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DCN: NMED-2013-07

Mr. William Moats
New Mexico Environment Department
Hazardous Waste Bureau
5500 San Antonio NE
Albuquerque, NM 87109

RE: Draft Technical Review Comments on the Pre-Remedy Monitoring and Soil-Vapor Extraction System Operation and Maintenance Work Plan Addendum for Monitoring Program Optimization, Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico, Dated January 2013

Dear Mr. Moats:

Attached please find draft technical review comments on the subject Kirtland Air Force Base (AFB) work plan addendum for the Bulk Fuels Facility (BFF) spill site, dated January 2013. The work plan describes proposed categories for groundwater monitoring wells, and proposed changes to the monitoring frequency for wells within these categories, at the BFF spill site. There are no proposed changes to the soil-vapor extraction system monitoring or soil vapor monitoring discussed in this document.

We generally agree with the proposed recommendations. In addition to reviewing the subject document, we have also reviewed the groundwater monitoring portions of the April-June 2012 Quarterly Monitoring Report (the latest quarterly report we could find on NMED's .ftp site) for the BFF spill site, as supporting information for the proposed changes in well categories and monitoring frequencies. Therefore, we recommend that NMED approve the subject Work Plan Addendum. Although there were particular statements or claims in the document that were not well substantiated (particularly with regards to contaminant trends over time), in general these did not impact the proposed changes in the groundwater monitoring program. However, we have included these comments herein for your consideration since they could impact future decisions at the site.

The contents of this deliverable should not be evaluated as a final work



If you or any of your staff have questions, please contact me at (801) 451-2864 or via email at paigewalton@msn.com.

Thank you, e



Paige Walton
AQS Senior Scientist and Program Manager

Enclosure

cc: David Cobrain, NMED (electronic)
Kent Friesen, Wyoming Environmental Consulting (electronic)
Joel Workman, AQS (electronic)

**Draft Technical Review Comments on the Pre-Remedy Monitoring and Soil-Vapor Extraction
System Operation and Maintenance Work Plan Addendum for Monitoring Program
Optimization, Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111,
Kirtland Air Force Base, Albuquerque, New Mexico**

Dated January 2013

GENERAL COMMENTS

1. **Monitor Group Assignments.** Tables 2 and 3 include the specific Monitor Group assignments for individual wells, and the proposed groundwater monitoring frequency for each Group. These Groups are also presented as color-coded symbols on Figure 2. In general we concur with the majority of these assignments. Following are the key Monitor Groups identified and associated sampling frequencies, along with our thoughts regarding applicability to the BFF groundwater monitoring:
 - a. **NAPL Area (annual monitoring)** – these wells are within the historical NAPL area, and are likely to be contaminated in excess of action levels for a considerably long time. Also, these wells are surrounded by Plume Core or Edge wells with more frequent analyses. Therefore, annual monitoring is adequate to provide long-term assessment of potential trends in source area contaminant reductions.
 - b. **Plume Core (quarterly monitoring)** - these wells are generally located just downgradient of the NAPL Area, and therefore more frequent monitoring is warranted to more closely assess potential downgradient (or vertical) migration of plume constituents.
 - c. **Plume Edge (quarterly monitoring)** – these wells are generally located downgradient of the Plume Core wells, and therefore more frequent sampling is warranted to monitor potential advance or retreat of the plume edge. The distinction between “Plume Core” and “Plume Edge” is not critical since the proposed sampling frequency is the same. “Early warning” wells near downgradient pump well KAFB-3 are also included in this group.
 - d. **Status (annual monitoring)** – results from these wells are typically nondetected, and the wells are located some distance outside the currently-demarcated plume boundary. Therefore we agree that annual monitoring is adequate, given that Plume Core and Plume Edge wells will give early warning of plume expansion. We note also that there are no downgradient Status wells identified with respect to the EDB plume, since the downgradient extent has not yet been established; this is appropriate and conservative.

Overall we believe that Kirtland AFB’s selection of monitoring frequencies is adequately protective and conservative.
2. The lateral or map-view configuration of Monitor Group well assignments proposed by Kirtland AFB is adequate (Figure 2). However, the vertical arrangement of Monitor Group well assignment at the NAPL area is not adequately protective. Previous reports have discussed some uncertainty regarding the direction of vertical groundwater flow within the plume. Therefore, the following wells are recommended to be re-assigned to different Monitor Groups as follows:
 - a. KAFB-106060 – this Intermediate Aquifer well was assigned by Kirtland AFB as “Status” for annual monitoring; however, it is within the historical NAPL source area,

and the overlying Shallow Aquifer well KAFB-106059 has historically encountered high concentrations. Further, well KAFB-106060 has only been monitored since 2011. Therefore, we recommend assignment of KAFB-106060 as a “Plume Edge” well with quarterly monitoring to more carefully assess the potential vertical migration of contaminants.

