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RON CURRY  
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**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

July 28, 2008

Patty Wagner  
Manager  
Sandia Site Office/NNSA  
U.S. Department of Energy  
P.O. Box 5400 MS 0184  
Albuquerque, NM 87185-5400

Francis B. Nimick  
Deputy Director  
Nuclear Energy & Global Securities Technologies  
Sandia National Laboratories  
P.O. Box 5800, MS 0701  
Albuquerque, NM 87185

**RE: NOTICE OF DISAPPROVAL: CORRECTIVE MEASURES EVALUATION  
REPORT FOR TECHNICAL AREA-V GROUNDWATER, JULY, 2005  
SANDIA NATIONAL LABORATORIES, EPA ID# NM5890110518  
HWB-SNL-05-027**

Dear Ms. Wagner and Mr. Nimick:

The New Mexico Environment Department (NMED) has reviewed the Corrective Measures Evaluation (CME) Report for Technical Area (TA-V) and hereby issues this Notice of Disapproval. The groundwater contaminant plume and hydrogeology of the area have not been adequately characterized, precluding the NMED from selecting a remedy for the remediation of contaminated ground water at Technical Area (TA-V) in accordance with Section VII.C.5 of the Compliance Order on Consent (April 2004). Additional site characterization efforts must be completed pursuant to Section IV.C of the Compliance Order on Consent before NMED can consider the CME for approval. NMED provides the following comments.

**COMMENTS RELATED TO FURTHER CHARACTERIZATION**

1. Section 2.1 p.12, 2<sup>nd</sup> paragraph states: "the extent of TCE, PCE, and nitrate contaminated groundwater is stable (or not expanding) because concentration trends are not increasing in TA-V monitoring wells." While this may have been correct at the time the document was being prepared, it is not accurate now. Analytical results of groundwater samples from monitoring well TAV-MW6 have shown an increasing trend in trichloroethene

(TCE) concentration since early 2004, and by mid 2006 levels have increased to above the MCL (5 µg/L). TCE concentrations are still increasing as of this date.

Section 3.2.1, Figure 3-4, p. 23, shows “plume contours are static or retreating” as part of the decision framework for evaluating monitored natural attenuation (MNA) and Section 3.2.1 paragraph 3.Tier I. Item 3.states that the plume contours are stable. However, due to the increase of TCE concentration in water samples from TAV-MW6, the contaminant plume appears to be expanding or migrating.

The local groundwater flow direction at TAV-MW6 (the well with increasing TCE concentration) is southeasterly. The nearest downgradient monitoring well to the east, TAV-MW3, where TCE has not been detected, is about 1700 feet away. The nearest downgradient well to the south is TAV-MW1, about 300 feet away. Typically TCE is detected in groundwater samples from TAV-MW1 at levels below the MCL, but at times concentrations may exceed the MCL, as was the case in 2005 and 2006. Figure 2-1, p. 14, shows the TCE plume extending in a southerly direction with no monitoring wells in place to detect the leading edge of the plume to the south. The Lawrence Livermore National Laboratory Groundwater Flow Study, Attachment 3 of the Summary Report of Groundwater Investigations at Technical Area V, Operable Units 1306 and 1307, March 1999, indicates a southerly flow component at LWDS-MW1 and TAV-MW1 using a direct groundwater-flow measurement borehole tool. Additional wells must therefore be installed for the purposes of better defining the ground water flow direction and for monitoring the TCE plume to the south and east.

2. The regional conceptual model in the TA-V area needs clarification. Figure 1-2, p. B-15 of Attachment B does not show the “mixed coarse to fine-grained alluvial fan sediments” encountered in the drilling of TAV-MW3. This zone was once considered to be Ancestral Rio Grande (ARG) based on identification of pumice in at least 4 separate zones in the geologist’s log. It was reinterpreted as “mixed coarse to fine-grained alluvial fan sediments” when it was decided that ARG did not extend as far to the east as previously believed (SAND2003-1869, Geologic Investigation: An Update of Subsurface Geology on Kirtland Air Force Base, New Mexico, p. 50).

