AR DOC #3525

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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

DAVE MARTIN
Secretary

RAJ SOLOMON, P.E.
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 31, 2011

Colonel Robert L. Maness
Base Commander
377 ABW/CC
2000 Wyoming Blvd. SE
Kirtland AFB, NM 87117-5606

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

RE: LNAPL CONTAINMENT INTERIM MEASURE WORK PLAN
BULK FUELS FACILITY SPILL
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-10-037

Dear Col. Maness and Mr. Pike:

The New Mexico Environment Department (NMED) received on December 1, 2010 the *Light Non-Aqueous Phase Liquid (LNAPL) Containment Interim Measure Work Plan* for Kirtland Air Force Base's (KAFB, or the Permittee) Bulk Fuels Facility Spill (Solid Waste Management Units (SWMUs) ST-106 and SS-111), dated November 2010, hereafter referred to as the Work Plan. In NMED's letter of April 2, 2010, the Permittee was directed to propose interim measures to stop the migration of the light nonaqueous phase liquid (LNAPL, or NAPL) plume and complete remediation of the plume within five years. The Work Plan has merit in that it presents a conceptual design for a pump-and-treat system to arrest migration of the LNAPL plume. Even though it does not have as a primary objective clean up of the bulk of the LNAPL that has been released, if successful, it could provide interim protection to allow for more time to develop and implement other remedial alternatives to clean up the vadose zone, LNAPL, and dissolved-phase groundwater contamination.

The Work Plan emphasizes that many details of the pump-and-treat system cannot be developed at this time because of the need to first obtain the requisite characterization information described

in the Work Plan primarily in Sections 1 through 6. The NMED concurs with the Permittee that collection of characterization data is a necessary precursor to the proposed interim measure, hence the need for a separate characterization plan. The revised Work Plan to be submitted in response to this letter, on the other hand, needs to focus on the design and operations aspects of the pump-and-treat system, and be developed after the characterization data has been obtained. Separating characterization work from the pump-and-treat system design will simplify the objectives of each plan, which is needed due to the complexity of the proposed pump-and-treat system.

The characterization plan must include proposed work to conduct the pumping tests and installation of the extraction and injection wells in addition to the other characterization activities proposed in Sections 1 through 6 of the Work Plan. Comments concerning characterization are addressed chiefly in Part 1 of this letter and primarily pertain to Sections 1 through 6 of the Work Plan.

Part 2 of this letter pertains chiefly to the design of the pump-and-treat system, found primarily in Sections 5 and 7 of the Work Plan. The design of the pump-and-treat system in the Work Plan must be revised to take advantage of the information obtained through implementation of the characterization plan, the Vadose Zone and Groundwater Investigation Plans, and the Interim Measures Work Plan.

PART 1 – COMMENTS ON CHARACTERIZATION

The following comments must be addressed in the characterization plan, and where directed in this Part, in both the characterization plan and the revised Work Plan.

1. Table 1-1 – Prepare the characterization plan to discuss the type of analyses that are intended for the parameter "NAPL cleaning." Identify the analytical laboratory that will be performing the analysis for hydrocarbon degrading bacteria.

2. Section 2.3 – NMED approval must be obtained for any changes to previously-approved work plans

3. Section 2.3 – Prepare the characterization plan to indicate where the Field Change Request form is to be found.

4. Section 4.4.1 – Prepare the characterization plan to indicate where Building 2405, the JP-8 offloading rack, is located on Figure 3-2.

5. Section 4.7 – Specific receptor points must be identified, such as the WUA, KAFB, and the Veterans Administration water supply wells.

6. Figure 5-2 – It is difficult to review data on Figure 5-2 due to the background aerial photograph. Provide an additional figure that leaves only major streets and/or other major features for reference to improve readability of the presented data.

7. Section 5.2.1 – Slug tests are proposed for wells KAFB-1065, KAFB-1066, KAFB-1068, KAFB-1069, KAFB-10610, and KAFB-10614. Additional hydraulic conductivity data for locations closer to the proposed extraction and injection wells are needed to better define the magnitude and spatial variability of hydraulic conductivity within the proposed containment area. At a minimum, conduct additional slug tests at wells KAFB-10613, KAFB-10617, KAFB-10618, KAFB-10619, KAFB-10620, KAFB-10628, and as appropriate, at new wells installed under the Groundwater Investigation Work Plan.