- b. KAFB-106063 – this Intermediate Aquifer well was assigned by Kirtland AFB as “Status” for annual monitoring; however, it is within the historical NAPL source area. Further, it has only been monitored since 2011. Therefore, we recommend assignment of KAFB-106063 as a “Plume Edge” well with quarterly monitoring to more carefully assess the potential vertical migration of contaminants.
 - c. KAFB-106077 – this Intermediate Aquifer well was assigned as “Status” by Kirtland AFB for annual monitoring; however, it is within the historical NAPL source area, and the overlying Shallow Aquifer well KAFB-106076 has historically encountered high concentrations. Further, well KAFB-106077 has only been monitored since 2011. Therefore, we recommend assignment of KAFB-106077 as a “Plume Edge” well with quarterly monitoring to more carefully assess the potential vertical migration of contaminants.
 - d. KAFB-106081 – this Deep Aquifer was assigned as “Status” by Kirtland AFB for annual monitoring; however, it is within the historical NAPL source area, and the overlying Shallow Aquifer well KAFB-106079 and Intermediate Aquifer well KAFB-106080 have historically encountered high concentrations. Further, well KAFB-106081 has only been monitored since 2011. Therefore, we recommend assignment of KAFB-106081 as a “Plume Edge” well with quarterly monitoring to more carefully assess the potential vertical migration of contaminants.
3. A key issue to consider that would impact future decisions is the site conditions that could lead to changes to the proposed monitoring plan. For example, Status wells are designated for annual monitoring; however, if any contaminant in excess of comparison criteria is detected in future monitoring at a Status well, then quarterly monitoring of that well would be warranted to assess contaminant migration. Conversely, Kirtland AFB may suggest that four quarters of non-detect data should warrant a change from quarterly to annual monitoring; however, if the well is located immediately downgradient of the plume or between the plume and receptors (i.e., pumping wells), then NMED should require continued quarterly monitoring. Additional criteria to consider for future Monitor Group assignment changes could also include the historical trends in contaminant concentration (e.g., as presented in Table 2, but with more objective evaluation of trends as discussed below).

SPECIFIC COMMENTS

1. **Pg. 1-1 Section 1.0 Introduction.** The second sentence indicates that this document presents an evaluation of groundwater monitoring and the “soil-vapor monitoring program”; however, there actually is no discussion of vadose zone monitoring presented in this document. Please delete reference to soil vapor or vadose zone monitoring data from the document.

2. **Pg. 1-2, Section 1.0 Introduction.** The third bullet indicates that general chemistry and SVOC analyses are recommended for wells subject to annual monitoring. Please clarify that general chemistry and SVOC analyses would be added to the other more primary indications of contamination, such as VOCs, EDB, TPH-DRO and TPH-GRO. All wells must be analyzed for VOCs, EDB, TPH-DRO and TPH-GRO.
3. **Pg. 1-2, Section 1.0 Introduction.** In the last bullet of the page, we concur with quarterly water level measurements in all wells, quarterly data reporting, and more comprehensive annual reporting.
4. **Pg. 2-1, Groundwater Data Analysis and Monitoring Program.** In the first sentence of the page, the document indicates that adequate data has been collected to fulfill the requirements of the RFI and CME, and references the first quarter 2012 monitor report. However, the reference “USACE 2012” appears to be the third quarter monitor report instead; please reconcile. Also, please provide additional validation of the statement that the data needs for the RFI and CME have been fulfilled; we reviewed the second quarter 2012 monitor report (April to June 2012) but that report does not seem to conclude anything regarding the adequacy of data for the RFI and CME.
5. **Pg. 2-1, Groundwater Data Analysis and Monitoring Program.** In the last paragraph, it is indicated that there are 118 wells in the monitoring network (109 with 4 quarters of data through August 2012, and 9 new wells). Why are only 68 wells shown on Table 2?
6. **Pg. 2-2, Groundwater Data Analysis and Monitoring Program.** In the first sentence, “Contamination” for VOCs and SVOCs must not be limited to exceedance of promulgated or risk-based standards; detected concentrations below the standard should also be considered when evaluating monitoring data, especially for contaminant trend analysis.
7. **Pg. 2-2, Groundwater Data Analysis and Monitoring Program.** In the second paragraph on the page, visual trend analysis is presented with the results summarized in Table 2, based on the time-concentration graphs provided in Attachment 1 of the current document (see also Appendix F of the 2012 quarterly monitoring reports). However, we note that the results of this trend analysis were not used for decisions in the rest of this document; for example, a decreasing trend is not offered as justification for assigning Monitor Group categories to wells. Any future contaminant trend evaluation should consider the following observations (also see additional comments regarding Table 2).
 - a. The visual trend analysis presented in Table 2 is overly subjective; a more objective approach (such as statistical trend analysis) is warranted to determine trend results.
 - b. Trend analysis needs to be presented by individual analytes, rather than all analytes as a whole. Different analytes will have different migration behavior and therefore potentially different trends (for example, as demonstrated in the different plume sizes of EDB and benzene).
 - c. The trend analysis needs to more carefully consider non-detect data versus detected concentrations; a trend based on only non-detect data is meaningless.

