NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

DAVE MARTIN
Secretary

RAJ SOLOMON, P.E.
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 5, 2011

Col. Robert L. Maness
Commander
377th ABW/CC
2000 Wyoming Blvd., SE
Kirtland Air Force Base, NM 87117-5606

John Pike
Director, Environmental Management Section
377 MSG/CEANR
2050 Wyoming Blvd., SE, Suite 116
Kirtland Air Force Base, NM 87117-5606

RE: NOTICE OF DISAPPROVAL
SOIL-VAPOR EXTRACTION OPTIMIZATION PLAN, BULK FUELS FACILITY SPILL, SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111, JUNE 2011
KIRTLAND AIR FORCE BASE, EPA ID# NMD9570024423
HWB-KAFB-11-010

Dear Mr. Col. Maness and Mr. Pike:

The New Mexico Environment Department (NMED) has reviewed the document *Soil-Vapor Extraction Optimization Plan, Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111, June 2011* (hereafter referred to as the Optimization Plan). The NMED has identified a number of deficiencies which are specified in the comments below. This letter also presents recommendations for future soil-vapor extraction (SVE) work.

Comments on Optimization Plan:

1. Page ix, Acronyms and Abbreviations - For clarification this list should be expanded to include all acronyms that appear in the document, such as "SVEW".

2. Page ES-3 - Investigating the vertical and horizontal radius of influence is appropriate. There are a number of wells already in the source area where the remediation effort should be concentrated. Useful information may be obtained by attaching manometers to wells that are appropriately screened to evaluate the vacuum propagation from the extraction wells currently being used. Revise the Optimization Plan accordingly.

3. Page 3 - Discussion of the nature and extent of contamination - This discussion would benefit from maps that have the tank and piping infrastructure included on them. This is a general comment for all maps that show distribution of wells, borings, and contaminant plumes. The spatial relationship of these items to the tank system infrastructure is critical to understanding the placement of future remediation wells. Revise the Optimization Plan accordingly.

4. Figures 4-1, 4-2, and 4-3 – These figures need to show tanks, lines and system infrastructure in spatial relationship to wells, borings and contaminant plumes. On Figure 4-2, the inset map is erroneously labeled as Figure 5-3. It should be Figure 4-3. Revise the Optimization Plan accordingly.

5. Figure 4-4 - Expand each panel to its own page. In the text of the report, describe how these data were collected. Either each map should show which wells were used for drawing the contours of the specific depth or include this information on the legends of individual depth maps along with the screened interval in each well. Data values supporting the contours should be posted on the maps. Revise the Optimization Plan accordingly.

6. Figure 4-5 - Describe meaning of the "flags" on wells in the legend. Describe the meaning of the grid blocks on the well designations in the legend. Check the figure for consistency of stratigraphic interpretation with the data presented. Revise the Optimization Plan accordingly.

7. In its December 10, 2010, letter to the Permittee, NMED instructed the Permittee to, among other things, prepare an Optimization Plan for the four existing SVE units and to:

    a. Prepare the locations of existing groundwater monitoring wells KAFB-3411, KAFB-10614, KAFB-10624, KAFB-10617, KAFB-10618, and KAFB-10610 for conducting SVE.
    b. Propose alternative technologies in the Optimization Plan for the removal and treatment of soil-vapor contamination that do not rely on the use of internal combustion engines.

    The Optimization Plan did not present any information concerning the preparation of well locations or on alternative technologies. Prepare the well locations and revise the Optimization Plan accordingly.

Recommendations for Future Work:

1. Page 4-1, SVE Well Summary- this text states: "...the extraction wells all have 15 foot screens". The standard approach is to place the screens for extraction wells throughout

the zone of contaminated soil. For a well that penetrates a large thickness of contaminated soil, multiple well screens can be set. Setting 15 foot screens in extraction wells, regardless of contaminant distribution, is not an efficient use of extraction wells.

Additionally, the extraction wells currently in place are only 2-inches in diameter. Standard practice for extraction wells deeper than 100 feet is 4-inch diameter and preferably 6-inch diameter wells. Increased well-screen surface area is a benefit of larger diameter wells. Installing larger diameter wells would also reduce potential significant head-loss issues associated with 2-inch diameter wells.

2. Pages 4-8 and 4-9, System flow for Unit ST-106- This RSI unit is manifolded to nine extraction wells. The unit is reportedly operating at 40 SCFM. This is an unusually low flow rate, more in-line with passive bio-venting than active SVE. The flow rate should be increased by at least an order of magnitude or give an explanation as to why such a low flow rate is being maintained.

3. Page 4-9, Non-Aqueous Phase Liquid Well Systems- "Assuming a 1-foot thick NAPL zone on the water table" This is an oversimplification of the presence of NAPL in the subsurface that can lead to remediation design mistakes. The complexity of the subsurface NAPL occurrence is further suggested by the observed reduction of the number of wells (3) reported to contain NAPL presumably because of a recent rise in the water table. A better model for understanding NAPL in the subsurface is described in, "Soil Properties and Design Factors Influencing Free Phase Hydrocarbon Clean-Up" by G.D. Beckett and David Hartley in *Environmental Science and Technology,* Volume 32, pages 287-293, January 1998.

4. Figure 4-7 - This graph suggests that the SRI units attached to wells KAFB-1065, KAFB-1066, and KAFB-1068 are either at their limit of efficacy or reaching conditions where extraction rates are diffusion limited. Given the remaining estimated volume of contamination and areal distribution of the contamination, these units should be moved to more advantageous extraction points.

5. Figures A-1 through A-20 - These graphs can be used in conjunction with the identified pipe leak locations and well screen intervals to make future decisions on where to locate and screen SVE wells.

6. Future wells should be installed as "dual purpose" wells, both investigative and potential remediation wells (i.e. appropriate screen lengths, larger diameters, high flow screen, and appropriate sand pack).

7. Properly designed SVE wells should be installed in the source area and attached to a SVE blower and treatment package as a project priority.

Concluding Remarks:

The Permittee must prepare the locations for conducting SVE by **October 7, 2011**, and notify the NMED of the completion of this work by **October 12, 2011**. The Permittee must also submit by **September 9, 2011**, revisions to the Optimization Plan that correct the deficiencies and provide the additional information specified in the section of this letter entitled *Comments on Optimization Plan.*

If you have any questions regarding this letter, please contact Mr. William McDonald of my staff at (505) 222-9582.

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

cc: R. Solomon, NMED Deputy Secretary
B. Tongate, NMED EPD
W. Moats, NMED HWB
W. McDonald, NMED HWB
S. Brandwein, NMED HWB
S. Reuter, NMED PSTB
G. Schuman, NMED SWB
J. Schoeppner, NMED GWQB
L. Barnhart, NMED OGC
B. Gallegos, AEHD
R. Shean, ABCWUA
L. King, EPA-Region 6 (6PD-N)
File: KAFB 2011 and Reading
KAFB-11-010