



KAFB PneuLog wells
NMED Comments on KAFB Response to
Disapproval of Bulk Fuels Facility Spill

August 2, 2013

NMED HWB staff has reviewed a draft letter from Col. Tom D. Miller, U.S. Air Force (Permittee) Kirtland Air Force Base (KAFB), to Mr. Tom Blaine, NMED. The Permittee requests that the NMED approve forgoing the PneuLog testing that is to be conducted at wells KAFB-106151 through KAFB106156 under the Interim Measures Work Plan for the Bulk Fuels Facility Spill (BFFS). The Permittee's draft letter provides three reasons why the request should be approved.

The primary purpose of the PneuLog testing is to characterize resistance to air flow in the vadose zone with respect to depth. Total and compound-specific hydrocarbon vapor concentrations are also measured at various depths. This information is useful to assist with the design of a soil vapor extraction (SVE) treatment system.

At this stage of the project, NMED HWB staff has no major concerns if the PneuLog testing is not conducted in the remaining six PneuLog wells, as ROI testing can be utilized instead and is better, and quarterly vapor monitoring is also better as discussed below (but all of the PneuLog holes should be geophysically logged as originally planned and approved). However, NMED HWB staff does not agree with most of the Permittee's reasons for approving the request as indicated in the following comments

Comments on Basis for Approving Request to Cease PneuLog Testing

Reason #1: KAFB states "In addition to the PneuLog results, the abundance of data collected at the BFF each quarter accurately characterizes the vadose zone."

1. Aside from the fact that soil matrix samples are collected only once, and sampling and analysis are not repeated every quarter, the analytical results of the soil samples are not directly comparable to the vapor concentrations measured via PneuLog testing. The soil matrix samples provide no characterization data related to air flow resistance.
2. Aside from the fact that most types of geotechnical samples (types not specified in the draft letter) are collected only once, and not repeated every quarter, such samples cannot be used to quantitatively assess air flow resistance. The geotechnical samples provide no characterization data related to vapor concentrations. Additionally, the geotechnical samples were collected only near the water table, and no evidence was provided that they represent the "great variation in vapor permeability" in the upper 200 ft of the vadose zone or even for any other depths above the water table.
3. Aside from the fact that ROI tests are not repeated every quarter, the first ROI tests utilizing the ICE Units did not provide good results; the results of the second ROI tests conducted using the CATOX SVE treatment system are under review. Until this review is completed, NMED cannot offer an opinion as to the quality and the usefulness of the reported data. While the ROI test results can provide useful

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information concerning air flow for the design of a SVE treatment system, they provide no characterization data on vapor concentrations.

In summary, although there is much data of different kinds that has been acquired for site characterization purposes for the BFFS project, much of the data mentioned in the draft letter do not provide the same information that is obtained through PneuLog testing.

Reason #2: KAFB states “The soil total volatile petroleum hydrocarbon (TVPH) pneulog results are consistent with expectations based on quarterly soil vapor sampling.”

NMED HWB staff has more confidence in the analytical results of the quarterly soil-vapor monitoring results than those associated with the PneuLog testing. The quarterly soil-vapor data represent samples collected from wells designed and constructed to yield discrete samples at specific depth intervals. Additionally, the samples are analyzed in a laboratory to accurately quantify vapor concentrations for a number of specific contaminants. Also, because samples are collected and analyzed quarterly, each sampling location is represented by more than one data point making it possible to evaluate the stability (or instability) and variability of the data and to more easily assess the data for errors (such as laboratory or transcription errors).

In contrast, the PneuLog testing provides only a one-time analysis of vapor concentrations. With only one data point per depth interval, it is not possible to evaluate the stability (or instability) and variability of the data. It is more difficult to assess the data for errors. Also, the samples are taken from wells which are not designed to monitor vapor at specific, discrete intervals.

The Permittee did not adequately support in the draft letter its claim of the existence of a good correlation between the quarterly monitoring results and the results from the PneuLog testing. Adequate support would include, at minimum, data from the PneuLog wells plotted against the data from the nearest soil-vapor monitoring wells and an assessment of the difference between the corresponding data. Furthermore, data representing the soil-vapor monitoring wells should not be limited to only those obtained in the Second Quarter 2012 as it is not uncommon to see appreciable variability in soil vapor data.

