

ENVIROCARE OF UTAH, INC.
THE SAFE ALTERNATIVE

June 10, 1994

40-8989

Mr. Joseph J. Holonich, Chief
Uranium Recovery Branch
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Response to NRC Letters
License No. SMC-1559

Dear Mr. Holonich:

Envirocare of Utah, Inc. ("Envirocare") submits 5 copies of Envirocare's responses to the NRC's letter dated May 19, 1994, regarding the Liner Compatibility Report, and to the letter dated May 27, 1994, regarding the Supplemental Groundwater Quality Data. Envirocare's consultant, Bingham Environmental, has prepared two Project Memorandum dated June 10, 1994, addressing the concerns raised by the NRC in its letters.

If you have any questions regarding this submittal please contact the undersigned at 801-532-0920.

Sincerely,



George W. Hellstrom

Enclosures

160002

9406160233 940610
PDR ADDCK 04008989
C PDR

46 WEST BROADWAY • SUITE 200

ALT LAKE CITY, UTAH 84101 • TELEPHONE (801) 532-1330

PDR: per S. Wastler

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1/1



PROJECT MEMORANDUM

TO: George Hellstrom - Envirocare of Utah

FROM: David Cline - Bingham Environmental, Inc. *David Cline*

DATE: June 10, 1994

SUBJECT: Response to
Request for Additional Information
Liner Compatibility Report
Envirocare 11e.(2) Facility
South Clive, Utah

This project memorandum addresses the request for additional information by the NRC in their May 19, 1994 letter. In summary the NRC review letter requested additional information in the following areas:

Initial Concentrations in the Synthetic Leachate Solution

The original proposal to perform liner compatibility testing was to utilize material from a proposed mill tailing remediation site to generate a leachate solution. The NRC was concerned that the leachate generated from one particular site would not represent all possible leachate solutions generated by other potential remediation sites. The decision was made to generate a synthetic solution which would represent a worse case scenario for possible leachate solutions. Sampling data collected by the NRC at nine different tailings ponds was used to set maximum levels of concentrations for expected contaminants. The concentration of sulfate (SO_4) was 1000 mg/l at all sites. The concentrations for barium and fluoride were set to the maximum levels permitted at the site. The sulfate levels used in the solution are well within the range for tailing leachate. It was known that these high levels would probably result in precipitates precipitating out of solution. The conditions at the site are also very high in carbonate. Sulfate and carbonate will both precipitate the more insoluble metals. The presence of significant precipitate on the clay liner in the permeameter mold was not evident. The precipitate in the leachate solution storage containers was minimal. It is not expected that the potential for precipitate has resulted in data unrealistic of the site conditions.

Potential Dissolution of Liner Material

The report indicated that there was a 2% loss in solids due to possible solubility of the high chloride content in the liner material. This 2% loss was recorded during permeability testing utilizing distilled water. Permeability testing utilizing shallow groundwater indicated that this solids loss was reduced to 0.2%, which is considered negligible. The recent results from leachate permeant testing



shows an approximate solids loss closer to 1.6% for solutions ranging from pH 2 to pH 7. The impacts due to the long term contact by leachate solution have not resulted in a significant increase in permeability. There is expected loss due to the high chloride content, however the site conditions will create leachate solutions with elevated specific gravity levels which should approximate conditions closer to the tests using groundwater.

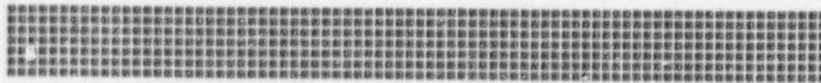
Sodium (Na) and Chloride (Cl) Concentrations in the Test Effluent

The initial permeability testing on the clay liner material included utilizing shallow groundwater from the site as the permeant. The leachate solution was introduced once the groundwater permeability testing stabilized and an approximate quantity of one pore volume of groundwater permeant was run through the permeability mold. The groundwater permeant was used to establish the baseline for the permeability of the clay material prior to contact with the leachate.

As noted by the NRC, the results from the chemical analyses on the effluent from the leachate permeability testing indicated high levels of Na and Cl. These elevated levels are due to the effluent containing residual groundwater from the pores of the permeability material from the previous groundwater permeant. The effluent from the initial groundwater tests was not mixed with the effluent from the leachate tests, however due to the fine grain nature of the clay material it is difficult to remove all of the residual water from the permeameter material. The levels of Na and Cl in the groundwater are approximately 40 to 70 percent higher than the levels in the leachate effluent. The elevated levels in the effluent are due to the mixing of the one pore volume of residual groundwater effluent with the leachate effluent.

Potential Physical Impacts to the Liner due to Low pH Solutions

The objective of the study was to determine the effects on the permeability of the liner due to the contact of several different leachate solutions. The conclusions from the permeability testing is that the liner permeability did not increase significantly for the equivalent contact period of 80 years, for even the lowest of possible pH levels. It is expected that any significant changes in physical characteristics in the clay liner material would result in changes to the permeability. There was no visual evidence during the testing that there were changes to the physical characteristics of the material and the testing showed no significant changes in the permeability for the four varying pH tests.



PROJECT MEMORANDUM

TO: George Hellstrom - Envirocare of Utah

FROM: Stan Plaisier - Bingham Environmental, Inc.
Mark Taggart - Bingham Environmental, Inc. *hjt*

DATE: June 10, 1994

SUBJECT: Responses to NRC Comments to Supplemental Groundwater Quality Data
11e.(2) Disposal Cell
South Clive, Utah

The following are responses to the NRC's comments to the "Supplemental Groundwater Quality Data", dated April 1, 1994:

Background Groundwater Quality Comments

1. Prior to disposing of 11e.(2) wastes, Envirocare will complete the collection of one full year of background water quality data, for each monitoring well and each constituent. All background water quality data for inorganic constituents was completed with the April 1994 sampling event. The organic constituents will be complete after the 3rd quarter sampling event which is scheduled for July 1994. The data for April 1994, and July 1994 will be submitted to the NRC when the results have been received and reviewed for QA.

To date POC wells GW-60 and GW-63 have been monitored for one full year on the following dates: August 4, 1993, November 3, 1993, February 9, 1994 and April 28, 1994. The attached Tables 1 and 2 summarize the one full year of background data for GW-60 and GW-63.

Background groundwater quality data is available for GW-57 from June 1992 through April 1994 for a total of 16 monitoring events. We are re-submitting the summary tables for GW-57 covering the period between June 1992 and February 1994.

2. Groundwater samples collected between June 1992 and May 1993 were obtained on a monthly (accelerated) basis which apparently minimized the build up of metals in the wells due to corrosion of the stainless steel dedicated bladder pumps. After the accelerated period sampling went to quarterly monitoring where well purging was less frequent (three to four months between sampling events). Because of the less frequent purging, concentrations of metals began to build up. Based on our review of the data through May 1993 baseline (background) levels were maintained.



A remediation plan for the LARW and 11e.(2) dedicated bladder pumps was submitted to the Utah Division of Water Quality and is presently being instituted and will be completed by the end of June 1994. Essentially all stainless steel pumps will be removed and replaced with PVC dedicated bladder pumps. Prior to removing the stainless steel pumps a minimum of six well volumes or 20 gallons, whichever is greater, will be purged from each well. The purging effort is designed to remove as much heavy metal contamination as practical. Confirmation sampling of all wells will be performed to confirm the removal of heavy metal contamination through analysis for cadmium, chromium and nickel. The effectiveness of purging large amounts of water prior to sampling is evident in the April 1994 quarterly groundwater sampling results where 15 gallons of water was purged prior to sampling and the results indicate baseline levels.

Observations on the Groundwater Protection Levels

3. Envirocare proposed the protection levels so that there would be consistency between the State and NRC regulated facilities which are in close proximity to each other. If the NRC feels that it is premature to set protection levels at this time then Envirocare will wait until the NRC is ready to establish protection levels.
4. Agreed.