8. Section 5.2.1 – There is a high likelihood that the presence of LNAPL will affect the outcome of the slug tests. It is therefore critical that the thickness of the LNAPL be measured immediately prior to and after the slug tests are performed, and the results recorded. Specify how the presence of LNAPL will be addressed during field data collection and how it may affect the slug test results.

9. Section 5.2.1 – Indicate and explain the method that will be used to evaluate slug test data.

10. Section 5.2.1 – Specify the size of slug or slugs that will be used.

11. Section 5.2.2 – In addition to the locations specified in Section 5.2.2, collect and analyze LNAPL and groundwater samples from well KAFB-10628, the extraction and injection wells, and any additional observation wells (see Comments #21 and 22 of Part 1 of this letter) installed for conducting the pumping tests.

All wells must be properly developed and purged before groundwater samples are collected for analysis in accordance with the KAFB Hazardous Waste Facility Permit (Permit) Parts 6.5.17.10.6 and 6.5.17.4.

12. Section 1.2, Item #2 – This section discusses various analytes for testing but is not consistent with worksheet 18g in Appendix B, UFB-QAPP. Correct the work sheet as appropriate.

13. Section 5.2.3 – Indicate whether the 3D model incorporates the potential for transient flow from KAFB and Veterans Administration water-supply wells.

14. Section 5.2.3 – NMED assumes the Permittee has a conceptual geologic model for the capture-zone modeling. It was therefore surprising that a RockWorks™ model for the Bulk Fuels Facility Spill was not provided in the Work Plan. Such a geologic model must be included in both the characterization plan and the revised Work Plan. Update the geologic model for each

of the plans to include newly collected geological and geophysical data, as applicable, obtained through implementation of the Vadose Zone and Groundwater Investigation Plans.

15. Section 5.3.1 – Clarify if the definition for residual saturation only applies to nonwetting liquids (as indicated in the first sentence), given that annotations for both wetting fluid and nonwetting fluid (S_{rw} and S_{rnw}) are provided in the second sentence.

16. The Permittee's analysis indicates that two extraction wells will capture the LNAPL plume, assuming the hydraulic parameters used in the analysis are reasonably accurate. However, there is considerable uncertainty regarding these parameters. The last three bullets of Section 5.1 indicate that a feasibility analysis was performed that resulted in the selection of a two-well hydraulic extraction system. NMED agrees that a system with two vertical extraction wells is better than one vertical well for the reasons described. However, the same logic can be used to validate the efficiency of three vertical extraction wells or more. While the Permittee has demonstrated that one extraction well is inadequate, the optimum number is still in question. The proposed two-well system may in fact not provide adequate capture of the LNAPL plume. At least one additional extraction well should be considered to provide system redundancy, enhance system flexibility, and facilitate monitoring during system performance and pumping tests. The suggested location for the well is midway between proposed wells KAFB-106108-NAPL and KAFB-106109-NAPL (see Figure 1 of this letter).

This additional extraction well would provide additional benefits, including system back-up for the proposed primary extraction wells during down times, and (if not being pumped) water-level measurements within the capture zone between the active extraction wells. Even if not brought online immediately, it could be activated as a primary extraction in the future well to facilitate adequate capture.

17. NMED does not approve of a cross-gradient location of the injection well, as specified in Section 6.2 and as shown on Figures 5-1, 5-2, and 6-1 of the Work Plan. This objection was first expressed by the NMED in its public meeting held on January 12, 2011, where representatives of KAFB were present. The injection well must be located upgradient of the LNAPL plume within the area shown on Figure 1 of this letter such that any contaminated water for which treatment fails to achieve clean up goals will be recaptured by the containment system or other future remedial system. The proposed injection well location is not acceptable because detectable levels of contaminants would be introduced into a portion of the aquifer near a water supply well where contamination is not known to exist. Also, this area would not be subject to capture and subsequent treatment, putting the water supply unnecessarily at risk.

