ENTERED

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

22 December 2022

Colonel Jason F. Vattioni, USAF
Commander
377th Air Base Wing
2000 Wyoming Blvd SE
Kirtland Air Force Base NM 87117

Received
DEC 28 2022
NMED Hazardous Waste Bureau

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

Dear Mr. Shean

On November 8, 2022, the New Mexico Environment Department's Hazardous Waste Bureau (NMED HWB) issued a Notice of Disapproval (NOD) on the *Work Plan for Groundwater Monitoring for Bulk Fuels Facility, Solid Waste Management Units ST-106 and SS-111,* which the Air Force had submitted to NMED HWB in April 2021 (2022 NOD). The U.S. Air Force respectfully requests NMED revise the 2022 NOD as the submitted work plan is grounded in historical NMED approvals and other NMED decisions. Several comments within the 2022 NOD either rescind previously established NMED approvals or state the department was unable to locate historical NMED decision documents. In order to advance the Bulk Fuels Facility corrective action out of the investigation phase and into the evaluation of corrective measures alternatives, the Air Force must be able to rely on previous approvals and decisions made by NMED. Comments within the 2022 NOD significantly impact this project's ability to advance through the Resource Conservation and Recovery Act (RCRA) Process and further evaluation of remedial options within the Corrective Measures Evaluation.

The Air Force strongly disagrees with NMED statements within the NOD regarding the representativeness of the groundwater data collected via passive sampling technology. The Air Force requests that NMED issue a revised and clarified NOD prior to the Air Force revising the work plan. The Air Force is respectfully requesting an extension for the revised Work Plan for Groundwater Monitoring from January 18, 2023, until 90 days after NMED clarification within a revised 2022 NOD is received addressing the specific 2022 NOD comments in question. The Air Force has detailed concerns regarding specific 2022 NOD comments within Attachment 1 of this letter.

As you are aware, the Air Force has performed groundwater monitoring activities in accordance with NMED-approved work plans as required by RCRA Permit Section 6.5.17 since the project's inception. NMED's October 2, 2020, letter, included as Attachmemnt 2, requested that the Air Force consolidate these approved work plans into one site-wide groundwater monitoring work plan. However, this letter did not indicate that revisions to the sampling methodologies were necessary. The April 2021 Work Plan was a consolidation of the following previously approved work plans, all of which are included in Attachment 2:

- Operations and Maintenance Plan, Groundwater Treatment System (NMED, 12 Dec 2016)

- Expansion of Dissolved-Phase Plume Groundwater Treatment System Design (NMED, 31 May 2017)
- Work Plan for Vadose Zone Coring, Vapor Monitoring, and Water Supply Sampling (NMED, 23 Feb 2018)
- Work Plan for Data Gap Monitoring Well Installation (NMED, 28 Feb 2018)
- Work Plan for Bioventing and Air-Lift Enhanced Bioremediation Pilot Tests (NMED, 6 April 2018)

For NMED's consideration, the Air Force has developed a list of specific concerns, listed below and discussed in detail within Attachment 1:

- NMED's review of historical approvals
- Referencing NMED approved documents
- Represenativeness of data passive sampling methodology
- NMED's statistical analysis included in NOD
- Total phase hydrocarbon requirement clarification

In summary, the Air Force is respectfully requesting an extension for the revised Work Plan for Groundwater Monitoring from January 18, 2023, until 90 days after the requested NMED clarification via a revised 2022 NOD is received regarding the specific concerns with 2022 NOD highlighted in Attachment 1. The Air Force submitted the Work Plan for Groundwater Monitoring to NMED in April 2021, approximately 19 months passed before NMED provided these comments that significantly impact the methods presented in the work plan and contradict NMED's historical decisions. NMED only allowed the Air Force two months to revise the work plan to incorporate all comments within the NOD and required the Air Force to produce an additional groundwater work plan by March 1, 2023. This second groundwater work plan directly conflicts with the intent of NMED's October 2, 2020, letter, which required a consolidated groundwater work plan for the site. The Air Force is requesting clarification from NMED as to what additional content they expect in the required March 1, 2023 groundwater work plan. The replacement of passive sampling systems is already required to be discussed within the January 18, 2023, work plan that requires all NMED comments to be addressed. The Air Force respectfully requests that only one groundwater monitoring work plan be produced moving forward to meet the intent of NMED's October 2, 2020 letter requiring a consolidated groundwater monitoring work plan.

