

TA 50

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Date: January 29, 2003
Refer to: RRES-WQH: 03-014

Mr. Curt Frischkorn
Ground Water Pollution Prevention Section
Ground Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

SUBJECT: TA-50 RADIOACTIVE LIQUID WASTE TREATMENT FACILITY, GROUND WATER DISCHARGE PLAN (DP-1132) QUARTERLY REPORT, FOURTH QUARTER 2002

Dear Mr. Frischkorn:

This letter and the enclosed attachments are intended to serve as Los Alamos National Laboratory's quarterly Ground Water Discharge Plan (DP-1132) report for the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) for the 4th quarter of 2002. Since the 1st quarter of 1999, Los Alamos National Laboratory has provided your agency with voluntary quarterly reports containing analytical results from effluent and ground water monitoring.

Mortandad Canyon Alluvial Ground Water Monitoring Results

Attachment 1.0, Table 1.0, presents the analytical results from sampling conducted at three Mortandad Canyon alluvial monitoring wells during the 4th quarter of 2002. All of the analytical results from MCO-3, MCO-6, and MCO-7 were below New Mexico Water Quality Control Commission (NM WQCC) Regulation 3103 standards for nitrate-nitrogen (NO₃-N), fluoride (F), and total dissolved solids (TDS).

Mortandad Canyon alluvial monitoring well MCO-4B did not have sufficient water for sampling during the 4th quarter. The prolonged drought conditions have resulted in declining water levels in many of the Laboratory's shallow alluvial monitoring wells. We will continue to measure the water level in MCO-4B each quarter and will sample the well whenever sufficient water is present.

In January 2002, you asked the Laboratory to add perchlorate (ClO₄) monitoring to the quarterly sampling conducted at Mortandad Canyon alluvial wells MCO-3, MCO-4B, MCO-6, and MCO-7 (letter, Curt Frischkorn, NMED, to Bob Beers, LANL, January 16, 2002). Per your request, perchlorate (ClO₄) results from sampling conducted at MCO-3, MCO-6, and MCO-7 on November 20, 2002, are 4.3 ppb, 77.5 ppb, and 108 ppb, respectively. These results have also been summarized in Attachment 1.0, Table 1.0.



Attachment 2.0, Figures 1-6, presents a summary of the 2002 perchlorate, the sum of nitrate-nitrogen and nitrite-nitrogen (NO₃+NO₂-N), TDS, F, Total Kjeldahl Nitrogen (TKN), and ammonia-nitrogen (NH₃-N) data collected from Mortandad Canyon alluvial wells MCO-3, MCO-6, and MCO-7. All of the 2002 analytical results are below NMWQCC Regulation 3103 standards for ground water. Perchlorate concentrations in MCO-3 declined by 95% (78.4 ppb to 4.3 ppb) during in 2002 in response to the RLWTF's installation of an ion exchange treatment unit for perchlorate removal in March 2002. Perchlorate concentrations in MCO-6 and MCO-7 for the 4th quarter of 2002 suggest a downward trend is also beginning in those wells.

RLWTF Effluent Monitoring Results

Attachment 3.0, Table 2.0, presents the analytical results from weekly monitoring of the RLWTF's effluent. The weekly samples are flow-proportioned composite samples prepared from each tank of effluent generated by the RLWTF during a 7-day period. Samples are submitted to General Engineering Laboratories (GEL), Charleston, SC, for analysis. All sample results from the 4th quarter were below NMWQCC Regulation 3103 standards for NO₃-N, F, and TDS with the exception of a single excursion for TDS. A composite sample for the week ending 12/8/2002 (submittal date: 12/9/02) showed a TDS concentration of 1,030 mg/L (+/-103 mg/L). As presented in Table 2.0, the 4th quarter average for TDS in the RLWTF's effluent was 753 mg/L.

The RLWTF's administrative procedures require that each tank of effluent be screened for TDS prior to discharge. Initial screening for TDS is performed using an electrical conductivity (EC) meter. If the TDS in the effluent is greater than 800 mg/L (by EC) then a sample is collected for gravimetric analysis. Four effluent tanks were discharge from the RLWTF during the week ending 12/8/02. The gravimetric results for these four tanks of effluent and the weekly composite are presented below:

RLWTF Effluent TDS Results: TDS by Gravimetric Analysis.