Figure 5-11 of SAND2003-1869 depicts a large area of fine to coarse grained alluvial fan sediments in the TA-V area as exemplified by the location of KAFB-10. Figure 5-7 of SAND2003-1869 shows an area of mixed alluvial fan lithofacies. Both of these figures distinguish between a zone of mixed deposits and the separate coarse grained and fine grained units shown on Figure 1-2. While Figures 5-7 and 5-11 don’t agree with each other in the TA-V area, they both show the regional importance of this “mixed coarse to fine-grained alluvial fan sediments” unit, contrary to what is reported in the CME (Figure 1-2 in Attachment B, p. B-15).

Increasing TCE concentrations at TAV-MW6 and local potentiometric surface maps imply groundwater is flowing toward TAV-MW3 and the "mixed coarse to fine-grained alluvial fan sediments". The ground water level is dropping faster at TAV-MW3 (the well finished in that unit) compared to the water levels in any other TA-V wells, implying a ground water flow gradient that is increasing faster to the east than to the west. While it could be argued that a larger gradient toward the east is good in that it leads to a longer travel time before the contaminant plume eventually moves west, it is not clear that there is a monitoring well appropriately placed to intersect the edge of a plume, nor are the hydrologic parameters of the "mixed coarse to fine-grained alluvial fan sediments" unit understood. Additional monitoring wells are needed to characterize the edge of the plume and its relationship to the mixed coarse to fine-grained alluvial fan sediments, and the hydrogeologic properties of the unit.

3. The Permittees must include surveying all the TAV, LWDS and AVN monitoring wells for accurate horizontal and vertical coordinates in a single survey to remove the possibility that the persistent, uncharacteristic "groundwater mound" is an artifact of survey errors and that the new wells help to show correctly the overall groundwater flow pattern.
4. Attachment C, Figure 3-2, p. C-29, and Figure 4-1, p. C-38, indicate ARG deposits occur approximately 2 miles away from TA-V. Section 2.2.4, p. C-23 states "[g]roundwater moves westward approximately 10,000 ft through the alluvial-fan lithofacies, where it enters the highly permeable ARG lithofacies...". However, Figure 2-3, p. C-16 indicates ARG was found at TAV-MW5 (600 feet from edge of plume and possibly closer to the plume). This would decrease the travel time needed for a contaminant to reach the Ridgecrest and KAFB well fields. The ARG at TAV-MW5 should be monitored.

#### **MISCELLANEOUS COMMENTS**

5. A U. S. Department of Energy letter to NMED dated November 27, 2006, concerning an increase in TCE concentration above the MCL at TAV-MW6 states "Sandia attributes increasing TCE concentrations in TAV-MW6 to groundwater with higher TCE concentrations migrating from upgradient locations." Describe what is meant by the phrase "upgradient locations".
6. The water level in the easternmost well, TAV-MW3, is declining faster than that in the westernmost well, TAV-MW5, implying a lessening of the gradient to the west of the center of the contaminant plume and a steepening of the gradient to the east of the center of the plume. Indicate whether this is expected to continue and explain how this might affect the conceptual and computer model of the contaminant plume.
7. The conceptual model in the TA-V area, as presented in Figure 1-2, p. B-15 of Attachment B, shows strata dipping with a westerly component. Strata at the few hundred

feet depth to the south at the Mixed Waste Landfill and to the north in the TAG area exhibit dips with an easterly component. Explain this difference in dip direction.

8. Submit in electronic form an updated spreadsheet of analytical results for groundwater sampling and elevations at all TAV, LWDS and AVN monitoring wells since the CME was submitted.

### **COMMENTS CONCERNING REVISIONS TO THE CME REPORT**

Various issues to be considered or corrected in a revised CME Report are discussed in the comments below. The Permittees must respond to these comments via the revised CME Report.

