AREVA

January 30, 2013

Mr. Andrew Persinko
Division of Waste Management & Environmental Protection
Office of Federal & State Materials & Environmental Management Programs
Mail Stop T-8F5
U.S. Nuclear Regulatory Commission
11545 Rockville, Maryland 20852-2738

Ref: Docket No. 40-2259, Source Material License No. SUA-672

Dear Mr. Persinko,

Enclosed please find two copies of the semi-annual ground water monitoring report (covering the third and fourth quarters of 2012) as required by condition 60B of the referenced license. Please let me know if there are any questions regarding the report.

Sincerely,

R. Mark Owens
General Manager

Enclosure

Cc: Blair Spitzberg, USNRC Region IV
Steve Hall, Stoller
Document Control Desk
Hydro-Engineering w/o encl.

PATHFINDER MINES CORPORATION

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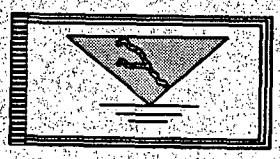
SEMI-ANNUAL
GROUND-WATER MONITORING
FOR LUCKY Mc MINE



HYDRO - ENGINEERING, LLC

SEMI-ANNUAL
GROUND-WATER MONITORING
FOR LUCKY Mc MINE

PREPARED FOR:

PATHFINDER MINES CORPORATION
LUCKY Mc MINE

BY:

HYDRO-ENGINEERING, L.L.C.

JANUARY, 2013

Brandon Weaver
BRANDON WEAVER

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GEORGE L. HOFFMAN, P.E.
HYDROLOGIST
1/28/2013

TABLE OF CONTENTS

Page Number

1.0 INTRODUCTION AND SUMMARY OF RESULTS 1

2.0 PIEZOMETRIC DATA 2

3.0 WATER-QUALITY DATA 2

FIGURES

Page Number

1 LOCATIONS OF MONITORING WELLS AND PIEZOMETRIC CONTOURS AT LUCKY Mc IN AUGUST 2012, FT-MSL 4

2 WATER-LEVEL ELEVATION VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 5

3 CHLORIDE CONCENTRATIONS IN AUGUST 2012 AT LUCKY Mc, IN mg/l 6

4 CHLORIDE CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 7

5 TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN AUGUST 2012 AT LUCKY Mc, IN mg/l 8

6 TDS CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 9

7 SULFATE CONCENTRATIONS IN AUGUST 2012 AT LUCKY Mc, IN mg/l 10

8 SULFATE CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 11

9 URANIUM CONCENTRATIONS IN AUGUST 2012 AT LUCKY Mc, IN mg/l 12

10 URANIUM CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 13

11 SELENIUM CONCENTRATIONS IN AUGUST 2012 AT LUCKY Mc, IN mg/l 14

TABLE OF CONTENTS
(continued)

FIGURES

Page Number

12 SELENIUM CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 15

13 RADIUM-226 + RADIUM-228 ACTIVITY IN AUGUST 2012 FOR LUCKY Mc, IN pCi/l 16

14 RADIUM-226 + RADIUM-228 ACTIVITY VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7 17

TABLES

Page Number

1 WATER-LEVEL AND WATER-QUALITY DATA 18

1.0 Introduction and Summary of Results

This semi-annual report presents the results of ground-water monitoring for the second half of 2012 for the Lucky Mc tailings area. This report covers the requirement of NRC License SUA-672, License Condition 60B.

The following table lists the site standards that are in effect at Lucky Mc tailings POC well T1-12. The tabulation also lists the measured November 2012 concentrations for POC well T1-12. All of the present concentrations in POC well T1-12 are significantly below the site standards.

GROUND-WATER PROTECTION STANDARDS FOR POINT-OF-COMPLIANCE WELL T1-12 AND NOVEMBER 2012 POC CONCENTRATION

POC STANDARD & CONCENTRATION	CONSTITUENT								
	Arsenic	Beryllium	Cadmium	Chromium	Nickel	RA-226+Ra-228	Selenium	Thorium-230	Uranium
SITE STANDARD	0.05	0.07	0.02	0.05	0.85	7.5	1.1	13.2	1.7
T1-12, NOVEMBER 2012	<0.001	<0.001	<0.001	<0.01	0.27	3.7	0.25	0.2	0.41

NOTE: All concentrations in mg/l except for radium and thorium in pCi/l.

Figure 1.3-2 in the Lucky Mc ACL report shows the base of the Lucky Mc aquifer which shows that a narrow outlet exists on the east side of the No. 1 and No. 2 Tailings connecting them to the Wind River Channel. The No. 1 and the No. 2 Tailings should not be presently contributing any seepage to the Wind River Channel and the Fraser Draw alluvium because the water levels in these tailings are below the base of the aquifer. Figures 1.3-4 (see channel close to the B side of the cross section) and 1.3-5 (see the ridge near well OBS-2) in the Lucky Mc ACL report show that the outlets to the No. 2 and No. 1 Tailings were dry or essentially dry in 2000. Therefore these tailings should not be contributing any additional source to the Lucky Mc aquifer with time. Stable concentrations in POC well T1-12 support this conclusion.

Modeling of key parameters, uranium, selenium and radium-226 + 228 are presented in the Lucky Mc ACL report. The following table presents a comparison between the model predictions and the 2012 observed concentrations for POC well T1-12 and wells AL-1 and AL-6. These comparisons show that the present concentrations agree fairly well with the model predictions for 2012. Concentrations at the POC well are not expected to ever exceed the site standards based on the present levels and the model predictions.

COMPARISON OF MODEL PREDICTION AND 2012 CONCENTRATIONS

CONSTITUENT	URANIUM			SELENIUM			RA-226 + RA-228		
WELL	T1-12	AL-1	AL-6	T1-12	AL-1	AL-6	T1-12	AL-1	AL-6
MODEL PREDICTIONS	0.6	1.1	1.1	0.2	0.4	0.3	7	1	1
2012 CONCENTRATIONS	0.4	1.6	0.8	0.3	0.3	0.1	4	0.3	6

NOTE: All concentrations in mg/l except for radium in pCi/l.

2.0 Piezometric Data

The water-level data collected during the fourth quarter of 2012 are presented in Table 1 along with the 2009 through 2012 water-level data. Figure 1 presents the piezometric surface of the Lucky Mc aquifer from the POC well through the Fraser Draw alluvium, while Figure 2 presents plots of the water-level elevations versus time for wells AL-6, T1-6, T1-12, AL-1 and AL-7. The corresponding water-level elevation or constituent concentration is posted adjacent to the well location on the plan view figures of the area (such as Figure 1). Water-level elevations in the third and fourth quarters of 2012 were steady in these wells after a gradual rise the previous two and one-half years.

3.0 Water-Quality Data

License Condition 60B requires monitoring of water from the POC and POE wells and other selected wells for the constituents presented in Table 1. An analysis of the selenium, uranium, combined radium-226 plus radium-228, sulfate, chloride and TDS concentrations is required.

Figure 3 presents the November 2012 chloride concentrations for the Lucky Mc aquifer. The chloride concentrations are highest in the Fraser Draw alluvial well AL-1 and Wind River Channel at POC well T1-12 and decrease significantly to levels similar to background levels at well AL-7. The chloride concentration in well AL-1 is higher showing the concentration gradient from the east to the west. Shift of the concentration gradient near AL-1 has caused the chloride concentration to increase in this well. Figure 4 presents the plots of chloride concentration versus time for the five monitored wells. Chloride concentrations in POC well T1-12 overall have been fairly steady in 2011 and 2012 while a gradual increase was observed in POE well AL-6 and well AL-7. A larger increase was observed in the last half of 2010 and 2011 in well AL-1. The 2012 chloride concentrations in well AL-1 have overall stayed steady.

Figure 5 presents the TDS concentrations for November 2012 water samples from the Lucky Mc aquifer. The TDS concentrations are greater than 5000 mg/l at POC well T1-12 and Fraser Draw alluvial well AL-1 and are less than 4000 mg/l in the western portion of the Fraser Draw alluvium at wells AL-6 and AL-7. Figure 6 presents the plots of TDS concentrations versus time and illustrates that the 2012 TDS concentrations are similar to the average value for the previous few years for well T1-12. A decrease in concentrations overall in 2012 was observed in well AL-1 after an increase in concentrations had been observed in 2010 and 2011. A gradual increase in TDS has been observed in well AL-7 and AL-6 in recent years. This change is due to the concentration gradient shifting from the west to east.

The measured sulfate concentrations for the Lucky Mc aquifer during November of 2012 are presented in Figure 7 and show that the sulfate concentrations in the western portion of the Fraser Draw alluvium are greater than 2000 mg/l near well AL-1 while concentrations are less than 2000 mg/l in the eastern half. The sulfate concentration versus time plots in Figure 8 show that sulfate concentrations in POC well T1-12 have overall been steady for the last six years but slightly larger than values observed prior to 2007. The increase in sulfate in the 2nd half of 2010 and 2011 in well AL-1 shows the affect of the shift in concentrations to the east. A decline in sulfate concentrations has been observed in well AL-1 in 2012.

Uranium concentrations for the Lucky Mc aquifer during November of 2012 are presented in Figure 9, and this figure shows the highest observed uranium concentrations at well AL-1.

Figure 10 shows that the uranium concentration in the POE well has overall gradually increased in 2012. A larger increase had been observed in well AL-1 with the 2012 values showing an overall decline in uranium concentrations. The uranium concentrations have been relatively steady in POC well T1-12 for the last few years.

Figure 11 presents the selenium concentrations for November 2012 for the Lucky Mc aquifer. Selenium concentrations are greatest at well AL-1. Selenium concentrations in POC well T1-12 have gradually declined for the last few years except for a small increase in the November value (see Figure 12). The selenium concentration in well AL-1 increased in May of 2010 which could be due to alluvial water shifting to the east in this area. Selenium concentrations gradually increased in well AL-1 during 2010 through 2012.

Figure 13 presents the radium-226 plus radium-228 activity for November 2012 in the Lucky Mc aquifer in pCi/l. The activity at POC well T1-12 is well below the radium-226 plus radium-228 site standard of 7.5 pCi/l. Measured radium activities generally exhibit more variability than other constituents, and little significance is given to occasional outliers. Figure 14 shows plots of the radium-226 plus radium-228 activity versus time for the monitored wells. These plots show significant variability in measured activity, which is thought to be due to variability in the laboratory analysis. The last six values for well AL-6 have been near 6pCi/l.

Concentrations of the remainder of the constituents at the site are gradually decreasing or are not significant at POC well T1-12.

