Rio Algom Mining LLC

January 31, 2012

Certified Mail
Return Receipt (7010 1870 0000 3702 9405)

Mr. Tom McLaughlin, Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
Washington, DC 20555

Re: **Ambrosia Lake Facility**
License SUA-1473, Docket No. 40-8905
License Condition #34, Semiannual Groundwater Report

Dear Mr. McLaughlin,

Pursuant to license condition #34 of the above referenced license, please find attached the semiannual groundwater monitoring report for the above referenced facility for the second half of 2011.

This report describes the groundwater stability monitoring plan, as approved by Amendment #56.

A digital copy of the semiannual groundwater monitoring report is also included in the package.

If you have any questions concerning this submittal, please contact me at (505) 287-8851, extension 15.

Regards,

Chuck Wentz
Environmental Department Supervisor
Radiation Safety Officer

Attachment

cc: Document Control (NRC-MD)
J. Shoeppner (NMED-NM)
File

P.O. Box 218, Grants, NM USA 87020 - Tel: 505.287.8851 - Fax: 505.285.5550

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FSME

RIO ALGOM LLC
AMBROSIA LAKE FACILITY

License SUA-1473 Docket 40-8905

Groundwater Stability Monitoring Report

2nd Half 2011

January 30, 2012

RIO ALGOM MINING LLC
AMBROSIA LAKE FACILITY
GROUNDWATER STABILITY MONITORING REPORT – 2nd HALF 2011

Nuclear Regulatory Commission (NRC) source material license SUA-1473, condition #34(D), requires Rio Algom Mining LLC (RAM) to submit semi-annual groundwater monitoring reports associated with the facility's groundwater stability monitoring plan established by Amendment 56. Condition 34.D states:

> *Submit, by February 1 and August 1 of each year groundwater monitoring reports to include a minimum of the following: potentiometric surface maps for each aquifer; time vs. concentration plots for all parameters for which ACLs have been issued, hydrographs for the downgradient most trend well or POE well in each aquifer, hydraulic gradient calculations, and tabulated analytical data for each ACL parameter for each well.*

Background

RAM's Ambrosia Lake facility is located in McKinley County approximately 24 miles due north of Grants, New Mexico, in the Ambrosia Lake valley. Uranium milling activities started at the site in 1957. The waste management structures were Tailings Impoundments 1 and 2, Decantation Pond 3, and Evaporation Ponds 4 through 10. Tailings Impoundments 1 and 2 were built in late 1958, along with Pond 3 at the eastern toe of Tailings Impoundment 1, to accept decanted tailings liquids. Tailings were first produced at the site in November 1958. In 1976, RAM diverted the natural course of the Arroyo del Puerto east of Ponds 4, 5, and 6, and lined Ponds 9 and 10. The solids fraction was disposed through a slurry transfer system to the tailings impoundments, while the liquids fraction was transferred to the evaporation ponds. Evaporation pond residues from Ponds 3, 4, 5, 6, 7, and 8 were placed in Tailings Impoundments 1 and 2 prior to final reclamation. All the aforementioned tailings impoundments and ponds were unlined. Seepage from the tailings impoundments and Evaporation Ponds 3 through 6, along with seepage from unrelated mining and milling operations, has saturated and impacted the Alluvium of the Arroyo del Puerto (Alluvium). Seepage from the tailings impoundments and evaporation Ponds 7 and 8 has recharged and impacted the Tres

Hermanos B sandstones within the Mancos Formation shale, and the Dakota Sandstone, which underlies the Mancos Formation.

Consequently, in 1983, RAM entered into an Assurance of Discontinuance (AOD) with the State of New Mexico to minimize the future impact of mill tailings solutions seepage on groundwater. The approved AOD remedial action required the construction and maintenance of an interceptor trench (IT-1) and the cessation of discharges to unlined Ponds 4 through 8. These ponds were taken out of service in 1983. In the late 1990s, RAM added interceptor trenches IT-2, -3, and -4 south of Pond 10 to collect seepage potentially missed by IT-1.

In 1986, after the State of New Mexico relinquished its licensing authority over uranium mill activities, NRC reasserted jurisdiction at the site and required that the site begin a groundwater detection monitoring program. Data from this program were the basis for the groundwater protection standards (GWPSs) established for the site by NRC, and a corrective action program (CAP) for the groundwater was developed based on this information. The CAP required pumping and treating groundwater to remove certain constituents. RAM implemented the CAP beginning in the mid-1980s. This requirement was removed when the alternate concentration limit (ACL) petition was granted in 2005.

Mining and milling operations in the area have had two notable hydrologic effects: creation and maintenance of a saturated zone at the base of the Alluvium, and creation of a cone of groundwater depression in bedrock aquifers due to dewatering of underground mines. Water quality in the Alluvium and the units into which the Alluvium drains has also been affected by area mining operations not directly related to the licensee.

2nd Half 2011 Activities

Activities associated with the groundwater monitoring program at the mill facility during the second half of 2011 consisted of performing sampling pursuant to the approved groundwater stability monitoring plan. The well network was designed to track and assess groundwater contamination between the tailings impoundment and the long-term care boundary and point of exposure (POE). NRC required more frequent monitoring during the beginning of the compliance monitoring program because of uncertainties in the hydrogeologic and transport models. Contaminated groundwater will not express itself as surface water; therefore any exposure must occur through actual groundwater use. The approved ACLs for the site are presented in Table 1 below.

Table 1. Rio Algom Mining – Ambrosia Lake Operation
Approved Alternate Concentration Limits

Parameter	Dakota	Tres Hermanos A	Tres Hermanos B	Alluvium
U-nat (mg/L)	1.6	No ACL	1.6	23
Th-230 (pCi/L)	945	945	945	13,627
Ra-226 and -228 (pCi/L)	218	218	218	3,167
Pb-210 (pCi/L)	88	88	88	1,274
Gross Alpha (pCi/L)	No ACL	No ACL	No ACL	8,402
Molybdenum (mg/L)	No ACL	No ACL	No ACL	176
Nickel (mg/L)	6.8	No ACL	6.8	98
Selenium (mg/L)	No ACL	No ACL	No ACL	49
Chloride (mg/L)	3,200	1,070	2,810	7,110
Nitrate (mg/L)	22.8	9.2	7.7	351
Sulfate (mg/L)	6,480	2,584	4,760	12,000
Total Dissolved Solids (mg/L)	14,100	6,400	11,700	26,100

mg/L = milligrams per liter
pCi/L = Pico Curies/liter

Appendix 1 contains the analytical data for the Dakota, Tres Hermanos A, Tres Hermanos B, and Alluvial units, respectively. Appendix 2 contains the time versus concentration plots for the ACL parameters for the Dakota, Tres Hermanos A, Tres Hermanos B, and Alluvial units.

Appendix 3 contains the hydrographs for the most downgradient monitoring well for the Dakota, Tres Hermanos A, Tres Hermanos B, and Alluvial units. The most notable observation in the data is that the potentiometric surface in the Alluvium continues to decline. For example, RAM has observed a decline of over 25 feet at

monitoring well 32-69 since February of 2005. This drop is attributable to the discontinuance of the Alluvial CAP, which was maintaining the artificial water mound in the vicinity of the site. RAM's groundwater flow model projected a 65- to 100-year period for the Alluvium to dewater following cessation of the CAP. This water table drop acts to slow the lateral migration rate of milling-related seepage. The area with the greatest drop in potentiometric surface was the southeast region near the POE for the Alluvium.

RAM determined the hydraulic gradients by calculating the difference in groundwater elevation between the most upgradient point of compliance (POC) well in each unit and the farthest downgradient trend or POE well in the same unit. That value was then divided by the distance along a flow path between the two wells. Results of these calculations are summarized below:

- Dakota Sandstone – 0.033 feet per foot
- Tres Hermanos A Sandstone – 0.009 feet per foot
- Tres Hermanos B Sandstone – 0.019 feet per foot
- Alluvium – 0.007 feet per foot

Appendix 4 contains the potentiometric surface maps for the Dakota, Tres Hermanos A, Tres Hermanos B, and Alluvial units, respectively.

Data Evaluation

As a component of the ACL approval process, NRC not only established ACLs for specific parameters, but NRC also maintained the GWPSs for those constituents for which ACLs were not proposed. During the time from initial ACL submission for the bedrock units (February 2000) to ACL approval (2006), the site maintained the CAP. Review of the data has resulted in RAM informing NRC on November 9, 2006, of elevated beryllium concentrations within Dakota POC monitoring well 36-06KD. As a result of this condition, RAM submitted a proposed CAP on January 15, 2007, to address the beryllium concentrations present within monitoring well 36-06KD, which was approved by NRC on April 30, 2007.

RAM has discussed the changes in concentration in samples of groundwater from monitoring well 36-06KD during past meetings with NRC, and both parties concurred that fluctuations in well water quality appear to be linked to surface

reclamation work. The previously increasing trend in beryllium concentration correlated with surface field work in the vicinity of the well. During the last reporting period, that trend had leveled, and RAM anticipated that the concentration trend would begin to decline over time. RAM proposed to continue monthly monitoring of well 36-06KD for beryllium so that additional data will be available for evaluating the beryllium concentrations. The beryllium concentration in the samples of groundwater from monitoring well 36-06KD continues to exceed the GWPS of 0.01 mg/L. However, the current value of 0.019 mg/L continues a downward trend from a ten-year high of near 0.04 mg/L in April of 2007 (Figure 1 and Table 2).

Figure 1. Beryllium Concentrations in Dakota Monitor Well 36-06KD

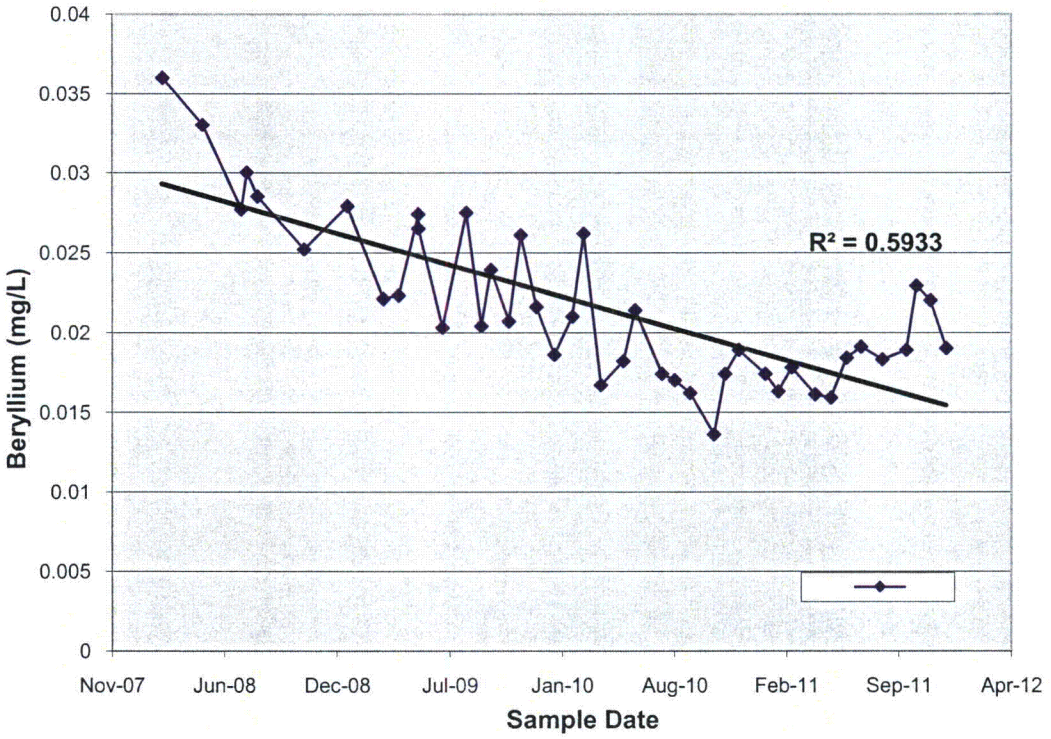
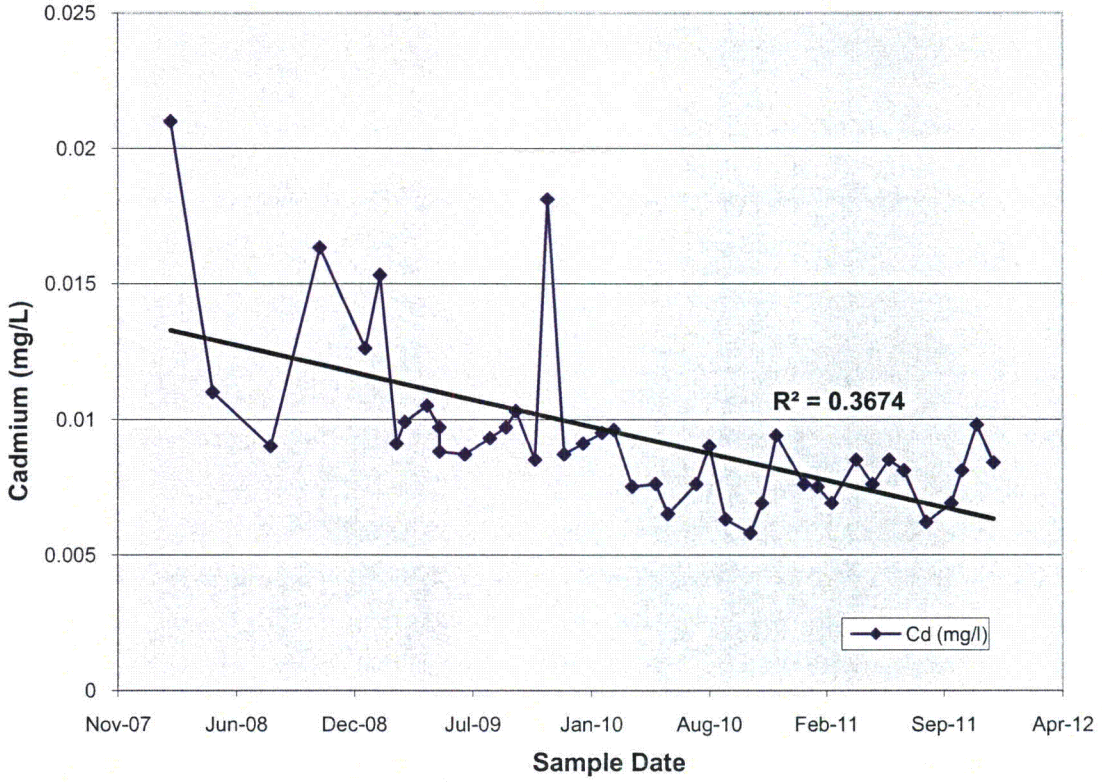


Table 2. 2nd Half 2011 Analytical Summary for Uranium in Monitoring Well 31-02 and Beryllium and Cadmium in Monitoring Well 36-06KD

Date	Well 31-02	Well 36-06KD	
	U-nat mg/L	Be mg/L	Cd mg/L
7/8/2011	3.31	0.0191	0.0081
8/15/2011	3.78	0.0183	0.0062
9/26/2011	4.27	0.0189	0.0069
10/14/2011	3.51	0.0229	0.0081
11/8/11	2.23	0.022	0.0098
12/6/2011	1.24	0.019	0.0084

Because of previous inadvertent omissions in reporting values that exceed a GWPS, in 2009 RAM instituted a policy of third-party review of laboratory data within five working days of receiving it. As a result of this policy, RAM was made aware that cadmium concentrations in the samples of groundwater from monitoring well 36-06KD had exceeded the GWPS of 0.01 mg/L during several sampling rounds beginning in November 2007 (Figure 2). Cadmium concentrations in monitoring well 36-06KD follow a pattern that is very similar to both uranium and beryllium concentrations in the same well. These constituents increase when pH decreases and decrease when pH increases. As with uranium and beryllium, cadmium concentrations are currently declining in monitoring well 36-06KD; the most recent sample was measured at 0.0084 mg/L (Figure 2 and Table 2), which is below the GWPS.

Figure 2. Cadmium Concentrations in Dakota Monitor Well 36-06KD.



As stated in the *Groundwater Stability Monitoring Report – 1st Half 2010,* RAM planned to discontinue monthly sampling and return to quarterly sampling of Tres Hermanos B monitoring well 31-02 in 2011. However, there has been a recent drop in water level and an increase in the concentrations for well 31-02. Uranium concentrations collected in July through November exceeded the ACL of 1.6 mg/L. To better understand these changes, additional evaluation may be required. It should be noted that concerns over the well's integrity have been raised as part of a review of the integrity of the entire monitoring network. The well is scheduled for replacement pending New Mexico Environment Department and NRC approval of the recently submitted well replacement work plan. RAM will continue to monitor monthly, and if it is determined the recent results are indicative of a trend, the site conditions will be evaluated to identify the cause of the recent changes.

In the first half of 2011, there were exceedences for calculated gross alpha in 31-67TRB, 36-02 TRB, and 33-01 TRA. Because calculated gross alpha concentrations

exceeded the GWPS in background, and because of the unusual number of concentrations exceeding a GWPS, these concentrations were suspected to result from laboratory error. Confirmation sampling was completed and there have not been exceedences for calculated gross alpha concentrations in 31-67TRB, 36-02 TRB, or 33-01 TRA during the second half of 2011. Calculated gross alpha concentrations of 80.2 pCi/L in October and 237 pCi/L in December in well 36-06KD did exceed the GWPS of 56 pCi/L.

