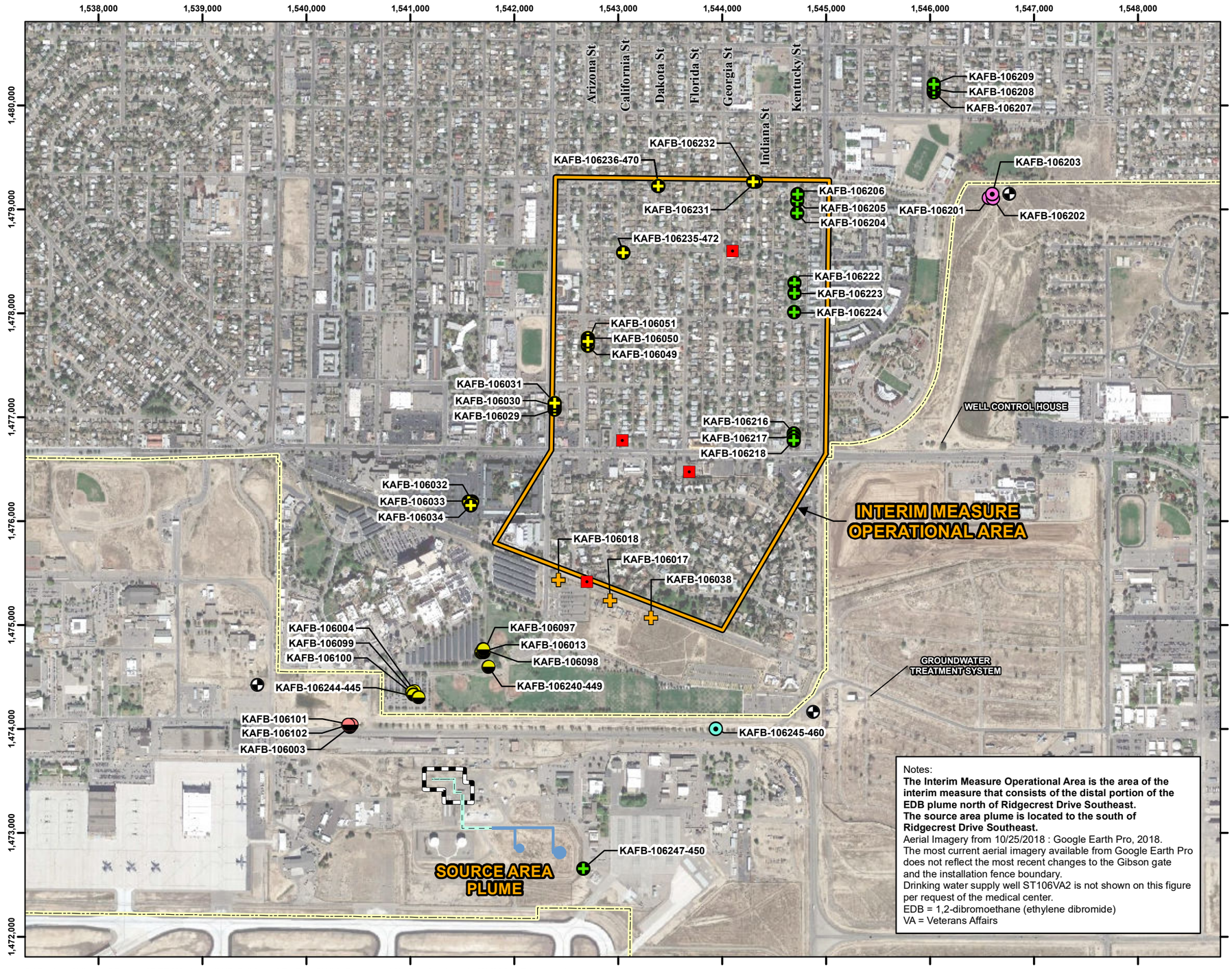
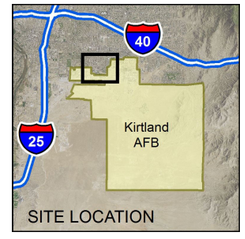


Legend

Well Designations

- Downgradient Proximal (Seasonal)
- Former Downgradient Proximal; Current Upgradient Well
- KAFB-003 Sentinel
- KAFB-016 Sentinel
- Signal
- VA Proximal, KAFB-015 Sentinel
- VA Proximal
- Drinking Water Supply Well
- Extraction Well
- Former Aboveground Storage
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Interim Measure Operational
- Installation Fence Boundary
- Source Area



N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

Notes:
The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018.
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
Drinking water supply well ST106VA2 is not shown on this figure per request of the medical center.
EDB = 1,2-dibromoethane (ethylene dibromide)
VA = Veterans Affairs

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-5

PROXIMAL, SIGNAL, AND SENTINEL WELL LOCATIONS

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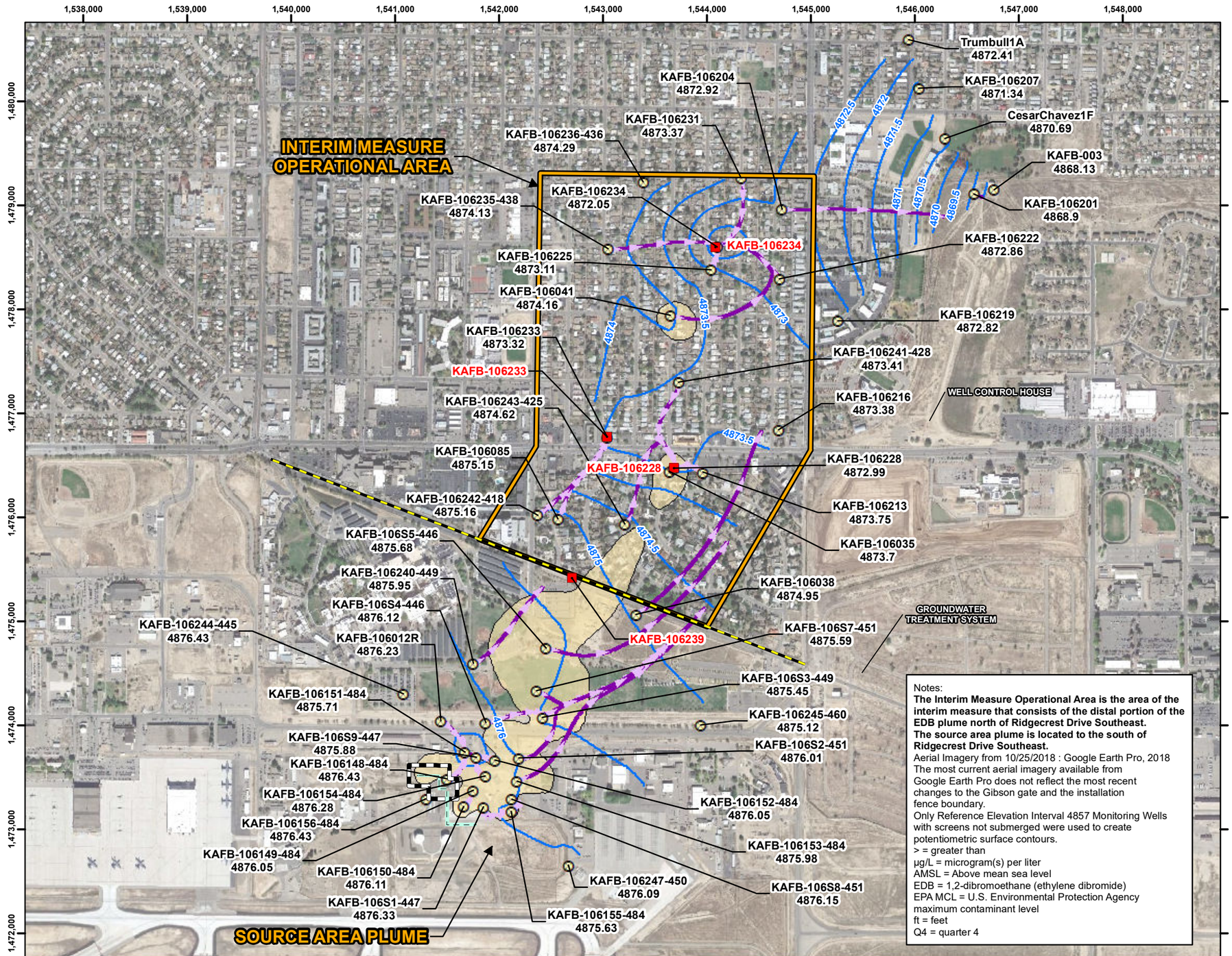
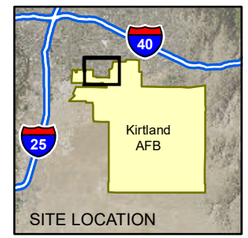


Notes:
The Interim Measure Operational Area is the area of the interim measure that consists of the distal portion of the EDB plume north of Ridgecrest Drive Southeast.
The source area plume is located to the south of Ridgecrest Drive Southeast.
Aerial Imagery from 10/25/2018 : Google Earth Pro, 2018
The most current aerial imagery available from Google Earth Pro does not reflect the most recent changes to the Gibson gate and the installation fence boundary.
Only Reference Elevation Interval 4857 Monitoring Wells with screens not submerged were used to create potentiometric surface contours.
> = greater than
µg/L = microgram(s) per liter
AMSL = Above mean sea level
EDB = 1,2-dibromoethane (ethylene dibromide)
EPA MCL = U.S. Environmental Protection Agency maximum contaminant level
ft = feet
Q4 = quarter 4

Legend

- Reference Elevation Interval 4857 Monitoring Well (Screen Not Submerged)
- Extraction Well
- Groundwater Level Contour (0.5 ft interval) (dashed where inferred)
- Particle Flow Lines (Direction of Flow)
- Installation Fence Boundary
- Target Capture Zone Boundary
- Interim Measure Operational Area
- Q4 2020 EDB Plume with Concentration > 0.05 µg/L (EPA MCL)
- Source Area



N

0 500 1,000 2,000
Feet
1 inch = 1,000 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-6

POTENTIOMETRIC SURFACE OF THE WATER TABLE, Q4 2020

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TABLES

Table 1-1
Previously Approved Work Plans

Work Plan Reference	NMED Approval	Contribution to GWM Work Plan
Kirtland AFB. 2016. Operations and Maintenance Plan, Groundwater Treatment System, Bulk Fuels Facility, SWMU ST-106/SS-111, Kirtland Air Force Base, New Mexico. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE–Albuquerque District Contract No. W912DR-12-D-0006. August.	Approved with modifications on December 12, 2016 (NMED, 2016). NMED Facility Record #4644.	This plan was listed in the October 2, 2020 letter (NMED, 2020a) as contributing to groundwater monitoring requirements. Waste management for Groundwater Monitoring (GWM) is detailed in this plan. Monitoring well purge water is categorized into non-hazardous, hazardous, and water of unknown quality. Non-hazardous water is discharged to the GWTS. Water of unknown quality is sampled and analyzed. Once determined to be non-hazardous, it is discharged to he GWTS. Hazardous water is not discharged to the GWTS.
Kirtland AFB. 2017a. Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2, Solid Waste Management Unit ST-106/SS-111. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE–Albuquerque District Contract No. W912DR-12-D-0006. January.	Approved with conditions on May 31, 2017 (NMED, 2017). NMED Facility Record #4554.	This plan was listed in the October 2, 2020 letter (NMED, 2020a) as contributing to groundwater monitoring requirements. The Work Plan for BFF Expansion of the Dissolved Phase Plume Groundwater Treatment System Design includes the basis for groundwater monitoring. This plan also includes and describes the groundwater monitoring network at that time (2017) and provides approval to sample select wells using passive sampling methods.
Kirtland AFB. 2017b. Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Revision 1, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-111. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE–Albuquerque District Contract No. W9128F-13-D-0006. December.	Approved with conditions on February 23, 2018 (NMED, 2018a). NMED Facility Record #4656	This plan was listed in the October 2, 2020 letter (NMED, 2020a) as contributing to groundwater monitoring requirements. The Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Bulk Fuels Facility adds nine monitoring wells installed in 2018 and 2019 to the groundwater monitoring network (KAFB-106S1-447, KAFB-106S2-451, KAFB-106S3-449, KAFB-106S4-446, KAFB-106S5-446, KAFB-106S7-451, KAFB-106S8-451, KAFB-106S9-447, and KAFB-106247-450).
Kirtland AFB. 2017c. Work Plan for Data Gap Monitoring Well Installation, Solid Waste Management Unit ST-106/SS-111. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE-Albuquerque District Contract No. W912DR-12-D-0006. December.	Approved with conditions on February 28, 2018 (NMED, 2018b). NMED Facility Record #4657.	This plan was listed in the October 2, 2020 letter (NMED, 2020a) as contributing to groundwater monitoring requirements. The Work Plan for Data Gap Monitoring Well Installation adds six new wells installed in 2018 (KAFB-106240-449, KAFB-106241-428, KAFB-106242-418, KAFB-106243-425, KAFB-106244-445, KAFB-106245-460) and 11 existing wells (KAFB-106041, KAFB-106148-484, KAFB-106149-484, KAFB-106150-484, KAFB-106151-484, KAFB-106152-484, KAFB-106153-484, KAFB-106154-484, KAFB-106155-484, and KAFB-106156-484), to the groundwater monitoring network. The existing wells were previously dry as they were originally installed in the vadose zone. Due to the rising water levels, these wells could now be used for sampling or gauging.
Kirtland AFB. 2018. Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-11. Prepared by EA Engineering, Science, and Technology, Inc. for USACE–Albuquerque District under contract W912WR-12-D-006. April	Approved with conditions on April 6, 2018 (NMED, 2018c). NMED Facility Record #4665.	This plan was listed in the October 2, 2020 letter (NMED, 2020a) as contributing to groundwater monitoring requirements. The Work Plan for Bioventing and Air Lift Enhanced Bioremediation Pilot Tests included groundwater sampling as part of monitoring the air-lift enhanced bioremediation pilot study. The air lift enhanced bioremediation pilot test well has not been installed and a request to defer the pilot study was submitted to NMED on July 23, 2018 (Appendix A-1). The request was submitted since it was deemed that the pilot study would be ineffective due to excessive well fouling. Any future monitoring under the scope of this work plan would be a part of the pilot study and not the Groundwater Monitoring work plan.
Kirtland AFB. 2019a. Work Plan for Data Gap Monitoring Well Installation KAFB-106248 to KAFB-106252, Bulk Fuels Facility, SWMUs ST-106/SS-111. Prepared by Sundance Consulting, Inc. for the USACE–Albuquerque District. December.	Approved with conditions on July 14, 2020 (NMED, 2020b). NMED Facility Record number is not currently available[a].	The Work Plan for Data Gap Monitoring Wells Installation, KAFB-106248 to KAFB-106252 and KAFB-106S10, adds six new wells, installed in 2020 and 2021, to the groundwater monitoring network (KAFB-106248, KAFB-106249, KAFB-106250, KAFB-106251, KAFB-106252, and KAFB-106S10).

Table 1-1
Previously Approved Work Plans

[a] The online NMED Facility Records does not include documents after November 2019.

AFB = Air Force Base

BFF = Bulk Fuels Facility

EPA = U.S. Environmental Protection Agency

GWM = Groundwater Monitoring

GWTS = Groundwater treatment system

NMED = New Mexico Environment Department

SWMU = Solid Waste Management Unit

NMED. 2016. Correspondence from Kathryn Roberts, Director, Resource Protection Division to Colonel Eric. H. Froehlich, Base Commander, Kirtland AFB, New Mexico, and Mr. John Pike, Director, Environmental Management Division, 377 MSG, Kirtland AFB, New Mexico, re: Operation and Maintenance Plan, Groundwater Treatment System, Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base. EPA ID No. NM9570024423, HWB-KAFB-13-MISC. December 12.

NMED. 2017a. Correspondence from Juan Carlos Borrego, Deputy Secretary, Environment Department to Colonel Eric H. Froehlich, Base Commander, Kirtland AFB, New Mexico, and Lieutenant Colonel Wayne J. Acosta, Civil Engineer Office, Kirtland AFB, New Mexico, re: Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design Revision 2, Bulk Fuels Facility SWMUs ST-106/SS-111, Kirtland AFB, EPA ID No. NM9570024423, HWB-KAFB-13-MISC. May 31.

NMED. 2018a. Correspondence from Mr. Juan Carlos Borrego, Deputy Secretary Environment Department, to Colonel Richard W. Gibbs, Base Commander, 377 ABW/CC, Kirtland AFB, New Mexico and Mr. Chris Segura, Chief, Installation Support Section, AFCEC/CZOW, Kirtland AFB, New Mexico, re: Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Revision 2, SWMUs ST-106/SS-111, Kirtland AFB, New Mexico, EPA ID No. NM9570024423, HWB-KAFB-13-MISC. February 23.

NMED. 2018b. Correspondence from Mr. Juan Carlos Borrego, Deputy Secretary Environment Department, to Colonel Richard W. Gibbs, Base Commander, 377 ABW/CC, Kirtland AFB, New Mexico and Mr. Chris Segura, Chief, Installation Support Section, AFCEC/CZOW, Kirtland AFB, New Mexico, re:Work Plan for Data Gap Monitoring Well Installation, Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland AFB, New Mexico. February 28

NMED. 2018c. Correspondence from Mr. Juan Carlos Borrego, Deputy Secretary Environment Department, to Colonel Richard W. Gibbs, Base Commander, 377 ABW/CC, Kirtland AFB, New Mexico and Mr. Chris Segura, Chief, Installation Support Section, AFCEC/CZOW, Kirtland AFB, New Mexico re: Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-11. April 6.

NMED. 2020a. Correspondence from Mr. Kevin M. Pierard, Chief, Hazardous Waste Bureau, NMED to Colonel David S. Miller, Base Commander, 377 ABW/CC, Kirtland AFB, New Mexico and Lt. Colonel Wayne J. Acosta, Civil Engineer Office, 377 Civil Engineer Division, 377 ABW/CC, Kirtland AFB, New Mexico re: Groundwater Monitoring Work Plan, Bulk Fuels Facility Spill Solid Waste Management Units ST-106 and SS-111, Kirtland AFB, New Mexico, EPA ID# NM6213820974 [sic], HWB-KAFB-BFFS-MISC. October 2.

NMED. 2020b. Correspondence from Mr. Kevin M. Pierard, Chief, Hazardous Waste Bureau, New Mexico Environment Department to Colonel David S. Miller, Base Commander, 377 ABW/CC, Kirtland AFB, New Mexico and Lt. Colonel Wayne J. Acosta, Civil Engineer Office, 377 Civil Engineer Division, 377 ABW/CC, Kirtland AFB, New Mexico re: Workplan for Data Gap Monitoring Well Installation KAFB-106248 to KAFB-106252, Bulk Fuels Facility, SWMUs ST-106/SS-111. July 14.

Table 1-2
Groundwater Monitoring Program

Well Location ID	1st Quarter (January-March)	2nd Quarter Semiannual (April-June)	3rd Quarter (July-September)	4th Quarter Annual (October-December)	Former Well Designation and Current Monitoring Well Objective[a]
Groundwater Monitoring Wells[b]					
KAFB-106001	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106002	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106003	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal, KAFB-015 Sentinel
KAFB-106004	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal
KAFB-106005	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, metals, anions, alkalinity, FP	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106006	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106007	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106008	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106009	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, metals, anions, alkalinity, FP	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106010	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106011	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106012R	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, metals, anions, alkalinity, FP	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106013	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal
KAFB-106014	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106015[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106016	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106017	Gauge Only	BTEX, Naphthalene, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Signal
KAFB-106018	Gauge Only	BTEX, Naphthalene, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Signal
KAFB-106019	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106020	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106021[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106022[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106023[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106024	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106025[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106026[c,d]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106027	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106028	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106029[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106030[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106031[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106032[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106033[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106034[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106035[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring; Groundwater well paired with KAFB-106228 extraction well
KAFB-106036[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring; Groundwater well paired with KAFB-106228 extraction well

Table 1-2
Groundwater Monitoring Program

Well Location ID	1st Quarter (January-March)	2nd Quarter Semiannual (April-June)	3rd Quarter (July-September)	4th Quarter Annual (October-December)	Former Well Designation and Current Monitoring Well Objective[a]
KAFB-106037[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring; Groundwater well paired with KAFB-106228 extraction well
KAFB-106038	Gauge Only	BTEX, Naphthalene, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Signal
KAFB-106039	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106040	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106041[c]	EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106042[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106043[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106044	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106045	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106046	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106047	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106048	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106049[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106050[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106051[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106052[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106053[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106054[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106055[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106057[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106058[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106059	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106060	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106061	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106062	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106063	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106064	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106065	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106066	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106067	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106068	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106069	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106070[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106071[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106072[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106073	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106074	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106075	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106076	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106077	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106078	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106079	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106080	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area
KAFB-106081	Gauge Only	BTEX, EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Source Area

Table 1-2
Groundwater Monitoring Program

Well Location ID	1st Quarter (January-March)	2nd Quarter Semiannual (April-June)	3rd Quarter (July-September)	4th Quarter Annual (October-December)	Former Well Designation and Current Monitoring Well Objective[a]
KAFB-106082	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106083	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106084	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106085[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106086[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106087[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106088[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106089[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106090[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106091[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106092[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106093[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106094	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106095	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106096	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring
KAFB-106097	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal
KAFB-106098	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal
KAFB-106099	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal
KAFB-106100	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal
KAFB-106101	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal, KAFB-015 Sentinel
KAFB-106102	BTEX, EDB, FP	BTEX, EDB, metals, anions, alkalinity, FP	BTEX, EDB, FP	EDB, VOCs, metals, anions, alkalinity, FP	VA Proximal, KAFB-015 Sentinel
KAFB-106103[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106104[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106105[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106106[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106107[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106148-484	Gauge Only	Gauge Only	Gauge Only	Gauge Only	Source Area
KAFB-106149-484[c]	EDB, metals, anions, alkalinity	BTEX, EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106150-484	Gauge Only	Gauge Only	Gauge Only	Gauge Only	Source Area
KAFB-106151-484[c]	EDB, metals, anions, alkalinity	BTEX, EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106152-484[c]	EDB, metals, anions, alkalinity	BTEX, EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106153-484[c]	EDB, metals, anions, alkalinity	BTEX, EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106154-484	Gauge Only	Gauge Only	Gauge Only	Gauge Only	Gauge Only
KAFB-106155-484	Gauge Only	Gauge Only	Gauge Only	Gauge Only	Gauge Only
KAFB-106156-484	Gauge Only	Gauge Only	Gauge Only	Gauge Only	Gauge Only
KAFB-106201[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	KAFB-003 Sentinel
KAFB-106202[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	KAFB-003 Sentinel
KAFB-106203[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	KAFB-003 Sentinel
KAFB-106204[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106205[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106206[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106207[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106208[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106209[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106211[e]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106212[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106213[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring

Table 1-2
Groundwater Monitoring Program

Well Location ID	1st Quarter (January-March)	2nd Quarter Semiannual (April-June)	3rd Quarter (July-September)	4th Quarter Annual (October-December)	Former Well Designation and Current Monitoring Well Objective[a]
KAFB-106214[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106215[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106216[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106217[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106218[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106219[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106220[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106221[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106222[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106223[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106224[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Downgradient Proximal (Seasonal)
KAFB-106225[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106226[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106227[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106229[c,f]	Gauge Only	EDB	Gauge Only	EDB	Groundwater well paired with KAFB-106233 extraction well
KAFB-106230[c,d]	EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, metals, anions, alkalinity	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106231[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106232[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106235-438[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106235-472[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106235-501[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106236-436[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106236-470[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106236-499[c]	EDB	EDB, metals, anions, alkalinity	EDB	EDB, VOCs, metals, anions, alkalinity	Former Downgradient Proximal; Current Upgradient Well
KAFB-106240-449[c]	BTEX, EDB	BTEX, EDB, metals, anions, alkalinity	BTEX, EDB	EDB, VOCs, metals, anions, alkalinity	VA Proximal
KAFB-106241-428[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106242-418[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106243-425[c]	Gauge Only	EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106244-445[c]	BTEX, EDB	BTEX, EDB, metals, anions, alkalinity	BTEX, EDB	EDB, VOCs, metals, anions, alkalinity	VA Proximal
KAFB-106245-460[c]	BTEX, EDB	BTEX, EDB, metals, anions, alkalinity	BTEX, EDB	EDB, VOCs, metals, anions, alkalinity	KAFB-016 Sentinel
KAFB-106247-450[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Groundwater Monitoring
KAFB-106248[g,h]	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	Groundwater Monitoring
KAFB-106249[g,h]	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	Groundwater Monitoring
KAFB-106250[g,h]	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	Groundwater Monitoring
KAFB-106251[g,h]	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	Groundwater Monitoring

Table 1-2
Groundwater Monitoring Program

Well Location ID	1st Quarter (January-March)	2nd Quarter Semiannual (April-June)	3rd Quarter (July-September)	4th Quarter Annual (October-December)	Former Well Designation and Current Monitoring Well Objective[a]
KAFB-106252[g,h]	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	Groundwater Monitoring
KAFB-106S1-447[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S2-451[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S3-449[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S4-446[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S5-446[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S7-451[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S8-451[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S9-447[c]	Gauge Only	BTEX, EDB, metals, anions, alkalinity	Gauge Only	EDB, VOCs, metals, anions, alkalinity	Source Area
KAFB-106S10[g,h]	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	EDB, VOCs, metals, anions, alkalinity, TPH, FP	Groundwater Monitoring
KAFB-3411	Gauge Only	EDB, metals, anions, alkalinity, FP	Gauge Only	EDB, VOCs, metals, anions, alkalinity, FP	Groundwater Monitoring

Table 2-1
Current and Former Well Designations

Current Well Designation	Previous Well Designation	REI Assignment	Previous Aquifer Assignment
KAFB-003	KAFB-3, KAFB003	—	Regional Deep
KAFB-015	KAFB-15, KAFB015	—	Regional Deep
KAFB-016	KAFB-16, KAFB016	—	Regional Deep
KAFB-106001	KAFB-1061	4857 & 4838	Shallow
KAFB-106002	KAFB-1062	4857	Shallow
KAFB-106003	KAFB-1063	4857	Shallow
KAFB-106004	KAFB-1064	4857	Shallow
KAFB-106005	KAFB-1065	4857	Shallow
KAFB-106006	KAFB-1066	4857	Shallow
KAFB-106007	KAFB-1067	4857	Shallow
KAFB-106008	KAFB-1068	4857	Shallow
KAFB-106009	KAFB-1069	4857	Shallow
KAFB-106010	KAFB-10610	4857	Shallow
KAFB-106011	KAFB-10611	4857	Shallow
KAFB-106012R	KAFB-10612R	4857	Shallow
KAFB-106013	KAFB-10613	4857	Shallow
KAFB-106014	KAFB-10614	4857	Shallow
KAFB-106015	KAFB-10615	4857 & 4838	Shallow
KAFB-106016	KAFB-10616	4857	Shallow
KAFB-106017	KAFB-10617	4857 & 4838	Shallow
KAFB-106018	KAFB-10618	4857 & 4838	Shallow
KAFB-106019	KAFB-10619	4857 & 4838	Shallow
KAFB-106020	KAFB-10620	4857	Shallow
KAFB-106021	KAFB-10621	4838	Shallow
KAFB-106022	KAFB-10622	4857 & 4838	Shallow
KAFB-106023	KAFB-10623	4857	Shallow
KAFB-106024	KAFB-10624	4857	Shallow
KAFB-106025	KAFB-10625	4857 & 4838	Shallow
KAFB-106026	KAFB-10626	4857	Shallow
KAFB-106027	KAFB-10627	4857	Shallow
KAFB-106028	KAFB-10628-510	4857	Shallow
KAFB-106029	—	4857	Shallow
KAFB-106030	—	4838	Intermediate
KAFB-106031	—	4814	Deep
KAFB-106032	—	4857	Shallow
KAFB-106033	—	4838	Intermediate
KAFB-106034	—	4814	Deep
KAFB-106035	—	4857	Shallow

Table 2-1
Current and Former Well Designations

Current Well Designation	Previous Well Designation	REI Assignment	Previous Aquifer Assignment
KAFB-106036	—	4838	Intermediate
KAFB-106037	—	4838	Deep
KAFB-106038	—	4857	Shallow
KAFB-106039	—	4838	Intermediate
KAFB-106040	—	4814	Deep
KAFB-106041	—	4857	—
KAFB-106042	—	4857	Shallow
KAFB-106043	—	4814	Deep
KAFB-106044	—	4838	Intermediate
KAFB-106045	—	4814	Deep
KAFB-106046	—	4857	Shallow
KAFB-106047	—	4838	Intermediate
KAFB-106048	—	4814	Deep
KAFB-106049	—	4857	Shallow
KAFB-106050	—	4838	Intermediate
KAFB-106051	—	4814	Deep
KAFB-106052	—	4857	Shallow
KAFB-106053	—	4838	Intermediate
KAFB-106054	—	4814	Deep
KAFB-106055	—	4857	Shallow
KAFB-106057	—	4838	Intermediate
KAFB-106058	—	4814	Deep
KAFB-106059	—	4857	Shallow
KAFB-106060	—	4838	Intermediate
KAFB-106061	—	4814	Deep
KAFB-106062	—	4814	Deep
KAFB-106063	—	4838	Intermediate
KAFB-106064	—	4857	Shallow
KAFB-106065	—	4838	Intermediate
KAFB-106066	—	4814	Deep
KAFB-106067	—	4857	Shallow
KAFB-106068	—	4814	Deep
KAFB-106069	—	4838	Intermediate
KAFB-106070	—	4857	Shallow
KAFB-106071	—	4814	Deep
KAFB-106072	—	4838	Intermediate
KAFB-106073	—	4838	Intermediate
KAFB-106074	—	4814	Deep

Table 2-1
Current and Former Well Designations

Current Well Designation	Previous Well Designation	REI Assignment	Previous Aquifer Assignment
KAFB-106075	—	4857	Shallow
KAFB-106076	—	4857	Shallow
KAFB-106077	—	4838	Intermediate
KAFB-106078	—	4814	Deep
KAFB-106079	—	4857	Shallow
KAFB-106080	—	4838	Intermediate
KAFB-106081	—	4814	Deep
KAFB-106082	—	4857	Shallow
KAFB-106083	—	4838	Intermediate
KAFB-106084	—	4814	Deep
KAFB-106085	—	4857	Shallow
KAFB-106086	—	4838	Intermediate
KAFB-106087	—	4814	Deep
KAFB-106088	—	4857	Shallow
KAFB-106089	—	4838	Intermediate
KAFB-106090	—	4814	Deep
KAFB-106091	—	4857	Shallow
KAFB-106092	—	4838	Intermediate
KAFB-106093	—	4814	Deep
KAFB-106094	—	4857	Shallow
KAFB-106095	—	4838	Intermediate
KAFB-106096	—	4814	Deep
KAFB-106097	—	4838	Intermediate
KAFB-106098	—	4814	Deep
KAFB-106099	—	4838	Intermediate
KAFB-106100	—	4814	Deep
KAFB-106101	—	4838	Intermediate
KAFB-106102	—	4814	Deep
KAFB-106103	—	4838	Intermediate
KAFB-106104	—	4814	Deep
KAFB-106105	—	4838	Intermediate
KAFB-106106	—	4857	Shallow
KAFB-106107	—	4814	Deep
KAFB-106148-484	—	4857	—
KAFB-106149-484	—	4857	—
KAFB-106150-484	—	4857	—
KAFB-106151-484	—	4857	—
KAFB-106152-484	—	4857	—

Table 2-1
Current and Former Well Designations

Current Well Designation	Previous Well Designation	REI Assignment	Previous Aquifer Assignment
KAFB-106153-484	—	4857	—
KAFB-106154-484	—	4857	—
KAFB-106155-484	—	4857	—
KAFB-106156-484	—	4857	—
KAFB-106201	—	4857	Shallow
KAFB-106202	—	4838	Intermediate
KAFB-106203	—	4814	Deep
KAFB-106204	—	4857	Shallow
KAFB-106205	—	4838	Intermediate
KAFB-106206	—	4814	Deep
KAFB-106207	—	4857	Shallow
KAFB-106208	—	4838	Intermediate
KAFB-106209	—	4814	Deep
KAFB-106211	—	4857	Currently Dry
KAFB-106212	—	4814	Deep
KAFB-106213	—	4857	Shallow
KAFB-106214	—	4838	Intermediate
KAFB-106215	—	4814	Deep
KAFB-106216	—	4857	Shallow
KAFB-106217	—	4838	Intermediate
KAFB-106218	—	4814	Deep
KAFB-106219	—	4857	Shallow
KAFB-106220	—	4838	Intermediate
KAFB-106221	—	4814	Deep
KAFB-106222	—	4857	Shallow
KAFB-106223	—	4838	Intermediate
KAFB-106224	—	4814	Deep
KAFB-106225	—	4857	Shallow
KAFB-106226	—	4838	Intermediate
KAFB-106227	—	4814	Deep
KAFB-106228	—	—	—
KAFB-106229	—	4857	Shallow, Intermediate, and Deep
KAFB-106230	—	4814	Intermediate
KAFB-106231	—	4857	Shallow
KAFB-106232	—	4814	Intermediate
KAFB-106233	—	—	—
KAFB-106234	—	—	—