Please reach out to the Air Force to coordinate a meeting or if there are any questions regarding the requested revision/clarification on NMED's November 8, 2022, NOD Letter. Please contact Mr. Ryan Wortman at the commercial line (505) 853-3484 or email ryan.wortman.3@us.af.mil.

Sincerely

VATTIONI.JASON.F.1170028640 Digitally signed by VATTIONI.JASON.F.1170028640 Date: 2022.12.22 15:31:04 -07'00'

JASON F. VATTIONI, Colonel, USAF
Commander

2 Attachments:
Attachment 1 - Specific Air Force Concerns with 2022 NOD
Attachment 2 - Relevant NMED Correspondences

cc:
NMED (Gilliam), letter, and 1 CD
NMED Resource Protection Division (Catechis), letter, and 1 CD
NMED HWB (Shean, Andress, Cobrain, Wear), 2 Hard Copies and 2 CDs
EPA Region 6 (King, McKinney), electronic only
AFCEC/CZ (Wortman Kottkamp, Segura), electronic only
USACE-ABQ District Office (Watts-Gravette, Moayyad, Earthman, Phaneuf, Dreeland), electronic only
Public Information Repository, Administrative Record/Information Repository (AR/IR), and File

Attachment 1

Specific Air Force Concerns with 2022 NOD

A. Within the 2022 NOD, comment numbers 28 and 31 both state that the department was unable to locate on their administrative record the approval for the *Expansion of Dissolved-Phase Plume Groundwater Treatment Design Work Plan* approved in May 2017. The review and consideration of this historical approval is the single most important historical document to review when considering the representativeness of passive sampling techniques because this letter approves the use of passive sampling techniques for select groundwater monitoring wells. In addition, the May 2017 NMED letter approved the same 2016 data and evaluation that NMED re-evaluated as an attachment to the 2022 NOD. This re-evaluation was then used in the 2022 NOD to justify disregarding five years of groundwater data. The Air Force respectfully requests that the 2022 NOD be revised after the department has reviewed this critical approval letter. This approval letter was included within Appendix A-1 of the April 2021 Consolidated Groundwater Work Plan, is attached to this letter, and can be found in NMED's administrative record under the NMED facility record number 4554.

B. Comments 13, 28, and 31 from 2022 NOD directs the Air Force to no longer reference previous approvals or any other project documents within this work plan and contain similar statements to what is cited below from comment 31:

"The revised groundwater monitoring Work Plan must include all information required to be a stand-alone document; reference to other documents is not acceptable."

The Air Force requests that NMED clarify whether it is asking the Air Force to append to the work plan all previously approved documents to which the work plan refers or whether NMED is refusing to recognize the validity of previously approved documents. If the former is what NMED is asking: The Air Force intends to make documents as "stand alone" as possible, but it would be unwieldy to attach large work plans and reports to every submission. If the latter is what NMED is asking: The Air Force's ability to consider and utilize historically approved documents, decisions, and evaluations is critical for advancing a project through the corrective measures process. The Air Force respectfully requests that NMED allow the Air Force to utilize previously completed efforts to support NMED and the Air Force's current understanding of the site. If NMED no longer accepts documents it previously approved, the Air Force's ability to advance the Bulk Fuels Facility project toward final corrective action will be seriously affected. Referencing specific documents is critical to furthering our understanding of a 22-year-old restoration site. For example, the approved RFI Phase I Report was developed to summarize 15 years of restoration activities and presents a comprehensive conceptual site model based on that information. The Air Force typically references this report when discussing site conditions and activities that do not directly impact the evaluations presented in a specific project document. The Air Force respectfully requests additional clarification from NMED on how historical decisions and approvals should be used from a project administrative perspective moving forward.

The groundwater monitoring data is a robust and representative data set necessary to progress the Bulk Fuels Facility Site to the conclusion of the investigation phase of the project. NMED publicly announced at the Groundwater Treatment System Open House in July 2021 that the investigation phase of the project was nearing the end. However, the conditions set forth in the 2022 NOD will significantly delay the Air Force's ability to conclude the investigation phase. Within the 2022 NOD, the department deemed five years of groundwater monitoring data collected via an NMED-approved sampling method unrepresentative, which implies that these data are non-RCRA compliant. NMED's evaluation to determine that this data set is not representative does not consider industry standards, guidance documents, or historical NMED decisions. Discussion of how NMED's new analysis of the data conflicts with accepted industry practice is discussed below in section D. If the project moves forward by discarding this data set, the Air Force anticipates a minimum of a five-year delay before the project can recover from the loss of this data. In addition, significant resourcing will be required to be re-invested and a loss of hundreds of thousands of dollars associated with disregarded efforts previously approved by the regulatory body will be realized.