Conclusions

Based on the developments with monitoring well 36-06KD, RAM proposes to continue to conduct monthly sampling of the well for beryllium, cadmium, and gross alpha until the beryllium and cadmium concentrations clearly decrease to below 0.01 mg/L and gross alpha concentrations are below 56 pCi/L. Water levels will also be monitored to determine whether the water available within the Dakota formation is continuing to decline. Results of this test phase will be presented within the 1st half 2012 groundwater report. Based on the results of pending re-analysis of this well for gross alpha, RAM may institute monthly sampling for this constituent.

Because of water level decrease and increased uranium concentration levels in samples from Tres Hermanos B monitoring well 31-02, RAM will continue monthly sampling for uranium concentrations in this well.

APPENDIX 1

Stability Monitoring Plan
Analytical Results

RIO ALGOM MINING LLC
2ND HALF 2011
DAKOTA WELL RESULTS - ACL PARAMETERS

Well	Date	Depth To Water	Total Depth	Spec. (Cond.)	Temp C	pH	Chloride (mg/L)	Sulfate (mg/L)	T.D.S. (mg/L)	Nitrate (mg/L)
17-01KD	27-Sep-11	683.71	807.71	1477	19.7	9.62	43	650	1080	0.06
17-01KD	07-Nov-11	684.22	807.7	1482	19.7	9.89	41	670	1070	<0.02
30-02KD	26-Sep-11	310.17	313.43	7290	17.1	6.96	2300	1790	6070	0.16
30-02KD	14-Nov-11	311.37	313.4	Insufficient Water						
30-48KD	16-Sep-11	Dry	332.46							
30-48KD	15-Nov-11	Dry	332.4							
32-45KD	26-Sep-11	245.87	269.91	2020	15.6	7.26	180	740	1540	1.08
32-45KD	07-Nov-11	245.86	269.9	1918	12.9	6.89	170	730	1530	0.95
36-06KD	26-Sep-11	180.97	197.98	7310	15.7	3.72	1100	3900	7400	0.12
36-06KD	08-Nov-11	185.07	198	8320	12.3	3.03	1220	3900	7850	0.09
5-02KD	16-Sep-11	188.24	190.62	Insufficient Water						
5-02KD	15-Nov-11	187.99	190.62	Insufficient Water						
ACL							**3200**	**6480**	**14100**	**22.8**

Well	Date	Ni (mg/L)	U-nat (mg/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Ra-226+Ra-228 (pCi/L)
17-01KD	27-Sep-11	0.004	0.0003	0.05	1.6	0.68
17-01KD	07-Nov-11	<0.02	<0.003	-0.05	0.74	1.2
30-02KD	26-Sep-11	0.017	0.0013	0.02	0	1.52
30-02KD						
30-48KD						
30-48KD						
32-45KD	26-Sep-11	0.0009	0.0091	-0.17	0	0.92
32-45KD	07-Nov-11	0.0008	0.0151	-0.21	2.4	4.6
36-06KD	26-Sep-11	0.203	0.7635	45	0	19.7
36-06KD	08-Nov-11	0.217	0.8135	170	3.7	29
5-02KD						
5-02KD						
ACL		**6.8**	**1.6**	**945**	**88**	**218**

Well 30-48KD is dry.
Well 5-02KD did not have sufficient water to collect a sample.
Well 30-02KD did not have sufficient water to collect a sample during the November sampling event.
< = constituent was not detected above the method detection limit.

RIO ALGOM MINING LLC
2ND HALF 2011
TRA WELL RESULTS - ACL PARAMETERS

Well	Date	Depth To Water	Total Depth	Spec. (Cond.)	Temp C	pH	Chloride (mg/L)	Sulfate (mg/L)	T.D.S. (mg/L)	Nitrate (mg/L)
30-01	16-Sep-11	205.43	207.38	Insufficient Water						
30-01	15-Nov-11	205.28	207.38	Insufficient Water						
31-01	20-Sep-11	202.74	250	1796	15.2	7.63	44	630	1350	0.13
31-01	08-Nov-11	202.56	250.1	1687	13.2	7.77	38	540	1400	0.02
33-01TRA	19-Sep-11	119.05	181.03	3250	14.6	7.21	35	1800	2690	0.05
33-01TRA	09-Nov-11	119.87	181.03	3250	12.3	7.53	34	1720	2700	0.03
ACL							**1070**	**2584**	**6400**	**9.2**

Well	Date	Th-230 (pCi/L)	Pb-210 (pCi/L)	Ra-226+Ra-228 (pCi/L)
30-01				
30-01				
31-01	20-Sep-11	0.23	0	2.3
31-01	08-Nov-11	0.35	0.15	4.6
33-01TRA	19-Sep-11	0.03	0	1.1
33-01TRA	09-Nov-11	0.37	1.3	4.44
ACL		**945**	**88**	**218**

< = constituent was not detected above the method detection limit.
Well 30-01 contained insufficient water for sample collection.

RIO ALGOM MINING LLC
2ND HALF 2011
TRB WELL RESULTS - ACL PARAMETERS

Well	Date	Depth To Water	Total Depth	Spec. (Cond.)	Temp C	pH	Chloride (mg/L)	Sulfate (mg/L)	T.D.S. (mg/L)	Nitrate (mg/L)
19-77	19-Sep-11	272.11	287.95	4150	15.9	7.25	19	2200	3410	0.28
19-77	14-Nov-11	272.41	287.95	4300	14	7.24	19	2000	3440	0.26
31-02	20-Sep-11	88.01	124.31	5360	13.6	7.06	710	2400	4920	0.06
31-02	08-Nov-11	91.77	124.26	5210	12.5	7.16	620	2300	5100	0.06
31-67	19-Sep-11	29.82	97.25	6580	12.9	6.5	1030	3100	6390	<0.02
31-67	14-Nov-11	29.72	97.25	6470	11.3	6.65	960	2900	6480	0.03
36-01	16-Sep-11	58.02	58.41	Insufficient Water						
36-01	15-Nov-11	58.02	58.42	Insufficient Water						
36-02	19-Sep-11	43.15	57.36	9240	14.1	6.8	2500	3500	8560	1.98
36-02	08-Nov-11	43.24	57.36	9150	11.3	7.02	2380	2400	8490	0.07
ACL							**2810**	**4760**	**11700**	**7.7**

Well	Date	Ni (mg/L)	U-nat (mg/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Ra-226+Ra-228 (pCi/L)
19-77	40805.41667	0.004	0.0264	-0.02	1.8	1.01
19-77	14-Nov-11	0.002	0.0175	0.2	9.4	1.3
31-02	20-Sep-11	0.013	4.27	-0.11	0	2.17
31-02	08-Nov-11	0.004	2.23	0.09	0	4.9
31-67	19-Sep-11	0.018	0.0207	-0.03	0	9.4
31-67	14-Nov-11	0.005	0.0174	0.3	7.8	10.1
36-01						
36-01						
36-02	19-Sep-11	0.018	0.0176	0.19	0	1.69
36-02	08-Nov-11	0.007	0.0106	0.52	1	8.2
ACL		**6.8**	**1.6**	**945**	**88**	**218**

< = constituent was not detected above the method detection limit.
Monitor Well 36-01 was dry or contained insufficient water for sample collection.

RIO ALGOM MINING LLC
2ND HALF 2011
ALLUVIAL WELL RESULTS - ACL PARAMETERS

Well	Date	Depth To Water	Total Depth	Spec. (Cond.)	Temp C	pH	Chloride (mg/L)	Sulfate (mg/L)	T.D.S. (mg/L)	Nitrate (mg/L)
5-73	40799	16.76	31.41	7070	12.6	7.01	1760	1700	5270	0.57
5-73	15-Nov-11	16.84	31.38	6190	12.2	7.17	1740	1700	5040	0.48
5-03	13-Sep-11	24.37	41.45	4580	13	8.46	500	1850	3640	0.02
5-03	15-Nov-11	24.75	41.45	4070	12.2	7.21	500	1820	3300	<0.02
5-04	13-Sep-11	20.99	63.95	5600	13.1	7.28	780	2800	4930	0.03
5-04	15-Nov-11	21.13	63.91	5040	12.9	6.87	810	2700	4790	0.06
5-08	13-Sep-11	30.61	87.15	4030	14.2	6.56	440	1810	3420	0.09
5-08	15-Nov-11	30.68	87.15	3720	11.7	6.44	430	1800	3340	0.11
31-61	13-Sep-11	13.86	29.25	14250	14.1	6.24	2370	6200	14200	2.71
31-61	15-Nov-11	14.13	29.25	12430	13.1	6.3	2500	5900	12900	1.7
31-65	13-Sep-11	15.81	46.01	13000	12.8	6.24	2210	5800	13500	0.09
31-65	14-Nov-11	16.19	46	11670	12.1	6.33	2300	5500	13000	0.02
32-59	13-Sep-11	18.28	28.02	5400	13.3	7.03	590	2600	4770	0.38
32-59	15-Nov-11	18.54	28.02	4910	12	7.23	610	2200	4590	0.36
MW-24	16-Sep-11	Dry	50.14							
MW-24	15-Nov-11	Dry	50.1							
ACL							**7110**	**12000**	**26100**	**351**

< = constituent was not detected above the method detection limit.
Monitor Well MW-24 was dry.

RIO ALGOM MINING LLC
2ND HALF 2011
ALLUVIAL WELL RESULTS - ACL PARAMETERS

Well	Date	Mo (mg/L)	Ni (mg/L)	Se (mg/L)	U-nat (mg/L)	Th-230 (pCi/L)	Pb-210 (pCi/L)	Ra-226+Ra-228 (pCi/L)	Gross Alpha (pCi/L)
5-73	13-Sep-11	0.003	0.041	<0.001	0.2732	0.32	0	1.96	79
5-73	15-Nov-11	<0.003	0.004	<0.001	0.1621	-0.22	26	1.66	75
5-03	13-Sep-11	<0.001	0.012	<0.001	0.0057	-0.09	1.5	1.53	7.1
5-03	15-Nov-11	<0.001	<0.001	<0.001	0.0008	-0.34	0	2.12	6.9
5-04	13-Sep-11	<0.003	0.014	<0.001	0.018	0.14	0	1.54	12
5-04	15-Nov-11	<0.003	<0.003	<0.001	0.003	0.85	13	1.26	19
5-08	13-Sep-11	0.004	0.019	<0.001	0.0059	0.32	0	13.2	32
5-08	15-Nov-11	0.002	<0.001	<0.001	0.0049	0.1	1.4	9.8	45
31-61	13-Sep-11	<0.005	0.086	0.003	0.56	-0.05	3.1	2.82	290
31-61	15-Nov-11	<0.005	0.047	0.0027	0.441	-0.14	0	2.31	210
31-65	13-Sep-11	<0.005	0.1	<0.001	0.113	-0.41	0	0.67	70
31-65	14-Nov-11	<0.005	0.059	0.0011	0.089	0.24	30	2.3	89
32-59	13-Sep-11	0.006	0.027	0.015	0.1567	-0.13	0.22	0.78	58
32-59	15-Nov-11	0.005	<0.003	0.0159	0.1396	-0.26	9.4	0.4	98
MW-24									
MW-24									
ACL		**176**	**98**	**49**	**23**	**13627**	**1274**	**3167**	**8402**

< = constituent was not detected above the method detection limit.
Monitor Well MW-24 was dry.

APPENDIX 2

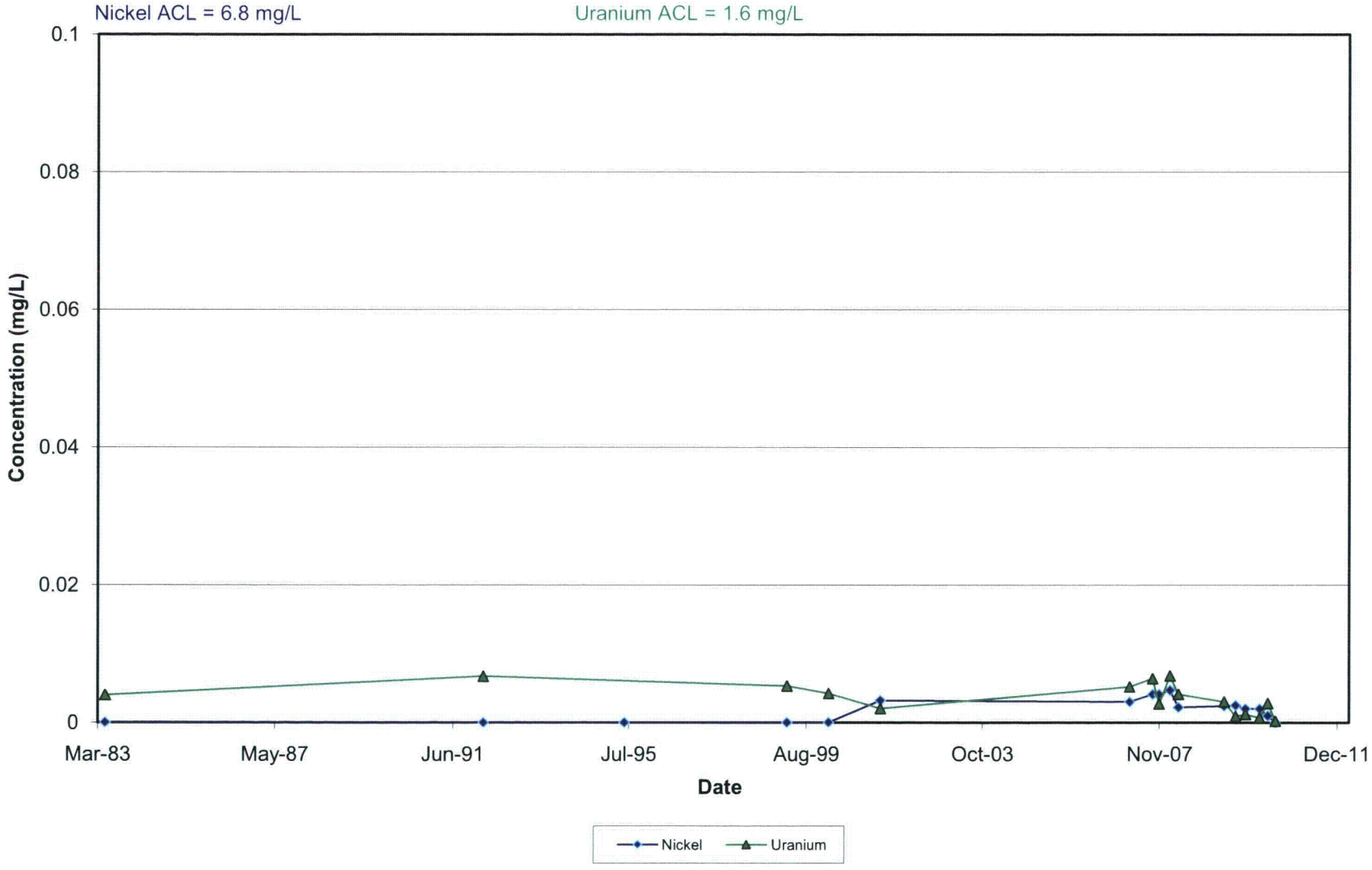
Stability Monitoring Plan
Time Versus Concentration Plots