The combination of a pump-and-treat system with an upgradient injection area provides a circulation cell whereby treated water is drawn into the upgradient portions of the plume in the capture zone. This imparts a flushing effect and serves to enhance hydraulic movement of the plume toward the extraction location, which should accelerate cleanup of the LNAPL and dissolved phase plume. NMED acknowledges the Permittee's March 24, 2011 letter and attachment to the Albuquerque Bernalillo County Water Utility Authority (WUA), in which Dr.

Gary Hecox opines that upgradient injection would "lead to spreading of the dissolved-phase contaminant plume outside containment area" due to influx of regional groundwater into the capture zone. NMED has not noted this phenomenon at other pump-and-treat systems with upgradient injection in New Mexico, and without supporting data, is not persuaded by this argument.

18. Collect samples for lab measurements of grain size distribution, hydraulic conductivity, specific yield, and porosity at the injection well, extraction wells, and any additional observation wells (see Comments #21 and 22 of Part 1 of this letter).

19. Sections 6.2.1.3 and 6.2.1.5 and Figures 6.2 and 6.3 – The text of these sections do not agree in all cases with what is shown on Figures 6-2 and 6-3.

a) Section 6.2.1.5 states that the thickness of bentonite seal will be a minimum of 5 feet but Figures 6-1 and 6-2 show the thickness as 10 ft.

b) Sections 6.2.1.3 and 6.2.1.5 state the estimated depth of the extraction wells as 550 feet, but Figure 6-2 shows the bottom of each well's filter pack to be 600 feet.

c) Section 6.2.1.3 states "the injection well boring will be drilled to 100 ft below the first encountered groundwater (approximately 550 feet)." It is unclear if the 550 feet refers to groundwater or well depth, but in any case, the water level is shown on Figure 6.3 at 500 feet and the bottom of the well at 600 feet.

d) Figure 6-3 shows 6-inch inside diameter (ID) casing as having an 8-5/8- inch outside diameter (OD). Correct these specifications as applicable.

e) Clarify if the 13-3/8-inch surface casing shown on Figures 6-2 and 6-3 extends down to approximately 200 feet (the approximate depth of the 13-¾-inch drive casing mentioned in Section 6.2.1.3). If the latter is true, clarify also in the well installation procedure in Section 6.2.1.5, which does not mention a 13-¾-inch borehole diameter.

20. Section 6.2.1.4 – Prepare geologic logs for all wells, including any observation wells (see Comments #21 and 22 of Permit Part 1 of this letter).

21. Section 6.2.2 –

a) The expected drawdowns at wells that are to serve as observation wells for the pumping tests are not discussed. It is unclear which wells are to be used as observation wells, and the closest monitoring well (which has yet to be installed) would be about 200 feet from the nearest extraction well. A pumping test conducted at approximately 50 gpm in nearby well KAFB ST-105 achieved drawdown of only about 0.3 feet in an observation well only 70 feet away. NMED is therefore concerned that the distances between possible observation wells and

the extraction/injection wells may be too large for the observation wells to serve effectively for pumping tests. To resolve this, an extraction/injection well can be moved closer to an existing well to increase the likelihood of achieving a predicted drawdown scenario, provided the well can still adequately serve its intended purpose for the pump and treat system.

b) At a minimum, initially model drawdown for each pumping well at 50, 100, and 250 feet, or the distance between the pumping well and the intended observation wells, using hydraulic conductivities of 131 and 246 ft/day for 24 and 72 hour tests, the hydraulic conductivities reported in Table 3-2 of Appendix B of the *Stage 2 Abatement Plan for Nitrate Contaminated Groundwater at Kirtland Air Force Base*, dated December 2009. Site-specific gradients and other hydraulic parameters must be used in the modeling to the extent that they are known. All modeling parameters and assumptions must be discussed in detail. Additional monitoring wells may be required for the pumping tests based on initial modeling.

c) Specify which wells will be used for observation wells for each of the well pumping tests and their distances from the pumping well, which wells will undergo pumping tests for 24 hours and which for 72 hours, and the minimum drawdown that the Permittee believes can be measured in the field with reasonable certainty that the measurements are accurate. Discuss the potential error in the drawdown measurements and demonstrate that the expected minimum drawdown value can be distinguished from water-level decreases caused by changes in barometric pressure or other possible sources of error.

d) Propose a plan to determine specific yield from the pumping tests.

e) The NMED recommends that the Permittee consider using at least two observation wells for each pumping test, and also to consider using observation wells oriented parallel to and perpendicular to the major axis of the LNAPL plume. Horizontal anisotropy may be present with greater hydraulic conductivity in a north-south direction compared to that in the east-west direction (see U. S. Geological Survey Water-Resources Investigations Report 02-4200, page 19).