9. In Section 2.2, Potential Receptors, p. 15, the 1<sup>st</sup> bullet states COA municipal well (RG-9302-S) is approximately 6 miles downgradient of TA-V. The well is actually about 5 miles from TA-V. The 2<sup>nd</sup> bullet states KAFB-4 is approximately 3.8 miles downgradient. KAFB-4 is less than 3 miles from TA-V. (A figure showing the current and hypothetical production wells considered would be helpful.) The 2<sup>nd</sup> paragraph refers to Section 3.1.3, presumably of Attachment C. However, Section 3.1.3 does not seem to discuss current and hypothetical production wells, suggesting that the reference is erroneous and should be corrected.
10. Section 2.4.4, of Attachment B, p. B-35 seems to eliminate air stripping out of hand. Additional justification should be provided to eliminate air stripping or air stripping in conjunction with MNA as viable remedial alternatives.
11. Section 3.4, Remedial Alternatives Evaluation, p. 32, needs to present a timeframe comparison argument for the alternatives, and give a clear estimate of how much time is expected to pass to achieve target cleanup goals. Clearly defined target cleanup goals (acceptable concentrations and timeframe) and how performance will be monitored need to be in the evaluation.
12. The CME Report should consider whether the KAFB 40-year water plan (in the process of being filed with the State Engineer) has any bearing on TA-V groundwater.
13. The November 27, 2006, letter (see comment # 5 above) refers to the "Groundwater Flow and TCE Transport Model for Technical Area V and Vicinity" (in preparation at the time that the letter was transmitted to the NMED). Presumably this report discusses a model of simulated TCE concentrations at TAV-MW6. Recent TCE concentration values exceed the upper bound of the 95% confidence interval of the degradation rate presented in the letter. Thus, the model and the report discussed in this letter are inaccurate. Also, the attached graph in the letter is confusing, as the first "x interval" is 4 years and the following intervals are 5 years. Thus, it is unclear if the data are plotted correctly at the appropriate time location. It is also unclear if the labels of the x-axis apply to the interval

between ticks or to the tick marks themselves. The graph should be corrected when the model is updated.

14. With respect to ARG (see comment 4), the model, Attachment C, Figure 3-2, p. C-29, and Figure 4-1, p. C-38 need to be consistent with Figure 2-3, p. C-16.
15. All wells should be used to create the cross-sectional flow model and should be shown on Figure 3-2, p. C-29 in Attachment C. Annotate the location of the Kirtland Air Force Base (KAFB) water-supply wells on the figure as well as potential locations for a Mesa del Sol well field.
16. Indicate whether pumping of the KAFB water-supply wells is taken into account in the model, and if so, how.
17. Show the location of KAFB-4 or other pertinent KAFB water supply wells on Figure 4-1, p. C-38 in Attachment C (see comment 5) after correction of the model in Attachment C.
18. As an example, the Regional Groundwater Elevation Map for SNL/KAFB, FY04 (Figure 7-4, p. 7-18 of the 2004 Annual Site Environmental Report for Sandia National Laboratories, New Mexico) shows a shorter pathway for groundwater flow between TA-V, and KAFB and water-supply wells than the map shown on Figure 3-2, p. C-29, Attachment C. The most conservative groundwater flow map should be used as the basis for the model in Attachment C.
19. Because the computer groundwater flow model presented in Attachment C does not predict the increase in TCE at TAV-MW6, the model should be revised.
20. Demonstrate using water level data whether the "groundwater mound" at TA-V is actually a mound or a ridge.
21. Discuss how the hydrologic parameters used in the computer groundwater model compare to the State Engineer's groundwater model in the KAFB area.

The U.S. Department of Energy and Sandia Corporation ("Permittees") must submit a revised CME Report. However, before submittal of a revised CME Report, the Permittees must respond to comments 1-8 above and submit a work plan to the NMED for approval to adequately characterize groundwater at TA-V by October 1, 2008. The work plan, in consideration of all of the comments above, must describe the work that will be performed to adequately characterize the contaminated groundwater and hydrogeology at TA-V. The work plan must also contain a proposed schedule of the work to be completed, subject to NMED review and approval including the dates of submission to the NMED of an investigation report and revised CME Report.

Ms. Wagner and Mr. Nimick  
July 28, 2008  
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If you have any questions regarding this matter, please contact Mr. Sid Brandwein of my staff at (505) 222-9504.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Bearzi', with a small dot above the 'i'.

James P. Bearzi  
Chief  
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB  
W. Moats, NMED HWB  
S. Brandwein, NMED HWB  
T. Skitbitski, NMED DOE OB  
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SNL-05-027