



September 14, 2012

Mr. Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
Mail Stop T8-F5
U. S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, Maryland 20852-2738

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

Dear Mr. McConnell:

Enclosed please find two copies of the semi-annual ground water monitoring report (covering the first and second 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,

A handwritten signature in black ink, appearing to read 'R. Mark Owens', is written over a horizontal line.

R. Mark Owens
General Manager

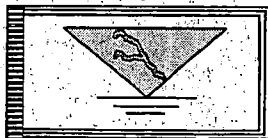
Enclosure

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

PATHFINDER MINES CORPORATION

935 PENDELL BLVD., P.O. BOX 730 MILLS, WYOMING 82644, U.S.A.
TEL.: 307 234 5019 FAX: 307 473 7306 WWW.US.AREVA.COM

**SEMI-ANNUAL
GROUND-WATER MONITORING
FOR LUCKY Mc MINE**



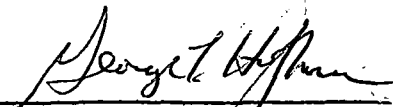
HYDRO - ENGINEERING, LLC

**SEMI-ANNUAL
GROUND-WATER MONITORING
FOR LUCKY Mc MINE**

**PREPARED FOR:
PATHFINDER MINES CORPORATION
LUCKY Mc MINE**

**BY:
HYDRO-ENGINEERING, L.L.C.
SEPTEMBER, 2012**


BRANDON WEAVER


**GEORGE L. HOFFMAN, P.E.
HYDROLOGIST**

9/12/2012

TABLE OF CONTENTS

| | | <u>Page Number</u> |
|-----|--|--------------------|
| 1.0 | INTRODUCTION AND SUMMARY OF RESULTS..... | 1 |
| 2.0 | PIEZOMETRIC DATA | 2 |
| 3.0 | WATER-QUALITY DATA..... | 2 |

FIGURES

| | | <u>Page Number</u> |
|----|---|--------------------|
| 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

| | <u>Page Number</u> |
|---|---------------------------|
| 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

| | <u>Page Number</u> |
|---|---------------------------|
| 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 first half of 2012 for the Lucky Mc tailings area. Data from the third quarter sampling is included in this report. 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 August 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 AUGUST 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, AUGUST 2012 | <0.001 | <0.001 | <0.001 | <0.01 | 0.26 | 4 | 0.22 | 0.04 | 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 WELL | URANIUM | | | SELENIUM | | | RA-226 + RA-228 | | |
| | 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 | 1.7 | 0.7 | 0.2 | 0.2 | 0.1 | 5 | 2 | 6 |

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

2.0 Piezometric Data

The water-level data collected during the third 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 quarter 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 August 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. Chloride concentrations in 2012 have overall declined in 2012 in well AL-1.

Figure 5 presents the TDS concentrations for August 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 well AL-6. 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. An increase in concentrations had been observed in well AL-1 in the last half of 2011 after a larger increase was observed in the 2nd half of 2010. Overall the TDS in well AL-1 has gradually declined in 2012. 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.

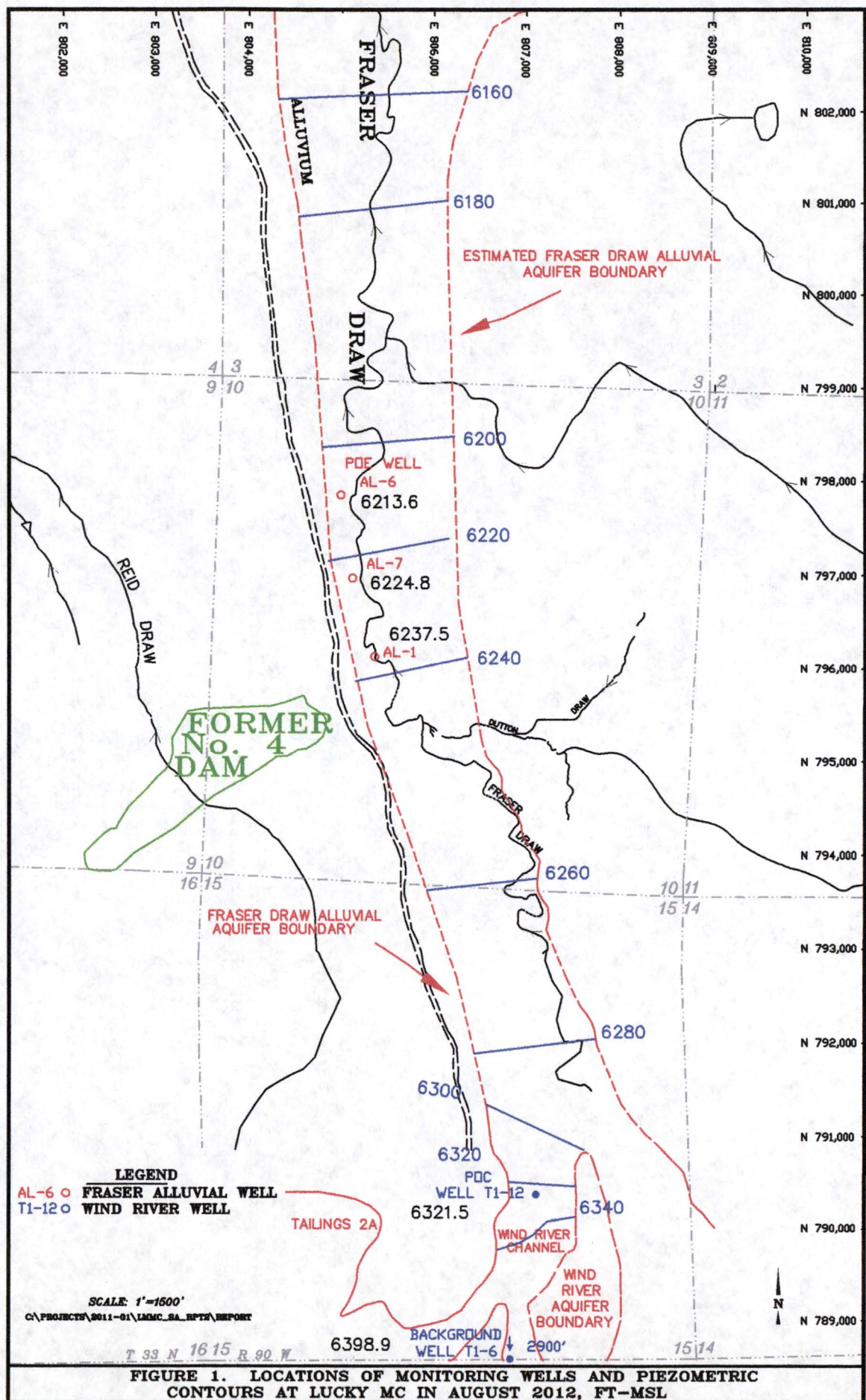
The measured sulfate concentrations for the Lucky Mc aquifer during August of 2012 are presented in Figure 7 and show that the sulfate concentrations in the western portion of the Fraser Draw alluvium are greater than 2000 mg/l near well AL-1 while concentrations are less than 2000 mg/l in the eastern 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 August 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 into early 2012 with the remainder 2012 values overall declining. 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 August 2012 for the Lucky Mc aquifer. Selenium concentrations are greatest at POC well T1-12. Selenium concentrations in POC well T1-12 have gradually declined for the last few years (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 the second half of 2011 and 2012.

Figure 13 presents the radium-226 plus radium-228 activity for August 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.

