General ENTERED John Young

Los Alamos
NATIONAL LABORATORY
EST. 1943

Environmental Protection Division
Water Quality & RCRA Group (ENV-RCRA)
P.O. Box 1663, Mail Stop K490
Los Alamos, New Mexico 87545
(505) 667-0666/FAX: (505) 667-5224

Date: March 25, 2008
Refer To: ENV-RCRA-08-065
LA-UR: 08-1709

Mr. Robert George, Domestic Team Leader
Ground Water Pollution Prevention Section
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2250
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, New Mexico 87502

Dear Mr. George:

SUBJECT: NOTICE OF INTENT DECISION TREE, LAND APPLICATION OF GROUND WATER

On March 14, 2008, at your Santa Fe office we discussed several technical issues concerning the NMED-approved NOI Decision Tree for the land application of water produced by Los Alamos National Laboratory (LANL) during the drilling, rehabilitation, development, and sampling of ground water wells. Most important of these issues is the problem of analytical detection limits that are greater than the NOI Decision Tree's screening levels. I would like to review the history of our communications on this subject, the key points from our March 14th discussions, and then propose a path forward for resolving this issue.

In October 25, 2007, and November 6, 2007, emails (see Enclosure 1) LANL reported to the NMED that eight organic compounds had Method Detection Limits (MDLs) that were greater than the NOI Decision Tree criteria for land application. In these emails the Laboratory proposed to your agency that the MDLs for these eight compounds become the default screening limits because (1) there is regulatory precedence for defaulting to MDLs (e.g., LANL's NPDES permit), (2) the Laboratory's analytical methods are in compliance with the New Mexico Water Quality Control Commission (NM WQCC) regulations for the analysis of ground water (NMAC 20.6.2.3107), and (3) the NM WQCC allows for the substitution of an MDL for a standard when the MDL is larger (NMAC 20.6.4.12.E).

In your staff's reply to our emails (see Enclosure 2) on February 8, 2008, Ms. Jennifer Fullman pointed out several discrepancies between the screening limits used by LANL and the NMED for the eight compounds of concern. In addition, Ms. Fullman recommended that four analytical methods with lower MDLs be considered as substitutes for SW-846-8260B and SW-846-8270C, the methods currently being used by LANL. These two topics were discussed in detail at the March 14th meeting. Below, I have attempted to summarize our response to Ms. Fullman's technical points:

1. The discrepancies in screening limits discovered by Ms. Fullman were created when the EPA Region 6 posted their revised Human Health Media Specific Screening Levels (HHMSSLs) in early 2008. The 2006 HMSSLs incorporated by LANL into the NOI Decision Tree are no longer current and will be replaced with the HHMSSLs listed on EPA's website: http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screenvalues.pdf.

2. The analytical methods recommended by Ms. Fullman are older, gas chromatography (GC) methods that have been replaced by mass spectrometry (MS) methods. While the GC methods might be capable of producing a small reduction in the MDLs for 5 of the 8 compounds, using them will require duplicate analytical runs—analyzing each ground water sample by both SW-846-8260B/8270C and the four GC methods—making their use both impractical and expensive given the modest gains in sensitivity. In lieu of the GC methods, the Laboratory recommended that our contract analytical laboratory, General Engineering Laboratories (GEL), undertake an MDL study to see if lower MDLs might be achievable using the SW-846-8260B and SW-846-8270C methods.

3. To add context to the discussion, the Laboratory introduced at the March 14th meeting the frequency of detections for the eight compounds (see Table 1.0). Only one of the eight compounds, acrolein, was detected in ground water (excluding springs) during 2003-2007.

Table 1.0. Frequency of Detections in Ground Water (excluding springs), 2003-2007.

Eight Compounds	Detections	Number of Results
Acrolien	1	722
Acrylonitrile	0	722
Benzidine	0	652
Bis (2-chloroethyl)ether	0	825
Nitrosodiethylamine (N-)	0	553
Nitrosodimethylamine (N-)	0	771
Nitroso-di-n-butylamine	0	553
Nitrosopyrrolidine (N-)	0	553

In summary, the Laboratory and the NMED have been communicating since October 2007 on the subject of MDLs greater than NOI Decision Tree screening limits for eight organic compounds. The NMED has identified errors in the HHMSSL screening limits being used by the Laboratory in the NOI Decision Tree and those will be corrected. Further, the NMED's recommendation to use GC analytical methods is, in the Laboratory's opinion, not cost effective due to the modest gains in sensitivity that these methods would provide. And finally, the frequency of detections in ground water for these eight compounds is very low with only one compound detected in a five year period.