Table 2-1
Current and Former Well Designations

Current Well Designation	Previous Well Designation	REI Assignment	Previous Aquifer Assignment
KAFB-106235-438	KAFB-106235-463	4857	—
KAFB-106235-472	KAFB-106235-492	4838	—
KAFB-106235-501	KAFB-106235-521	4814	—
KAFB-106236-436	KAFB-106236-461	4857	—
KAFB-106236-470	KAFB-106236-490	4838	—
KAFB-106236-499	KAFB-106236-519	4814	—
KAFB-106240-449	—	4857	—
KAFB-106241-428	—	4857	—
KAFB-106242-418	—	4857	—
KAFB-106243-425	—	4857	—
KAFB-106244-445	—	4857	—
KAFB-106245-460	—	4857	—
KAFB-106247-490	—	4857	—
KAFB-106S1-447	—	4857	—
KAFB-106S2-451	—	4857	—
KAFB-106S3-449	—	4857	—
KAFB-106S4-446	—	4857	—
KAFB-106S5-446	—	4857	—
KAFB-106S7-491	—	4857	—
KAFB-106S8-491	—	4857	—
KAFB-106S9-447	—	4857	—
KAFB-3411	KAFB3411	4857	Shallow
ST106-VA2	VA HOSPITAL WELL	—	Regional Deep

— = not applicable
REI = reference elevation interval
VA = Veterans Affairs

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106001	10/30/2020	Q4 2020	3.9	--	0.50	0.79	J	0.80	20	--	0.50	4.4	J	2.0
	11/1/2019	Q4 2019	4	--	0.5	ND	U	0.8	11	--	0.5	2	J	2
	10/30/2018	Q4 2018	**6**	--	0.5	0.8	J	0.8	34	--	0.5	6	--	2
	10/31/2017	Q4 2017	1	--	1	ND	U	1	12	--	1	4	--	1
KAFB-106002	10/20/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/11/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/17/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/25/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106003	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/15/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/30/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/17/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106004	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/16/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/5/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/16/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106005	10/23/2020	Q4 2020	**860**	--	2.5	230	--	4.0	**1,000**	--	2.5	**880**	--	10
	7/13/2020	Q3 2020	**1,700**	--	10	220	--	1.6	**1,800**	--	10	**840**	--	4
	4/16/2020	Q2 2020	**12**	J	0.5	110	--	0.8	2	--	0.5	160	--	2
	1/8/2020	Q1 2020	**21**	--	0.5	100	--	0.8	4	--	0.5	160	--	2
KAFB-106006	10/29/2020	Q4 2020	**6.5**	--	0.50	4.0	--	0.80	4.3	--	0.50	11	--	2.0
	4/24/2020	Q2 2020	**11**	--	0.5	2	--	0.8	0.3	J	0.5	5	J	2
	11/4/2019	Q4 2019	3	--	0.5	1	--	0.8	3	--	0.5	4	J	2
	4/25/2019	Q2 2019	**22**	--	0.5	0.8	J	0.8	27	--	0.5	5	--	2
KAFB-106007	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	1.8	J	0.5	ND	UJ	2
	10/18/2019	Q4 2019	ND	U	0.5	ND	U	0.8	4	--	0.5	ND	U	2
	10/25/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.5	J	0.5	ND	U	2
	10/26/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106008	10/21/2020	Q4 2020	**11,000**	--	100	310	--	16	**5,500**	--	10	**870**	--	40
	4/16/2020	Q2 2020	**8,900**	--	100	380	--	16	**4,000**	--	10	**1,000**	--	40
	11/7/2019	Q4 2019	**3,400**	--	10	230	--	2	950	--	10	480	--	4
	10/22/2018	Q4 2018	**5,800**	--	50	180	J	8	**2,700**	--	5	540	--	20
KAFB-106009	10/12/2020	Q4 2020	ND	U	5.0	ND	U	8.0	ND	U	5.0	ND	U	20
	7/9/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/16/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/8/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106010	10/22/2020	Q4 2020	**1,400**	--	5.0	510	--	8.0	**3,500**	--	50	**930**	--	20
	4/24/2020	Q2 2020	**600**	--	3	150	--	4	160	--	3	120	--	10
	11/5/2019	Q4 2019	**280**	--	5	190	--	0.8	180	--	0.5	150	--	2
	4/23/2019	Q2 2019	**280**	--	0.5	130	--	0.8	28	--	0.5	40	--	2
KAFB-106011	10/1/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/17/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/14/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/2/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106012R	10/2/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/14/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	--	0.50	ND	U	2.0
	4/23/2020	Q2 2020	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	1/14/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106013	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/15/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/1/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/15/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106014	10/29/2020	Q4 2020	**6,100**	--	50	**800**	--	8.0	**6,300**	--	50	**1,900**	--	20
	4/24/2020	Q2 2020	**86**	--	0.5	8	--	0.8	76	--	0.5	16	--	2
	11/4/2019	Q4 2019	**15**	--	0.5	20	--	0.8	2	--	0.5	20	--	2
	5/1/2019	Q2 2019	**53**	--	0.5	67	--	0.8	460	--	5	190	--	2
KAFB-106015	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106016	10/1/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/11/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/18/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/26/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106017	10/19/2020	Q4 2020	0.70	J	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/21/2020	Q2 2020	0.5	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/15/2019	Q4 2019	0.8	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/2/2019	Q2 2019	0.6	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106018	10/28/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	5/8/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/15/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/4/2019	Q2 2019	0.2	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106019	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	1.5		0.50	ND	U	2.0
	10/16/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/29/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/12/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106020	10/29/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/17/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/6/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/9/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106021	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106022	10/9/2020	Q4 2020	0.29	J	0.50	ND	UJ	0.80	ND	UJ	0.50	ND	UJ	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	0.2	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106023	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106024	10/21/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/16/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/17/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/26/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106025	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106026[c]	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/12/2015	Q4 2015	ND	U	1	ND	U	1	ND	U	1	ND	U	3
	8/17/2015	Q3 2015	ND	U	1	ND	U	1	ND	U	1	ND	U	3
KAFB-106027	10/1/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/15/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/16/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/12/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106028	10/22/2020	Q4 2020	**5,100**	J	50	**840**	--	8.0	**10,000**	J	50	**2,600**	--	20
	4/10/2020	Q2 2020	**1,100**	--	5	190	--	0.8	180	--	0.5	42	--	2
	4/22/2019	Q2 2019	**220**	--	0.5	130	--	0.8	77	--	0.5	38	--	2
	10/22/2018	Q4 2018	**6,800**	--	100	**1,400**	--	16	**15,000**	--	100	**3,000**	--	40
KAFB-106029	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106030	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	UJ	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106031	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106032	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106033	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106034	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106035	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106036	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106037	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106038	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	1.3	J	0.5	ND	UJ	2
	4/22/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/17/2019	Q4 2019	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	4/4/2019	Q2 2019	ND	U	0.5	ND	U	0.8	63	--	0.5	ND	U	2
KAFB-106039	10/5/2020	Q4 2020	ND	U	0.5	ND	U	0.8	0.92	J	0.5	ND	U	2
	10/17/2019	Q4 2019	ND	U	0.5	ND	U	0.8	4	--	0.5	ND	U	2
	11/7/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.5	J	0.5	ND	U	2
	10/9/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106040	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	1.4	--	0.50	ND	U	2.0
	10/16/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/7/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.3	J	0.5	ND	U	2
	10/25/2017	Q4 2017	ND	U	1	ND	U	1	0.5	J	1	ND	U	1
KAFB-106041	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/16/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106042	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106043	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106044	10/1/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/15/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/16/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/12/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106045	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.68	J	0.50	ND	U	2.0
	10/21/2019	Q4 2019	ND	U	0.5	ND	U	0.8	3	--	0.5	ND	U	2
	10/25/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.3	J	0.5	ND	U	2
	10/30/2017	Q4 2017	ND	U	1	ND	U	1	0.7	J	1	ND	U	1
KAFB-106046	10/20/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/14/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/18/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/1/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106047	10/20/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/14/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/17/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/1/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106048	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.87	J	0.50	ND	U	2.0
	10/22/2019	Q4 2019	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	11/13/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.4	J	0.5	ND	U	2
	11/1/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106049	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106050	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106051	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106052	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106053	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106054	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106055	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106057	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/9/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106058	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106059	10/23/2020	Q4 2020	**15,000**	--	100	**1,000**	--	16	**12,000**	--	100	**3,300**	--	40
	5/6/2020	Q2 2020	**2,300**	--	13	580	--	20	**1,600**	--	13	**1,800**	--	50
	10/21/2019	Q4 2019	**13,000**	--	50	640	--	8	**12,000**	--	50	**2,000**	--	20
	4/26/2019	Q2 2019	**12,000**	--	50	**900**	--	8	**15,000**	--	50	**3,100**	--	20
KAFB-106060	10/20/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/20/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/11/2019	Q4 2019	0.2	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/1/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106061	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.40	J	0.50	ND	U	2.0
	4/27/2020	Q2 2020	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	11/5/2019	Q4 2019	ND	U	0.5	ND	U	0.8	4	--	0.5	ND	U	2
	4/2/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106062	10/20/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/21/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/14/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/4/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106063[d]	10/14/2020	Q4 2020	**3,900**	--	50	**1,000**	--	8.0	**1,700**	--	5.0	**3,000**	--	20
	5/19/2020	Q2 2020	**5,700**	--	50	**1,700**	--	8	**18,000**	--	50	**5,100**	--	20
	10/4/2018	Q4 2018	**6,400**	--	50	**2,000**	--	8	**20,000**	--	50	**5,700**	--	20
	4/10/2018	Q2 2018	**2,000**	--	10	**710**	--	10	**3,600**	--	100	**1,200**	--	10
KAFB-106064[d]	10/14/2020	Q4 2020	**3,700**	--	25	**1,200**	--	4.0	430	--	2.5	**4,100**	--	10
	5/19/2020	Q2 2020	**3,600**	--	25	**1,500**	--	40	380	--	3	**4,700**	--	100
	10/4/2018	Q4 2018	**3,600**	--	50	**1,200**	--	8	**12,000**	--	50	**3,800**	--	20
	4/10/2018	Q2 2018	**3,800**	--	100	**2,100**	--	100	**15,000**	--	100	**5,900**	--	100
KAFB-106065	10/19/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/22/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/11/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/2/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106066	10/16/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/22/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/10/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/2/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106067	10/19/2020	Q4 2020	3.3	--	1.0	ND	U	1.6	ND	U	1.0	ND	U	4.0
	4/21/2020	Q2 2020	1	--	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/14/2019	Q4 2019	1	--	0.5	0.7	J	0.8	ND	U	0.5	ND	U	2
	4/1/2019	Q2 2019	1	--	0.5	2	--	0.8	ND	U	0.5	ND	U	2

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106068	10/16/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/20/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/11/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/1/2019	Q2 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106069	10/16/2020	Q4 2020	0.60	J	0.50	ND	U	0.80	0.64	J	0.50	ND	U	2.0
	4/23/2020	Q2 2020	0.2	J	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	10/16/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/30/2019	Q2 2019	ND	U	0.5	ND	U	0.8	0.2	J	0.5	ND	U	2
KAFB-106070	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/1/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106071	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/1/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106072	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/1/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/5/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106073	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.69	J	0.50	ND	U	2.0
	10/17/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/6/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/10/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106074	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	1.7	--	0.50	ND	U	2.0
	10/22/2019	Q4 2019	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	11/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.3	J	0.5	ND	U	2
	10/10/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106075	10/23/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/14/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/23/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/12/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106076	10/30/2020	Q4 2020	**16**	--	0.50	67	--	0.80	9.8	--	0.50	150	--	2.0
	4/28/2020	Q2 2020	0.6	J	0.5	7	--	0.8	2	--	0.5	12	--	2
	10/16/2019	Q4 2019	1	--	0.5	37	--	0.8	ND	U	0.5	100	--	2
	5/2/2019	Q2 2019	4	--	0.5	40	--	0.8	41	--	0.5	100	--	2
KAFB-106077	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	1.7	--	0.50	ND	U	2.0
	4/27/2020	Q2 2020	ND	U	0.5	ND	U	0.8	3	--	0.5	ND	U	2
	10/18/2019	Q4 2019	ND	U	0.5	ND	U	0.8	2	--	0.5	ND	U	2
	4/23/2019	Q2 2019	ND	U	0.5	ND	U	0.8	0.5	J	0.5	ND	U	2
KAFB-106078	10/20/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/21/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/15/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/2/2019	Q2 2019	ND	U	0.5	ND	--	0.8	ND	U	0.5	ND	U	2

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106079	10/30/2020	Q4 2020	**5,400**	--	25	490	--	4.0	340	--	2.5	430	--	10
	4/10/2020	Q2 2020	1	--	0.5	0.5	J	0.8	0.3	J	0.5	ND	U	2
	10/23/2019	Q4 2019	**140**	--	0.5	34	--	0.8	66	--	0.5	79	--	2
	10/23/2018	Q4 2018	**1,800**	--	5	200	--	0.8	51	--	0.5	380	--	2
KAFB-106080	10/24/2020	Q4 2020	**82**	--	0.50	5.9	--	0.80	ND	U	1.0	1.5	J	2.8
	4/23/2020	Q2 2020	**8**	--	0.5	3	--	0.8	ND	U	0.5	ND	U	2
	10/16/2019	Q4 2019	**170**	--	0.5	9	--	0.8	ND	U	0.5	4	J	2
	4/3/2019	Q2 2019	**8**	--	0.5	5	--	0.8	0.3	J	0.5	ND	U	2
KAFB-106081	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.49	J	0.50	ND	U	2.0
	4/29/2020	Q2 2020	ND	U	0.5	ND	U	0.8	0.7	J	0.5	ND	U	2
	10/18/2019	Q4 2019	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	4/24/2019	Q2 2019	ND	U	0.5	ND	U	0.8	3	--	0.5	ND	U	2
KAFB-106082	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	0.84	J	0.5	ND	U	2
	10/18/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/31/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.4	J	0.5	ND	U	2
	10/10/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106083	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	1.1	--	0.5	ND	U	2
	10/18/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/31/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.6	J	0.5	ND	U	2
	10/10/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106084	10/6/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.69	J	0.50	ND	U	2.0
	10/22/2019	Q4 2019	ND	U	0.5	ND	U	0.8	2	--	0.5	ND	U	2
	10/31/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.5	J	0.5	ND	U	2
	10/10/2017	Q4 2017	ND	U	1	ND	U	1	0.6	J	1	ND	U	1
KAFB-106085	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106086	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106087	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106088	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	0.2	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106089	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106090	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106091	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106092	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106093	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106094	10/19/2020	Q4 2020	0.48	J	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/14/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/16/2018	Q4 2018	0.3	J	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/11/2017	Q4 2017	1	--	1	0.7	J	1	ND	U	1	ND	U	1
KAFB-106095	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.61	J	0.50	ND	U	2.0
	10/21/2019	Q4 2019	ND	U	0.5	ND	U	0.8	2	--	0.5	ND	U	2
	11/13/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/11/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106096	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	0.80	J	0.50	ND	U	2.0
	10/10/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/16/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/11/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106097	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/16/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/1/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/15/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106098	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/15/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/1/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/15/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106099	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/16/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/5/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/16/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106100	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/16/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/5/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/16/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106101	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/15/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/4/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/17/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106102	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/15/2020	Q3 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	5/4/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/17/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106103	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106104	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/31/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106105	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106106	10/8/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106107	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106149-484	10/21/2020	Q4 2020	**1,500**	--	2.5	390	--	4.0	**3,900**	--	25	**2,200**	--	10
	4/16/2020	Q2 2020	**1,900**	--	25	270	--	4	**3,300**	--	25	**1,200**	--	10
	11/1/2019	Q4 2019	**8,200**	--	50	560	--	8	**10,000**	--	50	**2,300**	--	20
	4/16/2019	Q2 2019	**26,000**	--	250	**1,600**	--	400	**33,000**	--	250	**6,000**	--	1,000
KAFB-106151-484	10/21/2020	Q4 2020	0.38	J	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/16/2020	Q2 2020	**2,100**	--	25	690	--	4	**1,700**	--	25	**890**	--	10
	11/1/2019	Q4 2019	**1,100**	--	10	540	--	2	20	--	1	230	--	4
	4/18/2019	Q2 2019	**1,900**	--	10	600	--	16	70	--	1	350	--	4
KAFB-106152-484	10/21/2020	Q4 2020	**59**	--	0.50	18	--	0.80	0.65	J	0.50	6.5	--	2.0
	4/16/2020	Q2 2020	**540**	--	5	310	--	8	26	--	0.5	320	--	20
	11/1/2019	Q4 2019	**1,500**	--	3	330	--	4	850	--	3	360	--	10
	4/18/2019	Q2 2019	**430**	--	5	300	--	8	12	--	0.5	290	--	20
KAFB-106153-484	10/21/2020	Q4 2020	**14,000**	--	100	320	--	16	**10,000**	--	100	**1,500**	--	40
	4/16/2020	Q2 2020	**8,300**	--	100	380	--	16	**7,800**	--	100	**1,700**	--	40
	11/1/2019	Q4 2019	**9,000**	--	100	400	--	16	**7,100**	--	100	**1,800**	--	40
	4/18/2019	Q2 2019	**9,200**	--	100	440	--	160	**9,100**	--	100	**1,800**	--	400

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106201	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106202	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/18/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106203	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/18/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106204	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/23/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106205	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/23/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106206	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/23/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106207	10/5/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106208	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106209	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106212	10/9/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106213	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106214	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106215	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106216	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106217	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106218	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106219	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/5/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106220	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106221	10/7/2020	Q4 2020	ND	UJ	0.50	ND	UJ	0.80	ND	UJ	0.50	ND	UJ	2.0
	11/4/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/4/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106222	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106223	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106224	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/24/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106225	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106226	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	0.9	J	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106227	10/7/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/3/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106229[e]	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	11/20/2015	Q4 2015	0.376	J	1	ND	U	1	ND	U	1	ND	U	3
KAFB-106230[f]	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	4/7/2016	Q2 2016	ND	U	1	ND	U	1	ND	U	1	ND	U	1
	11/18/2015	Q4 2015	ND	U	1	ND	U	1	ND	U	1	ND	U	3
KAFB-106231	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106232	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/6/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106235-438	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	ND	UJ	0.5	ND	UJ	2
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106235-472	10/5/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106235-501	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	ND	UJ	0.5	ND	UJ	2
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106236-436	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	ND	UJ	0.5	ND	UJ	2
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106236-470	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	ND	UJ	0.5	ND	UJ	2
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106236-499	10/5/2020	Q4 2020	ND	UJ	0.5	ND	UJ	0.8	ND	UJ	0.5	ND	UJ	2
	10/29/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/1/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1
KAFB-106240-449	10/15/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/8/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/9/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/7/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106241-428	10/12/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106242-418	10/6/2020	Q4 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/28/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/8/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106243-425	10/13/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/30/2019	Q4 2019	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	10/2/2018	Q4 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	9/4/2018	Q3 2018	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106244-445	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/8/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/9/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/7/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106245-460	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/9/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2
	4/9/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2.0
	1/8/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106247-450	10/14/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/8/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/9/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/6/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
KAFB-106S1-447	10/21/2020	Q4 2020	**1,700**	--	50	590	--	80	**4,000**	--	50	**3,000**	--	200
	7/10/2020	Q3 2020	**5,000**	--	50	500	J	8	**6,300**	--	50	**2,800**	J	20
	4/9/2020	Q2 2020	**7,900**	--	50	**710**	--	8	**9,300**	--	50	**3,300**	--	20
	1/9/2020	Q1 2020	**7,800**	--	50	620	--	8	**10,000**	--	50	**2,600**	--	20
KAFB-106S2-451	10/22/2020	Q4 2020	**730**	--	2.5	18	--	4.0	54	--	2.5	550	--	10
	7/10/2020	Q3 2020	**1,100**	--	5	130	--	8	320	--	5	**1,200**	--	20
	4/9/2020	Q2 2020	**4,900**	--	25	420	--	4	**2,500**	--	25	**2,700**	--	10
	1/6/2020	Q1 2020	**9,800**	--	50	**880**	--	8	**12,000**	--	50	**4,600**	--	20
KAFB-106S3-449	10/22/2020	Q4 2020	**540**	--	1.0	12	--	1.6	5.1	--	1.0	**730**	--	40
	7/10/2020	Q3 2020	**200**	--	5	24	--	8	5	J	5	450	--	20
	4/10/2020	Q2 2020	**3,800**	--	25	**720**	--	4	**1,300**	--	3	**2,200**	--	10
	1/9/2020	Q1 2020	**5,500**	--	25	**1,400**	--	4	**4,900**	--	25	**4,200**	--	10
KAFB-106S4-446	10/22/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	7/9/2020	Q3 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	4/9/2020	Q2 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2
	1/6/2020	Q1 2020	ND	U	0.5	ND	U	0.8	ND	U	0.5	ND	U	2

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

Analyte:			Benzene			Ethylbenzene			Toluene			Xylenes, Total		
Project Screening Level[a]:			5 µg/L			700 µg/L			1,000 µg/L			620 µg/L		
Well Location ID	Sample Date	Sampling Quarter[b]	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD	Result	Val Qual	LOD
KAFB-106S5-446	10/22/2020	Q4 2020	**1,300**	--	5.0	**1,200**	--	8.0	**7,000**	--	50	**2,700**	--	20
	7/10/2020	Q3 2020	**990**	--	10	**1,300**	--	16	**3,400**	--	10	**2,400**	--	40
	4/16/2020	Q2 2020	**1,900**	--	5	**1,500**	--	8	**5,200**	--	50	**2,900**	--	20
	1/9/2020	Q1 2020	**1,500**	--	10	**1,600**	--	16	**4,900**	--	10	**3,100**	--	40
KAFB-106S7-451	10/22/2020	Q4 2020	**310**	--	2.5	**700**	--	4.0	**1,600**	--	25	**2,100**	--	10
	7/10/2020	Q3 2020	**520**	--	5	**1,000**	--	8	**1,700**	--	5	**3,300**	--	20
	4/16/2020	Q2 2020	**1,200**	--	10	640	--	16	**1,700**	--	10	**2,200**	--	40
	1/9/2020	Q1 2020	**6,700**	--	50	**1,200**	--	8	**7,700**	--	50	**4,000**	--	20
KAFB-106S8-451	10/21/2020	Q4 2020	**770**	J	2.5	15	--	4	390	J	2.5	130	--	10
	7/10/2020	Q3 2020	**5,000**	--	50	150	--	80	**3,300**	--	50	**2,000**	--	200
	4/10/2020	Q2 2020	**4,400**	--	25	210	--	4	**6,400**	--	25	**2,100**	--	10
	1/6/2020	Q1 2020	**200**	--	0.5	27	--	0.8	470	--	5	160	--	2
KAFB-106S9-447	10/21/2020	Q4 2020	**36**	--	0.50	52	--	0.80	1.9	--	0.50	65	--	2.0
	7/10/2020	Q3 2020	**4,200**	--	50	620	--	8	**1,700**	--	5	**1,300**	--	20
	4/16/2020	Q2 2020	**9,900**	--	100	**1,100**	--	16	**12,000**	--	100	**3,400**	--	40
	1/9/2020	Q1 2020	**7,300**	--	50	**970**	--	8	**11,000**	--	50	**2,700**	--	20
KAFB-3411	10/2/2020	Q4 2020	ND	U	0.50	ND	U	0.80	ND	U	0.50	ND	U	2.0
	10/17/2019	Q4 2019	ND	U	0.5	ND	U	0.8	1	--	0.5	ND	U	2
	10/22/2018	Q4 2018	ND	U	0.5	ND	U	0.8	0.5	J	0.5	ND	U	2
	10/30/2017	Q4 2017	ND	U	1	ND	U	1	ND	U	1	ND	U	1

Table 2-3
BTEX Concentrations from the Four Most Recent Sampling Events

[a] The project screening level was selected to satisfy the requirements of the Kirtland AFB Hazardous Waste Permit Number NM9570024423 as the lowest of (1) NM WQCC numeric standard or (2) EPA MCL. If no NM WQCC standard or MCL exists for any analyte, then the project screening level will be the EPA Tapwater RSL. For benzene, ethylbenzene, and toluene, the project screening level is the EPA MCL. For total xylenes, the project screening level is the NMWQCC numeric

[b] Data presented include results from the four most recent sampling events for each well. The sampling plan is provided in Table 4-1.

[c] This well was not sampled between Q4 2015 and Q4 2019 due to security issues.

[d] This well was not sampled in 2019 due to the presence of dedicated downhole equipment related to the EDB *in situ* biodegradation pilot test. Monitoring was resumed in 2020.

[e] This well has not been sampled four times for these analytes, all historical data from this well is presented here.

[f] This well was not sampled between Q2 2016 and Q4 2019 due to security issues.

µg/L = microgram per liter
AFB = Air Force Base
BTEX = benzene, toluene, ethylbenzene, and total xylenes
EDB = ethylene dibromide (1,2-dibromoethane)
EPA = U.S. Environmental Protection Agency
ID = identification
LOD = limit of detection
MCL = maximum contaminant level
ND = not detected
NM = New Mexico
Q1 = first quarter
Q2 = second quarter
Q3 = third quarter
Q4 = fourth quarter
RSL = regional screening level
Val Qual = validation qualifier
WQCC = Water Quality Control Commission
Shading = detected concentrations above the detection limit
Bold/Shading = reported concentrations exceed the project screening level
Val Quals based on independent data validation
J = Qualifier denotes the analyte was positively identified, but the associated numerical value is estimated.
U = Qualifier denotes the analyte was analyzed but not detected above the detection limit. The value associated with the U-qualifier is the LOD.
-- = Validation qualifier not assigned.

Table 6-1
Groundwater Monitoring Wells Sampling Methods

Location ID	Reference Elevation Interval (ft AMSL)	Well Installation Date[a]	Screen Interval[b] (ft bgs)	Screen Interval[b] (ft AMSL)	Sampling Technique	Screen Submerged as of Q4 2020[c] (Yes/No)?	Estimated Sample Depth[d,e] (ft bgs)
KAFB-106001	4857/4838	11/10/2000	483-508	4859-4834	Low Flow	Yes	496
KAFB-106002	4857	3/26/2002	479-504	4861-4836	Low Flow	Yes	492
KAFB-106003	4857	1/25/2003	476-501	4861-4836	Low Flow	Yes	489
KAFB-106004	4857	1/4/2006	484-509	4859-4834	Low Flow	Yes	497
KAFB-106005	4857	1/22/2007	479-504	4865-4840	Low Flow	Yes	492
KAFB-106006	4857	10/31/2007	484-509	4865-4840	Low Flow	Yes	497
KAFB-106007	4857	11/14/2007	484-509	4861-4836	Low Flow	Yes	497
KAFB-106008	4857	11/21/2007	486-511	4863-4838	Low Flow	Yes	499
KAFB-106009	4857	11/28/2007	480-505	4865-4840	Low Flow	Yes	493
KAFB-106010	4857	12/6/2007	483-508	4860-4835	Low Flow	Yes	496
KAFB-106011	4857	9/23/2008	486-511	4864-4839	Low Flow	Yes	499
KAFB-106012R	4857	4/22/2014	466-495	4877-4847	Low Flow	No	481
KAFB-106013	4857	9/19/2008	487-512	4861-4836	Low Flow	Yes	500
KAFB-106014	4857	10/3/2008	486-511	4861-4836	Low Flow	Yes	499
KAFB-106015	4857/4838	10/14/2008	485-510	4855-4830	Passive sampler	Yes	488
KAFB-106016	4857	10/17/2008	475-500	4864-4839	Low Flow	Yes	488
KAFB-106017	4857/4838	11/19/2008	482-507	4857-4832	Low Flow	Yes	495
KAFB-106018	4857/4838	11/24/2008	476-501	4857-4832	Low Flow	Yes	489
KAFB-106019	4857/4838	12/9/2008	493-518	4859-4834	Low Flow	Yes	506
KAFB-106020	4857	12/19/2008	482-507	4859-4834	Low Flow	Yes	495
KAFB-106021	4857/4838	6/7/2009	458-483	4856-4831	Passive sampler	Yes	459
KAFB-106022	4857/4838	6/12/2009	462-487	4856-4831	Passive sampler	Yes	463
KAFB-106023	4857	6/27/2009	473-498	4856-4831	Passive sampler	Yes	474
KAFB-106024	4857	8/3/2009	481-506	4863-4838	Low Flow	Yes	494
KAFB-106025	4857/4838	12/5/2010	465-490	4852-4827	Passive sampler	Yes	466
KAFB-106026	4857	4/23/2010	466-486	4857-4837	Passive sampler	Yes	467
KAFB-106027	4857	5/1/2010	481-501	4864-4844	Low Flow	Yes	491
KAFB-106028	4857	5/16/2010	486-511	4863-4838	Low Flow	Yes	499
KAFB-106029	4857	6/4/2011	451-471	4860-4840	Passive sampler	Yes	452
KAFB-106030	4838	5/25/2011	470-485	4842-4827	Passive sampler	—	470
KAFB-106031	4814	5/25/2011	496-510	4815-4802	Passive sampler	—	497
KAFB-106032	4857	6/24/2011	456-476	4862-4842	Passive sampler	Yes	457
KAFB-106033	4838	6/18/2011	477-492	4841-4826	Passive sampler	—	478
KAFB-106034	4814	6/24/2011	502-517	4817-4802	Passive sampler	—	503
KAFB-106035	4857	8/9/2011	452-482	4869-4839	Passive sampler	Yes	453
KAFB-106036	4838	8/5/2011	482-497	4840-4825	Passive sampler	—	483
KAFB-106037	4838	7/14/2011	507-522	4815-4800	Passive sampler	—	508
KAFB-106038	4857	8/5/2011	478-508	4870-4840	Low Flow	Yes	493
KAFB-106039	4838	7/26/2011	508-523	4840-4825	Low Flow	—	516
KAFB-106040	4814	7/19/2011	531-546	4817-4802	Low Flow	—	539
KAFB-106041	4857	6/6/2011	449-469	4875-4855	Passive sampler	No	450