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



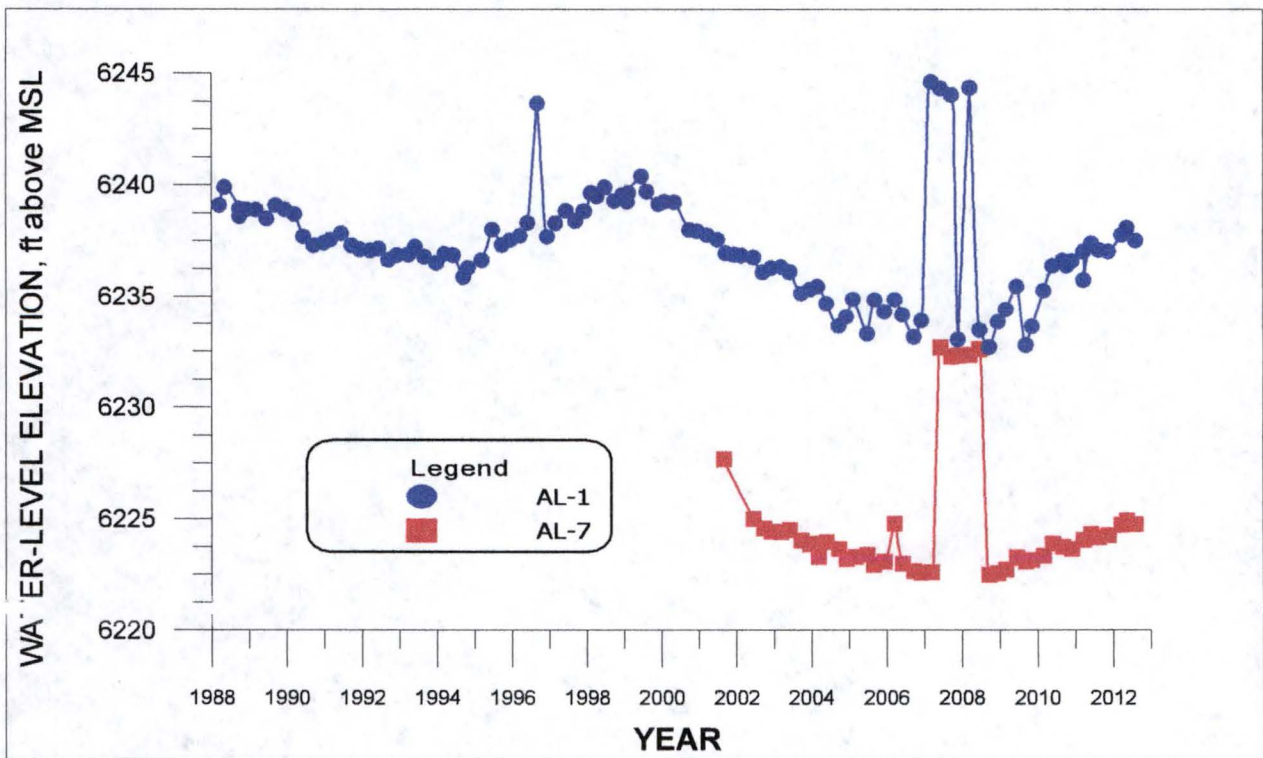
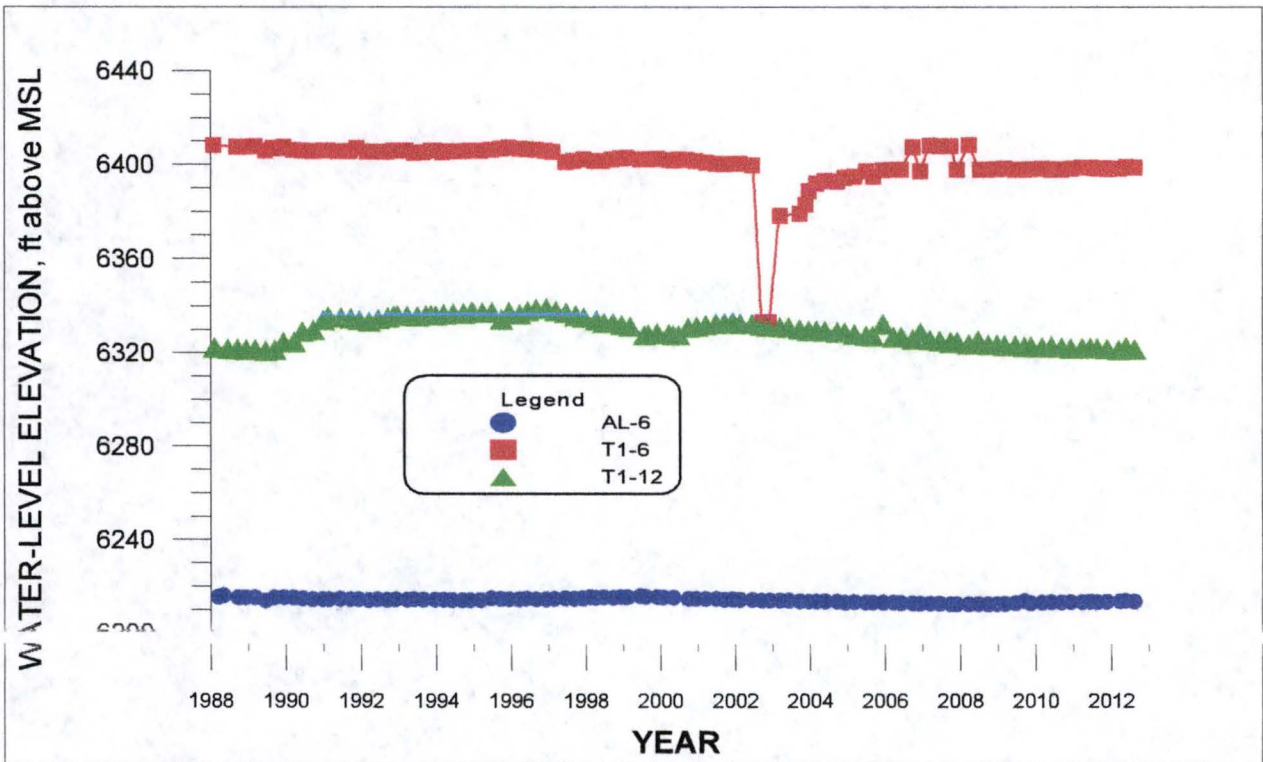
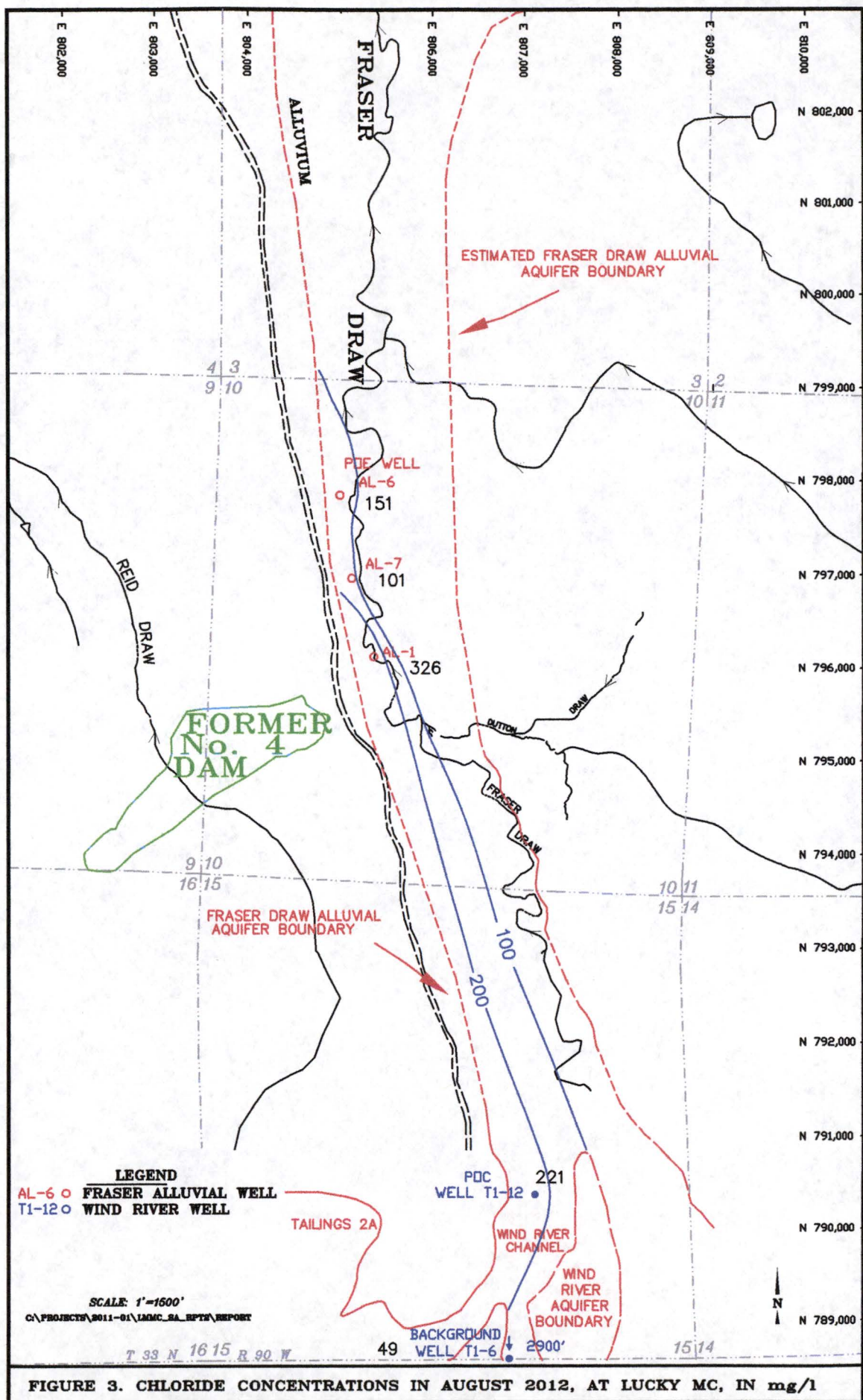


FIGURE 2. WATER-LEVEL ELEVATION VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.