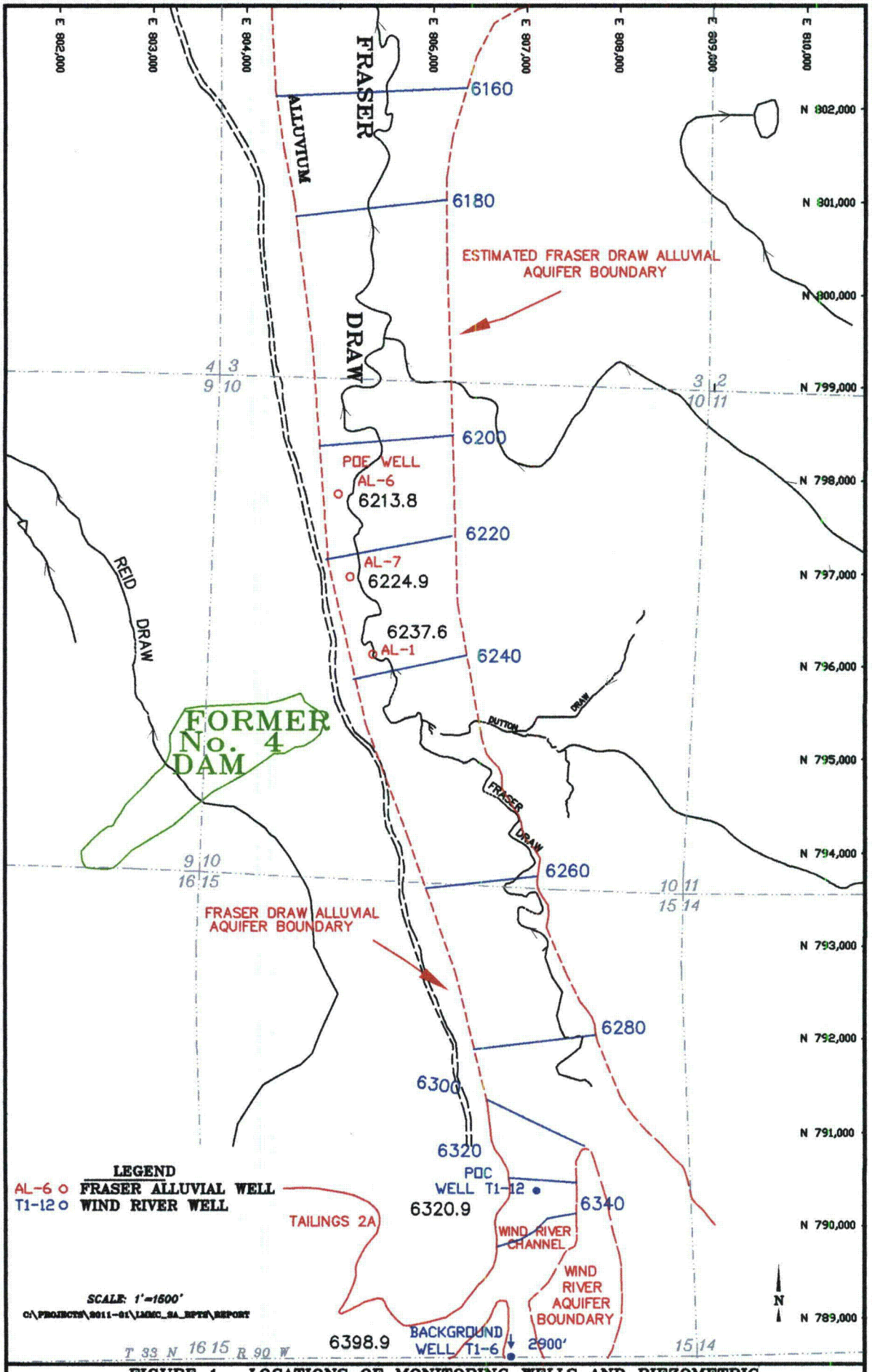
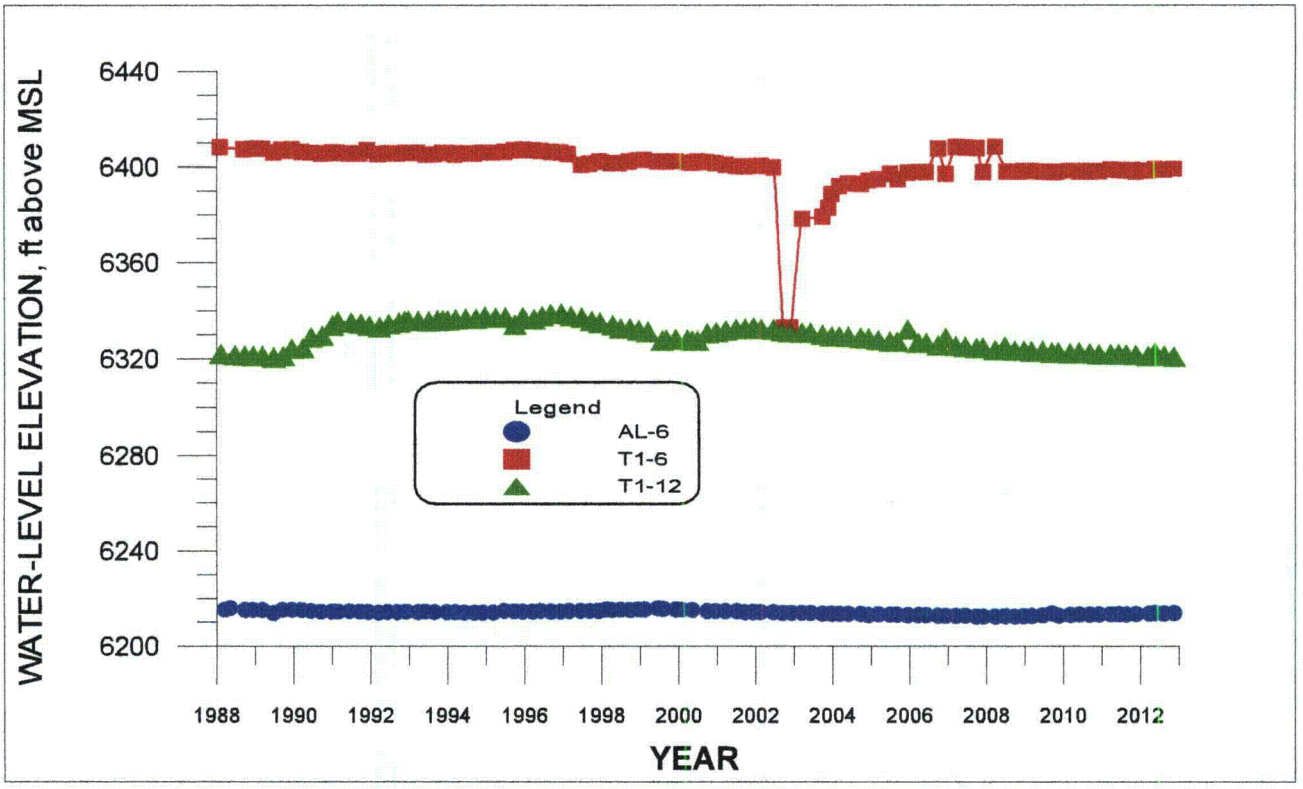


FIGURE 1. LOCATIONS OF MONITORING WELLS AND PIEZOMETRIC CONTOURS AT LUCKY MC IN NOVEMBER 2012, FT-MSL



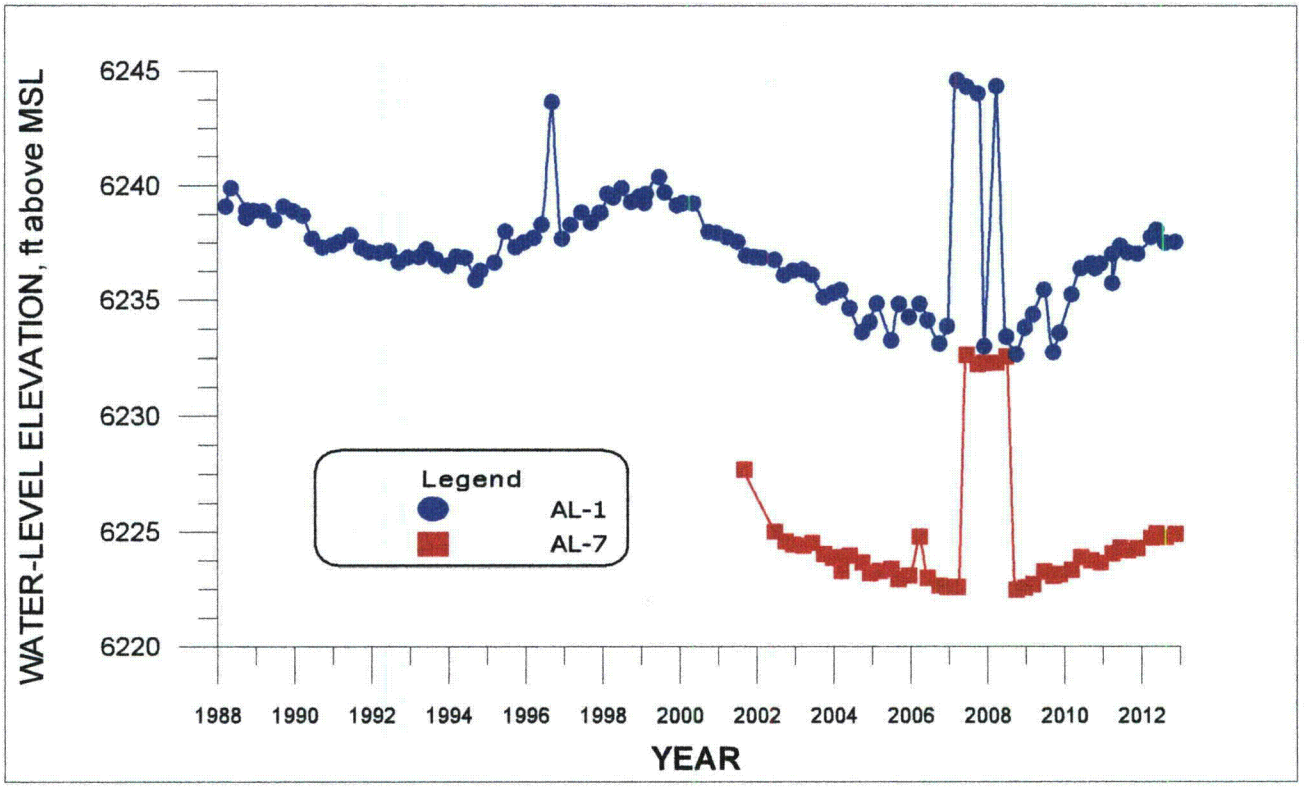


FIGURE 2. WATER-LEVEL ELEVATION VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

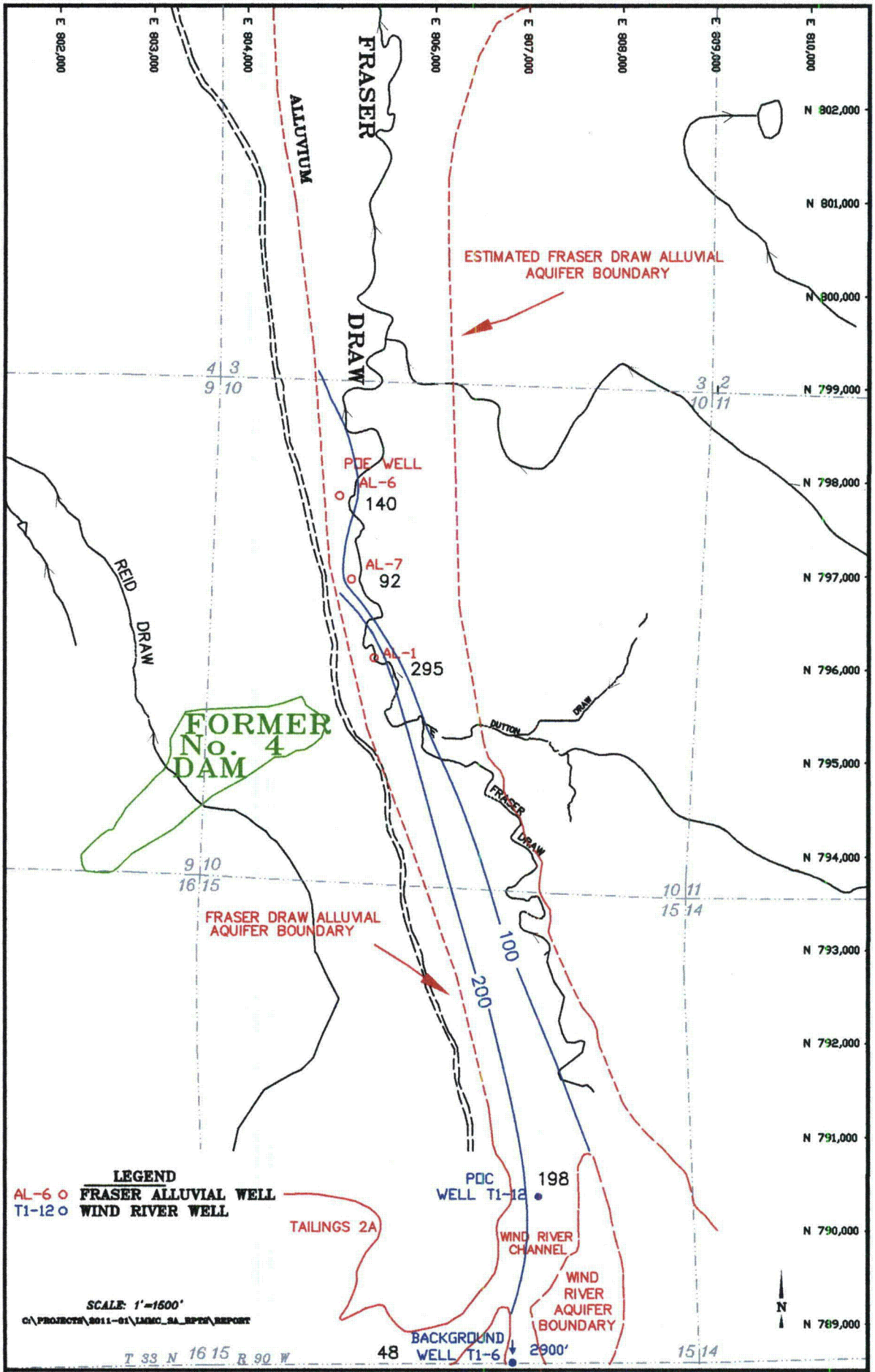
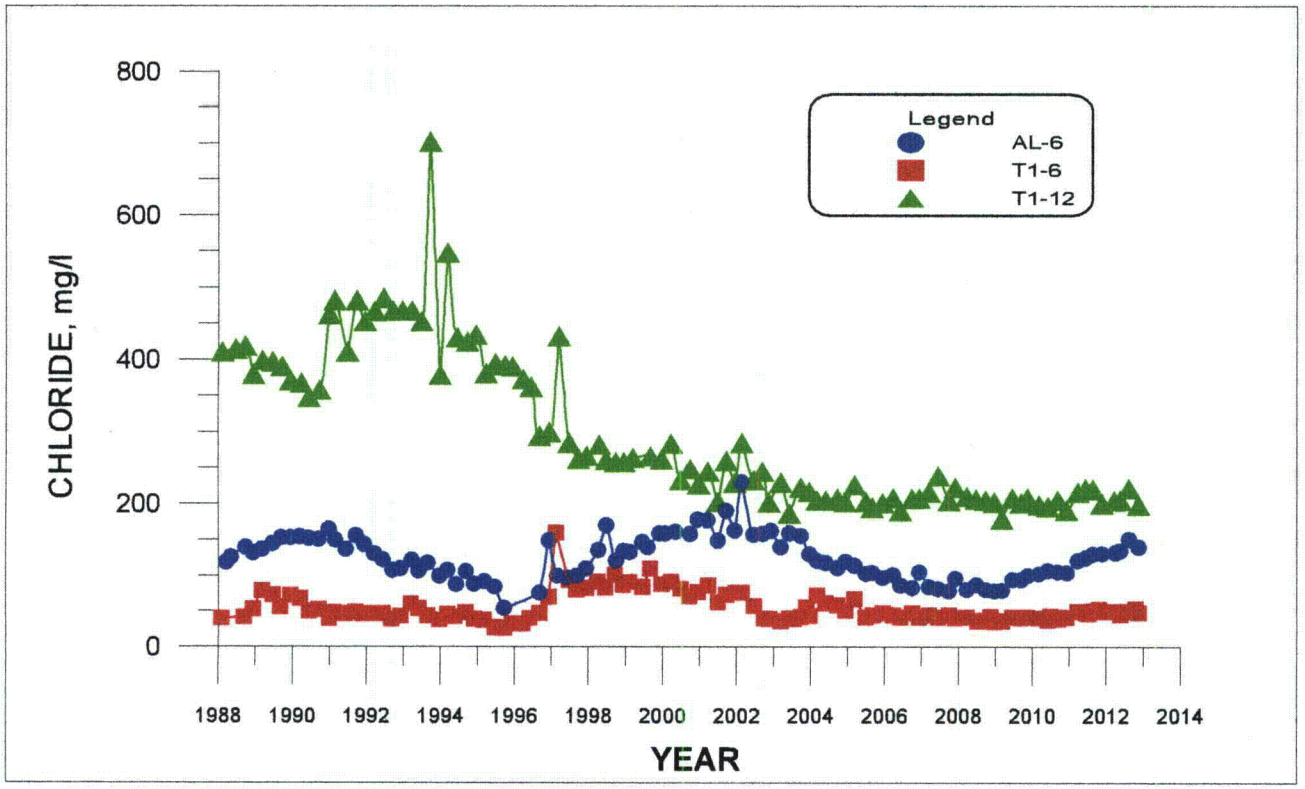


