



December 5, 1997

Mr. Bill Schleining
USDA-USFS Nemo
USFS - RR 2
Custer, SD 57730-9501

Re: USDA Forest Service Contract No. 53-84N8-6-005
Nemo Work Center, Nemo, South Dakota
Groundwater Sampling Results-November 1997

Dear Mr. Schleining:

This correspondence documents the procedures and analytical results of groundwater sampling recently conducted at selected monitoring wells and domestic supply wells. The sampling procedures and analytical results are described below.

Based on previous sampling results, several key wells were selected for further ongoing monitoring. The wells selected for sampling during this monitoring event include the following: monitoring wells MW-4, MW-5, MW-10, MW-11, and MW-12; and domestic supply wells Church, Deverman, Kaberna, Troxell, and Weston. Monitoring wells MW-4 and MW-5 were selected to evaluate conditions upgradient from the Weston well and along the edge of the southern contaminant plume. Well MW-10 was sampled since it had previously contained the highest observed contaminant concentrations. MW-11 and MW-12 were selected to evaluate conditions along the leading edges of each of the respective contaminant plumes. The Church well was selected to evaluate conditions within and along the northern plume, while the Weston and Kaberna wells were selected to evaluate previously observed fluctuations in contaminant concentrations. Monitoring wells MW-1, MW-2, and MW-3 were not sampled since they previously exhibited marginal impact. Wells MW-6, MW-7, and MW-9 were not sampled since they are outside of the contaminant plumes and associated groundwater flow paths. MW-8 was inaccessible due to construction associated with this well's development as a water supply well. However, this well is scheduled to be sampled in the near future, pending completion of the water supply system.

Boise Office
1605 North 13th Street
Boise, Idaho 83702 USA
(208) 345-8292
Fax (208) 344-8007
E-Mail
enviro@micron.net

Corporate Office
844 South 200 East
Salt Lake City,
Utah 84111-4203 USA
(801) 532-1717
Fax (801) 532-1777
E-Mail
enviro@xmission.com

Prague Office
c/o University of Agriculture
Department of Animal
Physiology and Zoology
165 21 Praha 6 - Suchbát
Czechoslovakia

Affiliates Worldwide

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Sampling Procedures

All samples were collected during the week of November 17, 1997. Sampling was conducted by Andy King of EnviroSearch, in coordination with USFS personnel. Static water levels were measured in all accessible monitoring wells. In order to minimize the potential for sample cross contamination, the monitoring and domestic wells were sampled in order from least impacted to most highly impacted, based on previous analytical results. The submersible pump used for purging was decontaminated by operating the pump and associated discharge hose in a drum ofalconox detergent and tap water for ten minutes, followed by operating the pump and associated discharge hose in a drum of fresh tap water for ten minutes.

Except where noted below, the following procedures were used for purging and sampling at each of the monitoring and domestic wells. Prior to sampling, static water levels were measured at each monitoring well. Groundwater was purged using a stainless steel submersible pump, which was decontaminated before use in each well to preclude sample cross contamination. Groundwater was monitored for pH, specific conductance and temperature during purging. After these parameters had stabilized and a minimum of three casing volumes of well water had been removed, a disposable Teflon bailer was used to collect a water sample. Each sample was transferred from a single bailer of water into prepared containers provided by the laboratory. Sample containers were sealed, labeled, and placed in a cooler with ice for transport to the laboratory. Sample custody was documented with a chain of custody record that accompanied the sample from the time of sample collection through delivery to the laboratory. All water samples were submitted for analysis to MidContinent Testing Laboratories in Rapid City, South Dakota.

The Kaberna domestic well was purged of approximately 110 gallons using its dedicated pump, and the water sample was then collected from a spigot at the wellhead. The Deverman well was sampled at an interior spigot. The Troxell well was sampled by USFS personnel at an interior spigot. A surface water sample was also collected from Boxelder Creek approximately 200 feet downstream from well MW-12.

All purged water and decontamination rinsate water was collected and temporarily stored onsite in 55-gallon drums. After all samples had been collected, a portable carbon absorption treatment system was used to treat the stored water. The treated waters were discharged onsite at a location not directly affecting existing surface waters.

Analytical Results

The water samples were analyzed for EDB using EPA Method 524.2. The analytical results are summarized in Table 1 below. Copies of the laboratory reports and chain-of-custody records are attached.