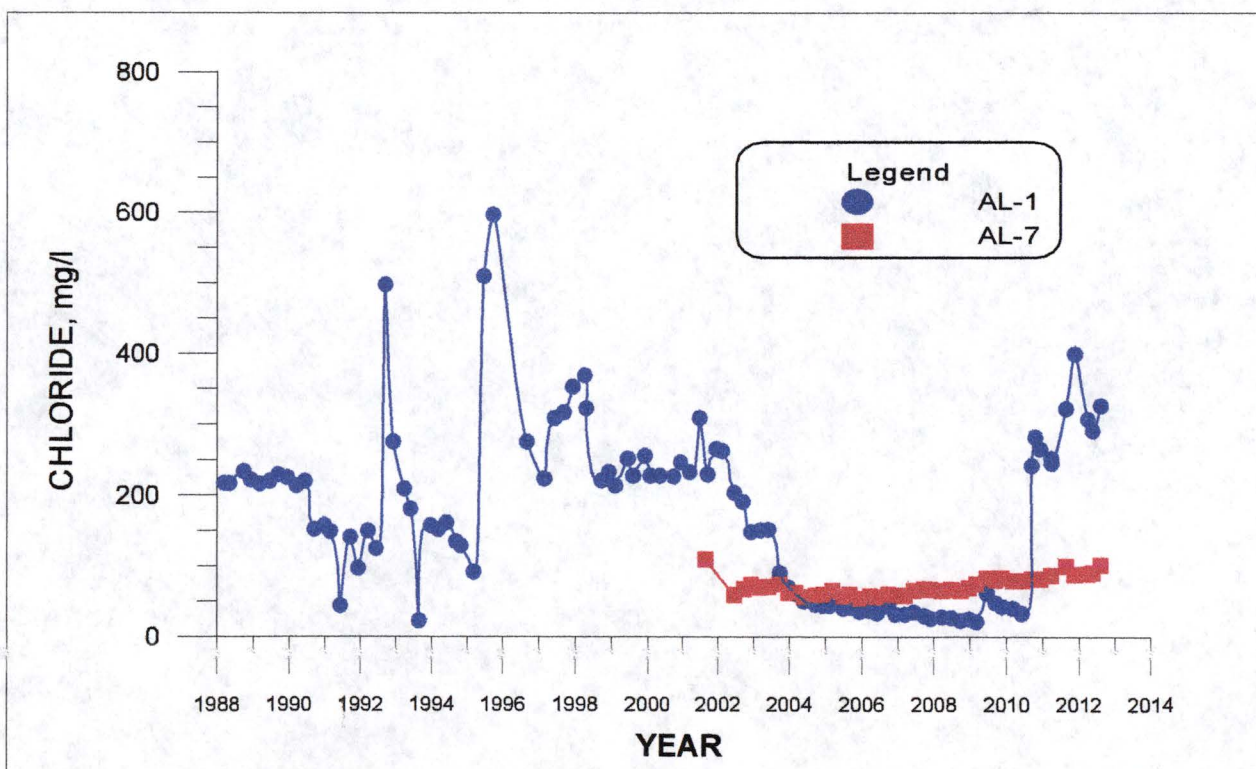
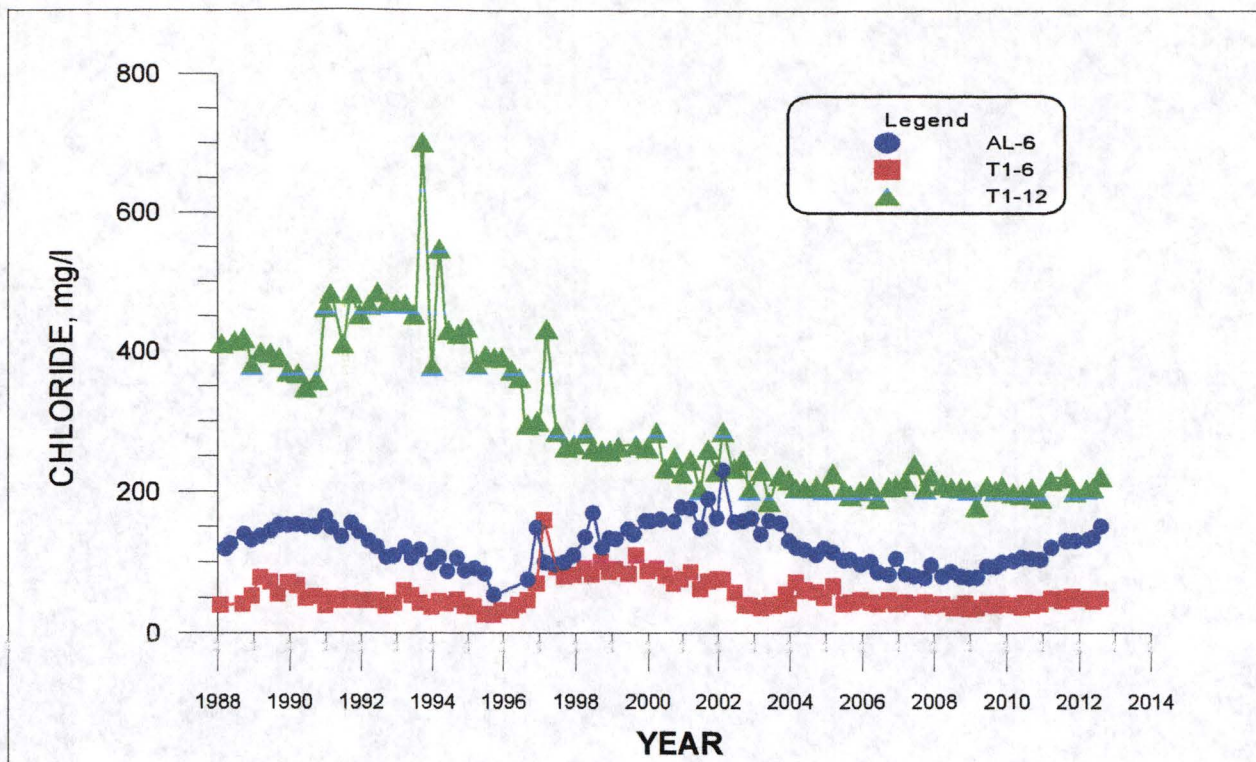
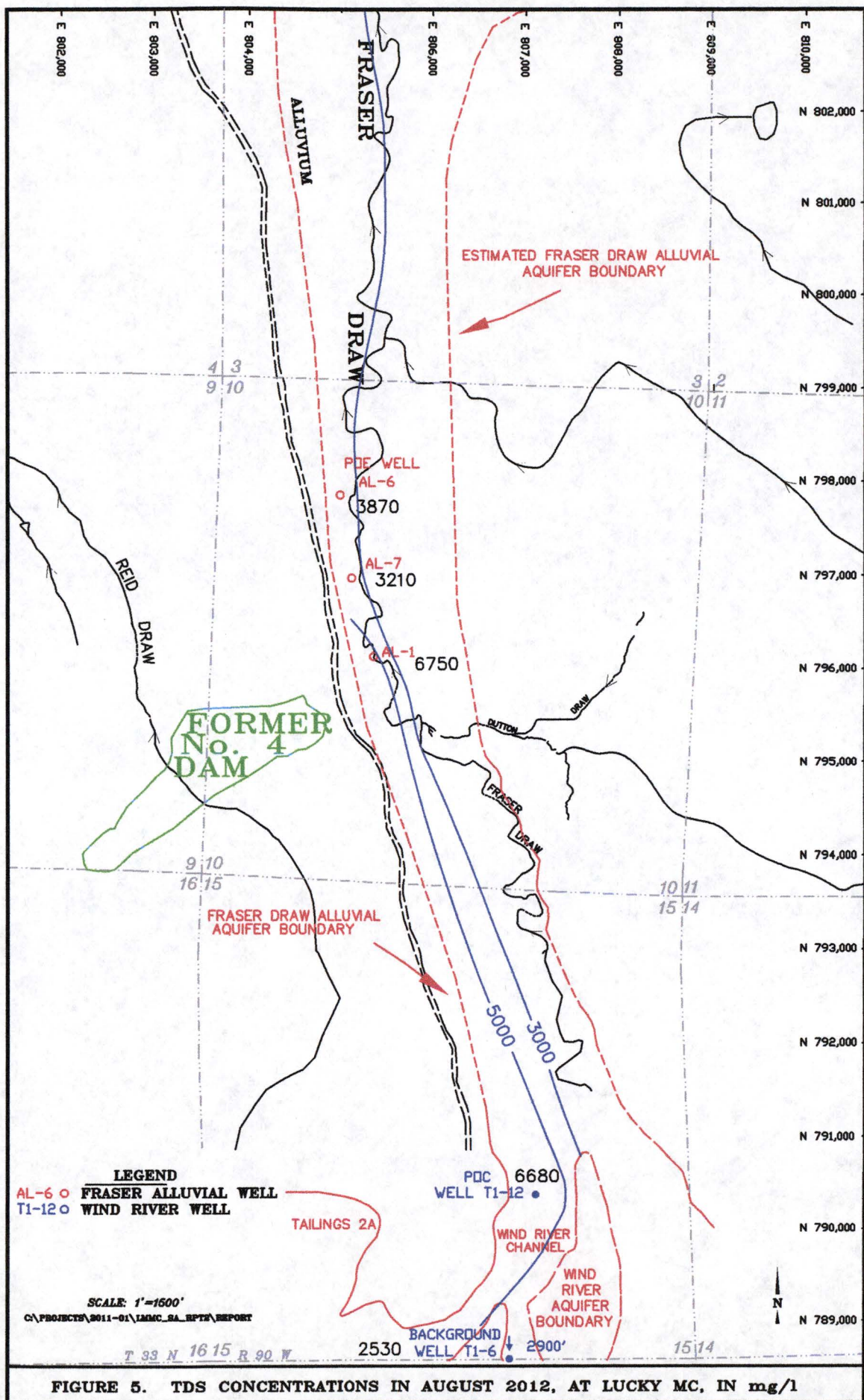


FIGURE 4. CHLORIDE CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.