FIGURE 3. CHLORIDE CONCENTRATIONS IN NOVEMBER 2012, AT LUCKY MC, IN mg/l



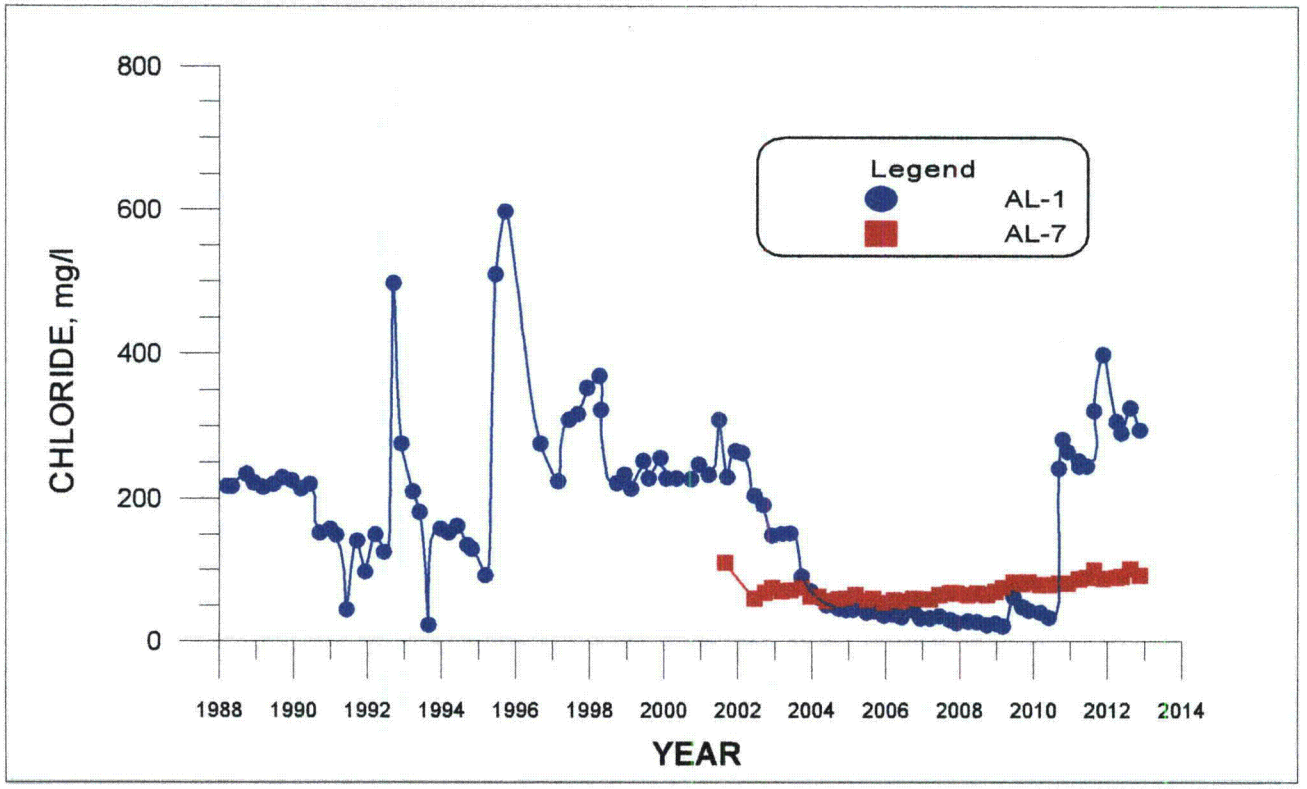


FIGURE 4. CHLORIDE CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

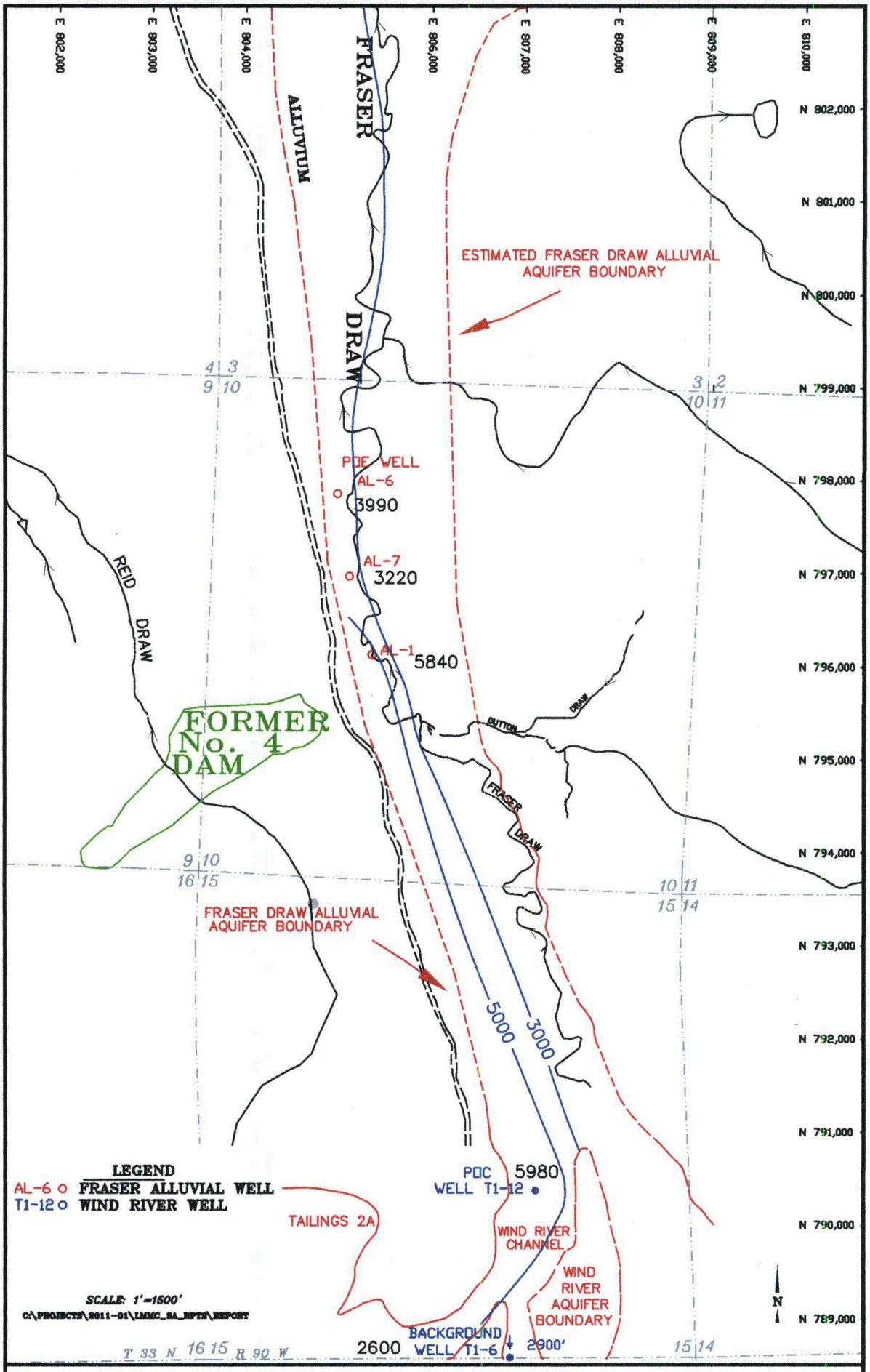
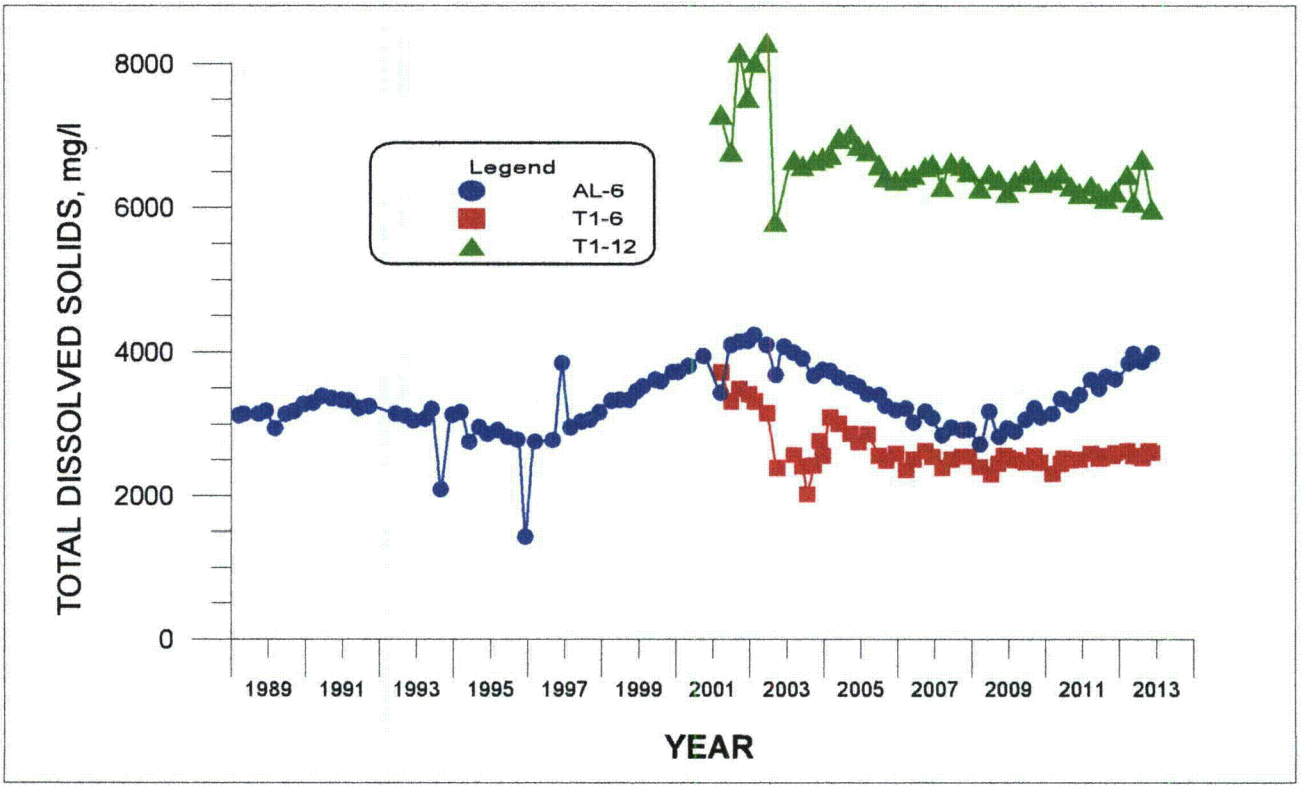