TABLE 1
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-60

Page 1 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	8-4-93	11-3-93	2-9-94	4-28-94
DISSOLVED METALS					
Arsenic	NE	[0.019]JFD	[0.021]JS	0.027	0.025
Barium	NE	0.019	0.03	0.008	ND
Beryllium	NE	ND	ND	ND	ND
Cadmium	NE	0.009	0.03	ND	ND
Chromium	NE	0.053	0.087	0.027	ND
Copper	NE	[0.024]JFD	[0.024]JFD	ND	ND
Lead	NE	ND	ND	ND	ND
Mercury	NE	0.0002	0.0004	ND	ND
Molybdenum	NE	0.2	0.3	0.2	0.2
Nickel	NE	[0.038]JFD	0.095	ND	ND
Selenium	NE	ND	[0.009]JS	[0.012]JS	[ND]UJ
Silver	NE	ND	ND	ND	ND
Zinc	NE	0.012	[0.023]JFD	ND	ND
ANIONS					
Bicarbonate	NE	190	190	190	[200]R
Carbonate	NE	ND	ND	ND	[ND]R
Chloride	NE	20000	21000	19000	18000
Sulfate	NE	3400	[3700]JFD	3500	3500
CATIONS					
Calcium	NE	430	460	380	360
Magnesium	NE	670	650	540	570
Potassium	NE	480	450	460	450
Sodium	NE	14000	15000	11000	13000
OTHER CHEMISTRIES					
Cyanide	NE	ND	ND	ND	ND
Fluoride	NE	3	2.8	3.5	3.2
Total Fluorine	NE	0.7	0.6	0.3	0.7
Nitrate	NE	0.16	[0.16]JFD	0.17	0.23
Nitrates (NO ₃ -N + NO ₂ -N)	NE	0.16	[0.16]JFD	0.17	0.23
Total Dissolved Solids	NE	41000	42000	40000	40000
Conductivity (umhos/cm)	NE	60000	74000	62000	68000
pH (units)	NE	7.3	7.3	7.5	7.6
ORGANICS					
Total Organic Carbon (TOC)	NE	ND	ND	ND	ND
Total Organic Halogens (TOX)	NE	ND	ND	ND	ND
FIELD MEASUREMENTS					
pH (units)	NE	7.32	7.06	7.41	7.37
Conductivity (umhos/cm)	NE	73300	69000	62600	62800
Temperature (Deg. C)	NE	13.2	11.9	12.2	13.1

ND Not Detected

NE Not Established

Radiologic results not yet available for the April 1994 event.

All volatile and semi-volatile organic results below laboratory detection limits.

TABLE 1
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-63

Page 1 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	8-4-93	11-3-93	2-9-94	4-28-94
DISSOLVED METALS					
Arsenic	NE	ND	[0.018]JS	0.025	0.024
Barium	NE	0.08	0.052	0.024	0.006
Beryllium	NE	ND	ND	ND	ND
Cadmium	NE	0.009	0.033	ND	ND
Chromium	NE	0.049	0.091	0.03	ND
Copper	NE	[0.026]JFD	[0.027]JFD	ND	ND
Lead	NE	ND	ND	ND	ND
Mercury	NE	0.0002	0.0004	ND	ND
Molybdenum	NE	0.2	0.3	0.2	0.2
Nickel	NE	[0.046]JFD	0.1	ND	ND
Selenium	NE	ND	[ND]UJ	[ND]UJ	[ND]UJ
Silver	NE	ND	ND	ND	ND
Zinc	NE	0.012	[0.03]JFD	0.012	ND
ANIONS					
Bicarbonate	NE	150	140	140	[140]R
Carbonate	NE	ND	ND	ND	[ND]R
Chloride	NE	19000	20000	19000	18000
Sulfate	NE	3100	[2700]JFD	3700	3300
CATIONS					
Calcium	NE	410	380	380	350
Magnesium	NE	640	850	570	580
Potassium	NE	450	460	430	430
Sodium	NE	13000	13000	11000	13000
OTHER CHEMISTRIES					
Cyanide	NE	ND	ND	ND	ND
Fluoride	NE	3.1	2.7	3.6	3.4
Total Fluorine	NE	0.9	0.6	0.4	0.7
Nitrate	NE	0.45	[0.6]JFD	0.56	0.62
Nitrates (NO3-N + NO2-N)	NE	0.45	[0.6]JFD	0.56	0.62
Total Dissolved Solids	NE	38000	47000	40000	38000
Conductivity (umhos/cm)	NE	56000	72000	61000	68000
pH (units)	NE	7.4	7.4	7.5	7.6
ORGANICS					
Total Organic Carbon (TOC)	NE	ND	ND	ND	ND
Total Organic Halogens (TOX)	NE	ND	ND	ND	ND
FIELD MEASUREMENTS					
pH (units)	NE	7.40	7.29	7.55	7.59
Conductivity (umhos/cm)	NE	65200	66400	61400	60300
Temperature (Deg. C)	NE	13.3	11.8	12.9	13.6

ND Not Detected

NE Not Established

Radiologic results not yet available for the April 1994 event.

All volatile and semi-volatile organic results below laboratory detection limits.



AMERICAN
WEST
ANALYTICAL
LABORATORIES

INORGANIC ANALYSIS REPORT

Client: Envirocare
Date Received: April 29, 1994
Lab Sample ID Number: 18308-05
Field Sample ID: Quarterly LARW GW Monitoring April 1994/GW-60

Contact: Jeff Low
Received By: Elona Hayward

Analytical Results

	Method Used:	Detection Limit: mg/L	Amount Detected: mg/L	Date Analyzed
DISSOLVED METALS				
	7060	0.005	0.025	5/5/94
	6010	0.002	ND	5/5/94
	6010	0.005	ND	5/5/94
	6010	0.004	ND	5/5/94
	6010	0.01	360	5/5/94
	6010	0.005	ND	5/5/94
	6010	0.005	ND	5/5/94
	7421	0.005	ND	5/5/94
	6010	0.01	570	5/5/94
	7471	0.0002	ND	5/5/94
	6010	0.1	0.2	5/5/94
	6010	0.01	ND	5/5/94
	6010	0.01	450	5/5/94
	7740	0.005	[ND]w	5/5/94
	6010	0.005	ND	5/5/94
	6010	0.01	13000	5/5/94
	6010	0.002	ND	5/5/94
OTHER CHEMISTRIES				
	310.1	10.	[200]R	5/13/94
	310.1	10.	[ND]R	5/13/94
	325.3	0.5	18000	5/14/94
	120.1	N/A	68000	5/11/94
	335.3	0.005	ND	5/10/94
	340.1	0.1	3.2	5/16/94
	353.2	0.01	0.23	5/4/94
	353.2	0.01	0.23	5/4/94
	150.1	0.1	7.6	5/13/94
	375.4	0.5	3500	5/9/94
	160.1	10.	40000	5/5/94
	415.2	1.0	ND	5/3/94
	9020	0.005	ND	5/9/94
			4.44	

† Units for conductivity are $\mu\text{mhos/cm}$ @ 25°C

Released by: _____

Laboratory Supervisor

Report Date 6/2/94

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ORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

Analysis Requested: Method Ref. Number: Date Extracted: Date Analyzed:
Semivolatile Organics EPA SW-846 #8270 May 2, 1994 May 11, 1994
Base Neutral Fraction

463 West 3600 South
Salt Lake City, Utah
84115

Lab Sample ID. Number: Field Sample ID. Number:
18308-05 Quarterly LARW GW Monitoring April 1994/GW-60

Analytical Results

ACID COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

(801) 263-8686
Fax (801) 263-8687

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
Diethyl phthalate	4.0	<4.0
2-Methylnaphthalene	4.0	<4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: *John L. Bennett*
Laboratory Supervisor

Report Date 6/2/94 1 of 1



AMERICAN
WEST
ANALYTICAL
LABORATORIES

INORGANIC ANALYSIS REPORT

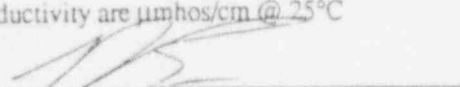
Client: Envirocare
Date Received: April 29, 1994
Lab Sample ID Number: 18308-06
Field Sample ID: Quarterly LARW GW Monitoring April 1994/GW-63

Contact: Jeff Low
Received By: Elona Hayward

Analytical Results

	<u>Method Used:</u>	<u>Detection Limit:</u> mg/L	<u>Amount Detected:</u> mg/L	<u>Date Analyzed</u>
DISSOLVED METALS				
Arsenic	7060	0.005	0.024	5/5/94
Barium	6010	0.002	0.006	5/5/94
Beryllium	6010	0.005	ND	5/5/94
Cadmium	6010	0.004	ND	5/5/94
Calcium	6010	0.01	350	5/5/94
Chromium	6010	0.005	ND	5/5/94
Copper	6010	0.005	ND	5/5/94
Lead	7421	0.005	ND	5/5/94
Magnesium	6010	0.01	580	5/5/94
Mercury	7471	0.0002	ND	5/5/94
Molybdenum	6010	0.1	0.2	5/5/94
Nickel	6010	0.01	ND	5/5/94
Potassium	6010	0.01	430	5/5/94
Selenium	7740	0.005	[ND]u	5/5/94
Silver	6010	0.005	ND	5/5/94
Sodium	6010	0.01	13000	5/5/94
Zinc	6010	0.002	ND	5/5/94
OTHER CHEMISTRIES				
Bicarbonate (as CaCO ₃)	310.1	10.	[140]R	5/13/94
Carbonate (as CaCO ₃)	310.1	10.	[ND]R	5/13/94
Chloride	325.3	0.5	18000	5/14/94
Conductivity†	120.1	N/A	68000	5/11/94
Cyanide	335.3	0.005	ND	5/10/94
Fluoride	340.1	0.1	3.4	5/16/94
Nitrate (as N)	353.2	0.01	0.62	5/4/94
Nitrate/Nitrite (as N)	353.2	0.01	0.62	5/4/94
pH	150.1	0.1	7.6	5/13/94
Sulfate	375.4	0.5	3300	5/9/94
TDS	160.1	10.	38000	5/5/94
TOC	415.2	1.0	ND	5/3/94
TOX	9020	0.005	ND	5/9/94
Ion Balance			4.95	