In consideration of the above, the Laboratory proposes to direct its contract analytical laboratory, GEL, to undertake a Method Detection Limit (MDL) study to determine the best analytical methods for achieving the lowest MDLs, at the lowest cost, for these eight compounds. The Laboratory will initiate this study within the next 30 days and will report the findings to the NMED in a written report by June 30, 2008. In the interim period, the Laboratory requests that the NMED allow the Laboratory to use the current MDLs for these eight compounds as the default screening limits for the NOI Decision Tree.

Please call me at (505) 667-7969 if you have any questions regarding this request.

Sincerely,

A R Grieggs for

Bob Beers
Water Quality & RCRA Group

BB/lm

Enclosures: a/s

Cy: Marcy Leavitt, NMED SWQB, Santa Fe, NM, w/enc.
John Young, NMED HWB, Santa Fe, NM, w/enc.
Jennifer Fullman, NMED GWQB, Santa Fe, NM, w/enc.
Steve Yanicak, LASO-GOV, w/enc., J993
Matthew Johansen, LASO-EO, w/o enc., A316
Gene Turner, LASO-EO, w/o enc., A316
Michael B. Mallory, PADOPS, w/o enc., A102
Richard S. Watkins, ADESHQ, w/o enc., K491
Tori George, ENV-DO, w/o enc., J978
Mike Saladen, ENV-RCRA, w/o enc., K490
Mike Alexander, WES-RS, w/o enc., K497
ENV-RCRA, File, w/enc., K490
IRM-RMMSO, w/enc., A150

Enclosure 1

To: john.young@state.nm.us, JakeKnutson, dave.cobrain@state.nm.us, jennifer.montoya@state.nm.us
From: Robert Beers <bbeers@lanl.gov>
Subject: NOI Decision Tree for Land Application of Ground Water_take2
Cc: saladen, alexander, Rene, sherrard@lanl.gov, GRIEGGS, wbh@lanl.gov, RobertGeorge, george.schuman@state.nm.us
Bcc: bbeers@lanl.gov
Attached: T:\my documents\2007\NOIs\MDL vs Stds Issue\NOI Decision Tree_MDLs greater than Limits.xls;

Hi John, Dave, Jake, and Jennifer,

Let me start with a little background information to frame the situation. Last year the NMED approved the NOI Decision Tree for the management of drilling, development, rehabilitation, and sampling purge water. The NOI Decision Tree established specific criteria for determining if the produced ground water could be land applied. Because the Laboratory may produce ground water at as many as 200 wells in a typical year we immediately realized that we needed to develop a database tool that could compare current analytical results with the NOI Decision Tree criteria. The database tool has been built and we quickly identified a minor problem that needs to be corrected. The purpose of this email is to bring this problem to your attention and request your concurrence in the solution we are proposing to implement.

MDLs Greater Than Applicable Screening Limits
We have identified nine compounds (all NM WQCC toxic pollutants) whose Minimum Detection Limits (MDLs), as established by General Engineering Laboratories, are greater than the EPA Region 6 Tap Water Human Health Medium-Specific Screening Levels. For one of the nine compounds, nitrobenzene (CAS#98-95-3), we found another analytical method with a lower MDL that will permit us to meet the screening level. We are moving forward to use this alternate method in future sampling events. We could not, however, find any methods with lower MDLs for the compounds in the attached table.

We propose to resolve this conflict in the following manner,
1) Use existing nitrobenzene data (with an MDL=3.13 ug/L, Screening Limit=3.395 ug/L, 90% Screening Limit=3.056 ug/L) for all current NOI Decision Tree determinations. The MDL will be the screening limit. In addition, we will begin using the alternate method, with an MDL=0.13 ug/L, in future ground water sampling events.
2) For the eight compounds listed in the attached table, the MDL would become the screening limit for all NOI Decision Tree determinations.