Table 6-1
Groundwater Monitoring Wells Sampling Methods

Location ID	Reference Elevation Interval (ft AMSL)	Well Installation Date[a]	Screen Interval[b] (ft bgs)	Screen Interval[b] (ft AMSL)	Sampling Technique	Screen Submerged as of Q4 2020[c] (Yes/No)?	Estimated Sample Depth[d,e] (ft bgs)
KAFB-106042	4857	5/31/2011	469-484	4855-4841	Passive sampler	Yes	470
KAFB-106043	4814	5/18/2011	543-558	4781-4767	Passive sampler	—	544
KAFB-106044	4838	1/7/2011	504-519	4841-4826	Low Flow	—	512
KAFB-106045	4814	1/17/2011	528-543	4817-4802	Low Flow	—	536
KAFB-106046	4857	4/8/2011	490-510	4863-4843	Low Flow	Yes	500
KAFB-106047	4838	4/8/2011	512-527	4841-4826	Low Flow	—	520
KAFB-106048	4814	4/8/2011	536-551	4817-4802	Low Flow	—	544
KAFB-106049	4857	5/13/2011	457-477	4859-4839	Passive sampler	Yes	458
KAFB-106050	4838	5/2/2011	474-489	4841-4826	Passive sampler	—	475
KAFB-106051	4814	4/26/2011	501-516	4815-4800	Passive sampler	—	502
KAFB-106052	4857	7/25/2011	450-480	4869-4839	Passive sampler	Yes	450
KAFB-106053	4838	7/11/2011	478-493	4840-4825	Passive sampler	—	479
KAFB-106054	4814	6/28/2011	504-519	4814-4799	Passive sampler	—	505
KAFB-106055	4857	6/24/2011	466-486	4859-4839	Passive sampler	Yes	467
KAFB-106057	4838	6/19/2011	485-500	4841-4826	Passive sampler	—	486
KAFB-106058	4814	6/14/2011	512-527	4814-4799	Passive sampler	—	513
KAFB-106059	4857	4/7/2011	483-503	4861-4841	Low Flow	Yes	493
KAFB-106060	4838	4/16/2011	503-518	4842-4827	Low Flow	—	511
KAFB-106061	4814	4/8/2011	573-588	4772-4757	Low Flow	—	581
KAFB-106062	4814	3/19/2011	575-590	4773-4758	Low Flow	—	583
KAFB-106063	4838	4/8/2011	505-520	4844-4829	Low Flow	—	511
KAFB-106064	4857	3/24/2011	485-505	4863-4843	Low Flow	Yes	493
KAFB-106065	4838	5/17/2011	508-523	4841-4826	Low Flow	—	516
KAFB-106066	4814	5/16/2011	576-591	4773-4758	Low Flow	—	584
KAFB-106067	4857	5/11/2011	485-505	4862-4842	Low Flow	Yes	495
KAFB-106068	4814	5/2/2011	580-595	4767-4752	Low Flow	—	588
KAFB-106069	4838	5/1/2011	506-521	4841-4826	Low Flow	—	514
KAFB-106070	4857	5/23/2011	460-480	4859-4839	Passive sampler	Yes	461
KAFB-106071	4814	5/13/2011	548-563	4773-4758	Passive sampler	—	549
KAFB-106072	4838	5/1/2011	475-495	4844-4824	Passive sampler	—	476
KAFB-106073	4838	5/5/2011	500-515	4840-4825	Low Flow	—	508
KAFB-106074	4814	4/28/2011	570-585	4771-4756	Low Flow	—	578
KAFB-106075	4857	4/17/2011	480-500	4860-4840	Low Flow	Yes	490
KAFB-106076	4857	4/8/2011	480-500	4865-4845	Low Flow	Yes	490
KAFB-106077	4838	4/8/2011	504-519	4841-4826	Low Flow	—	512
KAFB-106078	4814	4/8/2011	574-589	4771-4756	Low Flow	—	582
KAFB-106079	4857	3/22/2011	484-504	4863-4843	Low Flow	Yes	494
KAFB-106080	4838	4/17/2011	503-518	4843-4828	Low Flow	—	511
KAFB-106081	4814	4/16/2011	575-589	4772-4757	Low Flow	—	582
KAFB-106082	4857	4/5/2011	472-492	4863-4843	Low Flow	Yes	482
KAFB-106083	4838	4/15/2011	496-511	4840-4825	Low Flow	—	504
KAFB-106084	4814	4/5/2011	566-581	4768-4753	Low Flow	—	574

Table 6-1
Groundwater Monitoring Wells Sampling Methods

Location ID	Reference Elevation Interval (ft AMSL)	Well Installation Date[a]	Screen Interval[b] (ft bgs)	Screen Interval[b] (ft AMSL)	Sampling Technique	Screen Submerged as of Q4 2020[c] (Yes/No)?	Estimated Sample Depth[d,e] (ft bgs)
KAFB-106085	4857	7/8/2011	447-477	4871-4841	Passive sampler	Yes	447
KAFB-106086	4838	6/26/2011	476-491	4842-4827	Passive sampler	—	477
KAFB-106087	4814	6/19/2011	546-561	4771-4756	Passive sampler	—	547
KAFB-106088	4857	6/3/2011	460-480	4864-4844	Passive sampler	Yes	461
KAFB-106089	4838	5/23/2011	482-497	4842-4827	Passive sampler	—	482
KAFB-106090	4814	5/23/2011	555-570	4768-4753	Passive sampler	—	556
KAFB-106091	4857	6/4/2011	454-474	4860-4840	Passive sampler	Yes	455
KAFB-106092	4838	5/24/2011	474-489	4841-4826	Passive sampler	—	475
KAFB-106093	4814	5/24/2011	544-559	4771-4756	Passive sampler	—	545
KAFB-106094	4857	6/26/2011	484-504	4861-4841	Low Flow	Yes	494
KAFB-106095	4838	6/24/2011	504-519	4841-4826	Low Flow	—	512
KAFB-106096	4814	6/7/2011	576-591	4769-4754	Low Flow	—	584
KAFB-106097	4838	4/27/2011	506-521	4842-4827	Low Flow	—	514
KAFB-106098	4814	4/17/2011	531-546	4817-4802	Low Flow	—	539
KAFB-106099	4838	5/12/2011	501-516	4842-4827	Low Flow	—	509
KAFB-106100	4814	5/3/2011	526-541	4817-4802	Low Flow	—	534
KAFB-106101	4838	2/21/2011	496-511	4842-4826	Low Flow	—	504
KAFB-106102	4814	3/3/2011	521-535	4816-4803	Low Flow	—	528
KAFB-106103	4838	6/21/2011	485-500	4843-4828	Passive sampler	—	486
KAFB-106104	4814	6/15/2011	510-525	4818-4803	Passive sampler	—	511
KAFB-106105	4838	8/19/2011	484-499	4838-4823	Passive sampler	—	485
KAFB-106106	4857	8/10/2011	454-484	4868-4838	Passive sampler	Yes	454
KAFB-106107	4814	8/30/2011	510-525	4812-4797	Passive sampler	—	511
KAFB-106149-484	4857	9/16/2011	354-484	4992-4862	Passive sampler	No	472
KAFB-106151-484	4857	9/30/2011	355-484	4990-4861	Passive sampler	No	470
KAFB-106152-484	4857	10/7/2011	355-484	4992-4863	Passive sampler	No	472
KAFB-106153-484	4857	10/27/2011	355-484	4994-4865	Passive sampler	No	475
KAFB-106201	4857	9/24/2012	487-517	4867-4837	Passive sampler	Yes	490
KAFB-106202	4838	9/23/2012	517-532	4838-4823	Passive sampler	—	521
KAFB-106203	4814	9/9/2012	620-635	4734-4719	Passive sampler	—	624
KAFB-106204	4857	8/22/2012	463-493	4870-4840	Passive sampler	Yes	463
KAFB-106205	4838	8/15/2012	493-508	4841-4826	Passive sampler	—	493
KAFB-106206	4814	7/16/2012	594-608	4740-4725	Passive sampler	—	594
KAFB-106207	4857	8/22/2012	473-503	4871-4841	Passive sampler	Yes	474
KAFB-106208	4838	8/16/2012	503-518	4841-4826	Passive sampler	—	504
KAFB-106209	4814	8/7/2012	603-617	4740-4726	Passive sampler	—	604
KAFB-106212	4814	2/25/2015	543-558	4779-4764	Passive sampler	—	544
KAFB-106213	4857	2/10/2015	448-478	4877-4847	Passive sampler	No	451
KAFB-106214	4838	3/13/2015	478-493	4847-4833	Passive sampler	—	479
KAFB-106215	4814	4/22/2015	547-562	4779-4764	Passive sampler	—	548
KAFB-106216	4857	2/17/2015	456-486	4878-4848	Passive sampler	No	461
KAFB-106217	4838	2/17/2015	485-500	4849-4834	Passive sampler	—	486

Table 6-1
Groundwater Monitoring Wells Sampling Methods

Location ID	Reference Elevation Interval (ft AMSL)	Well Installation Date[a]	Screen Interval[b] (ft bgs)	Screen Interval[b] (ft AMSL)	Sampling Technique	Screen Submerged as of Q4 2020[c] (Yes/No)?	Estimated Sample Depth[d,e] (ft bgs)
KAFB-106218	4814	5/26/2015	552-567	4782-4767	Passive sampler	—	553
KAFB-106219	4857	3/20/2015	463-493	4878-4848	Passive sampler	No	469
KAFB-106220	4838	3/20/2015	493-508	4847-4832	Passive sampler	—	494
KAFB-106221	4814	6/18/2015	561-576	4779-4764	Passive sampler	—	562
KAFB-106222	4857	1/15/2015	458-488	4875-4845	Passive sampler	No	461
KAFB-106223	4838	2/17/2015	488-503	4846-4831	Passive sampler	—	489
KAFB-106224	4814	5/22/2015	555-570	4780-4765	Passive sampler	—	556
KAFB-106225	4857	1/19/2015	450-480	4876-4846	Passive sampler	No	453
KAFB-106226	4838	2/3/2015	480-495	4847-4832	Passive sampler	—	481
KAFB-106227	4814	5/19/2015	548-563	4780-4765	Passive sampler	—	549
KAFB-106229	4857	8/20/2015	431-531	4883-4783	Passive sampler	No	442
KAFB-106230	4814	9/1/2015	501-516	4824-4809	Passive sampler	—	502
KAFB-106231	4857	9/15/2015	440-475	4888-4853	Passive sampler	No	454
KAFB-106232	4814	9/15/2015	503-518	4824-4809	Passive sampler	—	504
KAFB-106235-438	4857	10/31/2016	438-463	4878-4853	Passive sampler	No	441
KAFB-106235-472	4838	10/31/2016	472-492	4844-4824	Passive sampler	—	473
KAFB-106235-501	4814	10/31/2016	501-521	4815-4795	Passive sampler	—	502
KAFB-106236-436	4857	11/23/2016	436-461	4880-4855	Passive sampler	No	442
KAFB-106236-470	4838	11/23/2016	470-490	4846-4826	Passive sampler	—	471
KAFB-106236-499	4814	11/23/2016	499-519	4817-4797	Passive sampler	—	500
KAFB-106240-449	4857	6/14/2018	449-489	4899-4859	Passive sampler	No	473
KAFB-106241-428	4857	8/16/2018	428-468	4896-4856	Passive sampler	No	452
KAFB-106242-418	4857	8/23/2018	418-458	4898-4858	Passive sampler	No	442
KAFB-106243-425	4857	7/27/2018	425-465	4896-4856	Passive sampler	No	447
KAFB-106244-445	4857	7/12/2018	445-485	4898-4858	Passive sampler	No	469
KAFB-106245-460	4857	9/7/2018	461-501	4897-4857	Passive sampler	No	485
KAFB-106247-450	4857	3/1/2019	450-490	4898-4858	Passive sampler	No	477
KAFB-106248[f]	TBD	TBD	TBD	TBD	Low Flow	No	TBD
KAFB-106249[f]	TBD	TBD	TBD	TBD	Low Flow	No	TBD
KAFB-106250[f]	TBD	TBD	TBD	TBD	Low Flow	No	TBD
KAFB-106251[f]	TBD	TBD	TBD	TBD	Low Flow	No	TBD
KAFB-106252[f]	TBD	TBD	TBD	TBD	Low Flow	No	TBD
KAFB-106S1-447	4857	2/18/2019	447-487	4898-4858	Passive sampler	No	471
KAFB-106S2-451	4857	11/21/2018	451-491	4898-4858	Passive sampler	No	478
KAFB-106S3-449	4857	11/29/2018	449-489	4899-4859	Passive sampler	No	476
KAFB-106S4-446	4857	11/16/2018	446-486	4897-4857	Passive sampler	No	471
KAFB-106S5-446	4857	11/5/2018	446-486	4898-4858	Passive sampler	No	468
KAFB-106S7-451	4857	2/4/2019	451-491	4898-4858	Passive sampler	No	475
KAFB-106S8-451	4857	3/1/2019	451-491	4897-4857	Passive sampler	No	476
KAFB-106S9-447	4857	11/8/2019	447-487	4899-4859	Passive sampler	No	471
KAFB-106S10[f]	TBD	TBD	TBD	TBD	TBD	No	TBD
KAFB-3411	4857	11/10/1999	477-502	4863-4838	Low Flow	Yes	490

Table 6-1
Groundwater Monitoring Wells Sampling Methods

[a] Well installation date is the date provided in ERPIMS, except where the date in ERPIMS is the start of drilling, in which case the well installation date is the date provided in the well completion diagram submitted to the NMOSE.

[b] Screen interval is rounded to the nearest foot.

[c] Well screens in REI 4857 wells intersected the water table when they were installed and current screen submergence is the result of water table rise. Well screens in REI 4838 and 4814 wells were designed with the screened interval fully submerged to capture conditions at depths below the water table.

[d] Low-flow sampling depths were estimated in Q4 2020 based on the equipment used at that time. Portable equipment sampling depths were estimated to the nearest foot as 2 ft below top of screen if submerged or 2 ft above bottom of screen if not submerged. Dedicated pump sampling depths were estimated as half-way between top and bottom of screen.

[e] Passive sampling depth is estimated to the nearest foot as the depth to the top of the highest sampler.

[f] Well completion and sampling details will be determined following well completion and surveying, and will be included in the next work plan update.
— = Wells in REI 4838 and 4814 were designed to monitor conditions a depth below the water table and were therefore installed with the screen fully submerged.
-- = pump intake depth is not applicable for passive samples
AMSL = above mean sea level
bgs = below ground surface
ERPIMS = Environmental Resources Program Information Management System
ft = foot/feet
ID = identification
NMOSE = New Mexico Office of the State Engineer
Q4 = fourth quarter
REI = reference elevation interval
TBD = to be determined

Table 6-2
Analytical Parameter, Method, Container, Preservation, and Holding Time Requirements

Parameter/Analytical Method	Matrix	Container/Preservation	Preparation/Analysis Holding Time	Data Package Turnaround
Volatile Organic Compounds – SW8260C	Water	3 x 40-mL VOA vials; HCL to pH <2; Cool to <6°C	14 days	15 business days
Ethylene Dibromide – SW8011	Water	3 x 40-mL VOA vials; HCL to pH <2; Cool to <6°C	14 days/40 days	15 business days
Total Petroleum Hydrocarbons-Gasoline Range Organics – SW8015D	Water	3 x 40-mL VOA vials; HCL to pH <2; Cool to <6°C	14 days	15 business days
Total Petroleum Hydrocarbons-Diesel/Motor Oil Range Organics – SW8015D	Water	2 x 250-mL amber glass; HCL to pH<2; Cool to <6°C	7 days/40 days	15 business days
Total Petroleum Hydrocarbons-Gasoline Range Organics – SW8015D	Solid	1 x 4-oz jar; Cool to <6°C	14 days	15 business days
Total Petroleum Hydrocarbons-Diesel/Motor Oil Range Organics – SW8015D	Solid	1 x 4-oz jar; Cool to <6°C	14 days	15 business days
Metals (ICP) – SW6010C	Water	1 x 250-mL plastic; HNO3 to pH <2; Cool to <6°C	180 days	15 business days
Metals (ICP/MS) – SW6020A	Water	1 x 250-mL plastic; HNO3 to pH <2; Cool to <6°C	180 days	15 business days
Anions – E300.0	Water	1 x 50-mL plastic; Cool to <6°C	28 days 2 days – nitrate and nitrite	15 business days
Nitrate/Nitrite Nitrogen – E353.2	Water	1 x 120-mL plastic or glass; H2SO4 to pH<2; Cool to <6°C	28 days	15 business days
Alkalinity (Bicarbonate/Carbonate) – SM2320B	Water	1 x 250-mL plastic or glass: Cool to <6°C	14 days	15 business days
TCLP VOCs – SW1311/8260C	Solid	1 x 4-oz jar; Cool to <6°C	14 days	15 business days
TCLP SVOC/Pesticides/Herbicides – SW1311/8270D/8081A/8151A	Solid	1 x 8-oz jar; Cool to <6°C	14 days	15 business days
TCLP RCRA Metals – SW1311/6010C/7470A	Solid	1 x 8-oz jar; Cool to <6°C	14 days	15 business days
Flashpoint/Ignitability – SW1010A/1030	Water/Solid	1 x 250-mL plastic/1 x 4-oz jar; Cool to <6°C	14 days	15 business days
Corrosivity (pH) – SW9040C/9045D	Water/Solid	1 x 125-mL plastic/1 x 4-oz jar; Cool to <6°C	Upon receipt	15 business days
Total/Reactive Cyanide – SW9012B/SW846 Chapter 7	Water/Solid	1 x 250-mL plastic, NaOH to pH 12/ 1 x 4-oz jar; Cool to <6°C	14 days/7 days	15 business days
Total/Reactive Sulfide – SW9034/SW846 Chapter 7	Water/Solid	1 x 1-liter plastic/ 1 x 4-oz jar; Cool to <6°C	7 days	15 business days

Table 6-2
Analytical Parameter, Method, Container, Preservation, and Holding Time Requirements

°C = Degrees Celsius
E = EPA Methods of Chemical Analysis of Water and Wastes, 1983 and updates
EPA = U.S. Environmental Protection Agency
HCL = Hydrochloric acid
HDPE = High density polyethylene
HNO3 = Nitric acid
ICP = Inductively coupled plasma
H_2SO_4 = Sulfuric acid
mL = Milliliter(s)
NaOH = Sodium hydroxide
RCRA = Resource Conservation and Recovery Act
SM = Standard Methods for Examination of Water and Wastewater, 22 Edition
SVOC = Semivolatile organic compound
SW = EPA SW846 Test Methods for Evaluating Solid Waste, Third Edition, 1986 and Updates
TCLP = Toxicity characteristic leaching procedure
VOA = Volatile organic analysis
VOC = Volatile organic compound

Table 6-3
Reference Limits and Screening Criteria for Groundwater Monitoring Well Samples

Analyte	Analytical Method	CAS RN	Units	c/nc	EPA MCL[a]	NM WQCC Standard[b]	EPA Tapwater RSL[c]	Project Screening Level[d]	Achievable Laboratory Limits[e]		
									LOQ	LOD	DL
Total Petroleum Hydrocarbons											
TPH as Gasoline Range Organics (C_6 to C_{10})	SW8015D	NS	µg/L	-	NS	NS	550	NS	50	40	30
TPH as Diesel Range Organics (C_{10} to C_{28})	SW8015D	NS	µg/L	-	NS	NS	1300	NS	100	90	50
TPH as Oil Range Organics (C_{28} to C_{35})	SW8015D	NS	µg/L	-	NS	NS	800	NS	100	90	50
Volatile Organic Compounds											
1,1,1,2-Tetrachloroethane	SW8260C	630-20-6	µg/L	c	NS	NS	5.7	5.7	1.0	0.5	0.2
1,1,1-Trichloroethane	SW8260C	71-55-6	µg/L	nc	200	200	8000	200	1.0	0.5	0.3
1,1,2,2-Tetrachloroethane	SW8260C	79-34-5	µg/L	c	NS	10	0.76	10	1.0	0.5	0.2
1,1,2-Trichloroethane	SW8260C	79-00-5	µg/L	c	5	5	2.8	5	1.0	0.5	0.2
1,1-Dichloroethane	SW8260C	75-34-3	µg/L	c	NS	25	28	25	1.0	0.5	0.2
1,1-Dichloroethene	SW8260C	75-35-4	µg/L	nc	7	7	280	7	1.0	0.5	0.2
1,1-Dichloropropene	SW8260C	563-58-6	µg/L	-	NS	NS	NS	NS	5.0	0.5	0.2
1,2,3-Trichlorobenzene	SW8260C	87-61-6	µg/L	nc	NS	NS	7	7	5.0	1.0	0.4
1,2,3-Trichloropropane	SW8260C	96-18-4	µg/L	c	NS	NS	0.0075	0.0075	5.0	0.5	0.2
1,2,4-Trichlorobenzene	SW8260C	120-82-1	µg/L	c	70	70	12	70	5.0	1.0	0.3
1,2,4-Trimethylbenzene	SW8260C	95-63-6	µg/L	nc	NS	NS	56	56	5.0	2.0	1.00
1,2-Dibromo-3-chloropropane	SW8260C	96-12-8	µg/L	c	0.2	NS	0.0033	0.2	5.0	1.0	0.3
1,2-Dibromoethane (EDB)	SW8260C	106-93-4	µg/L	c	0.05	0.05	0.075	0.05	1.0	0.5	0.2
1,2-Dibromoethane (EDB)	SW8011	106-93-4	µg/L	c	0.05	0.05	0.075	0.05	0.03	0.02	0.01
1,2-Dichlorobenzene	SW8260C	95-50-1	µg/L	nc	600	600	300	600	5.0	0.5	0.2
1,2-Dichloropropane	SW8260C	78-87-5	µg/L	c	5	5	8.5	5	1.0	0.5	0.2
2-Butanone (Methyl Etheyl Ketone)	SW8260C	78-93-3	µg/L	nc	NS	NS	5600	5600	10	1.0	0.3
1,3-Dichloropropane	SW8260C	142-28-9	µg/L	nc	NS	NS	370	370	1.0	0.5	0.2
1,3-Dichlorobenzene[f]	SW8260C	541-73-1	µg/L	-	600	600	300	600	5.0	0.5	0.2
1,3,5-Trimethylbenzene	SW8260C	108-67-8	µg/L	nc	NS	NS	60	60	5.0	1.0	0.3
1,4-Dichlorobenzene	SW8260C	106-46-7	µg/L	c	75	75	4.8	75	5.0	0.5	0.2
2-Chlorotoluene	SW8260C	95-49-8	µg/L	nc	NS	NS	240	240	5.0	0.5	0.2
2,2-Dichloropropane	SW8260C	594-20-7	µg/L	-	NS	NS	NS	NS	1.0	0.5	0.3
2-Hexanone	SW8260C	591-78-6	µg/L	nc	NS	NS	38	38	10	1.0	0.3
4-Chlorotoluene	SW8260C	106-43-4	µg/L	nc	NS	NS	250	250	5.0	0.5	0.2
4-Methyl-2-pentanone (Methyl isobutyl ketone)	SW8260C	108-10-1	µg/L	nc	NS	NS	6300	6300	10	1.0	0.5
Acetone	SW8260C	67-64-1	µg/L	nc	NS	NS	14000	14000	20	2,0	0.7
Acrolein	SW8260C	107-02-8	µg/L	nc	NS	NS	0.042	0.042	100	5.0	3.0
Acrylonitrile	SW8260C	107-13-1	µg/L	c	NS	NS	0.52	0.52	20	1.0	0.3
Benzene	SW8260C	71-43-2	µg/L	c	5	5	4.6	5	1.0	0.5	0.2
Bromobenzene	SW8260C	108-86-1	µg/L	nc	NS	NS	62	62	5.0	0.5	0.2
Bromochloromethane	SW8260C	74-97-5	µg/L	nc	NS	NS	83	83	5.0	0.5	0.2
Bromodichloromethane	SW8260C	75-27-4	µg/L	c	80	NS	1.3	80	1.0	0.5	0.2
Bromoform	SW8260C	75-25-2	µg/L	c	80	NS	33	80	4.0	2.0	1.0
Bromomethane	SW8260C	74-83-9	µg/L	nc	NS	NS	7.5	7.5	1.0	0.5	0.3
Carbon Disulfide	SW8260C	75-15-0	µg/L	nc	NS	NS	810	810	5.0	0.5	0.2
Carbon Tetrachloride	SW8260C	56-23-5	µg/L	c	5	5	4.6	5	1.0	0.5	0.2
Chlorobenzene	SW8260C	108-90-7	µg/L	nc	100	NS	78	100	1.0	0.5	0.2
Chloroethane	SW8260C	75-00-3	µg/L	nc	NS	NS	21000	21000	1.0	0.5	0.2
Chloroform	SW8260C	67-66-3	µg/L	c	80	100	2.2	100	1.0	0.5	0.2
Chloromethane	SW8260C	74-87-3	µg/L	nc	NS	NS	190	190	1.0	0.5	0.2
cis-1,2-Dichloroethene	SW8260C	156-59-2	µg/L	nc	70	70	36	70	1.0	0.5	0.2
cis-1,3-Dichloropropene	SW8260C	10061-01-5	µg/L	c	NS	NS	4.7	4.7	1.0	0.5	0.2
Dibromochloromethane	SW8260C	124-48-1	µg/L	c	80	NS	8.7	80	1.0	0.5	0.2
Dibromomethane	SW8260C	74-95-3	µg/L	nc	NS	NS	8.3	8.3	1.0	0.5	0.2
Dichlorodifluoromethane	SW8260C	75-71-8	µg/L	nc	NS	NS	200	200	1.0	0.5	0.2

Table 6-3
Reference Limits and Screening Criteria for Groundwater Monitoring Well Samples

Analyte	Analytical Method	CAS RN	Units	c/nc	EPA MCL[a]	NM WQCC Standard[b]	EPA Tapwater RSL[c]	Project Screening Level[d]	Achievable Laboratory Limits[e]		
									LOQ	LOD	DL
Ethylbenzene	SW8260C	100-41-4	µg/L	c	700	700	15	700	1.0	0.8	0.4
Hexachlorobutadiene	SW8260C	87-68-3	µg/L	c	NS	NS	1.4	1.4	5.0	2.0	0.4
Isopropylbenzene (Cumene)	SW8260C	98-82-8	µg/L	nc	NS	NS	450	450	5.0	0.5	0.2
Methyl tert-Butyl Ether	SW8260C	1634-04-4	µg/L	c	NS	100	140	100	1.0	0.5	0.2
Methylene Chloride	SW8260C	75-09-2	µg/L	c	5	5	110	5	1.0	0.5	0.3
n-Butylbenzene	SW8260C	104-51-8	µg/L	nc	NS	NS	1000	1000	5.0	0.5	0.2
n-Propylbenzene	SW8260C	103-65-1	µg/L	nc	NS	NS	660	660	5.0	0.5	0.2
Naphthalene[g]	SW8260C	91-20-3	µg/L	c	NS	30	1.2	30	5.0	2.0	1.0
p-Isopropyltoluene	SW8260C	99-87-6	µg/L	nc	NS	NS	NS	NS	5.0	0.5	0.2
sec-Butylbenzene	SW8260C	135-98-8	µg/L	nc	NS	NS	2000	2000	5.0	0.5	0.2
Styrene	SW8260C	100-42-5	µg/L	nc	100	100	1200	100	5.0	0.5	0.2
tert-Butylbenzene	SW8260C	98-06-6	µg/L	nc	NS	NS	690	690	5.0	1.0	0.3
Tetrachloroethene	SW8260C	127-18-4	µg/L	c	5	5	110	5	1.0	0.5	0.2
Toluene	SW8260C	108-88-3	µg/L	nc	1000	1000	1100	1000	1.0	0.5	0.2
trans-1,2-Dichloroethene	SW8260C	156-60-5	µg/L	nc	100	100	360	100	1.0	0.5	0.2
trans-1,3-Dichloropropene	SW8260C	10061-02-6	µg/L	c	NS	NS	4.7	4.7	1.0	0.5	0.2
Trichloroethene	SW8260C	79-01-6	µg/L	c	5	5	4.9	5	1.0	0.5	0.2
Trichlorofluoromethane	SW8260C	75-69-4	µg/L	nc	NS	NS	5200	5200	1.0	0.5	0.2
Vinyl Acetate	SW8260C	108-05-4	µg/L	nc	NS	NS	410	410	10	2.0	0.7
Vinyl Chloride	SW8260C	75-01-4	µg/L	c	2	2	0.19	2	1.0	0.5	0.2
m,p-Xylene[h]	SW8260C	179601-23-1	µg/L	nc	10000	NS	190	10000	5.0	2.0	1.0
o-Xylene[h]	SW8260C	95-47-6	µg/L	nc	10000	NS	190	10000	1.0	0.8	0.4
Xylene (Total)	SW8260C	1330-20-7	µg/L	nc	10000	620	190	620	6.0	2.0	1.0
ICPMS Metals[i]											
Arsenic	SW6020A	7440-38-2	µg/L	c	10	10	0.52	10	2	1.6	0.68
Lead	SW6020A	7439-92-1	µg/L	-	15	15	15	15	0.50	0.25	0.07
ICP Metals[i]											
Calcium	SW6010C	7440-70-2	µg/L	-	NS	NS	NS	NS	200	150	96
Iron	SW6010C	7439-89-6	µg/L	nc	NS	1000	14000	1000	200	100	40
Magnesium	SW6010C	7439-95-4	µg/L	-	NS	NS	NS	NS	100	75	40
Manganese	SW6010C	7439-96-5	µg/L	nc	NS	200	430	200	10	5.0	3.0
Potassium	SW6010C	7440-09-7	µg/L	-	NS	NS	NS	NS	500	375	204
Sodium	SW6010C	7440-23-5	µg/L	-	NS	NS	NS	NS	1000	500	239
Miscellaneous											
Alkalinity -Bicarbonate/Carbonate	SM 2320B	NS	mg/L	-	NS	NS	NS	NS	8.0	6.0	2.6
Bromide	EPA 300.0	24959-67-9	mg/L	-	NS	NS	NS	NS	0.50	0.40	0.25
Chloride	EPA 300.0	16887-00-6	mg/L	-	NS	250	NS	250	0.40	0.30	0.20
Nitrate-Nitrite Nitrogen[j]	EPA 353.2	84145-82-4	mg/L	nc	10	10	32	10	0.10	0.09	0.04
Sulfate	EPA 300.0	14808-79-8	mg/L	-	NS	600	NS	600	1.0	0.9	0.3

Table 6-3
Reference Limits and Screening Criteria for Groundwater Monitoring Well Samples

Analyte	Analytical Method	CAS RN	Units	c/nc	EPA MCL[a]	NM WQCC Standard[b]	EPA Tapwater RSL[c]	Project Screening Level[d]	Achievable Laboratory Limits[e]		
									LOQ	LOD	DL

[a] EPA National Primary Drinking Water Regulations, Maximum Contaminant Levels accessed at https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations (November 2020)

[b] New Mexico Administrative Code Title 20.6.2.3103, Standards for Ground Water of 10,000 mg/L total dissolved solids concentration or less (NMAC 2018). The NM WQCC standard applies to dissolved metals.

[c] EPA Regional Screening Levels (RSLs) accessed at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables (November 2020) for hazard index = 1.0 for noncarcinogens and 10-5 cancer risk for carcinogens.

[d] The project screening level was selected to satisfy the requirements of the Kirtland AFB Hazardous Waste Permit No. NM9570024423 as the lowest of (1) NM WQCC standard or (2) EPA MCL. If no MCL or NM WQCC standard exists for the analyte, then the project screening level is set at the EPA Tapwater RSL. RSLs that are not achievable by the laboratory reporting limits are shaded on the table. Non-detect results are reported as less than the LOD per DoD Quality Systems Manual Version 5.3 (2019).

[e] Achievable laboratory limits are for Eurofins Lancaster Laboratories Environmental, LLC unless noted for Eurofins Calscience.

[f] The screening value used is for 1,2-Dichlorobenzene.

[g] NMWQCC specifies a standard for the sum of naphthalene and mononaphthalenes (1- and 2-methylnaphthalene). Conservatively, this standard is shown for each of the three compounds.

[h] The screening values used are for total xylene.

[i] The EPA MCL and tapwater RSL apply to total metals. The NM WQCC standard applies to dissolved metals.

[j] The MCL used is for nitrate since the historical data show only nitrate reported in groundwater at the Kirtland Bulk Fuels Facility site.

µg/L = microgram(s) per liter
mg/L = milligram(s) per liter
c = carcinogenic
CAS = Chemical Abstracts Service
DL = detection limit
EPA = U.S. Environmental Protection Agency
ICP = inductively coupled plasma
ICPMS = inductively coupled plasma mass spectrometer
LOD = limit of detection
LOQ = limit of quantitation
MCL = Maximum Contaminant Level
nc = non-carcinogenic
NM = New Mexico
NMED = New Mexico Environment Department
WQCC = Water Quality Control Commission
NS = not specified
RSL = Regional Screening Level
RN = registry number
TPH = total petroleum hydrocarbon
Gray shading indicates RSLs that are not achievable by the laboratory reporting limits.

APPENDIX A

REGULATORY CORRESPONDENCE AND RCRA PERMIT REFERENCES

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

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

October 2, 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: GROUNDWATER MONITORING WORK PLAN
BULK FUELS FACILITY SPILL SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO
EPA ID# NM6213820974
HWB-KAFB-BFFS-MISC

Dear Colonel Miller and Lt. Colonel Acosta:

Currently, groundwater monitoring for the Bulk Fuels Facility Spill (BFFS) area is conducted under five separate monitoring plans. This is attributable to the Permittee, over time, providing new monitoring plans specific to newly installed wells rather than adding the new wells to existing NMED-approved groundwater monitoring plans.

The current plans that contain groundwater monitoring requirements include the following:

1. *Operations and Maintenance Plan Groundwater Treatment System, Bulk Fuels Facility, Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision 0,* dated August 2016. This plan was submitted to NMED on August 18, 2016 and approved with modifications on December 12, 2016.

2. *Work Plan for Bulk Fuels Facility Expansion of the Dissolved-Phase Plume Groundwater Treatment System Design, Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision 2,* dated January 2017.

This plan was submitted to NMED on January 31, 2017 and approved with conditions on May 31, 2017.

3. *Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling, Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision R1*, dated December 2017. This plan was submitted to NMED on December 15, 2017 and approved with conditions on February 23, 2018.