Date Effluent Tank Sampled	TDS (mg/L) by RLWTF	TDS (mg/L) by GEL
12/2/02	818 (+/-160)	Composite sample
12/2/02	968 (+/-190)	Composite sample
12/5/02	990 (+/-200)	Composite sample
12/6/02	760 (+/-150)	Composite sample
Weekly Average	884 (+/-176)	
Weekly Composite Sample		1,030 (+/-103)

The data presented above shows that the RLWTF's operational screening results from all four effluent tanks discharged during the week ending 12/8/02 were below the NM WQCC Regulation 3103 standard of 1,000 mg/L. The weekly composite TDS result of 1,030 mg/L (a composite sample prepared from the same four effluent tanks) was approximately 17% higher than the RLWTF's weekly average of 884 mg/L. It should be noted, however, that the discrepancy between the RLWTF's weekly average (884 mg/L) and the result reported by GEL (1,030 mg/L) is within the RLWTF's 20% analytical uncertainty.

The discrepancy between the RLWTF's operational screening results and the weekly composite result reported by GEL has prompted the Laboratory to institute the following corrective actions:

1. In accordance with current procedures, all effluent batches will be screened for TDS using electrical conductivity (EC). If the TDS concentration by EC is greater than 800 mg/L then a representative sample of effluent will be collected and analyzed for TDS using the gravimetric method.
2. The RLWTF will improve the precision of their gravimetric method for TDS analysis to an uncertainty of +/-10% (current uncertainty is +/-20%).
3. If the TDS concentration of the effluent by gravimetric analysis is less than 910 mg/L (+/- 91 mg/L) then the effluent will be released for discharge.
4. If, however, the TDS concentration of the effluent by gravimetric analysis is greater than 910 mg/L (+/- 91mg/L) then further treatment will be conducted.

By establishing the above administrative controls for TDS in the RLWTF's effluent, the Laboratory is confident that it can continue to honor its commitment to the NMED to only discharge effluent that is compliant with NMWQCC Regulation 3103 standards for ground water.

Please contact me at (505) 667-7969 if you would like additional information regarding this quarterly report.



Sincerely,

Bob Beers
Water Quality & Hydrology Group

BB/yg

Attachments: a/s

- Cy: J. Bearzi, NMED/HRMB, Santa Fe, New Mexico, w/att.
J. Davis, NMED/SWQB, Santa Fe, New Mexico, w/att.
J. Parker, NMED/DOE/OB, Santa Fe, New Mexico, w/att.
R. Ford-Schmid, NMED/DOE/OB, Santa Fe, New Mexico, w/att.
J. Vozella, DOE/OLASO, w/att., MS A316
G. Turner, DOE/OLASO, w/att., MS A316
J. Holt, ADO, w/att., MS A104
T. Stanford, FWO-DO, w/att., MS K492
D. Mclain, FWO-WFM, w/att., MS J593
R. Alexander, FWO-WFM, w/att., MS E518

Cy (continued):

D. Moss, FWO-WFM, w/att., MS E518
P. Worland, FWO-WFM, w/att., MS E518
B. Ramsey, RRES-DO, w/att., MS J591
K. Hargis, RRES-DO, w/att., MS J591
D. Stavert, RRES-EP, w/att., MS J591
S. Rae, RRES-WQH, w/att., MS K497
D. Rogers, RRES-WQH, w/att., MS K497
M. Saladen, RRES-WQH, w/att., MS K497
RRES-WQH File, w/att., MS K497
IM-5, w/att., MS A150

Table 1.0. Mortandad Canyon Alluvial Monitoring Wells Analytical Results, 4th Quarter, 2002.

Sampling Location	Sample Date	Perchlorate ² (ug/L)	NO3+NO2-N (mg/L)	TKN (mg/L)	NH3-N (mg/L)	TDS (mg/L)	F (mg/L)
MCO-3	11/20/2002	4.3	2.22	0.450	<0.024	383	0.623
MCO-4B	11/20/2002	NS ¹	NS ¹	NS ¹	NS ¹	NS ¹	NS ¹
MCO-6	11/20/2002	77.5	4.41	0.350	<0.024	355	1.07
MCO-7	11/20/2002	108	4.53	0.280	<0.024	328	1.29
NM WQCC 3103. Ground Water Standards (mg/L)							
			10 ³			1000	1.6

Notes:

¹NS means that there was not sufficient water available for sampling.