† Units for conductivity are $\mu\text{mhos/cm @ } 25^\circ\text{C}$

Released by: 
Laboratory Supervisor

Report Date 6/2/94

1 of 1



AMERICAN
WEST
ANALYTICAL
LABORATORIES

ORGANIC ANALYSIS REPORT

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

Analysis Requested:
Volatile Organics

Method Ref. Number:
EPA SW-846 #8260
Purge & Trap GC/MS

Date Analyzed:
May 2, 1994

463 West 3600 South
Salt Lake City, Utah
84115

Lab Sample ID. Number:
18308-06

Field Sample ID. Number:
Quarterly LARW GW Monitoring April 1994/GW-63

Analytical Results

VOLATILE ORGANIC COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

(801) 263-8686
Fax (801) 263-8687

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
Acetone	20.	< 20.
2-Butanone	20.	<20.
Carbon disulfide	2.0	< 2.0
Chloroform	2.0	< 2.0
1,2-Dichloroethane	2.0	< 2.0
Methylene chloride	2.0	< 2.0
Naphthalene	4.0	< 4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: John L. [Signature]
Laboratory Supervisor



ORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

<u>Analysis Requested:</u> Semivolatile Organics	<u>Method Ref. Number:</u> EPA SW-846 #8270 Base Neutral Fraction	<u>Date Extracted:</u> May 2, 1994	<u>Date Analyzed:</u> May 11, 1994
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463 West 3600 South
Salt Lake City, Utah
84115

<u>Lab Sample ID. Number:</u> 18308-06	<u>Field Sample ID. Number:</u> Quarterly LARW GW Monitoring April 1994/GW-63
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Analytical Results

ACID COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

(801) 263-8686
Fax (801) 263-8687

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
Diethyl phthalate	4.0	<4.0
2-Methylnaphthalene	4.0	<4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: *Jeff Low*
Laboratory Supervisor

TABLE 3
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-57

Page 1 of 2

PARAMETERS	SAMPLING DATE												
	6-12-92	7-8-92	8-5-92	9-2-92	10-6-92	11-3-92	12-8-9	1-13-93	2-9-93	3-9-93	4-5-93	5-10-93	8-3-93
DISSOLVED METALS													
Arsenic	0.005J	0.005J	0.013	<0.005	0.007	0.015	0.013	0.008	0.005	0.014	0.015	0.023	0.022
Barium	0.018JFD	<0.002	<0.002	<0.002	<0.002	<0.002	0.034	0.033	0.028	0.044	0.025	0.028	0.022
Beryllium	<0.005	NA	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Cadmium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	ND	ND	ND	ND	ND	ND	0.014
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.043	0.035	0.026	0.038	0.034	0.024	0.072
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	ND	[0.01J]	ND	0.029	ND	ND	0.024
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	ND	0.0009	ND	0.0003	ND	ND
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	ND	0.0009	ND	0.0003	0.0003	ND	ND
Molybdenum	0.4	NA	0.2	0.3	0.2	[0.1J]	0.4	0.5	0.4	0.3	0.3	0.3	0.4
Nickel	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	0.02	0.01	ND	ND	ND	ND	0.07
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Zinc	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	ND	ND	ND	0.024	0.038	ND	[0.019]JFD
CATIONS													
Bicarbonate	120	120	110	120	130	120	130	130	140	140	130	130	130
Carbonate	<10	<10	<10	<10	<10	<10	ND	ND	ND	ND	ND	ND	ND
Chloride	21000	20000	23000	19000	19000	21000	20000	23000	21000	20000	23000	20000	18000
Sulfate	4500	4300	4000	[2700]JFD	4000	4100	5800	3900	4200	4400	4500	4200	4600
CATIONS													
Calcium	870	560	690	590	660	690	640	620	640	630	590	630	640
Magnesium	1000JC	880	840	730	760	800	790	740	770	770	760	770	800
Potassium	670	460	530	480	290	520	510	490	480	490	510	480	500
Sodium	14000	13000	16000	13000	11000	13000	14000	14000	14000	13000	14000	13000	13000
OTHER CHEMISTRIES													
Cyanide	NA	NA	NA	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Fluoride	2.9	2.7	3.5	3.3	3.7	3.2	3.1	4	3.6	2.8	3.5	3.3	3.6
Fluorine	NA	NA	NA	NA	NA	NA	NA	0.7	0.7	0.7	0.6	0.8	0.9
Nitrate	0.22	0.27	0.31	0.27	0.36	0.47	0.36	0.31	0.3	0.25	0.32	0.34	0.38
Nitrates (NO3-N + NO2-N)	0.21	0.27	0.31	0.27	0.36	0.47	0.36	0.31	0.31	0.25	0.35	0.34	0.38
Total Dissolved Solids	40000	43000	42000	42000	42000	35000	38000	45000	41000	43000	42000	40000	42000
Conductivity (umhos/cm)	56000	61000	59000	59000	47000	48000	50000	49000	40000	60000	53000	[33000]R	64000
pH (units)	7.1	7.1	7.4	7.3	7.5	7.5	7.8	7.5	7.5	7.6	7.7	7.8	7.3
ORGANICS													
Total Organic Carbon (TOC)	<1.0	1.0J	<1.0	[1.0J]	2.9	2.8	2	ND	ND	ND	ND	ND	ND
Total Organic Halogens (TO)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
FIELD MEASUREMENTS													
pH (units)	7.39	7.44	7.47	7.49	7.41	7.43	7.36	7.55	7.45	7.54	7.56	7.33	7.43
Conductivity (umhos/cm)	63700	54933	52800	68633	62200	59766	65200	63100	56700	56500	60400	59300	69600
Temperature (Deg. C)	15.0	14.4	14.2	13.7	13.9	13.9	12.5	13.0	12.3	12.6	12.4	13.6	13.5

ND Not Detected
NA Not Analyzed

TABLE 3
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in pCi/l unless noted otherwise)

Well Identification: GW-57

Page 2 of 2

PARAMETERS	SAMPLING DATE												
	6-12-92	7-8-92	8-5-92	9-2-92	10-6-92	11-3-92	12-8-92	1-13-93	2-9-93	3-9-93	4-6-93	5-11-93	8-3-93
DISSOLVED RADIOLOGICS													
Gross Alpha	180+/-220	70+/-180	200+/-270	70+/-220	0+/-370	180+/-340	0+/-320	150+/-250	70+/-260	0+/-230	0+/-280	0+/-170	0+/-170
Gross Beta	550+/-260	470+/-180	990+/-310	540+/-210	350+/-380	500+/-230	530+/-190	610+/-190	500+/-200	510+/-190	290+/-190	400+/-190	440+/-180
Total Uranium	0.0076JTB	0.0061	0.0044	0.0080	0.0029	0.0046	0.0042	0.0048	0.0033	0.0040	0.0022	0.0035	0.0032
Beryllium-7	<110	<110	<160	<58	<65	<49	<68	<21	<45	<40	<25	<35	<23
Cadmium-109	<67	<77	<150	70	<56	<60	<86	<54	<87	<77	<56	<39	<44
Carbon-14	NA	NA	NA	NA	0.0+/-9.2	9.9+/-9.6	[3+/-12]J	0+/-10	[0.6+/-9.9]J	0+/-12	5.2+/-8.2	[1+/-11]J	11+/-14
Cobalt-60	<11	<11	<18	<9.0	<10	<9	<8.8	<3.7	<3.8	<5.6	<3.1	<4.0	<2.0
Iodine-129	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0+/-0.7	0.0+/-2.4	0.0+/-3.7	0.0+/-1.6
Lead-210	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0+/-1.3	1.9+/-1.3	0.5+/-1.4	[0.5+/-1.6]J
Manganese-54	<8	<7	<20	<12	<8	<5	<8.1	<2.5	<4.1	<3.1	<2.4	<3.4	<2.2
Neptunium-237	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0+/-0.3	0.0+/-0.2	0.0+/-0.4	[0.5+/-0.5]J
Polonium-210	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.1+/-0.6	0.0+/-0.3	0.0+/-0.3	[0.2+/-0.3]J
Potassium-40	320+/-100	320+/-100	590+/-190	390+/-110	400+/-150	360+/-100	310+/-150	394+/-115	520+/-140	450+/-130	480+/-100	440+/-120	460+/-90
Radium-226	0.5+/-0.4	0.7+/-0.5	0.8+/-0.8	0.5+/-0.4	[0.1+/-0.2]J	[0.1+/-0.3]J	[0.3+/-0.3]J	[0.5+/-0.4]J	[0.4+/-0.4]J	0.5+/-0.4	0.9+/-0.6	1.3+/-0.6	0.9+/-0.5
Radium-228	1.3+/-1.1	1.3+/-1.4	0.7+/-1.9J	1.2+/-1.5	[0.6+/-1.8]J	1.6+/-1.5	1.6+/-1.0	1.4+/-0.5	1.8+/-0.6	1.1+/-0.5	[0.4+/-0.7]J	2.5+/-0.7	1.4+/-0.5
Strontium-90	0.0+/-1.7	0.0+/-1.4	0.2+/-1.9J	[0.4+/-0.7]J	1.2+/-1.4	[0.2+/-1.1]J	[0.8+/-1.1]J	[0.6+/-1.0]J	0.0+/-1.2	0.0+/-1.4	0.0+/-1.3	0.0+/-1.7	0.0+/-0.9
Technetium-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	[5.3+/-8.0]J	[0.8+/-1.6]J	0.5+/-2.9	0.0+/-7.1
Thorium-230	0.0+/-0.7	0.0+/-0.6	0.0+/-2.4	0.0+/-1.1	0.0+/-0.6	0.0+/-1.0	3.2+/-3.5	0.0+/-2.6	[3.4+/-3.5]J	8.2+/-4.1	3.5+/-4.1	2.6+/-2.3	1.7+/-2.8
Thorium-232	0.0+/-0.9	0.0+/-0.8	0.0+/-2.5	0.0+/-1.4	0.0+/-0.7	0.0+/-1.3	0.0+/-2.3	0.0+/-2.3	0.0+/-3.1	0.6+/-2.4	0.0+/-3.3	0.0+/-1.0	0.0+/-1.9
Tritium	NA	NA	NA	NA	[70+/-280]J	[120+/-270]J	0+/-281	[80+/-280]J	[110+/-290]J	0+/-274	0+/-284	[50+/-31]J	0+/-290