4. *Work Plan for Data Gap Monitoring Well Installation, Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS- 111, Kirtland Air Force Base, New Mexico*, dated December 20, 2017. This plan was submitted to NMED on January 3, 2018 and approved with conditions on February 28, 2018.

5. *Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests, Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision R1,* dated November 2017. This plan was submitted to NMED on November 28, 2017 and approved with conditions on April 6, 2018.

In order to better organize the groundwater monitoring conducted as part of the BFFS corrective action and to address the requirement for groundwater monitoring plan annual updates, a groundwater monitoring work plan that includes all ongoing periodic monitoring must be created to consolidate the existing plans and ensure that all updates are included in the BFFS monitoring efforts. A single groundwater monitoring work plan to consolidate all monitoring conducted will increase efficiency, facilitate review of groundwater monitoring reports, and likely reduce overall costs associated with monitoring and reporting.

Air Force staff have indicated that contracting issues may preclude the Permittee from providing a consolidated groundwater monitoring work plan at this time. In recognition of this, the Permittee may submit updated revisions for each of the five work plans if it is not feasible at this time to submit a consolidated groundwater monitoring workplan. However, the expectation is that the Air Force will work towards eventually submitting a consolidated plan.

The Permittee must submit the initial comprehensive Bulk Fuels Facility Spill Groundwater Monitoring Plan, or the five monitoring plan revisions, no later than **February 26, 2021**. The plan or plans must describe the monitoring conducted at the BFFS and include descriptions of the proposed sampling methods, analytical methods, sampling frequency, and the locations of all wells included in the monitoring program. In addition, the work plan(s) must be updated annually on **April 1st** of each subsequent year, if necessary. The updates must include changes such as the addition of new wells to the monitoring network and incorporate any proposed changes to the monitoring program (e.g., sampling frequency, analytical suite, sample

collection methods). If no changes to the plan are proposed, the Permittee must submit a letter(s), specific to the plan(s), by **April 1** of the corresponding year stating that no changes to the monitoring program are proposed.

Should you have any questions, please contact me at (505) 476-6035, or your staff may contact Ben Wear at (505) 476-6041.

Sincerely,

Kevin Pierard

Digitally signed by Kevin Pierard
Date: 2020.10.02 15:59:36 -06'00'

Kevin M. Pierard, Chief
Hazardous Waste Bureau

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

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
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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 2, 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: REPORTING REQUIREMENTS FOR ALL DOCUMENT SUBMITTALS
KIRTLAND AIR FORCE BASE, NEW MEXICO
EPA ID# NM6213820974
HWB-KAFB-20-MISC

Dear Colonel Miller and Lt. Colonel Acosta:

In our discussions with Kirtland Air Force Base (KAFB or Permittee) staff, a concern was raised that New Mexico Environment Department (NMED) comments on specific submittals contained direction that more broadly applies to various activities conducted at KAFB. Your staff indicated that this creates difficulty for them in tracking directions provided by NMED. To respond to such concerns, NMED is providing the following compilation to clarify requirements for all documents submitted to NMED by the Permittee.

In general, many KAFB submittals to NMED consistently contain a substantial number of errors that should be identified during quality assurance and quality control reviews prior to submittal. In discussions with KAFB staff, NMED staff was assured that steps are being taken to review and enhance document quality control and address these recurring issues to assist NMED in expediting document reviews and to assist the public in better understanding the documents that are submitted by the Permittee.

1. **Laboratory Deliverables:** Section 6.5.18.2, Laboratory Deliverables, of the KAFB Resource Conservation and Recovery Act (RCRA) Permit (KAFB Permit), states the requirements for analytical laboratory reporting. The section states, "[l]aboratory analytical data packages shall be prepared in accordance with EPA-established Level III or IV analytical support protocols." The final paragraph of the permit section goes on to state, "[t]he 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." Therefore, for purposes of reporting, Level II QC results are necessary. Level III and IV data must be maintained by the Permittee to be made available upon request.

2. **General Guidelines:** NMED has included an attachment titled *General Reporting Guidelines* that provides guidance regarding its expectations of submittals to the Hazardous Waste Bureau. The Permittee must consult the guidance during document preparation.

3. **Document Scopes of Work:** In order to avoid confusion, all work plans must be written for one specific scope of work.

4. **Document Titles vs. Content:** All future document titles on cover pages must include all major scope activities incorporated within that document, including those presented in appendices. The names of all future documents and scopes of work must not change during the RCRA corrective action process (i.e., work plans through reports).

5. **Responses to NMED Comments:** Responses to NMED comments must be included as Appendix A of every document revision. Redline-strikeout versions must include <u>all</u> changes made to the corresponding revised document.

6. **Field Methods:** All field methods for the project must be documented in the text of the document or an appendix. The documentation must be specific to each monitoring activity, such as soil vapor monitoring, groundwater monitoring, or operation and maintenance of the groundwater treatment system. References to quality assurance project plans (QAPPs), standard operating procedures (SOPs), previous work plans, or other documents are not acceptable. All deviations from approved work plans must be discussed and explained in a Deviations section.

7. **Well Designations:** Wells must be consistently referred to by the same name/designation in all sections of the text, all tables, and all figures. The designation must also match that provided in the digital analytical data files.

8. **Data Tables, Figures, and Appendices:**
   - **a.** Sampling data tables must be logically arranged, either chronologically or by investigation, to facilitate location of information.
   - **b.** Sampling data tables must include the practical quantitation limit (PQL) and reporting detection limit for each analysis. Method detection limits must also be provided for each analytical method.
   - **c.** Sampling data tables must include the appropriate screening levels for data comparison.
   - **d.** Analytical data tables in digital format must include a column that indicates which analytical data report the specific sample information can be found. This link must correspond to the analytical data report file name.
   - **e.** Data from analyses where the PQL (or LOQ) exceeds 20% of the screening level are data quality exceptions and must be identified as such in all tables and figures.
   - **f.** Analytical data provided in digital format such as Excel files must be provided in a sortable, searchable format that can be uploaded into a database. Previous reports have provided digital data in the same format as the tables in the text which are not sortable or searchable.
   - **g.** Data in tables and figures must be presented with a consistent and appropriate number of significant figures.
   - **h.** All points (wells), structures, infrastructure, roads, etc. depicted on figures must be labeled.
   - **i.** All tables, figures, and appendices must be appropriately numbered and titled.
   - **j.** All figures must include a scale and a north arrow.
   - **k.** Data tables and figures must undergo quality assurance and quality control review prior to submittal to NMED.

9. **Document organization:** Every page of each submittal, including all pages within all sections and appendices, must be numbered either sequentially or in some other logical format.

Many of the issues listed above were discussed during a conference call between NMED and KAFB that was held on May 7, 2020; KAFB staff stated that they understood these issues and agreed to correct these problems. While NMED made every attempt to be comprehensive, other issues may arise. If NMED identifies further issues that occur in multiple submittals, NMED will contact KAFB staff informally to discuss the issues and follow up with further correspondence and direction.

Should you have any questions or wish to meet with us to discuss these comments, please contact me at (505) 476-6035 or your staff may contact Ben Wear at (505) 476-6041.

Sincerely,

Kevin M. Pierard, Chief
Hazardous Waste Bureau

Attachment

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

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

Attachment

GENERAL REPORTING GUIDELINES

1. Overview

The purpose of this guidance document is to provide the general requirements and formats for documents related to corrective action activities required under the Resource Conservation and Recovery Act (RCRA). This guidance is not intended to provide document requirements for every potential corrective action conducted at the facility. Therefore, the formats for all types of documents are not presented below. The formats described include the general reporting requirements and formats for site-specific investigation work plans, investigation reports, routine monitoring reports, risk assessment reports, and corrective measures evaluations. Permittees should generally consider the documents to be the equivalents of RCRA facility investigation (RFI) work plans, RFI reports, periodic monitoring reports, risk assessments, and corrective measures study (CMS) reports, respectively, for the purposes of RCRA compliance. Permittees must include detailed, site-specific requirements in all interim status unit, solid waste management unit (SWMU), and Area of Concern (AOC) investigation work plans, investigation reports, monitoring reports, and corrective measures evaluations. All plans and reports should be prepared with technical and regulatory input from the NMED. All work plans and reports must be submitted to the NMED in the form of two paper copies and an electronic copy.

The document requirements listed do not include all sections that may be necessary to complete each type of document listed. A permittee or the NMED may determine that additional sections are required to address additional site-specific issues or information collected during corrective action or monitoring activities not listed below. However, permittees must submit variations of the general report format and the formats for documents not listed in this guidance in outline form to the NMED for approval prior to submittal of the documents. The NMED will approve or disapprove, in writing, the proposed document outline after receipt of the outline. If the NMED disapproves the report outline, the NMED will notify the permittee, in writing, of the outline's deficiencies and will specify a date for submittal of a revised report outline. All documents submitted by the Permittee must follow the general approach and limitations for data presentation described in this guidance document. If in conflict with a facilities RCRA Permit, the Permit condition should be followed.

2. Investigation Work Plan

Permittees must fulfill the requirements for preparation of work plans for unit-specific or corrective action activities at the facility using the general outline below. The minimum requirements for describing proposed activities within each section are included. All research, locations, depths and methods of exploration, field procedures, analytical analyses, data collection methods, and schedules must be included in each work plan. In general, interpretation of data acquired during previous investigations must be presented only in the background sections of the work plans. The other text sections of the work plans must be reserved for presentation of anticipated site-specific activities and procedures relevant to the project. The general work plan outline is provided below.

2.1 Title Page

The title page must include the type of document, facility name and the unit, SWMU, or AOC name(s) and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible representative of the facility must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

2.2 Executive Summary (Abstract)

The executive summary (or abstract) must provide a brief summary of the purpose and scope of the investigation to be conducted at the subject site. The facility, unit, SWMU, or AOC name, revision number if applicable, and location must be included in the executive summary.

2.3 Table of Contents

The table of contents must list all text sections and subsections, tables, figures, and appendices or attachments included in the work plan. The corresponding page numbers for the titles of each section of the work plan must be included in the table of contents.

2.4 Introduction

The introduction must include the facility name, unit name and location, and unit status (e.g., active operations, closed, corrective action). General information on the current site usage and status must be included in this section. A brief description of the purpose of the investigation and the type of site investigation to be conducted must be provided in this section.

2.5 Background

The background section must describe relevant background information. This section must briefly summarize historical site uses including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features. The locations of pertinent subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures must be included in the background summary and labeled on the site plan.

This section must identify potential receptors, including groundwater, and include a brief summary of the type and characteristics of all waste and all contaminants, the known and possible sources of contamination, the history of releases or discharges of contamination, and the known extent of contamination. This section must include brief summaries of results of previous investigations, including references to pertinent figures, data summary tables, and text in previous reports. At a minimum, detections of contaminants encountered during previous investigations must be presented in table format, with an accompanying figure showing sample locations. References to previous reports must include page, table, and figure numbers for referenced information. Summary data tables and site plans showing relevant investigation locations must be included in the Tables and Figures sections of the document, respectively.

2.6 Site Conditions

2.6.1 Surface Conditions

A section on surface conditions must provide a detailed description of current site topography, features, and structures including a description of drainages, vegetation, erosional features, and a detailed description of current site uses and operations at the site. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site regarding sediment transport, surface water runoff, or contaminant fate and transport must be included in this section.

2.6.2 Subsurface Conditions

A section on subsurface conditions must provide a brief, detailed description of the site conditions observed during previous subsurface investigations, including relevant soil horizons, stratigraphy, presence of vadose zone fluids and groundwater, and other relevant information. A site plan showing the locations of all borings and excavations advanced during previous investigations must be included in the Figures section of the work plan. A brief description of the anticipated stratigraphic units that may be encountered during the investigation may be included in this section, if no previous investigations have been conducted at the site.

2.7 Scope of Activities

A section on the scope of activities must briefly describe a list of all anticipated activities to be performed during the investigation, including background information research, health and safety requirements that may affect or limit the completion of tasks, drilling, test pit or other excavations, well construction, field data collection, survey data collection, chemical analytical testing, aquifer testing, and IDW storage, disposal, and reporting.

2.8 Investigation Methods

A section on investigation methods must provide a description of all anticipated locations and methods for conducting the activities to be performed during the investigation. This section must include, but is not limited to, research methods, health and safety practices that may affect the completion of tasks, drilling methods, test pit or other excavation methods, sampling intervals and methods, well construction methods, field data collection methods, geophysical and land survey methods, field screening methods, chemical analytical testing, materials testing, aquifer testing, pilot testing, and other proposed investigation and testing methods. This information may also be summarized in table format, if appropriate.

2.9 Monitoring and Sampling Program

A section on monitoring and sampling must describe the anticipated monitoring and sampling program to be implemented after the initial investigation activities are completed. This section must provide a description of the anticipated vadose zone fluids, groundwater, vadose zone vapor, vadose zone moisture, and other monitoring and sampling programs to be implemented at the unit.

2.10 Schedule

A section must provide the anticipated schedule for completion of field investigation, pilot testing, and monitoring/sampling activities. In addition, this section must provide a schedule for submittal of reports and data to the NMED, including a schedule for submitting status reports, preliminary data, and the final investigation report.

2.11 Tables

The following summary tables may be included in the investigation work plans if previous investigations have been conducted at the unit. Data presented in the tables must include information on dates of data collection, analytical methods, detection limits, and significant data quality exceptions. All data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following tables must be included in investigation work plans, as applicable;

a. summaries of regulatory criteria, background, and applicable cleanup levels (may be included in the analytical data tables instead of as separate tables);

b. summaries of historical field survey location data;

c. summaries of historical field screening and field parameter measurements of soil, rock, sediments, groundwater, surface water, and air quality;

d. summaries of historical soil, rock, or sediment laboratory analytical data must include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data;

e. summaries of historical groundwater elevation and depth to groundwater data. The table must include the monitoring well depths, the screened intervals in each well, and the dates and times measurements were taken;

f. summaries of historical groundwater laboratory analytical data. The analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data;

g. summary of historical surface water laboratory analytical data. The analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data;

h. summary of historical air sample screening and chemical analytical data. The data tables must include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that could influence interpretation of the data; and

i. summary of historical pilot test or other test data, if applicable, including units of measurement and types of instruments used to obtain measurements.

2.12 Figures

The following figures must be included with each investigation work plan for each site, including presentation of data where previous investigations have been conducted. All figures must include an accurate bar scale and a north arrow. An explanation must be included on each figure for all abbreviations, symbols, acronyms, and qualifiers. The following figures must be included in investigation work plans, as applicable:

a. a vicinity map showing topography and the general location of the site relative to surrounding features and properties;

b. a unit site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and details; off-site well locations and other relevant features must be included on the site plan, if appropriate; additional site plans may be required to present the locations of relevant off-site well locations, structures, and features;

c. figures showing historical and proposed soil boring locations, excavation locations, and sampling locations;

d. figures presenting historical soil sample field screening and laboratory analytical data;

e. figures presenting the locations of all existing and proposed borings and vapor monitoring point locations,

f. figures presenting historical vadose zone organic vapor data;

g. figures showing all existing and proposed monitoring wells and piezometers;

h. figures presenting historical groundwater and vadose zone fluid elevation data, and indicating groundwater and vadose zone fluid flow directions;

i. figures presenting historical groundwater and vadose zone fluid laboratory analytical data, if applicable; the chemical analytical data corresponding to each sampling location can be presented in tabular form on the figure or as an isoconcentration map;

j. figures presenting historical and proposed vadose zone fluid neutron probe access tube locations and field measurement data for soil moisture, if applicable;

k. figures presenting historical surface water laboratory analytical data, if applicable;

l. figures showing historical and proposed air sampling locations and presenting historical air quality data, if applicable;

m. figures presenting historical pilot testing locations and data, where applicable, including site plans and graphic data presentation; and

n. figures presenting geologic cross-sections based on outcrop and borehole data acquired during previous investigations, if applicable.

2.13 Appendices

An IDW management plan must be included as an appendix to the investigation work plan. Additional appendices may be necessary to present additional data or documentation not listed above.

3. Investigation Report

Permittees must prepare investigation reports at the facility using the general outline below. Investigation Reports are the reporting mechanism for presenting the results of completed Investigation Work Plans. This section describes the minimum requirements for reporting on site investigations. All data collected during each site investigation event in the reporting period must be included in the reports. In general, interpretation of data must be presented only in the background, conclusions, and recommendations sections of the reports. The other text sections of the reports must be reserved for presentation of facts and data without interpretation or qualifications. The general report outline is provided below.

3.1 Title Page

The title page must include the type of document and version number, the facility name, the unit, SWMU, or AOC, and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible facility representative must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

3.2 Executive Summary

The executive summary must provide a brief summary of the purpose, scope, and results of the investigation conducted at the subject site during the reporting period. In addition, this section must include a brief summary of conclusions based on the investigation data collected and recommendations for future investigation, monitoring, remedial action, or site closure.

3.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report must be included in the table of contents.

3.4 Introduction

The introduction section must include the facility name, unit name and location, and unit status (e.g., active operations, closed, corrective action). General information on the site usage and status must be included in this section. A brief description of the purpose of the investigation, the type of site investigation conducted, and the type of results presented in the report also must be provided in this section.

3.5 Background

The background section must describe relevant background information. This section must briefly summarize historical site uses including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features. The locations of subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures must be included in the background summary and labeled on the figure. In addition, this section must include a brief summary of the possible sources of contamination, the history of releases or discharges of contamination, the known extent of contamination, and the results of previous investigations including references to previous reports. The references to previous reports must include page, table, and figure numbers for referenced information. A site plan showing relevant investigation locations and summary data tables must be included in the Figures and Tables sections of the document, respectively.

3.6 Scope of Activities

This section on the scope of activities must briefly describe all activities performed during the investigation event including background information research, implemented health and safety measures that affected or limited the completion of tasks, drilling, test pit or other excavation methods, well construction methods, field data collection, survey data collection, chemical analytical testing, aquifer testing, remediation system pilot testing, and IDW storage or disposal.

3.7 Field Investigation Results

A section must provide a summary of the procedures used and the results of all field investigation activities conducted at the site including, but not limited to, the dates that investigation activities were conducted, the type and purpose of field investigation activities performed, field screening measurements, logging and sampling results, pilot test results, construction details, and conditions observed. Field observations or conditions that altered the planned work or may have influenced the results of sampling, testing, and logging must be reported in this section. At a minimum, the following subsections must be included, where appropriate.

3.7.1 Surface Conditions

A section on surface conditions must describe current site topography, features, and structures including topographic drainages, man-made drainages, vegetation, and erosional features. It must also include a description of current site uses and any operations at the site. In addition, descriptions of features located in surrounding sites that may have an impact on the subject site

regarding sediment transport, surface water runoff, or contaminant transport must be included in this section.

3.7.2 Exploratory Drilling or Excavation Investigations

A section must describe the locations, methods, and depths of subsurface explorations. The description must include the types of equipment used, the logging procedures, exploration equipment, decontamination procedures, and conditions encountered that may have affected or limited the investigation. Samples obtained from all exploratory borings and excavations must be visually inspected and the soil or rock type classified in general accordance with ASTM D2487 (Unified Soil Classification System) and D2488, or AGI Methods for soil and rock classification. Detailed logs of each boring must be completed in the field by a qualified engineer or geologist.

A description of the site conditions observed during subsurface investigation activities must be included in this section, including soil horizon and stratigraphic information. Site plans showing the locations of all borings and excavations must be included in the Figures section of the report. Boring and test pit logs for all exploratory borings and test pits must be presented in an appendix or attachment to the report.

3.7.3 Subsurface Conditions

A section on subsurface conditions must describe known subsurface lithology and structures based on observations made during the current and previous subsurface investigations, including interpretation of geophysical logs and as-built drawings of man-made structures. A description of the known locations of pipelines, utility lines, and observed geologic structures must also be included in this section. A site plan showing boring and excavation locations and the locations of the site's above- and below-ground structures must be included in the Figures section of the report. In addition, cross-sections must be constructed, if appropriate, to provide additional visual presentation of site or regional subsurface conditions.

3.7.4 Monitoring Well Construction, Boring, or Excavation Abandonment

A section must describe the methods and details of monitoring well construction and the methods used to abandon or backfill exploratory borings and excavations. The description must include the dates of well construction, boring abandonment, or excavation backfilling. In addition, boring logs, test pit logs, and well construction diagrams must be included in an attachment or appendix. Well construction diagrams must be included with the associated boring logs for borings that are converted to monitoring wells.

3.7.5 Groundwater Conditions

A section must describe groundwater conditions observed beneath the subject site and relate local groundwater conditions to regional groundwater conditions. A description of the depths to water, aquifer thickness, and groundwater flow directions must be included in this section for alluvial groundwater, shallow perched groundwater, intermediate perched groundwater, and regional groundwater, as appropriate to the investigation. Figures showing well locations,

surrounding area, groundwater elevations, and flow directions for each hydrologic zone must be included in the Figures section of the report.

3.7.6 Surface Water Conditions

A section must describe surface water conditions and include a description of surface water runoff, surface water drainage, surface water sediment transport, and contaminant transport in surface water as suspended load and as a dissolved phase in surface water via natural and man-made drainages, if applicable. A description of contaminant fate and transport must be included, if appropriate.

3.7.7 Subsurface Air and Soil Moisture Conditions

A section must describe subsurface air monitoring and sampling methods used during the site investigation. It must also describe observations made during the site investigation regarding subsurface flow pathways and the subsurface air-flow regime.

3.7.8 Materials Testing Results

A section must discuss the materials testing results, such as core permeability testing, grain size analysis, or other materials testing results. Sample collection methods, locations, and depths must also be included. Corresponding summary tables must be included in the Tables section of the report.

3.7.9 Pilot Testing Results

A section must discuss the results of any pilot testing. Pilot testing is typically conducted after initial subsurface investigations are completed and the need for additional investigation or remediation has been evaluated. Pilot testing, including aquifer testing and remediation system pilot testing, must be addressed through separate pilot test work plans and reports. The format for pilot test work plans and reports must be approved by the NMED prior to submittal.

3.8 Regulatory Criteria

A section must set forth the applicable cleanup standards, screening levels, and risk-based cleanup goals for each pertinent medium at the subject site. The appropriate cleanup levels for each site must be included if site-specific levels have been established at separate facility sites or units. A table summarizing the applicable cleanup standards must be included as part of the document. Alternately, the report may include applicable cleanup standards as a column in the data tables. Risk-based evaluation procedures, if used to calculate cleanup levels, must be presented in a separate document or in an appendix to this report. If cleanup levels calculated in a risk evaluation are employed, the risk evaluation document must be referenced and must include pertinent page numbers for referenced information.

3.9 Site Contamination

A section must provide a description of sampling intervals and methods for detection of surface and subsurface contamination in soils, rock, sediments, groundwater, surface water, and as vapor-phase contamination. Only factual information must be included in this section. Interpretation of the data must be reserved for the summary and conclusions sections of the report. Tables summarizing all sampling, testing, and screening results for detected contaminants must be prepared in a format approved by the NMED. The tables must be presented in the Tables section of the report.

3.9.1 Soil, Rock, and Sediment Sampling

A section must describe the sampling of soil, rock and sediment. It must include the dates, locations, and methods of sample collection, sampling intervals, sample logging methods, screening sample selection methods, and laboratory sample selection methods including the collection depths for samples submitted for laboratory analyses. A site plan showing the sample locations must be included in the Figures section of the report.

3.9.2 Sample Field Screening Results

A section must describe the field screening methods used during the investigation and the field screening results. Field screening results also must be presented in summary tables in the Tables section of the document. The limitations of field screening instrumentation and any conditions that influenced the results of field screening must be discussed in this subsection.

3.9.3 Soil, Rock, and Sediment Sampling Chemical Analytical Results

A section must briefly summarize the laboratory analyses conducted, the analytical methods and results and provide a comparison of the data to cleanup standards or established cleanup levels for the site. The laboratory results also must be presented in summary tables in the Tables section of the document. Field conditions and sample collection methods that could potentially affect the analytical results must be described in this section. If appropriate, soil analytical data must be presented with sample locations on a site plan and included in the Figures section of the report.

3.9.4 Subsurface Vapor Sampling

A section must describe the air and subsurface vapor sampling. It must describe the dates, locations, methods of sample collection, methods for sample logging, and methods for laboratory sample selection. A site plan showing all air and subsurface vapor sampling locations must be provided in the Figures section of the report.

3.9.5 Subsurface Vapor Field Screening Results

A section must describe the subsurface vapor field screening results. It must describe the field screening methods used for ambient air and subsurface vapors during the investigation and the field screening results. Field screening results must also be presented in summary tables in the Tables section of the report. The locations of ambient air and subsurface vapor screening sample

collection must be presented on a site plan included in the Figures section of the report. The limitations of field screening instrumentation and any conditions that influenced the results of field screening must be discussed in this section.

3.9.6 Air and Subsurface Vapor Laboratory Analytical Results

This section must describe the results of air and subsurface vapor laboratory analyses. It must describe the air sampling laboratory analytical methods and results and provide a comparison of the data to applicable cleanup levels for the site. The rationale or purpose for altering or modifying the subsurface vapor sampling program outlined in the site investigation work plan also must be provided in this section. Field conditions that may have affected the analytical results during sample collection must be described in this section. Tables summarizing the air sample laboratory, field, and analytical QA/QC data; applicable cleanup levels; and modifications to the air sampling program must be provided in the Tables section of the report. Contaminant concentrations must be presented as data tables or as isoconcentration contours on a map included in the Figures section of the report.

3.10 Conclusions

A conclusions section must provide a brief summary of the investigation activities and a discussion of the conclusions of the investigation conducted at the site. In addition, this section must provide a comparison of the results to applicable cleanup levels, and to relevant historical investigation results and analytical data. Potential receptors, including groundwater, must be identified and discussed. An explanation must be provided with regard to data gaps. A risk assessment may be included as an appendix to the investigation report; however, the risk analysis must be presented in the risk assessment format described in Permit Section 6.5. References to the risk analysis must be presented only in the summary and conclusions sections of the Investigation Report.

3.11 Recommendations

A section must discuss the need for further investigation, corrective measures, risk assessment and monitoring, or recommendations for corrective action completed based on the conclusions provided in the Conclusions section. It must include explanations regarding additional sampling, monitoring, and site closure. A corresponding schedule for further action regarding the site must also be provided.

3.12 Tables

This section must provide the following summary tables. Data presented in the tables must include the current data, dates of data collection, analytical methods, detection limits, and significant data quality exceptions. All summary data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following tables must be included in investigation reports, as applicable:

a. tables summarizing regulatory criteria, background levels, and applicable cleanup levels; this information may be included in the analytical data tables instead of as separate tables;

b. tables summarizing field survey location data; separate tables must be prepared for well locations and individual medium sampling locations except where the locations are the same for more than one medium;

c. tables summarizing field screening and field parameter measurements of soil, sediment, vadose zone fluid, vadose zone vapor, vadose zone moisture, and groundwater, surface water, and air quality;

d. a table summarizing soil laboratory analytical data; it must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

e. a table summarizing the groundwater elevations and depth-to-water data; the table must include the monitoring well depths and the screened intervals in each well;

f. a table summarizing the groundwater laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

g. a table summarizing the surface water laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

h. A table summarizing the air sample screening and laboratory analytical data; the data tables must include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

i. tables summarizing the pilot testing data, if applicable, including units of measurement and types of instruments used to obtain measurements; and

j. a table summarizing the materials testing data, if applicable.

3.13 Figures

All figures must be included with each investigation report, as appropriate. All figures must include a scale and a north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All maps must have a date. A section must provide the following figures:

a. a vicinity map showing topography and the general location of the site relative to surrounding features and properties;

b. a site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and details; off-site well locations and other relevant features must be included on the site plan; additional site plans may be required to present the locations of relevant off-site well locations, structures and features;

c. figures showing boring, excavation, and sampling locations;

d. figures presenting soil sample field screening and laboratory analytical data;

e. figures displaying the locations of all newly installed and existing wells and borings;

f. figures presenting monitoring well locations, groundwater elevation data, and groundwater flow directions;

g. figures presenting groundwater laboratory analytical data, including any past data requested by the NMED; the chemical analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map;

h. figures presenting surface water sample locations and field measurement data including any past data requested by the NMED;

i. figures presenting surface water laboratory analytical data including any past data, if applicable; the laboratory analytical data corresponding to each sampling location may be presented in tabular form on the figure;

j. figures showing air and subsurface vapor sampling locations and presenting air and subsurface vapor quality data; the field screening or laboratory analytical data corresponding to each sampling location may be presented in tabular form on the figure or as an isoconcentration map;

k. figures presenting geologic cross-sections based on outcrop and borehole data; and

l. figures presenting pilot testing locations and data, where applicable, including site plans or graphic data presentation.

3.14 Appendices

Each investigation report must include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

3.14.1 Field Methods

An appendix must provide detailed descriptions of the methods used to acquire field measurements of each media that was surveyed or tested during the investigation. Methods must include, but are not limited to, exploratory drilling or excavation methods, the methods and types

of instruments used to obtain field screening, field analytical or field parameter measurements, instrument calibration procedures, sampling methods for each medium investigated, decontamination procedures, sample handling procedures, documentation procedures, and a description of field conditions that affected procedural or sample testing results. Methods of measuring and sampling during pilot testing must be reported in this appendix, if applicable. Copies of IDW disposal documentation must be provided in a separate appendix.

3.14.2 Boring/Test Pit Logs and Well Construction Diagrams

An appendix must provide boring logs, test pit or other excavation logs, and well construction details. In addition, a key to symbols and a soil or rock classification system must be included in this appendix. Geophysical logs must be provided in a separate section of this appendix.

3.14.3 Chemical Analytical Program

Chemical analytical methods, a summary of data quality objectives, and a summary of data quality review procedures must be reported in an appendix. A summary of data quality exceptions and their effect on the acceptability of the field and laboratory analytical data with regard to the investigation and the site status must be included in this appendix, along with references to case narratives provided in the laboratory reports.

3.14.4 Chemical Analytical Reports

A section must include all laboratory chemical analytical data generated for the reporting period. The reports must include all chain-of-custody records and QA/QC results provided by the laboratory. The laboratory reports may be provided electronically in a format approved by the NMED and must be in the form of a final laboratory report. Laboratory report data tables may be submitted in Microsoft Excel format. Hard (paper) copies of the chain-of-custody forms must be submitted with the reports regardless of whether the final laboratory report is submitted electronically or in hard copy.

3.14.5 Other Appendices

Other appendices containing additional information must be included as required by the NMED or as otherwise appropriate.

4. Periodic Monitoring Report

The Permittee must use the following guidance for preparing periodic monitoring reports. The reports must present the results of periodic groundwater, surface water, vapor, and remediation system monitoring at the facility. The following sections provide a general outline for monitoring reports and the minimum requirements for reporting of periodic monitoring conducted at the facility. All data collected during each monitoring or sampling event in the reporting period must be included in the reports. In general, interpretation of data must be presented only in the background, conclusions, and recommendations sections of the reports. The other text sections of the reports must be reserved for presentation of facts and data without interpretation or qualifications.

4.1 Title Page

The title page must include the type of document, revision number if applicable, the facility name, the unit, SWMU, or AOC name(s), and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible representative of the facility must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

4.2 Executive Summary

The executive summary must provide a brief summary of the purpose, scope, and results of the monitoring conducted at the subject site during the reporting period. The facility, unit, SWMU, and AOC name(s) and location(s) must be included in the executive summary. In addition, this section must include a brief summary of conclusions based on the monitoring data collected.

4.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the report. The corresponding page numbers for the titles of each section of the report must be included in the table of contents.

4.4 Introduction

The introduction section must include the facility name and the unit name(s), location(s), and status (e.g. active operations, closed, corrective action). General information on the site usage and status must be included in this section. A brief description of the purpose of the monitoring, type of monitoring conducted, and the type of results presented in the report also must be provided in this section.

4.5 Scope of Activities

A section on the scope of activities must briefly describe all activities performed during the monitoring event or reporting period including field data collection, analytical testing, if applicable, and purge/decontamination water storage and disposal.

4.6 Regulatory Criteria

A section on regulatory criteria must provide information regarding applicable cleanup standards, risk-based screening levels, and risk-based cleanup goals for the site. A table summarizing the applicable cleanup standards, or inclusion of applicable cleanup standards as a column in the data tables, can be substituted for this section. The appropriate cleanup levels for each site must be included if site-specific levels have been established at separate sites. Risk-based evaluation procedures, if used to calculate cleanup levels, must either be included as an attachment or submitted as a separate document and referenced. The specific document and page numbers must be included for all referenced materials.

