



SUSANA MARTINEZ  
Governor

JOHN A. SANCHEZ  
Lieutenant Governor

NEW MEXICO  
ENVIRONMENT DEPARTMENT

*Environmental Health Division*

Harold Runnels Building  
1190 Saint Francis Drive (87505)  
P.O. Box 5469, Santa Fe, NM 87502-5469  
Phone (505) 827-2855 Fax (505) 827-0310  
[www.nmenv.state.nm.us](http://www.nmenv.state.nm.us)



RYAN FLYNN  
Cabinet Secretary

BUTCH TONGATE  
Deputy Secretary

TOM BLAINE, P.E.  
Director  
Environmental Health Division

April 24, 2014

Colonel Tom D. Miller  
Base Commander  
377 ABW/CC  
2000 Wyoming Blvd. SE  
Kirtland AFB, NM 87117-5606

John Pike  
Director, Environmental Management Services  
377 MSG  
2050 Wyoming Blvd. SE, Suite 116  
Kirtland AFB, NM 87117-5270

**RE: LNAPL AND DISSOLVED PHASE EDB  
AEROBIC REMEDIATION  
INTERIM MEASURE WORK PLAN  
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:

In accord with the Kirtland Air Force Base (Base) Hazardous Waste Treatment Facility Operating Permit No. NM9570024423 (Permit), issued to the United States Air Force (USAF or Permittee) by the New Mexico Environment Department (NMED) pursuant to the New Mexico Hazardous Waste Act, NMSA 1978, Sections 74-4-1 to 74-4-14, NMED required, and the USAF committed to, implementation of interim measures to reduce and prevent migration of hazardous wastes and hazardous waste constituents from the Bulk Fuels Facility Spill at the Base while long-term corrective action remedies are being evaluated and implemented. See Permit Sections 6.0 and 6.2.2.2.12.1. The interim measures were justified based on the extent of the fuel spill, its location, and the amount of time needed to establish and implement corrective measures under the Resource Conservation and Recovery Act (RCRA). The deadlines for certain interim measures were discussed, evaluated, decided and presented publically by the USAF and NMED at the Albuquerque Bernalillo County Water Utility Authority Governing Board Meeting on August 21, 2013.<sup>1</sup> NMED required that interim measures be implemented to address three

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<sup>1</sup> <https://abcwua.legistar.com/LegislationDetail.aspx?ID=1468058&GUID=B0B2F126-32F8-404F-A39C-EA02C3E0129E>  
<https://abcwua.legistar.com/LegislationDetail.aspx?ID=1468057&GUID=A99E6C62-CADF-4D8C-8E51-B3ADCF3FA026>

related but separable contaminated areas of the subsurface affected by the fuel spill, and the USAF agreed to implement three interim measure tasks by specified dates:

- (1) The Vadose Zone (expand Soil Vapor Extraction System, end of 1<sup>st</sup> Q, 2014);
- (2) The Light Non Aqueous Phase Liquid (LNAPL) (design and implement interim measures to address LNAPL and dissolved phase Ethylene Dibromide (EDB), benzene, toluene, ethylbenzene and total xylenes (BTEX) located in the vicinity of the release site, end of 2<sup>nd</sup> Q, 2014); and
- (3) EDB (design and implement interim measures to address dissolved phase EDB that has migrated off site north of the Base, end of 4<sup>th</sup> Q, 2014).

In addition to the three interim measure tasks, the USAF committed to developing a pump test of the extraction well by the end of the 3<sup>rd</sup> Q, 2013.

Since then, NMED, the USAF, the USAF's contractor CB&I (formerly Shaw Environmental), the U.S. Army Corp of Engineers, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), the City of Albuquerque, the U.S. Environmental Protection Agency and the Veterans Administration Hospital have engaged in weekly technical meetings to ensure progress is made under RCRA, including implementation of the required interim measures to achieve near-term reductions in contaminant concentrations in both the saturated and unsaturated zones beneath and downgradient from the Bulk Fuels Facility Spill. Initially, NMED was pleased with the progress made by the USAF and CB&I to develop a pump test of the extraction well and expand the Soil Vapor Extraction System by the required deadlines. Recently, NMED has been concerned with the performance of the USAF and CB&I as they work through RCRA requirements and towards implementation of the LNAPL and dissolved phase EDB interim measure treatment. The work product submissions have not been technically adequate, maps have been mislabeled, tables have contained errors, permitting implications of proposed actions have not been considered, and there has been an overall lack of attention to detail for a matter that is of the utmost importance to NMED and the State of New Mexico. The quality of the work has jeopardized the achievement of the interim measures by the specified deadlines.

This letter serves to reinforce the deadline that was set by NMED, and committed to by the USAF, to implement interim treatment technologies for the LNAPL and dissolved phase EDB by June 30, 2014. Additional correspondence will address subsequent tasks. Interim measures are imperative to prevent the further spread of contamination in advance of the selection and implementation of a final remedy, which is NMED's ultimate goal.

NMED has conducted ongoing discussions with the Permittee and CB&I since August 2013 concerning interim measures to address LNAPL and the generally co-located dissolved BTEX and EDB plume in the groundwater that resulted from the release of aviation gasoline and jet fuel in the vicinity of the former Bulk Fuels Loading Facility. Based on the results of investigation and monitoring over the past two years, the LNAPL/BTEX plume appears to be relatively stable, likely due to biodegradation occurring where contaminant concentrations are lower relative to the source area. The EDB plume has, however, migrated over 3,500 feet north (downgradient) from the estimated northern edge of the BTEX plume, indicating that the biodegradation limiting

the migration of BTEX does not effectively restrict EDB from continuing to move north from the source area.