FIGURE 5. TDS CONCENTRATIONS IN NOVEMBER 2012, AT LUCKY MC, IN mg/l



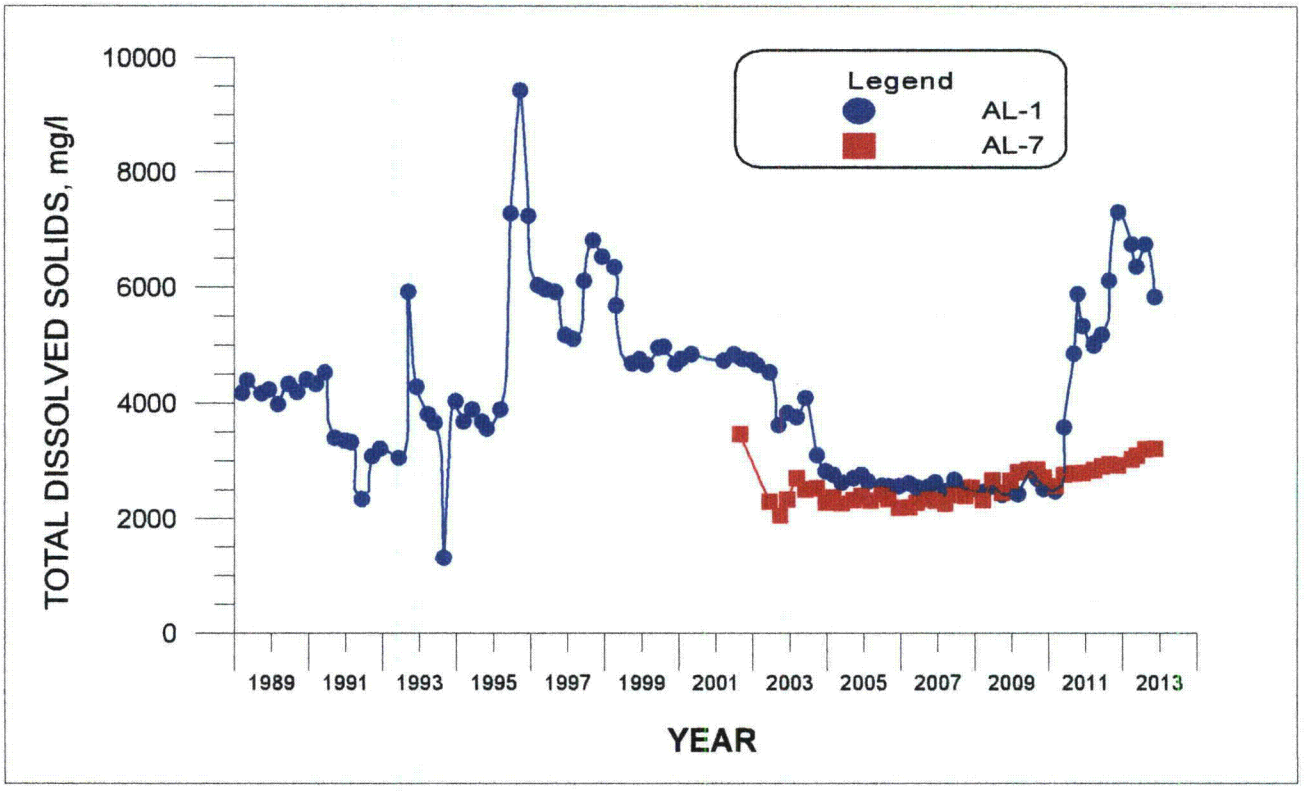


FIGURE 6. TDS CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

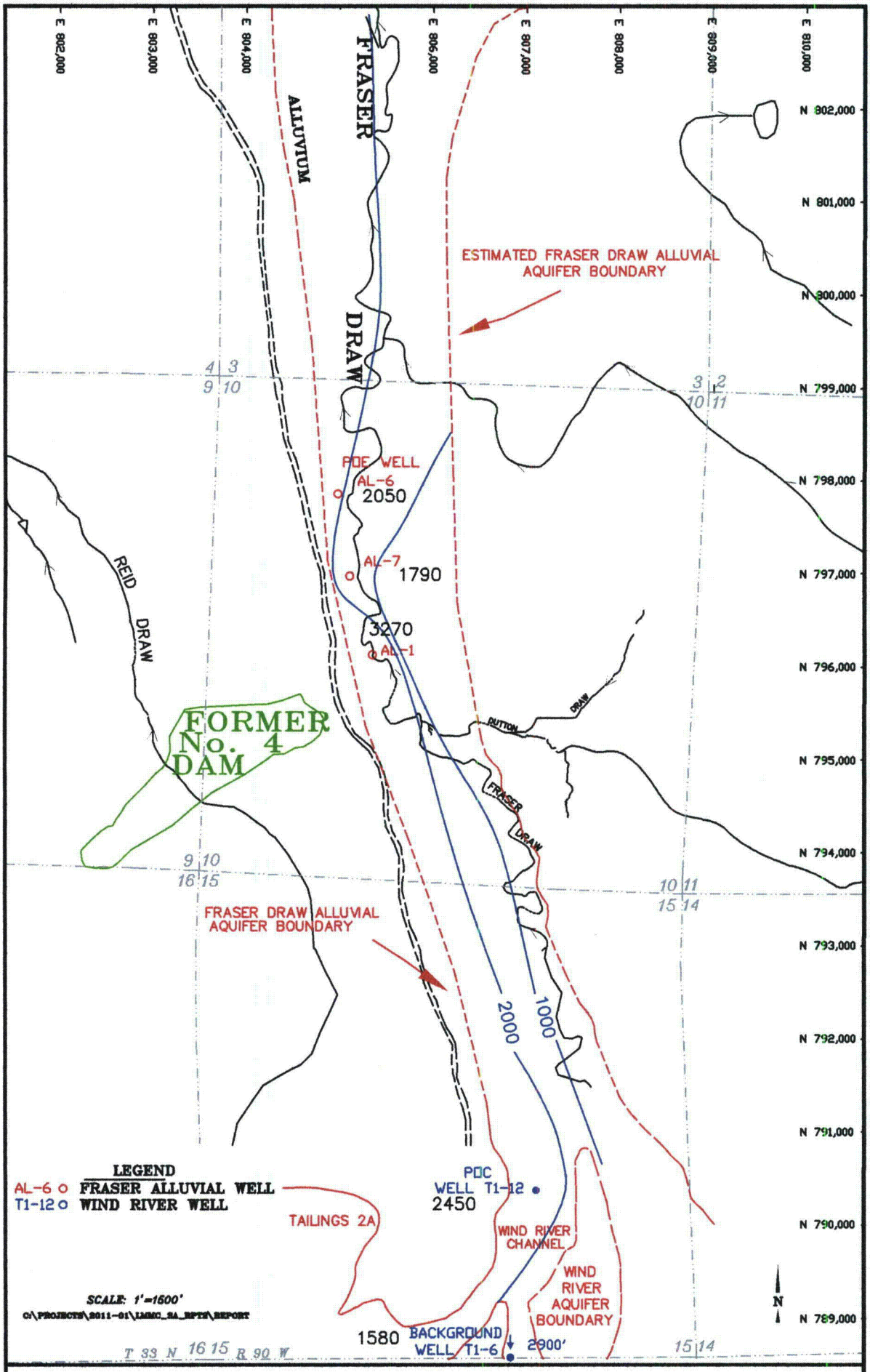
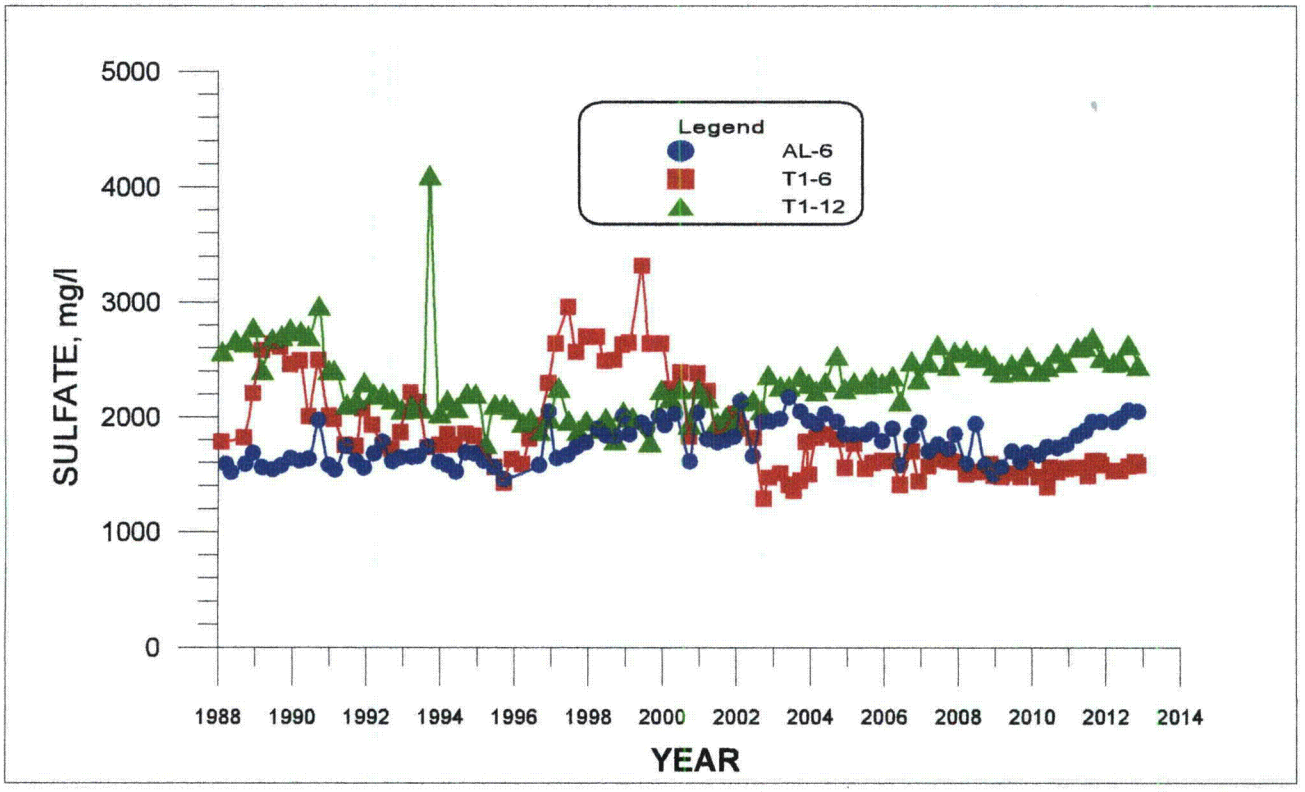


