DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

Colonel Tom D. Miller
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OCT 09 2014

Mr. Tom Blaine, Manager
Environmental Health Division Director
Environmental Health Division
New Mexico Environment Department (NMED)
1190 St. Francis Drive, Room North 4050
Santa Fe, New Mexico 87502

Dear Mr. Blaine

In technical working groups, NMED and USAF personnel have reviewed data that highlight the need for further horizontal and vertical dissolved phase 1,2 dibromoethane/ethylene dibromide (EDB) plume characterization, for the Kirtland Bulk Fuels Plume remediation project. The attached work plan, "*Kirtland Air Force Base Bulk Fuels Facility – Groundwater Extraction Pilot Implementation and Additional Plume Characterization Letter Work Plan Addendum*" addresses the proposed activities for installation of additional groundwater monitoring wells to further characterize the EDB plume.

Please contact Mr. L. Wayne Bitner at (505) 853-3484 or at ludie.bitner@us.af.mil, Ms. Victoria Branson at (505) 846-6362 or at victoria.branson@us.af.mil, and/or Dr. Adria Bodour at (210) 395-8426 or at adria.bodour.1@us.af.mil if you have questions.

Sincerely,

TOM D. MILLER, Colonel, USAF
Commander

cc:
NMED-HWB (Kieling, Cobrain, McDonald, Brandwein)
NMED (McQuillan, Longmire)
NMED-PSTB (Reuter)
NMED-GWQB (Schoeppner)
NMED-OGC (Kendall)
EPA Region 6 (King)
AFCEC-CZRX (Oyelowo, Bodour)
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40 CFR 270.11
DOCUMENT CERTIFICATION
SEPTEMBER 2014

OCT 0 9 2014

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

TOM D. MILLER, Colonel, USAF
Commander, 377th Air Base Wing

This document has been approved for public release.

KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs

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October 3 , 2014

Subject: **Kirtland Air Force Base Bulk Fuel Facility – Groundwater Extraction Pilot Implementation and Additional Plume Characterization Letter Work Plan Addendum–Final**

This Kirtland Air Force Base (AFB) Bulk Fuel Facility (BFF) Groundwater Extraction Pilot Implementation and Additional Plume Characterization Letter Work Plan Addendum has been prepared by CB&I Federal Services LLC (CB&I) for the U.S. Army Corps of Engineers (USACE), Albuquerque District, under Contract No. W912DY-10-D-0014. This letter Work Plan Addendum responds to the conditions identified in the New Mexico Environment Department (NMED) approval letter dated August 20, 2014 (NMED, 2014) and is based on the technical discussions held among the Air Force Civil Engineer Center, USACE, the NMED, Kirtland AFB personnel, and the Kirtland AFB contractor on July 30 and August 20, 2014. This letter Work Plan Addendum expands on the activities needed for the installation of additional groundwater monitoring wells to further characterize the horizontal and vertical extent of the dissolved-phase 1,2-dibromoethane/ethylene dibromide (EDB) plume defined by the 0.05 microgram maximum contaminant level.

Proposed Amendments to the August 1, 2014 Work Plan and Approval Conditions of August 20, 2014

Condition 1 of the August 20 NMED approval letter (NMED, 2014)

"NMED, the Permittee, the Permittee's contractors, the Albuquerque Bernalillo County Water Utility Authority, and the City of Albuquerque shall have a coordination meeting prior to the commencement of drilling operations."

Response

A coordination meeting will be planned before the start of drilling activities.

Condition 2 of the August 20 NMED approval letter (NMED, 2014)

"For each of the additional 5 monitoring well nests the Permittee shall provide a written work plan describing the anticipated depth to groundwater, lithology and contamination conditions based on the results obtained from well KAFB-106212 and other wells in the area. These drilling work plans shall become part of the work plan approved by this letter."