If you would like, I am available to meet with you at your earliest convenience to discuss this matter further. I have some charts showing the distribution of MDL values over the past three years that I would be happy to share with you. I look forward to your reply to our proposed plan. We are unable to make any final determinations under the NOI Decision Tree regarding the management of produced ground water until this is resolved.

Sincerely,
Bob

NOI Decision Tree, Table of Analytes w/ MDLs Greater Than Screening Limits (DATA SOURCE: WQDB)

Analyte	CAS	Screening Limit (ug/L)	90% of Screening Limit	Current MDL	3-Yr MDL Range	Analytical Method to Use	Carcinogenic Code
Acrolein	107-02-8	0.0416	0.03744	3	3	SW-846:8260B	N
Acrylonitrile	107-13-1	0.389	0.3501	1	1	SW-846:8260B	C
Benzidine	92-87-5	0.0029	0.00261	1.35	1.35-5	SW-846:8270C	C
Bis(2-chloroethyl)ether	111-44-4	0.098	0.0882	2.08	1.35-5	SW-846:8270C	C
Nitrosodiethylamine[N-]	55-18-5	0.0045	0.00405	1.35	1.35-5	SW-846:8270C	C
Nitrosodimethylamine[N-]	62-75-9	0.013	0.0117	0.22	0.22-8	SW-846:8270C	C
Nitroso-di-n-butylamine[N-]	924-16-3	0.02	0.018	1.35	1.35-5	SW-846:8270C	C
Nitrosopyrrolidine[N-]	930-55-2	0.32	0.288	1.35	1.35-5	SW-846:8270C	C

Note: All of the data contained in the above table is available to the public at: http://wqdbworld.lanl.gov/

To: RobertGeorge, JohnYoung, george.schuman@state.nm.us
From: Robert Beers <bbeers@lanl.gov>
Subject: Fwd: NOI Decision Tree for Land Application of Ground Water_take2
Cc: saladen, alexander, rene, GRIEGGS
Bcc:
Attached: T:\my documents\2007\NOIs\MDL vs Stds Issue\NOI Decision Tree_MDLs greater than Limits.xls;

Hi Robert and John,

Just on follow-up on my previous email concerning the problem of MDLs greater than NOI Decision Tree limits. I would like to make three additional points regarding our request.

First, there is a precedence in defaulting to the MDL when the limit is lower; several of the Laboratory's NPDES permit limits are lower than the analytical method MDL. The EPA defaults to the MQL (3.3*MDL) as the effective limit for those contaminants.

Second, the analytical techniques that we are employing for the analysis of ground water are in compliance with the requirements of NMAC 20.6.2.3107.

And third, NMAC 20.6.4.12, E. states, *The commission may establish a numeric water quality standard at a concentration that is below the minimum quantification level. In such cases, the water quality standard is enforceable at the minimum quantification level.*

We believe there is adequate justification for using the MDL as the screening limit for 8 contaminants in question.

In closing, our coordinated efforts to establish a process for the land application of ground water produced during drilling, development, rehabilitation, and sampling goes back over 18 months to March 2006. Since that time we have jointly developed the NOI Decision Tree, built a database tool to screen analytical data, and written a Standard Operating Procedure (SOP) to establish procedures for the land application of ground water. Pending resolution of this final issue we are ready to land apply ground water that meets the criteria of the NOI Decision Tree.

Our readiness to land apply does not come too soon; while the NOI Decision Tree, database tool, and SOP have been in development we have not land applied any of the sampling purge water generated during ground water monitoring. It is imperative that we proceed as quickly as is possible to begin land application of those waters that meet the criteria of the NOI Decision Tree before winter sets in. Therefore, your prompt response to this request would be greatly appreciated.

