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NMED Hazardous Waste Bureau

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

JUN 21 2013

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

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

In the NMED letter dated January 17, 2013, the NMED responded to proposed actions presented in our letter; *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*, dated January 4, 2013. NMED conveyed concerns related to the following four specific items which are addressed in this letter:

1. **NMED Comment:** NMED directed the Permittee to collect an ambient air sample for the purpose of establishing background air composition at the site. However, the Permittee did not agree to collect and analyze an ambient air sample, citing that the use of argon in place of compressed air renders understanding ambient air composition as useless. NMED disagrees; not only is ambient air composition useful for analyzing earlier data collected by compressed-air-driven pumps, but is necessary for setting the baseline atmospheric argon concentration to be used for evaluating data from samples collected with argon-powered pumps. The Permittee shall collect, analyze, and provide the results of an ambient air sample to the NMED as previously directed. Furthermore, the ambient air sample shall be collected at one of the wells and on the same day where the sampling of gas bubbles is to take place at the well.

   Response: As directed by the NMED in the January 17, 2013, letter a single ambient air sample will be collected. The ambient air sample will be collected from a location within 25 feet of one of the wells where gas samples are to be obtained from groundwater and will be collected immediately prior to, at the same time as, or immediately after the gas sample is collected from the well. The ambient air sample will be collected over a duration not to exceed 60 minutes; the exact location will be determined in the field in order to prevent contamination by any exhaust emitting equipment in the immediate area; the location selected will be upwind of such equipment. The ambient air sample will be collected in a cali-5 bond bag, provided by IsoTech® Laboratories, Inc., following the methods in the attached product sheet (Attachment A). Both the ambient air and gas bubble samples will be analyzed in the same laboratory for the same suite of analyses.

The results of the ambient air sample will be used as a laboratory quality control. Additionally, the ambient air sample results will be used to establish the background content of CO_2, argon, methane, and other gases in ambient air.

2. **NMED Comment:** Isotech Laboratories, the supplier of IsoBag® sample container to be used in this effort, has specific recommendations for collecting water samples by pulsating pump for dissolved gas analysis. NMED directed the Permittee to report these procedures, if any, as they relate to collecting samples at BFF wells. The Permittee's response was that Isotech Laboratories "recommendations have been incorporated into the design of the evaluation," meaning that there are recommendations to report, which were not provided. The Permittee shall report the recommendations made by Isotech Laboratories as directed in NMED's December 7, 2012, letter.

   Response: Prior to submittal of the Kirtland AFB November 30, 2012 letter, Shaw contacted Isotech Laboratories to discuss sampling of gas bubbles; Shaw specifically discussed the Bennett™ pumps and the appropriateness of the standard protocol. Isotech Laboratories recommended no change to their sampling protocol (Attachment A) using their Isobag® sample container. As stated in the Kirtland AFB January 3, 2013 letter, the instructions in the attached laboratory-provided sheet have been incorporated into the sampling procedure outlined in the Kirtland AFB November 30, 2012 letter.

3. **NMED Comment:** The NMED directed the Permittee to provide details on sites in New Mexico where ARCH drilling technology was used to install wells where bubbles in water samples have been observed as a result of air forced into groundwater by the drilling method. The Permittee cites an opinion from an NMED staff member that ARCH may be the source for entrained air in groundwater in the case of some wells at Los Alamos National Laboratory (LANL). No information was provided by the Permittee to indicate that conditions similar to LANL exist for wells installed for the BFF project. In addition, no documentation regarding entrained air in groundwater LANL was referenced. Therefore, the NMED has no reason to believe that ARCH drilling is the source of the bubbles observed for BFF wells.

   Response: Detailed information concerning the use of ARCH drilling methodology during LANL's groundwater investigation, and subsequent reporting, has not been located. The information regarding gas bubbles as a result of ARCH drilling was anecdotal information provided by an NMED staff member in the field during the well sampling on November 6, 2012. The original intent was to remind all parties of the conversation.