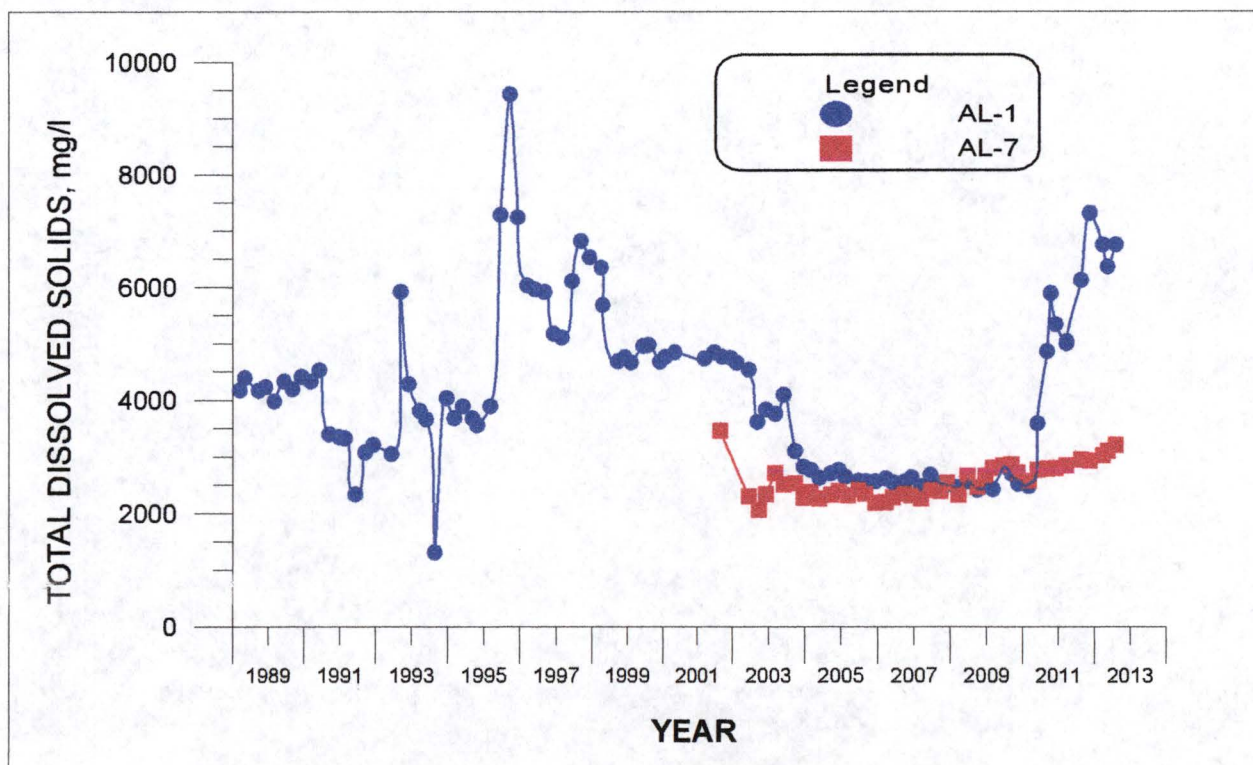
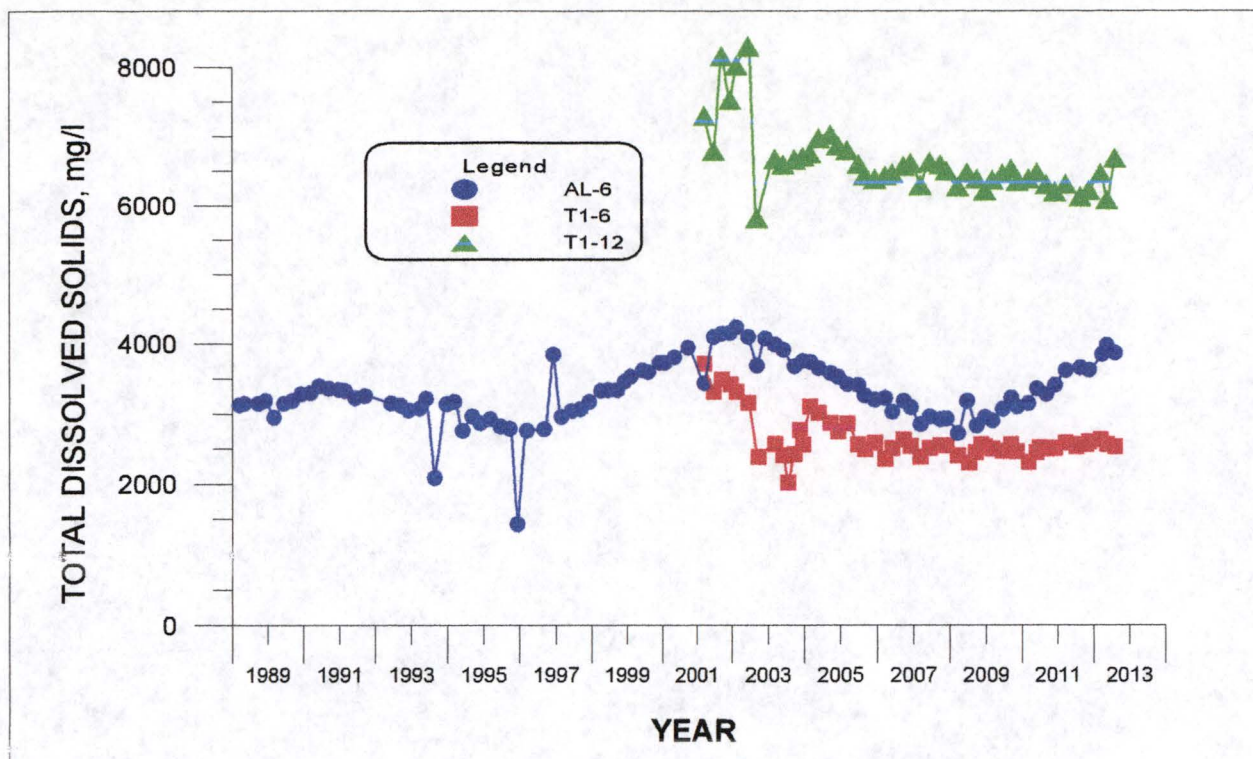
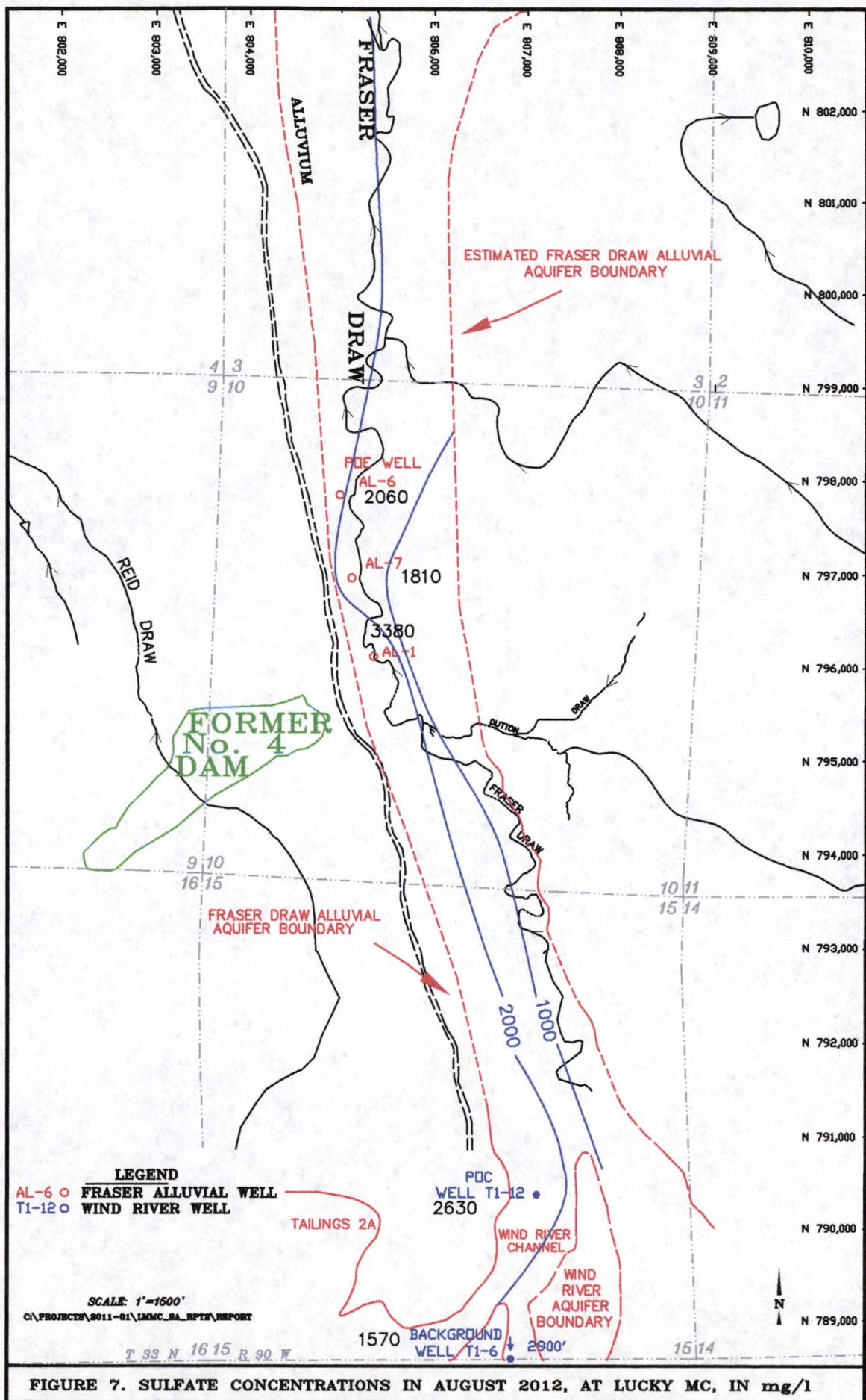