Response

The geology in the vicinity of the proposed borings is anticipated to be piedmont alluvium, consisting dominantly of silt to sandy silt to a depth of approximately 140 to 175 feet below ground surface (bgs). Underlying this silt is the Upper Santa Fe Group, consisting of mostly poorly to well-graded sand with intermittent silt, clay, and gravel lenses. Expected contamination conditions at the boring locations can be seen on Figure 1. The static water level is anticipated to be 465 to 470 feet bgs. The actual static water table depth will be defined once each boring has been completed but prior to the well installation. Three

measurements will be taken at intervals exceeding 10 minutes apart. The water level will be considered stable if the three measurements are within 0.1 foot of the mean average of the three measurements. If necessary, the water level will be allowed to stabilize overnight before well installation begins. The depths provided in this Work Plan Addendum are estimates and are subject to revision, with NMED concurrence, based on field observations. A second letter work plan addendum will be submitted to the NMED following the vertical EDB delineation as determined at well Kirtland Air Force Base (KAFB)-106212. This second work plan addendum will include the screen intervals of all Shallow and Intermediate Zone wells installed to date as part of this interim measure, design schematics for the proposed screen intervals of the deep wells, and the analytical results of the groundwater sampling at KAFB-106212.

Condition 3 of the August 20 NMED approval letter (NMED, 2014)

"For each of the additional 15 monitoring wells the Permittee shall provide a lithologic log and proposed screened interval to NMED for approval. NMED will provide a list of staff who will be available to receive, review and approve this information during drilling operations."

Response

The NMED will be notified two days prior to drilling and notified on the day an individual boring is completed. Upon reaching the total depth of the well, a qualified NMED representative will be available in the field to review the lithologic log and proposed screen interval for the well, and sign the screen interval approval form. Based on discussion with NMED, it is anticipated that the proposed screen interval will be approved or disapproved by the NMED field representative within 1 hour of its receiving the documents. If the screen interval is not approved, a decision will be made in the field to either set the screen higher, or drill the well slightly deeper to set the screen lower. See Figure 1 for the Screen Approval form.

Additional detail regarding well installation, requested in the August 20, 2014 meeting with NMED, is provided below. See Figure 2 for a map of proposed locations.

Deep Groundwater Wells (KAFB-106212, KAFB-106215, KAFB-106218, KAFB-106221, KAFB-106224, KAFB-106227, and KAFB-106228)

Air rotary casing hammer (ARCH) drilling will be used from the surface to approximately 10 feet above the water table (approximately 450 feet bgs) as determined by the nearest completed monitoring wells. The ARCH rig will move off the boring while leaving the drive casing in place. A sonic rig will be moved onto the boring and proceed to take continuous core from approximately 10 feet above the water table to the total depth of the boring (anticipated to be 130 feet below the water table). The core will be 4 inches in diameter and collected at intervals of 10 feet to improve core recovery. The core will be withdrawn from the core barrel by a contracted core-handling service and placed directly into a box for storage to preserve the stratigraphy. The core box will be appropriately marked with the depth interval and well number. Once the core has been photographed and logged by the site geologist, it will be transported on base to a set of bunkers that will be re-purposed as a storage facility. The core is not expected to be hazardous waste; therefore RCRA hazardous waste storage regulations will not apply. The core will be available for 180 days or for the duration of the lease of the storage facility; after this period, it will be disposed of unless it is claimed by another party. NMED will be notified two weeks prior to the planned disposal of the core material.

Once the total depth has been reached, the sonic rig will be moved off, and the ARCH rig will continue drilling from 10 feet above the water table to the total depth. Since the boring will have been cored over this interval, ARCH cuttings will not be logged. The monitoring well will be installed with a screened

interval extending from 85 to 100 feet below the water table or as determined from the EDB delineation sampling at KAFB-106212 (see Groundwater Extraction Pilot Implementation and Additional Plume Characterization Work Plan, [USACE, 2014]). Refer to Table 1 for anticipated screen intervals.