22. If appreciable drawdown is not observed for at least one observation well for a given pumping test, and taking other actions fail to produce appreciable drawdown, at least one observation well closer to the pumping well must be installed, and the pumping test for the well repeated. The location of new observation wells must be approved by NMED prior to their installation.

23. The volume of wastewater expected from the pumping tests could exceed 200,000 gallons. According to Table 2 of Appendix C, the proposed method for treatment/disposal of investigation-derived wastewater is "Discharge to ground surface per approval." Discharge of pumping-test water to the ground may not be acceptable given the expected contaminated nature

of the water from the extraction wells, which potentially may be a hazardous waste because of the toxicity of benzene. Even if treated, the wastewater from the pumping tests must be contained, sampled, and disposed of in accordance with Permit Part 6.5.7. Discharge to the ground surface must be approved in advance by NMED's Ground Water Quality Bureau. Discuss in detail in the characterization plan the means by which investigation-derived wastewater and other investigation-derived waste will be managed and disposed of.

24. Section 6.3 – This section implies that geophysical logging for the extraction and injection wells will be performed within steel-drive casing after total depth has been reached and before well construction. EM induction logging is generally used for uncased boreholes or polyvinyl chloride (PVC) cased wells, and therefore may not be effective under these circumstances. Describe the effectiveness of each logging tool when employed in steel-drive casing if this is indeed the plan.

25. Section 6.3.1 – Prepare geophysical logs for all wells, including any observation wells (see Comments #21 and 22 of Permit Part 1 of this letter).

26. Section 6.3.1 – This section discusses the use of a caliper tool. Because geophysical logging is presumably planned to be conducted within drive casing having a constant inside diameter, the purpose of the caliper logging in this application is unclear and its use potentially unnecessary.

27. Section 6.3.2 – This section states "The borehole induction system can be used in boreholes that range from 2 to 8 inches in diameter without significant borehole effects." Because the proposed boreholes are larger than 8-inches in diameter, explain what the significant borehole effects are or could be expected, and how these effects will be mitigated or taken into account.

28. Section 6.3.2 – Prepare the characterization plan to indicate whether the induction logging tool will be centralized. Provide the focusing radii of the medium and deep dual induction tool.

29. Section 6.3.5.1 – The Work Plan states that the cable to be used to conduct geophysical logging tool is long enough to log to depths of 600 ft. Section 6.3.2 says "the depth of measurement ...will be 650 ft." Correct the text of these sections to be consistent in that logging must be conducted from surface to total depth of each well.

30. Section 6.4 – Include a proposal to submit quarterly reports to the NMED.

31. The thickness of the aquifer is likely greater than 60 ft, and thus, the pumping wells will likely not fully penetrate the aquifer. Provide a detailed discussion in the characterization plan on how the true thickness of the aquifer may affect the results of pumping-test drawdown and how the modeling of drawdown has taken this into account.

32. Include a water-level map in the characterization plan (see Comment #2 in Part 2 of this letter).

PART 2 – COMMENTS ON DESIGN OF PUMP-AND-TREAT SYSTEM

The following comments must be addressed in the revised Work Plan, and where directed in this Part, in both the characterization plan and the revised Work Plan.

1. The thickness of the aquifer is likely greater than 60 ft. It is therefore likely that the extraction wells will probably not fully penetrate the aquifer. The revised Work Plan must contain a detailed discussion on how the true thickness of the aquifer may affect the results of drawdown, and thus, the extent of the capture zone and how the modeling of the capture zone has taken this into account.