FIGURE 6. TDS CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.



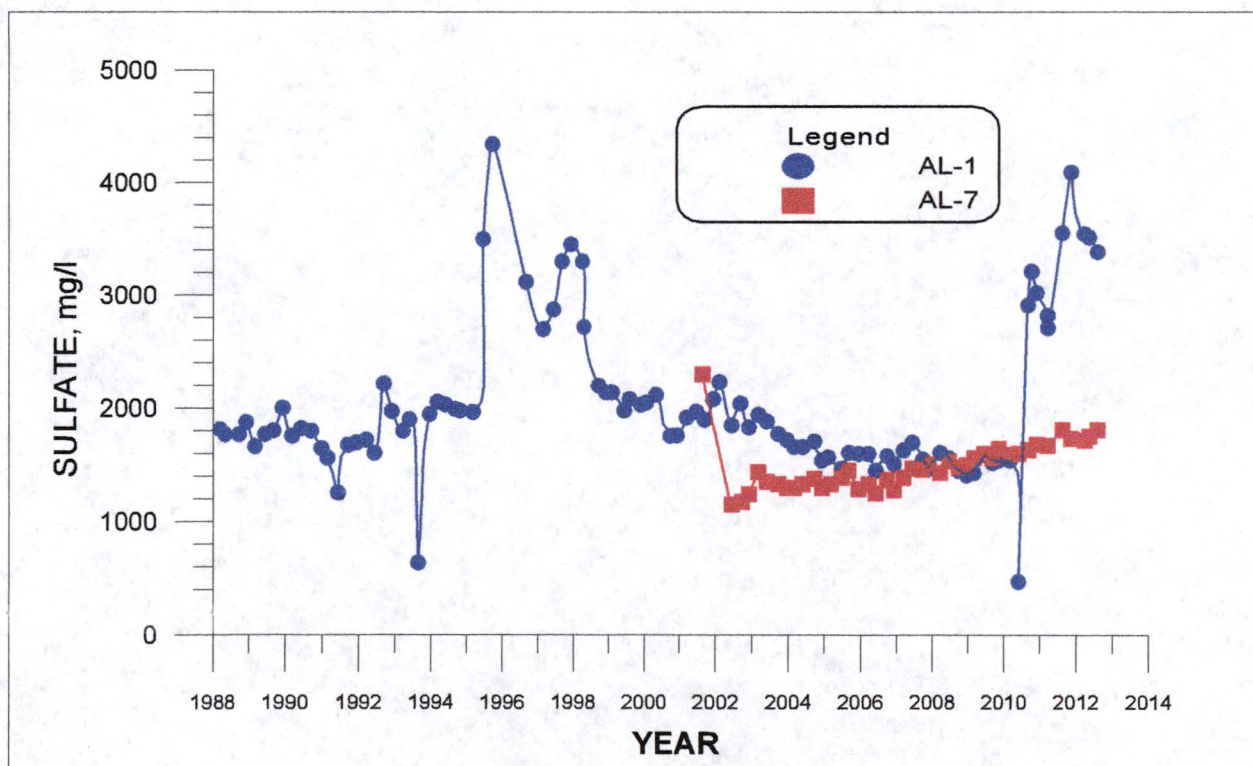
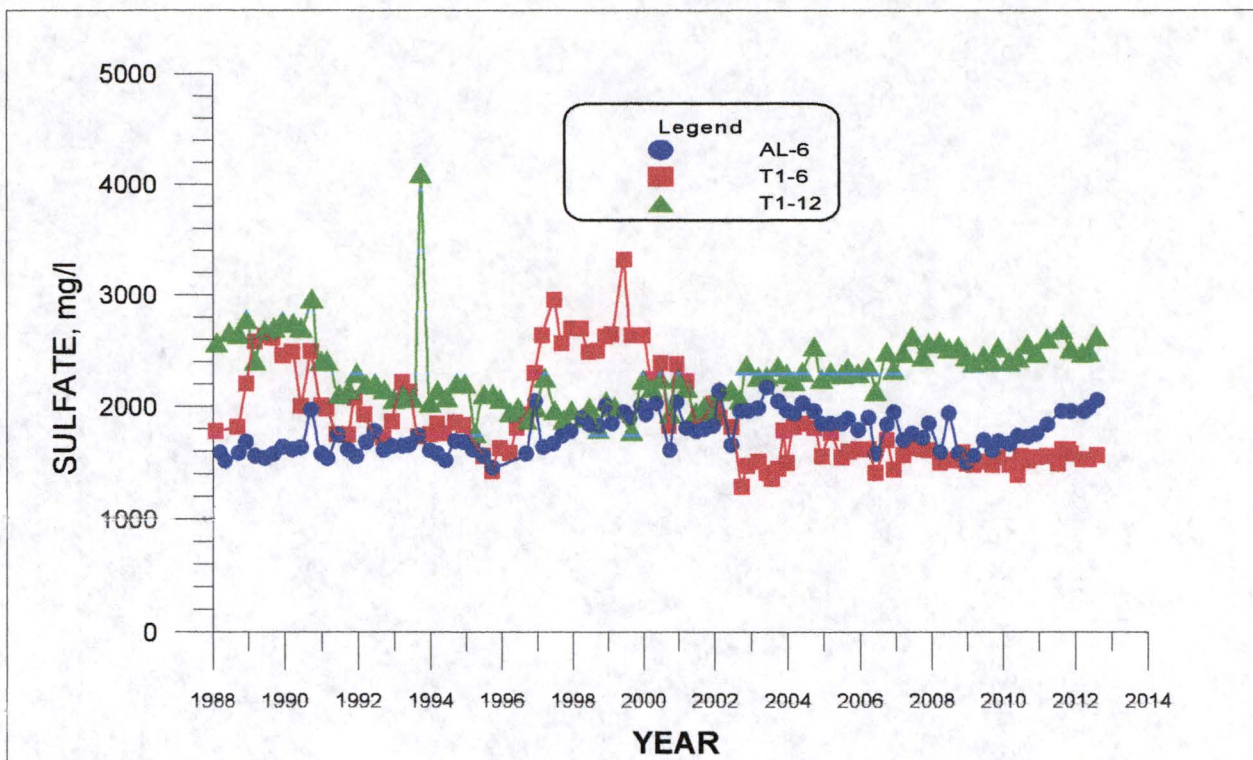