C. The Air Force asserts that the use of passive sampling technologies complies with the Air Force's RCRA permit and is RCRA-compliant. Therefore, the Air Force strongly suggests that NMED reconsider comment 4 and similar comments that declare passive sampling technologies are not RCRA-compliant. Kirtland AFB RCRA Permit Section 1.38 states:

"Upon the Department's written approval, all submittals and associated schedules shall become enforceable under this Permit in accordance with the terms of the Department's written approval, and such documents as approved shall control over any contrary or conflicting requirements of this Permit."

Pursuant to Section 1.38, NMED's May 2017 approval letter made the submitted work plan enforceable and controlling. Because the Air Force collected data using passive sampling technologies that NMED had approved, those technologies complied with the NMED permit. Again, the Air Force respectfully requests that NMED review the May 2017 NMED approval letter and the above-cited permit condition to revise the 2022 NOD to no longer imply that the data collected using passive sampling technologies is not RCRA-compliant.

D. The Air Force has the following comments on NMED's data evaluation included as an attachment to the 2022 NOD:

First, this data evaluation was based on 2016 data that NMED already evaluated when it approved the Expansion of Dissolved-Phase Plume Groundwater Treatment Design Work Plan in May 2017. When NMED reviewed the work plan that initially presented this data, the department deemed passive sampling acceptable. Based on NMED and Technical Working Group recommendations, the Air Force even provided a similar Relative Percent Difference (RPD) evaluation that NMED re-evaluated in the 2022 NOD. The Air Force is requesting NMED clarify what new information supported NMED's determination that this previously approved data set needed re-evaluation.

Secondly, the RPDs presented by NMED as an attachment to the 2022 NOD consider samples that were either non-detect or estimated concentrations for 1,2 Dibromoethane. This practice of using results at or below the detection limit is not consistent with NMED's explanation for how RPDs were calculated in the attachment. From 2022 NOD:

"RPDs were calculated for all concentration data with values greater than the detection limit"

RPDs calculated from data collected in the second quarter of 2016 from locations KAFB-106009 and KAFB-106105 and collected in the third quarter of 2016 from location KAFB-106082 are examples of RPDs that were calculated using the detection limit to represent non-detect data or estimated detections. The Air Force is requesting NMED not utilize RPDs that are biased by analytical laboratory uncertainty to determine that passive sampling is not representative. These RPDs will not allow NMED to evaluate if high RPD values are an artifact of analytical laboratory uncertainty or differences produced by the two sample methods evaluated. Thus, the NMED conclusion that passive sampling is not representative does not consider and is impacted by analytical laboratory uncertainty. The Air Force recommends NMED review the RPDs calculated within Appendix G of the *Expansion of Dissolved-Phase Plume Groundwater Treatment Design Work Plan* approved by NMED in May 2017.

Thirdly, Air Force has not been able to find any guidance documents that support the position that a simple RPD evaluation between active and passive sampling techniques should be utilized to determine that passive sampling techniques are not representative. The RPDs re-evaluated by NMED highlight the differences in how active and passive sampling techniques impact the aquifer's natural conditions during sample collection and cannot be used as the sole line of evidence that one of these sampling techniques is not producing representative data. The Air Force agrees that these technologies can yield different results from a single well; however, the Air Force asserts that both of these NMED-approved technologies produce defensible and usable data to inform restoration project decisions. In fact, the Interstate Technology and Regulatory Council's (ITRC's) guidance cautions projects reaching the conclusion NMED reached based on RPDs. The Recommendation for *Use of Polyethylene diffusion Bag Samplers for the Long-Term Monitoring of Volatile Organic* Compounds in Groundwater, ITRC November 6, 2022, stated:

"Statistical regressions of PDB sampling data versus data from other sampling methods are often misleading. Outlying data can produce a high correlation coefficient that is virtually meaningless. Therefore, statistical regressions should not be required for the comparison of PDB sampling with other technologies."