²Unfiltered sample.

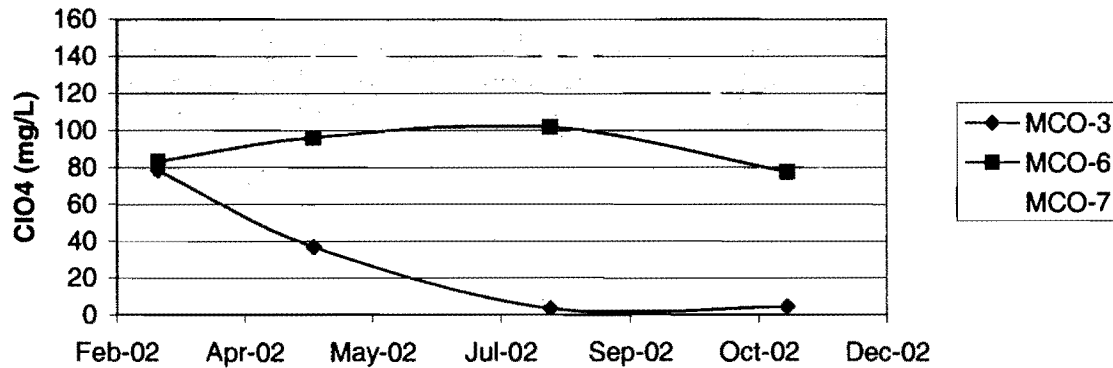
³NM WQCC 3103 ground water standard is for NO3-N only.

J indicates an estimated value. The result was less than the reporting limit, but greater than the detection limit.

All analyses by General Engineering Laboratories, Charleston, SC.

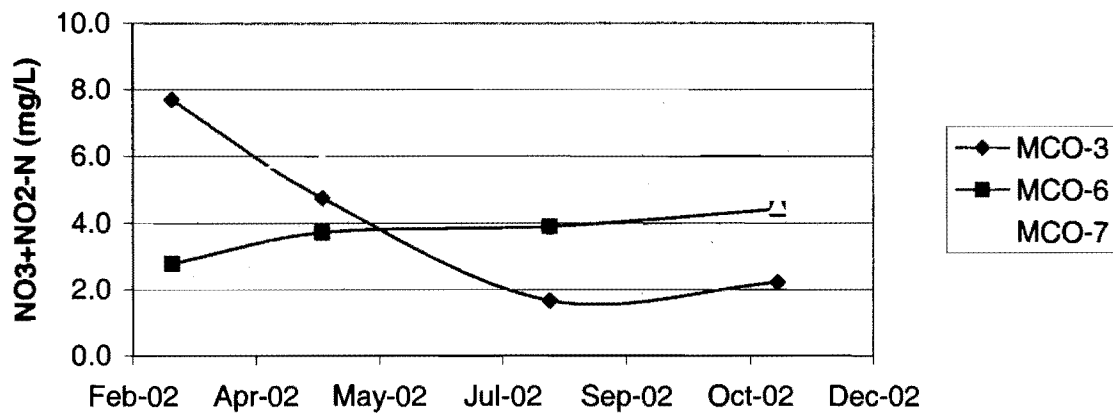
All samples filtered unless otherwise noted.