NA: Not Analyzed

TABLE 5
SUMMARY OF WATER QUALITY DATA
 LARW Compliance Monitor Wells
 (in mg/l unless noted otherwise)

Well Identification: GW-57

Page 1 of 2

PARAMETERS	SAMPLING DATE		
	GWPL	3rd Quarter (8-3-93)	4th Quarter (11-3-93)
DISSOLVED METALS			
Arsenic	0.05	0.022	[0.018]JS
Barium	1	0.022	0.037
Beryllium		ND	ND
Cadmium	0.01	0.014	0.035
Chromium	0.05	0.072	0.1
Copper	1	0.024	[0.037]JFD
Lead	0.05	ND	ND
Mercury	0.002	ND	0.0005
Molybdenum		0.4	0.4
Nickel	0.15	0.07	0.17
Selenium	0.01	ND	[ND]JS
Silver	0.05	ND	ND
Zinc	5	[0.019]JFD	[0.027]JFD
ANIONS			
Bicarbonate		130	120
Carbonate		ND	ND
Chloride		18000	21000
Sulfate		4600	[3500]JFD
CATIONS			
Calcium		640	630
Magnesium		800	750
Potassium		500	450
Sodium		13000	14000
OTHER CHEMISTRIES			
Cyanide		ND	ND
Fluoride	3.59	3.6	3.2
Nitrate		0.38	[0.35]JFD
Nitrates (NO3-N + NO2-N)	10	0.38	[0.35]JFD
Total Dissolved Solids	43610	42000	42000
Conductivity (umhos/cm)		64000	74000
pH (units)	6.5-8.5	7.3	7.4
ORGANICS			
Total Organic Carbon (TOC)	2.57	ND	ND
Total Organic Halogens (TOX)	0.01	ND	ND
FIELD MEASUREMENTS			
pH (units)		7.43	7.32
Conductivity (umhos/cm)		69800	62700
Temperature (Deg. C)		13.5	12.1

ND Not Detected

Shaded areas indicate values above GWPL.

TABLE 5
SUMMARY OF WATER QUALITY DATA
 LARW Compliance Monitor Wells
 (in pCi/l unless noted otherwise)

Well Identification: GW-57

Page 2 of 2

PARAMETERS	SAMPLING DATE		
	GWPL	3rd Quarter (8-3-93)	4th Quarter (11-3-93)
DISSOLVED RADIOLOGICS			
Gross Alpha	186	0 +/-170	70 +/-160
Gross Beta	723	440 +/-180	550 +/-200
Total Uranium (mg/l)	0.02	0.0032	0.0047
Beryllium-7		<23	<15
Cadmium-109		<44	<30
Carbon-14	2133	11 +/-14	[11 +/-14]J
Cobalt-60		<2.0	<1.5
Iodine-129	4	0.0 +/-1.6	0.0 +/-1.1
Manganese-54		<2.2	<1.4
Neptunium-237	8	[0.5 +/-0.5]J	0.0 +/-0.7
Potassium-40	486	460 +/-90	380 +/-60
Radium-226	(Ra-226+Ra-228) 5	0.9 +/-0.5	[0.6 +/-0.5]J
Radium-228		1.4 +/-0.5	1.8 +/-0.5
Strontium-90	8	0.0 +/-0.9	[1.3 +/-1.4]J
Technetium-99	800	0.0 +/-1.1	[3.0 +/-3.9]J
Thorium-230	5.33	1.7 +/-2.8	0.0 +/-2.1
Thorium-232	5.33	0.0 +/-1.9	0.0 +/-2.4
Tritium		0 +/-290	0 +/-309

TABLE 5
SUMMARY OF WATER QUALITY DATA
LARW Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-57

Page 1 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	1st Quarter (2-8-94)	2nd Quarter	3rd Quarter	4th Quarter
DISSOLVED METALS					
Arsenic	0.05	0.021			
Barium	1	0.018			
Beryllium		ND			
Cadmium	0.01	ND			
Chromium	0.05	0.049			
Copper	1	ND			
Lead	0.05	ND			
Mercury	0.002	ND			
Molybdenum		0.4			
Nickel	0.15	0.044			
Selenium	0.01	[ND]JS			
Silver	0.05	ND			
Zinc	5	ND			
ANIONS					
Bicarbonate		120			
Carbonate		ND			
Chloride		20000			
Sulfate		5200			
CATIONS					
Calcium		560			
Magnesium		680			
Potassium		440			
Sodium		11000			
OTHER CHEMISTRIES					
Cyanide		ND			
Fluoride	3.59	3.70			
Total Fluorine		0.40			
Nitrate		0.35			
Nitrates (NO3-N + NO2-N)	10	0.35			
Total Dissolved Solids	43610	42000			
Conductivity (umhos/cm)		63000			
pH (units)	6.5-8.5	7.60			
ORGANICS					
Total Organic Carbon (TOC)	2.57	ND			
Total Organic Halogens (TOX)	0.01	ND			
FIELD MEASUREMENTS					
pH (units)		7.37			
Conductivity (umhos/cm)		65300			
Temperature (Deg. C)		11.2			

ND Not Detected

Shaded areas indicate values above GWPL.

TABLE 5
 SUMMARY OF WATER QUALITY DATA
 LARW Compliance Monitor Wells
 (in pCi/l unless noted otherwise)

Well Identification: GW-57

Page 2 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	1st Quarter (2-8-94)	2nd Quarter	3rd Quarter	4th Quarter
DISSOLVED RADIOLOGICS					
Gross Alpha	186	6.8±1.5			
Gross Beta	723	420±190			
Total Uranium (mg/l)	0.02	0.0035			
Beryllium-7		< 15			
Cadmium-109		< 33			
Carbon-14	2133	0.0±9.6			
Cobalt-60		< 2			
Iodine-129	4	0.0±1.0			
Manganese-54		< 2			
Neptunium-237	8	[0.2±0.5]J			
Potassium-40	486	510±60			
Radium-226	(Ra-226+Ra-228) 5	[0.6±0.5]J			
Radium-228		1.5±0.5			
Strontium-90	8	[0.9±1.4]J			
Technetium-99	800	[0.7±4.0]J			
Thorium-230	5.33	0.0±1.2			
Thorium-232	5.33	0.0±1.2			
Tritium		0±190			

ENVIROCARE OF UTAH, INC.
THE SAFE ALTERNATIVE

June 10, 1994

Mr. Joseph J. Holonich, Chief
Uranium Recovery Branch
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Response to NRC Letters
License No. SMC-1559

Dear Mr. Holonich:

Envirocare of Utah, Inc. ("Envirocare") submits 5 copies of Envirocare's responses to the NRC's letter dated May 19, 1994, regarding the Liner Compatibility Report, and to the letter dated May 27, 1994, regarding the Supplemental Groundwater Quality Data. Envirocare's consultant, Bingham Environmental, has prepared two Project Memorandum dated June 13, 1994, addressing the concerns raised by the NRC in its letters.

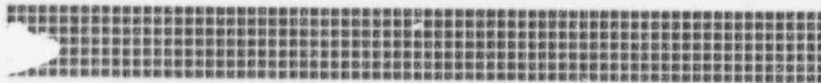
If you have any questions regarding this submittal please contact the undersigned at 801-532-0920.