4.7 Monitoring Results

A section must provide a summary of the results of monitoring conducted at the site. This section must include the dates and times that monitoring was conducted, the measured depths to groundwater, directions of groundwater and vadose zone fluids flow, field air and water quality measurements, static pressures, field measurements, and a comparison to previous monitoring results. Field observations or conditions that may influence the results of monitoring must be reported in this section. Tables summarizing leachate and vapor-monitoring parameters, groundwater and vadose zone fluid elevations, depth-to-water measurements, and other field measurements may be substituted for this section. The tables must include all information required in Permit Section 6.4.11.

4.8 Chemical Analytical Data Results

A section must discuss the results of the chemical analyses. It must provide the dates of sampling and the analytical results. It must also provide a comparison of the data to previous results and to any cleanup standards or established cleanup levels for the site. The rationale or purpose for altering or modifying the sampling program must be provided in this section. A table summarizing the laboratory analytical data, QA/QC data, applicable cleanup levels, and modifications to the sampling program may be substituted for this section. The tables must include all information required in Permit Section 6.4.11.

4.9 Remediation System Monitoring

A section must discuss remediation system monitoring. It must summarize the remediation system's capabilities and performance. It must also provide monitoring data, treatment system discharge sampling requirements, and system influent and effluent sample analytical results. The dates of operation, system failures, and modifications made to the remediation system during the reporting period must also be included in this section. A summary table may be substituted for this section. The tables must include all information required in Permit Section 6.4.11.

4.10 Summary

A summary section must provide a discussion and conclusions of the monitoring conducted at the site. In addition, this section must provide a comparison of the results to applicable cleanup levels and to relevant historical monitoring and chemical analytical data. An explanation must be provided with regard to data gaps. A discussion of remediation system performance, monitoring results, modifications if applicable, and compliance with discharge requirements must be provided in this section. Recommendations and explanations regarding future monitoring, remedial actions, or site closure must also be included in this section.

4.11 Tables

A section must provide the following summary tables for the media sampled. With prior approval from the NMED, the Permittee may combine one or more of the tables. Data presented in the tables must include the current sampling and monitoring data, as well as data from the three previous monitoring events or, if data from less than three monitoring events is available, data

acquired during previous investigations. Remediation system monitoring data also must be presented. The dates of data collection must be included in the tables. Summary tables may be substituted for portions of the text. The analytical data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following tables must be included, as applicable:

a. a table summarizing the regulatory criteria (a regulatory criteria text section may be substituted for this table or the applicable cleanup levels may be included in the analytical data tables);

b. a table summarizing groundwater and vadose zone fluid elevations, and depths to water data; the table must include the monitoring well depths, casing elevations, the screened intervals in each well, and the dates and times of measurements;

c. a table summarizing field measurements of surface water quality data, if applicable;

d. a table summarizing field measurements of subsurface vapor monitoring and soil moisture data (including historical vapor monitoring data as described above);

e. a table summarizing field measurements of groundwater and vadose zone fluid quality data (including historical water quality data as described above);

f. a table summarizing subsurface vapors chemical analytical data, if applicable (including historical analytical data as described above);

g. a table summarizing surface water chemical analytical data, if applicable (including historical surface water analytical data as described above);

h. a table summarizing groundwater and vadose zone fluid chemical analytical data (including historical groundwater analytical data as described above); and

i. a table summarizing remediation system monitoring data, if applicable (including historical remediation system monitoring data as described above).

4.12 Figures

A section must include the following figures. All figures must include a scale and north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures must have a date. The following figures must be included, as applicable:

a. a vicinity map showing topography and the general location of the site relative to surrounding features or properties;

b. a facility site plan that presents pertinent site features and structures, well and piezometer

neutron probe access tubes locations and remediation system location(s) and features; off-site well locations and pertinent features must be included on the site plan, if practical; additional site plans may be required to present the locations of relevant off-site well locations, structures, and features;

c. figures presenting the locations of neutron probe access tubes, monitoring and other well locations, groundwater and vadose zone fluid elevation data, and groundwater and vadose zone fluid flow directions;

d. figures presenting groundwater and vadose zone fluid analytical data for the current monitoring event; the analytical data corresponding to each sampling location may be presented in tabular form on the figure or as an isoconcentration map;

e. figures presenting surface water sampling locations and analytical data for the current monitoring period;

f. figures presenting vertical profiles of soil moisture content for neutron probe measurements for the current monitoring period;

g. figures presenting subsurface vapor sampling locations and analytical data for the current monitoring event; the analytical data corresponding to each sampling location may be presented in table form on the figure or as an isoconcentration map; and

h. figures presenting geologic cross-sections based on outcrop and borehole data, if applicable.

4.13 Appendices

Each monitoring report must include the following appendices. Additional appendices may be necessary to present data or documentation not listed below.

4.13.1 Field Methods

The report must include a section that outlines the methods used to acquire field measurements of groundwater and vadose zone fluid elevations, subsurface vapor, soil moisture, water quality data, subsurface vapor samples, vadose zone fluid samples, and groundwater samples. It must include the methods and types of instruments used to measure depths to water, air, headspace, or subsurface vapor parameters, soil moisture information, and water quality parameters. In addition, decontamination, well purging techniques, well sampling techniques, and sample handling procedures must be provided in this appendix. Methods of measuring and sampling remediation systems must be reported in this section, if applicable. Purge and decontamination water storage and disposal methods must also be presented in this appendix. Copies of purge and decontamination water disposal documentation must be provided in a separate appendix.

4.13.2 Chemical Analytical Program

An appendix must discuss the analytical program. It must include the analytical methods, a summary of data quality objectives, and data quality review procedures. A summary of data quality exceptions and their effect on the acceptability of the analytical data with regard to the monitoring event and the site status must be included in this appendix along with references to case narratives provided in the laboratory reports.

4.13.3 Chemical Analytical Reports

An appendix must include all laboratory chemical analytical data generated for the reporting period. The data may be submitted electronically on a compact disc in Microsoft Excel or other format acceptable to the NMED. The reports must include all chain-of-custody records and QA/QC results provided by the laboratory. Hard (paper) copies of all chain-of-custody records must be submitted as part of this appendix.

5. Risk Assessment Report

The Permittee must prepare risk assessment reports for sites requiring corrective action at the facility using the format described below. This section provides a general outline for risk assessments and also sets forth the minimum requirements for describing risk assessment elements. In general, interpretation of data must be presented only in the background, conceptual site model, and conclusions and recommendations sections of the reports. The other text sections of the risk assessment report must be reserved for presentation of sampling results from all investigations, conceptual and mathematical elements of the risk assessment, and presentations of toxicity information and screening values used in the risk assessment. The human health and ecological risk assessments must be presented in separate sections, but the general risk assessment outline applicable to both sections is provided below.

5.1 Title Page

The title page must include the type of document, revision number if applicable, the facility name, the unit, SWMU, or AOC name(s), and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible representative of the facility must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

5.2 Executive Summary

The executive summary section must provide a brief summary of the purpose and scope of the risk assessment of the subject site. The executive summary must also briefly summarize the conclusions of the risk assessment. The facility, unit, SWMU, or AOC name(s) and location(s) must be included in the executive summary.

5.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the risk assessment. The corresponding page numbers for the titles of each unit of the report must be included in the table of contents.

5.4 Introduction

The introduction section must include the facility name, unit name(s) and location(s), and unit status (e.g., active operations, closed, corrective action). General information on the current site usage and status must be included in this section.

5.5 Background

The background section must describe relevant background information. This section must briefly summarize historical site uses including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features.

5.5.1 Site Description

A section must provide a description of current site topography, features, and structures including a description of drainages, erosional features, current site uses, and other data relevant to assessing risk at the site. Depth to groundwater, vadose zone fluids, and directions of groundwater and vadose zone fluids flow must be included in this section. The presence and location of surface water bodies such as springs or wetlands must be noted in this section. Photos of the site may be incorporated into this section, if desired. Ecological features of the site must be described here, including type and amount of vegetative cover, observed and expected wildlife receptors, and level of disturbance of the site. A topographical map of the site and general vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features must be included in the Figures section of the document.

5.5.2 Sampling Results

A section must include a summary of the history of releases of contaminants, known and possible sources of contamination, and the vertical and lateral extent of contamination present in each media. This section must include summaries of sampling results of all investigations, including site plans (included in the Figures section of the document), showing locations of detected contaminants. This section must reference pertinent figures, data summary tables, and citations for references to previous reports. References to previous reports must include page, table, and figure numbers for referenced information. Summaries of sampling data for each constituent must include the maximum value detected, the detection limit, the 95% UCL of the mean value detected (if applicable to the data set) and whether that 95% UCL of the mean was calculated based on a normal or lognormal distribution. Background values used for comparison to inorganic constituents at the site must be presented in this subsection. The table of background values must appear in the Tables section of the document and include actual values used as well as the origin

of the values (facility-wide, site-specific, UCL, UTL). This section must also include a discussion of how “non-detect” sample results were handled in the averaging of data.

5.6 Conceptual Site Model

A section must present the conceptual site model. It must include information on the expected fate and transport of contaminants detected at the site. This section must provide a list of all sources of contamination at the site. Sources that are no longer considered to be ongoing but represent the point of origination for contaminants transported to other locations must be included. The discussion of fate and transport must 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 model must appear in the Figures section of the document.

For human health risk assessments, the conceptual site model must include residential land use as the future land use for all risk assessments. In addition, site-specific future land use may be included, provided that written approval to consider a site-specific future land use has been obtained from the NMED prior to inclusion in the risk assessment. If a site-specific future land use scenario appears in the risk assessment, all values for exposure parameters and the source of those values must be included in table format and presented in the Tables section of the document.

Conceptual site models presented for ecological risk assessments must identify assessment endpoints and measurement receptors for the site. The discussion of the model must explain how the measurement receptors for the site are protective of wildlife receptors.

5.7 Risk Screening Levels

A section must present the actual screening values used for each contaminant for comparison to all human health and ecological risk screening levels. A discussion of the methods used to calculate the screening levels in accordance with Permit Section 3.5 and any variances from those procedures must be included in this Section. If no valid toxicological studies exist for the receptor or contaminant, the contaminant and receptor combination must be addressed using qualitative methods. If an approved site-specific risk scenario is used for the human health risk assessment, this section must include all toxicity information and exposure assessment equations used for the site-specific scenario, as well as the sources for that information. Other regulatory levels applicable to screening the site, such as drinking water MCLs, must also be included in this section.

5.8 Risk Assessment Results

This section must present all risk values, Hazard Quotients (HQs), and Hazard Indices (HIs) for human health under projected future residential scenario and any site-specific scenarios. This section must also present the HQ and HI for each contaminant for each ecological receptor. IN

addition, this section must include discussion of qualitative, semi-quantitative, and quantitative uncertainty in the risk assessment and estimate the potential impact of the various uncertainties.

5.9 Conclusions and Recommendations

This section must include an interpretation of the results of the risk assessment and any recommendations for future disposition of the site. This section may include additional information and considerations that the Permittee believes are relevant to the analysis of the site.

5.10 Tables

Data presented in the summary tables must include information on detection limits and significant data quality exceptions. All data tables must include only detected analytes and data quality exceptions that could potentially mask detections. A section must provide the following summary tables, as appropriate. With prior approval from the NMED, the Permittee may combine one or more of the tables:

a. a table presenting background values used for comparison to inorganic constituents at the site; the table must include actual values used as well as the origin of the values (facility-wide, site-specific, UCL, UTL, or maximum);

b. a table summarizing sampling data must include, for each constituent, all detected values above background, the maximum value detected, the 95 percent UCL of the mean value detected (if applicable to the data set), and whether that 95 percent UCL of the mean was calculated based on a normal or lognormal distribution;

c. a table of all screening values used and the sources of those values;

d. a table presenting all risk values, HQs, and HIs under projected future residential scenario;

e. a table presenting all risk values, HQs, and HIs under approved additional site- specific future land use scenario; and

f. a table presenting the HQ and HI for each contaminant for each ecological receptor.

5.11 Figures

This section must present the following figures for each site, as appropriate. With prior approval from the NMED, the Permittee may combine one or more of the figures. All figures must include a scale and a north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. The following figures must be included, as applicable:

a. a vicinity map showing topography and the general location of the site relative to surrounding features or properties;

b. for human health risk assessments, a site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and its details; off-site well locations and other relevant features must be included on the site plan if practical; additional site plans may be required to present the locations of relevant off-site wells, structures, and features;

c. for ecological risk assessments, a topographical map of the site and general vicinity of the site showing habitat types, boundaries of each habitat, and any surface water features; and

d. conceptual site model diagrams for both human health and ecological risk assessments.

5.12 Appendices

Appendices may be included to present additional relevant information for the risk analysis such as the results of statistical analyses of data sets and comparisons of data, ecological checklists for the site, full sets of results of all sampling investigations at the site, or other data as appropriate.

6. Corrective Measures Evaluation

The Permittee must prepare corrective measures evaluations for sites requiring corrective measures using the format described below. This section provides a general outline for corrective measures evaluations and sets forth the minimum requirements for describing corrective measures when preparing these documents. All investigation summaries, site condition descriptions, corrective action goals, corrective action options, remedial options selection criteria, and schedules must be included in the corrective measures evaluations. In general, interpretation of historical investigation data must be presented only in the background sections of the corrective measures evaluations. At a minimum, detections of contaminants encountered during previous site investigations must be presented in the corrective measures evaluations in table format with an accompanying site plan depicting sample locations. The other text sections of the corrective measures evaluations must be reserved for presentation of corrective action-related information regarding anticipated or potential site-specific corrective action options and methods relevant to the project. The general corrective measures evaluation outline is provided below.

6.1 Title Page

The title page must include the type of document, revision number if applicable, the facility name, the unit, SWMU, or AOC name(s), and the submittal date. A signature block providing spaces for the name, title, and organization of the preparer and the responsible facility representative must be provided on the title page in accordance with the signature requirements in 40 CFR 270.11(b).

6.2 Executive Summary

The executive summary must provide a brief summary of the purpose and scope of the corrective measures evaluation to be conducted at the site. The executive summary or abstract must also

briefly summarize the conclusions of the evaluation. The facility, unit, SWMU, or AOC name(s) and location(s) must be included in the executive summary.

6.3 Table of Contents

The table of contents must list all text sections, subsections, tables, figures, and appendices or attachments included in the corrective measures evaluation. The corresponding page numbers for the titles of each section of the report must be included in the table of contents.

6.4 Introduction

The introduction section must include the facility name, unit name(s) and location(s) and unit status (e.g., active operations, closed, corrective action). General information on the current site use and status must be included in this section. A brief description of the purpose of the corrective measures evaluation and the corrective action objectives for the project also must be provided in this section.

6.5 Background

The background section must describe the relevant background information. This section must briefly summarize historical site activities including the locations of current and former site structures and features. A labeled figure must be included in the document showing the locations of current and former site structures and features. The locations of subsurface features such as pipelines, underground tanks, utility lines, and other subsurface structures must be included in the background section and labeled on the site plan.

This section must include contaminant and waste characteristics, a brief summary of the history of contaminant releases, known and possible sources of contamination, and the vertical and lateral extent of contamination present in each medium. This section must include brief summaries of results of previous investigations, including references to pertinent figures, data summary tables, and text in previous reports. References to previous reports must include page, table, and figure numbers for referenced information. Summary tables and site plans showing relevant investigation locations must be referenced and included in the Tables and Figures sections of the document, respectively.

6.6 Site Conditions

6.6.1 Surface Conditions

A section on surface conditions must describe current and historic site topography, features, and structures, including a description of topographic drainages, man-made drainages, vegetation, and erosional features. It must also include a description of current uses of the site and any current operations at the site. This section must also include a description of those features that could potentially influence corrective action option selection or implementation such as archeological sites, wetlands, or other features that may affect remedial activities. In addition, descriptions of features located in surrounding sites that may have an effect on the subject site regarding sediment transport, surface water runoff, or contaminant transport must be included in

this section. A site plan displaying the locations of all pertinent surface features and structures must be included in the Figures section of the corrective measures evaluation.

6.6.2 Subsurface Conditions

A section on subsurface conditions must describe the site conditions observed during previous subsurface investigations. It must include relevant soil horizon and stratigraphic information, groundwater and vadose zone fluid conditions, fracture data, and subsurface vapor information. A site plan displaying the locations of all borings and excavations advanced during previous investigations must be included in the Figures section of the corrective measures evaluation.

6.7 Potential Receptors

6.7.1 Sources

A section must provide a list of all sources of contamination at the site where corrective measures are to be considered or are required. Sources that are no longer considered to be releasing contaminants at the site, but may be the point of origination for contaminants transported to other locations, must be included in this section.

6.7.2 Pathways

A section must describe potential migration pathways that could result in either acute or chronic exposures to contaminants. It must include such pathways as utility trenches, paleochannels, surface exposures, surface drainages, stratigraphic units, fractures, structures, and other features. The migration pathways for each contaminant and each medium must be tied to the potential receptors for each pathway. A discussion of contaminant characteristics relating to fate and transport of contaminants through each pathway must also be included in this section.

6.7.3 Receptors

A section must provide a listing and description of all anticipated potential receptors that could possibly be affected by the contamination present at the site. Potential receptors must include human and ecological receptors, groundwater, and other potential receptors. This section must identify relevant pathways, such as pathways that could divert or accelerate the transport of contamination to human receptors, ecological receptors, and/or groundwater.

6.8 Regulatory Criteria

A section must set forth the applicable cleanup standards, risk-based screening levels, and risk-based cleanup goals for each medium at the site. The appropriate cleanup levels for each site must be included, if site-specific levels have been established. A table summarizing the applicable cleanup standards must be included as part of the document. Alternately, the report may include applicable cleanup standards as a column in the data tables. If cleanup levels calculated in a risk evaluation are employed, the risk evaluation document must be referenced including pertinent page numbers for referenced information.

6.9 Identification of Corrective Measures Options

A section must identify and describe potential corrective measures for source, pathway, and receptor controls. Corrective measures options must include the range of available options including, but not limited to, a no action alternative, institutional controls, engineering controls, in-situ and onsite remediation alternatives, complete removal, and any combination of alternatives that would potentially achieve cleanup goals.

6.10 Evaluation of Corrective Measures Options

A section must provide an evaluation of the corrective measures options identified in Section 6.6.9 above. The evaluation must be based on the applicability, technical feasibility, effectiveness, implementability, impacts to human health and the environment, and cost of each option. A table summarizing the corrective measures alternatives and the criteria listed below must be included in the Tables section of this document. The general basis for evaluation of corrective measures options is described below.

6.10.1 Applicability

Applicability addresses the overall suitability for the corrective action option for containment or remediation of the contaminants in the relevant media with regard to protection of human health and the environment.

6.10.2 Technical Feasibility

Technical feasibility describes the uncertainty in designing, constructing, and operating a specific remedial alternative. The description must include an evaluation of historical applications of the remedial alternative including performance, reliability, and minimization of hazards.

6.10.3 Effectiveness

Effectiveness assesses the ability of the corrective measure to mitigate the measured or potential impact of contamination in a medium under the current and projected site conditions. The assessment also must include the anticipated duration for the technology to attain regulatory compliance. In general, all corrective measures described above will have the ability to mitigate the impacts of contamination at the site, but not all remedial options will be equally effective at achieving the desired cleanup goals to the degree and within the same time frame as other options. Each remedy must be evaluated for both short-term and long-term effectiveness.

6.10.4 Implementability

Implementability characterizes the degree of difficulty involved during the installation, construction, and operation of the corrective measure. Operation and maintenance of the alternative must be addressed in this section.

6.10.5 Human Health and Ecological Protectiveness

This category evaluates the short-term (remedy installation-related) and long-term (remedy operation-related) hazards to human health and the environment of implementing the corrective measure. The assessment must include whether the technology will create a hazard or increase existing hazards and the possible methods of hazard reduction.

6.10.6 Cost

A section must discuss the anticipated cost of implementing the corrective measure. The costs must be divided into: 1) capital costs associated with construction, installation, pilot testing, evaluation, permitting, and reporting of the effectiveness of the alternative; and 2) continuing costs associated with operating, maintaining, monitoring, testing, and reporting on the use and effectiveness of the technology.

6.11 Selection of Preferred Corrective Measure

The Permittee must propose the preferred corrective measures at the site and provide a justification for the selection in this section. The proposal must be based upon the ability of the remedial alternative to: 1) achieve cleanup standard objectives in a timely manner; 2) protect human and ecological receptors; 3) control or eliminate the sources of contamination; 4) control migration of released contaminants; and 5) manage remediation waste in accordance with State and Federal regulations. The justification must include the supporting rationale for the remedy selection, based on the factors listed in Permit Section 6.6.10, and a discussion of short- and long-term objectives for the site. The benefits and possible hazards of each potential corrective measure alternative must be included in this section.

6.12 Design Criteria to Meet Cleanup Objectives

The Permittee must present descriptions of the preliminary design for the selected corrective measures in this section. The description must include appropriate preliminary plans and specifications to effectively illustrate the technology and the anticipated implementation of the remedial option at the site. The preliminary design must discuss the design life of the alternative and provide engineering calculations for proposed remediation systems.

6.13 Schedule

A section must set forth a proposed schedule for completion of remedy-related activities such as bench testing, pilot testing, construction, installation, remedial excavation, cap construction, installation of monitoring points, and other remedial actions. The anticipated duration of corrective action operations and the schedule for conducting monitoring and sampling activities must also be presented. In addition, this section must provide a schedule for submittal of reports and data to the NMED, including a schedule for submitting all status reports and preliminary data.

6.14 Tables

A section must present the following summary tables, as appropriate. Data presented in the summary tables must include information on dates of sample collection, analytical methods, detection limits, and significant data quality exceptions. All data tables must include only detected analytes and data quality exceptions that could potentially mask detections. The following summary tables must be included in the corrective measures evaluations, as appropriate:

a. a table summarizing regulatory criteria, background, and the applicable cleanup standards;

b. a table summarizing historical field survey location data;

c. tables summarizing historical field screening and field parameter measurements for each media;

d. tables summarizing historical soil, rock, or sediment laboratory analytical data; the summary tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

e. a table summarizing historical groundwater elevation and depth to water data; the table must include the monitoring well depths and the screened intervals in each well;

f. tables summarizing historical groundwater and vadose zone laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

g. tables summarizing historical surface water laboratory analytical data; the analytical data tables must include the analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

h. tables summarizing historical air sample screening and analytical data; the data tables must include the screening instruments used, laboratory analytical methods, detection limits, and significant data quality exceptions that would influence interpretation of the data;

i. tables summarizing historical pilot or other testing data, if applicable, including units of measurement and types of instruments used to obtain measurements;

j. a table summarizing the corrective measures alternatives and evaluation criteria; and

k. a table presenting the schedule for installation, construction, implementation, and reporting of selected corrective measures.

6.15 Figures

This section must present the following figures for each site, as appropriate. All figures must include a scale. All plan view figures must include a north arrow. An explanation must be provided on each figure for all abbreviations, symbols, acronyms, and qualifiers. All figures must contain a date. The following figures must be included, as applicable:

a. a vicinity map showing topography and the general location of the subject site relative to surrounding features or properties;

b. a unit site plan that presents pertinent site features and structures, underground utilities, well locations, and remediation system locations and details; off-site well locations and other relevant features must be included on the site plan if practical; additional site plans may be required to present the locations of relevant off-site well locations, structures, and features;

c. figures showing historical soil boring locations, excavation locations, and sampling locations;

d. figures presenting historical soil sample field screening and laboratory analytical data, if appropriate;

e. figures showing all existing wells including vapor monitoring wells and piezometers; the figures must present historical groundwater elevation data and indicate groundwater flow directions;

f. figures presenting historical groundwater laboratory analytical data including past data, if applicable; the analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure, or as an isoconcentration map;

g. figures presenting historical surface water sample locations and analytical data including past data, if applicable; the laboratory analytical data corresponding to each sampling location may be presented as individual concentrations or in table form on the figure;

h. figures presenting historical air sampling locations and presenting air quality data; the field screening or laboratory analytical data corresponding to each sampling location may be presented as individual concentrations, in table form on the figure or as an isoconcentration map;

i. figures presenting historical pilot or other test locations and data, where applicable, including site plans or graphic data presentation;

j. figures presenting geologic cross-sections based on outcrop and borehole data, if applicable;

k. figures presenting the locations of existing and proposed remediation systems;

l. figures presenting existing remedial system design and construction details; and

m. figures presenting preliminary design and construction details for preferred corrective measures.

6.16 Appendices

Each corrective measures evaluation must include, as appropriate, as an appendix, the management plan for waste, including investigation derived waste, generated as a result of construction, installation, or operation of remedial systems or activities conducted. Each corrective measures evaluation must include additional appendices presenting relevant additional data, such as pilot or other test or investigation data, remediation system design specifications, system performance data, or cost analyses as necessary.

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Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 23, 2018

Colonel Richard W. Gibbs
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Mr. Chris Segura
Chief, Installation Support Section
AFCEC/CZOW
2050 Wyoming Blvd SE, Suite 124
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RE: WORK PLAN FOR VADOSE ZONE CORING, VAPOR MONITORING, AND WATER SUPPLY SAMPLING, REVISION 2
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") *Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Revision 1* ("Work Plan"), dated December 15, 2017. The Work Plan addresses activities to be performed at the Bulk Fuels Facility ("BFF") site, including:

- Continuous coring and sample collection from up to twelve (12) boring locations;
- Installation of soil vapor monitoring ("SVM") points in three continuous coring locations;
- Installation of dual-completion soil vapor/groundwater monitoring wells in up to eight (8) boring locations;
- Vadose zone monitoring, maintenance, and reporting of existing SVM network; and
- Sampling and reporting for water supply wells.

The data collected under the Work Plan will provide critical data to address the existing data gap which is complicating efforts to define the nature and extent of light non-aqueous phase liquid ("LNAPL") at the Site along with allowing the Permittee to estimate the remaining mass of LNAPL. Further, as indicated in the Work Plan, the data will also be important for development of treatability studies at the BFF site in support of the Corrective Action process.

As stated in the Work Plan (Section 3.1.1), when the fuel leak began, the water table was likely higher than today. As the water table dropped over time due to increased demand and pumping of the aquifer, a "smear zone" was created. Therefore, the vertical extent of LNAPL is from a maximum elevation of the LNAPL layer above the highest historical water table elevation to the minimum elevation of LNAPL-water interface at the lowest water table elevation. The horizontal extent can be anticipated to be variable over time, with LNAPL migrating some distance over time, even as the water table dropped. An additional level of complexity is how the LNAPL thickness over time will be affected by the submergence of water table well screens, as the water table has rebounded since 2009. The coring locations, depths, and procedures provided in the Work Plan were scoped and designed over a series of technical working groups to most effectively and efficiently characterize the LNAPL remaining in the subsurface and understand any potential sources that remain.

An additional key component of the Work Plan is the installation of groundwater monitoring wells screened across the water table at the coring locations. With the rising water table, the majority of the water table groundwater monitoring well network has become submerged, resulting in a loss of data refinement at the water table for both dissolved-phase contaminants and measurable LNAPL thickness. A newly installed groundwater monitoring well, KAFB-106MW1, is monitored in support of the in-situ bioremediation pilot test and had measurable LNAPL in September and October 2017. This occurrence of LNAPL in a water table groundwater monitoring well, along with concentration data from 2017, indicates that LNAPL is present in sufficient quantities at the water table to enter a monitoring well in a measurable thickness.

The Work Plan is hereby approved, subject to the following conditions:

1. Photoionization detector ("PID") readings will be collected every twenty (20) feet from the ground surface to the top of the 1970 high water mark, at which point the frequency shall be increased to at least every ten (10) feet in order to capture zones of residual fuel contamination in the vadose zone.
2. Coring intervals will begin at least ten (10) feet above the 1970s high water mark, which is equivalent to the 1960s high water mark. Coring intervals may be changed based upon preceding coring and field data, and will be conveyed by the Permittee to NMED for approval prior to implementing changes in coring depths.
3. Figure 3-7 indicates that mineralogical and microbial data will only be collected from samples within the saturated and or smear zone. The Permittee shall propose, for NMED approval, unsaturated zone coring intervals for source area locations KAFB 106V1 and KARB-106V2 where these analyses also will be conducted.

4. Coring location KAFB-106S7 will remain as optional, pending the results obtained from coring locations KAFB-106S3 and KAFB-106S5.
5. Background coring ST-106 SBBG shall be the last drilling location. The Permittee and NMED shall meet to discuss observations and test results from other coring locations, and the Permittee shall propose to NMED for approval, coring intervals and analyses for ST-106 SBBG that will provide actual background data to use for screening data and informing decisions. The Permittee and NMED shall meet and agree on coring intervals and analyses for ST-106 SBBG, as expeditiously as possible, so as not to incur drilling down-time or a separate mobilization.
6. If the location of background well ST-106 SBBG becomes problematic due to its closeness to the airport runway, the Permittee shall propose, and obtain NMED approval for, a new location.
7. The Permittee shall core and install a groundwater monitoring well at location KAFB-106S5 first, so that information from this well can be used to monitor contamination conditions south of groundwater extraction well KAFB-106239.
8. During drilling, the Permittee shall provide a PDF copy of lithologic logs daily along with an update email documenting daily and planned activities. A well approval form with the proposed screen intervals for groundwater monitoring well completions must be submitted for NMED approval prior to the start of well construction. NMED understands the importance of no field delays and will return the approved well form within one working day of receipt.
9. This approval also applies to the drilling and construction of soil vapor monitoring and injection wells, injection points, and an air lift well that will be used in bioventing and air lift pilot tests. NMED is currently reviewing the full workplans for these pilot tests and will provide the Permittee with comments in the near future, but the Permittee is authorized to proceed with the drilling and construction of these wells and points.
10. Prior to drilling de-mobilization, and after the coring program has generated additional data, NMED and the Permittee shall meet to discuss feasibility of continuous coring and groundwater monitoring well installation at locations near KAFB-106MW1, where LNAPL was measured in September and October 2017, and KAFB-106018 where measurable LNAPL and high dissolved-phase hydrocarbons have been detected in the past.

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

Sincerely,

JCB

Juan Carlos Borrego
Deputy Secretary
Environment Department

cc: Col. M. Harner, KAFB
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File: KAFB 2018 Bulk Fuels Facility Spill

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Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 28, 2018

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2050 Wyoming Blvd SE, Suite 124
Kirtland AFB, NM 87117-5270

RE: WORK PLAN FOR DATA GAP MONITORING WELL INSTALLATION
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") *Work Plan for Data Gap Monitoring Well Installation* ("Work Plan"), dated December 20, 2017. The Work Plan proposes activities to be performed at the Bulk Fuels Facility ("BFF") site, including:

- Installation of six (6) groundwater monitoring wells;
- Incorporation of six (6) existing wells into the groundwater quality monitoring network for quarterly sampling (i.e., groundwater monitoring wells and soil vapor monitoring wells that were previously dry and that now have water in the screens due to the rising water table);
- Incorporation of twelve (12) existing wells into the groundwater quality monitoring network for quarterly gauging depths to groundwater and light non-aqueous phase liquid

("LNAPL"), including the six (6) wells previously mentioned for incorporation into the groundwater quality monitoring network for quarterly sampling;

- Gauging, sampling, and maintenance of the newly added wells; and

- Reporting of the data collected for the newly added wells, including groundwater elevations, LNAPL thickness, groundwater geochemical data, and well installation details.

Increased water conservation by Water Authority consumers, and use of river water as a source of public water supply has resulted in decreased pumping of Water Authority wells, and an ongoing rise in the groundwater table. Water levels have risen to elevations above the top of well screens in a number of monitoring wells, rendering them unsuitable to monitor groundwater quality in the uppermost aquifer. The objective of the Work Plan is to address data gaps created by the submergence of monitoring well screens. Specifically, the Work Plan proposes to install groundwater monitoring wells that are screened across the current water table elevations. The Work Plan addresses tasks supporting monitoring well installation and baseline water quality sampling and is the procedural guidance document for activities to be executed as part of the Resource Conservation and Recovery Act ("RCRA") corrective action process. The data collected under the Work Plan will be critical to completing the RCRA Facility Investigation Report ("RFI"), which will then support the Corrective Measures Evaluation ("CME").

The Work Plan is hereby approved subject to the following conditions:

1. The Permittee and NMED have agreed to move well KAFB-106240 to a location east of the VA Hospital supply well, as shown on the attached map. Subject to NMED approval, the Permittee shall propose the specific location, based on accessibility for drilling vehicles and equipment.

2. For each day of active drilling, the Permittee shall provide NMED with an email containing a copy of lithologic logs and an update summary of daily and planned activities. A well approval form with the proposed screen intervals for groundwater monitoring well completions must be submitted for NMED approval prior to the start of well construction. NMED understands the importance of no field delays and will return the approved well form within one (1) working day of receipt.