The Permittee has proposed, in a draft plan, to conduct pilot tests to enhance anaerobic degradation of hydrocarbons within the LNAPL/BTEX plume. 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 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 effectiveness of injecting nutrients into groundwater in the saturated zone near the water table. If this approach appears viable, a pilot test consisting of injection of nutrients and subsequent monitoring to determine the efficacy of the technology would likely take more than one year to complete. The permitting requirements to allow this technology could take several months. Such permitting requirements were discussed with CB&I at the time they were preparing for the aquifer test completed in November 2013. Additionally, early in March, when CB&I identified to NMED the anaerobic proposal for treatment of the LNAPL, NMED staff advised that permitting of an injection well for the nutrients could take between 2 and 4 months. To date, an application for a permit to inject nutrients into the groundwater has not been filed.

Given the length of time to implement enhancement of anaerobic biodegradation, the USAF shall implement the proven technology of aerobic remediation. This shall be conducted in parallel with the anaerobic testing. The implementation of the aerobic technology shall be conducted at or near the downgradient boundary of the LNAPL/BTEX plume to evaluate that remediation technology's effectiveness in addressing the LNAPL and dissolved phase EDB in the groundwater. The objective of this will be to evaluate the use of air sparging to remove LNAPL constituents, such as EDB, migrating past the observed northern limit of the LNAPL/BTEX plume, as a containment measure. Air sparging will be implemented as an interim measure to contain LNAPL and dissolved phase constituent migration from the LNAPL source area (Task 2). If this technology can demonstrate effective and significant removal of EDB, it may be considered as part of a more comprehensive interim measure to remediate EDB-contaminated groundwater (Task 3) that has migrated beneath areas north of Bullhead Park by eliminating the ongoing source of LNAPL and dissolved phase EDB contamination.

To evaluate air sparging as a remediation technology to remove LNAPL dissolved phase EDB from groundwater migrating north from the BTEX/LNAPL plume, the Permittee is directed to submit a work plan to NMED proposing aerobic treatment of groundwater in the vicinity of the northern extent of detected benzene in groundwater. The treatment technology shall be designed to work in conjunction with an SVE system to remove volatilized LNAPL and EDB, generated by air sparging, from the vadose zone.

The LNAPL and Dissolved Phase EDB Aerobic Remediation Interim Measure Work Plan must include a detailed description of the proposed air sparging pilot test, including the details of air sparge and SVE well drilling and installation; core sampling and groundwater sampling; the specifications and capabilities of the equipment necessary to conduct the pilot test; the method of

treatment of extracted air and any applicable air emissions permitting issues; the proposed wells that will be used to monitor the effects of the air sparging, including any new wells to either implement or monitor the pilot test; the proposed testing and monitoring methods to be employed; and a schedule for implementation and reporting on all activities related to the pilot test.

The final LNAPL and Dissolved Phase EDB Aerobic Remediation Interim Measure Work Plan must be submitted to NMED for review no later than **May 8, 2014**. Upon receipt, NMED will either approve the work plan, approve with modification, or, in the event that NMED determines that the work plan is deficient, disapprove the work plan in accordance with 20.4.2.201(B)(4) NMAC. If the Permittee receives a Notice of Disapproval, the Permittee shall submit to NMED an amended work plan addressing all items listed in the Notice of Disapproval within the time period set out in such Notice. Upon NMED approval of the work plan, the Permittee shall commence the work as set forth in the work plan immediately and will implement the aerobic remediation by **June 30, 2014**.

As explained above, NMED has required the implementation of interim measures, and NMED may require submissions related thereto, as the submissions and the requirement to implement interim measures are contemplated within the Permit itself. NMED is demanding submission of the LNAPL and Dissolved Phase EDB Aerobic Remediation Interim Measure Work Plan based on its Permit authority to require interim measures, CB&I's recent sub-par performance and the USAF's commitment to meet the interim measure deadlines. Failure to submit any of the work plans, schedules, reports, and other deliverable documents required in this letter or required by NMED for implementation of interim measures may subject the Permittee to an enforcement action under Permit Section 1.2, including NMSA 1978, Sections 74-4-10 or 74-4-13. Should the Permittee fail to submit the requested work plan by the dates indicated in this letter, or fail to implement interim measure treatment technologies for the LNAPL and dissolved phase EDB by June 30, 2014, NMED will exercise its statutory authority under the New Mexico Hazardous Waste Act and issue a compliance order which may include civil penalties of up to ten thousand dollars (\$10,000) per day of noncompliance for each violation. Failure to comply with any corrective action specified in a compliance order may result in additional penalties of up to twenty-five thousand dollars (\$25,000) for each day of continued noncompliance with the requirements.

As Secretary Flynn and the USAF indicated in August, we cannot allow this spill to impact Albuquerque's drinking water, and we must implement aggressive interim measures in the months ahead to ensure that drinking water remains safe. We have a statutory and moral duty to the citizens of New Mexico to hold the USAF to that commitment.

Please contact me at (505) 827-2855 if you have questions.

Sincerely,



Tom Blaine, P.E.

Director

Environmental Health Division

cc: J. Kendall, NMED General Counsel  
B. Grantham, NMED OGC  
J. Kieling, NMED HWB  
D. Cobrain, NMED HWB  
S. Reuter, NMED PSTB  
J. Lanning, KAFB  
L. Bitner, KAFB  
B. Gallegos, AEHD  
F. Shean, ABCWUA  
L. King, EPA-Region 6 (6PD-N)

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