FIGURE 8. SULFATE CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

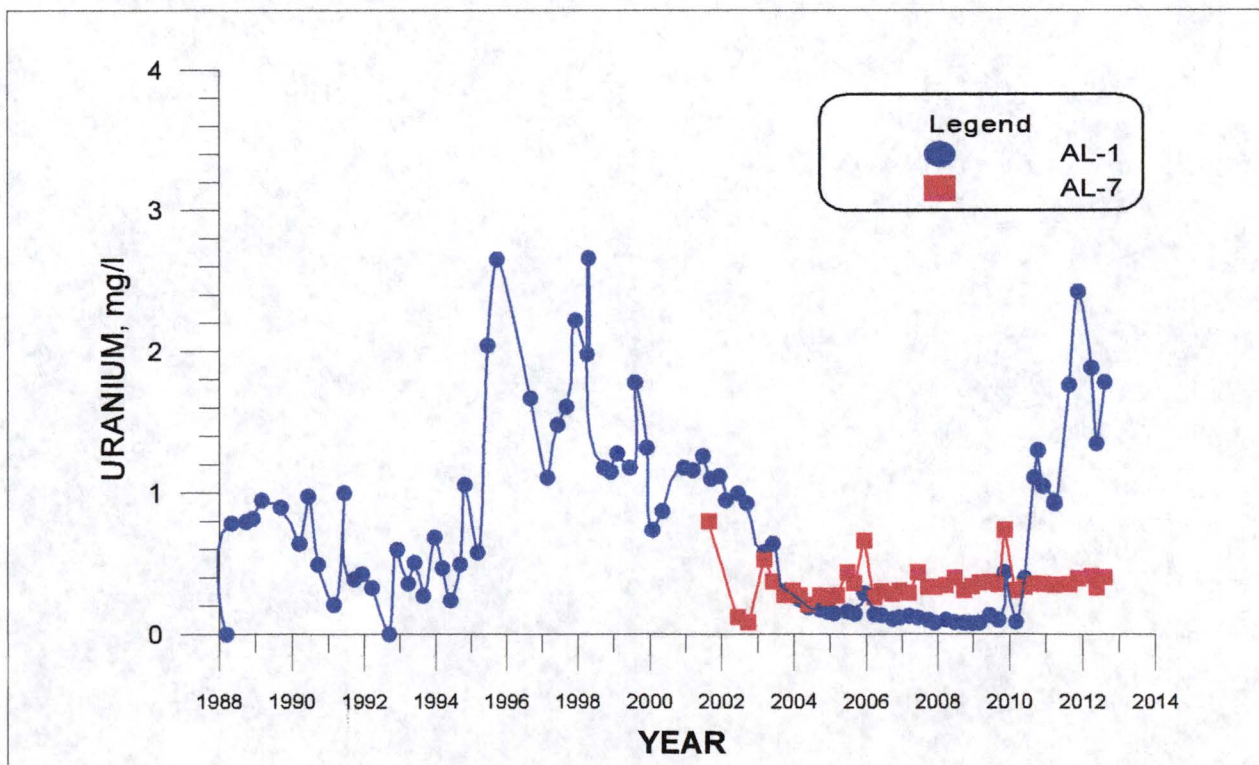
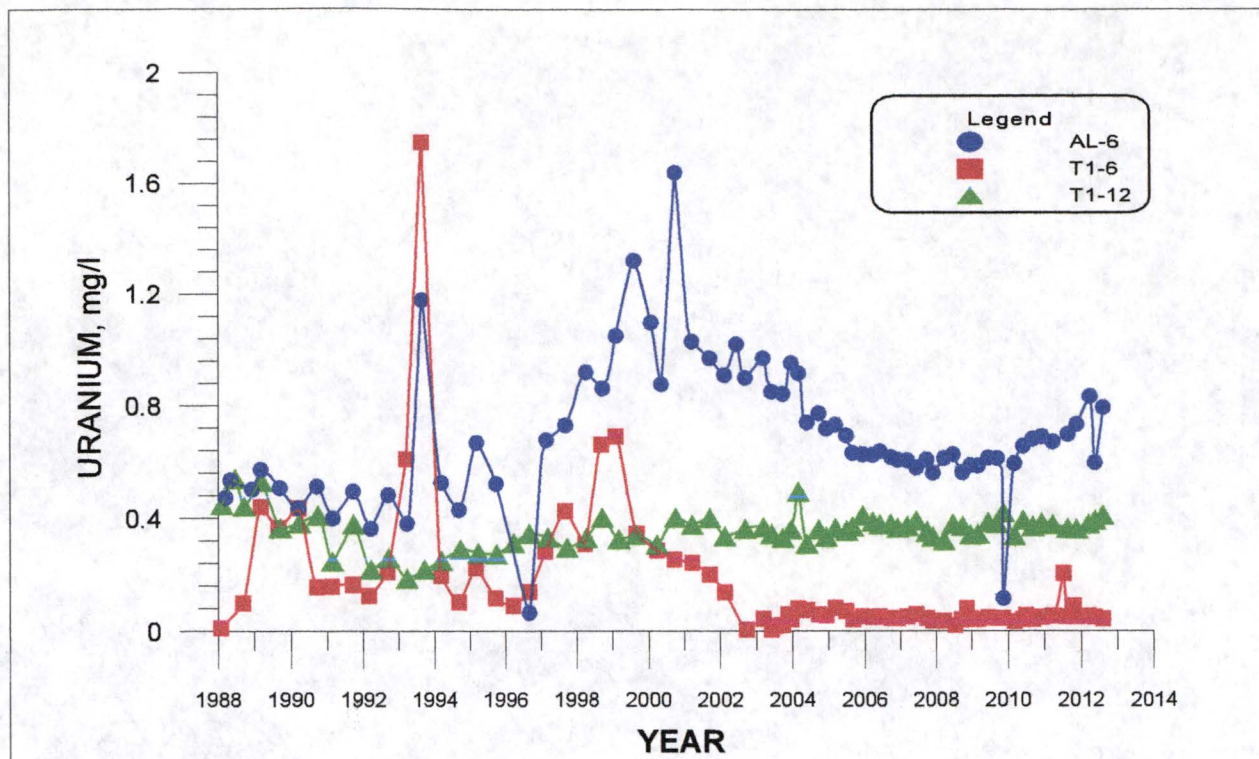
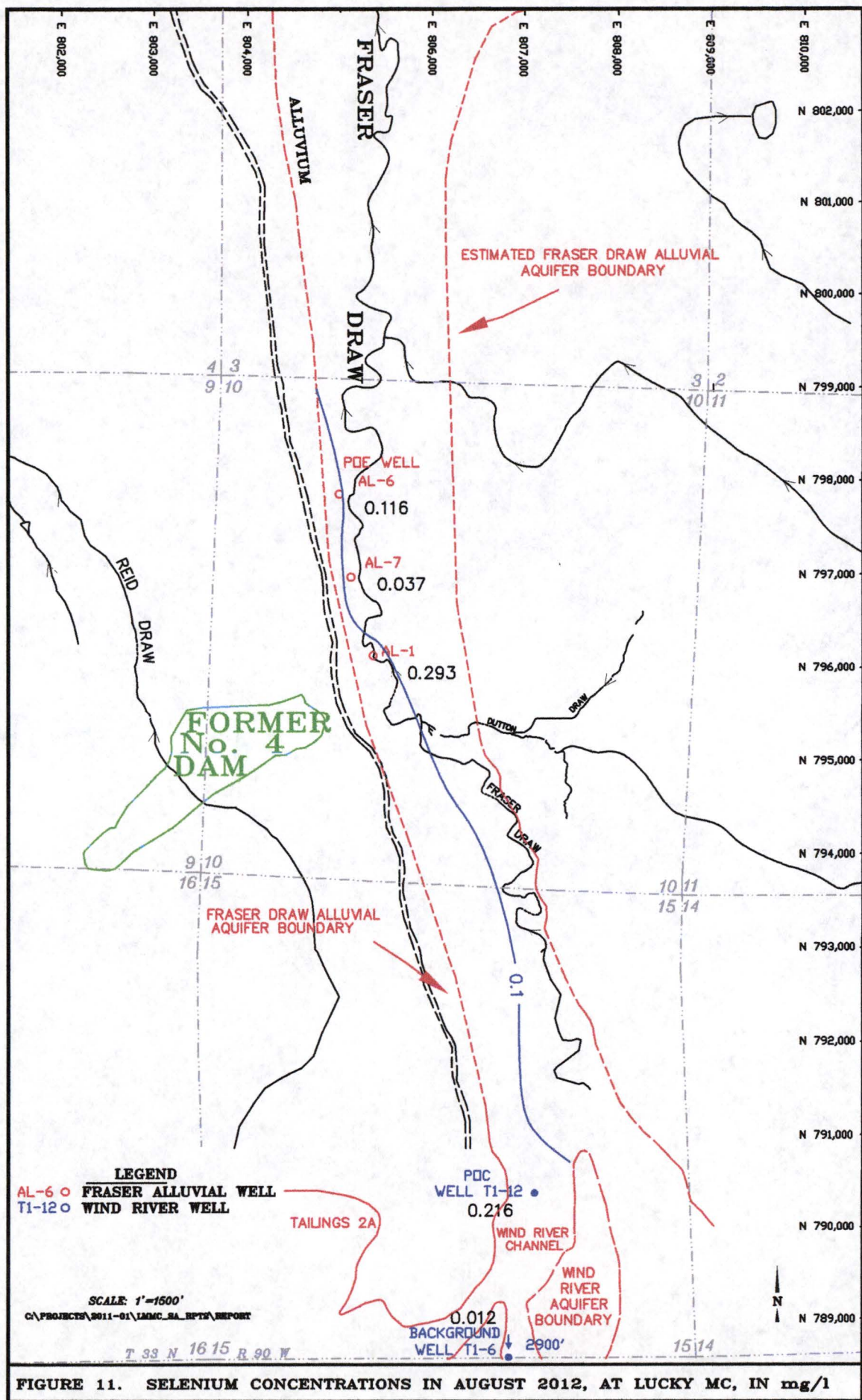


FIGURE 10. URANIUM CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.