FIGURE 7. SULFATE CONCENTRATIONS IN NOVEMBER 2012, AT LUCKY MC, IN mg/l



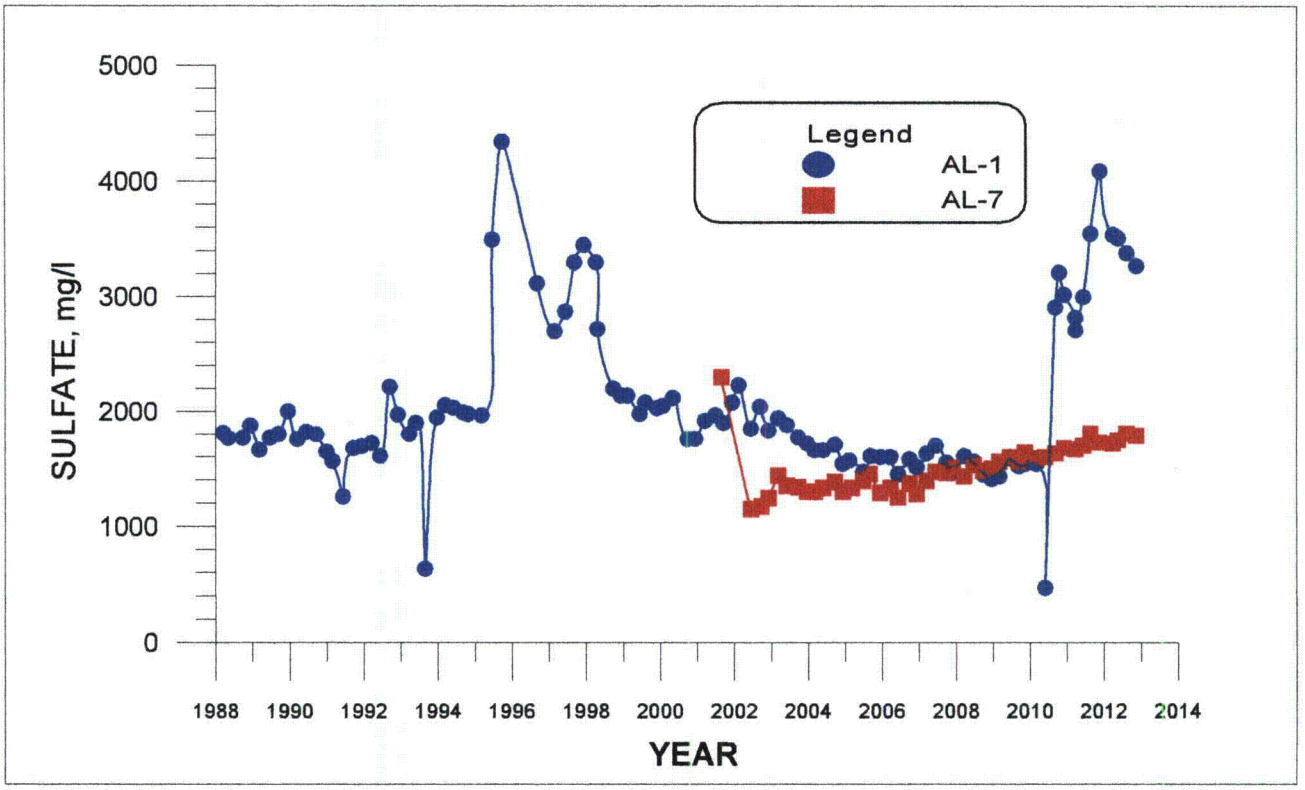


FIGURE 8. SULFATE CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

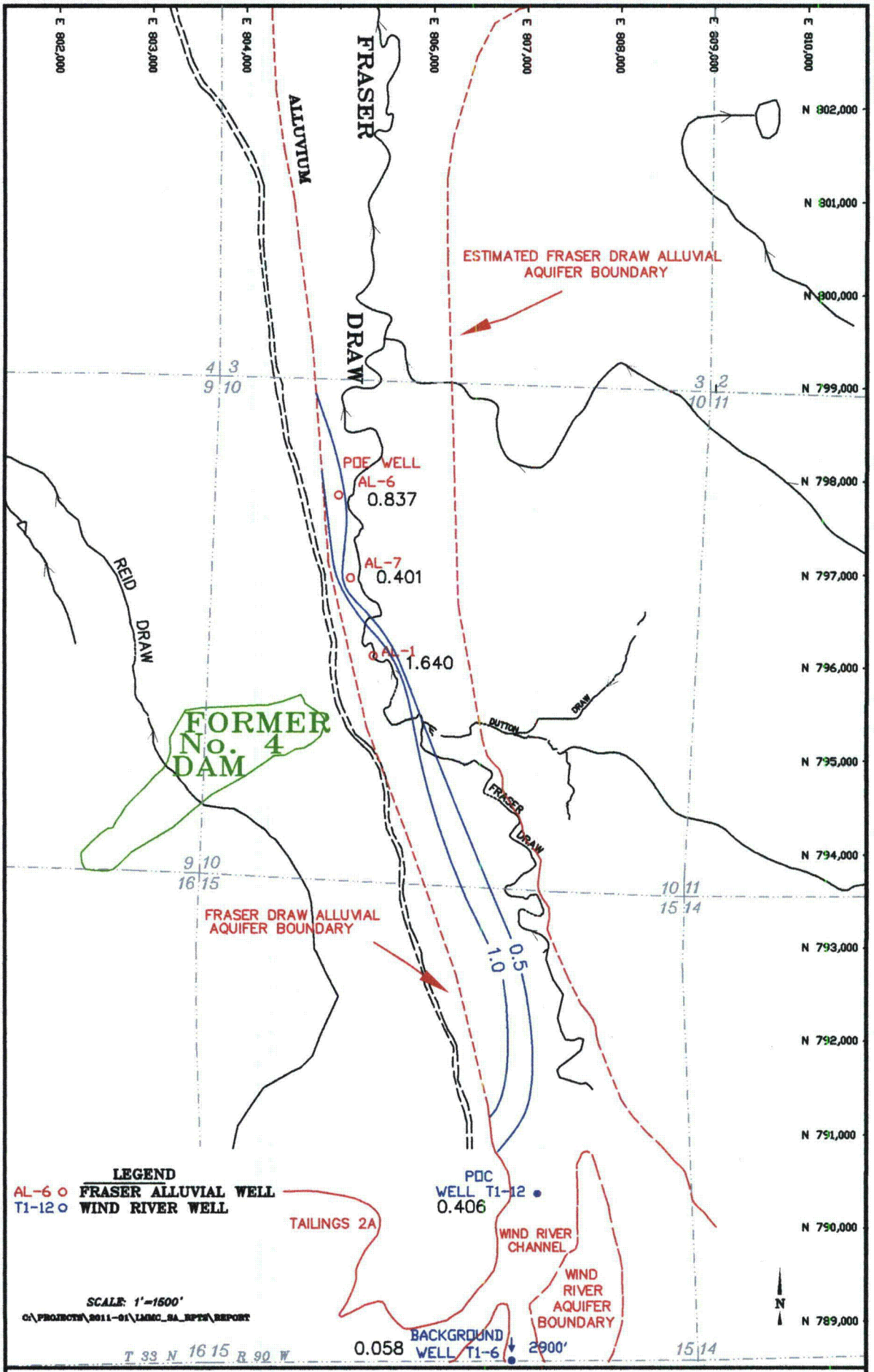
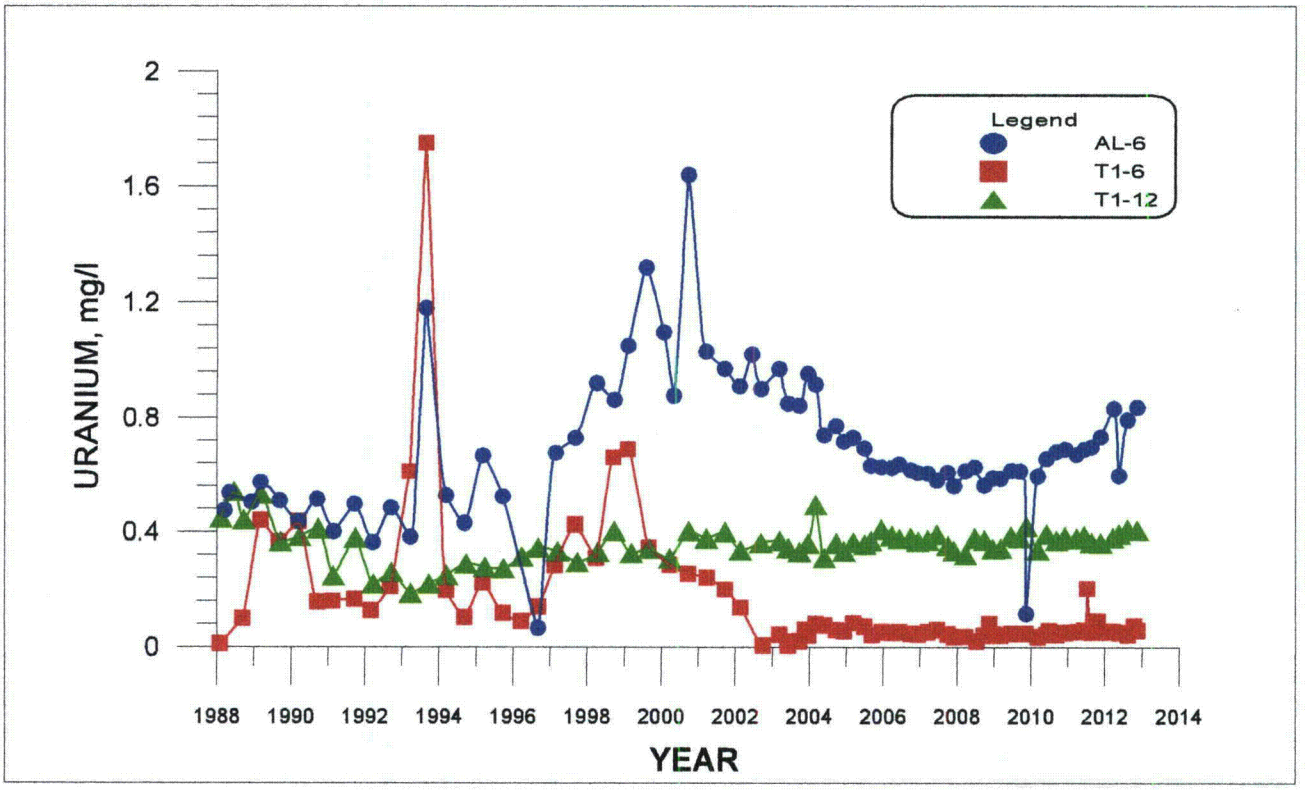


FIGURE 9. URANIUM CONCENTRATIONS IN NOVEMBER 2012, AT LUCKY MC, IN mg/l



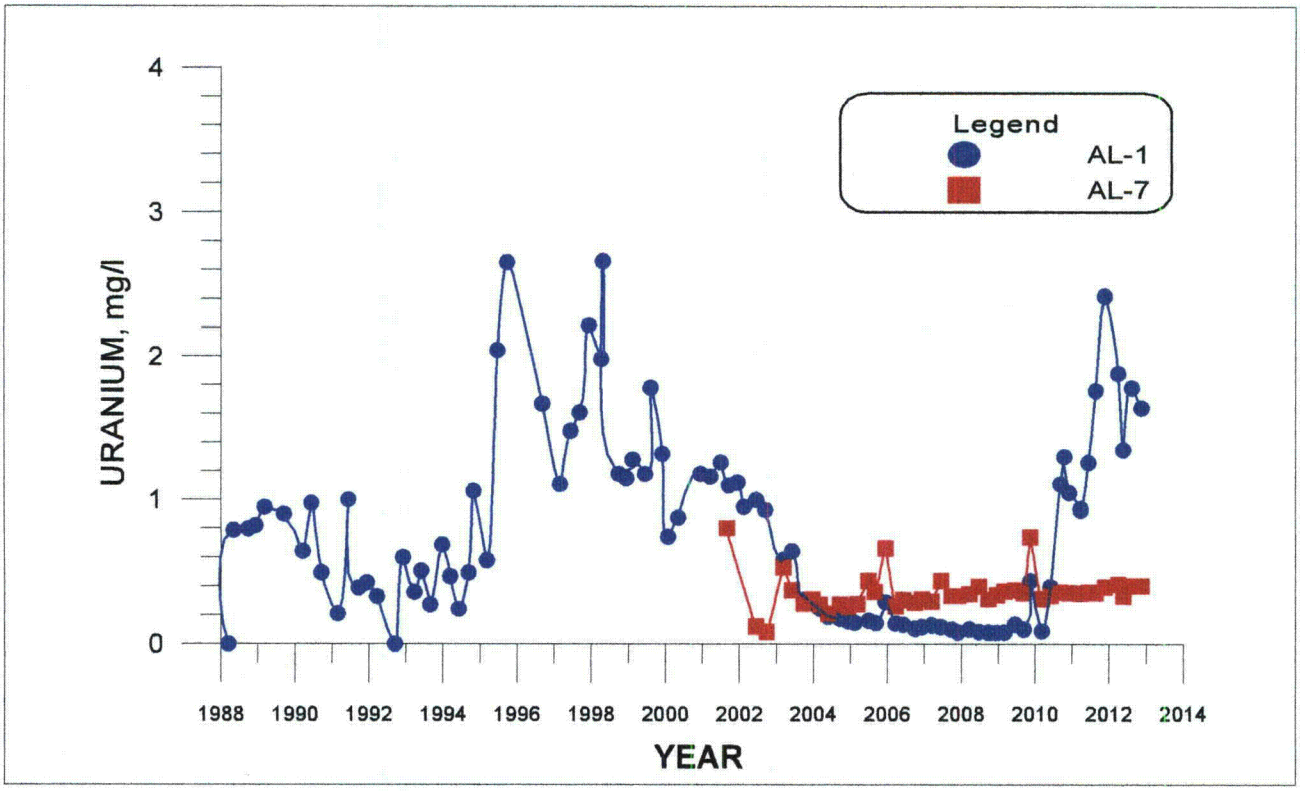


FIGURE 10. URANIUM CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

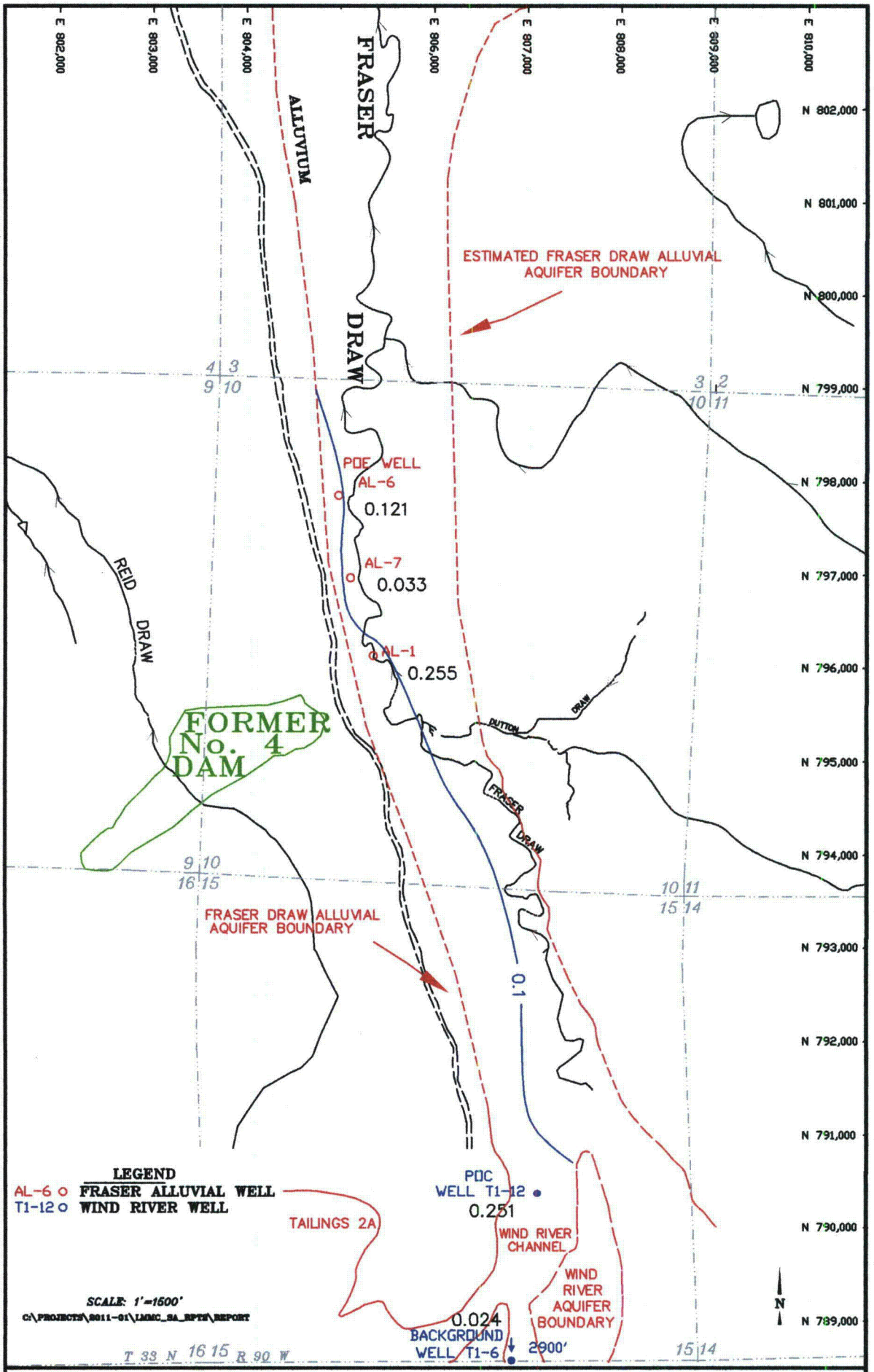
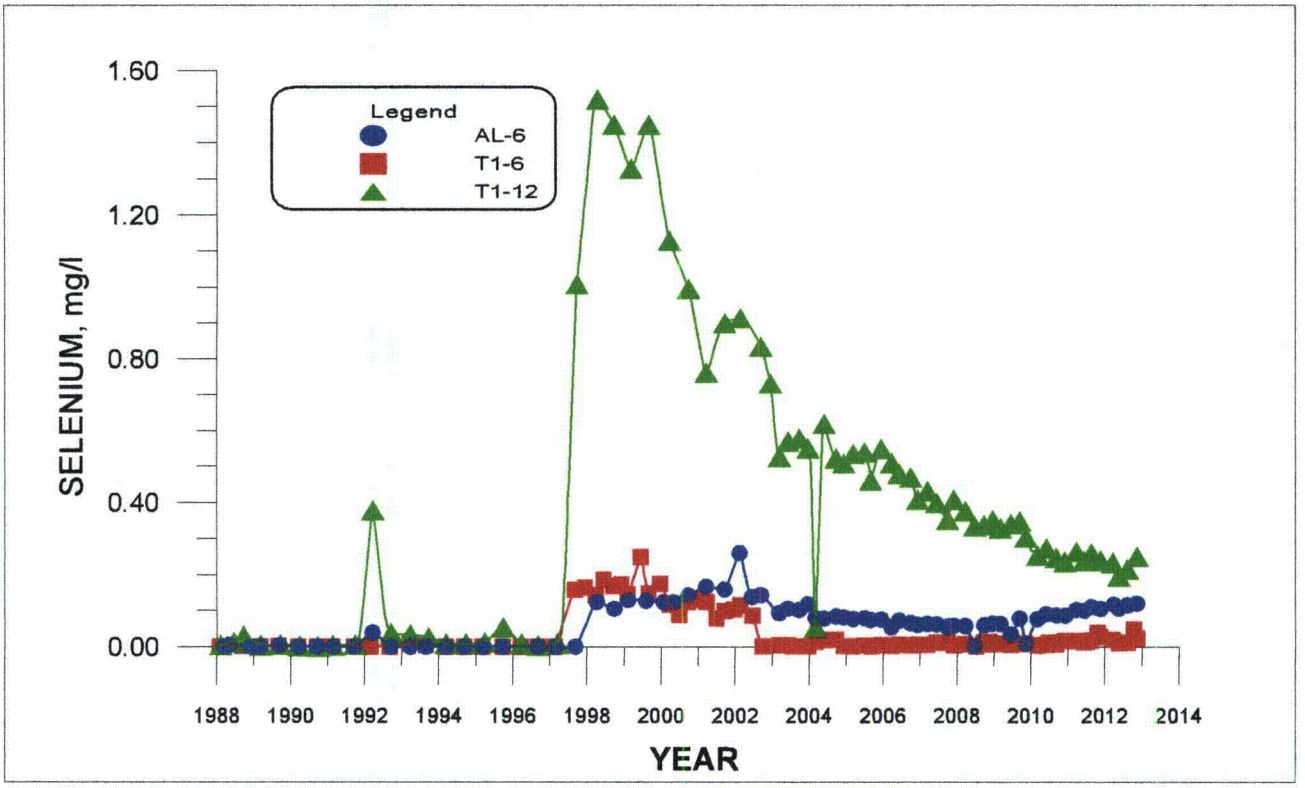