Stability Monitoring Plan
Time Versus Concentration Plots

Dakota

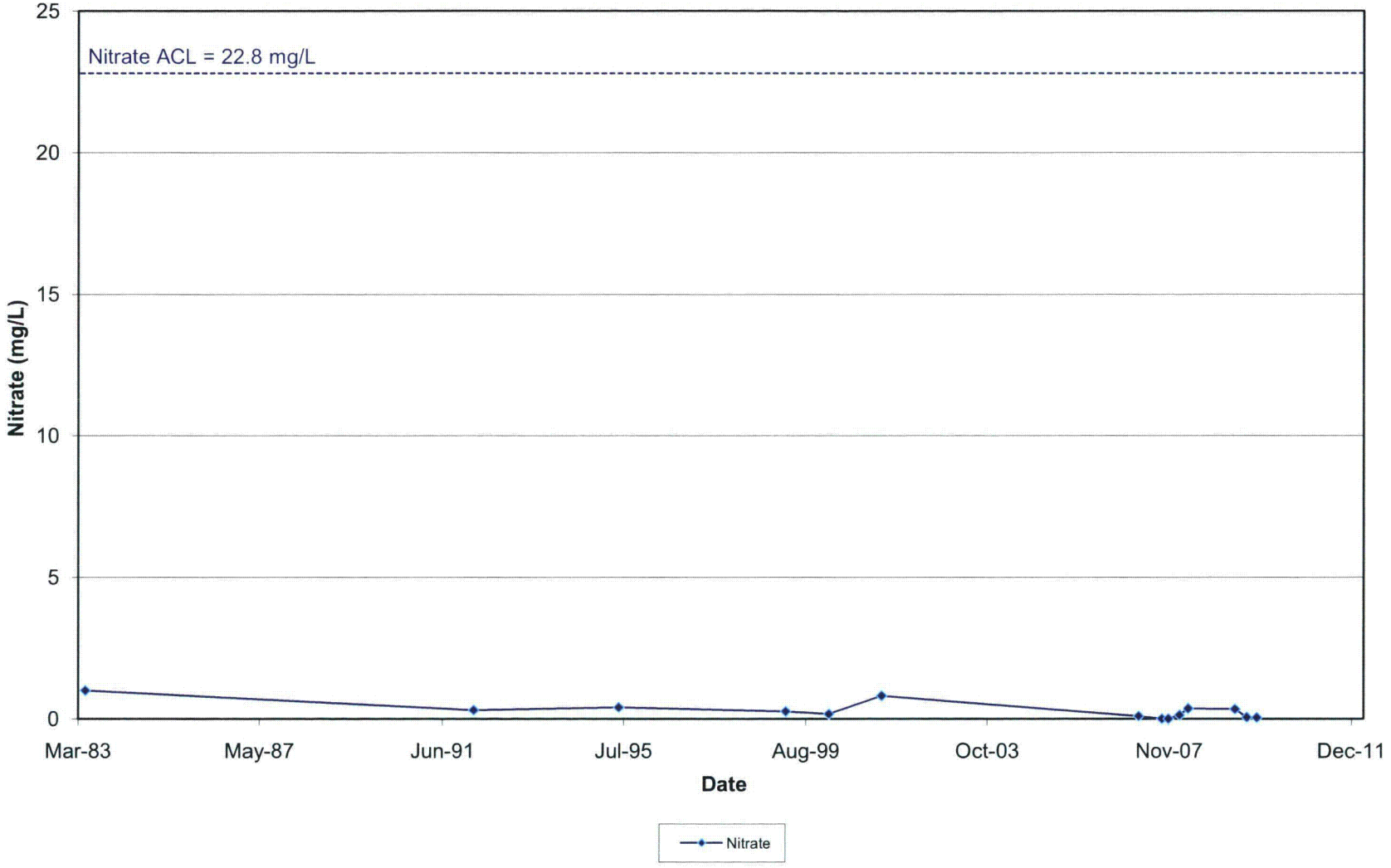
Anions and TDS in Monitoring Well 5-02KD

Metals in Monitoring Well 5-02KD

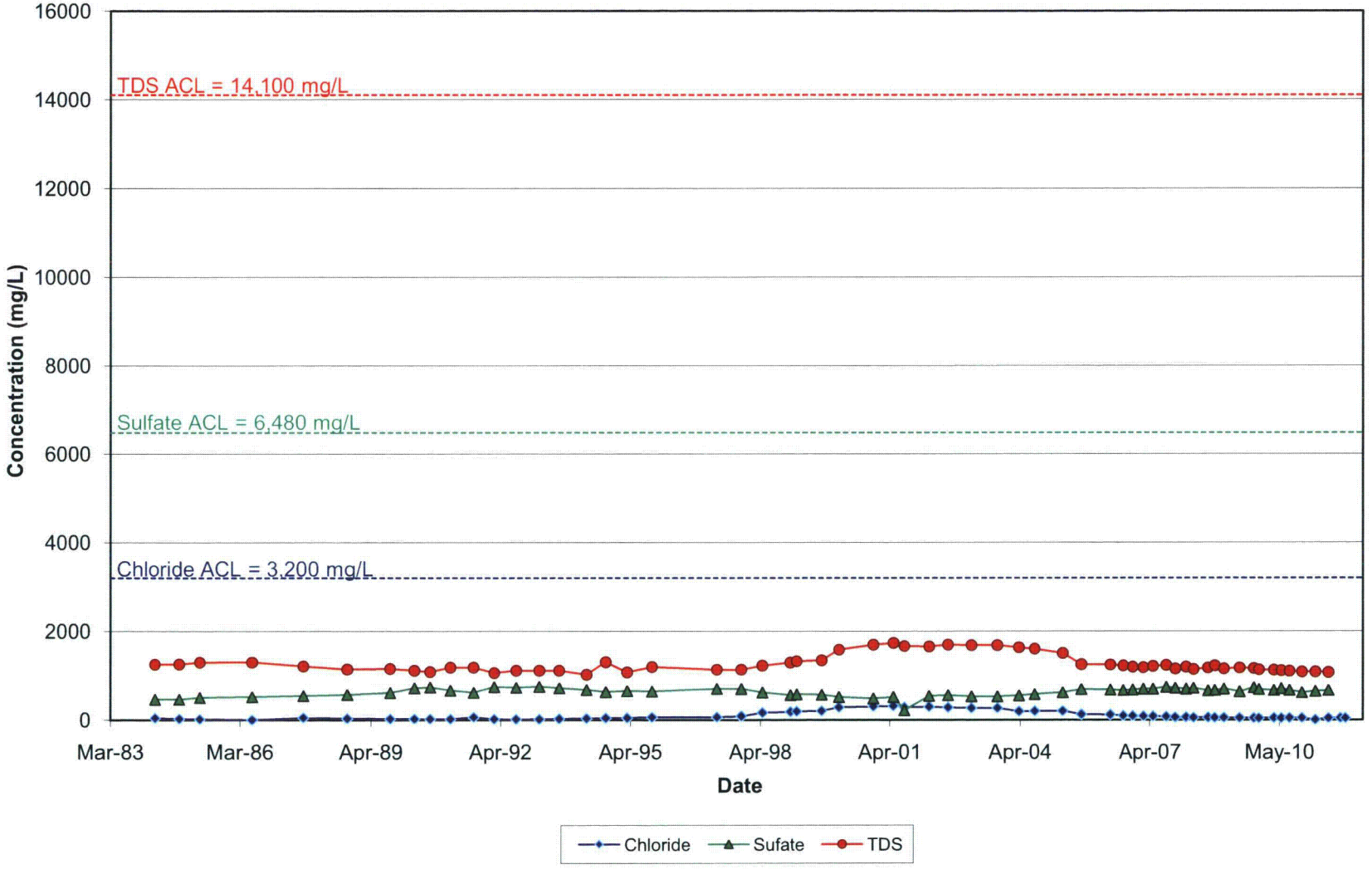


Radionuclides in Monitoring Well 5-02KD

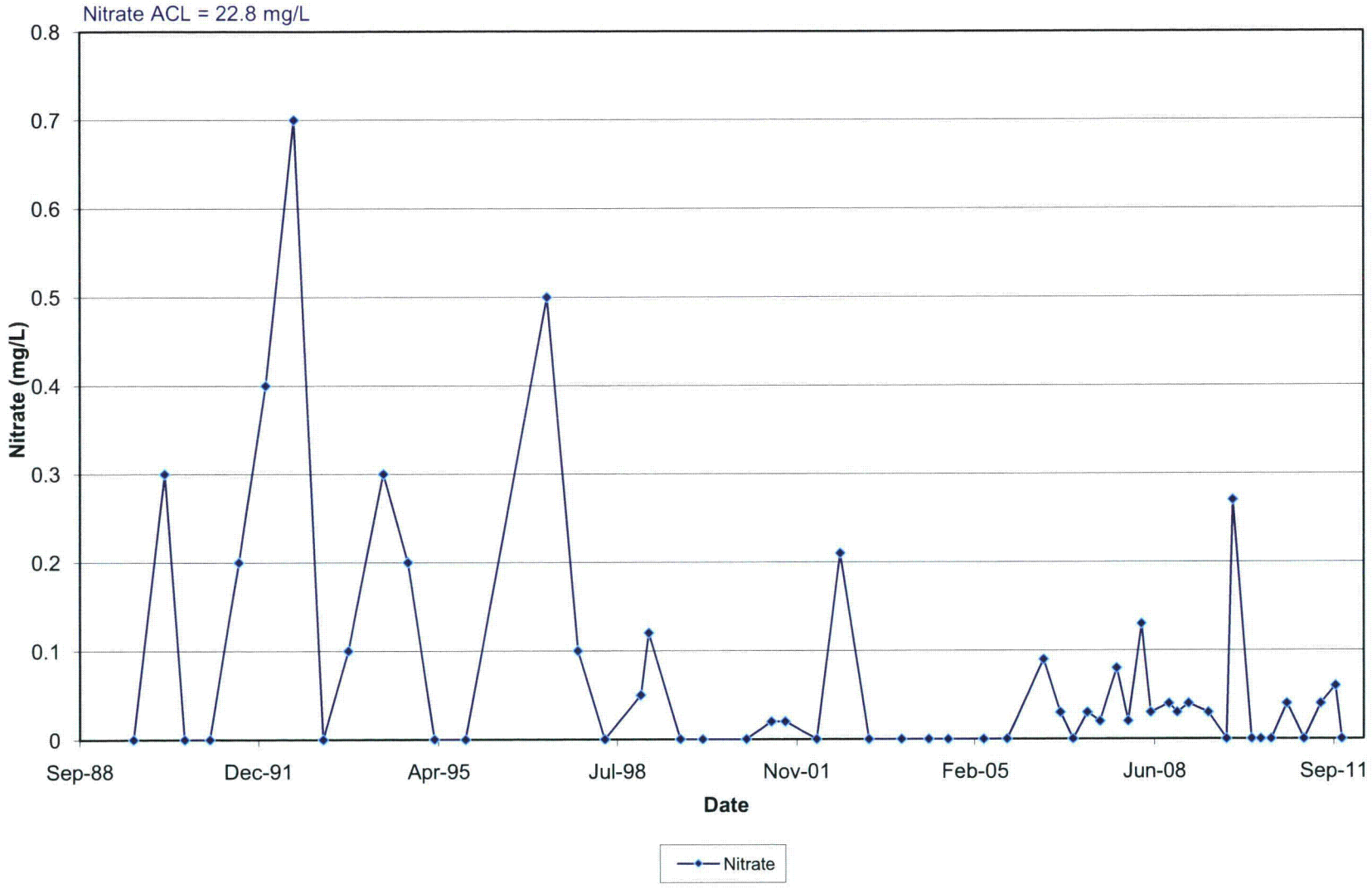
Nitrate in Monitoring Well 5-02KD



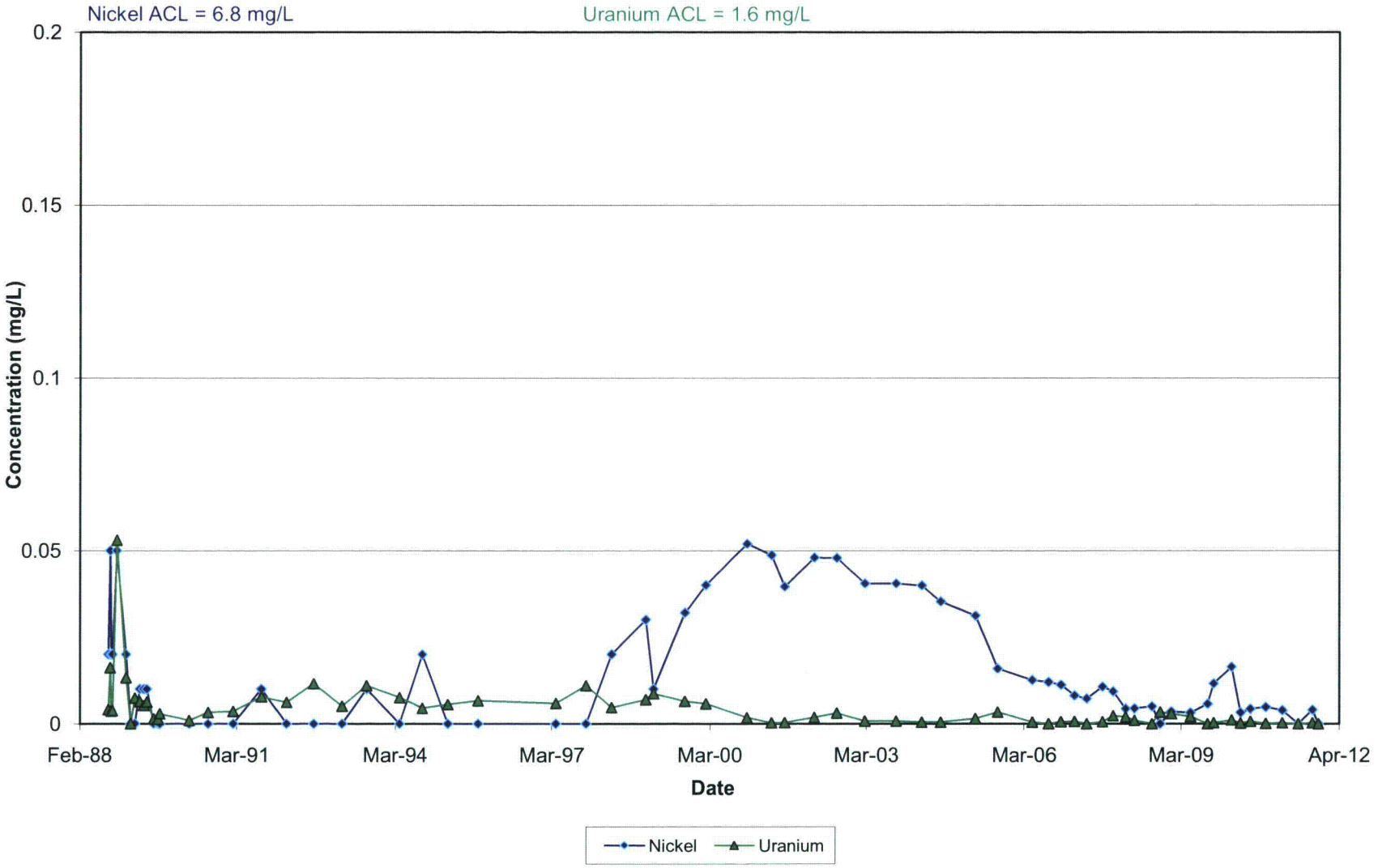
Anions and TDS in Monitoring Well 17-01KD