2. Figure 5-2 – Prepare an additional figure showing the water table utilizing data from the wells shown on this figure, new monitoring wells to be installed under the Groundwater Investigation Work Plan, and the following wells: KAFB-0508, KAFB-0510, KAFB-0118, KAFB–0119, KAFB-0121, KAFB-0524, KAFB-3, KAFB-14, KAFB-15 and KAFB-16.

3. Section 5.2.3 – As indicated in Comment #14 in Part 1 of this letter, include a geologic model in the characterization plan and the revised Work Plan.

4. Section 5.2.4 – Clarify in the revised Work Plan if the vertical capture of contaminants is an objective of this interim action.

5. Section 7 – This section of the Work Plan does not provide an adequate discussion of the sampling and analysis of groundwater after it has been treated. Provide in the revised Work Plan details concerning:

a) a sampling port for effluent;

b) parameters to be tested for;

c) laboratory testing methods and detection limits;

d) frequency of analysis of effluent; and

e) quality assurance/quality control.

NMED's Ground Water Quality Bureau may direct further sampling and analysis requirements through any permits it may issue regarding reinjection of treated water.

6. Explain in the revised Work Plan the corrective action procedures that will be conducted if a sample of effluent fails any clean up goals.

7. Figure 7-1 – Explain in the revised Work Plan with notes added to the figure all acronyms used on the figure.

8. Section 7.2.2 – This section discusses discharge limits established under 20.6.2.3103 NMAC. The Permittee must also abide by the clean up goals established in Permit Part 6.2.3.

9. Section 7.3.1 –Indicate in the revised Work Plan what pre-design data will be collected to refine the design of the treatment process.

10. Section 7.4 – This section does not discuss the vapor GAC unit seen on Figure7-1. Discuss in the revised Work Plan if there are any air emissions from this GAC unit (or anywhere else in the system) and discuss if an air quality permit will be or may be necessary. Discuss if there will be a sampling port for vapor at the unit.

11. Section 7.4 – Indicate in the revised Work Plan if the piping to and from the treatment building is to be located above ground or below ground. Indicate also if cathodic protection or freeze protection is necessary.

12. Appendix B: Uniform Federal Policy – Quality Assurance Project Plan (UFP-QAPP) (labeled as Pending Review) – The plan appears to be a combination of many types of plans, such as project management, training, data validation, quality assurance, and sampling and analysis plans. Much of the information presented appears to be overly burdensome and not particularly useful in the present format.

Revise Appendix E into multiple appendices to separate the various types of plans (e.g. project management, training, data validation, quality assurance, and sampling and analysis). As expressed in our meeting on January 6, 2011, NMED is expecting a Quality Assurance (QA) Plan that contains quality assurance and quality control activities specific to the project. The QA plan is to integrate all technical and quality aspects of the project to ensure that the necessary type and quality of data are obtained.

Explain also what is meant by "Pending Review." If the document is considered a draft document because it is labeled "Pending Review," it must be finalized before re-submitting it to the NMED.

13. Provide more detail and clarification of the criteria to be used to demonstrate adequate capture of the LNAPL plume by the extraction wells. Refer to the "Six Steps for Systematic Evaluation of Capture Zones" provided in Environmental Protection Agency (EPA), 2008a, available at http://www.epa.gov/nrmrl/pubs/600R08003/600R08003.pdf. The approach must include, but not be limited to:

a) Documentation of pumping performance over time (e.g., were there any down times);

b) Water-level measurements and interpreted flow paths that demonstrate drawdown at or near the extraction wells, and reverse gradients north of the extraction wells;

c) Modeled water-level contours, particle tracks, and drawdown/buildup contours; and

d) Analytical monitoring data from downgradient wells.

Adequate capture of the plume must be demonstrated with empirical data derived from water-level measurements showing the presence of a groundwater divide at or beyond the leading edge of the LNAPL plume. Additional groundwater monitoring wells may be necessary to make this demonstration.

14. Section 5.2.4 lists the hydraulic gradient used as input for the capture zone model as 0.004 ft/ft. Because gradient has a significant influence on the predicted capture zone, explain why measured hydraulic gradient ranges from about 0.001 to 0.0015 ft/ft (based on water levels observed at existing wells) were not used.