3. NMED may require the installation of additional groundwater monitoring wells if the six wells installed pursuant to this Work Plan do not sufficiently address the data gaps.

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

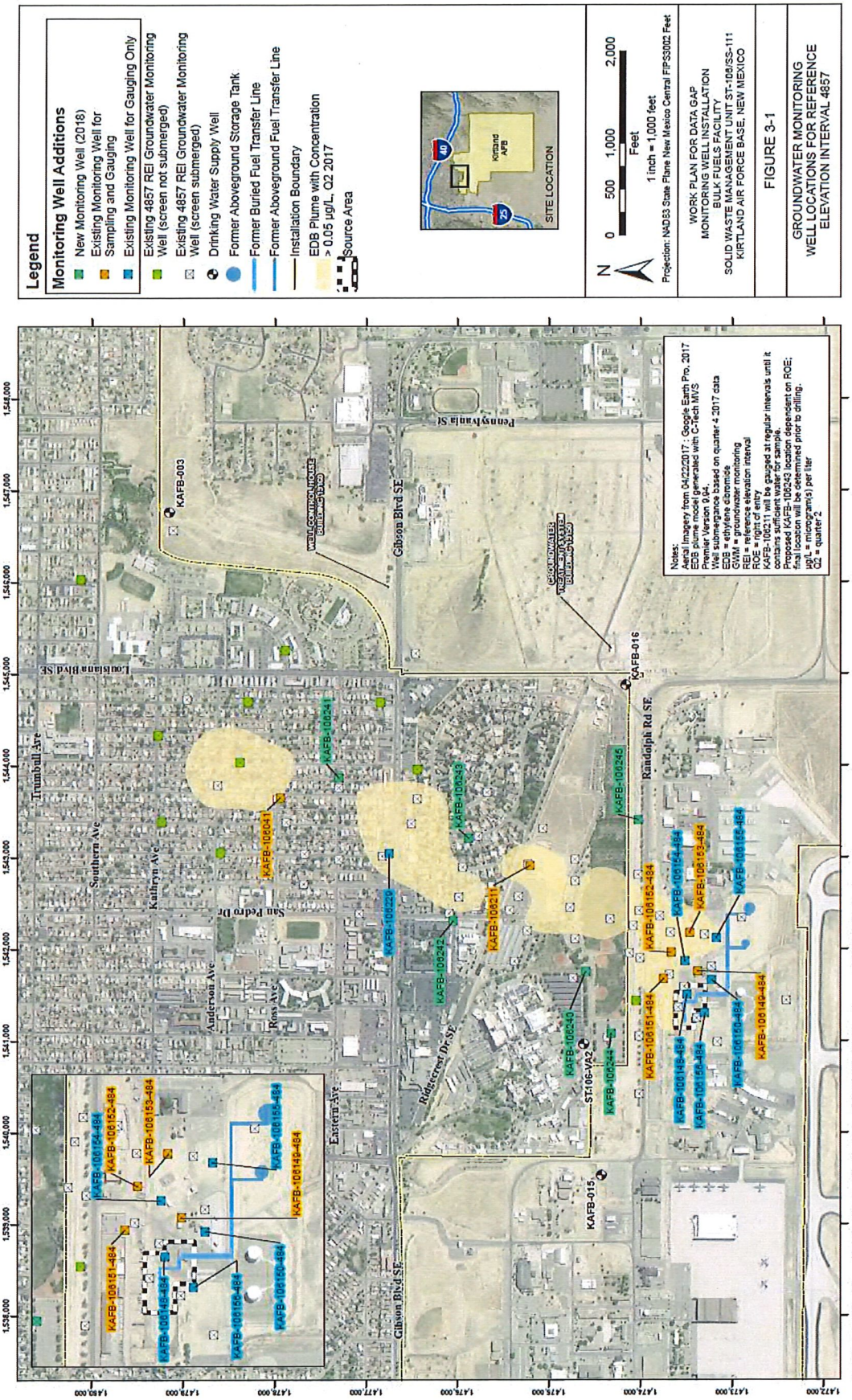
Sincerely,

JCB

Juan Carlos Borrego
Deputy Secretary
Environment Department

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

File: KAFB 2018 Bulk Fuels Facility Spill


Legend
Monitoring Well Additions
New Monitoring Well (2018)
Existing Monitoring Well for Sampling and Gauging
Existing Monitoring Well for Gauging Only
Existing 4857 REI Groundwater Monitoring Well (screen not submerged)
Existing 4857 REI Groundwater Monitoring Well (screen submerged)
Drinking Water Supply Well
Former Aboveground Storage Tank
Former Buried Fuel Transfer Line
Former Aboveground Fuel Transfer Line
Installation Boundary
EDB Plume with Concentration > 0.05 µg/L, Q2 2017
Source Area
SITE LOCATION
Kirtland AFB
N
0 500 1,000 2,000
Feet
1 inch = 1,000 feet
Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet
WORK PLAN FOR DATA GAP MONITORING WELL INSTALLATION
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNIT ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO
FIGURE 3-1
GROUNDWATER MONITORING WELL LOCATIONS FOR REFERENCE ELEVATION INTERVAL 4857
Notes:
Aerial Imagery from 04/22/2017 - Google Earth Pro, 2017
EDB plume model generated with C-Tech MVS
Plume boundary is dashed.
Well submergence based on quarter 4 2017 data
EDB = ethylene dibromide
GWM = groundwater monitoring
REI = reference elevation interval
ROE = right of entry
KAFB-108211 will be gauged at regular intervals until it contains sufficient water for sample.
Proposed KAFB-108243 location dependent on ROE; final location will be determined prior to drilling.
µg/L = micrograms/l per liter
Q2 = quarter 2
KAFB-003
KAFB-015
KAFB-016
ST-106-VA2
Gibson Blvd SE
Louisiana Blvd SE
Pennsylvania St
Randolph Rd SE
Trumbull Ave
Southern Ave
Kathryn Ave
San Pedro Dr
Anderson Ave
Ross Ave
Eastern Ave
Ridgecrest Dr SE
WELL CONSTRUCTION SUSPENDED
GROUNDWATER MONITORING WELL INSTALLATION SUSPENDED

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
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SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 6, 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: WORK PLAN FOR BIOVENTING AND AIR-LIFT ENHANCED BIOREMEDIATION PILOT TESTS
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") *Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests* ("Work Plan"), dated November 2017. The objective of the Work Plan is to detail the activities to be implemented in performing treatability studies to support the future Corrective Measures Evaluation ("CME") for the Bulk Fuels Facility ("BFF") source area and groundwater solute plume.

As explained in the Work Plan, bioventing includes the delivery of oxygen to the contaminated vadose zone (unsaturated soils) via air injection to stimulate biodegradation. The bioventing pilot testing will include short-duration "dry" and "moist" respiration tests (approximately three weeks), followed by two longer-term (two years in duration) pilot tests conducted simultaneously. The goal of the bioventing pilot test is to measure the oxygen utilization rate by microbes in the subsurface. The rate of oxygen utilization is directly proportional to the aerobic biodegradation rate of fuel hydrocarbons in the subsurface, and is therefore an indication of the effectiveness of bioventing to achieve site cleanup in a timely manner. Contaminant mass

destruction rate, cleanup time, and cost of corrective measure implementation can be estimated to support the future CME.

Air-lift enhanced bioremediation includes stimulating microbes within the aquifer matrix by creating a circulation cell through the injection of air below the water table. The injected air forces entrained water out of the lower portion of the well screen and "lifts" it above the static water level where it flows outward into the capillary fringe and upper portion of the water table. While lifting, contaminants are stripped and the groundwater is oxygenated. This "aerated" water flows out into the upper portion of the water table, a zone of the solute plume typically with high solute and residual contamination, where it adds oxygen to enhance aerobic biodegradation. The air-lift enhanced bioremediation pilot test is scheduled to operate for a period of two years.

The Work Plan is hereby approved subject to the following conditions:

1. The Permittee shall replace (as a single page replacement) the original Figure 3-1 with a revised version showing the locations of groundwater monitoring wells in the vicinity of the pilot test areas.
2. It is acknowledged that the screened intervals for nested soil vapor wells KAFB-106V1 and KAFB-106V2 were selected based on the lithology and screened intervals of nearby soil vapor wells. If, during the installation of KAFB-106V1 and KAFB-106V2, substantially different lithology is encountered, the Permittee and NMED shall meet to discuss the need for possible adjustments to screened intervals.
3. During the course of the pilot tests, the Permittee shall identify the source(s) of water that will be used for soil moisture addition. If any water source to be used is disinfected with chlorine, the Permittee shall describe what measures will be taken to ensure that chlorine residual concentrations will not adversely affect the ability of soil bacteria to biodegrade fuel contaminants.

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
S. Clark, KAFB-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
A. Romero, NMED-GWQB
M. Hunter, NMED-GWQB
D. McQuillan, NMED-OOTS

File: KAFB 2018 Bulk Fuels Facility Spill

DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

JUL 2 3 2018

Colonel Richard W. Gibbs, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland AFB NM 87117

GROUND WATER
JUL 30 2018
BUREAU

Mr. John Kieling, Bureau Chief
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

Kirtland Air Force Base (AFB) is requesting deferral of the air-lift enhanced bioremediation pilot test approved by NMED on April 6, 2018 in the *Work Plan for Bioventing and Air-lift Enhanced Bioremediation Pilot Test, Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, dated November 2017*. This request for deferral follows a meeting that was held between Kirtland Air Force Base and Mr. Dennis McQuillan on June 7, 2018, to discuss 1) the positive results coming from the anaerobic in situ bioremediation (ISB) pilot test 2) the technical issues have lead the Air Force to recommend placing the air-lift enhanced bioremediation pilot test on hold at this time. Some of the issues with the proposed air-lift technology were discussed at the meeting and include:

a. The ground water in the pilot test location is currently anaerobic. Introduction of oxygen into groundwater with elevated ferrous iron concentrations (and possibly other minerals) caused by the strongly reducing condition near residual nonaqueous phase liquid (NAPL) will quickly foul and plug the pilot test well significantly impeding water flow.

b. The mineral fouling will result in excessive maintenance and well rehabilitation, and after several redevelopment events, will result in wells that are typically of limited effectiveness.

c. This technology relies on establishing a groundwater circulation pattern which has proven difficult to achieve on many sites. As a result, it is estimated the zone of influence for air-lift enhanced wells will be quite small, and it is unlikely that sufficient oxygen will be delivered to groundwater to have significant impact.

d. Even if the air-lift pilot test proved technically feasible, because of the limited zone of influence of this technology, scaling-up the technology would require an inordinate number of wells to treat a residual NAPL zone measured in acres.

e. Full-scale implementation of this technology at the BFF is infeasible due to limited zone of influence and highly unlikely for future selection in an alternatives analysis.

The general concurrence of meeting participants was that the air-lift pilot test should not be performed at this time. Kirtland Air Force Base (AFB) is hereby formally requesting deferral of the air-lift enhanced bioremediation pilot test until additional source zone information is collected during the coring program and final data are available from the ISB project. However, Kirtland AFB would like to proceed with coring the proposed air-lift well KAFB-106S1 location and installing a two-well nest design currently approved on February 28, 2018 under the *Work Plan for Data Gap Monitoring Well Installation, Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, dated December 2017.*

If you have any questions or concerns, please contact Mr. Scott Clark at (505) 846-9017 or at scott.clark@us.af.mil; or Mr. Sheen Kottkamp at (505) 846-7674 or at sheen.kottkamp.1@us.af.mil.

Sincerely

Richard W. Gibbs

RICHARD W. GIBBS, Colonel, USAF
Commander

cc:
NMED (Borrego) letter
NMED-OOTS (McQuillan), letter and CD
NMED GWQB (Hunter), letter and CD
EPA Region 6 (King, Ellinger), letter and CD
SAF-IEE (Lynnes), electronic only
AFCEC/CZ (Renaghan, Clark, Kottkamp, Segura), electronic only
USACE-ABQ District Office (Moayyad, Phaneuf, Dreeland, Sanchez, Salazar), electronic only
Public Info Repository, Administrative Record/Information Repository (AR/IR) and File

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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Santa Fe, New Mexico 87505-6313
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Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

July 14, 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
WORK PLAN FOR DATA GAP MONITORING WELL INSTALLATION
KAFB-106248 to KAFB-106252
BULK FUELS FACILITY SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO
EPA ID# NM6213820974
HWB-KAFB-19-015

Dear Colonel Miller and Lt. Colonel Acosta:

The New Mexico Environment Department (NMED) is in receipt of the Kirtland Air Force Base (Permittee or KAFB) *Work Plan for Data Gap Monitoring Well Installation KAFB-106248 to KAFB-106252* (Work Plan), dated December 2019. NMED has reviewed the Work Plan and hereby issues this Approval with Modifications.

The attached comments include direction to expedite the characterization of the source area contaminant migration pathway, correct deficiencies in the Work Plan, and provide specific information regarding the sampling of newly installed groundwater monitoring wells. NMED comments are presented in Attachments I and II. NMED and KAFB staff met on May 28, 2020 to discuss relocating one or two of the wells closer to the source area, the associated changes to

the scope of the project, and additional NMED comments and questions. NMED sent a list to KAFB describing the changes in scope of work via electronic mail on June 1, 2020.

Please submit replacement pages and proposed borehole locations to NMED no later than **September 15, 2020**. The Permittee shall ensure that all copies of the Work Plan are updated with the NMED-approved replacement pages and that contractors are issued copies of the updated Work Plan so that investigation activities are conducted according to the modified scope provided in this Approval with Modifications letter. The Permittee is advised that if field work is not performed appropriately due to incorrect direction given to field staff, it may result in the Permittee being required to repeat or conduct additional work.

Please submit an investigation report summarizing the results of the implementation of this Work Plan no later than **June 15, 2021**. The report must address all of the comments included in this Approval with Modifications. The report must be submitted to NMED in the form of two hard copies and one electronic copy.

This approval 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.

Should you have any questions or wish to meet with us to discuss these comments, please contact me at (505) 476-6035.

Sincerely,

for

Kevin M. Pierard, Chief
Hazardous Waste Bureau

Attachments I and II

cc: S. Stringer, Director NMED RPD
D. Cobrain, NMED HWB
B. Wear, NMED HWB
R. Murphy, NMED HWB
L. King EPA Region 6 (6LCRRC)
S. Kottkamp, KAFB
K. Lynnes, KAFB

File: KAFB 2020 Bulk Fuels Facility Spill and Reading

Attachment I

APPROVAL WITH MODIFICATIONS COMMENTS:

1. **Address contaminant migration pathway data gaps beneath the source area.**

   NMED Comment: Data gaps remain from the source zone characterization previously performed under the Permittee's *Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision R1*, dated December 2017 and approved with conditions by NMED on February 23, 2018. The results of the investigation were presented in the *Source Zone Characterization Report for the Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111*, received by NMED on October 30, 2019. This Report is currently under NMED review. The review in progress indicates that that the migration pathway has not been adequately characterized beneath the source area.

   In order to understand the migration of contaminants through the vadose zone beneath the former fuel offloading rack (FFOR), an understanding of the stratigraphy approximately 250-300 feet below ground surface (ft bgs) is essential. The source area contaminants descend essentially vertically from the surface to a depth of approximately 250-350 ft bgs where a distinct clay layer is present. The clay layer is easily identified in drill cores and on geophysical logs. The thickness, lateral continuity, and geometry of this clay layer changes across the site. Directly below the FFOR the clay occurs as a single layer at approximately 275-300 ft bgs (lower clay). East-southeast of the FFOR the clay occurs as a single layer at approximately 250 ft bgs (upper clay). A vertical offset can be identified in the clay layer directly below the FFOR that likely creates a preferential pathway to vertical migration of contaminants. Once contaminants reach the 250-300 foot depth range they appear to migrate predominantly downdip (to the east-southeast) on the lower clay layer and then generally vertically to the water table. Three other data sets support this interpretation of the contaminant migration pathway: the observed lateral offset of elevated volatile organic compound (VOC) concentrations with depth; soil vapor extraction system rebound data; and Pneulog total volatile petroleum hydrocarbons (TVPH) soil gas data. All three data sets show contaminant migration to be predominantly vertical beneath the FFOR to a depth in the 250-300 foot range with a shift in the pathway to the east-southeast before continuing on a vertical downward path to the water table.

   As stated in NMED's November 4, 2019 letter, "NMED met with the Permittee on September 26, 2019 to discuss the potential to utilize some of the proposed wells for multiple purposes to address other data gaps, the most important being the further characterization of the source area migration pathway through the vadose zone east of the former location of the bulk fuels loading racks. The Permittee agreed to evaluate the potential..." Therefore, the Permittee is instructed to relocate one or two of the proposed monitoring wells (KAFB-106250 and KAFB-106251) nearer to source area, as shown in Attachment II.

In order to reduce cost and accelerate work, borehole(s) may be drilled with air rotary casing hammer techniques (ARCH) to a depth of approximately 230 ft bgs, just above the top of the clay described above. The boreholes must then be continuously cored to the total depth of the borehole and sampled for total petroleum hydrocarbons (TPH) gasoline range organics (GRO) and diesel range organics (DRO) Extended using United States Environmental Protection Agency (EPA) Method 8015 (modified). The total depth must be 10 feet below any field screening evidence of contamination (e.g., photoionization detector (PID) readings greater than 10 parts per million volume (ppmv)) to obtain a consistent detailed vertical profile of the migration pathway and to determine the vertical extent of contamination in the source area. A sample for TPH GRO and DRO Extended must be collected at the total depth of the borehole(s). The borehole(s) must also be geophysically logged. See Attachment II for NMED's proposed location for source area migration pathway boreholes.

The Permittee must provide NMED email notification at certain stages of the drilling process. These stages include but may not be limited to:

a) initiation and cessation of ARCH drilling,
b) initiation of sonic drilling,
c) upon reaching a depth of 300 ft bgs,
d) upon reaching the water table, and
e) upon reaching total well depth.

The Permittee's notification to NMED that the driller has reached a depth of 300 ft bgs must include the actual depth bgs and thickness of the clay layer, if it is encountered. If the clay layer is not encountered then the objective of the well will have been achieved, that is, to identify the possible gap in the clay layer located 250 and 300 ft bgs as described above.

If the clay layer is encountered, the Permittee, in consultation with NMED, must make a determination about whether it is the lower or upper clay. If it is determined that the driller has encountered the lower clay, the driller should stop at 300 ft bgs or just below the bottom of the clay and the Permittee must partially backfill the borehole with a bentonite seal and sand. The bentonite must be emplaced with a tremie pipe to approximately 2 ft below the top of the clay followed by one foot of sand to prevent bentonite from entering the well screen. The borehole must then be completed as a soil vapor monitoring well (SVMW) with the lower end of the screen located across the top of the clay layer. The SVMW must be constructed with a 1 foot sump and a 2 foot screen of an appropriate slot size. A SVMW design must be submitted to NMED for review with the Work Plan replacement pages.

If it is determined that the driller has encountered the upper clay only, the driller should advance the borehole to total depth below the water table and the Permittee must complete the well as a dual screen ground water monitoring well as proposed in the Work Plan.

If the first borehole is not successful in locating the contamination migration pathway (i.e., lower clay has been encountered) then a second borehole location should be selected based on the findings of the first borehole. The proposed second borehole location must be submitted by the Permittee to NMED for approval via electronic mail and approved prior to initiation of drilling.

If the first borehole is successful in locating the contamination migration pathway then the Permittee, in consultation with NMED, must make a determination if a second borehole location should be selected to refine the migration pathway or if the borehole should be used to meet the objectives outlined in the Work Plan. See comments below for further detail.

Upon completion of drilling the first borehole in the source area, the Permittee must provide NMED a copy of the lithologic log(s) by email. After reviewing the lithologic logs, NMED will provide direction for well installation at that location and direction on drilling a second borehole in the source area.

NMED may require the installation of additional groundwater monitoring wells, if the five wells installed pursuant to this Work Plan do not sufficiently address the data gaps.

2. Section 6.0 Monitoring and Sampling, page 6-1, line 28

Permittee Statement: "Beginning in 2016 passive sampling techniques were implemented at select GWM [ground water monitoring] well locations. The transition to passive sampling for select GWM well locations was formally approved by NMED on May 31, 2017 (NMED, 2017. A further passive sampling evaluation was performed in Q4 2017 (Section 3.7.7 of KAFB, 2018b). This evaluation demonstrated that analytical results from passive sampling techniques and analytical results from low-flow sampling techniques are generally comparable between the two sampling methods, with no consistent bias identified (i.e., neither method has consistently resulted in higher or lower concentrations)."

NMED Comment: NMED's May 31, 2017 approval letter approved the change to the use of passive diffusion bags and dual membrane samplers for certain groundwater monitoring wells located north of Ridgecrest Drive in residential areas. NMED did not approve the use of passive sampling south of Ridgecrest Drive, particularly in areas with elevated petroleum hydrocarbon contamination. The passive sampling demonstration evaluation performed in Q4 [fourth quarter] 2017 and presented in the *Quarterly Monitoring Report October-December 2017 and Annual Report for 2017*, dated March 2018, was not reviewed or approved by NMED Hazardous Waste Bureau (HWB).

The *Quarterly Monitoring Report-October-December 2018 and Annual Report for 2018,* dated March 2019, states "Field parameters [i.e., turbidity, temperature, dissolved oxygen,

specific conductivity, pH, and oxidation reduction potential] were not collected from wells that were sampled using passive sampling methods due to the unreliable field parameter data associated with this technology."

Additionally, an email to NMED from KAFB, dated February 28, 2020, provided data from this evaluation. The data indicates that source area monitoring well KAFB-106053 does not produce "high quality and representative sampling that was highly comparable to low-flow sampling," as indicated in the text of the email. Low-flow sampling results indicated a benzene concentration of 15,000 µg/L with duplicate results of 16,000 µg/L, while the passive sampling results for this same well indicated a benzene concentration of 3,700 µg/L with duplicate results of 3,600 µg/L. This demonstrates an order of magnitude difference between the sampling methods for this well located in the source area.

3. **Section 4.0, Scope of Activities, page 4-1**

NMED Comment: The Permittee must revise Section 4.0 of the Work Plan along with corresponding Figures and Tables to incorporate the modifications required by NMED to characterize the source area migration pathway. See individual comments on Section 4.0 revisions below. The Permittee must submit the revised Section 4.0 and corresponding Figures and Tables as replacement pages.

4. **Section 4.0, Scope of Activities, page 4-1, line 6**

Permittee Statement: "...well locations proposed in this Work Plan are shown on Figure 2-1 and Figure 2-2."

NMED Comment: The Permittee must relocate one or two of the proposed monitoring wells (KAFB-106250 and KAFB-106251) to locations in the source area to determine the source area migration pathway. Propose two new locations within the area identified in Attachment 2. Include a primary location to be drilled first and a secondary location to be drilled should the first borehole not successfully locate the migration pathway.

5. **Section 4.0, Scope of Activities, page 4-1, line 9 and Figure 4-1, Proposed Construction Diagram for Groundwater Monitoring Well with Contingency Well and Figure 4-2, Proposed Construction Diagram for Groundwater Monitoring Well KAFB-10624**

Permittee Statement: "Four of the five proposed GWM wells (KAFB-106249 through KAFB-106252) will be constructed with the same design employed by the Work Plan for Data Gap Monitoring Well Installation (Section 3.1.1 of [Work Plan for Data Gap Well Installation, 2017]) as shown on the construction diagram (Figure 4-1)."

NMED Comment: All groundwater monitoring wells must be constructed utilizing an appropriate well casing diameter (e.g., four-inch inside diameter) to accommodate

equipment, such as low-flow pumps, which can effectively purge wells for active sampling.

6. Section 4.0, Scope of Activities, page 4-2, lines 1 through 16

Permittee Statement: "KAFB-106250 is proposed to be installed in the parking lot of the Air National Guard (ANG) adjacent to the existing well KAFB-106046. This location will help to bound both the EDB [ethylene dibromide] and benzene plumes in this area...KAFB-106251 is also proposed for installation on ANG property, adjacent to the boundary with the BFF [Bulk Fuels Facility]... However, water table wells are needed closer to the source area to more accurately delineate the EDB and benzene plumes in this area."

NMED Comment: According to Figures 2-1, Proposed Monitoring Well Locations and Q2 [second quarter] 2019 EDB Plume Map, and Figure 2-2, Proposed Monitoring Well Locations and Q2 2019 Benzene Plume Map, wells KAFB-106245 and KAFB-106247 do not have submerged well screens and neither EDB nor benzene were detected in the second quarter of 2019 (Q2 2019). These wells provide delineation of the plumes to the east and east-southeast of the source area; therefore, proposed wells KAFB-106250 and KAFB-106251 are good candidates to be moved to characterize the source area migration pathway.

7. Section 5.0, Scope of Activities, page 4-1

NMED Comment: Please revise Section 5.0 of the Work Plan along with corresponding Figures and Tables to incorporate the modifications required by NMED to characterize the source area migration pathway. See individual comments on Section 5.0 revisions below. The Permittee must submit the revised Section 5.0 and corresponding Figures and Tables as replacement pages.

8. Section 5.0, Scope of Activities, page 4-1

NMED Comment: The Permittee must incorporate / reference the relevant scopes of work from the *Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling Bulk Fuels Facility, Solid Waste Management Unit (SWMU) ST-106/SS-111, Kirtland Air Force Base, New Mexico, Revision R1,* dated December 2017, and approved with conditions by NMED on February 23, 2018 (VZ Work Plan), including, but not limited to, the following:

a) Drilling Approach and Methodology as outlined in Section 3.1.1.1, page 3-2 of the VZ Work Plan: "....borings can be cored continuously from ground surface to total depth, these borings will be over-reamed via air rotary casing hammer (ARCH) technique to the nominal 10-inch diameter OR borings can be accomplished using a combination of ARCH drilling to the designated coring depth, followed by sonic drilling [or other continuous core methodology] to obtain undisturbed cores from the designated coring intervals. Upon achieving the top of the designated coring interval depth, the ARCH rig will be moved off each location while leaving the casing downhole, and the sonic [or other

continuous core] rigs will be positioned at the cased holes to core the prescribed designated coring intervals and then subsequently reamed with a sufficient size bit with the ARCH drilling rig to provide a large enough borehole for well construction."

b) Core temperatures must be monitored as outlined on page 3-2 in Section 3.1.1.1, page 3-2 of the VZ Work Plan: "Heating during continuous core collection can impact contaminant, geochemical and microbial properties and adversely affect sample representativeness. In addition to advancing the borehole to the designated coring depth with the ARCH rig, to minimize the heating potential, heating of the sonic drilling core barrels in the unsaturated zone can be controlled by any one or combination of the following:
   i. Advancing shorter sampling runs (5-10 feet versus 20 feet)
   ii. Allowing the core barrel to cool (or pre-cooling the core barrel) before tripping back into the borehole
   iii. Changing the vibration level and rotation speed
   iv. Injecting small quantities of potable water between the override casing and the core barrel without compromising sample integrity as described in ASTM International D6914/D6914M-16.
   v. Temperature inside the core will be monitored when returned to the surface to ensure that heating of the core barrel is not impacting sample selection or integrity. Background soil vapor temperatures in the vadose zone have historically averaged from 20 to 22 degrees Celsius (°C). Average groundwater temperatures at the site are 19°C. Any core heating over 20°C will require mitigation steps as outlined above. If water is injected, the bottom few inches of the core intervals that are possibly in contact with water accumulating in the bottom of borehole will be discarded prior to collection of samples. Sonic core barrels in the saturated zone are naturally cooled by the presence of formation water; however, similar steps will be implemented as described above to ensure sample representativeness."

c) Field Screening for hydrocarbons must be conducted as outlined in Section 3.1.1.3, page 3-3 of the VZ WP, with depths modified as follows: When advancing the borehole to the designated coring interval with ARCH, all cuttings must be logged and PID measurements collected at a minimum of every 10 feet as described in Section 3.2.10 of the VZ WP. Within the designated coring interval, PID readings must be collected every 5 ft. Additional measurements will be collected if qualitative data (e.g., staining, odor, etc.) indicate possible LNAPL. All PID readings shall be recorded on borehole logs.

d) Laboratory Analyses for Selected Core Samples as outlined in Section 3.1.1.4, page 3-4 of the VZ WP, and modified as follows: Samples for laboratory analyses shall be

collected every 10 ft, additional samples shall be selected based on elevated PID measurements (augmented by lithologic and qualitative data) and sampled for TPH GRO/DRO Extended by EPA Method 8015 (modified) from 230 ft bgs to the total depth of the boring(s), to obtain a consistent detailed vertical profile of the migration pathway.

9. Section 5.1.2 Drilling of Groundwater Monitoring Wells, page 5-2, line 2

Permittee Statement: "All five new monitoring nested wells will be installed via air rotary casing hammer technology with casing advancement."

NMED Comment: The two designated boreholes to be used for the investigation of the source area migration pathway must be continuously cored from 230 ft bgs to total depth. This will provide undisturbed cores for more accurate lithologic logging, field screening, and soil sampling. This can be accomplished using a combination of ARCH drilling to the designated coring depth, followed by sonic or other continuous core drilling method to obtain undisturbed cores from the designated coring intervals.

10. Section 5.1.2.2 Photoionization Detector [PID] and Headspace Screening, page 5-2, line 32

Permittee Statement: "PIDs will be used for breathing zone monitoring during drilling and sampling activities, as well as for field screening of hydrocarbons in soil cuttings during drilling. This instrument monitors volatile organic compounds using a PID with a 9.8-electronvolt (eV), 10.6-eV, or 11.7-eV UV lamp."

NMED Comment: The Permittee must use either a 9.5 eV or 9.8 eV UV lamp for field screening samples to avoid fouling of the lamp due to dust, moisture, or high concentrations of petroleum vapors. If evidence of lamp fouling is observed during use of a PID with a 9.8 eV lamp, the Permittee must switch to a 9.5 eV UV lamp to obtain the most accurate PID readings possible. The Permittee must have an additional PID with the lower lamp strength readily available. Reliable PID readings will result in a consistent detailed vertical profile of the migration pathway. Failure to obtain reliable readings in the potential migration pathway may result in having to drill another boring to obtain accurate readings.

11. Section 5.1.2.2 Photoionization Detector and Headspace Screening, page 5-2, line 37

Permittee Statement: "Record PID measurements at a minimum of every 25 ft of drill cuttings down to 450-ft depth, and then every 10 ft of drill cuttings to total depth following the process below..."

NMED Comment: For boreholes that will be continuously cored, the Permittee must record PID sample measurement, at a minimum, every 10 ft from ground surface to the start of

coring and every 5 ft from the start of coring to the total depth of the borehole to obtain a detailed vertical profile of the migration pathway.

12. Section 5.1.3 Construction of Groundwater Monitoring Wells, page5-3, line 21

Permittee Statement: "The GWM nested wells will each be constructed using 3-inch diameter Schedule 80 polyvinyl chloride (PVC) casing..."

NMED Comment: The Permittee must construct all wells with well casing of sufficient diameter such that they can be sampled via active sampling techniques (e.g.: four-inch inside diameter well casing to accommodate pumps). See also Comment 5.

13. Geophysical logging of source area boreholes

NMED Comment: The Permittee must add a section to the Work Plan proposing to geophysically log all source area migration pathway investigation bore holes with a dual induction geophysical logging tool. The Permittee must specify approximate depths of interrogation for the tool they propose to use. The tool must be calibrated and operated according to American Society for Testing and Materials (ASTM) standards for geophysical logging and the operation manual for the specific model of logging tool. In the report summarizing the results of the investigation the Permittee must provide shop calibration and daily field calibration data. An electronic copy of raw and processed data must be provided in Excel table format. A visual presentation of the log curve must be presented on a single page in a continuous format rather than as several separate pages. The geophysical log(s) for each well must be displayed with the lithologic log for comparison purposes and a discussion of the results must be included in the main body of the investigation report. Wells that are to be or will be geophysically logged must be designed with PVC centralizers rather than steel centralizers.

14. Section 5.1.3.2 Well Development, page 5-4

NMED Comment:
The Permittee must measure and record the parameters for pH, temperature, conductivity, and turbidity, as shown on the field form presented in Appendix B, Field Forms.

The Permittee must collect groundwater samples within 10 days after well development in accordance with Section 6.5.17.3 of the Permit. Samples must be analyzed in accordance with Table 6-1, Groundwater Monitoring Requirements for Data Gap Wells.

15. Section 5.1.3.2 Well Development, page 5-4, line 34

Permittee Statement: "The new wells (KAFB-106248 through KAFB-106252) were designed for passive sampling (Section 6), and the 0.010-inch slot size should minimize formation fines in these wells."

