



KAFB 6/15/13  
Bulk Fuels Facility Spill  
Geophysics and  
Pneulog testing

On June 13, 2013, NMED HWB staff participated in a phone meeting with Kirtland Air Force Base (KAFB), Corp of Engineers, CB&I/Shaw (contactors to KAFB), and Jet West (geophysical logging contractor to CB&I/Shaw). The purpose of the meeting was to discuss two issues related to the Bulk Fuels Facility Spill (BFFS): 1) calibration problems with geophysical logging (induction logs) and 2) Pneulog testing. These two issues are important, concerning in particular, comments in a Notice of Disapproval (NOD) issued for the BFFS quarterly report for the April-June 2012 period.

NMED was asked by Tom Cooper of CB&I/Shaw what purpose did NMED see in the value of the geophysical logging. NMED answered that the purpose of the geophysical logging is to map stratigraphy of the lithologic units in the subsurface in the BFFS area. Lithology (and structural relationships that can be identified through the spatial distribution of lithologic units) can control the migration of contaminants in both the vadose (unsaturated) and the saturated zones. Although samples of cuttings from lithologic units were recovered and logged during the installation of wells, NMED has noted that not all geologic logs were done well, and geophysics helps to overcome the poor logging done by some CB&I geologists. Additionally, downhole geophysics is the only way to more accurately fix the depth of lithologic contacts given the drilling method used to install wells on the BFFS project (wells were not cored, rather cuttings were sampled and logged). Accurate, calibrated geophysical logs can also provide continuous information which can detect stratigraphy missed by the sampling of cuttings on 5 ft intervals, and can provide objective data, as opposed to subjective data where one geologist might call a sample silt and another call the same sample a fine sand, thus making stratigraphic correlation between nearby boreholes problematic.

NMED discussed numerous specific examples of induction logs that were improperly calibrated, and thus, are not similar to other logs done by other geophysical logging contractors at wells within and near the BFFS project (especially given the fact that there should be approximately an order of magnitude difference between the finer and coarser units). The Jet West representative stated that he experiences calibration problems at his shop, did not rely on calibration of the logging tool in the field, and complained that the layered sequence of the "shales and clays" impaired his tool's proper functioning. Bear in mind that distinguishing the layered sequence of "shales and clays" from coarser lithologies is supposed to be the purpose for using an induction logging tool. The geologic logs do not show any indications of shale, and there are few occurrences of clay. Even if this were the case, there are large zones of sands and gravel where the tool should not have been affected as claimed by Jet west. The Jet West representative also mentioned hole size or other site specific hole conditions (for example grout behind the casing) may also have influenced the tool. Many of these logging tools are designed for holes such those associated with the BFFS project, which are also common in engineering/hazardous waste investigations. A previous subcontractor (to CB&I/Shaw) did provide results that show the expected order of magnitude difference, indicating again that the Jet West results are suspect. NMED mentioned that ASTM Method 6726 (called for in the work plan) calls for 2 calibration standards and a free air check. The Jet West representative stated he used one calibration standard and that the tool had failed the free air check. The bottom line is that the Jet West tool did not provide acceptable results as a result of tool design or mechanical or human error or a combination of such errors. NMED asked KAFB to respond to the letter to provide the explanation given in the phone meeting (problems

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with calibration and tool function). NMED expects KAFB to take a position that the induction logs are not necessary; however, NMED HWB technical staff would not agree. Logs in hand done by other contractors, especially the induction logs, are clearly of great benefit to understanding the geology of the area.

The Pnelog issue was covered in a short amount of time because it really had been addressed in our meeting with KAFB a few weeks ago. KAFB has conducted Pnelog testing in 3 of 9 boreholes installed for this purpose. KAFB does not want to conduct the testing in the other 6 boreholes, insisting that additional data will not enhance the understanding of the geologic and contaminated conditions at the source area or affect SVE design. While KAFB sought agreement with NMED that the other 6 boreholes need not be tested, NMED cannot make a decision in the absence of justification and data supporting the justification. NMED informed KAFB (again) that they need to submit justification and we will consider their request. We also indicated, as we did a few weeks ago, that the Pnelog borings are to be logged using geophysical tools, even if the Pnelog testing is not conducted. All opportunities to collect information on the geology of the site at depth need to be taken advantage of, especially geophysical logging which is inexpensive and had been found to extremely helpful in mapping stratigraphy (which is now known to exert major control of contaminant migration in the source area).