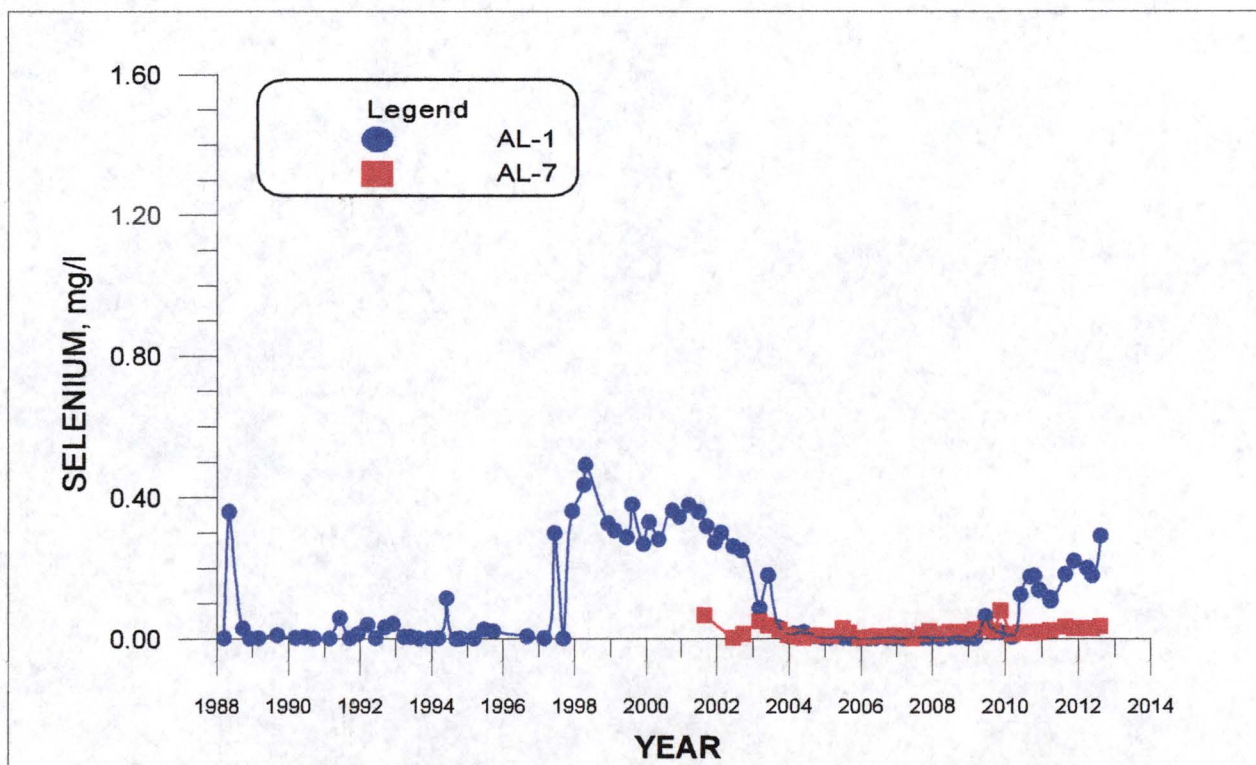
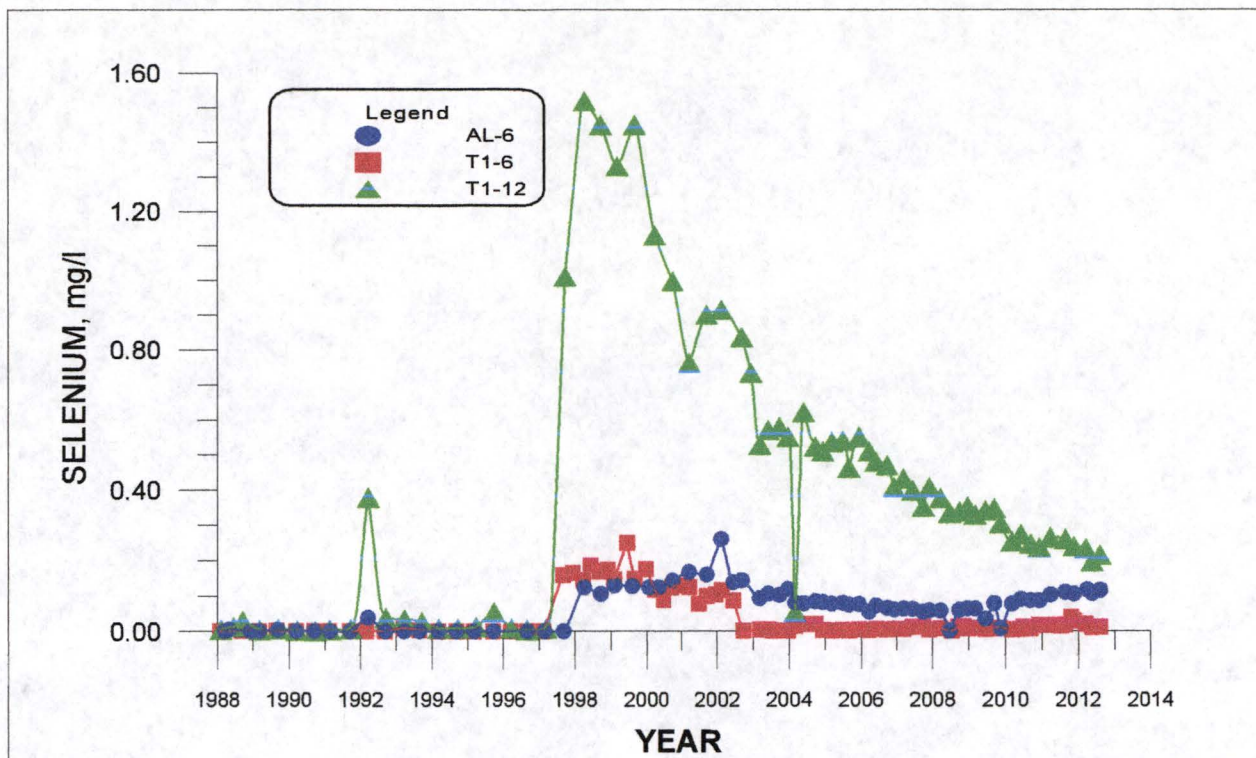
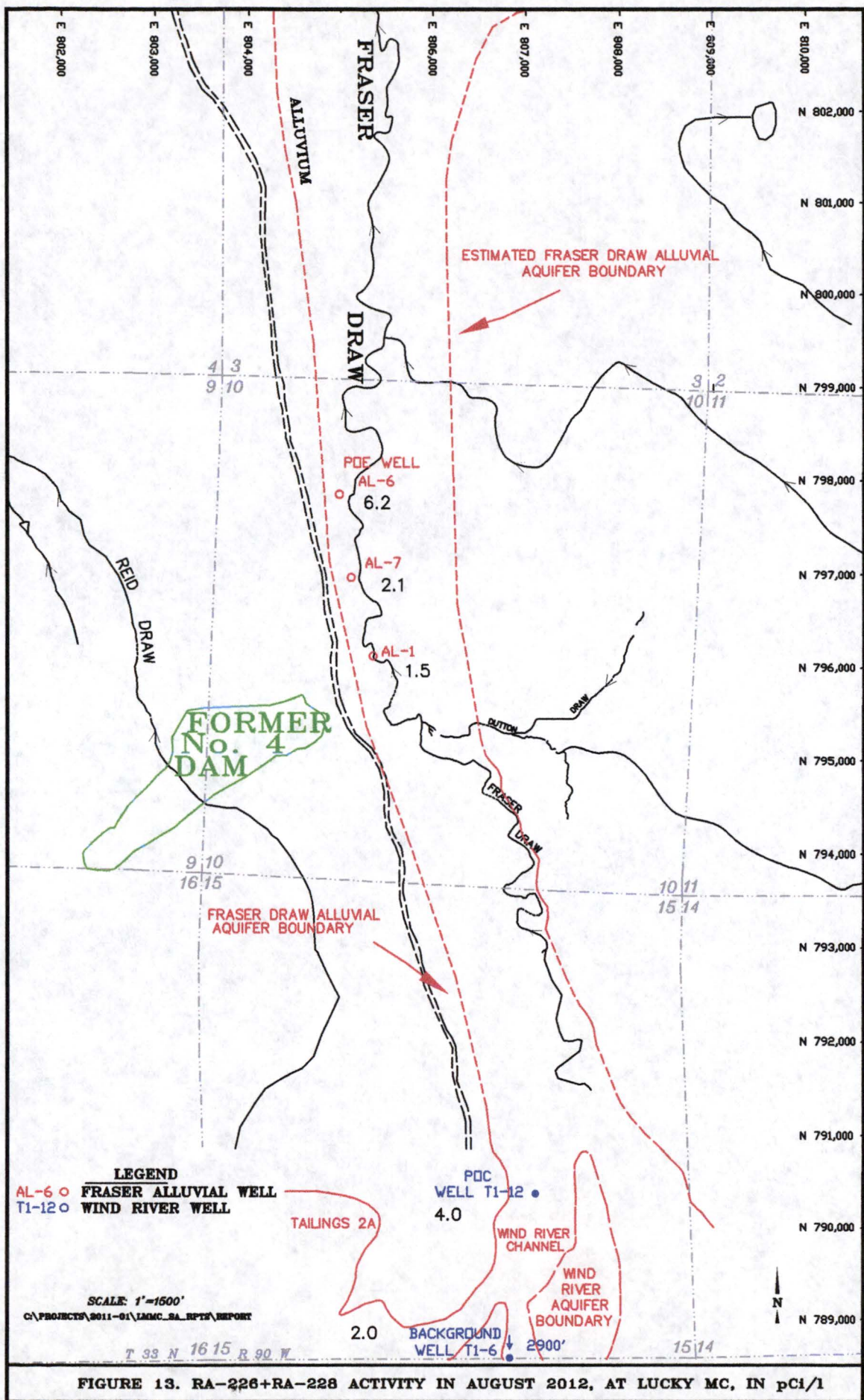