Sincerely,



George W. Hellstrom

Enclosures



PROJECT MEMORANDUM

TO: George Hellstrom - Envirocare of Utah

FROM: David Cline - Bingham Environmental, Inc. *David Cline*

DATE: June 10, 1994

SUBJECT: Response to
Request for Additional Information
Liner Compatibility Report
Envirocare 11e.(2) Facility
South Clive, Utah

This project memorandum addresses the request for additional information by the NRC in their May 19, 1994 letter. In summary the NRC review letter requested additional information in the following areas:

Initial Concentrations in the Synthetic Leachate Solution

The original proposal to perform liner compatibility testing was to utilize material from a proposed mill tailing remediation site to generate a leachate solution. The NRC was concerned that the leachate generated from one particular site would not represent all possible leachate solutions generated by other potential remediation sites. The decision was made to generate a synthetic solution which would represent a worse case scenario for possible leachate solutions. Sampling data collected by the NRC at nine different tailings ponds was used to set maximum levels of concentrations for expected contaminants. The concentration of sulfate (SO_4) was very high at all sites. The concentrations for barium and fluoride were set to the maximum allowable levels permitted at the site. The sulfate levels used in the solution are well within the range expected for tailing leachate. It was known that these high levels would probably result in certain elements precipitating out of solution. The conditions at the site are also very high in calcium carbonate. Sulfate and carbonate will both precipitate the more insoluble metals. The presence of significant precipitate on the clay liner in the permeameter mold was not evident. The precipitate in the leachate solution storage containers was minimal. It is not expected that the potential for precipitate has resulted in data unrealistic of the site conditions.

Potential Dissolution of Liner Material

The report indicated that there was a 2% loss in solids due to possible solubility of the high chloride content in the liner material. This 2% loss was recorded during permeability testing utilizing distilled water. Permeability testing utilizing shallow groundwater indicated that this solids loss was reduced to 0.2%, which is considered negligible. The recent results from leachate permeant testing



shows an approximate solids loss closer to 1.6% for solutions ranging from pH 2 to pH 7. The impacts due to the long term contact by leachate solution have not resulted in a significant increase in permeability. There is expected loss due to the high chloride content, however the site conditions will create leachate solutions with elevated specific gravity levels which should approximate conditions closer to the tests using groundwater.

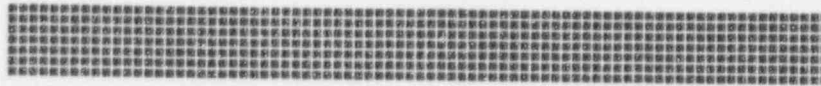
Sodium (Na) and Chloride (Cl) Concentrations in the Test Effluent

The initial permeability testing on the clay liner material included utilizing shallow groundwater from the site as the permeant. The leachate solution was introduced once the groundwater permeability testing stabilized and an approximate quantity of one pore volume of groundwater permeant was run through the permeability mold. The groundwater permeant was used to establish the baseline for the permeability of the clay material prior to contact with the leachate.

As noted by the NRC, the results from the chemical analyses on the effluent from the leachate permeability testing indicated high levels of Na and Cl. These elevated levels are due to the effluent containing residual groundwater from the pores of the permeability material from the previous groundwater permeant. The effluent from the initial groundwater tests was not mixed with the effluent from the leachate tests, however due to the fine grain nature of the clay material it is difficult to remove all of the residual water from the permeameter material. The levels of Na and Cl in the groundwater are approximately 40 to 70 percent higher than the levels in the leachate effluent. The elevated levels in the effluent are due to the mixing of the one pore volume of residual groundwater effluent with the leachate effluent.

Potential Physical Impacts to the Liner due to Low pH Solutions

The objective of the study was to determine the effects on the permeability of the liner due to the contact of several different leachate solutions. The conclusions from the permeability testing is that the liner permeability did not increase significantly for the equivalent contact period of 80 years, for even the lowest of possible pH levels. It is expected that any significant changes in physical characteristics in the clay liner material would result in changes to the permeability. There was no visual evidence during the testing that there were changes to the physical characteristics of the material and the testing showed no significant changes in the permeability for the four varying pH tests.



PROJECT MEMORANDUM

TO: George Hellstrom - Envirocare of Utah

FROM: Stan Plaisier - Bingham Environmental, Inc.
Mark Taggart - Bingham Environmental, Inc. *hjt*

DATE: June 10, 1994

SUBJECT: Responses to NRC Comments to Supplemental Groundwater Quality Data
11e.(2) Disposal Cell
South Clive, Utah

The following are responses to the NRC's comments to the "Supplemental Groundwater Quality Data", dated April 1, 1994:

Background Groundwater Quality Comments

1. Prior to disposing of 11e.(2) wastes, Envirocare will complete the collection of one full year of background water quality data, for each monitoring well and each constituent. All background water quality data for inorganic constituents was completed with the April 1994 sampling event. The organic constituents will be complete after the 3rd quarter sampling event which is scheduled for July 1994. The data for April 1994, and July 1994 will be submitted to the NRC when the results have been received and reviewed for QA.

To date POC wells GW-60 and GW-63 have been monitored for one full year on the following dates: August 4, 1993, November 3, 1993, February 9, 1994 and April 28, 1994. The attached Tables 1 and 2 summarize the one full year of background data for GW-60 and GW-63.

Background groundwater quality data is available for GW-57 from June 1992 through April 1994 for a total of 16 monitoring events. We are re-submitting the summary tables for GW-57 covering the period between June 1992 and February 1994.

2. Groundwater samples collected between June 1992 and May 1993 were obtained on a monthly (accelerated) basis which apparently minimized the build up of metals in the wells due to corrosion of the stainless steel dedicated bladder pumps. After the accelerated period sampling went to quarterly monitoring where well purging was less frequent (three to four months between sampling events). Because of the less frequent purging, concentrations of metals began to build up. Based on our review of the data through May 1993 baseline (background) levels were maintained.

A remediation plan for the LARW and 11e.(2) dedicated bladder pumps was submitted to the Utah Division of Water Quality and is presently being instituted and will be completed by the end of June 1994. Essentially all stainless steel pumps will be removed and replaced with PVC dedicated bladder pumps. Prior to removing the stainless steel pumps a minimum of six well volumes or 20 gallons, whichever is greater, will be purged from each well. The purging effort is designed to remove as much heavy metal contamination as practical. Confirmation sampling of all wells will be performed to confirm the removal of heavy metal contamination through analysis for cadmium, chromium and nickel. The effectiveness of purging large amounts of water prior to sampling is evident in the April 1994 quarterly groundwater sampling results where 15 gallons of water was purged prior to sampling and the results indicate baseline levels.

Observations on the Groundwater Protection Levels

3. Envirocare proposed the protection levels so that there would be consistency between the State and NRC regulated facilities which are in close proximity to each other. If the NRC feels that it is premature to set protection levels at this time then Envirocare will wait until the NRC is ready to establish protection levels.
4. Agreed.



TABLE 1
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-60

Page 1 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	8-4-93	11-3-93	2-9-94	4-28-94
DISSOLVED METALS					
Arsenic	NE	[0.019]JFD	[0.021]JS	0.027	0.025
Barium	NE	0.019	0.03	0.008	ND
Beryllium	NE	ND	ND	ND	ND
Cadmium	NE	0.009	0.03	ND	ND
Chromium	NE	0.053	0.087	0.027	ND
Copper	NE	[0.024]JFD	[0.024]JFD	ND	ND
Lead	NE	ND	ND	ND	ND
Mercury	NE	0.0002	0.0004	ND	ND
Molybdenum	NE	0.2	0.3	0.2	0.2
Nickel	NE	[0.038]JFD	0.095	ND	ND
Selenium	NE	ND	[0.009]JS	[0.012]JS	[ND]UJ
Silver	NE	ND	ND	ND	ND
Zinc	NE	0.012	[0.023]JFD	ND	ND
ANIONS					
Bicarbonate	NE	190	190	190	[200]R
Carbonate	NE	ND	ND	ND	[ND]R
Chloride	NE	20000	21000	19000	18000
Sulfate	NE	3400	[3700]JFD	3500	3500
CATIONS					
Calcium	NE	430	460	380	360
Magnesium	NE	670	650	540	570
Potassium	NE	480	450	460	450
Sodium	NE	14000	15000	11000	13000
OTHER CHEMISTRIES					
Cyanide	NE	ND	ND	ND	ND
Fluoride	NE	3	2.8	3.5	3.2
Total Fluorine	NE	0.7	0.6	0.3	0.7
Nitrate	NE	0.16	[0.16]JFD	0.17	0.23
Nitrates (NO ₃ -N + NO ₂ -N)	NE	0.16	[0.16]JFD	0.17	0.23
Total Dissolved Solids	NE	41000	42000	40000	40000
Conductivity (umhos/cm)	NE	60000	74000	62000	68000
pH (units)	NE	7.3	7.3	7.5	7.6
ORGANICS					
Total Organic Carbon (TOC)	NE	ND	ND	ND	ND
Total Organic Halogens (TOX)	NE	ND	ND	ND	ND
FIELD MEASUREMENTS					
pH (units)	NE	7.32	7.06	7.41	7.37
Conductivity (umhos/cm)	NE	73300	69000	62600	62800
Temperature (Deg. C)	NE	13.2	11.9	12.2	13.1

ND Not Detected

NE Not Established

Radiologic results not yet available for the April 1994 event.