4. **NMED Comment:** Collecting and analyzing gas samples from only two wells out of the more than 30 wells that have been observed with entrained gas bubbles in purge water and water samples is insufficient to support a conclusion with regard to the source of the gas bubbles. The Permittee shall propose at least six wells for gas sampling, as directed previously.

   Response: As stated in the Kirtland AFB January 3, 2013 letter, the following six wells are proposed for the sampling of gas bubbles in groundwater.

   The six wells listed below have all been approved or recommended by the NMED Hazardous Waste Bureau (HWB) in either the May 23, 2013 partial approval letter, or an email dated June 5, 2013:

   - KAFB-106205: This well is one of the most recently installed groundwater monitoring wells and had bubbles observed in groundwater during sampling in November 2012.

   - KAFB-106206: This well is one of the most recently installed groundwater monitoring wells and had bubbles observed in groundwater during sampling in November 2012.

- KAFB-106040: This is a deep well located along the eastern edge of the plume that has had bubbles observed six out of the past seven quarters.

- KAFB-106051: This is deep well that serves as a sentry well along the western edge of the plume and it has had bubbles observed six out of the past seven quarters.

- KAFB-106071: This is a deep well located along the western edge of the plume and it has had bubbles observed six out of the past seven quarters.

- KAFB-106104: This is a deep well located along the eastern edge of the plume and it has had bubbles observed during the past seven quarters of sampling.

In addition to the above listed wells, one alternate well was recommended by the NMED HWB. This well may be sampled if one of the original six proposed well does not have bubbles present at the time of sampling.

- KAFB-106092: This is an intermediate well located near the western edge of the plume and has had bubbles observed six out of the past seven quarters.

NMED will be notified no less than 10 days in advance of sampling. Initially, gas bubbles will be sampled from wells KAFB-106205 and KAFB-106206, with a 72-hour turn-around time for laboratory results. The results will be evaluated and will be used to inform the sampling of the four remaining wells. The attached schedule shows that the four wells will be sampled within approximately 10 days of receipt of the results from wells KAFB-106205 and KAFB-106206. This time period accounts for time to validate the gas analytical results from the first two samples plus the ambient sample. If there are any issues with the sample collection method or analytical data, more time may be required to have further discussions with the NMED on sample wells, approach, and/or laboratory. Sampling of gas bubbles will also be dependent on the observation of gas bubbles, since bubbles do not consistently occur in all wells from quarter to quarter (Attachment B). If no bubbles are found in groundwater at a well that is proposed for the collection of gas samples in this letter, an alternate well will be selected and proposed to NMED for approval. KAFB will request that the NMED select an alternative well within two working days of discovery that bubbles are not present in groundwater at a well.

Attachment B is an updated table illustrating the occurrences of bubbles during quarterly groundwater monitoring events. The table is current through Second Quarter 2013.

Attachment C is an updated schedule for gas bubble sampling and reporting. The first two gas bubble samples will be collected two weeks after receipt of NMED approval of this plan. A data letter report documenting the findings of the gas bubble sampling, as well as conclusions and recommendations, will be submitted to the NMED by **August 26, 2013**.

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

cc:
NMED-RPD (Skibitski) w/o attch
NMED-HWB (Cobrain, Moats, McDonald, Brandwein) w/attch
NMED-GWQB (J. Schoeppner) w/attch
NMED-PSTB (Reuter) w/attch
NMED-OGC w/o attch
EPA Region 6 (L. King) w/o attch
AFCEE/CMSE (Mr. Oyelowo) w/o attch
Public Info Repository (Central New Mexico) w/attch
Administrative Record/Information Repository (AR/IR) w/attch
File, w/ attch

40 CFR 270.11
DOCUMENT CERTIFICATION
JUNE 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

This document has been approved for public release.