Table 1
Summary of Laboratory Analyses
For Nemo Water Samples
(µg/l*)

Sampling Location	Date of Laboratory Submittal	EDB
Church	10/08/96	1.3-1.8
	10/16/96	1.4
	05/27/97	0.29
	11/24/97	0.073
Deverman (sink)	10/08/96	<0.010
	05/27/97	<0.020
	11/20/97	
Kaberna	10/22/96	13
	10/29/96	10
	03/25/97	9.4
	05/19/97	12
	11/20/97	14
Troxell Lillian *	11/24/97	<0.020
Weston	10/22/96	2.2
	10/29/96	1.7
	05/19/97	0.28
	11/24/97	0.057
MW-4	03/17/97	1.0
	11/24/97	0.18
MW-5	03/15/97	0.021
	03/28/97	<0.020
	11/20/97	<0.020
MW-10	05/12/97	18.5
	11/24/97	5.1
MW-11	05/14/97	0.057
	11/20/97	<0.020
MW-12	05/14/97	0.55
	11/20/97	<0.020
Boxelder Creek	11/20/97	<0.020
Federal Drinking Water MCL		0.05
RBC		0.00075

NOTES:

- * The Lillian Troxell well was inadvertently sampled rather than the Keough/Troxell well.
- NA - Not Analyzed or Not applicable
- *1 µg/l is approximately equal to 1 ppb
- tr - trace; detected below the quantification limit
- MCL - Federal Drinking Water Maximum Contaminant Level
- RBC - Risk Based Concentrations from EPA Region III Table.
- Concentrations assume residential exposure by tap water ingestion.

Of the samples collected from monitoring wells, the highest EDB concentration (5.1 ug/l) was detected in the sample collected from MW-10. An EDB concentration of 0.18 ug/l was detected in groundwater from MW-4. No EDB was detected in MW-5, MW-11, or MW-12. The highest EDB concentration was

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detected in a groundwater sample from the Kaberna well (14 ug/l). Groundwater samples collected by EnviroSearch from the Nemo Church and Weston wells contained EDB concentrations of 0.073 ug/l and 0.057 ug/l, respectively. Groundwater samples collected from the Deverman and Lillian Troxell wells were below laboratory detection limits with respect to EDB. Contaminated groundwater had previously been identified flowing from a seep (Flak Seep) near MW-12. The Flak Seep was not flowing during this sampling event, and no EDB was detected in a water sample from Box Elder Creek collected downstream from MW-12.

Conclusions

In general, EDB concentrations in groundwater appear to be relatively stable for samples collected from the Kaberna well. Analytical results for groundwater samples collected from the Church and Weston wells show decreases in EDB concentrations. Decreases in EDB concentrations were also observed in monitoring wells MW-4, MW-10, MW-11, and MW-12.

Throughout the project area, groundwater elevations measured during this monitoring event were substantially lower than those measured during May 1997. The changes in EDB concentrations in many of the wells may be associated with changes in groundwater elevation over time. For example, EDB concentrations decreased substantially in wells MW-4, MW-10, MW-11, and MW-12. The measured decreases in groundwater elevation in these wells were 11.1 feet, 10.6 feet, 5.4 feet, and 9.7 feet, respectively. The greatest decrease in groundwater elevation (20.7 feet) was observed in well MW-2, which was not sampled during this monitoring event. The observed changes in groundwater elevation and EDB concentrations are being correlated with available precipitation data and associated changes in groundwater recharge. An updated potentiometric surface map is also in preparation to examine temporal changes in flow paths throughout the area. This ongoing analysis may help explain the observed distribution and fluctuations of EDB concentrations over time, and could help to predict future contaminant trends based on changes in groundwater recharge conditions, such as extended periods of drought or high precipitation.

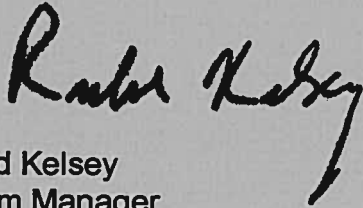
EnviroSearch recommends that semiannual sampling be conducted at key wells throughout the project area, with the next sitewide round of groundwater monitoring to be conducted in approximately May of 1998. This will allow collection of piezometric and contaminant concentration data during the spring runoff to evaluate seasonal hydrologic trends and the potential persistence of high EDB concentrations during periods of higher groundwater levels. At that time, the same wells which were sampled during November 1997 should again be sampled, along with wells MW-1, MW-3, the Flak Seep, and the

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Troxell/Keough well. Monitoring wells MW-13 and possibly MW-14, which are the new domestic supply wells for the Weston and Kaberna residences, should be sampled on a more frequent basis (i.e., MW-13 monthly for 6 months then quarterly for 6 months). Startup monitoring associated with water supply well MW-8 should include monitoring of water levels and well response to determine capacity, in addition to periodic sampling for chemical analysis (i.e., monthly for 6 months then quarterly for 6 months).

We appreciate the opportunity to be of assistance to the USDA-USFS in this matter. If you should have any questions, please contact Richard Kelsey at (208) 345-8292 or me at (801) 461-0888.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard Kelsey". The signature is written in a cursive style with a long, sweeping tail on the letter "y".