All volatile and semi-volatile organic results below laboratory detection limits.

TABLE 1
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-63

Page 1 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	8-4-93	11-3-93	2-9-94	4-28-94
DISSOLVED METALS					
Arsenic	NE	ND	[0.018]JS	0.025	0.024
Barium	NE	0.08	0.052	0.024	0.006
Beryllium	NE	ND	ND	ND	ND
Cadmium	NE	0.009	0.033	ND	ND
Chromium	NE	0.049	0.091	0.03	ND
Copper	NE	[0.026]JFD	[0.027]JFD	ND	ND
Lead	NE	ND	ND	ND	ND
Mercury	NE	0.0002	0.0004	ND	ND
Molybdenum	NE	0.2	0.3	0.2	0.2
Nickel	NE	[0.046]JFD	0.1	ND	ND
Selenium	NE	ND	[ND]UJ	[ND]UJ	[ND]UJ
Silver	NE	ND	ND	ND	ND
Zinc	NE	0.012	[0.03]JFD	0.012	ND
ANIONS					
Bicarbonate	NE	150	140	140	[140]R
Carbonate	NE	ND	ND	ND	[ND]R
Chloride	NE	19000	20000	19000	18000
Sulfate	NE	3100	[2700]JFD	3700	3300
CATIONS					
Calcium	NE	410	380	380	350
Magnesium	NE	640	850	570	580
Potassium	NE	450	460	430	430
Sodium	NE	13000	13000	11000	13000
OTHER CHEMISTRIES					
Cyanide	NE	ND	ND	ND	ND
Fluoride	NE	3.1	2.7	3.6	3.4
Total Fluorine	NE	0.9	0.6	0.4	0.7
Nitrate	NE	0.45	[0.6]JFD	0.56	0.62
Nitrates (NO ₃ -N + NO ₂ -N)	NE	0.45	[0.6]JFD	0.56	0.62
Total Dissolved Solids	NE	38000	47000	40000	38000
Conductivity (umhos/cm)	NE	56000	72000	61000	68000
pH (units)	NE	7.4	7.4	7.5	7.6
ORGANICS					
Total Organic Carbon (TOC)	NE	ND	ND	ND	ND
Total Organic Halogens (TOX)	NE	ND	ND	ND	ND
FIELD MEASUREMENTS					
pH (units)	NE	7.40	7.29	7.55	7.59
Conductivity (umhos/cm)	NE	65200	66400	61400	60300
Temperature (Deg. C)	NE	13.3	11.8	12.9	13.6

ND Not Detected

NE Not Established

Radiologic results not yet available for the April 1994 event.

All volatile and semi-volatile organic results below laboratory detection limits.



AMERICAN
WEST
ANALYTICAL
LABORATORIES

INORGANIC ANALYSIS REPORT

Client: Envirocare
Date Received: April 29, 1994
Lab Sample ID Number: 18308-05
Field Sample ID: Quarterly LARW GW Monitoring April 1994/GW-60

Contact: Jeff Low
Received By: Elona Hayward


Analytical Results

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Fax (801) 263-8687

	Method Used:	Detection Limit: mg/L	Amount Detected: mg/L	Date Analyzed
DISSOLVED METALS				
Arsenic	7060	0.005	0.025	5/5/94
Barium	6010	0.002	ND	5/5/94
Beryllium	6010	0.005	ND	5/5/94
Cadmium	6010	0.004	ND	5/5/94
Calcium	6010	0.01	360	5/5/94
Chromium	6010	0.005	ND	5/5/94
Copper	6010	0.005	ND	5/5/94
Lead	7421	0.005	ND	5/5/94
Magnesium	6010	0.01	570	5/5/94
Mercury	7471	0.0002	ND	5/5/94
Molybdenum	6010	0.1	0.2	5/5/94
Nickel	6010	0.01	ND	5/5/94
Potassium	6010	0.01	450	5/5/94
Selenium	7740	0.005	[ND]WJ	5/5/94
Silver	6010	0.005	ND	5/5/94
Sodium	6010	0.01	13000	5/5/94
Zinc	6010	0.002	ND	5/5/94
OTHER CHEMISTRIES				
Bicarbonate (as CaCO ₃)	310.1	10.	[200]R	5/13/94
Carbonate (as CaCO ₃)	310.1	10.	[ND]R	5/13/94
Chloride	325.3	0.5	18000	5/14/94
Conductivity†	120.1	N/A	68000	5/11/94
Cyanide	335.3	0.005	ND	5/10/94
Fluoride	340.1	0.1	3.2	5/16/94
Nitrate (as N)	353.2	0.01	0.23	5/4/94
Nitrate/Nitrite (as N)	353.2	0.01	0.23	5/4/94
pH	150.1	0.1	7.6	5/13/94
Sulfate	375.4	0.5	3500	5/9/94
TDS	160.1	10.	40000	5/5/94
TOC	415.2	1.0	ND	5/3/94
TOX	9020	0.005	ND	5/9/94
Ion Balance			4.44	

† Units for conductivity are $\mu\text{mhos/cm}$ @ 25°C

Released by: 
Laboratory Supervisor

Report Date 6/2/94

1 of 1

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AMERICAN
WEST
ANALYTICAL
LABORATORIES

ORGANIC ANALYSIS REPORT

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

Analysis Requested:
Volatile Organics

Method Ref. Number:
EPA SW-846 #8260
Purge & Trap GC/MS

Date Analyzed:
May 2, 1994

463 West 3600 South
Salt Lake City, Utah
84115

Lab Sample ID. Number:
18308-05

Field Sample ID. Number:
Quarterly LARW GW Monitoring April 1994/GW-60

Analytical Results

VOLATILE ORGANIC COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

(801) 263-8686
Fax (801) 263-8687

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
Acetone	20.	< 20.
2-Butanone	20.	<20.
Carbon disulfide	2.0	< 2.0
Chloroform	2.0	< 2.0
1,2-Dichloroethane	2.0	< 2.0
Methylene chloride	2.0	< 2.0
Naphthalene	4.0	< 4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: Elona Hayward
Laboratory Supervisor



ORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

Analysis Requested: Semivolatile Organics
Method Ref. Number: EPA SW-846 #8270
Base Neutral Fraction
Date Extracted: May 2, 1994
Date Analyzed: May 11, 1994

463 West 3600 South
Salt Lake City, Utah
84115

Lab Sample ID. Number: 18308-05
Field Sample ID. Number: Quarterly LARW GW Monitoring April 1994/GW-60

Analytical Results

ACID COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
(801) 263-8686 Fax (801) 263-8687 Diethyl phthalate	4.0	<4.0
2-Methylnaphthalene	4.0	<4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: John Young
Laboratory Supervisor

Report Date 6/2/94 1 of 1



AMERICAN
WEST
ANALYTICAL
LABORATORIES

INORGANIC ANALYSIS REPORT

Client: Envirocare
Date Received: April 29, 1994
Lab Sample ID Number: 18308-06
Field Sample ID: Quarterly LARW GW Monitoring April 1994/GW-63

Contact: Jeff Low
Received By: Elona Hayward

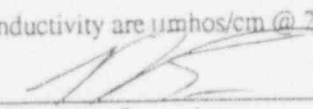
Analytical Results

463 West 3600 South
Salt Lake City, Utah
84115

(801) 263-8686
Fax (801) 263-8687

	<u>Method Used:</u>	<u>Detection Limit:</u> mg/L	<u>Amount Detected:</u> mg/L	<u>Date Analyzed</u>
DISSOLVED METALS				
Arsenic	7060	0.005	0.024	5/5/94
Barium	6010	0.002	0.006	5/5/94
Beryllium	6010	0.005	ND	5/5/94
Cadmium	6010	0.004	ND	5/5/94
Calcium	6010	0.01	350	5/5/94
Chromium	6010	0.005	ND	5/5/94
Copper	6010	0.005	ND	5/5/94
Lead	7421	0.005	ND	5/5/94
Magnesium	6010	0.01	580	5/5/94
Mercury	7471	0.0002	ND	5/5/94
Molybdenum	6010	0.1	0.2	5/5/94
Nickel	6010	0.01	ND	5/5/94
Potassium	6010	0.01	430	5/5/94
Selenium	7740	0.005	[ND]u	5/5/94
Silver	6010	0.005	ND	5/5/94
Sodium	6010	0.01	13000	5/5/94
Zinc	6010	0.002	ND	5/5/94
OTHER CHEMISTRIES				
Bicarbonate (as CaCO ₃)	310.1	10.	[140]R	5/13/94
Carbonate (as CaCO ₃)	310.1	10.	[ND]R	5/13/94
Chloride	325.3	0.5	18000	5/14/94
Conductivity†	120.1	N/A	68000	5/11/94
Cyanide	335.3	0.005	ND	5/10/94
Fluoride	340.1	0.1	3.4	5/16/94
Nitrate (as N)	353.2	0.01	0.62	5/4/94
Nitrate/Nitrite (as N)	353.2	0.01	0.62	5/4/94
pH	150.1	0.1	7.6	5/13/94
Sulfate	375.4	0.5	3300	5/9/94
TDS	160.1	10.	38000	5/5/94
TOC	415.2	1.0	ND	5/3/94
TOX	9020	0.005	ND	5/9/94
Ion Balance			4.95	