Sincerely,

Bob

Enclosure 2

X-Sieve: CMU Sieve 2.2
Subject: RE: NOI Decision Tree for Land Application of Ground Water
Date: Fri, 8 Feb 2008 15:20:00 -0700
X-MS-Has-Attach: yes
X-MS-TNEF-Correlator:
Thread-Topic: NOI Decision Tree for Land Application of Ground Water
Thread-Index: AcgWikszB/PhGM3PRnmoUmaUxB4EbBT74SOw
From: "Fullam, Jennifer, NMENV" <Jennifer.Fullam@state.nm.us>
To: "Robert Beers" <bbeers@lanl.gov>
Cc: "George, Robert, NMENV" <robert.george@state.nm.us>,
"Schuman, George, NMENV" <george.schuman@state.nm.us>,
"Pullen, Steve, NMENV" <steve.pullen@state.nm.us>,
"Young, John, NMENV" <john.young@state.nm.us>
X-OriginalArrivalTime: 08 Feb 2008 22:21:17.0128 (UTC) FILETIME=[EC447480:01C86AA0]
X-Proofpoint-Virus-Version: vendor=fsecure engine=4.65.5502:2.3.11,1.2.37,4.0.164 definitions=2008-02-08_06:2008-02-07,2008-02-08,2008-02-08 signatures=0
X-Proofpoint-Spam: 0
X-CTN-5-MailScanner-Information: Please see http://network.lanl.gov/email/virus-scan.php
X-CTN-5-MailScanner: Found to be clean
X-CTN-5-MailScanner-From: jennifer.fullam@state.nm.us
X-Spam-Status: No

Bob,

I am sorry I have not responded earlier to your request regarding the MDL/Screening limit issue. Before we are able to make a decision regarding your request I have a few questions regarding the table you provided which I hope you can clarify for me.

- *The screening limits we have were derived from EPA R6 (10^{-6}) Medium-Specific Screening Levels (December 2006) for tap water and are not consistent with what you have provided. Please clarify where your Screening Levels were derived from.*
- *How were the 10^{-5} values determined? Was this just and adjustment in an order of magnitude?*
- *NMED identified alternate methods with lower detection limits for five of the compounds in question. Please clarify why these methods were not proposed.*
- *Please clarify the units for the data (we have assumed µg/L)?*

I have included a modified table based on what you submitted which includes our findings. I look forward to your response. If you have any questions please feel free to contact me. Thanks.

LANL

Analyte	CAS	LANL's Screening Limit (10-5) µg/L	NMED's understanding of EPA Screening Limit adjusted by 10 (10-5) (µg/L)	NMED's understanding of 90% Screening Limit (10-5) (µg/L)	LANL Proposed Analytical Method	LANL Listed MDL (µg/L)	NMED's Identified Alternate MDL (µg/L)	NMED's Identified Alternate Method	Reference
Acrolien	107-02-8	0.0416	0.42	0.378	SW-846-8260B	3	0.7	EPA 603	http://www.atsdr.cdc.gov/toxprofiles/tp124-c7.pdf
Acrylonitrile	107-13-1	0.389	0.39	0.351	SW-846-8260B	1	0.5	EPA 1982a (GC/FID)	http://www.atsdr.cdc.gov/toxprofiles/tp125-c6.pdf
Benzidine	92-87-5	0.0029	0.00094	0.000846	SW-846-8270C	1.35	0.5	EPA 1982a (GC/FID)	http://www.atsdr.cdc.gov/toxprofiles/tp125-c6.pdf
Bis (2-chloroethyl)ether	111-44-4	0.098	0.098	0.0882	SW-846-8270C	2.08	0.3	EPA 1982a (GC/HSD)	http://www.atsdr.cdc.gov/toxprofiles/tp127-c6.pdf
Nitrosodiethylamine (N-)	55-18-5	0.0045	0.0014	0.00126	SW-846-8270C	1.35		None Found	
Nitrosodimethylamine (N-)	62-75-9	0.013	0.0042	0.00378	SW-846-8270C	0.22	0.00001	EPA 1976b (GC/ECD and GC/MS)	http://www.atsdr.cdc.gov/toxprofiles/tp94-c6.pdf
Nitroso-di-n-butylamine	924-16-3	0.02	0.02	0.018	SW-846-8270C	1.35		None Found	
Nitrosopyrrolidine (N-)	930-55-2	0.32	0.32	0.288	SW-846-8270C	1.35		None Found	

http://www.atsdr.cdc.gov/toxprofiles/