The NMED will be notified two days prior to drilling and notified on the day an individual boring is completed. In accordance with Condition #3 in the August 20 NMED approval letter (NMED, 2014), upon reaching the total depth of the well, a qualified NMED representative will be available in the field to review the lithology log and proposed screen interval for the well, and sign the screen interval approval form. Based on discussions with NMED, it is anticipated that the proposed screen interval will be approved or disapproved by the NMED field representative within 1 hour of receiving the documents. If the screen interval is not approved, a decision will be made in the field to either set the screen higher, or drill the well slightly deeper to set the screen lower. See Figure 1 for the Screen Approval form.

Shallow and Intermediate Groundwater Wells

The Shallow and Intermediate Zone wells will be installed independently of operations at KAFB-106212 and will be screened at preset depths relative to the static water table at each location. The actual static water-table depth will be defined once each boring has been completed, but prior to the well installation. The depths provided in in this Work Plan Addendum are estimates. The Shallow Zone wells will be set with 15 feet of the screen above the water table and 15 feet of the screen below the water table. The Intermediate Zone wells will be set such that the top of the screen is 15 feet below the water table. Refer to Table 1 for anticipated screen intervals. ARCH rigs will be used to install the Shallow and Intermediate Zone groundwater wells.

The Shallow and Intermediate Zone wells will not be cored.

The NMED will be notified two days prior to drilling and notified on the day an individual boring is completed. In accordance with Condition #3 in the August 20 NMED approved letter (NMED, 2014), upon reaching the total depth of the well, a qualified NMED representative will be available in the field to review the lithologic log and proposed screen interval for the well, and sign the screen interval approval form. Based on discussion with NMED, it is anticipated that the proposed screen interval will be approved or disapproved by the NMED field representative within 1 hour of its receiving the documents. If the screen interval is not approved, a decision will be made in the field to either set the screen higher, or drill the well slightly deeper to set the screen lower. See Figure 1 for the Screen Approval form.

Condition 4 of the August 20 NMED approval letter (NMED, 2014)

"The monitoring well drilling and installation shall be overseen by a person with extensive experience in supervising drilling activities, interpreting and cataloging drill cuttings and core samples, and in preparing lithologic well logs. This person also shall record all relevant information obtained during drilling including drillers' comments on the earth material encountered in the boring, description of core hammer and type of coring device used, blow counts during coring, and amount of material recovered during drilling and coring."

Response

All borings will be logged by experienced geologists. The CB&I staff selected for this work has a combined experience in geologic operations exceeding 85 years. The data recorded will include, but not be limited to, drillers' comments on the earth material encountered in the boring, a description of the core hammer and type of coring device used, and the amount of material recovered during drilling and coring. Soil is to be classified according to the Unified Soil Classification System ASTM International D2488-09ε, "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)."

This method of classification is detailed in Appendix D, Form 2 of the Groundwater Investigation Work Plan (USACE, 2011). This classification method identifies soil types on the basis of grain size and liquid limits, and categorizes them by two-letter symbols. Blow counts cannot be collected as sonic drilling does not use a hammer for core-barrel advancement.

Condition 5 of the August 20 NMED approval letter (NMED, 2014)

"NMED staff shall make unannounced site visits and inspections of field notes, drill cuttings and core samples, and shall abide by all reasonable site health and safety requirements imposed by the Permittee or the Permittee's contractors."

Response

Acknowledged. Sections of the health and safety plan that apply to site visitors will be provided to NMED prior to the start of drilling operations.

Condition 6 of the August 20 NMED approval letter (NMED, 2014)

"The Permittee shall provide weekly email updates on drilling progress by close of business on Friday during each week of drilling."

Response

Weekly email updates will be submitted by noon on Monday during each week of drilling so that work from the previous week of drilling can be summarized.

References

NMED. 2014. August 20, 2014 correspondence from Mr. Tom Blaine, Director, NMED-EHD, to Colonel Tom Miller, Base Commander, 377 ABW/CC, Kirtland AFB, NM, and Mr. John Pike, Director, Environmental Management Section, 377 MSG/CEANR, Kirtland AFB, NM, re: Interim Groundwater Extraction and Additional Characterization, Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, New Mexico, April 2012, EPA ID# NM9570024423, HWB-KAFB-14-MISC.