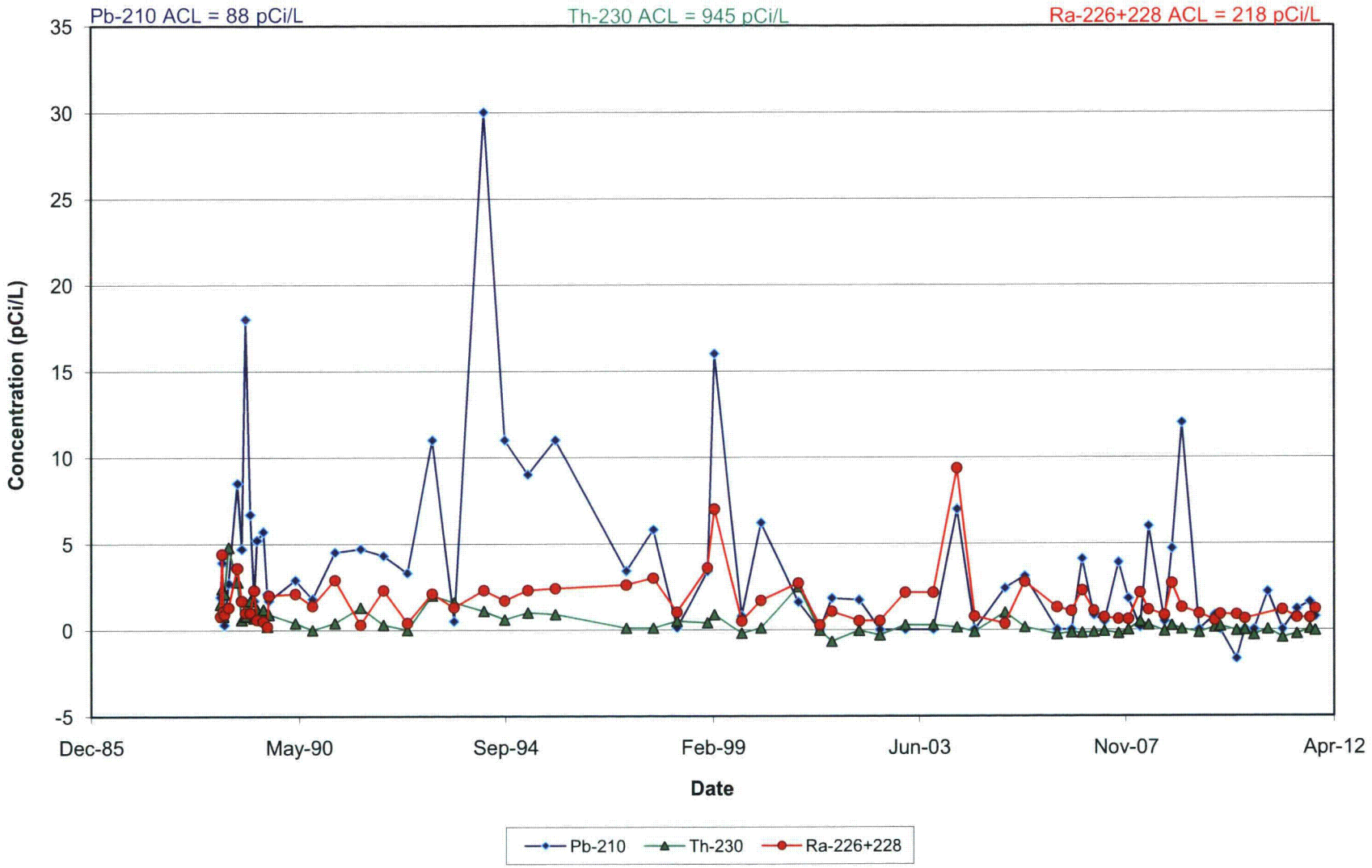
Nitrate in Monitoring Well 17-01KD



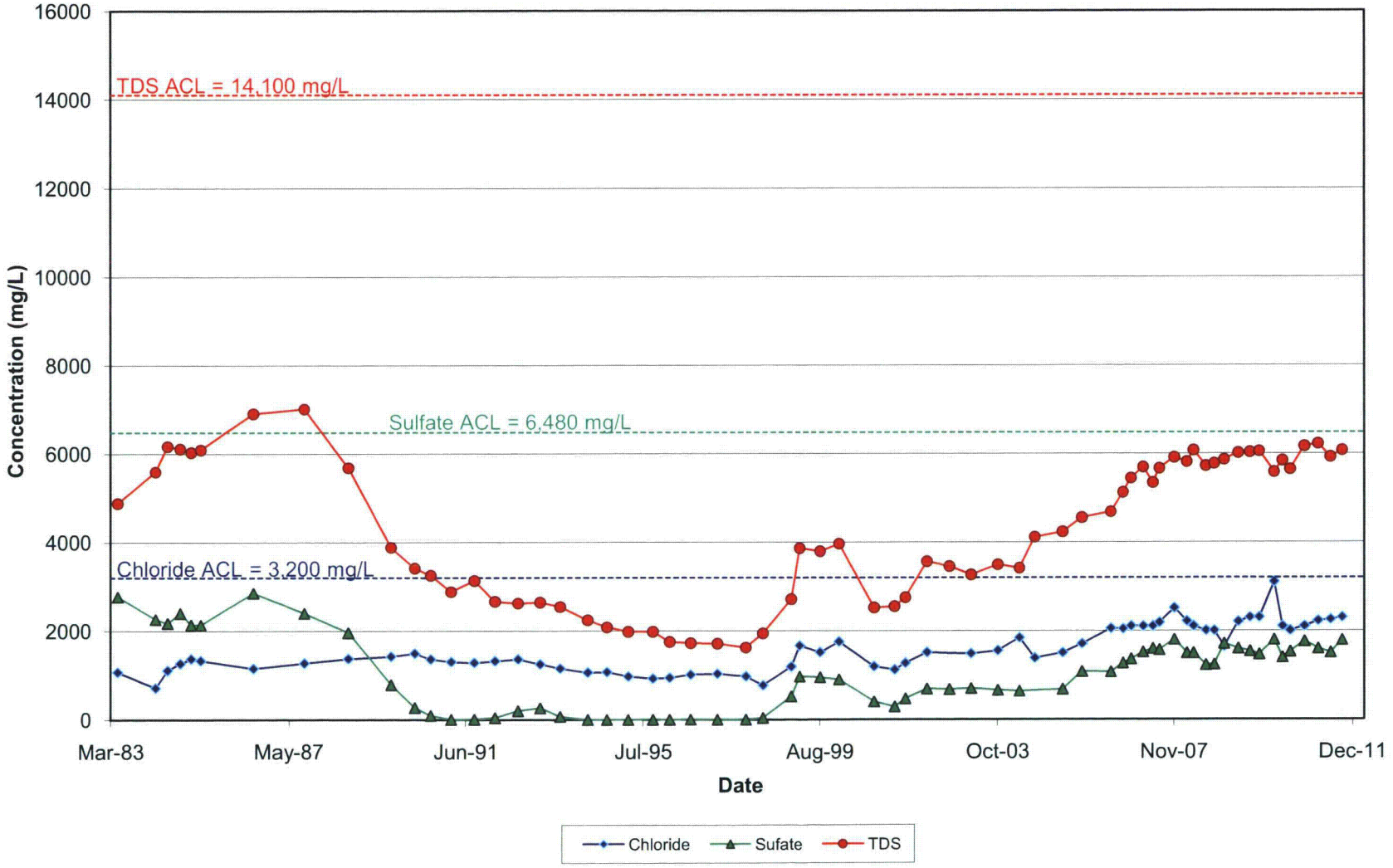
Metals in Monitoring Well 17-01KD



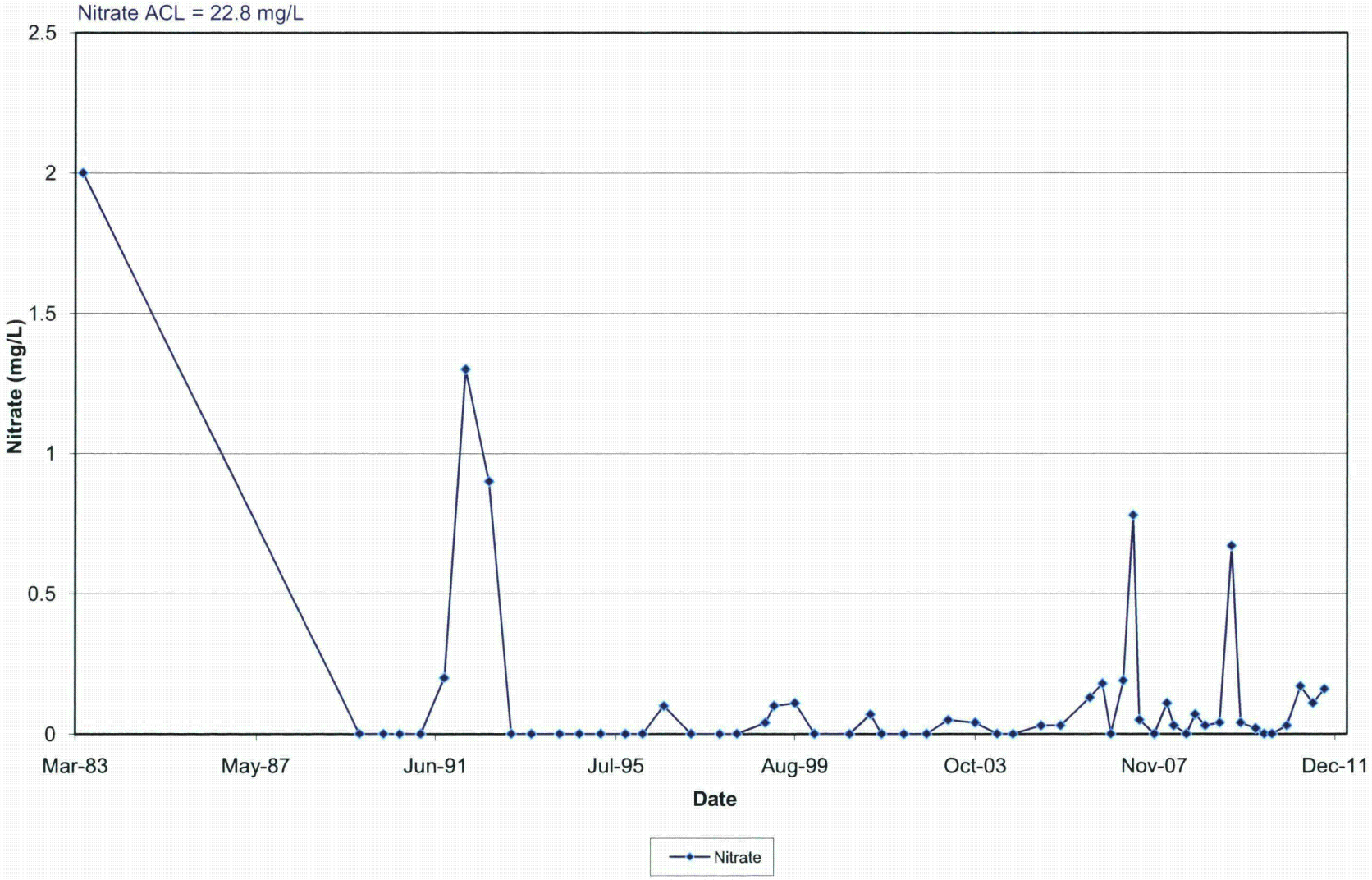
Radionuclides in Monitoring Well 17-01KD



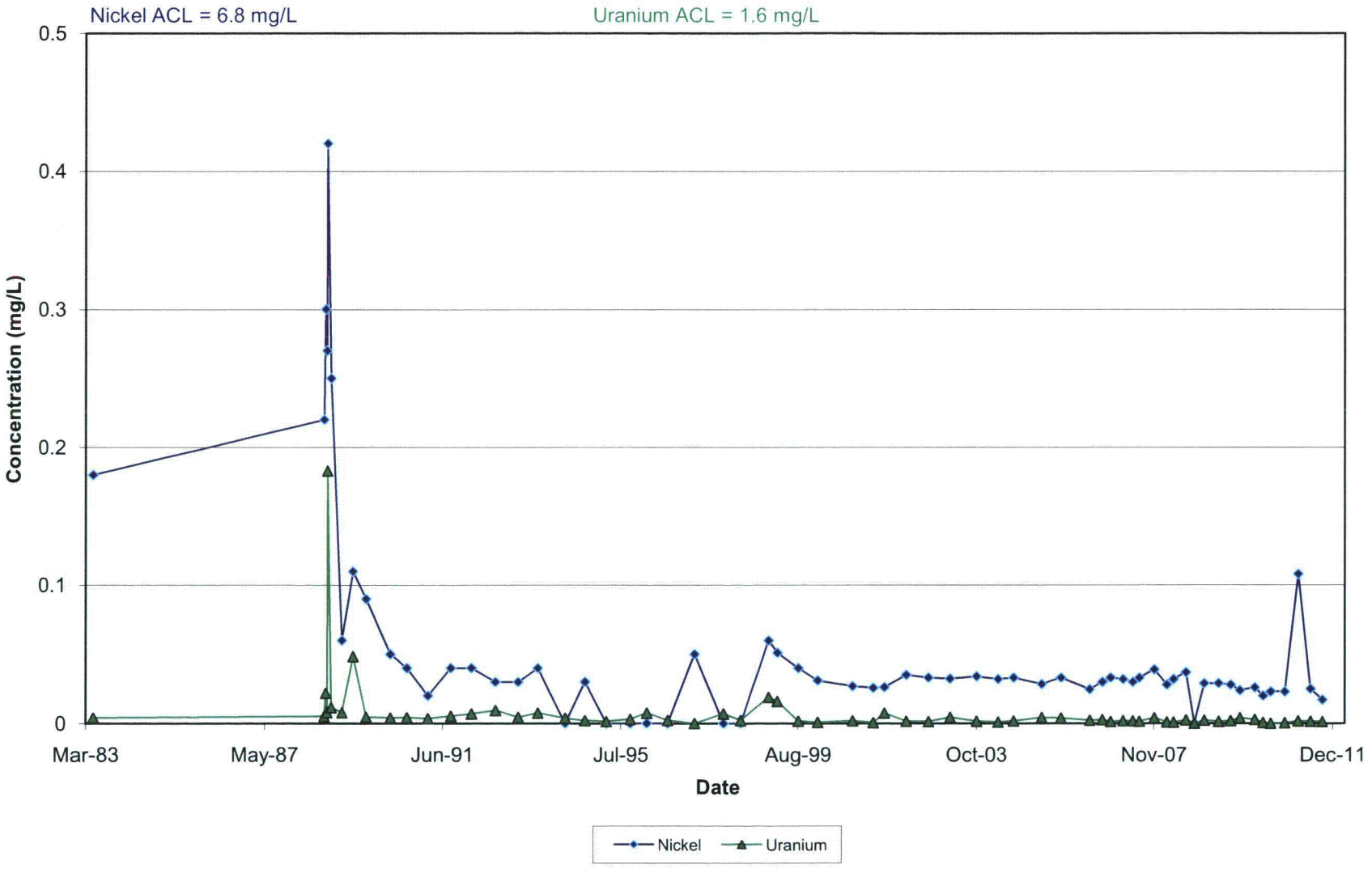
Anions and TDS in Monitoring Well 30-02KD