FIGURE 11. SELENIUM CONCENTRATIONS IN NOVEMBER 2012, AT LUCKY MC, IN mg/l



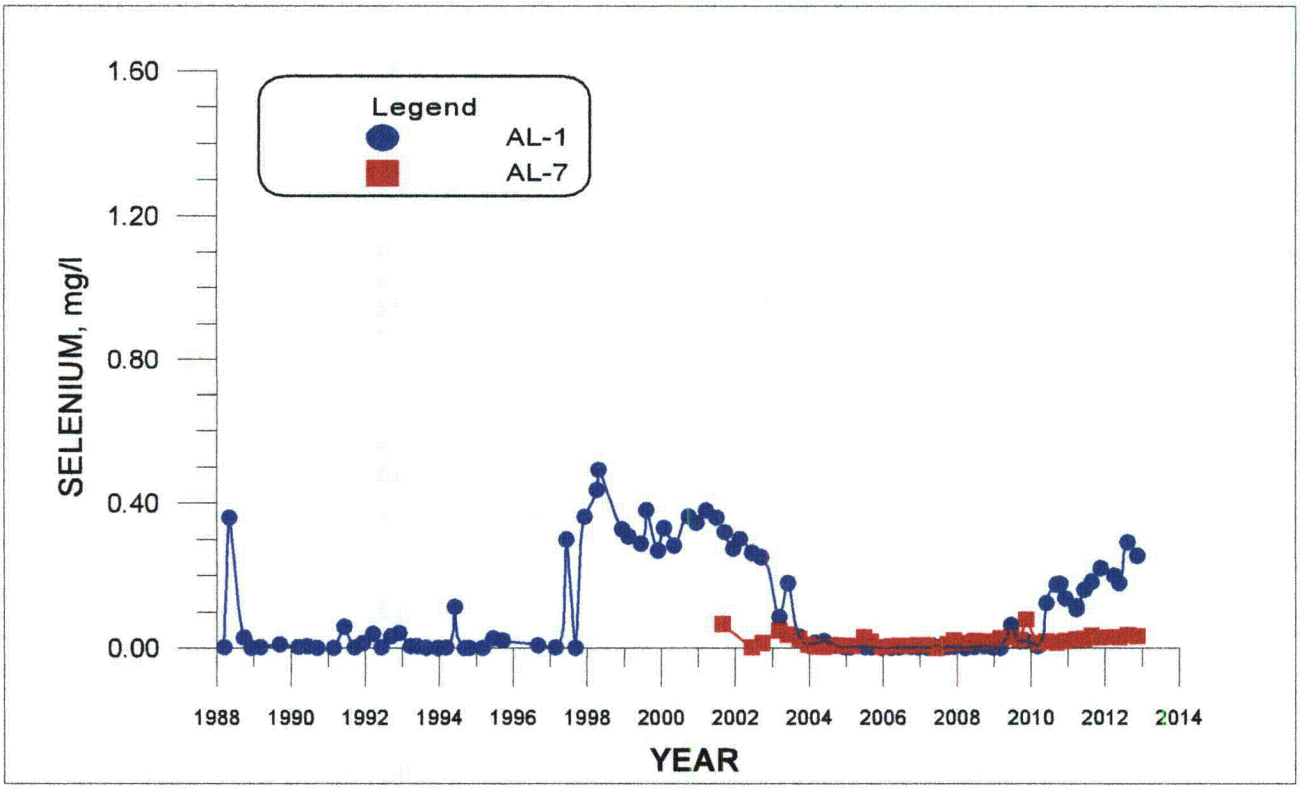


FIGURE 12. SELENIUM CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

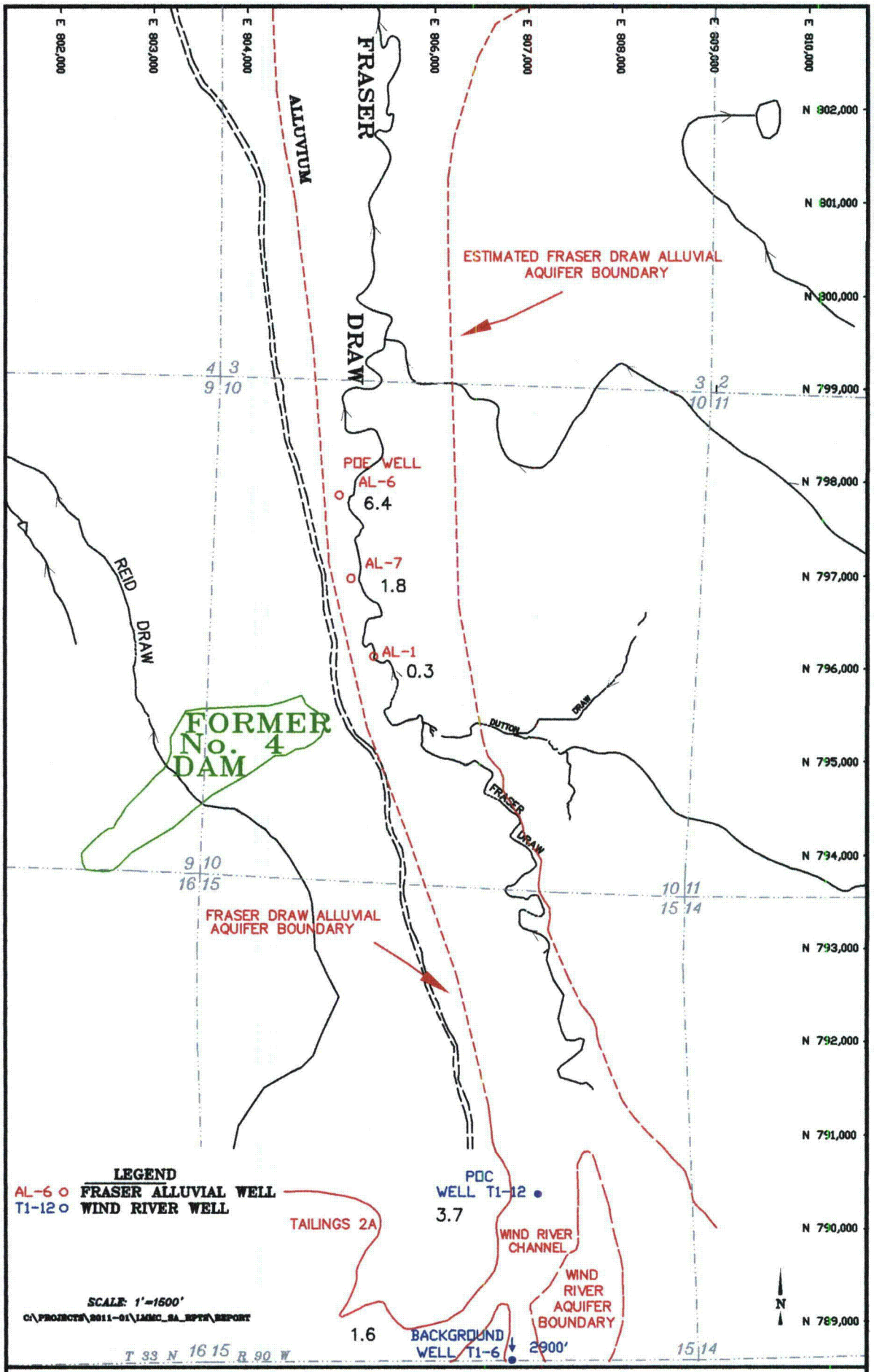
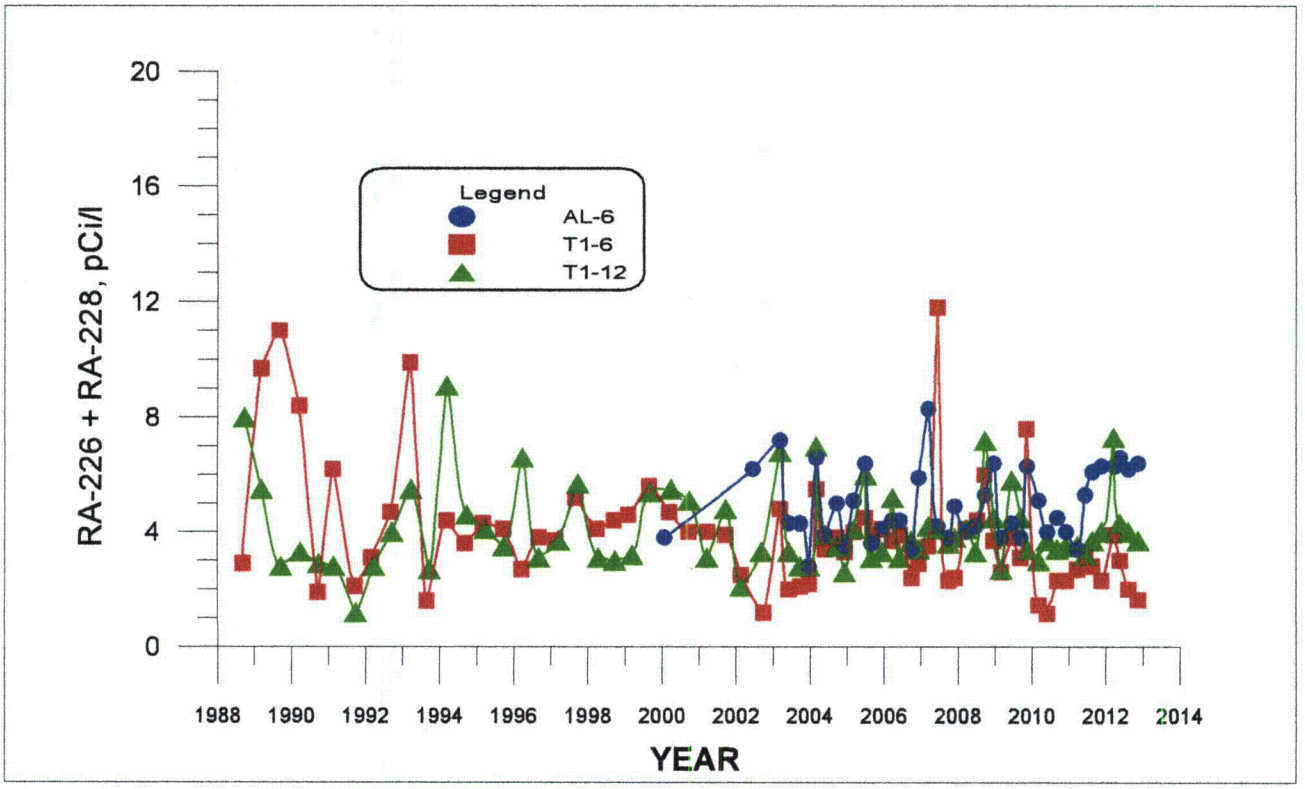