Reason #3: KAFB states “The pneulog results, although demonstrating some variability, are consistent with each other, suggesting that additional testing would not change the conceptual site model.”

With regard to TVPH vapor profiles, PneuLog well KAFB-106148 is markedly different from wells KAFB-106149 and KAFB-106150. All three wells do show a zone of higher vapor concentrations (15,000 - 30,000 ppmv) at about 250 feet. However, the profile for KAFB-106148 shows a zone of higher vapor levels from near surface to a depth of 340 ft, averaging about 10,000 ppmv. Below 340 ft, the profile for KAFB-106148 shows vapor levels averaging about 3,000 - 4,000 ppmv.

In contrast, the profiles for KAFB-106149 and KAFB-106150 show a zone of higher vapor levels from a depth of 360 ft to the bottom of each well, averaging about 18,000 - 20,000 ppmv. Above 200 ft, the profiles for KAFB-106149 and KAFB-106150 show vapor levels that average no more than about 1000 ppmv.

The PneuLog vapor profiles (as well as geologic, geophysical, and chemical data not obtained through only the PneuLog wells) clearly illustrate that the “anomaly” at 250 ft significantly influences the distribution of contaminant vapor in the vadose zone. For this reason, contaminated strata occurring within 100 ft above the water table should not be the sole focus for remediation as part of the SVE Phase II Interim Measure. SVE should target all of the fuel contamination that resides in the vadose zone, which extends from the fuel offloading rack to the area where it first encounters the groundwater. SVE should also target areas of fuel contamination still floating on the water table and thus, amenable to SVE.

Additional Comments on Draft Letter

Although the Permittee states in the draft letter that “75 percent of the soil total petroleum hydrocarbon contamination is below 250 ft bgs”, this estimate has never been supported with data and calculations. In fact, the Permittee has many times claimed that an estimate of the amount of fuel in the vadose zone is not needed until such time that the results of the RCRA Facility Investigation (RFI) is reported, and has refused to address this matter in public meetings.

The Permittee also states “...additional testing is unlikely to change the conceptual site model.” NMED has repeatedly indicated in its reviews of BFFS-related quarterly reports that the reports do not provide an adequate geologic conceptual site model, especially for the source area of the contamination. Rather than correct this deficiency in the quarterly reports, the Permittee has asserted many times that a proper conceptual site model will be included in the not-yet-submitted RFI Reports for the vadose zone and groundwater. Thus, NMED cannot assess whether additional testing is unlikely to change the conceptual site model when an adequate model has not yet been made available by the Permittee for review.

Additionally, the Permittee states that additional PneuLog testing is unlikely to provide further insight into vadose zone geology and contamination. As long as the PneuLog tests are conducted properly, NMED cannot agree with this claim. Just about any good characterization data are useful, even if only in a qualitative sense. What matters is whether the benefit of having the data is worth the cost and time to acquire it.

An advantage of the PneuLog testing is gaining continuous data in a borehole as opposed to collecting data at discrete intervals. It is also a relatively inexpensive method to obtain data for air flow resistance versus depth. In fact, the Permittee’s letter’s reason #2 makes the case clearly. For KAFB-106149 - “the only anomaly that is not obvious from the quarterly soil vapor data is a 25 ft interval of heightened vapor concentration at 250 ft bgs”, and for KAFB-106150 – “with the exception of a single anomaly, again at 250 ft of heightened vapor concentrations

demonstrated in the PneuLog profile.” The fact that two of the PneuLog holes demonstrated a zone of higher vapor concentrations that was missed by the Permittee’s evaluation of other data shows in this case an advantage, at least for the Permittee, of acquiring the PneuLog data.

The Permittee states that the 250 ft anomaly is found in all three PneuLog profiles, and implies that the anomaly was not known to exist from evidence obtained by other means. The Permittee also implies that knowing whether the distribution of this anomaly is continuous or laterally extensive would not likely change the conceptual site model. To the contrary, this anomaly may be a controlling factor on contaminant migration and thus may be important in development of the site conceptual model and ultimately the design of the remediation system.

Finally, although the draft letter indicates that there are attachments, NMED HWB staff did not find any attachments.