- d. The time-concentrations graphs presented to date are difficult to read because multiple analytes are presented on each graph, and because the graph symbols for the data posts are not scaled to the same size as the symbols in the legends.
 - e. Kirtland AFB should also qualitatively consider hydrograph trends (Appendix F-1 hydrographs of the Quarterly Monitoring Reports) when interpreting analyte concentration trends over time. Concentration changes over time may be associated with fluctuations in water levels, rather than plume mass reduction due to other causes such as biodegradation.
 - f. Kirtland AFB should also consider screen depth relative to recent water levels; multiple well screens are now fully submerged, and the increase in sampled depth could potentially influence observed contaminant concentration trends.
8. **Pg. 2-3, Groundwater Data Analysis and Monitoring Program.** In the bullets following the second paragraph, add EDB analysis to the analytes listed. Also, in the first bullet, the specific “current groundwater program” for the NAPL area must include the following (from the 2nd quarter 2012 monitoring report):
- a. VOCs – EPA SW8026B
 - b. EDB – EPA SW8011
 - c. SVOCs – EPA SW8270C
 - d. TPH-GRO and TPH-DRO – EPA SW8015B
 - e. Polycyclic aromatic hydrocarbons – EPA SW8270C low-level method (VA-2 well only)
 - f. Lead and major cations – EPA SW6010C
 - g. Dissolved iron and manganese – EPA SW6010C
 - h. Anions (chloride and sulfate) – EPA 300.0
 - i. Nitrate/nitrite as nitrogen – EPA 353.2
 - j. Ammonia nitrogen – SM [Standard Method] 4500NHB
 - k. Total sulfide – SM 4500 S-2CF
 - l. Carbonate/bicarbonate alkalinity – SM 2320B
9. **Pg. 3-1 Reporting.** In the first sentence, both groundwater monitoring and soil vapor monitoring is discussed; however, there is no vadose zone monitoring discussed in this submittal. Therefore, remove reference to soil vapor monitoring from the text.
10. **Table 1.** Regarding the last four columns, if the well detected EDB, is that considered a VOC or a SVOC, or was it not included in this? For future reference, suggest adding a separate column for EDB since that analyte has a unique plume footprint.
11. **Attachment 1.** Suggest deleting the word “Hydrograph” from the upper left corner of these time-analyte concentration charts, which more commonly refers to time vs. water elevation charts.

12. **Table 2.** Following are comments for select wells from the visual trends identified in Table 2, which illustrate the subjective nature of the analysis performed. Note, however, that these identified trends do not impact the selection of well Monitor Groups or sample frequencies as identified in Table 3; therefore, a more comprehensive critique of the Table 2 results was not presented. Further, since the trend results were not used herein, NMED may elect to not pass these comments on to Kirtland AFB.
- a. KAFB-106008: “Decreasing Trend” was indicated, and we concur.
 - b. KAFB-106009: “Decreasing Trend” was indicated, but we do not concur, since there was no strong trend evident. We find similar observations for wells KAFB-106014 and KAFB-106024; decreasing trends are either nonexistent or weak at best.
 - c. KAFB-106012: “No Trend” was indicated, with comments that concentrations were “decreasing until 2010, then stabilizing.” We disagree with the comment, since large spikes in concentrations of TPH-DRO, toluene, and naphthalene occurred in 2010.
 - d. KAFB-106018: “Decreasing Trend” was indicated, and we concur; however, the concentrations have somewhat stabilized during last few quarters, and we note that this well now has a submerged screen, so it is possible that decreasing trends are more related to the rising groundwater elevation than actual decreases in local plume contaminant mass.
 - e. KAFB-106028-510: “Decreasing Trend” was indicated, and it was commented “compounds steady for the last year, except TPH-DRO.” However, for most analytes we observe a “W” shaped trend with a relatively recent, somewhat alarming increase in concentrations.
 - f. KAFB-106080: “No Trend” was indicated, but we observe a slightly increasing trend for most analytes.
 - g. KAFB-106002: “No Trend” was indicated, but Table 1 indicates that no analytes were detected, and this well is located generally outside of the plume. Therefore, any trends discerned from these data would be meaningless, since fluctuations on the graph simply show changes in reporting limits for the analytes over time.
 - h. KAFB-106004, KAFB-106007, and KAFB-106027: “No Trend” was indicated. Table 1 indicated only TPH-GRO was detected in each of these wells, and the wells are located generally outside of the designated TPH-GRO plume. Therefore, any trends discerned from these data (such as “Compounds steady for the last year” for KAFB-106004) are meaningless, since fluctuations on the graph simply show changes in reporting limits for the analytes over time.
 - i. KAFB-106026: “No Trend” was indicated, with the Comment that “compounds steady for the last year.” However, Table 1 indicates that no analytes were detected; therefore, any observations concerning trends are meaningless.
 - j. KAFB-106075: “No Trend” was indicated; however, it appears that EDB concentrations are decreasing.
 - k. KAFB-106091: “No Trend” was indicated; however, it appears that ethylbenzene, naphthalene, and xylene concentrations are increasing.