FIGURE 13. RA-226+RA-228 ACTIVITY IN NOVEMBER 2012, AT LUCKY MC, IN pCi/l



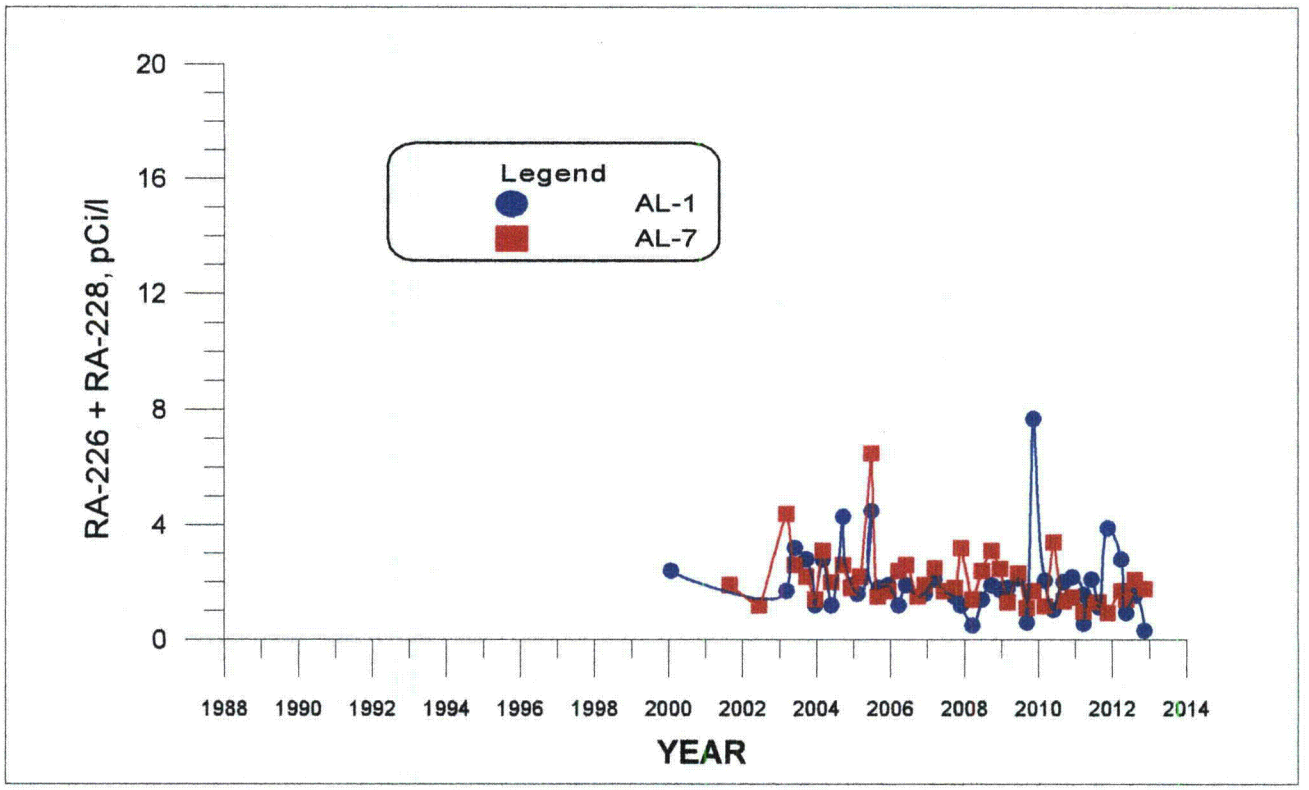


FIGURE 14. RADIUM-226 + RADIUM-228 ACTIVITY VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

TABLE 1. WATER-LEVEL AND WATER-QUALITY DATA.

Lucky MC Mine - Pathfinder Mines Corp.

Sample Point Name	Date	WL (feet)	WL_ELEV (ft-msl)	pH(f) (std. units)	Cond(f) (µmhos)	TDS (mg/l)	SO4 (mg/l)	Cl (mg/l)	NO3+NO2 (mg/l)	Unat (mg/l)
AL-1	3/3/2009	30.20	6234.40	6.6	3310	2430	1430	21.0	< 0.1	0.082
	6/16/2009	29.14	6235.46	6.9	3610	2850	1590	62.0	19.6	0.135
	9/11/2009	31.81	6232.79	6.9	3290	2700	1520	48.0	2.7	0.102
	11/12/2009	30.98	6233.62	6.7	3250	2520	1540	43.0	2.8	0.437
	3/4/2010	29.34	6235.26	6.6	3220	2480	1540	40.0	1.5	0.090
	5/30/2010	28.22	6236.38	6.9	3920	3590	470	33.0	41.0	0.396
	9/7/2010	27.98	6236.62	7.0	4990	4860	2910	242.0	62.0	1.110
	10/14/2010	28.21	6236.39	6.9	4370	5890	3210	282.0	66.0	1.300
	12/2/2010	28.00	6236.60	6.8	4740	5340	3020	265.0	48.0	1.050
	3/24/2011	27.58	6237.02	7.1	4210	5000	2820	252.0	45.0	0.939
	3/25/2011	28.85	6235.75	7.1	3520	5040	2710	245.0	53.0	0.924
	6/8/2011	27.22	6237.38	7.1	4030	5190	3000	245.0	58.0	1.260
	8/18/2011	27.51	6237.09	6.5	4370	6120	3550	322.0	78.0	1.760
	11/17/2011	27.57	6237.03	6.6	4610	7310	4090	399.0	89.0	2.420
	3/27/2012	26.83	6237.77	6.7	3990	6750	3540	307.0	76.0	1.880
	5/16/2012	26.51	6238.09	6.8	3040	6360	3510	291.0	62.0	1.350
	8/9/2012	27.08	6237.52	6.9	3030	6750	3380	326.0	123.0	1.780
	11/13/2012	27.05	6237.55	6.8	3020	5840	3270	295.0	78.0	1.640
AL-6	3/3/2009	24.24	6212.56	6.6	3660	2900	1560	79.0	45.8	0.586
	6/16/2009	23.89	6212.91	6.8	3870	3070	1700	94.0	29.0	0.613
	9/11/2009	23.05	6213.75	7.1	3700	3230	1610	94.0	55.0	0.612
	11/12/2009	23.98	6212.82	6.8	3680	3100	1690	100.0	62.0	0.116
	3/4/2010	23.79	6213.01	6.7	3690	3150	1670	102.0	67.0	0.594
	5/30/2010	23.51	6213.29	6.9	3420	3360	1740	107.0	69.0	0.656
	9/7/2010	23.62	6213.18	7.1	3390	3280	1730	105.0	68.0	0.681
	12/2/2010	23.50	6213.30	6.8	3120	3410	1760	104.0	69.0	0.690
	3/24/2011	23.41	6213.39	7.1	3040	3620	1840	121.0	76.0	0.671
	6/8/2011	23.36	6213.44	7.1	2940	3500	1880	125.0	80.0	0.689
	8/18/2011	23.55	6213.25	6.5	2720	3660	1960	130.0	72.0	0.698
	11/17/2011	23.33	6213.47	6.6	2590	3630	1960	131.0	74.0	0.733
	3/27/2012	23.13	6213.67	6.6	1942	3850	1960	132.0	78.0	0.832
	5/16/2012	22.95	6213.85	6.9	1483	3980	1990	135.0	72.0	0.596
	8/9/2012	23.22	6213.58	7.0	1504	3870	2060	151.0	83.0	0.793
	11/13/2012	22.98	6213.82	6.9	1562	3990	2050	140.0	79.0	0.837
AL-7	3/3/2009	29.28	6222.72	6.6	3540	2810	1560	75.0	24.1	0.365
	6/16/2009	28.74	6223.26	6.9	3530	2850	1600	83.0	30.5	0.371
	9/11/2009	28.92	6223.08	6.9	3410	2860	1560	80.0	17.9	0.354
	11/12/2009	28.84	6223.16	6.7	3410	2720	1640	83.0	14.2	0.738
	3/4/2010	28.66	6223.34	6.6	3170	2570	1590	79.0	10.0	0.313
	5/30/2010	28.12	6223.88	6.8	3110	2770	1600	79.0	10.0	0.336
	9/7/2010	28.25	6223.75	7.0	2920	2790	1630	81.0	5.9	0.358
	12/2/2010	28.35	6223.65	6.8	2810	2800	1680	81.0	9.0	0.353
	3/24/2011	27.95	6224.05	7.1	2680	2850	1670	87.0	13.0	0.350
	6/8/2011	27.68	6224.32	7.1	1916	2910	1700	89.0	14.0	0.357

TABLE 1. WATER-LEVEL AND WATER-QUALITY DATA. (cont'd)

Lucky MC Mine - Pathfinder Mines Corp.

Sample Point Name	Date	WL (feet)	WL_ELEV (ft-msl)	pH(f) (std. units)	Cond(f) (µmhos)	TDS (mg/l)	SO4 (mg/l)	Cl (mg/l)	NO3+NO2 (mg/l)	Unat (mg/l)
AL-7	8/18/2011	27.82	6224.18	6.4	2510	2950	1810	100.0	17.0	0.353
	11/17/2011	27.72	6224.28	6.6	2440	2930	1730	88.0	15.0	0.395
	3/27/2012	27.26	6224.74	6.6	1818	3030	1720	89.0	16.0	0.412
	5/16/2012	27.05	6224.95	6.9	1331	3100	1750	91.0	16.0	0.332
	8/9/2012	27.24	6224.76	7.0	1424	3210	1810	101.0	21.0	0.403
	11/13/2012	27.08	6224.92	6.9	1435	3220	1790	92.0	16.0	0.401
T1-6	3/3/2009	29.81	6398.41	6.9	3410	2500	1480	36.0	0.4	0.042
	6/16/2009	30.10	6398.12	7.1	3240	2470	1510	41.0	0.4	0.048
	9/11/2009	30.35	6397.87	7.0	3150	2560	1480	40.0	0.8	0.047
	11/5/2009	30.05	6398.17	7.0	1628	2460	1550	41.0	0.7	0.047
	3/4/2010	29.71	6398.51	6.9	3100	2310	1480	40.0	0.7	0.035
	5/30/2010	30.12	6398.10	7.4	2750	2450	1390	37.0	0.8	0.043
	6/26/2010	30.00	6398.22	7.0	2660	2520	1560	43.0	0.5	0.056
	9/7/2010	30.15	6398.07	7.1	2720	2500	1520	39.0	0.7	0.043
	12/2/2010	29.80	6398.42	7.0	2640	2510	1550	41.0	0.8	0.051
	3/24/2011	29.23	6398.99	7.0	1873	2590	1560	49.0	0.8	0.054
	6/8/2011	29.45	6398.77	7.0	1647	2520	1560	48.0	0.6	0.059
	7/7/2011	29.57	6398.65	6.3	1587	2530	1490	46.0	0.7	0.204
	8/18/2011	29.65	6398.57	6.7	2610	2560	1620	50.0	0.5	0.053
	10/20/2011	29.47	6398.75	6.8	1544	2560	1620	52.0	1.3	0.089
	11/17/2011	30.08	6398.14	6.9	1697	2600	1580	49.0	1.0	0.052
	3/14/2012	29.64	6398.58	6.9	1293	2630	1530	49.0	0.7	0.054
	5/16/2012	28.98	6399.24	7.2	1090	2560	1530	45.0	0.4	0.050
	8/9/2012	29.29	6398.93	7.3	1193	2530	1570	49.0	0.9	0.044
	10/10/2012	—	—	—	—	2630	1610	53.0	1.8	0.074
	11/13/2012	28.84	6399.38	7.2	1301	2600	1580	48.0	0.9	0.058
T1-12	3/3/2009	17.71	6323.09	5.9	7520	6370	2390	179.0	253.0	0.343
	6/16/2009	17.43	6323.37	6.3	7490	6460	2460	208.0	309.0	0.385
	9/11/2009	18.14	6322.66	6.4	7210	6530	2400	201.0	261.0	0.381
	11/12/2009	17.91	6322.89	6.2	6980	6350	2530	208.0	260.0	0.419
	3/4/2010	18.47	6322.33	6.2	6710	6390	2400	198.0	257.0	0.338
	5/30/2010	18.10	6322.70	6.2	5820	6480	2440	196.0	256.0	0.393
	9/7/2010	18.37	6322.43	6.3	5410	6300	2560	205.0	216.0	0.371
	12/2/2010	18.86	6321.94	6.2	5260	6200	2480	191.0	206.0	0.383
	3/24/2011	18.79	6322.01	6.4	4730	6310	2610	216.0	179.0	0.378
	6/8/2011	18.83	6321.97	6.4	4130	6200	2620	221.0	217.0	0.387
	8/18/2011	18.93	6321.87	5.9	4610	6130	2690	220.0	217.0	0.364
	11/17/2011	19.19	6321.61	6.0	3920	6220	2520	200.0	193.0	0.362
	3/14/2012	19.50	6321.30	6.0	3440	6460	2480	204.0	233.0	0.380
	5/16/2012	18.22	6322.58	6.2	1790	6080	2490	205.0	194.0	0.393
	8/9/2012	19.29	6321.51	6.3	1692	6680	2630	221.0	239.0	0.410
	11/13/2012	19.88	6320.92	6.3	3040	5980	2450	198.0	278.0	0.406

TABLE 1. WATER-LEVEL AND WATER-QUALITY DATA. (cont'd)

Lucky MC Mine - Pathfinder Mines Corp.