15. In both the revised Work Plan and the characterization plan, evaluate and discuss the results of the existing step drawdown tests of nearby WUA or KAFB wells as they may relate to the capture zone model results and the proposed pumping tests. For example, the specific capacity of Ridgecrest #3 (on the order of 75 gpm/ft) and the specific capacities of wells KAFB-3, KAFB-15, KAFB-16 (60-80 gpm/ft) imply that a pumping rate of 50-100 gpm at the extraction wells may not yield the 5 ft of predicted drawdown shown on Figure 5-2 of the Work Plan. The pumping test conducted at ST-105 also suggests that the expected drawdown may not be achieved.

16. Section 5.2.4 does not seem to use representative site-specific water-level elevations. The fifth bullet of in Section 5.2.4 indicates "groundwater elevation 4900 used as reference head from measured water table elevations." However, the document *Kirtland Air Force Base, New Mexico, Quarterly Remediation and Site Investigation Report for the Bulk Fuels Facility Spill, July 2010 through September 2010* (dated November 2010) presents actual measured water-level elevations ranging from approximately 4,852 to 4,857 ft amsl, which are approximately 20 to 40 ft lower than those used in the model (see Figure 5-2, which shows groundwater elevations of 4,874 to 4,894). Explain the differences in water-level elevations or correct as appropriate, using site-specific data when available.

17. Section 5.2.4 – In the second full paragraph, first sentence, indicate whether the intent is to span the entire width of the dissolved plume for the target capture zone or just the width of the LNAPL plume.

18. Section 5.2.4 – This section contains the sentence: "The actual hydraulic capture zone will be determined using conventional capture-zone methods, including the Darcy Flow GIS

[geographic information system] method (e.g., EPA, 2008a)." The "Darcy Flow GIS method" is not discussed in the reference given. Include in the revised Work Plan the Six Steps for Systematic Evaluation of Capture Zones, as discussed in Exhibit 1, Section A of the given reference and as included below.

Step 1: Review site data, site conceptual model, and remedy objectives;

Step 2: Define site-specific target capture zone(s);

Step 3: Interpret water levels (from potentiometric surface maps and water level pairs);

Step 4: Perform calculations (capture zone width calculations, and numerical modeling);

Step 5: Evaluate concentration trends; and

Step 6: Interpret actual capture based on Steps 1-5.

See also Comment #13 of Part 2 of this letter.

19. Section 5.4 – Provide a description of the pump system planned for the extraction wells to recover LNAPL. Although the proposed extraction wells are to be located in an area with thin LNAPL, it is reasonable to expect that LNAPL will eventually accumulate in the resulting cone(s) of depression. LNAPL removal and inducing the formation of a cone of depression appear to be contradictory goals for a single pump in an extraction well. Indicate if a two pump system will be used, and if not, explain how the accumulated LNAPL will be removed and total fluids treated.

20. Section 5.4, Bullet 7 – Indicate specifically which wells are to be used to assess the performance of the remediation system. Also, define the term "liquid level measurement."

21. Section 6.1 – This section discusses permitting, which does not clearly indicate that a discharge permit for the injection well must be obtained from the NMED Ground Water Quality Bureau, which typically takes a minimum of four to six months to obtain (or more time if a public hearing is held). Furthermore, Section 6.1 does not mention if a treatment permit is or may be required under the New Mexico Hazardous Waste Management Regulations, 20.4.1 NMAC. Indicate in the revised Work Plan and the characterization plan that a discharge permit will be acquired from the NMED Ground Water Quality Bureau, and evaluate the need for a treatment permit under the New Mexico Hazardous Waste Act.

Additionally, permits may be required from the Office of the State Engineer. Indicate in the characterization plan and the revised Work Plan if permits must be obtained from the Office of the State Engineer to conduct the pumping tests or to operate the pump-and-treat system. Also indicate if water rights will need to be procured to conduct any of the proposed extraction.

The schedule in Appendix E implies a discharge permit would be obtained in about 3 months. The schedule should be revised to include a more realistic time frame for the acquisition of a discharge and any other required permits.

22. Section 6.2.1.5 – This section discusses a 60-feet length of screen for the extraction wells. Describe in the revised Work Plan the expected depths at which the pumps will be set in the extraction wells.