KIRTLAND AIR FORCE BASE
377 ABW Public Affairs

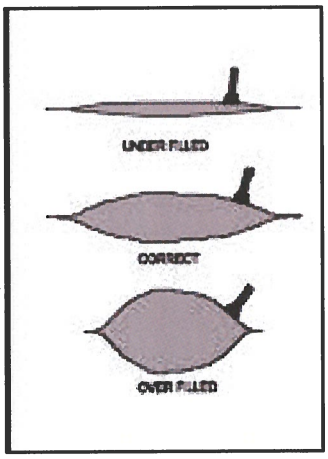
ATTACHMENT A

Collection of Gas Samples Using a Hand Pump and Gas Bags

1. Attach the inlet tubing of the hand pump provided (black end) to the monitoring probe or sampling point and pump for a sufficient length of time to purge the system of air. The purge gas may be vented to the atmosphere.

2. Remove a gas bag from its shipping container and while pumping slowly, insert the male luer fitting on the outlet of the hand pump (clear end) into the luer-fit valve on the gas bag with a slight twisting motion. Inserting the male luer fitting depresses the valve stem and opens the valve. The tapered design of this fitting allows for a leak-tight friction fit.

3. The bag can be filled with about twenty squeezes of the bulb. To allow space for expansion during shipment, the bag should only be filled to about 2/3 of capacity. The bag is properly filled when it is about 1 1/2 inches thick, as shown in the drawing.



4. Once the bag is filled, remove the fitting from the bag (be careful because if the fitting is pressed into the valve too tightly, the top of the valve can separate from the main valve body when attempting to remove the fitting). Although these bags are durable, they can be damaged if not handled properly. Be careful not to crease or puncture the bags.

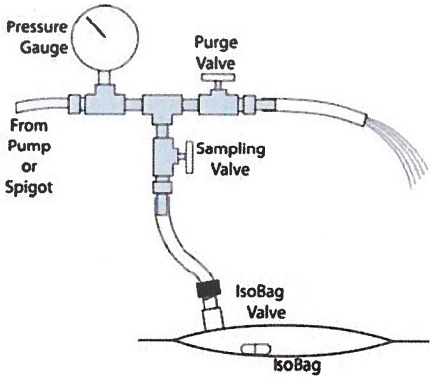
5. Record the pertinent information on the tag attached to the bag and on the chain of custody form provided and return the bag to the shipping container in which it was received. Samples should be shipped to the laboratory for analysis as soon as possible. If the samples are suspected to be flammable (>5% methane) they must be identified as hazardous and shipped according to the enclosed shipping instructions.

In preparing the sampling equipment described above we have tried to provide the user with the equipment and instructions necessary for the safe collection of gas samples under normal conditions. These have been prepared assuming that they will be used by someone who is familiar with the collection of natural gas samples and is fully aware of standard safety procedures and precautions. Isotech is not responsible for accidents resulting from improper use of this equipment or from use of unsafe practices.

Collection of Ground Water Samples from Domestic and Municipal Water Wells for Dissolved Gas Analysis

1. **Sampling source:** Water samples should either be collected from a pressurized water system or by using a suitable water pump. When sampling from a pressurized water system, it is recommended to use an outdoor spigot or other source which bypasses any water treatment systems (i.e. water softeners, etc.). 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.

2. **Sampling Mechanism:** *After purging the well*, a mechanism consisting of a pressure gauge in line with two valves should be attached to the spigot or pump output (see figure). The ***purge valve*** (see figure) allows water to be pumped through the system to purge both the well and the tubing. The ***sampling valve*** (which should point downward), provides a point whereby a sample split can be slowly "bled" off from that water which is being continuously purged out of the system via the ***purge valve***. Sampling in this manner allows for collection of a sample over a longer period of time, and as such should provide a sample that is more representative of the water source, in essence creating an "averaging effect" during collection.



3. **IsoBags:** The gas bags provided have been evacuated in advance. A capsule filled with bactericide has also been inserted.

4. **Collection of samples:** Slowly open the ***purge valve*** to purge any gas or air from the tubing. The flow rate should be controlled so as to allow a reasonable flow, while also maintaining a pressure close to the maximum pressure of the water system or pump. When the line has been adequately purged and a steady state situation is achieved, open the sampling valve slightly to purge the air from it. Then, with the water still running at a low rate, connect the fitting to the valve on the IsoBag and proceed to fill the bag (note: the slower the filling rate, the greater the "averaging effect"). The bag should be filled with approximately 500 cc of water (i.e. to a thickness of about 1 inch). When sufficient sample has been collected, close the sampling valve and quickly disconnect the fitting from the IsoBag. The water flow can now be turned off and the hose disconnected. Reattach the cap to the valve of the IsoBag.