Richard Kelsey
Program Manager

Enclosures Laboratory Report
 Chain of Custody Records

C2825.doc



CLIENT ID: ENVIROSEARCH
 ACCT. NUMBER: W1145
 PROJECT ID: NEMO WORK AREA
 DATE RECEIVED: 11/30, 24/97
 DATE REPORTED: 12/04/97
 DATE ANALYZED: 11/24/97
 MATRIX: WATER
 TEST METHOD: EPA 824.2
 REPORTED UNITS: ug/L, PART PER BILLION

Post-It Fax Note	7871	Date	12/04/97
To	Andy King	From	Bob Miller
Co/Dept	Envirosearch	Co	Mid-Continent
Phone #		Phone #	605-348-0111
Fax #	801-461-0008	Fax #	

LAB NUMBER	SAMPLE ID	EDS ug/L	EDS MDL ug/L	SURROGATE RECOVERIES	
				SURR1 (%)	SURR2 (%)
19971124501	OLD KABERNA	14.	0.20	93.	94.
19971124502	MW-12	ND	0.020	88.	91.
19971124503	MW-11	ND	0.020	92.	93.
19971124504	BOX ELDER CREEK	ND	0.020	98.	95.
19971124505	MW-5	ND	0.020	93.	92.
19971124506	DEVERMAN SINK	ND	0.020	92.	92.
19971124507	MW-10	5.1	0.020	93.	91.
19971124508	MW-4	0.18	0.020	91.	90.
19971124509	WESTON	0.057	0.020	91.	91.
19971124510	CHURCH	0.073	0.020	90.	88.
19971124511	TROXELL	ND	0.020	90.	90.
19971124505-DUP	MW-5 DUPLICATE	ND	0.020	92.	89.
19971124507-DUP	MW-10 DUPLICATE	4.8	0.020	90.	90.
19971124510-DUP	CHURCH DUPLICATE	0.074	0.020	91.	90.

SURR1= 4-BROMOFLUOROBENZENE
 SURR2= 1,2- DICHLOROBENZENE d4

Approved by:
 Date: 12/04/97

KEY
 ND = NOT DETECTED ABOVE THE MDL
 MDL = METHOD DETECTION LIMIT

2881 South Plaza Drive
 P.O. Box 74388
 Omaha, NE 68174
 Ph 800/248-0111

CHAIN OF CUSTODY RECORD

ENVIROSEARCH

PROJECT		PROJECT NAME		PROJECT NUMBER		PURCHASE ORDER #	
12-52	NEAD						
DATE	TIME	INITIALS	LOCATION	NO. OF CONTAINERS	CONTAINER TYPE	DATE	TIME
11/18	01:48	X	IND. KAHLENA	3			
11/18	14:57	X	MW-12	3			
11/20	12:54	X	MW-1	3			
11/20	19:28	X	Box E. M. Creek	3			
11/20	19:38	X	MW-5	3			
11/19	16:23	X	Deserian (S.H.)	3			
<p>ANALYST: <i>Andy King</i></p> <p>LABORATORY: <i>Andy King</i></p> <p>DATE: <i>11/18</i> TIME: <i>17:03</i></p> <p>DATE: <i>11/20</i> TIME: <i>19:28</i></p> <p>DATE: <i>11/20</i> TIME: <i>19:38</i></p> <p>DATE: <i>11/19</i> TIME: <i>16:23</i></p>							
<p>ANALYST SIGNATURE: <i>Andy King</i></p> <p>LABORATORY SIGNATURE: <i>Andy King</i></p>				<p>DATE: <i>11/18</i> TIME: <i>17:03</i></p> <p>DATE: <i>11/20</i> TIME: <i>19:28</i></p> <p>DATE: <i>11/20</i> TIME: <i>19:38</i></p> <p>DATE: <i>11/19</i> TIME: <i>16:23</i></p>			

Attention: Bob Miller

EnviroSearch

CHAIN OF CUSTODY RECORD

PROB. NO.		PROB. NAME		PURCHASE ORDER #	
182		USE'S - Nevada			
DATE	TIME	INITIALS	CONTAINER LOCATION	NO. OF CONTAINERS	INITIALS
1/21	10:58	[Signature]	RAW-10	3	[Signature]
1/21	8:56	[Signature]	RAW-41	3	[Signature]
1/21	13:18	[Signature]	Western	3	[Signature]
1/21	15:30	[Signature]	Church	3	[Signature]
1/22	9:30	[Signature]	Trossell	2	[Signature]
<p>RECEIVED BY: [Signature] DATE: 1/27/98 TIME: 7:57</p> <p>RECEIVED BY: [Signature] DATE: 1/27/98 TIME: 7:57</p> <p>RECEIVED BY: [Signature] DATE: 1/27/98 TIME: 7:57</p>					