Los Alamos
NATIONAL LABORATORY
EST. 1943
Environmental Programs
P.O. Box 1663, MS M991
Los Alamos, New Mexico 87545
(505) 606-2337/FAX (505) 665-1812

National Nuclear Security Administration
Los Alamos Site Office, MS A316
Environmental Restoration Program
Los Alamos, New Mexico 87544
(505) 667-4255/FAX (505) 606-2132

Date: SEP 2 9 2010
Refer To: EP2010-0435

James Bearzi, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Submittal of the Response to the Requirement to Discontinue Use of Brüel and Kaejer Multigas Analyzer for Field Screening of Volatile Organic Compounds at Material Disposal Areas G, H, and L, at Technical Area 54

References: (1) Letter, Mr. Bearzi to Messrs. Rael and Graham, dated 07/30/10
(2) Email, Mr. Shen to Mr. Paris, dated 05/18/08
(3) Email, Mr. McInroy to Messrs. Cobrain and Paris, dated 05/22/08

Dear Mr. Bearzi:

This letter is in response to the above-referenced letter from the New Mexico Environment Department (NMED) regarding screening volatile organic compounds (VOCs) at Material Disposal Areas (MDAs) G, H, and L.

The Laboratory performs pore-gas monitoring in accordance with Standard Operating Procedure 5074, Sampling of Subsurface Vapor. This procedure requires each sampling interval be purged for an amount of time sufficient to ensure that formation air is sampled. Additionally, pore gas is field screened for carbon dioxide and oxygen using a LandTec GEM-500, thereby providing additional evidence that formation air is being sampled. Historically, the Laboratory has also used a Brüel and Kaejer (B&K) Type 1302 multigas photoacoustic analyzer to field screen sampling ports at Technical Area 54 (TA-54) for carbon dioxide, water vapor, and selected VOCs: 1,1,1-trichloroethane (TCA); trichloroethene (TCE); tetrachloroethene (PCE); and Freon-11.

Previously, the Laboratory proposed to discontinue using the B&K instrument for screening PCE and Freon-11 because of the lack of correlation between the field-screening results and the analytical data. The Laboratory proposed to continue to screen for TCA and TCE because of the proven correlation between field-screening results and analytical data for these constituents. However, in the above-referenced letter (Reference 1), NMED states: "the field-screening results for TCA and TCE in fact, do not correlate with the analytical results" and "the B&K therefore does not provide useful field-screening data at MDA G or MDA L and the Permittees must discontinue using it for field-screening activities."

The Laboratory acknowledges NMED's concerns regarding the correlation of the B&K data with

the analytical data. However, in the following paragraphs, the Laboratory will demonstrate the correlation between field screening and analytical data for TCA and TCE. Data from three separate sampling events were selected: fiscal year (FY) 2009 MDA G periodic monitoring report (LA-UR-10-0269); first quarter FY2010 MDA L periodic monitoring report (LA-UR-10-2471); and second quarter FY2010 MDA H periodic monitoring report (LA-UR-10-0227). TCA and TCE are the most prevalent subsurface contaminants at MDAs G and L, and for this reason, these constituents were selected for field screening using the B&K. Minitab 16 statistical software was used to generate the correlation plots below.

Figure 1 shows the correlation for TCA field-screening results and analytical data from the three sampling events combined. The R-Square value of 95% indicates a statistically significant correlation between the TCA field-screening results and the analytical data.

As previously noted by NMED, there are often negative values for the screening results. These values are usually associated with low concentration areas, such as what is observed at MDA H. To evaluate the impact of lower TCA concentrations on the correlation, the pore gas-groundwater equivalency concentration (based on Henry's Law and defined in the vapor periodic monitoring reports) was used as a threshold concentration. Figure 2 shows the TCA correlation for concentrations less than 42,300 $\mu g/m^3$ (poor correlation, R-Square = 18.4%), and Figure 3 shows the TCA correlation for concentrations greater than 42,300 $\mu g/m^3$ (good correlation, R-Square = 93.3%). This analysis demonstrates that for low concentration areas, such as at MDA H, the usefulness of the B&K instrument as a screening instrument is limited. However, at areas with higher concentrations of TCA, such as MDAs L and G, the B&K instrument provides useful information without collecting an analytical sample at every sampling port. The examples of poor correlation cited in NMED's letter had TCA analytical concentrations less than 42,300 $\mu g/m^3$.

Figure 4 shows the correlation for all of the TCE field-screening results and analytical data from the three sampling events combined. The R-Square value of 92.6% indicates a statistically significant correlation between the TCE field-screening results and the analytical data.

As with the TCA data, to evaluate the impact of lower TCE concentrations on the correlation, the pore gas-groundwater equivalency concentration (based on Henry's Law) was used as a threshold concentration. Figure 5 shows the TCE correlation for concentrations less than 2000 $\mu g/m^3$ (poor correlation, R-Square = 33.6%), and Figure 6 shows the TCE correlation for concentrations greater than 2000 $\mu g/m^3$ (good correlation, R-Square = 91.5%). Again, this analysis demonstrates that for areas with low concentrations of TCE, such as at MDA H, the usefulness of the B&K instrument as a screening instrument is limited. However, at areas with higher concentrations of TCE, such as MDAs L and G, the B&K instrument provides useful information without collecting an analytical sample at every sampling port. The examples of poor correlation cited in NMED's letter had TCE analytical concentrations less than 2000 $\mu g/m^3$.

Additionally, NMED states that "the Permittees use results of field-screening to guide collection of samples for laboratory analyses." In fact, field screening does not guide sample collection. Since 2008, the Laboratory has used predetermined sampling locations approved by NMED for MDA G (Reference 2) and MDA L (Reference 3).

The Laboratory intends to continue to utilize the B&K instrument for field screening at MDA L and MDA G. As directed by NMED, the Laboratory will also use a photoionization detector (PID) equipped with an 11.7 electron volt lamp to field screen for the presence of VOCs, beginning with first quarter 2011 pore-gas monitoring at MDA H and MDA L. The Laboratory is concerned that the PID only identifies the presence of VOCs (e.g., a positive or negative reading) and will provide limited information during screening. Following review of the above information, the Laboratory requests that NMED reconsider its direction on this issue.

If you have any questions, please contact Jarrett Rice at (505) 665-3874 (wjrice@lanl.gov) or Ed Worth at (505) 606-0398 (eworth@doeal.gov).

Sincerely,

Michael J. Graham, Associate Director
Environmental Programs
Los Alamos National Laboratory

Sincerely,

George J. Rael, Manager
Environmental Projects Office
Los Alamos Site Office

MG/GR/AB/JR:sm

Enclosures: Two hard copies with electronic files – Correlations for Field-Screening Results at Material Disposal Areas G, H, and L (LA-UR-10-6475)

Cy: (w/enc.)
Neil Weber, San Ildefonso Pueblo
Ed Worth, DOE-LASO, MS A316
Jarrett Rice, EP-TA-54 Closure Project, MS M991
RPF, MS M707 (w/ two CDs)
Public Reading Room, MS M992

Cy: (Letter and CD and/or DVD only)
Laurie King, EPA Region 6, Dallas, TX
Steve Yanicak, NMED-DOE-OB, MS M894
Kristine Smeltz, EP-BPS, MS M992

Cy: (w/o enc.)
Tom Skibitski, NMED-OB, Santa Fe, NM
Annette Russell, DOE-LASO (date-stamped letter emailed)
Andy Baumer, EP-TA-54 Closure Project, MS C348
Michael J. Graham, ADEP, MS M991