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**KIRTLAND AIR FORCE BASE
ALBUQUERQUE, NEW MEXICO**

**Response to NMED Letter Dated December 7, 2012
Repeat Sampling and Gas Bubbles in Groundwater
Samples**

**Bulk Fuels Facility Spill
Solid Waste Management Units ST-106 and SS-111**

January 2013



**377 MSG/CEANR
2050 Wyoming Blvd. SE
Kirtland AFB, New Mexico 87117-5270**





DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 377TH AIR BASE WING (AFMC)

ENTERED

Colonel John C. Kubinec
377 ABW/CC
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5600

JAN 04 2013



Mr. John Kieling, Manager
RCRA Permits Management Program
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Road
Santa Fe New Mexico 87505

Dear Mr. Kieling

Attached please find letter with subject title: *Response to NMED Letter dated December 7, 2012; Repeat Sampling and Gas Bubbles in Groundwater Samples; Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111; Kirtland Air Force Base, New Mexico.* This letter addresses NMED concerns listed in NMED letter dated December 7, 2012.

Please contact Mr. L. Wayne Bitner at (505) 853-3484 or at ludie.bitner@kirtland.af.mil or Ms. Victoria R. Martinez at (505) 846-6362 or at victoria.martinez@kirtland.af.mil if you have any questions.

Sincerely


JOHN C. KUBINEC, Colonel USAF
Commander

Attachment:

Response to NMED Letter dated December 7, 2012; Repeat Sampling and Gas Bubbles in Groundwater Samples; Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111; Kirtland Air Force Base, New Mexico

cc:

NMED-RPD (Skibitski), w/out attach
NMED-HWB (Moats, McDonald, Salem, Brandwein), w/ attach
NMED-GWQB (J. Schoeppner), w/ attach
NMED-OGC w/out attach

EPA Region 6 (L. King), w/out attach

AFCEE/CMSE (Mr. Oyelowo), w/out attach

/EXEC (Mr. Urrutia), w/out attach

Public Info Repository (Central New Mexico), w/ attach

Administrative Record/Information Repository (AR/IR), w/ attach

File, w/ attach

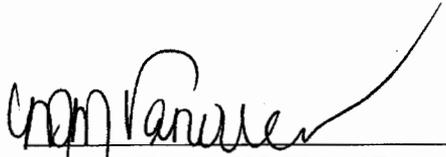
**40 CFR 270.11
DOCUMENT CERTIFICATION
JANUARY 2013**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.



JOHN C. KUBINEC, Colonel, USAF
Commander, 377th Air Base Wing

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KIRTLAND AIR FORCE BASE
377th Air Base Wing Public Affairs



January 4, 2013

**Subject: Response to NMED Letter Dated December 7, 2012
Repeat Sampling and Gas Bubbles in Groundwater Samples
Bulk Fuels Facility Spill, Solid Waste Management Units ST-106 and SS-111
Kirtland Air Force Base, New Mexico**

To Whom it May Concern:

This letter is being submitted in response to the letter received from the New Mexico Environment Department (NMED) on December 7, 2012, regarding the sampling of gas bubbles in groundwater samples. This letter responds to the concerns enumerated in the referenced letter.

As stated in the NMED letter dated September 28, 2011, the concern is that the presence of gas bubbles in water samples would be detrimental to sample integrity, particularly to those samples analyzed for volatile organic compounds. In the Kirtland Air Force Base (AFB) response letter, sent January 26, 2012, potential sources of entrained bubbles were identified as follows:

- Faulty Bennett™ pump operation
- Naturally occurring gas bubbles dissolving when in equilibrium with the atmosphere

As stated in the Kirtland AFB letter dated January 26, 2012, the Bennett sample pumps in use are gas driven pumps. Compressed gas is used to return groundwater to the surface and atmospheric air could potentially enter the sample stream if there is a broken seal between the air drive cylinder and the water-side piston. The design of the pump is such that when functioning properly, the drive gas never contacts the groundwater. The pumps installed in the wells of concern in the original August 2011 verbal communication from the NMED (KAFB-106045, KAFB-106061, and KAFB-106081) all had new, dedicated Bennett™ sample pumps installed at the time the bubbles were observed. Similarly, the wells documented in the letter dated November 7, 2012 (KAFB-106205, KAFB-106205, and KAFB-106209), all had recently installed new, dedicated Bennett™ sample pumps. All new pumps were thoroughly tested by the manufacturer prior to shipment. Additionally, Shaw Environmental & Infrastructure, Inc. (Shaw) worked with Bennett™ to verify pump functionality and determined that air in the discharge tubing from pump malfunction was a low probability because water would not be returned to the surface. However, if the observed bubbles are a function of the sampling equipment, they should have gas analytical results equivalent to the drive gas (e.g., atmospheric for atmospheric air compressor, or argon).