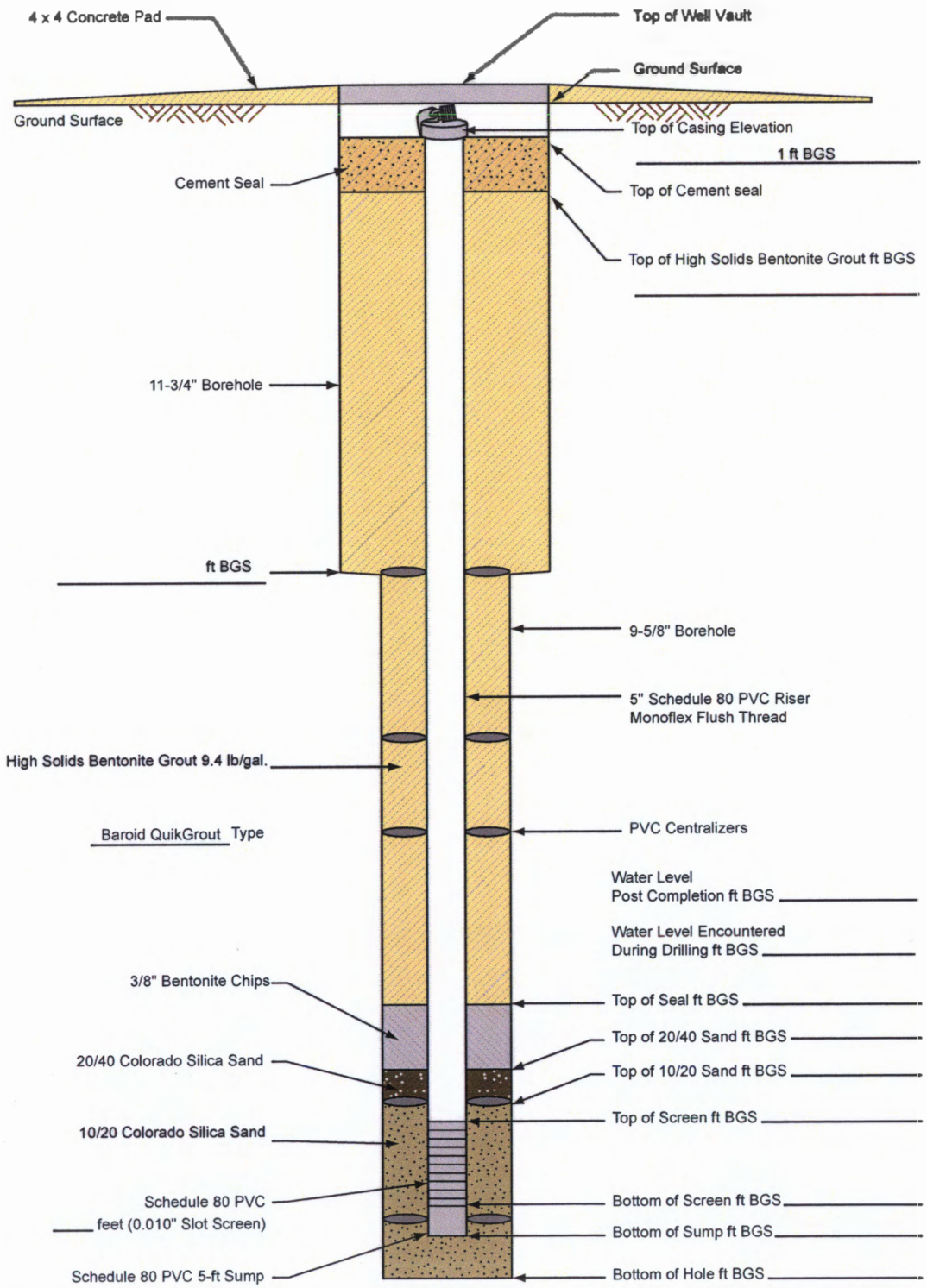
USACE. 2014. *Groundwater Extraction Pilot Implementation and Additional Plume Characterization Work Plan, Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico.* Prepared by CB&I Federal Services LLC for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. August.