† Units for conductivity are $\mu\text{mhos/cm}$ @ 25°C

Released by: 
Laboratory Supervisor

Report Date 6/2/94

1 of 1



AMERICAN
WEST
ANALYTICAL
LABORATORIES

ORGANIC ANALYSIS REPORT

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

Analysis Requested:
Volatile Organics

Method Ref. Number:
EPA SW-846 #8260
Purge & Trap GC/MS

Date Analyzed:
May 2, 1994

463 West 3600 South
Salt Lake City, Utah
84115

Lab Sample ID. Number:
18308-06

Field Sample ID. Number:
Quarterly LARW GW Monitoring April 1994/GW-63

Analytical Results

VOLATILE ORGANIC COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

(801) 263-8686
Fax (801) 263-8687

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
Acetone	20.	< 20.
2-Butanone	20.	<20.
Carbon disulfide	2.0	< 2.0
Chloroform	2.0	< 2.0
1,2-Dichloroethane	2.0	< 2.0
Methylene chloride	2.0	< 2.0
Naphthalene	4.0	< 4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: John L. Hayward
Laboratory Supervisor



ORGANIC ANALYSIS REPORT

AMERICAN
WEST
ANALYTICAL
LABORATORIES

Client: Envirocare
Date Received: April 29, 1994
Set Identification Number: 18308
Set Description: Nine Water Samples

Contact: Jeff Low
Received By: Elona Hayward

Analysis Requested: Semivolatile Organics
Method Ref. Number: EPA SW-846 #8270
Base Neutral Fraction
Date Extracted: May 2, 1994
Date Analyzed: May 11, 1994

463 West 3600 South
Salt Lake City, Utah
84115

Lab Sample ID. Number: 18308-06
Field Sample ID. Number: Quarterly LARW GW Monitoring April 1994/GW-63

Analytical Results

ACID COMPOUNDS

Units = $\mu\text{g/L}$ (ppb)

(801) 263-8686
Fax (801) 263-8687

<u>Compound:</u>	<u>Detection Limit:</u>	<u>Amount Detected:</u>
Diethyl phthalate	4.0	<4.0
2-Methylnaphthalene	4.0	<4.0

<Value = None detected above the specified method detection limit, or a value that reflects a reasonable limit due to interferences.

Released by: *John Upmeyer*
Laboratory Supervisor

Report Date 6/2/94 1 of 1

TABLE 3
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in mg/l unless noted otherwise)

Page 1 of 2

PARAMETERS	SAMPLING DATE												
	6-12-92	7-8-92	8-5-92	9-2-92	10-6-92	11-3-92	12-8-9	1-13-93	2-9-93	3-9-93	4-5-93	5-10-93	8-3-93
DISSOLVED METALS													
Arsenic	0.005J	0.005J	0.013	<0.005	0.007	0.015	0.013	0.008	0.005	0.014	0.015	0.023	0.022
Barium	0.018JFD	<0.002	<0.002	<0.002	<0.002	<0.002	0.034	0.033	0.028	0.044	0.025	0.028	0.022
Beryllium	<0.005	NA	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Cadmium	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	ND	ND	ND	ND	ND	ND	0.014
Chromium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.043	0.035	0.026	0.038	0.034	0.024	0.072
Copper	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	ND	10.1J	ND	0.029	ND	ND	0.024
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	ND	ND	ND	ND	ND	ND
Mercury	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	ND	0.0009	ND	0.0003	0.0003	ND	ND
Molybdenum	0.4	NA	0.2	0.3	0.2	10.1J	0.4	0.5	0.4	0.3	0.3	0.3	0.4
Nickel	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	0.02	0.01	ND	ND	ND	ND	0.07
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Silver	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Zinc	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	ND	ND	ND	0.024	0.038	ND	(0.019)JFD
ANIONS													
Bicarbonate	120	120	110	120	130	120	130	130	140	140	130	130	130
Carbonate	<10	<10	<10	<10	<10	<10	ND	ND	ND	ND	ND	ND	ND
Chloride	21000	20000	23000	19000	19000	21000	20000	23000	21000	20000	23000	20000	18000
Sulfate	4500	4300	4000	2700JFD	4000	4100	5800	3900	4200	4400	4500	4200	4600
CATIONS													
Calcium	870	560	690	590	660	690	640	620	640	630	590	630	640
Magnesium	1000JC	880	840	730	760	800	790	740	770	770	760	770	800
Potassium	670	460	530	480	290	520	510	490	480	490	510	480	500
Sodium	14000	13000	16009	13000	11000	13000	14000	14000	14000	13000	14000	13000	13000
OTHER CHEMISTRIES													
Cyanide	NA	NA	NA	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
Fluoride	2.9	2.7	3.5	3.3	3.7	3.2	3.1	4	3.6	2.8	3.5	3.3	3.6
Fluorine	NA	NA	NA	NA	NA	NA	NA	0.7	0.7	0.7	0.6	0.8	0.9
Nitrate	0.22	0.27	0.31	0.27	0.36	0.47	0.36	0.31	0.3	0.25	0.32	0.34	0.38
Nitrates (NO3-N + NO2-N)	0.21	0.27	0.31	0.27	0.36	0.47	0.36	0.31	0.31	0.25	0.35	0.34	0.38
Total Dissolved Solids	40000	43000	42000	42000	42000	35000	38000	45000	41000	43000	42000	40000	42000
Conductivity (umhos/cm)	56000	61000	59000	59000	47000	48000	50000	49000	40000	60000	53000	33000JR	64000
pH (units)	7.1	7.1	7.4	7.3	7.5	7.5	7.8	7.5	7.5	7.6	7.7	7.8	7.3
ORGANICS													
Total Organic Carbon (TOC)	<1.0	1.0J	<1.0	1.0J	2.9	2.8	2	ND	ND	ND	ND	ND	ND
Total Organic Halogens (TO)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	ND	ND	ND	ND	ND	ND
FIELD MEASUREMENTS													
pH (units)	7.39	7.44	7.47	7.49	7.41	7.43	7.36	7.55	7.45	7.54	7.56	7.33	7.43
Conductivity (umhos/cm)	63700	54933	52800	68633	62200	59766	65200	63100	56700	56500	60400	59300	69600
Temperature (Deg. C)	15.0	14.4	14.2	13.7	13.9	13.9	12.5	13.0	12.3	12.6	12.4	13.6	13.5

ND Not Detected
NA Not Analyzed

TABLE 3
SUMMARY OF WATER QUALITY DATA
11e.(2) Compliance Monitor Wells
(in pCi/l unless noted otherwise)