23. Quarterly reports must be prepared and combined with other quarterly reporting as specified in NMED's letter of June 4, 2010. The quarterly reports must document the construction, maintenance, and operation of the pump and treat system, and must summarize the analytical water-quality data for both treated and untreated groundwater.

25. Final Report (Interim Measures Report) – Appendix E, *Project Schedule*, indicates that an Interim Measures Report will be submitted after construction of the pump and treatment system. Provide additional details of the planned content of this report. At a minimum this report must meet the requirements of Permit Parts 6.2.2.2.12.5 and 6.2.4.10.

Final Direction

The Permittee's letter of December 3, 2010 states that the certification that accompanies documents like the revised Work Plan and the characterization plan must be signed by the commander of KAFB (currently Col. Maness). NMED notes that the certification that was submitted with the Work Plan was signed by Mr. Wayne Bitner, who does not appear to be authorized to sign for the Permittee in these matters. Submit the certification with the appropriate signature for the characterization plan and the revised Work Plan.

The characterization plan and the revised Work Plan must address the comments noted herein and incorporate the requirements set forth in this letter as they apply to each plan. The characterization plan must be submitted to the NMED no later than **June 15, 2011**. The characterization plan must also contain a schedule of the work to be completed under the plan, including the submittal of a report of the results to the NMED. The report must be submitted to the NMED by no later than **February 1, 2012**. The revised Work Plan must include sufficient detail that the pump-and-treat system could be constructed and operated under provisions of the plan with a reasonable expectation that its operation will be successful in stopping the migration of the LNAPL plume. The revised Work Plan must be submitted to the NMED no later than **April 1, 2012**. A certification must be included in the revised Work Plan, signed and stamped by a professional engineer registered in New Mexico, stating that the design and specifications of the pump and treat system have been reviewed by him/her, and a reasonable standard of care was used in designing the pump-and-treat system to meet the stated goal of stopping the migration of the LNAPL plume. The Permittee cannot construct or operate the pump-and-treat system until such time that it obtains NMED approval.

This corrective action is being conducted under the aegis of the Permit. Specifically, all field activities must be completed in accordance with Permit Part 6.5.2. All equipment that is not disposable must be decontaminated pursuant to Permit Part 6.5.3. All equipment that requires calibration must be calibrated as required under Permit Part 6.5.4. Sample handing, shipping, and custody procedures must comply with Permit Part 6.5.5. The collection and management of investigation-derived waste must conform to Permit Part 6.5.7. Well locations must be surveyed in accordance with Permit Part 6.5.8. Field quality control samples must be collected and analyzed for all environmental media pursuant to Permit Parts 6.5.14 and 6.5.17.6. Laboratory analyses, including laboratory quality control samples, must be conducted as required under Permit Part 6.5.18. Field and laboratory quality control data must be reviewed and validated in accordance with Permit Part 6.5.18.3. Reporting of field activities, including sampling and analysis results, completion of geologic and geophysical logging, and well installations, must be as directed by NMED's letter of June 4, 2010, for quarterly reporting.

NMED also notes that the WUA has submitted comments on the Work Plan to the Permittee, and urges the Permittee's thoughtful consideration of the WUA's comments in development of the characterization plan and the revised Work Plan.

As part of the response letters that accompany the characterization plan and the revised Work Plan, include a table that details where all revisions have been made to the plans and that cross-references NMED's numbered comments. Submittals (including maps and tables) must be in the form of two paper copies and one electronic copy in accordance with Permit Part 1.36.