5. **Submission of samples.** After recording the sample identification on the attached label, the bag should be placed in its protective box and packed **laying flat**. Complete a Chain-of-Custody/Analysis Request form and include it with the sample(s). **If possible, samples should be shipped the same day collected, via an overnight delivery service. Client MUST inform Isotech of shipment prior to arrival.** Please note Isotech's receiving hours of **Monday thru Friday** 8:00 am to 4:30 p.m.

   Ship samples to:

   Isotech Laboratories, Inc.
   1308 Parkland Court
   Champaign, IL 61821

These instructions have been provided to simplify the collection of samples for dissolved gas analysis. Although we try to foresee and avoid problems in the field, it is never possible to predict every situation. If you encounter any difficulties, or if any additions or changes in these instructions would be beneficial, please let us know.

Isotech Laboratories, Inc. makes no warranty as to the applicability and/or safety of the procedures described herein.

ATTACHMENT B

Bubbles Only Data

Well ID	Shallow, Intermediate, Deep	Qt4, 2011	Qt1, 2012	Qt2, 2012	Qt3, 2012	Qt4, 2012	Qt1, 2013	Qt2, 2013
KAFB-3								
KAFB-15								
KAFB-16								
KAFB-3411	Shallow							
KAFB-1061	Shallow							
KAFB-1062	Shallow							
KAFB-1063	Shallow							
KAFB-1064	Shallow						X	X
KAFB-1065	Shallow		X					
KAFB-1066	Shallow							
KAFB-1067	Shallow							
KAFB-1068	Shallow		X					
KAFB-1069	Shallow			X				
KAFB-10610	Shallow							
KAFB-10611	Shallow							
KAFB-10612	Shallow							
KAFB-10613	Shallow						X	
KAFB-10614	Shallow							
KAFB-10615	Shallow							
KAFB-10616	Shallow							
KAFB-10617	Shallow							
KAFB-10618	Shallow							
KAFB-10619	Shallow							X
KAFB-10620	Shallow							
KAFB-10621	Shallow		X					X
KAFB-10622	Shallow							
KAFB-10623	Shallow							X
KAFB-10624	Shallow							
KAFB-10625	Shallow						X	X
KAFB-10626	Shallow			X				
KAFB-10627	Shallow							
KAFB-10628-510	Shallow							
KAFB-106029	Shallow			X			X	X
KAFB-106030	Intermediate			X		X	X	X
KAFB-106031	Deep (550 ft)				X	X	X	X
KAFB-106032	Shallow		X					
KAFB-106033	Intermediate	X			X	X	X	X
KAFB-106034	Deep (550 ft)		X		X	X	X	X
KAFB-106035	Shallow						X	
KAFB-106036	Intermediate		X			X	X	X
KAFB-106037	Shallow				X	X	X	X
KAFB-106038	Shallow						X	
KAFB-106039	Intermediate	X	X	X			X	X
KAFB-106040	Deep (550 ft)	X	X	X		X	X	X
KAFB-106041	Shallow							
KAFB-106042	Intermediate							X
KAFB-106043	Deep (590 ft)		X	X			X	X
KAFB-106044	Intermediate						X	X
KAFB-106045	Deep (550 ft)				X			
KAFB-106046	Shallow							X

Bubbles Only Data (continued)