Figure 1. Perchlorate in Mortandad Canyon Alluvial Ground Water in 2002



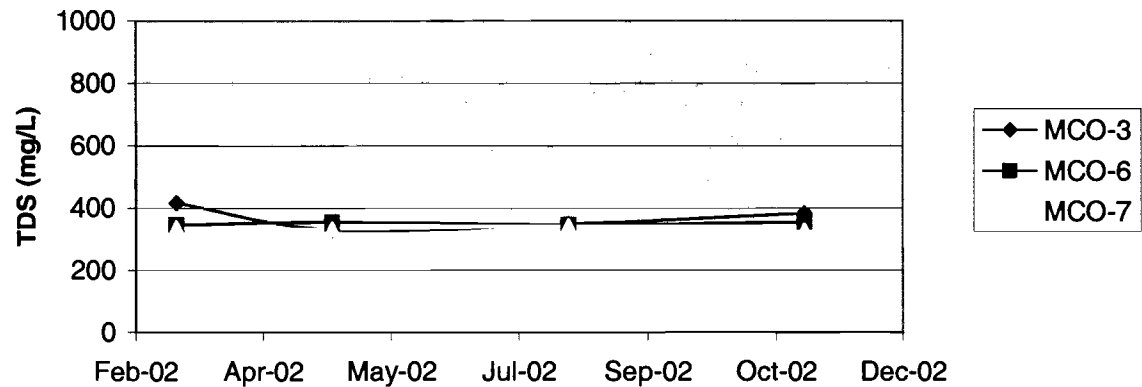
	Perchlorate (mg/L)		
	MCO-3	MCO-6	MCO-7
Mar-02	78.4	83.2	128
May-02	36.9	96.2	137
Aug-02	3.5	102	143
Nov-02	4.3	77.5	108

Figure 2. Nitrate+Nitrite (as N) in Mortandad Canyon Alluvial Ground Water in 2002



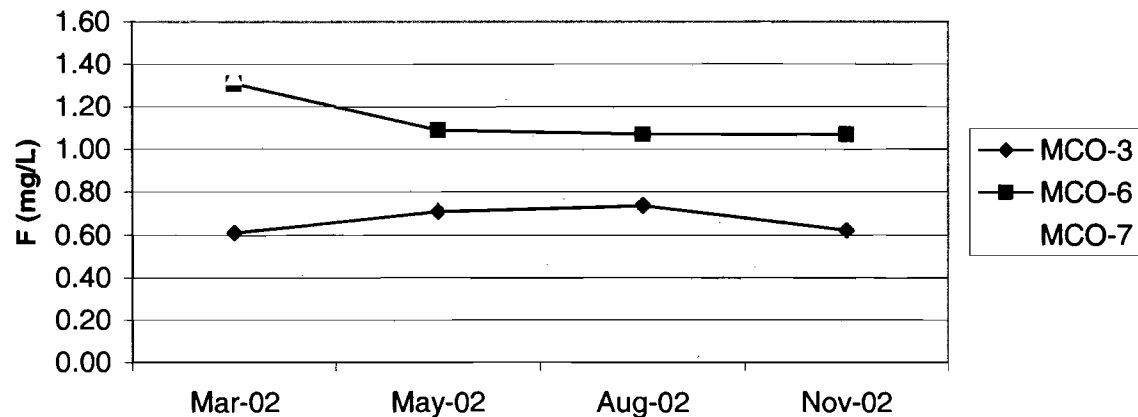
	NO3+NO2-N (mg/L)		
	MCO-3	MCO-6	MCO-7
Mar-02	7.70	2.78	4.90
May-02	4.75	3.72	5.90
Aug-02	1.67	3.90	5.70
Nov-02	2.22	4.41	4.53

Figure 3. Total Dissolved Solids in Mortandad Canyon Alluvial Ground Water in 2002



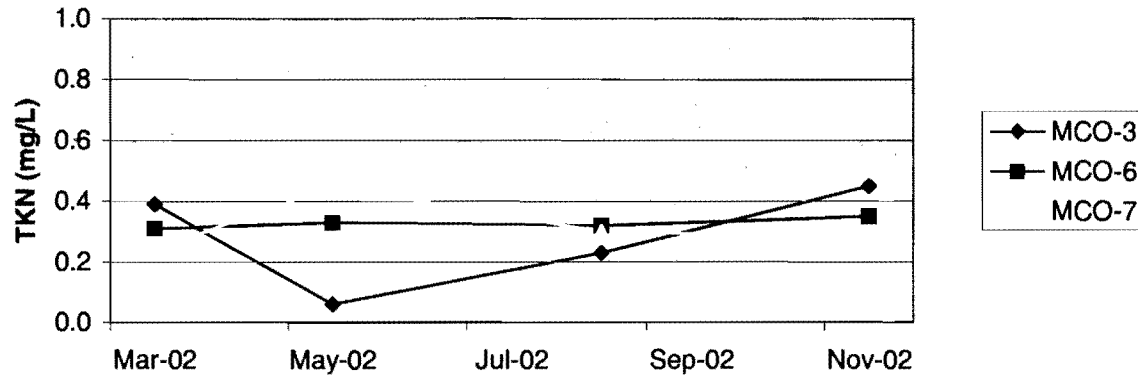
	TDS (mg/L)		
	MCO-3	MCO-6	MCO-7
Mar-02	417	346	337
May-02	331	356	333
Aug-02	348	346	342
Nov-02	383	355	328