Furthermore: *"If relative percent deviation is used to evaluate the comparability of sampling results, it is important to remember that variations in results for duplicate samples using the same sampling technique are often 50 percent or more. It is also important to remember that higher concentrations indicated by PDB sampler over conventional sampling results do not mean that environmental conditions are worse than originally thought. The data must be interpreted within the context of the sampling method."*

Based on NMED's historical approvals, the misuse of non-detect/estimated sample results within RPD calculations, and the cited ITRC guidance, the Air Force respectfully requests NMED revise the conclusion reached that passive sampling techniques are yielding unrepresentative data. Without these revisions, the project will be delayed by a minimum of 5 years. The Air Force asserts both active and passive sampling techniques are NMED-approved sampling methods that yield representative data for site groundwater conditions. Nonetheless, since active sampling will also yield representative data, the Air Force is working to transition the entire groundwater monitoring network to active sampling based on 2022 NOD comments. Despite this planned transition, the Air Force requests that NMED affirmatively state that passive sampling techniques are reliable methods to collect representative groundwater samples for historical data and potential future implementation.

E. The Air Force would also like NMED clarification on the comments that require the re-implementation of Total Phase Hydrocarbon (TPH) analysis. The last communication received by NMED regarding this analytical analysis was within the NMED response to the Air Force's Requested Optimization of Monitoring and Reporting, Second Phase, Bulk Fuels Facility, January 20, 2016. Within the cited quotation from NMED below, NMED determined based on evaluations performed at Hydrogeological Working Groups that TPH data would not be used for site decision making purposes. The Air Force is requesting an explanation as to how NMED determined a new need for TPH data and for what specific decisions will NMED be utilizing the TPH data set. The Air Force still agrees with the Hydrogeological Working Group and NMED 2016 determination that TPH is not needed for this site.

"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 condition, 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)*
- *Semi-volatile organic compounds (EPA Method 8270D)*
- *Polynuclear aromatic hydrocarbons (EPA Method 8270D Mod)"*

Attachment 2

Relevant NMED Correspondence

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

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

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J. C. BORREGO
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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

May 31, 2017

Colonel Eric. H. Froehlich
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Kirtland AFB, NM 87117-5606

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

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

Dear Colonel Froelich and Lt. Colonel Acosta:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The following sections of the Work Plan are not approved:

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

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

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

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

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

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

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

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

Sincerely,

Juan Carlos Borrego
Deputy Secretary
Environment Department

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

File: KAFB 2017 Bulk Fuels Facility Spill

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Governor

JOHN A. SANCHEZ
Lieutenant Governor

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 12, 2016

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

Kathryn Roberts

Kathryn Roberts
Director
Resource Protection Division

cc: Col M. Harner, KAFB
K. Lynnes, KAFB
A. Bodour, KAFB-AFCEC
T. Simpler, USACE
M.L. Leonard, AEHD
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M. Hunter, NMED-GWQB
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File: KAFB 2016 Bulk Fuels Facility Spill

NEW MEXICO ENVIRONMENT DEPARTMENT

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 23, 2018

Colonel Richard W. Gibbs
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Mr. Chris Segura
Chief, Installation Support Section
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2050 Wyoming Blvd SE, Suite 124
Kirtland AFB, NM 87117-5270

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
K. Lynnes, KAFB
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S. Pullen, NMED-GWQB
M. Hunter, NMED-GWQB
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File: KAFB 2018 Bulk Fuels Facility Spill

ENTERED

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 6, 2018

Colonel Richard W. Gibbs
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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
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M. Hunter, NMED-GWQB
D. McQuillan, NMED-OOTS