NMED Comment: The new wells must be designed for active sampling techniques. The new wells must be sampled using active sampling (e.g., low-flow sampling) for a minimum of eight consecutive quarters to establish baseline concentrations in order to establish the precision criteria for passive sampling methods for the newly installed wells. While the approved work plans for data gap well installation and vadose zone coring included passive sampling of newly installed wells, the NMED administrative record does not contain documentation that the use of passive sampling south of Ridgecrest Drive, particularly in areas of elevated contaminant concentrations, has been evaluated or approved by NMED.

16. Section 6.0 Monitoring and Sampling, page 6-1

NMED Comment: The Permittee must revise Section 6.0 of the Work Plan along with corresponding figures and tables to incorporate the modifications required by NMED to characterize the source area migration pathway. See individual comments on Section 6.0 revisions below. The Permittee must submit the revised Section 6.0 and corresponding figures and tables as replacement pages.

17. Section 6.0 Monitoring and Sampling, page 6-1, line 11

Permittee Statement: "All newly installed wells will be sampled for four consecutive quarters to establish baseline concentrations for the parameters listed in Table 6-1."

NMED Comment: The Permittee must collect groundwater samples from all newly installed wells within 10 days after well development in accordance with Section 6.5.17.3 of the Permit, at the next quarterly sampling event, and quarterly thereafter for eight consecutive quarters via active sampling methods (e.g., low-flow) to establish baseline concentrations. These data will be used to establish precision criteria for passive sampling methods for the newly installed wells. Groundwater samples must be analyzed for analytes presented in Table 6-1, Groundwater Monitoring Sampling Requirements for Data Gap Wells, of the Work Plan.

18. Section 6.0 Monitoring and Sampling, page 6-1, line 35

Permittee Statement: "Groundwater sampling will be performed via passive sampling techniques for all new GWM wells covered in this Work Plan, barring any environmental

factors that would preclude the ability to sample with this technology (e.g., significant and continuous LNAPL thickness in the well)."

NMED Comment: Given the concerns stated above, the Permittee must not use passive sampling in areas with elevated petroleum hydrocarbon contamination (i.e., in the vicinity of the source area).

19. Section 6.2 Preparation for Groundwater Well Sampling, page 6-3, line 2

Permittee Statement: "All wells covered in this Work Plan will be sampled via passive sampling technology and, therefore, well purging will not be required in association with sampling"

NMED Comment: The Permittee must add active sampling (e.g., low-flow) to relevant portions of Section 6.0. See the preceding comments regarding passive sampling.

20. Section 6.2.1 Collection of Groundwater Samples from Monitoring Wells Using Passive Sampling Techniques, page 6-3, line 19

Permittee Statement: "The procedures below will be followed for passive sampling."

NMED Comment: As stated previously, active sampling techniques are required. Please include a section describing the procedures for active sampling in the modified Section 6.0 replacement pages and remove the description for passive sampling.

21. Section 6.3 Analytical Requirements and Quality Control, page 6-4, line 31

NMED Comment: The Permittee must revise Section 6.3 of the Work Plan along with the relevant figures and tables to include the additional sampling required for the modified scopes of work in the modified Section 6.0 replacement pages.

22. Section 6.3 Analytical Requirements and Quality Control, page 6-4, line 31

NMED Comment: The Permittee must include a data validation section of the Report which describes the data validation process outlined in this Section 6.3 of the Work Plan. Data validation shall be conducted in accordance with Permit Section 6.5.18.

23. Section 6.5.2 Hazardous Water Investigation-Derived Waste, page 6-6, line 30

Permittee Statement: "No hazardous/potentially hazardous [investigation-derived waste] IDW is anticipated to be generated from the activities outlined in this Work Plan."

NMED Comment: This statement must be revised in the modified Section 6.0 replacement pages. The modified scope of work requires drilling and well development activities in the source area which may generate potentially hazardous IDW. Provide a description of the proposed management of hazardous IDW. Alternately, propose to dispose of purge / development water in the on-site groundwater treatment system that treats groundwater removed from recovery wells located north of Ridgecrest Drive.

24. Section 7 Project Schedule, page 7-1, line 1

NMED Comment: The Permittee must revise Section 7.0 of the Work Plan along with corresponding figures and tables to incorporate the modifications required by NMED to characterize the source area migration pathway. See individual comments on Section 7.0 revisions below. The Permittee must submit the revised Section 7.0 section as replacement pages.

25. Table 6-1, Groundwater Monitoring Sampling Requirements for Data Gap Wells

NMED Comment: Baseline sampling of newly installed wells must include quarterly sampling for GRO, DRO, and volatile organic compounds. The sampling frequency and analytical suite will be re-evaluated after the initial post-development sampling plus eight quarters of baseline sampling.

26. Table 6-3, Summary of Investigation-Derived Waste Sampling

NMED Comment: Under the portion of the table titled "Water Investigation-Derived Waste from Drilling", the Permittee indicates that post development water will be characterized by a sample taken from "the bailer at end of development". The Permittee is directed to take a composite sample of water from all containers of development water from each well. The contaminant concentrations in the development water may be higher or lower at the start of well development than at the end of development. A composite sample will provide a more accurate representation of contaminant concentrations in the IDW.

27. Appendix B, Field Forms

NMED Comment: The Borehole/Well Construction Log must include well details for all wells to be installed in a single borehole. The example field form shows only one well while the scope of work proposes two wells per borehole. The field form must include well details for installing two wells in each borehole.

28. Appendix C, Eurofins Lancaster Laboratories Environmental [Limited Liability Company] LLC Method Reporting Limits and Screening Criteria

NMED Comment: The Permittee must add a table which presents relevant Method Reporting Limits for soil analyses for the modified scope of work outlined in this Approval with Modifications letter.

29. Appendix C, Eurofins Lancaster Laboratories Environmental LLC Method Reporting Limits and Screening Criteria

NMED Comment: The Permittee must ensure that the limit of quantitation (LOQ) is less than the project screening levels. If this cannot be achieved by the laboratory due to the dilution of samples or other reason, the new LOQ, and all data qualifiers must be reported. Data tables in the investigation report must present the final limit of detection (LOD), LOQ, sample results, and all laboratory data qualifiers for the analytical results. No revision to Work Plan required.

SPECIFIC COMMENTS:

30. Section 2.1, Background Information, page 2-1, line 5

NMED Comment: The Permittee must include a more complete site history in the investigation report. The background information / site history must include a comprehensive summary of the subsurface field investigations that have contributed to the understanding of the site conceptual model and hydrogeology. The Report must also include a more detailed discussion of current water use and the influence of water supply wells on the hydrology and dissolved phase contaminant migration at the site. Discuss the impact these factors may have on projected future use of the water supply wells.

31. Section 2, Background Information, page 2-1, line 34

Permittee Statement: "Appendix A-1...illustrates groundwater elevations from 2011 through 2018 along two transects through the [ethylene dibromide] EDB plume. These time series graphs illustrate that the most pronounced increases in groundwater elevation are in the northern area of the site."

NMED Comment: Appendix A-1, Water Level Hydrographs, does not clearly illustrate this. It is difficult to ascertain trends with the bar graphs presented. Significant differences between the southern and northern portions of the site are not readily apparent. In future documents the Permittee must present data trends in an easy to interpret format. In addition, on Figure L-2-1, Groundwater Elevation Cross Section, three drinking water supply wells are shown on the figure but are not identified in the legend. Other figures had to be

consulted to identify these wells. In future documents the Permittee must include all pertinent symbols in the legends of figures. No revision is necessary.

32. Section 2, Background Information, page 2-1, line 45 and page 2-2, line1

Permittee Statement: "Appendix A-1 includes compiled potentiometric surface maps, EDB plume maps, and benzene plume maps at the 4,857 reference elevation interval (REI)..."

NMED Comment: In the investigation report the Permittee must add a brief explanation of REI's at the site including the depth intervals they represent in both words and numbers (e.g., "the 4,857 REI represents wells screened in the shallow zone at depths ranging from approximately X ft bgs to X ft bgs.") and include a figure / table for visual clarification of this term.

33. Section 2.2, Initial Data Gap Groundwater Wells and Vadose Zone Coring Activities, page 2-2, line 38

Permittee Statement: "The Source Zone Characterization Report...describes the complete suite of analyses performed to characterize LNAPL in the soil cores. The report also describes the conclusions of the LNAPL analyses."

NMED Comment: The Source Zone Characterization Report is currently in review by NMED and has not yet been approved. In future documents the Permittee must refrain from referencing documents that have not been approved by NMED, as it could be misleading to stakeholders reviewing documents. If referencing such documents is necessary, the Permittee must add a statement stating the official status of the referenced document (e.g., "currently in review by NMED".)

34. Section 3.0, Site Conditions, page 3-1, line 14

Permittee Statement: "The groundwater elevation graphs shown in Appendix A-1, illustrate that the operation of the Ridgecrest wellfield has a significant influence on the groundwater gradient at SWMUs ST-106/SS-111. Measurements from 2010 to 2015 indicated a north–northeast-oriented hydraulic gradient toward the Ridgecrest wellfield (Section 7.6.1.2 of KAFB, 2018a). However, with changes in Water Authority and Kirtland AFB pumping practices, the hydraulic gradient no longer has a consistent orientation each quarter. As described in the Q2 2018 report (Section 5.4.4.1 of KAFB, 2018c), the observed rise in groundwater levels across the plume area has occurred at the same time as a continual decrease in groundwater extraction at the Ridgecrest wellfield."

NMED Comment: Appendix A-1 does not clearly depict this. See Comments 35 and 36.

35. Section 3.0, Site Conditions, page 3-1, line 41

Permittee Statement: "Currently, these exceedances of EDB and benzene cannot be accurately bounded because GWM wells with non-detect concentrations of EDB and benzene to the southeast have submerged well screens."

NMED Comment: According to Figures 2-1, Proposed Monitoring Well Locations and Q2 2019 EDB Plume Map, and Figure 2-2, Proposed Monitoring Well Locations and Q2 2019 Benzene Plume Map, the southeast boundaries of both the benzene and EDB plumes are bounded by groundwater monitoring wells KAFB-106245 and KAFB-106247, neither of which have submerged well screens. According to these figures it appears that the southern and southwestern boundaries of these plumes are not bounded by any wells which do not have submerged well screens. Proposed groundwater monitoring well KAFB-106252 will close the southern data gap, however, additional wells may need to be installed in the future to delineate the southwestern edge of these plumes. No response required.

36. Section 6.4 Reporting, page 6-5, line 25

Permittee Statement: "Information and data collected during any quarter from drilling, installation, sampling, and gauging activities performed on the newly added monitoring wells will be submitted in SWMUs ST-106/SS-111 Quarterly Monitoring Reports."

NMED Comment: In accordance with Section 6.2.2.1.2, Site Investigations, Investigation Reports, and Section 6.2.4.3, Reporting Requirements, Investigation Reports of the KAFB Resource Conservation and Recovery Act (RCRA) Permit the information and data collected from all investigation activities related to this Work Plan must be submitted to NMED as a separate stand-alone Investigation Report.

37. Section 8.0 References, page 8-2, line 1

Permittee Statement: The Permittee cites, "KAFB, 2019c. *Source Zone Characterization Report Bulk Fuels Facility, SWMUs ST-106/SS-111*. Prepared by EA Engineering, Science, and Technology, Inc., PBC for USACE Albuquerque District under USACE Contract No. W912DR-12-D-006. November."

NMED Comment: The Permittee is reminded not to include references for documents that have not been approved by NMED.

38. Appendix A-2 HISTORICAL GROUNDWATER PLUME MAPS

NMED Comment: The Permittee is reminded that all appendices must have properly numbered pages, tables, and figures. For example, the figure numbers presented in Appendix A-2 include five Figure 3-3's, three Figure 3-6's, two Figure 3-7's, three Figure 3-9's, and two Figure 3-10's. There is no Figure 3-1, Figure 3-2, Figure 3-4, Figure 3-5, or Figure 3-8. In all future submittals all figures, tables, and pages must be renumbered sequentially for the specific appendices they are placed in and include cross-references to corresponding tables and figures in referenced documents.

Attachment II

Figure 1: Site map of KAFB Bulk Fuels Facility. The blue polygon represents the area proposed by NMED for relocating boreholes KAFB-106250 and KAFB-106251. Aerial imagery from Google Earth Pro, 2018.

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

May 31, 2017

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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

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BUTCH TONGATE
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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.

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's 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:
NMED will be verbally notified via the Environmental Emergencies hot line (505-827-9329) within 24 hours of discovery with the following information:
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 tum 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. Hamer, KAFB
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
T. Simpler, USACE
M L. Leonard, AEHD
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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

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

January 20, 2016

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John Pike
Director, Environmental Management Services
377 MSG
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Kirtland AFB, NM 87117-5270

Re: REQUESTED OPTIMIZATION OF MONITORING AND REPORTING, SECOND PHASE, 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) is in receipt of the Kirtland Air Force Base (AFB) (the Permittee) *Technical Memorandum: Requested Optimization of Monitoring and Reporting, Second Phase, Bulk Fuels Facility Spill Site*, dated December 9, 2015. The Memorandum proposed further optimization to the groundwater monitoring program and quarterly reports including:

- Removal of five analyses from the site groundwater analytical program. These five analyses were evaluated by the optimization subgroup of the Hydrogeology Working Group as not being necessary to inform risk, monitor site conditions, or use in support of site decisions:
  - Total petroleum hydrocarbons-diesel range organics (EPA Method 8015C)
  - Total petroleum hydrocarbons-gasoline range organics (EPA Method 8015C)
  - Semivolatile organic compounds (EPA Method 8270D)
  - Polynuclear aromatic hydrocarbons (EPA Method 8270D Mod)

  - Field analysis for alkalinity
- Reduced frequency of sampling of groundwater monitoring wells within the benzene plume footprint. These wells are defined as "Source Area Wells" and are proposed for semi-annual sampling for benzene, toluene, ethylbenzene, and xylene (BTEX), ethylene dibromide (EDB), metals, anions, alkalinity, and field parameters.
- Reduced frequency of sampling of groundwater monitoring wells located outside of the downgradient portion of the benzene plume that could indicate migration of the BTEX constituents. These wells are defined as "Signal Wells" and are proposed for semi-annual sampling for BTEX plus naphthalene, EDB, metals, anions, alkalinity, and field parameters. The signal wells would indicate migration of BTEX constituents and concentration data trends from these wells could prompt a re-evaluation of sampling frequency of BTEX or naphthalene.
- Revised frequency of sampling for metals, anions, and alkalinity at groundwater monitoring wells located between the dissolved-phase plume and the VA Medical Center drinking water supply wells. These wells are defined as "VA Proximal Wells" and are proposed for quarterly sampling of BTEX, EDB, and field parameters and semi-annual sampling for metals, anions, and alkalinity. This well category is inclusive of the VA sentinel wells.
- Revised frequency of sampling for metals, anions, and alkalinity at groundwater monitoring wells located between the leading edge of the EDB plume and drinking water supply wells KAFB-3, Ridgecrest-3, and Burton-5. These wells are defined as "Downgradient Proximal Wells" and are proposed for quarterly sampling for EDB and field parameters and semi-annual sampling for metals, anions, and alkalinity. Additionally, the Permittee proposes no longer monitoring these wells for BTEX. This category is inclusive of downgradient sentinel wells.
- Revised frequency of sampling for metals, anions, and alkalinity at the groundwater monitoring wells installed in the calendar year 2015. These wells are defined as "Newly Installed Wells" and are proposed for quarterly monitoring for EDB and field parameters and semi-annual monitoring for metals, anions, and alkalinity. Additionally, the Permittee proposes not sampling for BTEX at these wells.
- Revised frequency of sampling and reduction in analysis at 139 groundwater monitoring wells. These wells are defined as "Extended Well Network" and are proposed for semi-annual monitoring for EDB, metals, anions, alkalinity, and field parameters.
- Revisions to the quarterly reporting format to include the compilation of a robust annual report with the annual sampling event in the Fourth Quarter and non-cumulative data reports for each of the First, Second, and Third Quarter sampling events.

The proposed optimizations in the analytical program, sampling frequency, and reporting in the Permittee's Technical Memorandum: Requested Optimization of Monitoring and Reporting are hereby approved with the following conditions:

1. The Permittee shall continue quarterly sampling for EDB, metals, anions, alkalinity, and field parameters at the "Newly Installed Wells" until each well has four consecutive quarters. At the end of the fourth consecutive quarter, the Permittee may change to a

semi-annual sampling program for metals, anions, and alkalinity and continue with quarterly sampling for EDB and field parameters.

2. The Permittee shall continue quarterly sampling for BTEX, EDB, metals, anions, alkalinity, and field parameters in the groundwater monitoring wells with observed increasing trends in nitrate, chloride, and sulfate, as discussed at the December 8, 2015 Hydrogeology Working Group. At a minimum, this includes wells KAFB-1065, KAFB-1069, and KAFB-10612R.
3. Sampling frequency of metals and alkalinity for the VA and downgradient proximal wells may be revised based on recommendations of the Hydrogeology Working Group for indicator parameters.

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)
J. Kieling, NMED-HWB
D. McQuillan, NMED KAFB Fuel Spill Cleanup Team Leader

File: KAFB 2015 Bulk Fuels Facility Spill Library and Reading

NEW MEXICO
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RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

July 17, 2015

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

RE: REVISED QUARTERLY PRE-REMEDY MONITORING AND SITE INVESTIGATION REPORTS
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) proposed changes to the *Quarterly Pre-Remedy Monitoring and Site Investigation Reports*, dated May 12, 2015. The proposed changes include:

- Discontinuation of sampling/reporting for 97 specific analytes for which there were no detections above regulatory standards in quarterly sampling during 2013-2014.
- Revising text, tables, figures and appendices to be non-cumulative and to only include data from the specific quarter addressed by the report. The Permittee, however, still intends to comply with Comment No. 31 in NMED's August 17, 2011 letter with respect to data exports in Appendix E.
- Reduction of report figures to only include data that are currently driving decisions.

The Permittee's proposed changes to the quarterly monitoring and reporting practices are hereby approved with the following conditions:

1. The Permittee shall continue to monitor for calcium, magnesium, potassium and sodium in groundwater, and shall report the test results in the quarterly reports.

2. The Permittee shall summarize vapor, groundwater, and remediation system monitoring data in tables. All data tables shall include only detected analytes and data quality exceptions that could potentially mask detections. Data presented in the tables shall include the current data plus data from the three previous monitoring events or, if data from fewer than three monitoring events is available, data acquired from the three most recent monitoring events during previous investigations, if any, must be provided. The dates of data collection shall be included in the tables.
3. The Permittee shall submit, in addition to the full Quarterly Report, an Executive Summary of the Quarterly Report, written for the lay public and with embedded figures, that includes the following information:
    a. A brief summary of ongoing investigation and cleanup actions, with reference to availability of the full Quarterly Report for those who are interested;
    b. Figures and written summaries of cumulative amounts of product recovered/biodegraded in the soil and groundwater;
    c. Descriptions of new groundwater or soil vapor wells and new test parameters, if any;
    d. Identification and discussion of any significant changes in contamination concentrations or distributions;
    e. Cumulative groundwater maps for benzene, EDB, and dissolved oxygen;
    f. A map of groundwater natural attenuation parameters including electron acceptors, alkalinity and bromide (or split into multiple maps if necessary for clarity);
    g. Cumulative soil vapor maps and depth slices for total VOCs and benzene;
    h. Any other monitoring data deemed by the Permittee to be important in driving decisions; and
    i. Descriptions of newly initiated or planned investigations, tests or studies.
4. The Permittee shall, no later than by August 1, 2015, submit a draft of the Executive Summary described in Condition #2 above for data gathered in the first quarter of 2015.
5. The Permittee shall fully implement the changes to sampling and reporting approved in this letter for data gathered in the second quarter of 2015.

NMED technical staff will assist you and your contractor in any way possible to evaluate and optimize sampling and reporting practices.

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
Wayne Bitner, KAFB
Herbert Bohannon, KAFB
M.L. Leonard, AEHD
F. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
J. Kieling, NMED-HWB
D. McQuillan, NMED KAFB Fuel Spill Cleanup Team Leader

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

APPENDIX A-2

CROSS-WALK TABLE BETWEEN THE RCRA PERMIT AND GROUNDWATER MONITORING WORK PLAN

Appendix A-2
Cross-Walk Table Between the RCRA Permit and Groundwater Monitoring Work Plan

RCRA Permit Part	Permit Requirement	Reference Location in Work Plan for Groundwater Monitoring
Part 6	Corrective Action	Section 1 Introduction
Part 6.2.2.1.1	Investigation Work Plan	Section 1 Introduction
Part 6.2.4.2	Investigation Work Plan Format	Section 1 Introduction
Part 6.5.2	Documentation of Field Activities	Section 6.1 Documentation of Field Activities
Part 6.5.3	Decontamination Procedures	Section 6.2 Decontamination Procedures
Part 6.5.4	Field Equipment Calibration Procedures	Section 6.3 Field Equipment Calibration Procedures
Part 6.5.5	Sample Handling, Shipping, and Custody Requirements	Section 6.9 Sample Handling, Shipping, and Custody
Part 6.5.5.1	Sample Handling	Section 6.9.1 Sample Handling
Part 6.5.5.2	Sample Shipment Procedures	Section 6.9.2 Sample Shipment
Part 6.5.5.3	Sample Custody	Section 6.9.3 Sample Custody
Part 6.5.5.4	Sample Labels	Section 6.9.4 Sample Labels
Part 6.5.7	Collection and Management of Investigation Derived Waste	Appendix C Investigation Derived Waste Management Plan
Part 6.5.17	Technical Requirements for Groundwater Investigations	Section 6 Monitoring and Sampling, Table 1-1
Part 6.5.17.2	Groundwater Levels	Section 6.5 Groundwater and Light Non-Aqueous Phase Liquid Gauging
Part 6.5.17.3	Groundwater Sampling	Section 6.6 Groundwater Sampling
Part 6.5.17.4	Well Purging	Section 6.6 Groundwater Sampling, Section 6.6.2.1 Well Purging
Part 6.5.17.5	Groundwater Sample Collectior	Section 6.6 Groundwater Sampling
Part 6.5.17.6	Field QC for Groundwater Sampling	Section 6.8 Field Quality Control for Groundwater Sampling
Part 6.5.18	Laboratory Analyses Requirements for all Environmental Media	Section 6.10 Laboratory Analytical Requirements
Part 6.5.18.1	Laboratory QA/QC Requirements	Section 6.10.2 Laboratory QA/QC Requirements
Part 6.5.18.2	Laboratory Deliverables	Section 6.10.3 Laboratory Deliverables
Part 6.5.18.3	Review of Field and Laboratory QC Data for all Media	Section 6.10.4 Review of Field and Laboratory QC Data
Table I-2, Permit Attachment I	Submittal Requirements for Corrective Action	Section 7.2 Periodic Monitoring Report Schedule

QA = quality assurance

QC = quality control

RCRA = Resource Conservation and Recovery Act

APPENDIX B

EXAMPLE FIELD FORMS

225 Schiling Circle Suite
400 Hunt Valley MD
Tel No: (410) 584-7000
Fax No. (410) 771-1625

CHAIN-OF-CUSTODY RECORD

COC NUMBER

PROJECT NAME:	PROJECT NUMBER:	LABORATORY NAME AND CONTACT:	FAX AND MAIL REPORTS/EDD TO:	YEAR:
Kirtland AFB Bulk Fuels Facility		**Eurofins Lancaster Laboratories** **2425 New Holland Pike Lancaster PA 17601**	FAX AND MAIL REPORTS/EDD TO:	QUARTER:
PROJECT SITE AND PHASE: ST106/SS111		Lab PO Number:	LAB CONTACT:	

				ANALYSIS REQUIRED (Specify number of bottles)												
ITEM	SAMPLE IDENTIFIER	DATE COLLECTED	TIME COLLECTED	Total Number of Bottles	(8260C) VOCs	(8260C) BTEX	(8260C) BTEXN	(8011) EDB	Total (As,Pb,Ca,K,Na,Mg) (6020A/6010C)	Dissolved Fe, Mn (6010C)	Chloride, bromide, sulfate (300.0)	Nitrate-Nitrite (353.2)	(Total, Carbonate, and Bicarbonate) Alkalinity (SM2320B)	(RSK-175) Carbon Dioxide	(RSK-175) Methane	COMMENTS
1																
2																
3																
4																
5																
6																

COMMENTS: *Dissolved Fe, Mn aliquot was field filtered

SAMPLER(S):

COURIER AND SHIPPING NUMBER:

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		
Printed Name and Signature:			Printed Name and Signature:		

Kirtland AFB BFF Project #
Groundwater Well Inspection Form

Well ID: _____ **PID:** _____ ppm **Date:** _____

Stick up: ☐ **Flush Mount**: ☐

Well Pad Condition:	Below Grade	☐	Functional	☐	Repair Required	☐
Bollards:	Not Applicable	☐	Functional	☐	Repair Required	☐
Protective Casing:	Not Applicable	☐	Functional	☐	Repair Required	☐
Lock/Cover Bolt:	Not Applicable	☐	Functional	☐	Replacement Required	☐
Vault Threads:	Not Applicable	☐	Functional	☐	Cleaning Required	☐
Vault Cover:	Not Applicable	☐	Functional	☐	Repair Required	☐
Vault Seal:	Not Applicable	☐	Functional	☐	Repair Required	☐

Water in Vault:	Yes	☐	No	☐	***If yes, Depth of Water***:	Ft.
Debris in Vault:	Yes	☐	No	☐	***If yes, Type of Debris***:	
Pump Present:	Yes	☐	No	☐	***If no pump, J-Plug Present:*** Yes	No

Bennett Pump Inventory:

Drop Pipe Plug:	Missing	☐	Functional	☐	Repair Required	☐
Exhaust Line Plug:	Missing	☐	Functional	☐	Repair Required	☐
Pump Line Plug:	Missing	☐	Functional	☐	Repair Required	☐
Well Sounder Plug:	Missing	☐	Functional	☐	Repair Required	☐

Additional Comments: _____

_____

_____

Work Performed: _____

_____

_____

Photographs Taken: BEFORE ☐ AFTER ☐

Recorded By: _____

For serious problems, contact

Well Gauging Form

Year: ____

Project: Kirtland AFB BFF STs-106/SS-111

Quarter : ____

Group	Well ID	Previous DTW (ft MRP)		Date	Depth to NAPL (ft MRP)	DTW (ft MRP)	Total Depth of Well (ft MRP)	Initials	North of Ridgecrest	Well Completion	Barricades	Reference Point
		Date	DTW (ft MRP)									
	KAFB-											

Groundwater Purge and Sampling Log

Year:

Quarter:

Project: Kirtland AFB BFF STs-106/SS-111

Well ID:

Project No:

Samplers:

Date:

Crew Signature:

Well Information

Prior Well Status: Non-Hazardous Hazardous

Well Depth: ft MRP

Prior Screen Status: Submerged Not Submerged

Top of Screen: ft MRP

Barricade/Notification: ☐

Bottom of Screen: ft MRP

Measurement Reference Point (MRP):

Water Bearing Zone:

IDW will be taken to:

IDW Label:

Protective Casing/Vault: Intact Damaged

Well Locked/Security Bolt Present: Yes No

Well ID Marked: Yes No

Photoionization Measurements at Wellhead: ppm

LNAPL Present (circle one)? Yes No

LNAPL Thickness: ft

Previous Depth to water: ft MRP

Depth to Water (DTW): ft MRP

Pump Information

Bennett Pump Serial No.:

Non-Dedicated Pump Depth: ft MRP

* - if screen is submerged, place pump 2 ft below top of screen; if not submerged, place pump 2 ft above bottom of screen.

Field Instrumentation

pH, Conductivity, ORP, DO, Temperature

Serial No:

PID:

Serial No:

Water Level Meter:

Serial No:

Turbidity Meter:

Serial No:

Sample Information

Sample ID:

Sampling Method: Low-flow

Duplicate ID: (if applicable)

Sampling Medium: Water

COC#:

Reviewed by: Initials: Review Date:

Groundwater Purge and Sampling Log

Year:

Quarter:

Project: Kirtland AFB BFF STs-106/SS-111 Well

ID: ***Purge Information and Field Parameter*** Date:

Purge Start Time: _____ Purge Rate: _____ L/min X 0.265 = _____ gal/min

Description of first water purged: _____

Drawdown Limit: _____ ft (based on previous water level)

Time	Volume Purged (gal)	DTW (ft)	Turbidity (NTU)	Temp. (°C)	Saturated DO (%)	DO (mg/L)	Specific Conductance (µS/cm)	pH	ORP (mV)
Stabilization Requirements		-------	If >10,±10%	±10%	-------	±10%	±10%	±0.5	-------
Historical Data:									

Sample Time: _____ Sample Date: _____

Purge End Time: _____

Bubbles in the vials? ☐ Yes ☐ No Where? _____ Amount _____ Size _____

Sampled by: _____ Sampler Signature: _____

IDW Management

Drum No.	Estimated volume per IDW drum (gal)
1	
2	
Total	

IDW will be taken to:

IDW Label:

Comments: _____

Reviewed by: _____ Initials: _____ Review Date: _____

Passive Diffusion Water Sampling Data Sheet

Year:
Quarter:
Sample ID:

Well Location ID: _____ ***Deployment***

Well Information

Screen Interval Length (ft):
Previous Depth to Water (MRP):
Length of Screen not submerged (ft):

Well Depth: _____ ft MRP
Top of Screen: _____ ft MRP
Bottom of Screen: _____ ft MRP

Deployment Team: _____

Date Deployed: _____ **Time Deployed:** _____

PID: **MiniRAE 3000** **Serial No:** _____

Water Level Meter: **Solinst 500 ft** **Serial No:** _____

PID Reading: _____ **ppm**

Depth to Water: _____

DMS Tether and Reel ID match Well ID? _____
Initial to confirm that ID check was completed

Notes: _____

QC sample notes. (If blank, no QC samples required):	**Analyte(s):**

Sampler Number:	**Top of Sampler Depth (MRP)**
1	
2	
3	
4	
5	
6	
7	
8	
9	

Depths highlighted blue represent submerged samplers based on previous water level

Reviewed by: _____ Review Date: _____

Primary Samples (3 DMS)	Primary and Duplicate Samples (5 DMS)	Primary and MS/MSD Samples (5 DMS)
DMS 1: 3 VOCs + 2 EDBs + Metal (Dissolved) 120 mL + 80 mL + 250 mL = 450 mL	DMS 1: 6 VOCs + 4EDBs 240 mL + 160 mL = 400 mL	DMS 1: 9 VOCs + 3 EDBs 360 mL + 120 mL = 480 mL
DMS 2: Metal (Total) + Alkalinity 250 mL + 250 mL = 500 mL	DMS 2: 2 Metals (Total and Dissolved) 250 mL + 250 mL = 500 mL	DMS 2: 3 EDBs + Dissolved Metal + Nitrate/Nitrite-N + Anions 120 + 250 +40 +50 = 460 mL
DMS 3: Anions + Nitrate/Nitrite-N 50 mL + 40 mL = 90 mL	DMS 3: 2 Metals (Total and Dissolved) Dup 250 mL + 250 mL = 500 mL	DMS 3: 2 Dissolved Metals 250 mL + 250 mL = 500 mL
460 mL Spare	DMS4: 2 Anions + 2 Nitrate/Nitrite-N 100 mL + 800 mL = 180 mL	DMS 4: 2 Total Metals 250 mL + 250 mL = 500 mL
	DMS 5: 2 Alkalinitys 250 mL + 250 mL = 500 mL	DMS 5: Total Metal + Alkalinity 250 mL + 250 mL = 500 mL
	420 mL Spare	60 mL Spare

Passive Diffusion Water Sampling Data Sheet

Year:
Quarter:
Sample ID:

Well Location ID: _____ ***Sampling***

Date Sampled: _____ **Time Sampled:** _____ **Sampling Team:** _____

PID Reading: _____ **DMS Tether and Reel ID match Well ID?** _____ *Initial to confirm that ID check was completed*

Sampler Number:
(shallow to deep)

Type of Analysis (circle appropriate)