Well Identification: GW-57

Page 2 of 2

PARAMETERS	SAMPLING DATE												
	6-12-92	7-8-92	8-5-92	9-2-92	10-6-92	11-3-92	12-8-92	1-13-93	2-9-93	3-9-93	4-6-93	5-11-93	8-3-93
DISSOLVED RADIOLOGICS													
Gross Alpha	180+/-220	70+/-180	200+/-270	70+/-220	0+/-370	180+/-340	0+/-320	150+/-250	70+/-260	0+/-230	0+/-280	0+/-170	0+/-170
Gross Beta	550+/-260	470+/-180	990+/-310	540+/-210	350+/-380	500+/-230	530+/-190	610+/-190	500+/-200	510+/-190	290+/-190	400+/-190	440+/-180
Total Uranium	0.0076JTB	0.0061	0.0044	0.0080	0.0029	0.0046	0.0042	0.0048	0.0033	0.0040	0.0022	0.0035	0.0032
Beryllium-7	<110	<110	<160	<58	<65	<49	<68	<21	<45	<40	<25	<35	<23
Cadmium-109	<67	<77	<150	70	<56	<60	<86	<54	<87	<77	<56	<39	<44
Carbon-14	NA	NA	NA	NA	0.0+/-9.2	9.9+/-9.6	[3+/-12]J	0+/-10	[0.6+/-9.9]J	0+/-12	5.2+/-8.2	[1+/-11]J	11+/-14
Cobalt-60	<11	<11	<18	<9.0	<10	<9	<8.8	<3.7	<3.8	<5.6	<3.1	<4.0	<2.0
Iodine-129	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0+/-0.7	0.0+/-2.4	0.0+/-3.7	0.0+/-1.6
Lead-210	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0+/-1.3	1.9+/-1.3	0.5+/-1.4	[0.5+/-1.6]J
Manganese-54	<8	<7	<20	<12	<8	<5	<8.1	<2.5	<4.1	<3.1	<2.4	<3.4	<2.2
Neptunium-237	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0+/-0.3	0.0+/-0.2	0.0+/-0.4	[0.5+/-0.5]J
Polonium-210	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.1+/-0.6	0.0+/-0.3	0.0+/-0.3	[0.2+/-0.3]J
Potassium-40	320+/-100	320+/-100	590+/-190	390+/-110	400+/-150	360+/-100	310+/-150	394+/-115	520+/-140	450+/-130	480+/-100	440+/-120	460+/-90
Radium-226	0.5+/-0.4	0.7+/-0.5	0.8+/-0.8	0.5+/-0.4	[0.1+/-0.2]J	[0.1+/-0.3]J	[0.3+/-0.3]J	[0.5+/-0.4]J	[0.4+/-0.4]J	0.5+/-0.4	0.9+/-0.6	1.3+/-0.6	0.9+/-0.5
Radium-228	1.0+/-1.1	1.3+/-1.4	0.7+/-1.9J	1.2+/-1.5	[0.6+/-1.8]J	1.6+/-1.5	1.6+/-1.0	1.4+/-0.5	1.8+/-0.6	1.1+/-0.5	[0.4+/-0.7]J	2.5+/-0.7	1.4+/-0.5
Strontium-90	0.0+/-1.7	0.0+/-1.4	0.2+/-1.9J	[0.4+/-0.7]J	1.2+/-1.4	[0.2+/-1.1]J	[0.8+/-1.1]J	[0.6+/-1.0]J	0.0+/-1.2	0.0+/-1.4	0.9+/-1.3	0.0+/-1.7	0.0+/-0.9
Technetium-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	[5.3+/-8.0]J	[0.8+/-1.6]J	0.5+/-2.9	0.0+/-7.1
Thorium-230	0.0+/-0.7	0.0+/-0.6	0.0+/-2.4	0.0+/-1.1	0.0+/-0.6	0.0+/-1.0	3.2+/-3.5	0.0+/-2.6	[3.4+/-3.5]J	8.2+/-4.1	3.5+/-4.1	2.6+/-2.3	1.7+/-2.8
Thorium-232	0.0+/-0.9	0.0+/-0.8	0.0+/-2.5	0.0+/-1.4	0.0+/-0.7	0.0+/-1.3	0.0+/-2.3	0.0+/-2.3	0.0+/-3.1	0.6+/-2.4	0.0+/-3.3	0.0+/-1.0	0.0+/-1.9
Tritium	NA	NA	NA	NA	[70+/-280]J	[120+/-270]J	0+/-281	[80+/-280]J	[110+/-290]J	0+/-274	0+/-284	[50+/-31]J	0+/-290

NA Not Analyzed

TABLE 5
SUMMARY OF WATER QUALITY DATA
 LARW Compliance Monitor Wells
 (in mg/l unless noted otherwise)

Well Identification: GW-57

Page 1 of 2

PARAMETERS	SAMPLING DATE		
	GWPL	3rd Quarter (8-3-93)	4th Quarter (11-3-93)
DISSOLVED METALS			
Arsenic	0.05	0.022	[0.018]JS
Barium	1	0.022	0.037
Beryllium		ND	ND
Cadmium	0.01	0.014	0.035
Chromium	0.05	0.072	0.1
Copper	1	0.024	[0.037]JFD
Lead	0.05	ND	ND
Mercury	0.002	ND	0.0005
Molybdenum		0.4	0.4
Nickel	0.15	0.07	0.17
Selenium	0.01	ND	[ND]JS
Silver	0.05	ND	ND
Zinc	5	[0.019]JFD	[0.027]JFD
ANIONS			
Bicarbonate		130	120
Carbonate		ND	ND
Chloride		18000	21000
Sulfate		4600	[3500]JFD
CATIONS			
Calcium		640	630
Magnesium		800	750
Potassium		500	450
Sodium		13000	14000
OTHER CHEMISTRIES			
Cyanide		ND	ND
Fluoride	3.59	3.6	3.2
Nitrate		0.38	[0.35]JFD
Nitrates (NO3-N + NO2-N)	10	0.38	[0.35]JFD
Total Dissolved Solids	43610	42000	42000
Conductivity (umhos/cm)		64000	74000
pH (units)	6.5-8.5	7.3	7.4
ORGANICS			
Total Organic Carbon (TOC)	2.57	ND	ND
Total Organic Halogens (TOX)	0.01	ND	ND
FIELD MEASUREMENTS			
pH (units)		7.43	7.32
Conductivity (umhos/cm)		69800	62700
Temperature (Deg. C)		13.5	12.1

ND Not Detected

Shaded areas indicate values above GWPL.

TABLE 5
 SUMMARY OF WATER QUALITY DATA
 LARW Compliance Monitor Wells
 (in pCi/l unless noted otherwise)

Well Identification: GW-57

Page 2 of 2

PARAMETERS	SAMPLING DATE		
	GWPL	3rd Quarter (8-3-93)	4th Quarter (11-3-93)
DISSOLVED RADIOLOGICS			
Gross Alpha	186	0+/-170	70+/-160
Gross Beta	723	440+/-180	550+/-200
Total Uranium (mg/l)	0.02	0.0032	0.0047
Beryllium-7		<23	<15
Cadmium-109		<44	<30
Carbon-14	2133	11+/-14	[11+/-14]J
Cobalt-60		<2.0	<1.5
Iodine-129	4	0.0+/-1.6	0.0+/-1.1
Manganese-54		<2.2	<1.4
Neptunium-237	8	[0.5+/-0.5]J	0.0+/-0.7
Potassium-40	486	460+/-90	380+/-60
Radium-226	(Ra-226+Ra-228) 5	0.9+/-0.5	[0.6+/-0.5]J
Radium-228		1.4+/-0.5	1.8+/-0.5
Strontium-90	8	0.0+/-0.9	[1.3+/-1.4]J
Technetium-99	800	0.0+/-7.1	[3.0+/-3.9]J
Thorium-230	5.33	1.7+/-2.8	0.0+/-2.1
Thorium-232	5.33	0.0+/-1.9	0.0+/-2.4
Tritium		0+/-290	0+/-309

TABLE 5
SUMMARY OF WATER QUALITY DATA
LARW Compliance Monitor Wells
(in mg/l unless noted otherwise)

Well Identification: GW-57

Page 1 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	1st Quarter (2-8-94)	2nd Quarter	3rd Quarter	4th Quarter
DISSOLVED METALS					
Arsenic	0.05	0.021			
Barium	1	0.018			
Beryllium		ND			
Cadmium	0.01	ND			
Chromium	0.05	0.049			
Copper	1	ND			
Lead	0.05	ND			
Mercury	0.002	ND			
Molybdenum		0.4			
Nickel	0.15	0.044			
Selenium	0.01	[ND]JS			
Silver	0.05	ND			
Zinc	5	ND			
ANIONS					
Bicarbonate		120			
Carbonate		ND			
Chloride		20000			
Sulfate		5200			
CATIONS					
Calcium		560			
Magnesium		680			
Potassium		440			
Sodium		11000			
OTHER CHEMISTRIES					
Cyanide		ND			
Fluoride	3.59	3.70			
Total Fluorine		0.40			
Nitrate		0.35			
Nitrates (NO ₃ -N + NO ₂ -N)	10	0.35			
Total Dissolved Solids	43610	42000			
Conductivity (umhos/cm)		63000			
pH (units)	6.5-8.5	7.60			
ORGANICS					
Total Organic Carbon (TOC)	2.57	ND			
Total Organic Halogens (TOX)	0.01	ND			
FIELD MEASUREMENTS					
pH (units)		7.37			
Conductivity (umhos/cm)		65300			
Temperature (Deg. C)		11.2			

ND Not Detected

Shaded areas indicate values above GWPL.

TABLE 5
 SUMMARY OF WATER QUALITY DATA
 LARW Compliance Monitor Wells
 (in pCi/l unless noted otherwise)

Well Identification: GW-57

Page 2 of 2

PARAMETERS	SAMPLING DATE				
	GWPL	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
DISSOLVED RADIOLOGICS		(2-8-94)			
Gross Alpha	186	6.8±1.5			
Gross Beta	723	420±190			
Total Uranium (mg/l)	0.02	0.0035			
Beryllium-7		< 15			
Cadmium-109		< 33			
Carbon-14	2133	0.0±9.6			
Cobalt-60		< 2			
Iodine-129	4	0.0±1.0			
Manganese-54		< 2			
Neptunium-237	8	[0.2±0.5]J			
Potassium-40	486	510±60			
Radium-226	(Ra-226+Ra-228) 5	[0.6±0.5]J			
Radium-228		1.5±0.5			
Strontium-90	8	[0.9±1.4]J			
Technetium-99	800	[0.7±4.0]J			
Thorium-230	5.33	0.0±1.2			
Thorium-232	5.33	0.0±1.2			
Tritium		0±190			