FIGURE 12. SELENIUM CONCENTRATIONS VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.



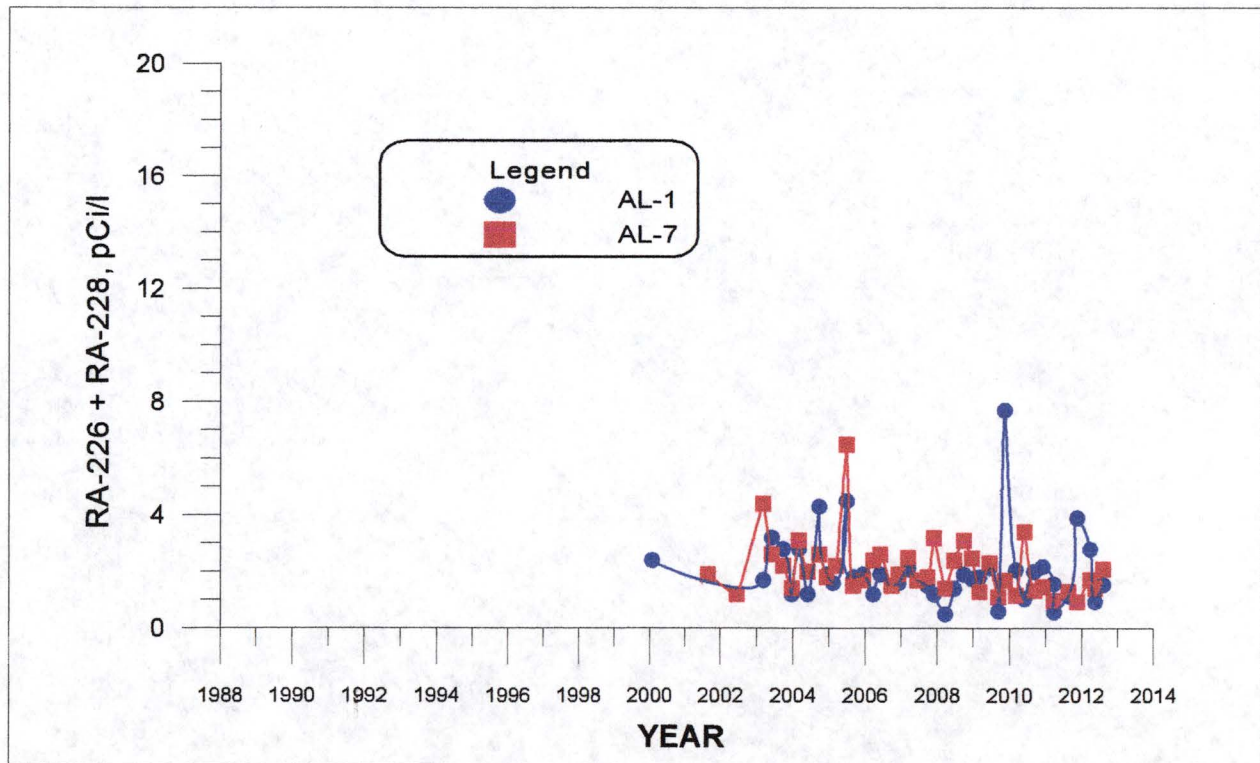
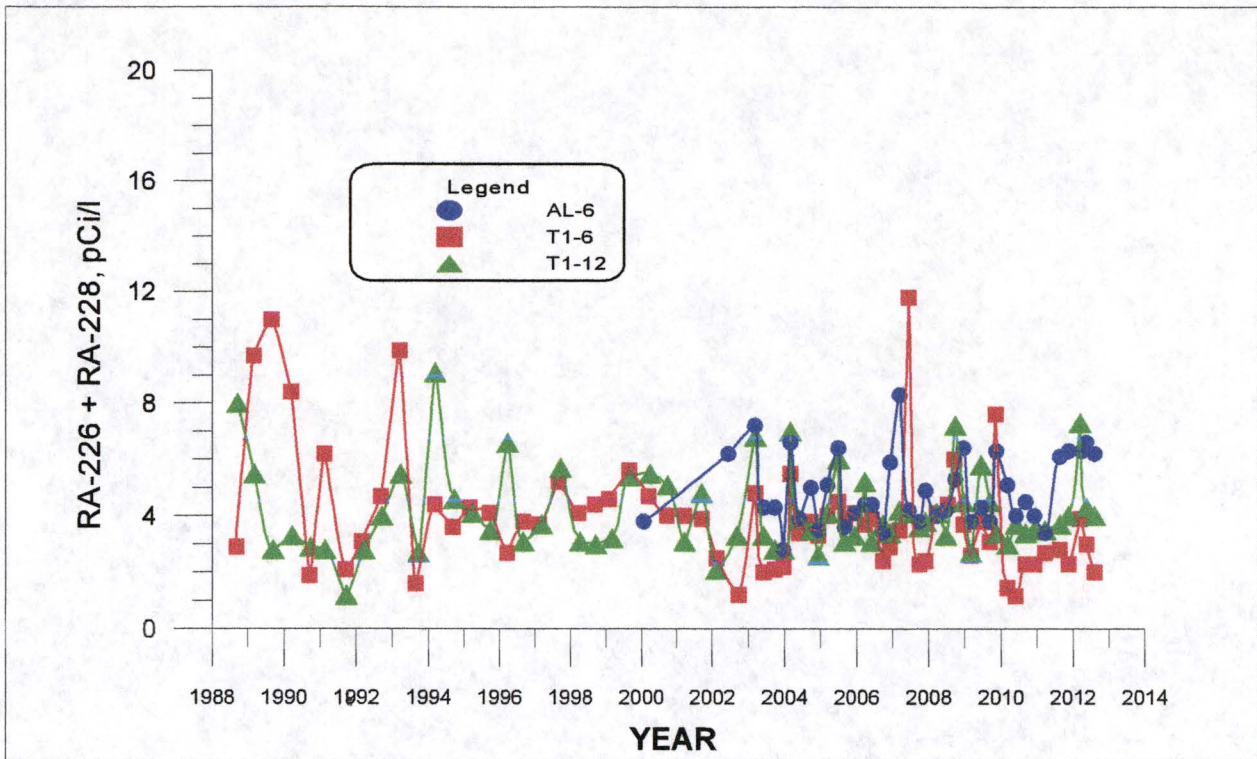


FIGURE 14. RADIUM-226 + RADIUM-228 ACTIVITY VERSUS TIME FOR WELLS T1-6, T1-12, AL-1, AL-6 AND AL-7.

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 | --- | --- | --- | --- | --- |
| | 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 |
| 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 | --- | --- | --- | --- | --- |
| | 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 |
| 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 | --- | --- | --- | --- | --- |
| | 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 |

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 | 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 |
| 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 | — | — | — | — | — |
| | 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 |
| 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 | — | — | — | — | — |
| | 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 |

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 |
| | 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 |
| 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 |
| | 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 |
| 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 |
| | 8/18/2011 | 0.050 | ± 0.1 | 0.8 | ± 0.2 | 0.5 | ± 0.6 | 1.3 |
| | 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 |
| T1-6 | 3/3/2009 | -0.020 | ± 0.1 | 1.8 | ± 0.3 | 0.8 | ± 0.6 | 2.6 |

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) |
|-------------------|------------|---------------|------------------|---------------|------------------|---------------|------------------|---------------------|
| T1-6 | 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 |
| | 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 |
| 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 |
| | 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 |

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 |
| | 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 |
| 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 |
| | 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 |
| 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 |
| | 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 |

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) |
|-------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 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 |
| | 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 |
| 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 |
| | 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 |