Well ID	Shallow, Intermediate, Deep	Qt4, 2011	Qt1, 2012	Qt2, 2012	Qt3, 2012	Qt4, 2012	Qt1, 2013	Qt2, 2013
KAFB-106047	Intermediate		X			X	X	X
KAFB-106048	Deep (550 ft)					X	X	X
KAFB-106049	Shallow						X	
KAFB-106050	Intermediate				X	X	X	X
KAFB-106051	Deep (550 ft)		X	X	X	X	X	X
KAFB-106052	Shallow							X
KAFB-106053	Intermediate	X	X					X
KAFB-106054	Deep (550 ft)	X	X					
KAFB-106055	Shallow							X
KAFB-106057	Intermediate	X	X		X		X	X
KAFB-106058	Deep (550 ft)		X			X	X	X
KAFB-106059	Shallow				X			
KAFB-106060	Intermediate		X	X	X		X	X
KAFB-106061	Deep (590 ft)							
KAFB-106062	Deep (590 ft)							
KAFB-106063	Intermediate		X				X	X
KAFB-106064	Shallow						X	
KAFB-106065	Intermediate		X		X	X	X	X
KAFB-106066	Deep (550 ft)		X			X	X	X
KAFB-106067	Shallow						X	
KAFB-106068	Deep (590 ft)		X	X	X		X	X
KAFB-106069	Intermediate							
KAFB-106070	Shallow							X
KAFB-106071	Deep (590 ft)	X	X	X		X	X	X
KAFB-106072	Intermediate		X	X		X		X
KAFB-106073	Intermediate		X		X	X	X	X
KAFB-106074	Deep (590 ft)		X		X			
KAFB-106075	Shallow				X		X	X
KAFB-106076	Shallow							
KAFB-106077	Intermediate					X	X	X
KAFB-106078	Deep (590 ft)			X				
KAFB-106079	Shallow		X	X	X		X	
KAFB-106080	Intermediate							
KAFB-106081	Deep (590 ft)							
KAFB-106082	Shallow				X		X	X
KAFB-106083	Intermediate		X	X	X		X	X
KAFB-106084	Deep (590 ft)		X	X	X		X	X
KAFB-106085	Shallow						X	X
KAFB-106086	Intermediate			X	X	X	X	X
KAFB-106087	Deep (590 ft)			X	X	X	X	X
KAFB-106088	Shallow							
KAFB-106089	Intermediate		X	X	X	X	X	X
KAFB-106090	Deep (590 ft)	X	X	X	X	X	X	X
KAFB-106091	Shallow							X
KAFB-106092	Intermediate	X	X	X		X	X	X
KAFB-106093	Deep (590 ft)		X	X	X		X	X
KAFB-106094	Shallow	X	X				X	
KAFB-106095	Intermediate			X		X	X	X
KAFB-106096	Deep (590 ft)	X	X			X		
KAFB-106097	Intermediate		X	X	X		X	X
KAFB-106098	Deep (550 ft)		X	X			X	X

Bubbles Only Data (concluded)

Well ID	Shallow, Intermediate, Deep	Qt4, 2011	Qt1, 2012	Qt2, 2012	Qt3, 2012	Qt4, 2012	Qt1, 2013	Qt2, 2013
KAFB-106099	Intermediate	X	X			X		X
KAFB-106100	Deep (550 ft)		X				X	X
KAFB-106101	Intermediate			X			X	
KAFB-106102	Deep (550 ft)							
KAFB-106103	Intermediate	X						
KAFB-106104	Deep (550 ft)	X	X	X	X	X	X	X
KAFB-106105	Intermediate		X				X	X
KAFB-106106	Shallow		X					
KAFB-106107	Deep (550 ft)		X	X	X	X	X	X
KAFB-106160								
KAFB-106161							X	
KAFB-106201	Shallow						X	
KAFB-106202	Intermediate					X	X	
KAFB-106203	Deep					X	X	X
KAFB-106204	Shallow							
KAFB-106205	Intermediate					X		X
KAFB-106205R	Intermediate					X		
KAFB-106206	Intermediate					X	X	X
KAFB-106206R	Intermediate					X		
KAFB-106207	Shallow							X
KAFB-106208	Intermediate						X	X
KAFB-106209	Deep					X	X	X
KAFB-106209R	Deep					X		
KAFB-106007-R								
KAFB-2819-R-CRT								
KAFB-VA2								
KAFB-ST106-VA2								

ft Foot/feet
ID Identification

ATTACHMENT C