Choose only one

										Document in notes	
										Dup?	**MS/MSD?**
1	**EDB**	**VOCs**	**BTEX (N)**	**Metals (Dissolved)**	**Metals (Total)**	**Alkalinity**	**Anions**	**Nitrate / Nitrite**		☐	☐
2	**EDB**	**VOCs**	**BTEX (N)**	**Metals (Dissolved)**	**Metals (Total)**	**Alkalinity**	**Anions**	**Nitrate / Nitrite**		☐	☐
3	**EDB**	**VOCs**	**BTEX (N)**	**Metals (Dissolved)**	**Metals (Total)**	**Alkalinity**	**Anions**	**Nitrate / Nitrite**		☐	☐
4	**EDB**	**VOCs**	**BTEX (N)**	**Metals (Dissolved)**	**Metals (Total)**	**Alkalinity**	**Anions**	**Nitrate / Nitrite**		☐	☐
5	**EDB**	**VOCs**	**BTEX (N)**	**Metals (Dissolved)**	**Metals (Total)**	**Alkalinity**	**Anions**	**Nitrate / Nitrite**		☐	☐
6	**EDB**	**VOCs**	**BTEX (N)**	**Metals (Dissolved)**	**Metals (Total)**	**Alkalinity**	**Anions**	**Nitrate / Nitrite**		☐	☐

6mm

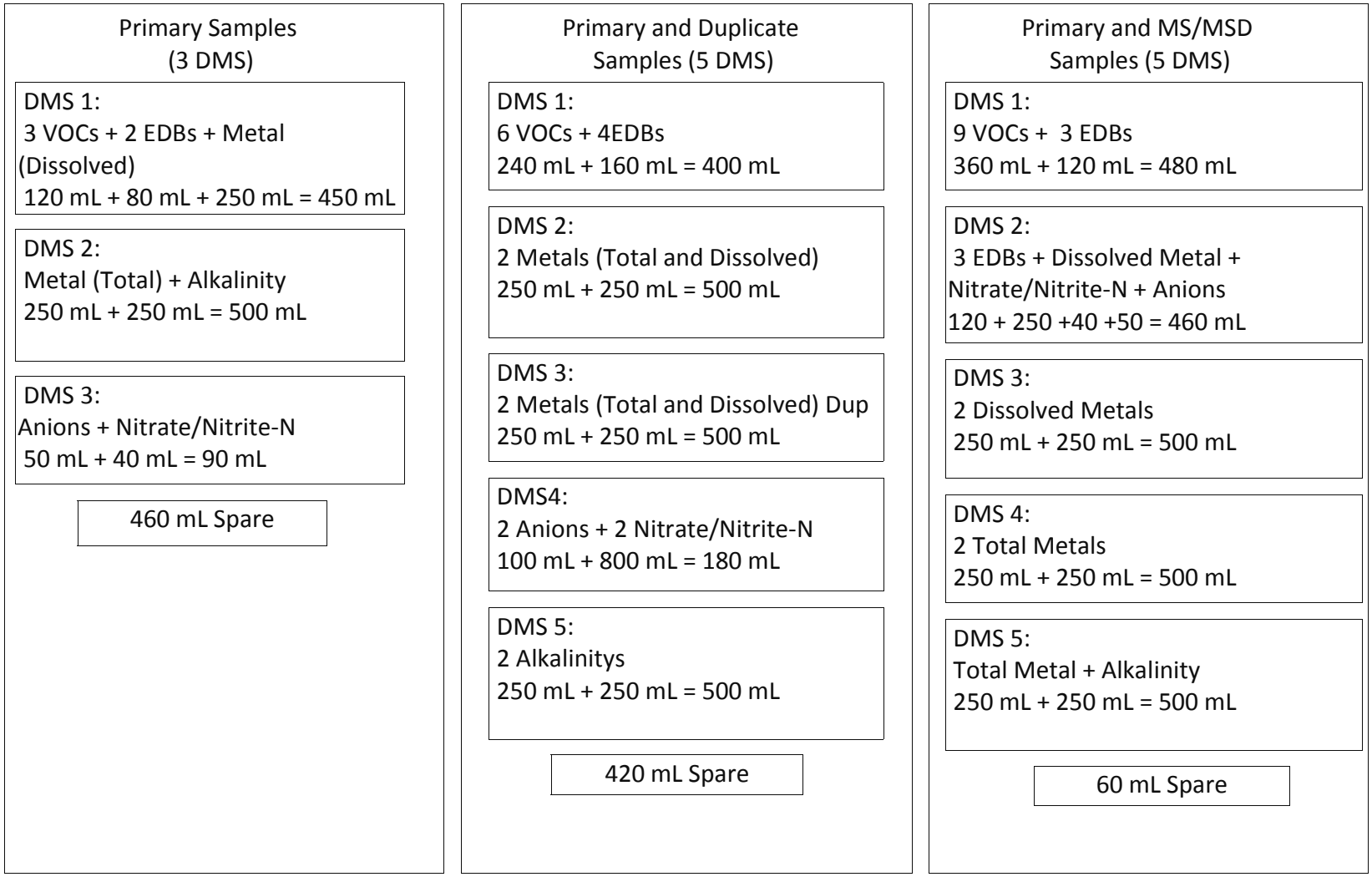
PID: MiniRAE 3000 Serial No: _____

IDW will be taken to:

Notes: _____

Sample ID: _____
Duplicate ID: (if applicable) _____
COC#: _____

Reviewed by: _____ Review Date: _____


Primary Samples
(3 DMS)
DMS 1:
3 VOCs + 2 EDBs + Metal
(Dissolved)
120 mL + 80 mL + 250 mL = 450 mL
DMS 2:
Metal (Total) + Alkalinity
250 mL + 250 mL = 500 mL
DMS 3:
Anions + Nitrate/Nitrite-N
50 mL + 40 mL = 90 mL
460 mL Spare
Primary and Duplicate
Samples (5 DMS)
DMS 1:
6 VOCs + 4EDBs
240 mL + 160 mL = 400 mL
DMS 2:
2 Metals (Total and Dissolved)
250 mL + 250 mL = 500 mL
DMS 3:
2 Metals (Total and Dissolved) Dup
250 mL + 250 mL = 500 mL
DMS4:
2 Anions + 2 Nitrate/Nitrite-N
100 mL + 800 mL = 180 mL
DMS 5:
2 Alkalinitys
250 mL + 250 mL = 500 mL
420 mL Spare
Primary and MS/MSD
Samples (5 DMS)
DMS 1:
9 VOCs + 3 EDBs
360 mL + 120 mL = 480 mL
DMS 2:
3 EDBs + Dissolved Metal +
Nitrate/Nitrite-N + Anions
120 + 250 +40 +50 = 460 mL
DMS 3:
2 Dissolved Metals
250 mL + 250 mL = 500 mL
DMS 4:
2 Total Metals
250 mL + 250 mL = 500 mL
DMS 5:
Total Metal + Alkalinity
250 mL + 250 mL = 500 mL
60 mL Spare

Parameter Meter Calibration Log

Serial #

Year:

Project: Kirtland AFB BFF ST-106/SS-111

Quarter :

Date	Cal or Bump	pH 4.00	pH 7.00	pH 10.00	ORP (220 mV)	Conductivity (1413 µS/cm)	Measured DO (% Sat)	Barometer (mm Hg)	100% DO Sat Adjusted for Barometric Pressure	Initials
Calibration Tolerances:		+/- 0.2 pH Units			+/- 20 mV Standard	+/- 0.5% of Standard	+/- 2% of the Adjusted DO Value	N/A	N/A	N/A

* Calibrate all parameters weekly. Bump check all parameters daily and re-calibrate if values are out of tolerance.

* 100% DO Sat =100 x (Barometric Pressure in mmHg/760)

Photoionization Detector Log

Serial # _____ Year: ____

Project: Kirtland AFB BFF STs-106/SS-111 Quarter :____

Date	Cal or Bump	0 ppm	100 ppm	Initials
Calibration Tolerances:		+/- 10% of standard value		N/A

* Calibrate all parameters weekly. Bump check all parameters daily and re-calibrate if values are out of tolerance.

Portable Turbidimeter Log

Unit/Serial #

Year: ____

Project: Kirtland AFB BFF STs-106/SS-111

Quarter : ___

Date	Bump or Cal	20 NTU	100 NTU	800 NTU	10 NTU	Initials
Calibration Tolerance:		+/- 10% of Standard Value				N/A

*Calibrate Instrument every three months, bump check weekly and re-calibrate if values are out of tolerance.

SAMPLE COOLER

SHIPPING CHECKLIST

Site Name: Kirtland BFF **Date: _____**

Fedex Tracking Number: _____

Matrix: Groundwater **Lab:** Eurofins (Lancaster, PA)

Cooler Sealed: _____ (Time) **Delivered to FedEx:_____(Time)**

Sampler 1 (Initials)		Sampler 2 (Initials)
☐	**Two (2) Plastic Bag Liners Included**	☐
☐	**Temperature Blank Included at Bottom of Cooler Surrounded by Ice**	☐
☐	**Trip Blank Included (2 for EDB, 2 for VOCs if present)**	☐
☐	**Samples Checked Against Chain of Custody**	☐
☐	**Chain of Custody Originals Included**	☐
☐	**All Void Space in Cooler filled with Ice**	☐
☐	**Custody Seals On Plastic Bag Liner And Outside Of Cooler**	☐

(Print)Name:_____ **(Print)Name:_____**

Signature:_____ **Signature:_____**

Date/Time:_____ **Date/Time:_____**

COC's in Cooler:

_____

_____

_____

_____

APPENDIX C

INVESTIGATION-DERIVED WASTE MANAGEMENT PLAN

LIST OF ACRONYMS AND ABBREVIATIONS

IDW	Investigation derived waste
RCRA	Resource Conservation and Recovery Act
GWTS	Groundwater Treatment System
GWM	Groundwater Monitoring
AFB	Air Force Base
CFR	Code of Federal Regulations

APPENDIX C
INVESTIGATION-DERIVED WASTE MANAGEMENT PLAN

Investigation-derived waste (IDW) generated during the implementation of this project will be managed in accordance with the procedures outlined in Part 6.5.7 of the Resource Conservation and Recovery Act (RCRA) Permit (NMED, 2010). Waste volumes will be minimized to the extent practical. Refer to Figure C-1 for the proposed locations of the IDW management areas.

C-1. Investigation-Derived Waste — Water

Groundwater generated during routine Groundwater Monitoring (GWM) events will be contained in approved containers during generation per Part 6.5.7 of the RCRA Permit (NMED, 2010). Up to 1000 gallons of non-hazardous purge water may be generated during sampling events. Purge water will be managed pending historical data review or current quarterly analytical results and approval to discharge to the Groundwater Treatment System (GWTS) or appropriate offsite disposal locations. GWTS acceptance criteria is discussed in the Operations and Maintenance Plan (Kirtland AFB, 2016) which was approved with modifications by NMED on December 12, 2016 (NMED, 2016). Operation of the GWTS is subject to the terms of Class V Underground Injection Well Discharge Permit No. 1839 (NMED, 2017) and National Pollutant Discharge Elimination System Permit NM0031216 (EPA, 2019). Management of IDW water includes proper containment, inspections, labeling, characterization, disposition, and recordkeeping.

Hazardous or potentially hazardous waste will be properly managed in a RCRA less than 90-day hazardous waste accumulation area within Kirtland Air Force Base (AFB). Based on the historical data from SWMUs ST-106/SS-111, hazardous waste will most likely be characteristically hazardous for benzene (D018). Management will include proper waste containment, labeling, segregation, area signage, onsite contingency plans, employee training, and weekly area inspections. Management activities will follow the requirements of Part 6.5.7 of the RCRA Permit (NMED, 2010).

The following categories of water are discussed in the sections below:

- Non-hazardous water generated from:
  - — Purged wells that do not meet hazardous waste criteria that have historical data demonstrating the water meets GWTS acceptance criteria. This water is discharged through the GWTS.
  - — Purged wells that do not meet hazardous waste criteria that are new or do not consistently meet GWTS waste acceptance criteria. Quarterly analytical data for water from these wells must be reviewed for approval to discharge to the GWTS or indicate offsite disposal is required.
- Hazardous/potentially hazardous water generated from:
  - — Purged wells with routine concentrations of contaminants above the characteristic hazardous waste toxicity criteria (40 Code of Federal Regulations [CFR] Part 261.24 [2015]) that fall into Generator Knowledge for waste determination.
  - — Purged wells with contaminant concentrations from two consecutive preceding sampling events above the characteristic hazardous waste toxicity criteria (40 CFR Part 261.24).

— Purged wells for which historical data show water quality fluctuating between non-hazardous and hazardous classification.

In accordance with Part 2.6 of the RCRA Permit, waste may be characterized based on either acceptable knowledge or sampling and analysis. Acceptable knowledge is defined as generator knowledge of the process that generated a waste including facility records of previous analyses. Waste characterization by sampling and analysis will be conducted in accordance with Part 2.6.3 of the RCRA Permit (NMED, 2010).

C-1.1 Non-Hazardous Water

Non-hazardous IDW water from GWM wells is managed based on historical reviews of groundwater analytical results, in conjunction with the evaluation of current quarterly sample results. There are three primary categories of non-hazardous IDW water:

- Pre-Approved Wells for GWTS Discharge: Purge water from wells that have historical data indicating that the water is non-hazardous and consistently meets all GWTS acceptance criteria. Water from these wells is collected and held in the "Pending Disposal" area of the IDW yard until it can be processed through the GWTS. Review of quarterly analytical data is not required. This waste is characterized based on acceptable knowledge per Part 2.6.2 of the RCRA Permit (NMED, 2010).

- Wells that have historic concentrations of analytes below hazardous waste criteria, but dissolved metal concentrations that may exceed GWTS acceptance criteria. This water is held in the "Pending Analysis" area of the IDW yard. Upon receipt of analytical data, the purge water is evaluated to determine if it can be discharged to the GWTS. This waste is characterized based on sampling and analysis per Part 2.6.3 of the RCRA Permit (NMED, 2010).

- Purge water that does not meet hazardous criteria, but fails GWTS acceptance criteria, is held for offsite disposal at an appropriate treatment, storage, and disposal facility.

C-1.1.1 Non-Hazardous Water with Dissolved Metals Exceeding Groundwater Treatment System Effluent Discharge Limits

IDW verified to contain dissolved iron and manganese concentrations above the acceptance criteria for the GWTS will be placed in dedicated drums and held in the "pending analysis" area of the IDW yard. This water will be profiled for offsite disposal based on the analytical data from the respective sample collected from the well purged. The quantity of water purged from each well will be recorded.

C-1.1.2 Non-Hazardous Water with Dissolved Metals Less than the Groundwater Treatment System Effluent Discharge Limits

GWM purge water from wells with historically consistent data meeting the GWTS acceptance criteria (Kirtland AFB, 2016) is discharged to the GWTS for treatment without further review based on acceptable knowledge (Part 2.6.2 of the RCRA Permit [NMED, 2010]). Purge water from wells that have no history (new wells) or a history of varying organic or dissolved metal concentrations is held pending review of the current quarterly sampling analytical results. If concentrations of organics and dissolved metals are within allowable GWTS discharge limits (Kirtland AFB, 2016), the water is approved to be processed through the GWTS. The quantity of water purged from each well and the total quantity of water transferred to the GWTS will be recorded. If, for any reason, the GWTS cannot accept the purge water as

it is generated (e.g., shut down for maintenance), the water will be managed in the IDW area on pallets and properly labeled until it can be discharged to the GWTS for treatment. Water that does not meet GWTS criteria is held as discussed in Section C-1.1.1.

C-1.2 Hazardous/Potentially Hazardous Water

GWM wells that have purge water which consistently meets hazardous waste criteria (source area wells) are characterized based on acceptable knowledge (Part 2.6.2 of the RCRA Permit [NMED, 2010]). This category automatically defines the waste as hazardous and will be managed as such. Water from these wells does not need quarterly analytical data verification for waste determination purposes.

Wells that have been determined to be hazardous based on the previous two quarterly sampling event results will be managed as a potentially hazardous waste from the point of origin. Upon generation, the water will be placed in dedicated drums, properly labeled as a hazardous waste, and transported to the less than 90-day hazardous waste accumulation area where the drums will be managed pending laboratory analytical verification. Purge water that is confirmed to meet hazardous waste criteria will be properly manifested and transported to a permitted treatment, storage, and disposal facility for disposal. Kirtland AFB personnel will approve all offsite waste shipments and only Kirtland AFB personnel can sign waste manifests for offsite disposal.

Potentially hazardous purge water that is determined, by current quarterly analytical data, to not meet hazardous waste criteria will be reclassified as a non-hazardous waste. This waste will be moved to an appropriate non-hazardous IDW yard and removed from hazardous waste management requirements.

Purge water generated from new wells located in areas of suspected hazardous plume concentrations (source area) will be managed as a hazardous waste until proven as hazardous or non-hazardous from analytical results. The quantity of water purged from each well will be recorded.

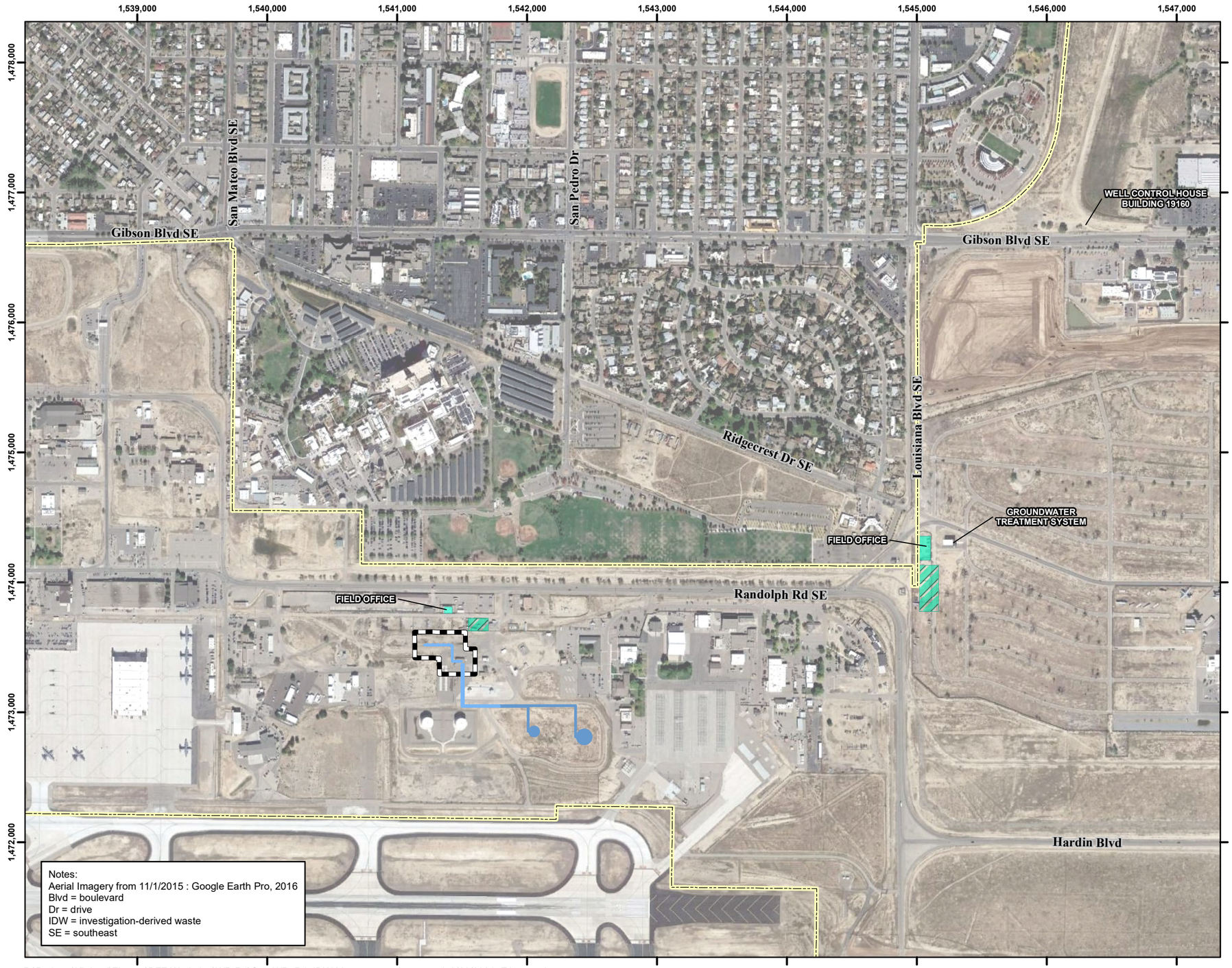
REFERENCES

(U.S.) Environmental Protection Agency (EPA). 2019. *National Pollutant Discharge Elimination System Permit No. NM0031216, Kirtland Air Force Base, Bernalillo County, New Mexico.* September.

Kirtland AFB. 2016. Operations and Maintenance Plan, Groundwater Treatment System, Bulk Fuels Facility, SWMU ST-106/SS-111, Kirtland Air Force Base, New Mexico. Prepared by EA Engineering, Science, and Technology, Inc., PBC for Kirtland AFB under USACE–Albuquerque District Contract No. W912DR-12-D-0006. August.

New Mexico Environment Department (NMED). 2010. *Hazardous Waste Treatment Facility Operating Permit, EPA ID No. NM9570024423*. Issued to U.S. Air Force for the Open Detonation Unit Located at Kirtland Air Force Base, Bernalillo County, New Mexico, by the NMED Hazardous Waste Bureau. July.

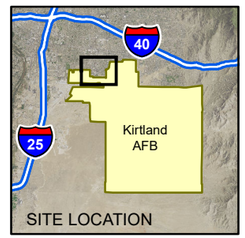
NMED. 2017. *Discharge Permit Issuance DP-1839, Kirtland Air Force Base, Bernalillo County, New Mexico*. By the New Mexico Environment Department Groundwater Quality Bureau. April.



P:\Projects\Kirtland\Figures\BFF Workplan\WP-R4\C-1_WP_R4_IDW Management Areas.mxd 2/20/2021 EA ecarpio

Legend

- IDW Management Area
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Installation Boundary
- Source Area



N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection: NAD83 State Plane New Mexico Central FIPS3002 Feet

WORK PLAN FOR GROUNDWATER MONITORING
BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE C-1

IDW MANAGEMENT AREAS

Table C-1
Reference Limits for Investigation-Derived Waste Samples

Analyte	Analytical Method	CASRN	Units	NM WQCC Standard[a]	Kirtland AFB Landfill Levels [b]	RCRA Waste Regulatory Levels[c]	Achievable Laboratory Limits[d]		
							LOQ	LOD	DL
Volatile Organic Compounds (Water)									
1,2-Dibromoethane (EDB)	SW8011	106-93-4	µg/L	0.05	NS	NS	0.03	0.02	0.01
Benzene	SW8260C	71-43-2	µg/L	5	NS	NS	1.0	0.5	0.2
Ethylbenzene	SW8260C	100-41-4	µg/L	700	NS	NS	1.0	0.8	0.4
Toluene	SW8260C	108-88-3	µg/L	1,000	NS	NS	1.0	0.5	0.2
Xylenes (Total)	SW8260C	1330-20-7	µg/L	620	NS	NS	6.0	2.0	1.0
Volatile Organic Compounds (Soil)									
1,2-Dibromoethane (EDB)	SW8011	106-93-4	µg/kg	NS	NS	NS	0.11	0.05	0.02
Benzene	SW8260C	71-43-2	mg/kg	NS	10[e]	NS	0.005	0.001	0.0003
Ethylbenzene	SW8260C	100-41-4	mg/kg	NS	50[e]	NS	0.005	0.001	0.0003
Toluene	SW8260C	108-88-3	mg/kg	NS	50[e]	NS	0.005	0.001	0.0003
Xylenes (Total)	SW8260C	1330-20-7	mg/kg	NS	50[e]	NS	0.010	0.001	0.0008
Total Petroleum Hydrocarbons (Soil)									
Diesel Range Organics (DRO)	SW8015D	TPH-DRO	mg/kg	NS	100[f]	NS	10.0	10.0	5.0
Motor Oil Range Organice (MRO)	SW8015D	MOIL	mg/kg	NS	100[f]	NS	25.0	25.0	10.0
Gasoline Range Organics (GRO)	SW8015D	TPH-GRO	mg/kg	NS	100[f]	NS	5.0	2.0	1.0
ICP Metals (Water)									
Iron	SW6010C	7439-89-6	µg/L	1,000	NS	NS	200	100	40
Manganese	SW6010C	7439-96-5	µg/L	200	NS	NS	10	5.0	3.0
ICPMS Metals (Water)									
Arsenic	SW6020A	7440-38-2	µg/L	10	NS	NS	2	1.6	0.68
Lead	SW6020A	7439-92-1	µg/L	15	NS	NS	0.50	0.25	0.07
Miscellaneous (Water)									
pH	SW9040C	NS	S.U.	6-9	NS	≥2 or ≤12	0.1	0.1	0.1
Flashpoint	SW1010A	NS	Degrees F	NS	NS	<140	50	50	50
TCLP Volatile Organic Compounds (Solid/Liquid)									
1,1-Dichloroethene	SW1311/8260C	75-35-4	mg/L	NS	NS	0.70	0.02	0.02	0.01
1,2-Dichloroethane	SW1311/8260C	107-06-2	mg/L	NS	NS	0.50	0.02	0.02	0.01
2-Butanone (Methyl Ethyl Ketone)	SW1311/8260C	78-93-3	mg/L	NS	NS	200	0.2	0.16	0.06
Benzene	SW1311/8260C	71-43-2	mg/L	NS	NS	0.50	0.02	0.02	0.01
Carbon Tetrachloride	SW1311/8260C	56-23-5	mg/L	NS	NS	0.50	0.02	0.02	0.01
Chlorobenzene	SW1311/8260C	108-90-7	mg/L	NS	NS	100	0.02	0.02	0.01
Chloroform	SW1311/8260C	67-66-3	mg/L	NS	NS	6.0	0.02	0.02	0.01
Tetrachloroethene	SW1311/8260C	127-18-4	mg/L	NS	NS	0.70	0.02	0.02	0.01
Trichloroethene	SW1311/8260C	79-01-6	mg/L	NS	NS	0.50	0.02	0.02	0.01
Vinyl Chloride	SW1311/8260C	75-01-4	mg/L	NS	NS	0.20	0.02	0.02	0.01
TCLP Pesticides (Solid/Liquid)									
Chlordane	SW1311/8081A	5103-70-9	mg/L	NS	NS	0.030	0.0025	0.0016	0.0008
Endrin	SW1311/8081A	72-20-8	mg/L	NS	NS	0.020	0.0001	0.0001	0.00004
Gamma BHC (Lindane)	SW1311/8081A	58-89-9	mg/L	NS	NS	0.40	0.00005	0.00002	0.00001
Heptachlor	SW1311/8081A	76-44-8	mg/L	NS	NS	0.008	0.00005	0.00004	0.00002
Heptachlor Epoxide	SW1311/8081A	1024-57-3	mg/L	NS	NS	0.008	0.00005	0.000036	0.000012
Methoxychlor	SW1311/8081A	72-43-5	mg/L	NS	NS	10	0.0005	0.0004	0.00015
Toxaphene	SW1311/8081A	8001-35-2	mg/L	NS	NS	0.50	0.015	0.01	0.005
TCLP Herbicides (Solid/Liquid)									
2,4,5-TP (Silvex)	SW1311/8151A	93-72-1	mg/L	NS	NS	1.0	0.005	0.002	0.001
2,4-D	SW1311/8151A	94-75-7	mg/L	NS	NS	10	0.05	0.032	0.016

Table C-1
Reference Limits for Investigation-Derived Waste Samples

Analyte	Analytical Method	CASRN	Units	NM WQCC Standard[a]	Kirtland AFB Landfill Levels [b]	RCRA Waste Regulatory Levels[c]	Achievable Laboratory Limits[d]		
							LOQ	LOD	DL
TCLP Semivolatile Organic Compounds (Solid/Liquid)									
1,4-Dichlorobenzene	SW1311/8270D	106-46-7	mg/L	NS	NS	7.5	0.005	0.005	0.0025
2,4,5-Trichlorophenol	SW1311/8270D	95-95-4	mg/L	NS	NS	400	0.005	0.005	0.0025
2,4,6-Trichlorophenol	SW1311/8270D	88-06-2	mg/L	NS	NS	2.0	0.005	0.005	0.0025
2,4-Dinitrotoluene	SW1311/8270D	121-14-2	mg/L	NS	NS	0.13	0.025	0.01	0.005
2-Methylphenol (o-Cresol)	SW1311/8270D	95-48-7	mg/L	NS	NS	200	0.005	0.005	0.0025
3- and 4-Methylphenol (m, p-Cresol)	SW1311/8270D	106-44-5	mg/L	NS	NS	200	0.005	0.005	0.0025
Hexachlorobenzene	SW1311/8270D	118-74-1	mg/L	NS	NS	0.13	0.0025	0.001	0.0005
Hexachlorobutadiene	SW1311/8270D	87-68-3	mg/L	NS	NS	0.50	0.005	0.005	0.0025
Hexachloroethane	SW1311/8270D	67-72-1	mg/L	NS	NS	3.0	0.025	0.01	0.005
Nitrobenzene	SW1311/8270D	98-95-3	mg/L	NS	NS	2.0	0.005	0.005	0.0025
Pentachlorophenol	SW1311/8270D	87-86-5	mg/L	NS	NS	100	0.025	0.01	0.005
Pyridine	SW1311/8270D	110-86-1	mg/L	NS	NS	5.0	0.025	0.02	0.01
TCLP Metals (Solid/Liquid)									
Arsenic	SW1311/6010C	7440-38-2	mg/L	NS	NS	5.0	0.02	0.02	0.0072
Barium	SW1311/6010C	7440-39-3	mg/L	NS	NS	100	0.005	0.000625	0.0003
Cadmium	SW1311/6010C	7440-43-9	mg/L	NS	NS	1.0	0.005	0.000625	0.0003
Chromium	SW1311/6010C	7440-47-3	mg/L	NS	NS	5.0	0.015	0.00375	0.0015
Lead	SW1311/6010C	7439-92-1	mg/L	NS	NS	5.0	0.015	0.015	0.0051
Mercury	SW1311/7470A	7439-97-6	mg/L	NS	NS	0.20	0.0002	0.0001	0.00005
Selenium	SW1311/6010C	7782-49-2	mg/L	NS	NS	1.0	0.02	0.02	0.0082
Silver	SW1311/6010C	7440-22-4	mg/L	NS	NS	5.0	0.005	0.0025	0.0014
Waste Characteristics (Solid/Liquid)									
Ignitability	SW1010A/1030	NS	°F	NS	NS	<140	NA	NA	NA
Corrosivity/pH	SW9040C/9045D	NS	S.U.	NS	NS	≥2 or ≤12.5	0.01	0.01	0.01
Reactivity - Cyanide (Total cyanide)	SW9012B	57-12-5	mg/L	NS	NS	NS	0.005	0.005	0.001
Reactivity - Sulfide (Total sulfide)	SW9034	NS	mg/L	NS	NS	NS	0.05	0.05	0.01
Reactivity - Cyanide (Total cyanide)	SW9012B	57-12-5	mg/kg	NS	NS	NS	60	60	20
Reactivity - Sulfide (Total sulfide)	SW9034	NS	mg/kg	NS	NS	NS	160	150	53.6

Table C-1
Reference Limits for Investigation-Derived Waste Samples

[a] New Mexico Administrative Code Title 20.6.2.3103, Standards for Ground Water of 10,000 mg/L total dissolved solids concentration or less (NMAC 2018). For metals, the NM WQCC applies to dissolved metals and total mercury.
[b] Kirtland AFB landfill requirements per the *Department of Air Force Technical Memorandum for Kirtland AFB/Department of Energy/Sandia National Laboratories Restoration Agencies and Their Commercial Contractors (2009).*

[c] Code of Federal Regulations Title 40 Part 261, Regulatory levels for the Toxicity Characteristics of Hazardous Waste.
[d] Achievable laboratory limits are specific to Eurofins Lancaster Laboratories Environmental, LLC.
[e] Kirtland AFB limit for BTEX measured as the sum of benzene, toluene, ethylbenzene, and total xylenes.
[f] Kirtland AFB limit for TPH measured as the sum of gasoline, diesel and motor oil range organics.
ug/L = Microgram(s) per liter.
ug/kg = Microgram(s) per kilogram.
AFB = Air Force Base
CASRN = Chemical Abstracts Service Registry Number.
DL = Detection limit.
EPA = U.S. Environmental Protection Agency
LOD = Limit of detection.
LOQ = Limit of quantitation.
mg/kg = Milligrams per kilogram.
mg/L = Milligrams per liter.
NA = Not applicable.
NM = New Mexico
NS = Not specified.
RCRA = Resource Conservation and Recovery Act.
SW = EPA SW-846 Test Methods for Evaluating Solid Waste, Third Edition and Updates.
TCLP = Toxicity Characteristic Leaching Procedure.
WQCC = Water Quality Control Commission