Figure 4. Fluoride in Mortandad Canyon Alluvial Ground Water in 2002



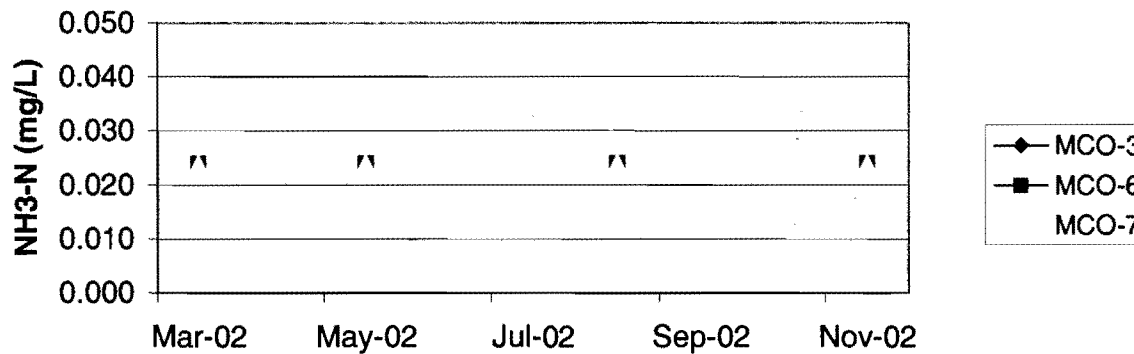
	F (mg/L)		
	MCO-3	MCO-6	MCO-7
Mar-02	0.61	1.31	1.34
May-02	0.71	1.09	1.28
Aug-02	0.74	1.07	1.28
Nov-02	0.62	1.07	1.29

Figure 5. TKN in Mortandad Canyon Alluvial Ground Water in 2002



TKN (mg/L)			
	MCO-3	MCO-6	MCO-7
Mar-02	0.39	0.31	0.24
May-02	0.06	0.33	0.45
Aug-02	0.23	0.32	0.30
Nov-02	0.45	0.35	0.28

Figure 6. Ammonia-N in Mortandad Canyon Alluvial Ground Water in 2002
 (Method Detection Limit=0.024 mg/L)



NH3 (mg/L)			
	MCO-3	MCO-6	MCO-7
Mar-02	0.024	0.024	0.024
May-02	0.024	0.024	0.024
Aug-02	0.024	0.024	0.024
Nov-02	0.024	0.024	0.024

Table 2.0. RLWTF Weekly Effluent Monitoring Analytical Results, 4th Quarter, 2002.

Monitoring Period	Composite Date	RLWTF Weekly Effluent Monitoring Analytical Results (mg/L)		
		NO3+NO2-N	Fluoride	TDS
SEPTEMBER	9/24/2002	1.60	0.40	235
	9/17/2002	1.26	0.37	140
OCTOBER	10/1/802	2.49	0.63	426
	10/9/2002	2.38	0.78	591
	10/16/2002	1.19	0.65	536
	10/22/2002	1.34	1.15	746
	10/29/2002	1.00	1.19	781
	NOVEMBER	11/6/2002	1.13	1.06
	11/13/2002	0.15	0.84	708
	11/20/2002	1.91	0.62	866
	11/25/2002	1.91	0.46	748
DECEMBER	12/3/2002	0.15	0.58	877
	12/9/2002	1.40	0.9	1030
	12/17/2002	1.92	0.89	806
	12/24/2002	results pending	results pending	results pending
4th Quarter Averages (mg/L)		1.41	0.81	753
<i>NM WQCC 3103. Ground Water Standards (mg/L)</i>		<i>10.0</i>	<i>1.6</i>	<i>1000</i>

Notes:

¹Results for these analyses are pending.

²A duplicate sample result.

All analyses by the General Engineering Laboratories, Charleston, South Carolina.