File: KAFB 2018 Bulk Fuels Facility Spill

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

February 28, 2018

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Mr. Chris Segura
Chief, Installation Support Section
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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
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M. Hunter, NMED-GWQB
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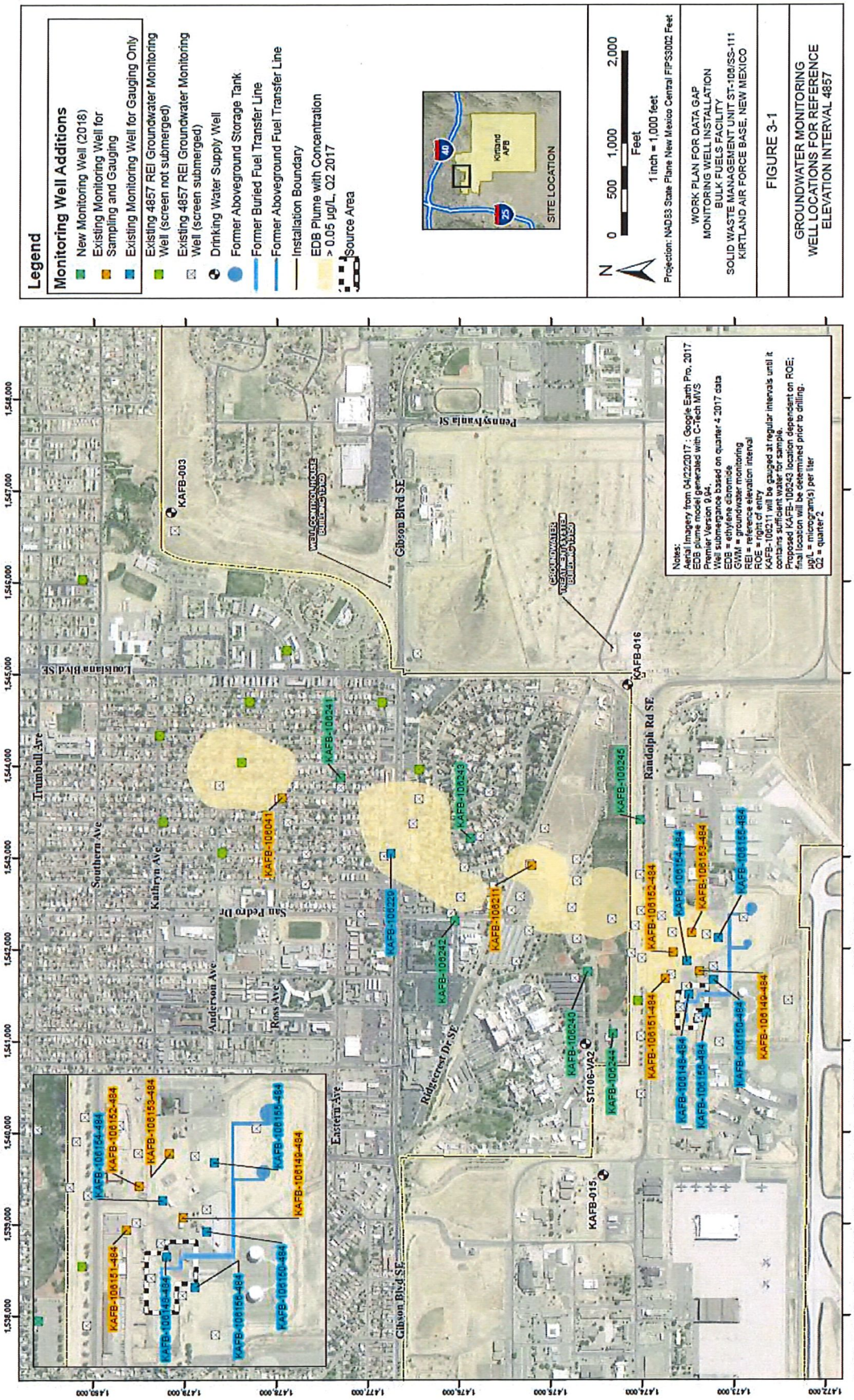
File: KAFB 2018 Bulk Fuels Facility Spill


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-108/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
Plume footprint generated with C-Tech MVS
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(s) per liter
Q2 = quarter 2
Gibson Blvd SE
Pennsylvania St
Louisiana Blvd SE
Trumbull Ave
Southern Ave
Kathryn Ave
San Pedro Dr
Anderson Ave
Ross Ave
Eastern Ave
Ridgecrest Dr SE
Randolph Rd SE
KAFB-003
KAFB-016
KAFB-015
KAFB-108241
KAFB-108229
KAFB-108242
KAFB-108243
KAFB-108211
KAFB-108240
KAFB-108245
ST-106-VA2
KAFB-108244
KAFB-108151-484
KAFB-108152-484
KAFB-108153-484
KAFB-108154-484
KAFB-108155-484
KAFB-108156-484
KAFB-108148-484
KAFB-108149-484
KAFB-108150-484