Sample Point Name	Date	Th230 (pCi/l)	Th230(e) (pCi/l)	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	Ra226+Ra228 (pCi/l)
AL-1	3/3/2009	0.090	± 0.2	1.0	± 0.2	0.8	± 0.6	1.8
	6/16/2009	0.100	± 0.2	0.7	± 0.2	1.4	± 0.7	2.1
	9/11/2009	- 0.008	± 0.2	0.5	± 0.2	0.1	± 0.8	0.6
	11/12/2009	0.100	± 0.1	7.1	± 0.4	0.6	± 0.7	7.7
	3/4/2010	0.050	± 0.1	0.9	± 0.2	1.2	± 0.7	2.1
	5/30/2010	0.050	± 0.1	0.7	± 0.2	0.3	± 0.6	1.0
	9/7/2010	0.040	± 0.1	0.7	± 0.2	1.3	± 0.6	2.0
	12/2/2010	0.020	0.1	0.7	0.2	1.5	0.7	2.2
	3/24/2011	0.300	± 0.1	0.5	± 0.2	1.1	± 0.6	1.6
	3/25/2011	0.070	± 0.1	0.6	± 0.2	0.0	± 0.6	0.6
	6/8/2011	0.050	0.1	0.9	0.2	1.2	0.8	2.1
	8/18/2011	0.070	± 0.1	1.0	± 0.2	0.2	± 0.6	1.2
	11/17/2011	0.080	± 0.1	1.7	± 0.3	2.2	± 0.9	3.9
	3/27/2012	-0.020	0.1	2.2	0.3	0.6	0.6	2.8
	5/16/2012	0.100	0.1	0.7	0.2	0.2	0.8	0.9
	8/9/2012	0.009	0.1	0.6	0.2	0.9	0.8	1.5
	11/13/2012	0.040	0.1	0.4	0.2	0.0	0.8	0.3
AL-6	3/3/2009	0.010	± 0.2	2.4	± 0.3	1.4	± 0.6	3.8
	6/16/2009	0.200	± 0.2	2.7	± 0.4	1.6	± 0.7	4.3
	9/11/2009	- 0.030	± 0.1	2.7	± 0.3	1.1	± 0.8	3.8
	11/12/2009	0.080	± 0.1	4.9	± 0.4	1.4	± 0.7	6.3
	3/4/2010	0.200	± 0.1	3.0	± 0.4	2.1	± 0.7	5.1
	5/30/2010	0.050	± 0.1	2.9	± 0.3	1.1	± 0.7	4.0
	9/7/2010	-0.020	± 0.1	2.8	± 0.3	1.7	± 0.7	4.5
	12/2/2010	0.050	0.1	2.5	0.3	1.5	0.6	4.0
	3/24/2011	0.050	± 0.1	2.9	± 0.4	0.5	± 0.6	3.4
	6/8/2011	0.080	0.1	2.8	0.4	2.5	0.8	5.3
	8/18/2011	0.020	± 0.1	4.3	± 0.5	1.8	± 0.7	6.1
	11/17/2011	0.040	± 0.1	3.9	± 0.4	2.4	± 0.9	6.3
	3/27/2012	0.080	0.1	4.7	0.4	1.6	0.6	6.3
	5/16/2012	0.050	0.1	3.9	0.5	2.7	1.4	6.6
	8/9/2012	0.100	0.1	4.2	0.5	2.0	0.8	6.2
	11/13/2012	-0.008	0.1	4.5	0.5	1.9	1.0	6.4
AL-7	3/3/2009	0.020	± 0.1	0.4	± 0.1	0.9	± 0.6	1.3
	6/16/2009	< 0.050	± 0.4	0.3	± 0.2	2.0	± 1.0	2.3
	9/11/2009	0.050	± 0.1	0.9	± 0.2	0.2	± 0.8	1.1
	11/12/2009	0.050	± 0.1	0.5	± 0.1	1.2	± 0.7	1.7
	3/4/2010	0.070	± 0.1	0.3	± 0.1	0.9	± 0.6	1.2
	5/30/2010	0.010	± 0.1	1.1	± 0.2	2.3	± 0.7	3.4
	9/7/2010	0.060	± 0.1	0.5	± 0.2	0.8	± 0.7	1.3
	12/2/2010	0.100	0.1	0.4	0.1	1.1	0.6	1.5
	3/24/2011	0.020	± 0.1	0.5	± 0.2	0.5	± 0.6	1.0
	6/8/2011	0.060	0.1	0.5	0.2	0.8	0.7	1.3
	8/18/2011	0.050	± 0.1	0.8	± 0.2	0.5	± 0.6	1.3

TABLE 1. WATER-LEVEL AND WATER-QUALITY DATA. (cont'd)

Lucky MC Mine - Pathfinder Mines Corp.

Sample Point Name	Date	Th230 (pCi/l)	Th230(e) (pCi/l)	Ra226 (pCi/l)	Ra226(e) (pCi/l)	Ra228 (pCi/l)	Ra228(e) (pCi/l)	Ra226+Ra228 (pCi/l)
AL-7	11/17/2011	0.020	± 0.1	0.2	± 0.1	0.7	± 0.8	0.9
	3/27/2012	0.070	0.1	0.9	0.2	0.8	0.6	1.7
	5/16/2012	0.030	0.1	0.5	0.2	0.9	0.9	1.4
	8/9/2012	0.020	0.1	0.8	0.2	1.3	0.8	2.1
	11/13/2012	0.060	0.1	0.7	0.2	1.1	1.0	1.8
T1-6	3/3/2009	-0.020	± 0.1	1.8	± 0.3	0.8	± 0.6	2.6
	6/16/2009	-0.040	± 0.2	2.1	± 0.3	1.7	± 0.7	3.8
	9/11/2009	- 0.030	± 0.1	2.0	± 0.3	1.1	± 0.8	3.1
	11/5/2009	0.030	± 0.1	4.6	± 0.5	3.0	± 1.0	7.6
	3/4/2010	0.300	± 0.2	0.8	± 0.2	0.7	± 0.6	1.5
	5/30/2010	0.030	± 0.1	0.9	± 0.2	0.3	± 0.6	1.2
	6/26/2010	—	—	3.9	± 0.4	—	—	—
	9/7/2010	-0.010	± 0.1	1.3	± 0.2	1.0	± 0.7	2.3
	12/2/2010	0.070	0.1	1.5	0.3	0.8	0.6	2.3
	3/24/2011	0.030	± 0.1	1.2	± 0.3	1.5	± 0.8	2.7
	6/8/2011	0.060	0.1	1.8	0.3	1.3	0.8	3.1
	7/7/2011	—	—	10.0	± 0.6	—	—	—
	8/18/2011	0.030	± 0.1	1.6	± 0.3	1.2	± 0.7	2.8
	10/20/2011	—	—	3.9	± 0.4	—	—	—
	11/17/2011	0.030	± 0.1	1.6	± 0.3	0.7	± 0.7	2.3
	3/14/2012	0.400	0.2	2.6	0.3	1.3	0.6	3.9
	5/16/2012	0.070	0.1	2.0	0.3	1.0	0.8	3.0
	8/9/2012	-0.008	0.1	1.3	0.3	0.7	0.7	2.0
	10/10/2012	—	—	3.5	0.4	—	—	—
	11/13/2012	0.010	0.1	0.9	0.3	0.7	1.2	1.6
T1-12	3/3/2009	0.300	± 0.3	1.8	± 0.3	0.9	± 0.6	2.7
	6/16/2009	1.100	± 0.6	3.5	± 0.4	2.3	± 0.6	5.8
	9/11/2009	0.300	± 0.4	2.1	± 0.3	2.4	± 0.8	4.5
	11/12/2009	0.500	± 0.2	2.1	± 0.3	1.3	± 1.1	3.4
	3/4/2010	0.080	± 0.1	1.7	± 0.2	1.3	± 0.6	3.0
	5/30/2010	0.200	± 0.4	2.7	± 0.3	1.0	± 0.6	3.7
	9/7/2010	0.300	± 0.3	1.9	± 0.3	1.5	± 0.6	3.4
	12/2/2010	0.050	0.1	1.9	0.3	1.6	0.6	3.5
	3/24/2011	0.070	± 0.1	1.7	± 0.3	1.8	± 0.7	3.5
	6/8/2011	0.300	0.2	1.7	0.3	1.5	0.7	3.2
	8/18/2011	0.200	± 0.2	2.4	± 0.5	1.3	± 1.2	3.7
	11/17/2011	0.100	± 0.1	2.5	± 0.3	1.5	± 0.8	4.0
	3/14/2012	0.200	0.2	3.9	0.6	3.4	1.4	7.3
	5/16/2012	2.300	0.4	2.9	0.4	1.4	0.9	4.3
	8/9/2012	0.040	0.1	2.3	0.3	1.7	0.7	4.0
	11/13/2012	0.200	0.1	2.2	0.4	1.5	1.2	3.7

TABLE 1. WATER-LEVEL AND WATER-QUALITY DATA. (cont'd)

Lucky MC Mine - Pathfinder Mines Corp.

Sample Point Name	Date	As (mg/l)	Be (mg/l)	Cd (mg/l)	Cr (mg/l)	Ni (mg/l)	Se (mg/l)
AL-1	3/3/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.001
	6/16/2009	0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.065
	9/11/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.019
	11/12/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.020
	3/4/2010	0.002	< 0.010	< 0.010	< 0.05	< 0.05	0.006
	5/30/2010	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.126
	9/7/2010	0.003	< 0.010	< 0.010	< 0.05	< 0.05	0.177
	10/14/2010	—	—	—	—	—	0.179
	12/2/2010	0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.139
	3/24/2011	0.002	< 0.010	< 0.010	< 0.05	< 0.05	0.117
	3/25/2011	0.002	< 0.010	< 0.010	< 0.05	< 0.05	0.109
	6/8/2011	0.003	< 0.010	< 0.010	< 0.05	< 0.05	0.162
	8/18/2011	0.003	< 0.010	< 0.010	< 0.05	< 0.05	0.184
	11/17/2011	0.006	< 0.010	< 0.005	< 0.05	< 0.05	0.222
	3/27/2012	0.004	< 0.010	< 0.005	< 0.05	< 0.05	0.201
	5/16/2012	0.002	< 0.010	< 0.005	< 0.05	< 0.05	0.181
	8/9/2012	0.005	< 0.001	< 0.001	< 0.01	0.03	0.293
	11/13/2012	0.003	< 0.001	< 0.001	< 0.01	0.03	0.255
AL-6	3/3/2009	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.064
	6/16/2009	0.003	< 0.010	< 0.005	< 0.05	< 0.05	0.035
	9/11/2009	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.079
	11/12/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.009
	3/4/2010	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.078
	5/30/2010	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.091
	9/7/2010	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.088
	12/2/2010	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.087
	3/24/2011	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.103
	6/8/2011	0.006	< 0.010	< 0.010	< 0.05	< 0.05	0.101
	8/18/2011	0.007	< 0.010	< 0.010	< 0.05	< 0.05	0.111
	11/17/2011	0.006	< 0.010	< 0.005	< 0.05	< 0.05	0.106
	3/27/2012	0.006	< 0.010	< 0.005	< 0.05	< 0.05	0.118
	5/16/2012	0.005	< 0.010	< 0.005	< 0.05	< 0.05	0.107
	8/9/2012	0.006	< 0.001	< 0.001	< 0.01	< 0.01	0.116
	11/13/2012	0.007	< 0.001	< 0.001	< 0.01	< 0.01	0.121
AL-7	3/3/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.028
	6/16/2009	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.032
	9/11/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.023
	11/12/2009	0.009	< 0.010	< 0.010	< 0.05	< 0.05	0.080
	3/4/2010	0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.014
	5/30/2010	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.018
	9/7/2010	0.002	< 0.010	< 0.010	< 0.05	< 0.05	0.016
	12/2/2010	0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.020
	3/24/2011	0.002	< 0.010	< 0.010	< 0.05	< 0.05	0.025
	6/8/2011	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.026

TABLE 1. WATER-LEVEL AND WATER-QUALITY DATA. (cont'd)

Lucky MC Mine - Pathfinder Mines Corp.

Sample Point Name	Date	As (mg/l)	Be (mg/l)	Cd (mg/l)	Cr (mg/l)	Ni (mg/l)	Se (mg/l)
AL-7	8/18/2011	0.003	< 0.010	< 0.010	< 0.05	< 0.05	0.036
	11/17/2011	0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.030
	3/27/2012	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.031
	5/16/2012	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.030
	8/9/2012	0.004	< 0.001	< 0.001	< 0.01	0.01	0.037
	11/13/2012	0.002	< 0.001	< 0.001	< 0.01	0.02	0.033
T1-6	3/3/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.010
	6/16/2009	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.007
	9/11/2009	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.009
	11/5/2009	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.010
	3/4/2010	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.005
	5/30/2010	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.007
	6/26/2010	< 0.001	---	< 0.005	< 0.05	< 0.05	0.013
	9/7/2010	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.008
	12/2/2010	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.017
	3/24/2011	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.017
	6/8/2011	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.014
	7/7/2011	0.008	---	< 0.005	< 0.05	< 0.05	0.016
	8/18/2011	< 0.001	< 0.010	< 0.010	< 0.05	< 0.05	0.018
	10/20/2011	< 0.001	---	< 0.005	< 0.05	< 0.05	0.040
	11/17/2011	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.029
	3/14/2012	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.021
	5/16/2012	< 0.001	< 0.010	< 0.005	< 0.05	< 0.05	0.011
	8/9/2012	< 0.001	< 0.001	< 0.001	< 0.01	0.01	0.012
	10/10/2012	< 0.001	---	< 0.005	< 0.05	< 0.05	0.048
	11/13/2012	< 0.001	< 0.001	< 0.001	< 0.01	0.02	0.024
T1-12	3/3/2009	< 0.001	< 0.010	< 0.010	< 0.05	0.28	0.330
	6/16/2009	0.001	< 0.010	< 0.005	< 0.05	0.27	0.342
	9/11/2009	< 0.001	< 0.010	< 0.010	< 0.05	0.27	0.348
	11/12/2009	< 0.001	< 0.010	< 0.010	< 0.05	0.25	0.305
	3/4/2010	0.003	< 0.010	< 0.010	< 0.05	0.24	0.254
	5/30/2010	< 0.001	< 0.010	< 0.010	< 0.05	0.27	0.274
	9/7/2010	< 0.001	< 0.010	< 0.010	< 0.05	0.27	0.248
	12/2/2010	0.003	< 0.010	< 0.010	< 0.05	0.28	0.237
	3/24/2011	0.001	< 0.010	< 0.010	< 0.05	0.28	0.265
	6/8/2011	< 0.001	< 0.010	< 0.010	< 0.05	0.27	0.239
	8/18/2011	0.002	< 0.010	< 0.010	< 0.05	0.26	0.260
	11/17/2011	< 0.001	< 0.010	< 0.005	< 0.05	0.19	0.240
	3/14/2012	< 0.001	< 0.010	< 0.005	< 0.05	0.27	0.234
	5/16/2012	< 0.001	< 0.010	< 0.005	< 0.05	0.29	0.197
	8/9/2012	< 0.001	< 0.001	< 0.001	< 0.01	0.26	0.216
	11/13/2012	< 0.001	< 0.001	< 0.001	< 0.01	0.27	0.251