In the letter dated January 26, 2012, Kirtland AFB recommended additional gas bubble sampling in order to better document the potential source of the gas bubbles. These methods were further documented in the Kirtland AFB letter dated November 30, 2012. The methods outlined in the letter are industry standard methodologies for sampling and analyzing gas bubbles. The NMED letter dated December 7, 2012, identified the following four main concerns following the receipt of the Kirtland AFB letter:

1. **NMED Comment:** An ambient air sample needs to be obtained and analyzed to provide “background conditions.” Previously, the Permittee compared gas sample analyses to a published reference on air components, which may not present accurate information for the Bulk Fuels Facility Spill Site.

Response: The Bulk Fuels sampling program utilizes air compressors as the source of compressed gas to drive the sample pumps. The air compressors draw atmospheric air in and utilize that air to drive the sample pump. In the previous evaluation of gas bubbles, it was most appropriate to compare the gas bubble sampling results to ambient air because the air compressors utilize ambient/atmospheric air. This current evaluation will utilize compressed argon as the drive gas in the air compressors. The use of argon gas will allow a definitive path forward to evaluate whether or not a faulty sampling pump is the source of entrained gas bubbles. An ambient air sample would be a benefit to the evaluation if atmospheric air was being introduced to the system through the air compressor; in the proposed approach this is not the case. Since argon will be used, no ambient air sample will be collected.

2. **NMED Comment:** The Isotech Laboratories, Inc. website (<http://www.isotechlabs.com/customsupport/samplingprocedures/IsoBagSM.pdf>) states “...When using a pump, it should be capable of maintaining a constant pressure at or above that which exists within the aquifer. This is to ensure that gases dissolved in the water within the aquifer remain dissolved until the water is transferred into an IsoBag®. If using a pulsating pump such as a bladder pump, please contact Isotech for additional recommendations.” The Permittee must contact Isotech and report to the NMED additional recommendations made by Isotech, if any, concerning the use of their product in this particular situation, which includes both the pressure in the tubing being below ambient aquifer pressure and use of a pulsating pump.

Response: Isotech Laboratories was contacted prior to developing the evaluations documented in the Kirtland AFB letter dated November 30, 2012, and all recommendations have been incorporated into the design of the evaluation.

3. **NMED Comment:** The second bullet of Page 3 states “Based on experience with similar sites in New Mexico, where ARCH has been used and has resulted in bubbles, the bubbles caused by this drilling method will be persistent with time.” The Permittee must provide details describing which sites this statement refers to and what relevant conditions are similar between these sites and the Bulk Fuels Facility Spill area.

Response: During the resampling even on November 6, 2012, during which NMED, Kirtland AFB, U.S. Army Corps of Engineers (USACE), and Shaw representatives were on site to observe the gas bubbles and determine path forward, an NMED employee stated that he had seen the same type and density of bubbles during groundwater sampling in wells at Los Alamos National Labs. He stated that they were able to determine that ARCH introduced gas bubbles into the aquifer because of the amount of air pressure used to drive cuttings to the ground surface. The Kirtland AFB letter dated November 30, 2012, was documenting this verbal communication, per agreement reached in the field between NMED, Kirtland AFB, USACE, and Shaw.

4. **NMED Comment:** The analysis of only two gas samples is insufficient. Propose at least four additional samples that are to be taken at well locations along the entire length of the plume and at different depths where bubbles have been observed during water sampling.

Response: Based on the sporadic occurrences of bubbles observed in the groundwater monitoring wells (Table 1 in the Kirtland AFB letter dated November 30, 2012), Shaw proposed an iterative approach to sampling gas bubbles in order to evaluate the source(s) of bubbles. Shaw will schedule and sample gas bubbles at the two proposed wells (KAFB-106205 and KAFB-106206). The results of these two samples will be used to inform the selection of four additional groundwater monitoring wells for gas bubble sampling. Sampling of gas bubbles at additional wells will also be dependent on the observation of gas bubbles during groundwater monitoring sampling; bubbles do not consistently occur in all wells from quarter to quarter (Kirtland AFB letter dated November 30, 2012). The additional gas bubbles will be collected in coordination with the scheduled groundwater monitoring sampling.

The following are four wells Shaw has tentatively selected for sampling, following the receipt and analysis of gas bubble samples from KAFB-106205 and KAFB-106206:

- KAFB-1069: This well was installed during initial drilling of monitoring wells for the Bulk Fuels Facility spill and is located in the historic nonaqueous phase liquid footprint at the toe of the plume.
- KAFB-106082: This is a shallow well in the plume core, along the plume axis that had bubbles observed during Third Quarter 2012.
- KAFB-106057: This is an intermediate well near the northeastern boundary of the ethyldibromide plume. Bubbles were observed in this well location in three of the four quarters evaluated in the Kirtland AFB letter dated November 30, 2012.
- KAFB-106090: This is a deep well along the plume axis. Bubbles have been observed at this well location since installation.