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April 16, 2014

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RE: WORK PLAN TO CONDUCT PILOT TESTING FOR
AEROBIC REMEDIATION EVALUATION
BULK FUELS FACILITY SPILL
SOLID WASTE MANAGEMENT UNITS ST-106 AND SS-111
KIRTLAND AIR FORCE BASE
EPA ID# NM9570024423, HWB-KAFB-14-MISC

Dear Colonel Miller and Mr. Pike:

The New Mexico Environment Department (NMED) and the Air Force presented interim measures goals for addressing the Kirtland Air Force Base (KAFB) Bulk Fuels Facility Spill at an Albuquerque Bernalillo County Water Utility Authority (WUA) Governing Board Meeting on August 21, 2013. The three stated goals are to implement interim measures (IM) for three tasks to address: 1) soil-vapor extraction (SVE) system expansion, 2) light nonaqueous-phase liquids (LNAPL), located in the vicinity of the release site, and 3) the ethylene dibromide plume (EDB) that has migrated off site north of the Base. In an August 26, 2013 email from Tom Blaine, Director Environmental Health Division to Brent Wilson, KAFB Base Civil Engineer, NMED requested separate work plans for each task outlined by both NMED and the Air Force at the WUA Governing Board meeting. In a reply email dated August 27, 2013, from Brent Wilson to Tom Blaine, the U.S. Air Force (Permittee) agreed that proposed work would be presented in work plans.

NMED has conducted discussions on an ongoing basis with the Permittee since August 2013 concerning interim measures to address LNAPL and the generally co-located dissolved benzene,



toluene, ethylbenzene and total xylenes (BTEX) plume in groundwater that resulted from the release of aviation gasoline and jet fuel in the vicinity of the former Bulk Fuels Loading Facility. It is NMED's opinion that progress related to the three tasks identified above has been limited.

An interim measure SVE system consisting of two extraction wells, an associated blower and ancillary equipment and a catalytic oxidizer (CATOX) vapor treatment system extracts subsurface vapors in the vicinity of the release location (source area) on Kirtland Air Force Base property. The SVE system began operation in the LNAPL/BTEX plume source area in January 2013. The SVE system currently destroys hydrocarbons extracted from the subsurface at a reported rate of approximately 70 pounds per hour. Three additional wells were connected to the CATOX treatment system in late March 2014.

The Permittee has proposed, in a draft plan, to conduct pilot tests to enhance anaerobic degradation of hydrocarbons at the locations of some of the highest detected concentrations of benzene in groundwater, and at the downgradient end of the BTEX plume approximately 1000 feet and 2000 feet, respectively, from the source area. The plan proposes to conduct bench-scale testing of samples obtained from the vicinity of the center of the BTEX plume and from the western edge of the plume. The samples would be tested using a range of nutrient additives to determine whether enhanced biodegradation of hydrocarbons is applicable to the site and to identify the type and concentrations of nutrients that would be most effective to enhance anaerobic degradation. The bench-scale tests are expected to take approximately five months to complete. A subsequent plan would propose conducting push-pull tests at the two sampling locations in an attempt to evaluate the efficacy of injecting nutrients into groundwater in the saturated zone near the water table. Should this approach appear viable, a pilot test consisting of injection of nutrients and subsequent monitoring to determine the effectiveness of the technology would be conducted that would likely take one or more years to complete.

Given the length of time for the adequate testing of enhancement of anaerobic biodegradation, it is NMED's opinion that pilot testing of aerobic remediation technologies should be conducted in parallel with the anaerobic testing within the LNAPL/BTEX plume to evaluate aerobic remediation technologies at a location sufficiently distant from the anaerobic test locations that any effects of an aerobic pilot test will not interfere with the anaerobic testing over the next two to three years.

In a letter dated **April XX, 2014 [draft sent to Air Force on 4/4/14 but not yet sent formally]**, NMED directed the Permittee to upgrade their SVE system by expanding the hydrocarbon treatment capability and targeting the migration pathway from the source area to the water table using either existing wells, if located appropriately, or installing new extraction wells specifically targeting depths where high concentrations of vapor-phase hydrocarbons have historically been detected. The migration pathway contains the highest concentrations of hydrocarbons adsorbed to subsurface soils in the vadose zone and likely contains the highest concentrations of vapor-phase hydrocarbons and may be a continuing source of groundwater contamination.

To further evaluate remediation technologies that may be effective in mitigating LNAPL and dissolved-phase fuels-related contamination, the Permittee is directed to submit a work plan to NMED proposing aerobic treatment of groundwater at the source area. The treatment

Col. Miller and Mr. Pike
April 16, 2014
Page 3

technology should be designed to work in conjunction with the upgraded SVE system. Based on the estimated groundwater flow rate of 200 feet per year, source area groundwater should not reach the location of the anaerobic pilot testing in the center of the LNAPL/BTEX plume for approximately five years. Therefore, there is sufficient time to complete both pilot tests before any interference with the anaerobic pilot test by aerobically treated water is likely to occur.

The work plan must include a detailed description of the proposed method for aerobic treatment of groundwater, the proposed wells that will be used to monitor the interim measure including any new wells necessary to implement or monitor the pilot test, any permits necessary to implement the interim measure (NMED prefers an interim measure that does not require additional permitting), a list of the equipment necessary to implement the interim measure, a description of all testing and monitoring methods to be employed and a schedule for implementation and reporting on all activities related to the pilot test. The work plan must be submitted to NMED for review no later than **June 1, 2014**. Please contact me at (505) 827-2855 if you have questions.

Sincerely,

Tom Blaine, P.E.
Director
Environmental Health Division

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File: KAFB 2014 Bulk Fuels Facility Spill - SWMUs ST-106 and SS-111