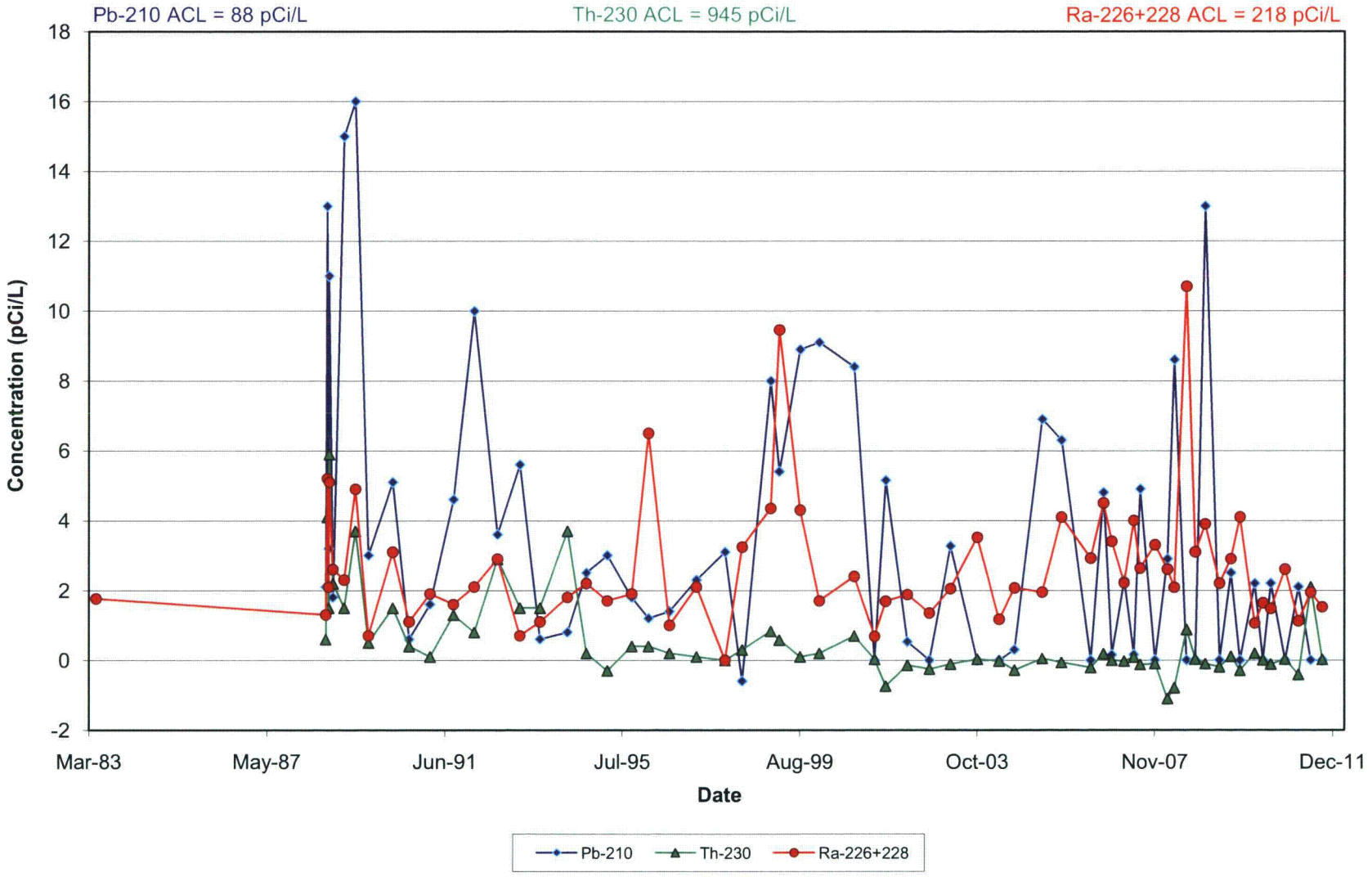
Nitrate in Monitoring Well 30-02KD



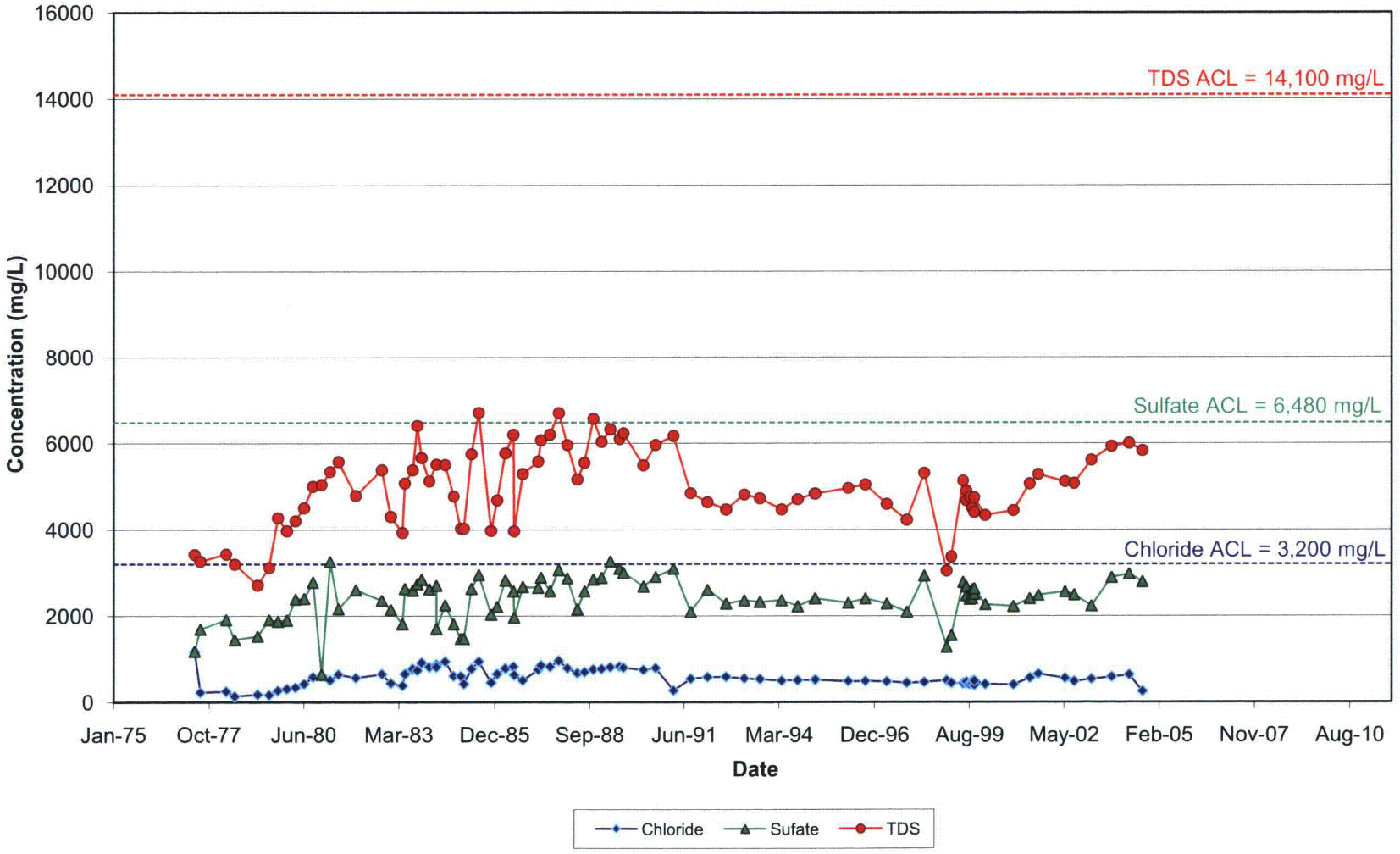
Metals in Monitoring Well 30-02KD



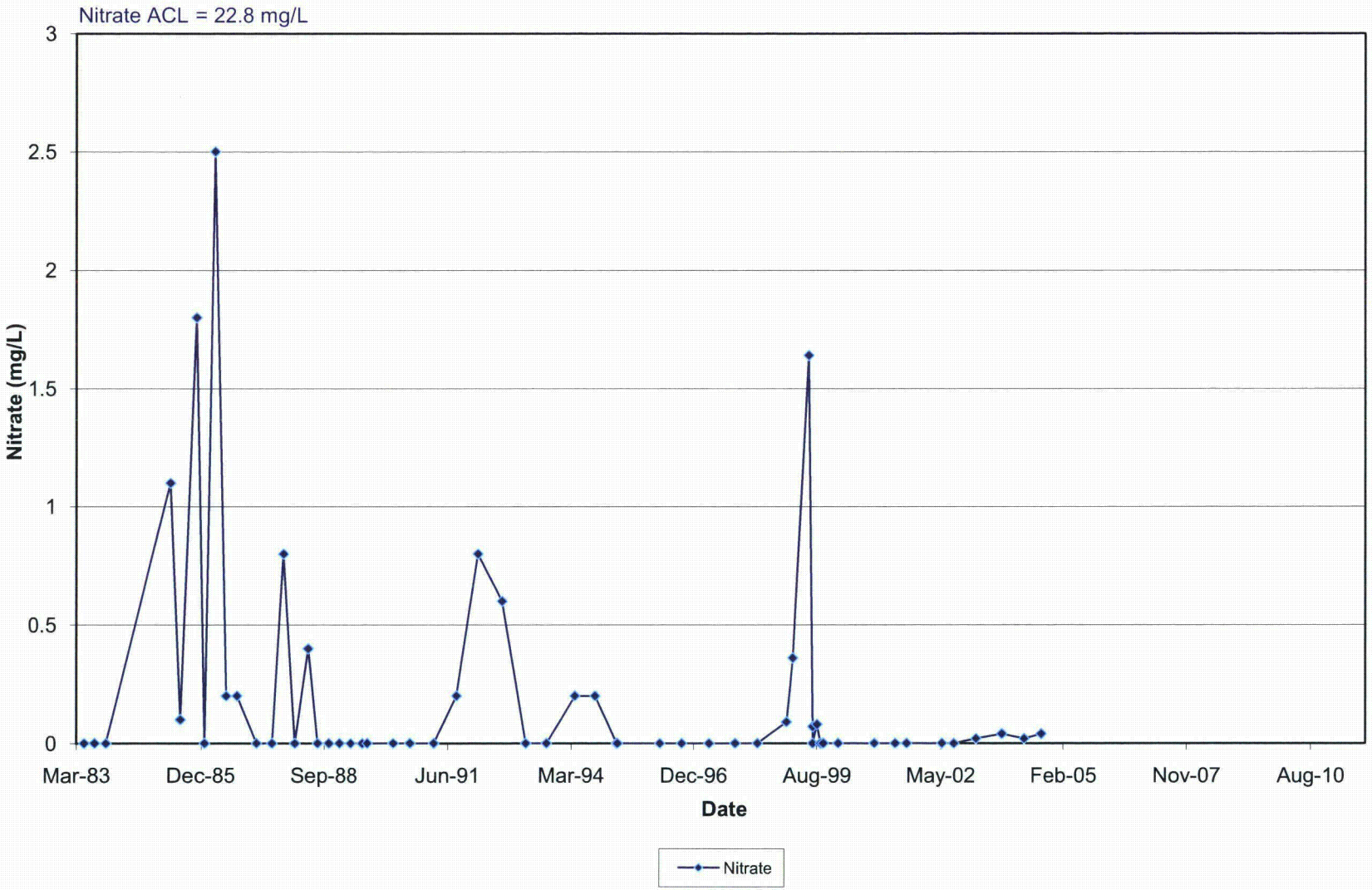
Radionuclides in Monitoring Well 30-02KD



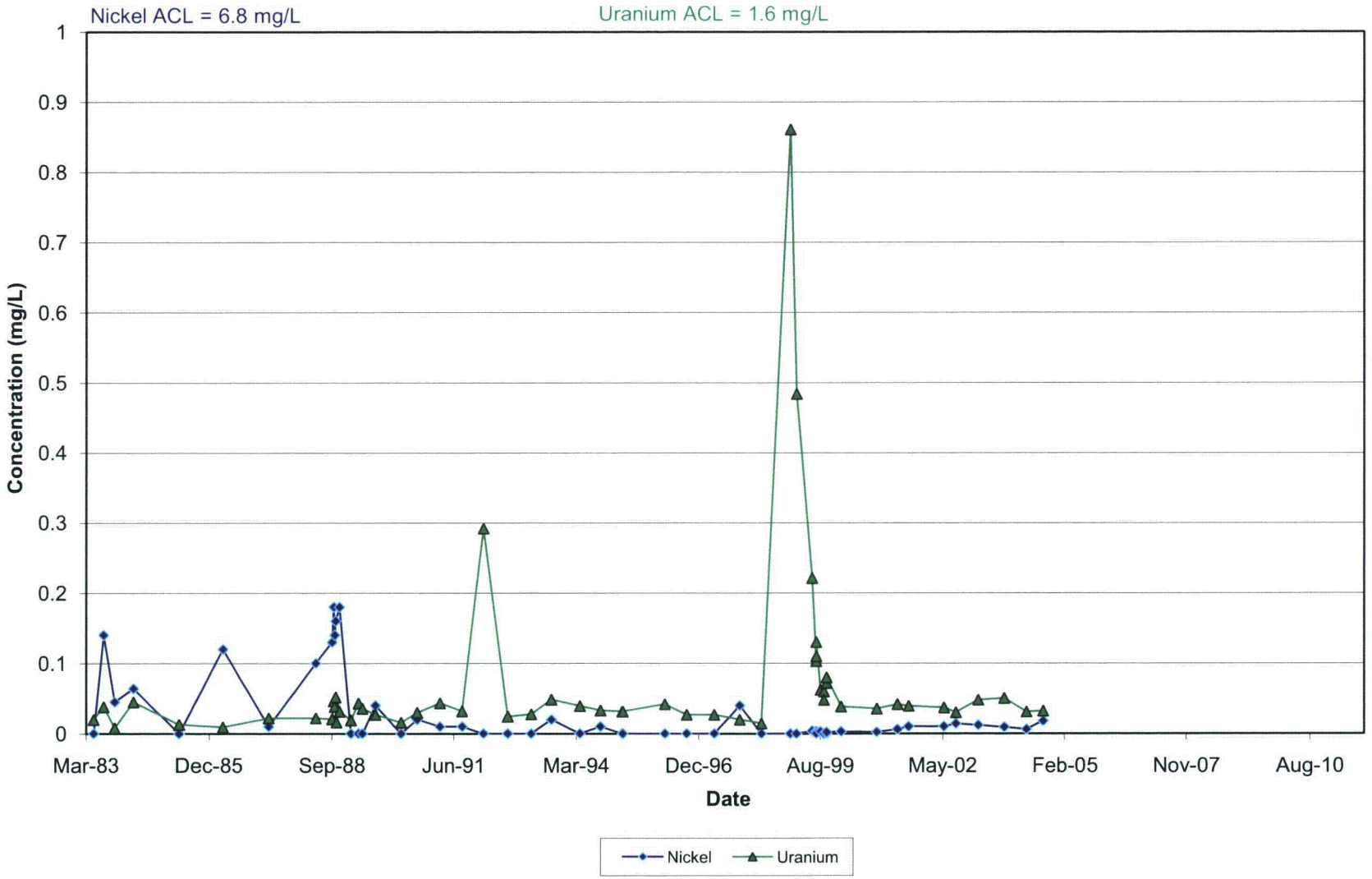
Anions and TDS in Monitoring Well 30-48KD