Respond to this letter to my attention, with copy to Mr. Bill Olson of the NMED Ground Water Quality Bureau, and Mr. William Moats of my staff (NMED HWB, 5500 San Antonio NE, Albuquerque, NM 87109). NMED invites the Permittee to meet regarding the issues raised in this letter. Please contact me to arrange such a meeting, or should you have any questions.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

Attachment: Figure 1

cc: R. Solomon, Deputy Cabinet Secretary, NMED
J. Kieling, NMED HWB
W. Moats, NMED HWB
W. McDonald, NMED HWB
S. Brandwein, NMED HWB

B. Olson, HWB GWQB
B. Swanson, HWB GWQB
L. Barnhart, NMED OGC
B. Gallegos, AEHD
R. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
File: Reading and KAFB 2010

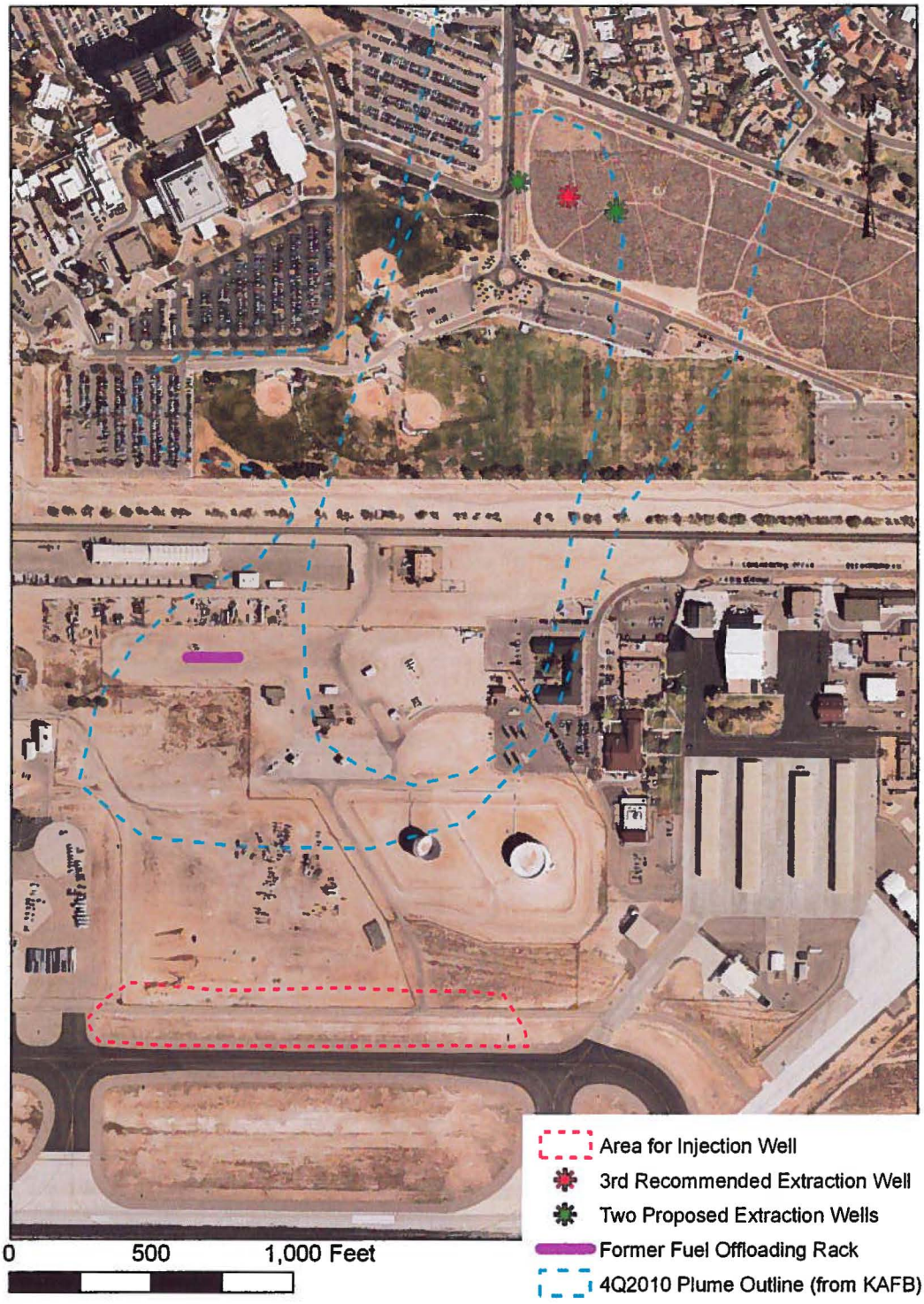

Figure 1. Locations for Extraction Wells and Injection Well