USACE. 2011. *Groundwater Investigation Work Plan, Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico.* Prepared by Shaw Environmental & Infrastructure, Inc. for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. March.

FIGURES

Figure 1. Screen Approval Form
Monitoring Well Completion Diagram KAFB-_____

Installation Start Date/Time: _____
Installation End Date/Time: _____

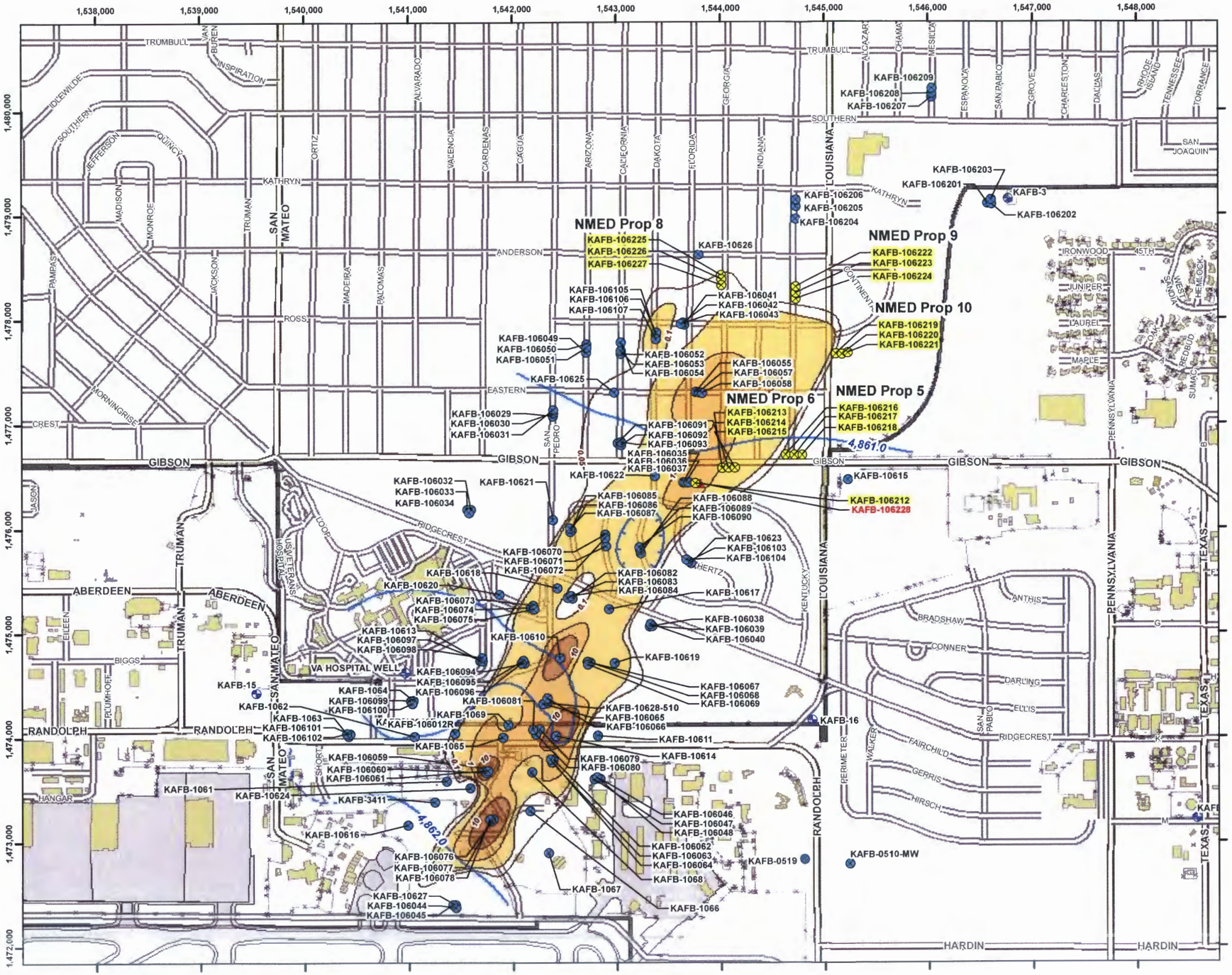


CB&I Representative: _____ Date: _____

NMED Representative: _____ Date: _____

140705.CBREA001

Not to Scale
BGS = Below Ground Surface



H:\Kirtland_AFB\GIS_Documents\Project_Maps\Misc_Maps\KAFB_001_NMED_proposed_gw_locs.mxd 08/26/14

Legend

- Proposed Monitor Well
- Proposed Extraction Well Location
- Monitor Well
- Water Supply Well
- Groundwater Level Contour (ft above msl)
- (dashed where inferred)
- Groundwater Depression
- EDB Concentration Contour (ug/L)

EDB Concentration (ug/L)

Contours less than 0.05 ug/L are not shown

- 0.1 - 1
- 1 - 10
- 10 - 70

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Revision Date: 08/26/14

N

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

PUMP AND TREAT WORKPLAN
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2

PROPOSED WELL LOCATIONS

TABLE

Table 1. Approximate Screen Placement for 16 Proposed Groundwater Monitoring Wells							
Well ID	Cluster Designation	Groundwater Zone	Water Table Elevation[1] (feet AMSL)	Top of Screen[2] (feet from Static Water Level)	Bottom of Screen[2] (feet from Static Water Level)	Top of Screen[2] (approximate feet bgs)	Bottom of Screen[2] (approximate feet bgs)