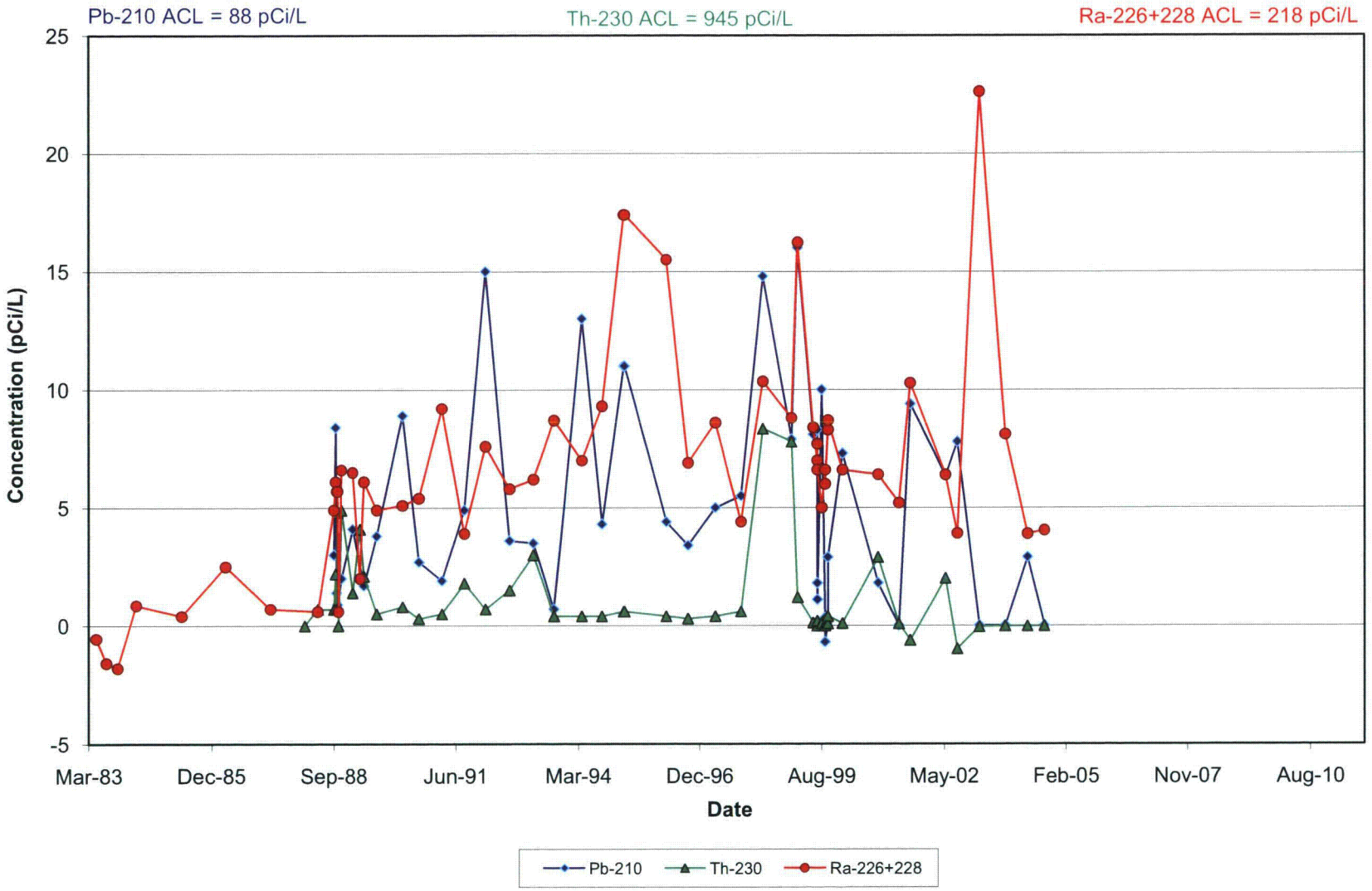
Nitrate in Monitoring Well 30-48KD



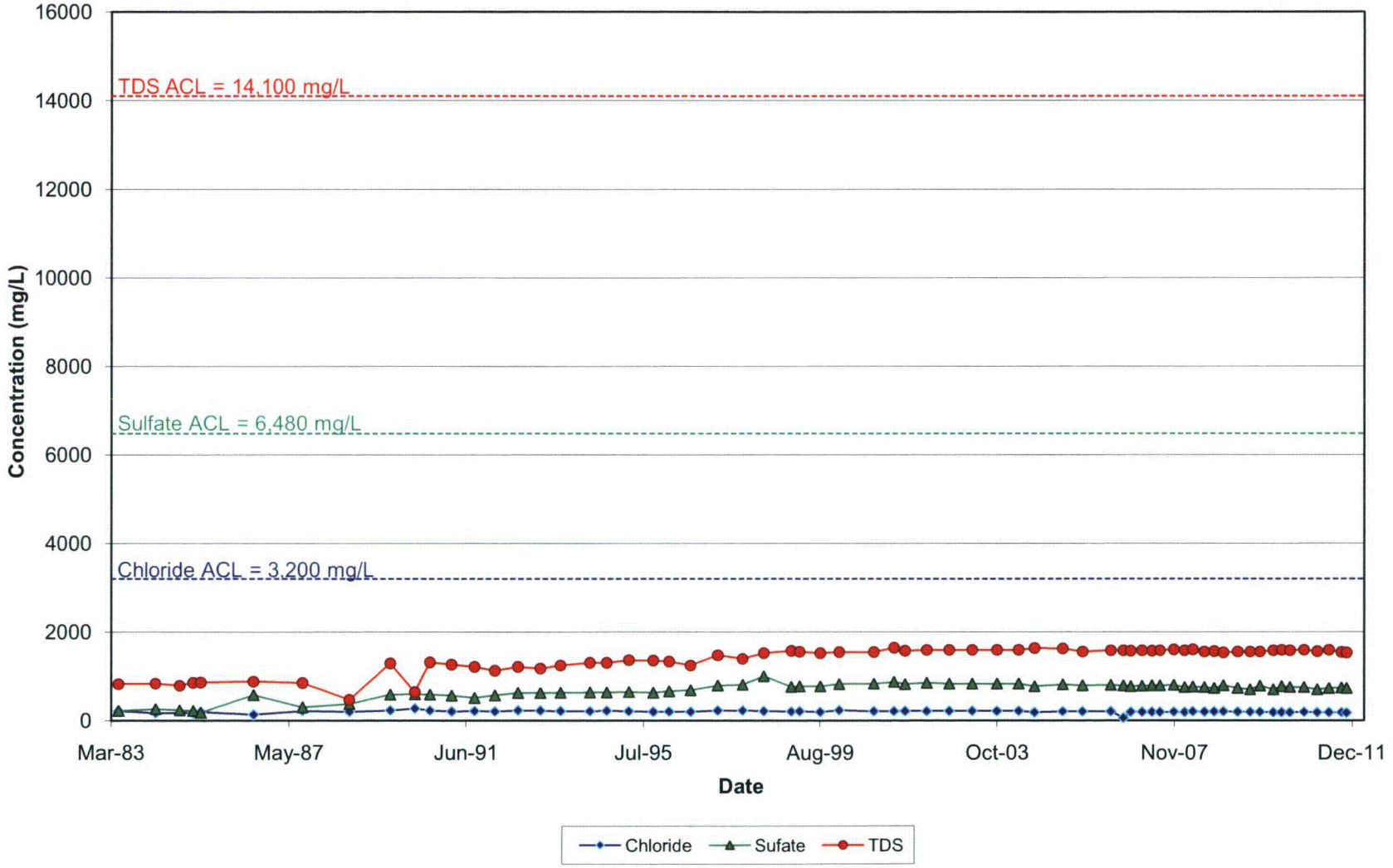
Metals in Monitoring Well 30-48KD



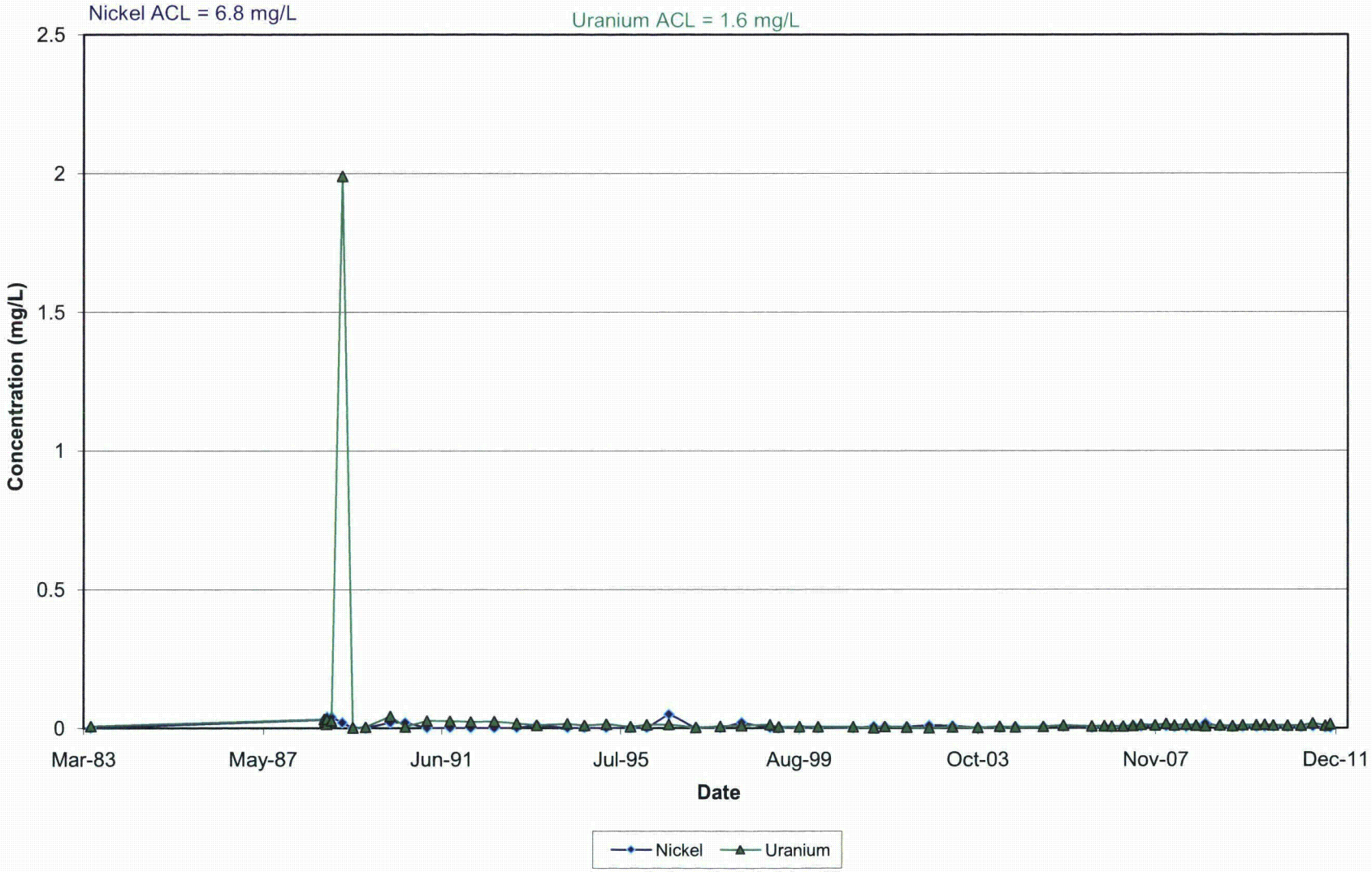
Radionuclides in Monitoring Well 30-48KD



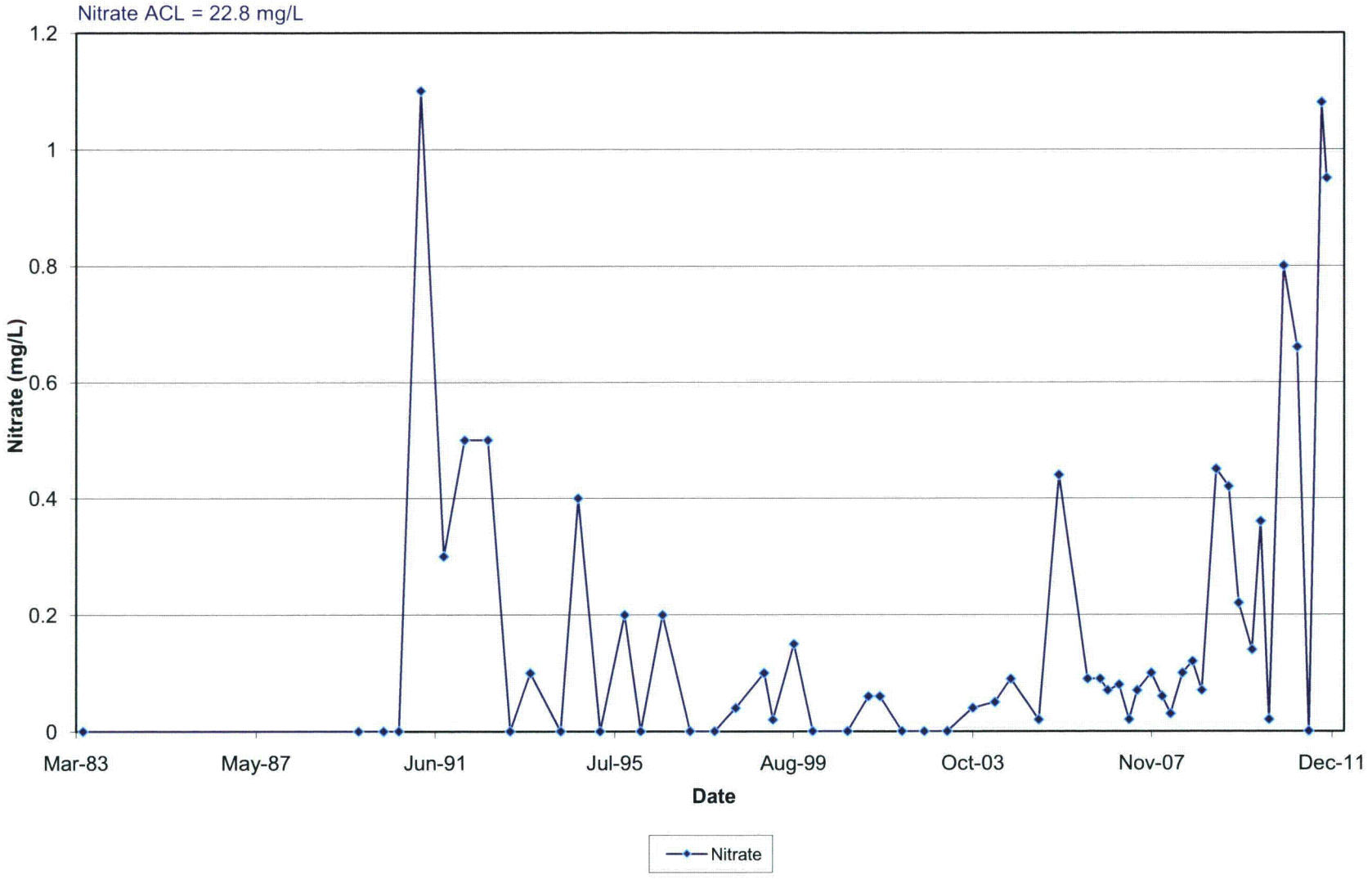
Anions and TDS in Monitoring Well 32-45KD



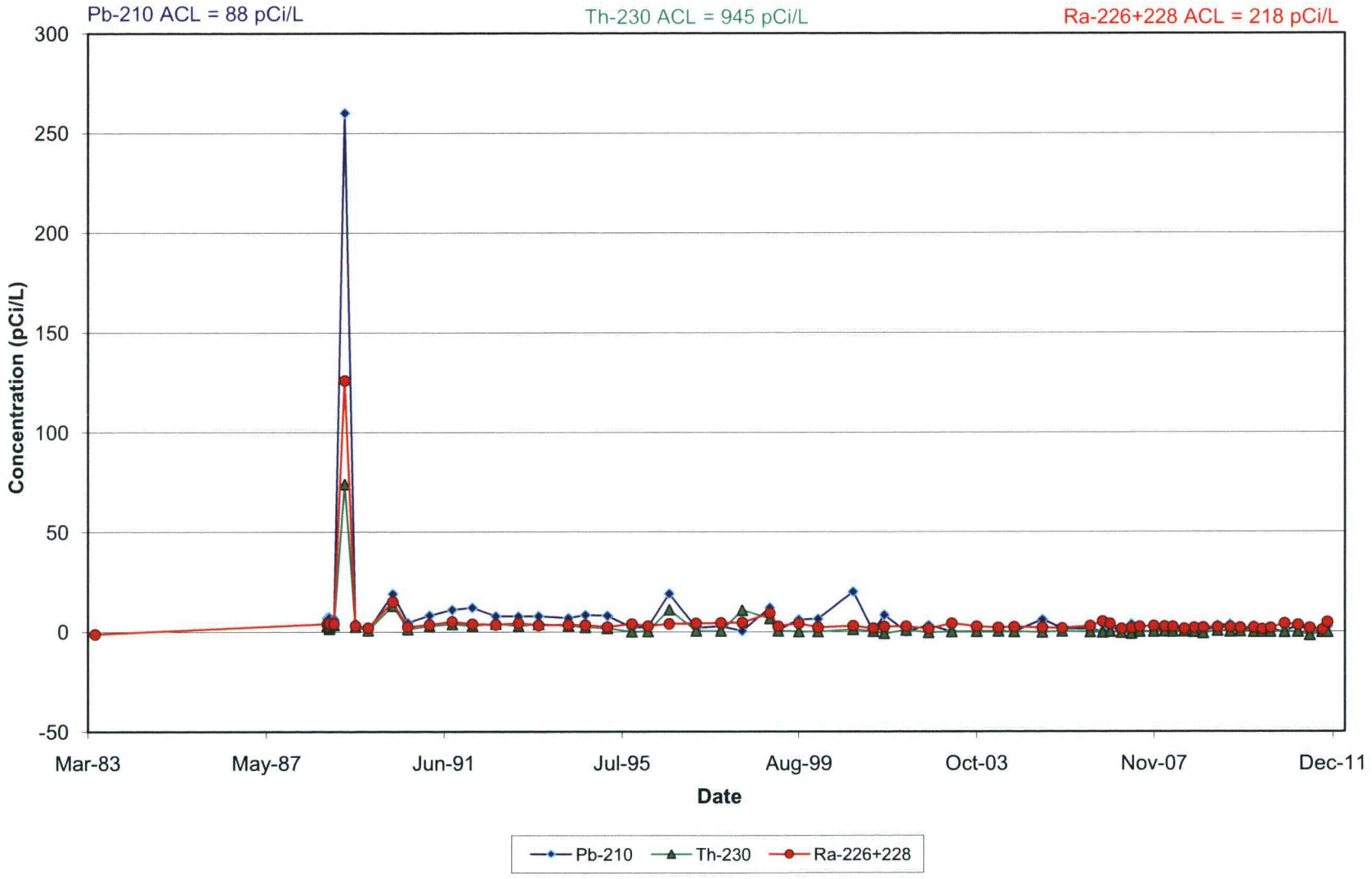
Metals in Monitoring Well 32-45KD



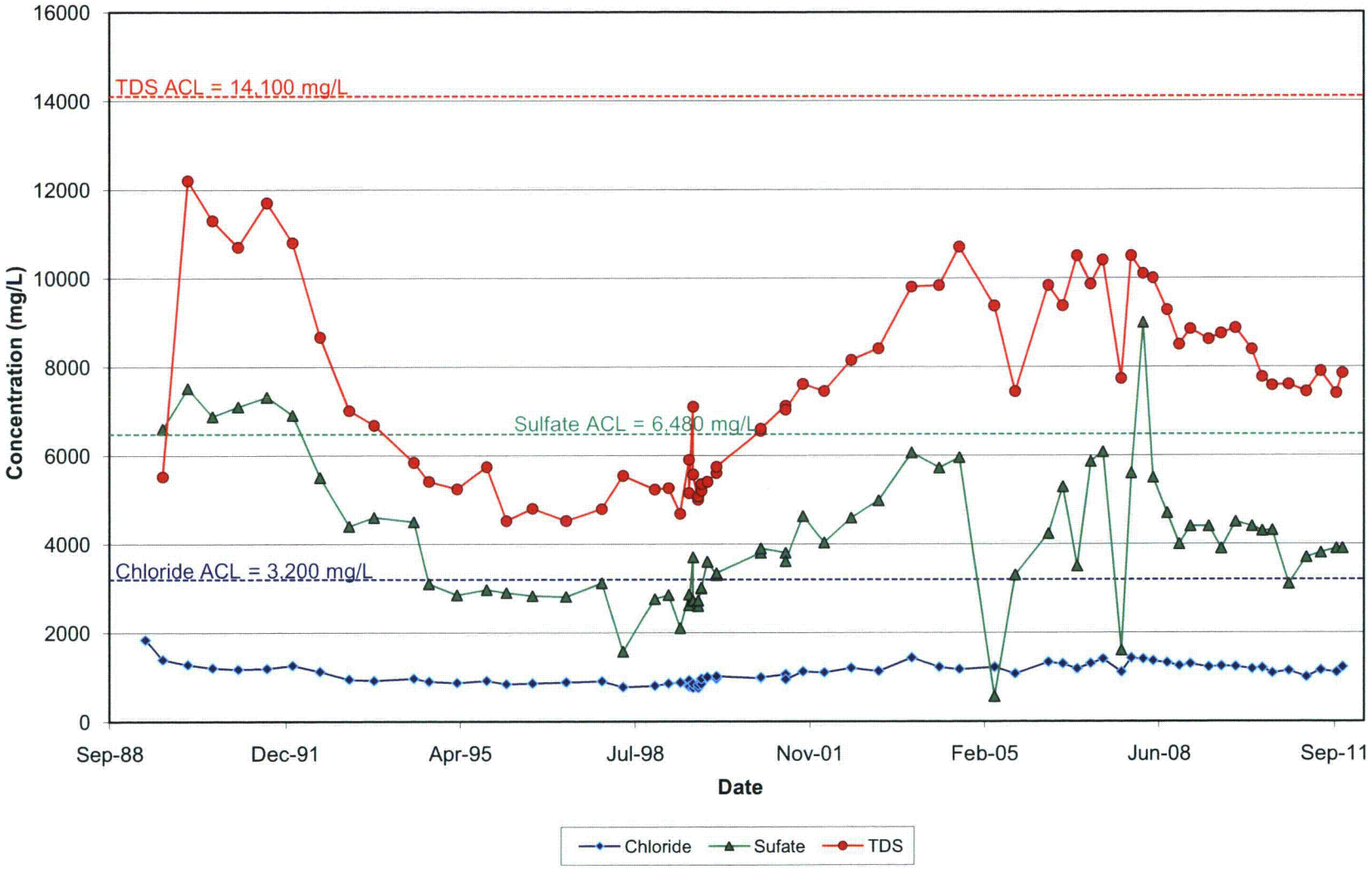
Nitrate in Monitoring Well 32-45KD



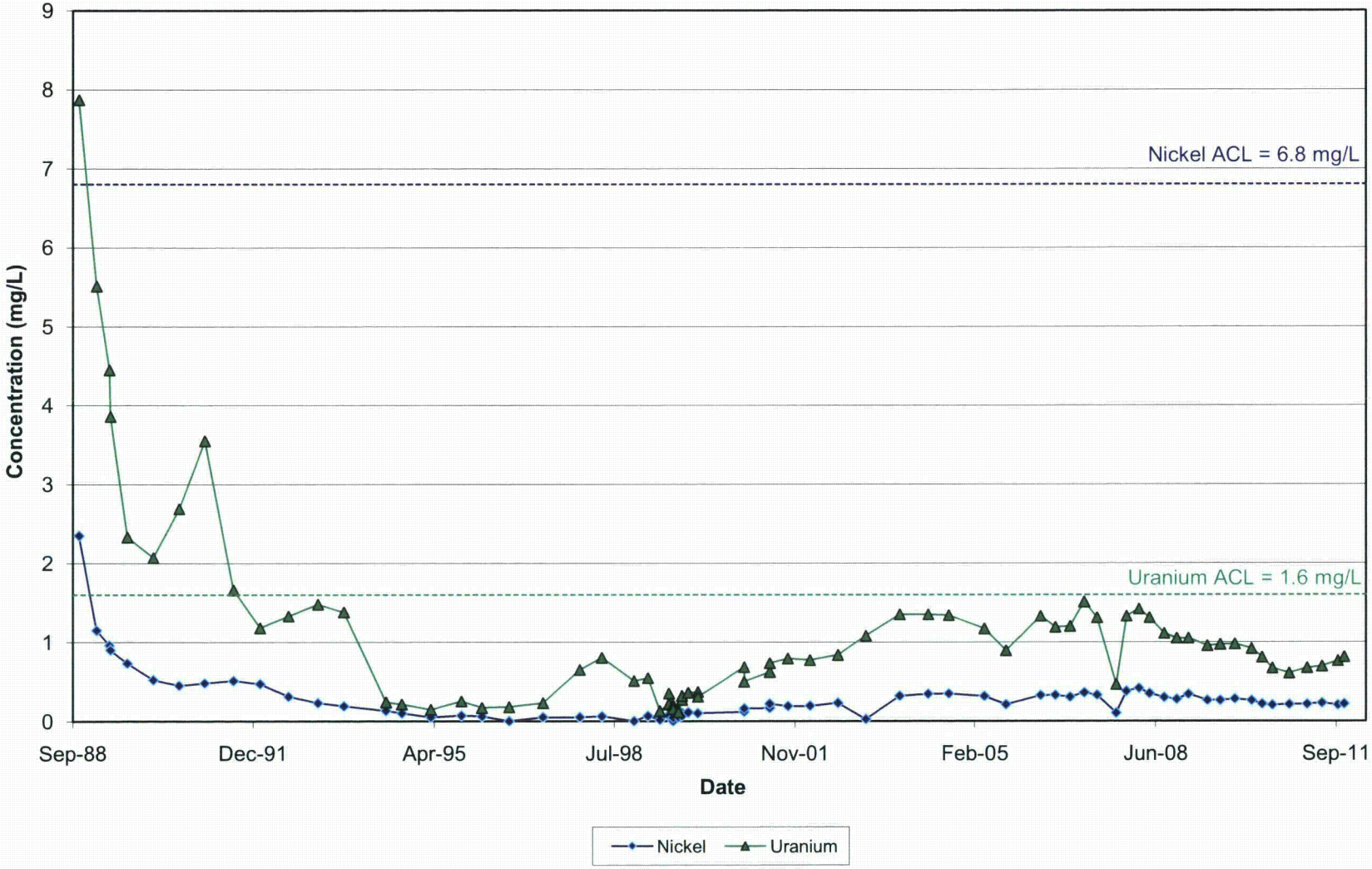
Radionuclides in Monitoring Well 32-45KD



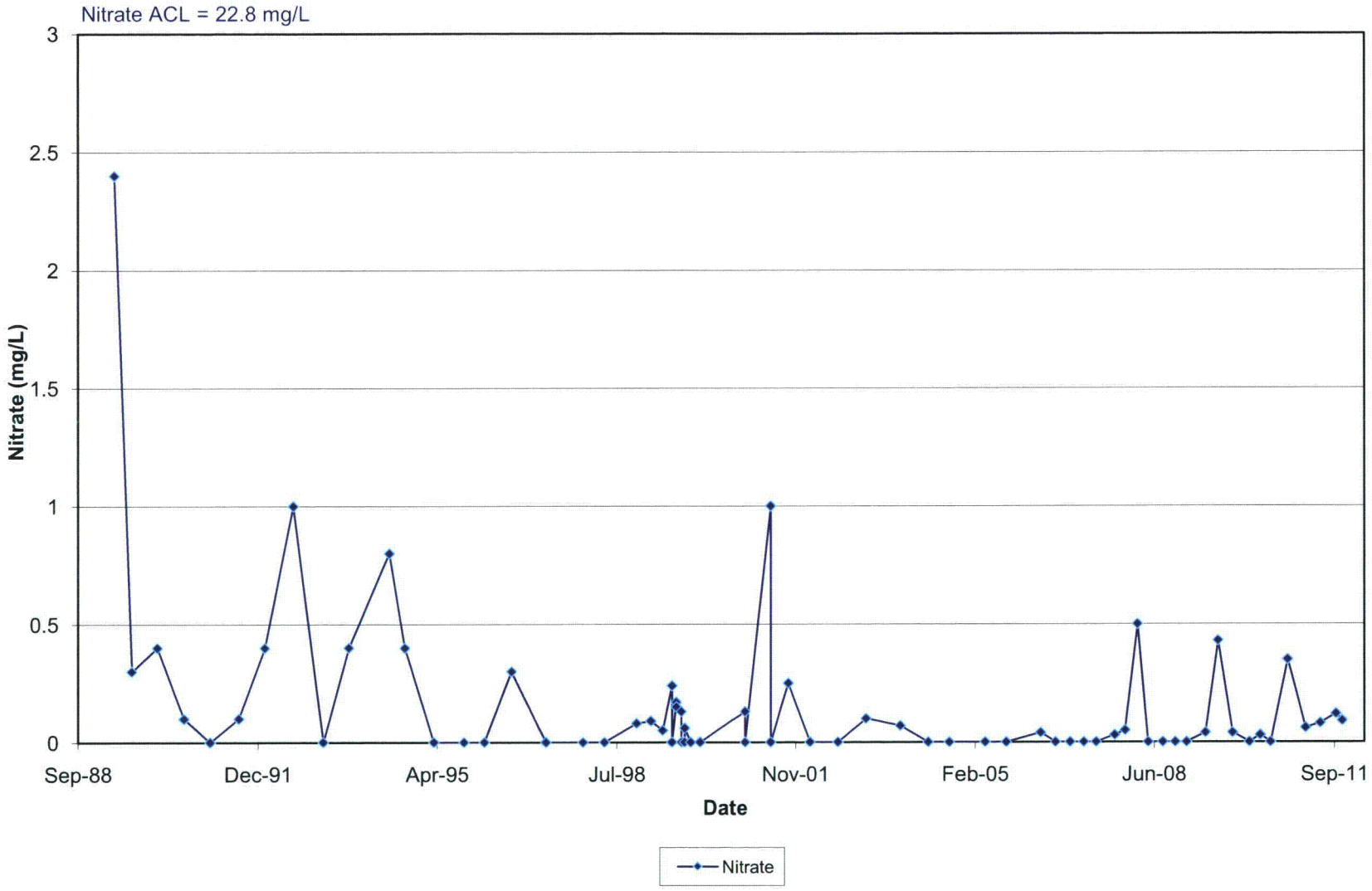
Anions and TDS Well 36-06KD



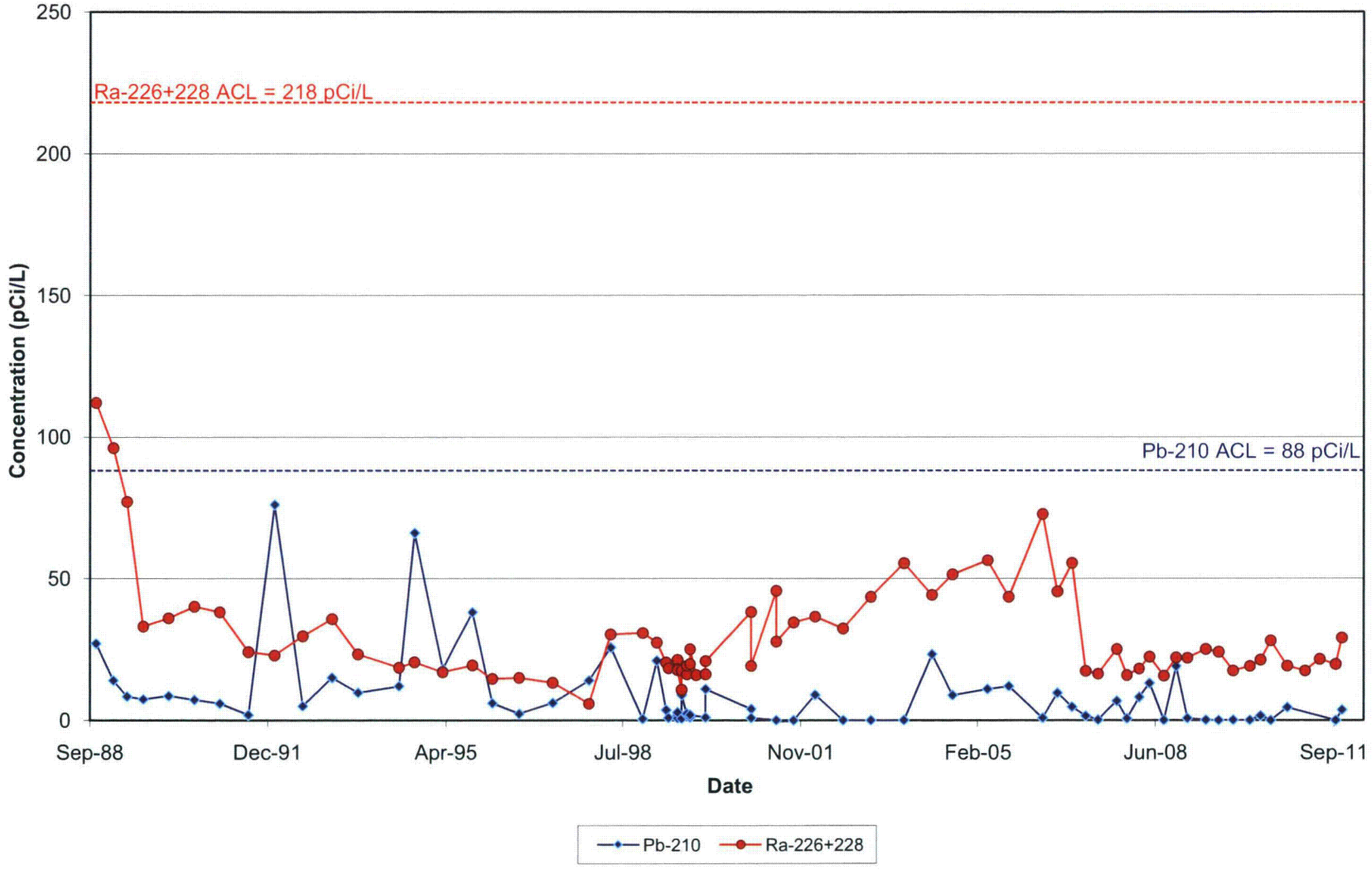
Metals in Monitoring Well 36-06KD



Nitrate in Monitoring Well 36-06KD



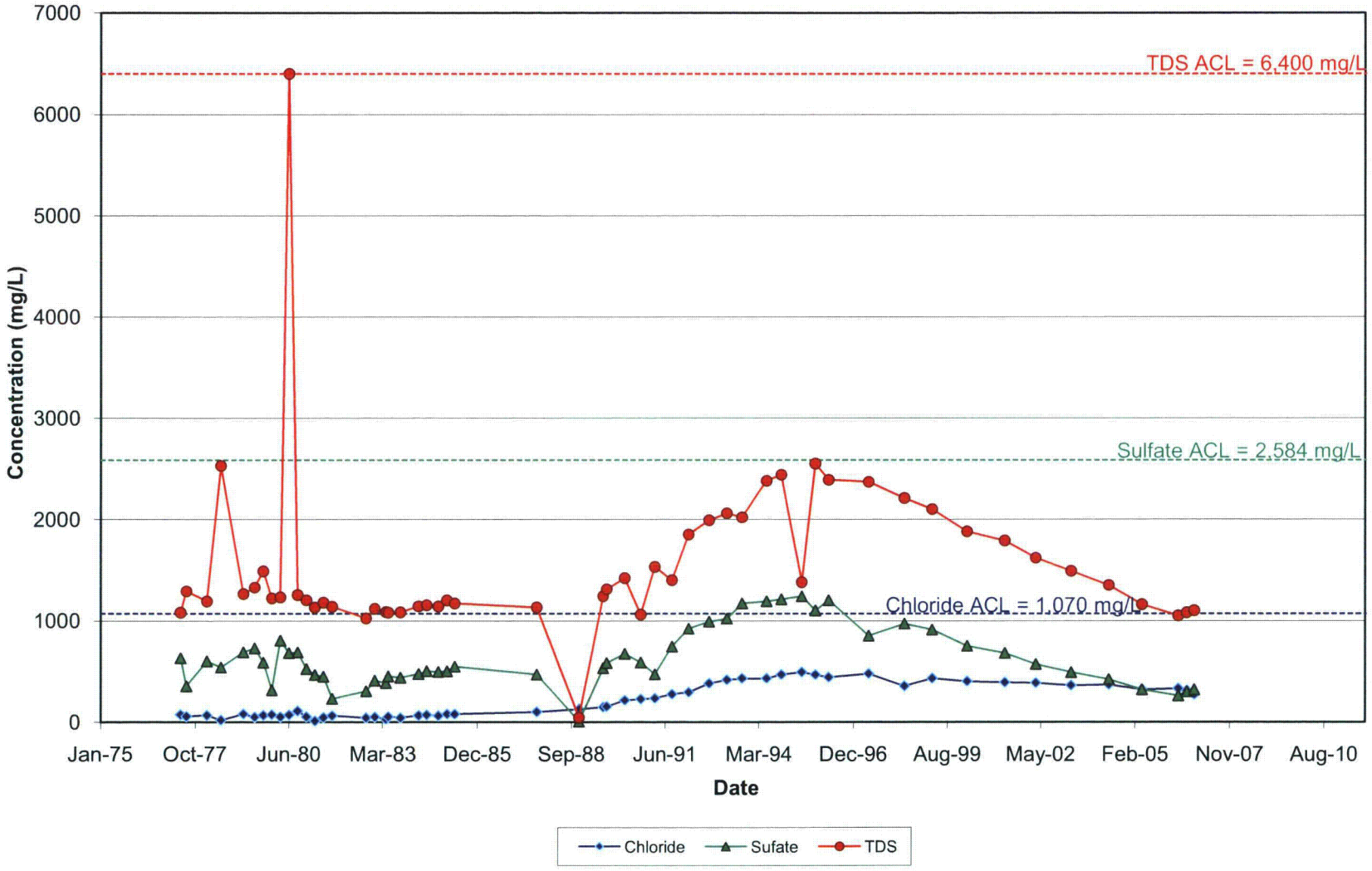
Radionuclides in Monitoring Well 36-06KD



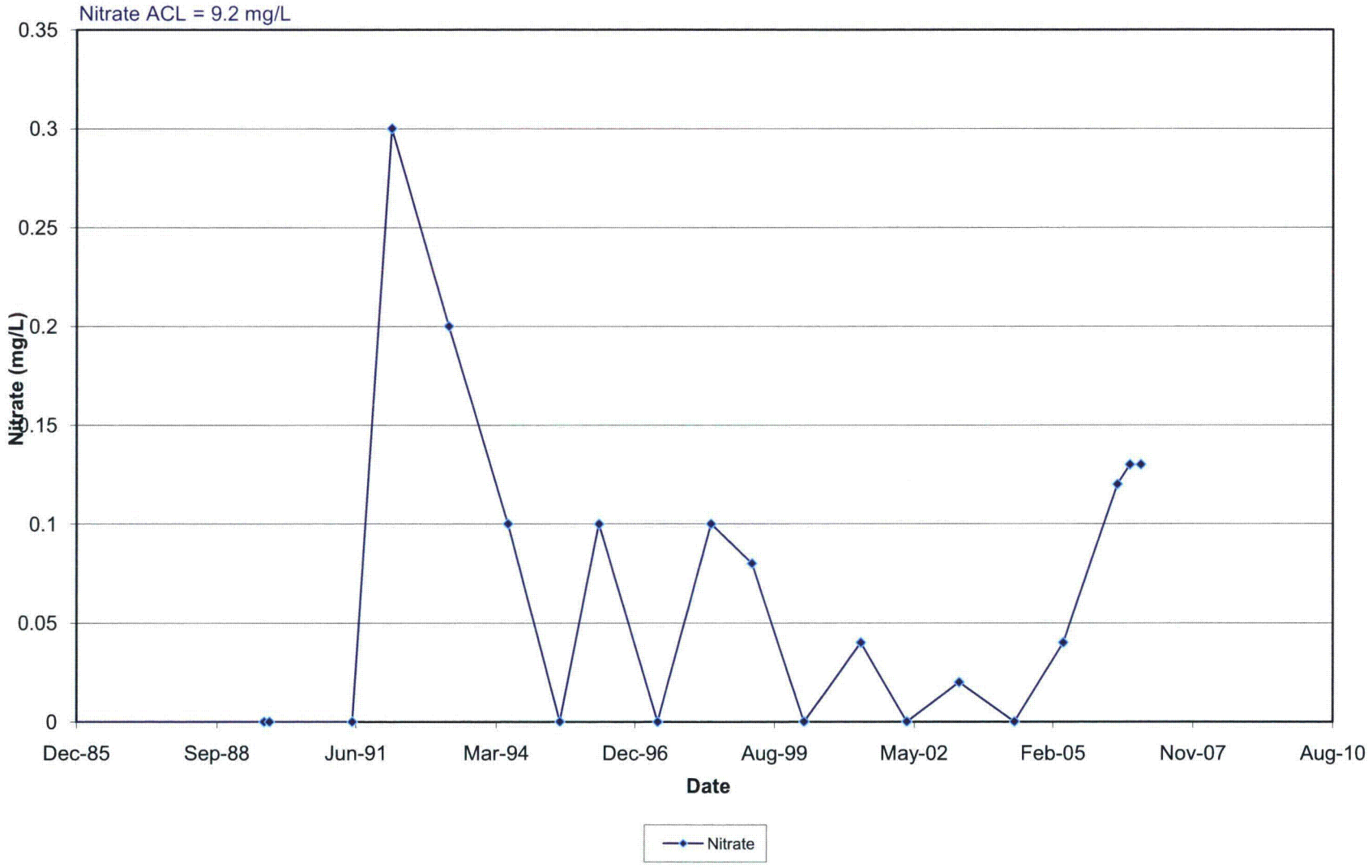
Stability Monitoring Plan
Time Versus Concentration Plots