KAFB-106212	NA	Deep	4861	-85	-100	545	560
KAFB-106213	NMED Prop 6	Shallow	4861	+15	-15	450	480
KAFB-106214	NMED Prop 6	Intermediate	4861	-15	-30	480	495
KAFB-106215	NMED Prop 6	Deep	4861	TBD	TBD	TBD	TBD
KAFB-106216	NMED Prop 5	Shallow	4861	+15	-15	455	485
KAFB-106217	NMED Prop 5	Intermediate	4861	-15	-30	485	500
KAFB-106218	NMED Prop 5	Deep	4861	TBD	TBD	TBD	TBD
KAFB-106219	NMED Prop 10	Shallow	4860	+15	-15	455	485
KAFB-106220	NMED Prop 10	Intermediate	4860	-15	-30	485	500
KAFB-106221	NMED Prop 10	Deep	4860	TBD	TBD	TBD	TBD
KAFB-106222	NMED Prop 9	Shallow	4860	+15	-15	455	485
KAFB-106223	NMED Prop 9	Intermediate	4860	-15	-30	485	500
KAFB-106224	NMED Prop 9	Deep	4860	TBD	TBD	TBD	TBD
KAFB-106225	NMED Prop 8	Shallow	4860	+15	-15	450	480
KAFB-106226	NMED Prop 8	Intermediate	4860	-15	-30	480	495
KAFB-106227	NMED Prop 8	Deep	4860	TBD	TBD	TBD	TBD

[1] Water table elevation is approximate and based on the groundwater contours created using water levels measured in Second Quarter CY 2014

[2] Top and bottom of screen placements are estimates based on the approximate water table elevation. The exact screen placements will be based on the water table encountered during drilling.

AMSL	above mean sea level
bgs	below ground surface
CY	calendar year
ID	identification
KAFB	Kirtland Air Force Base
NA	not applicable
NMED	New Mexico Environment Department
TBD	to be determined