Tres Hermanos A

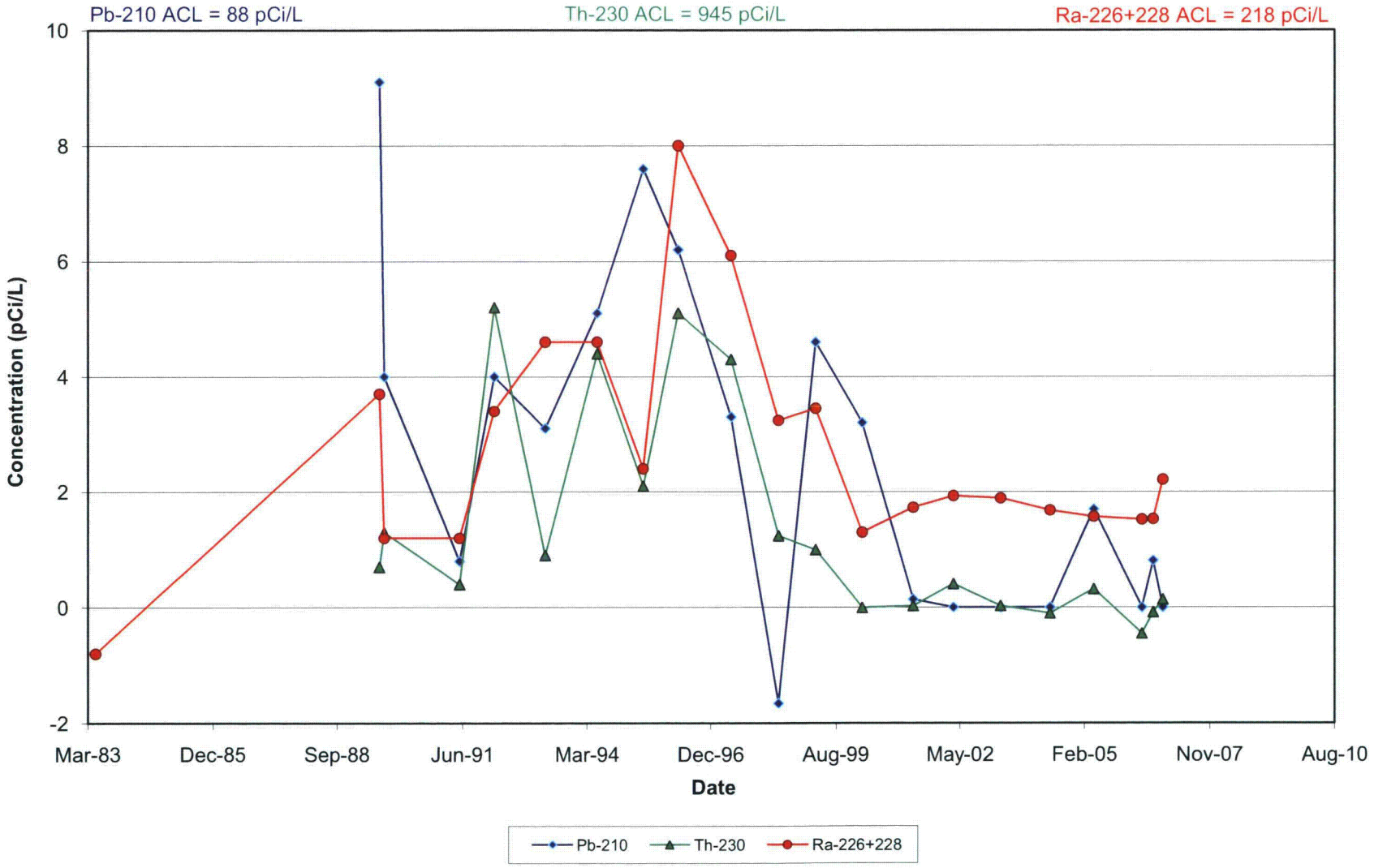
Anions and TDS in Monitoring Well 30-01



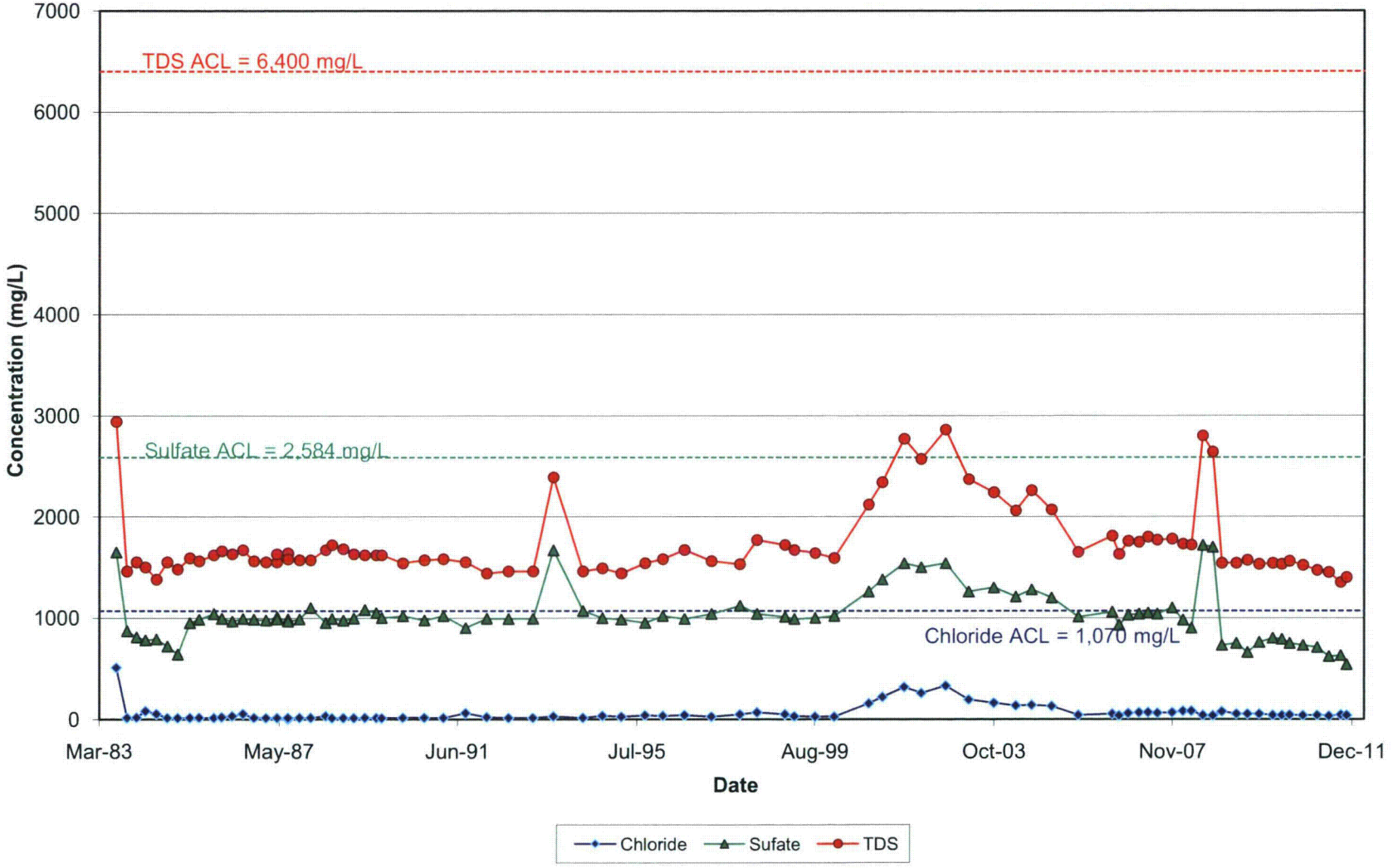
Nitrate in Monitoring Well 30-01



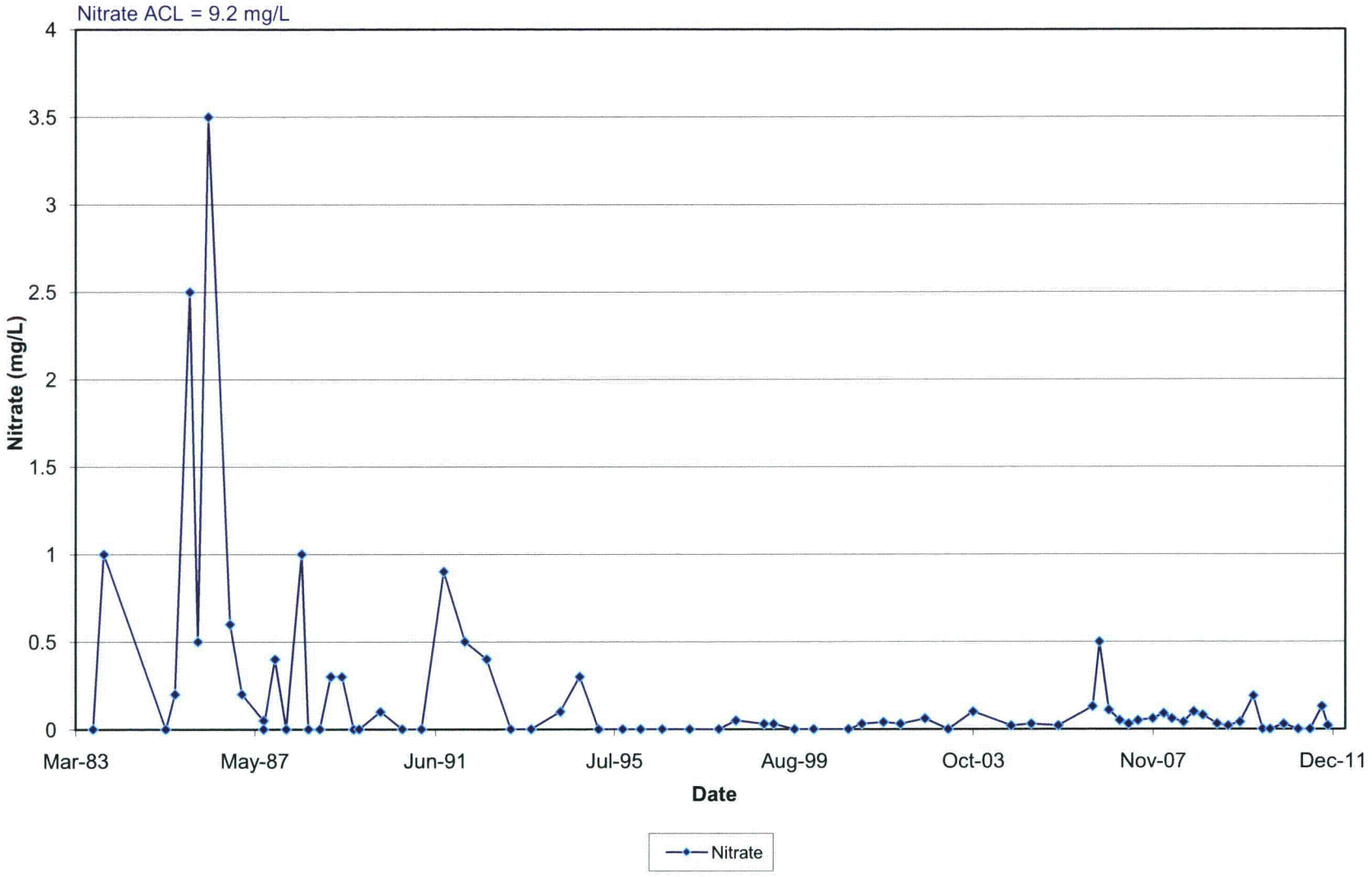
Radionuclides in Monitoring Well 30-01



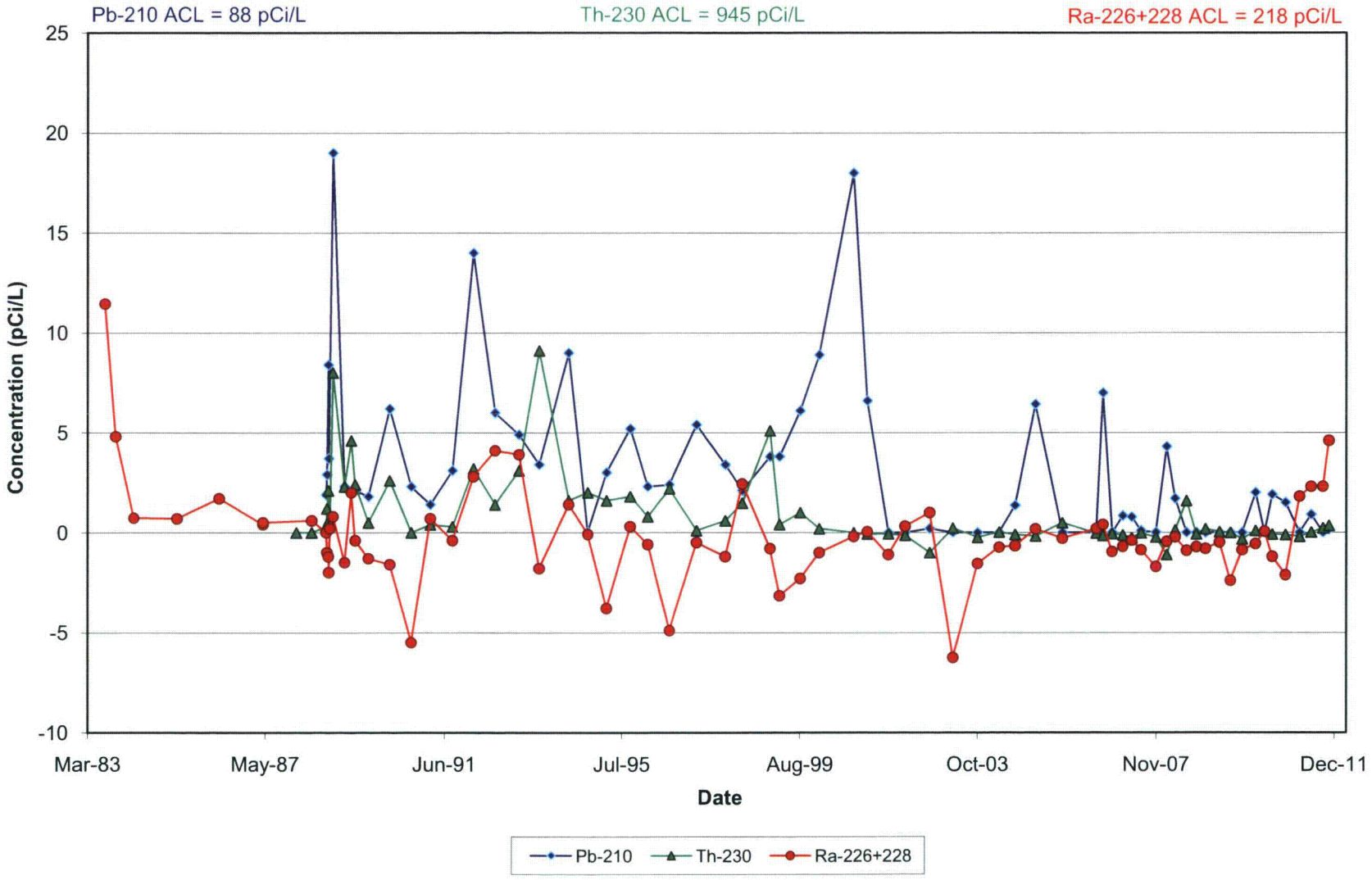
Anions and TDS in Monitoring Well 31-01



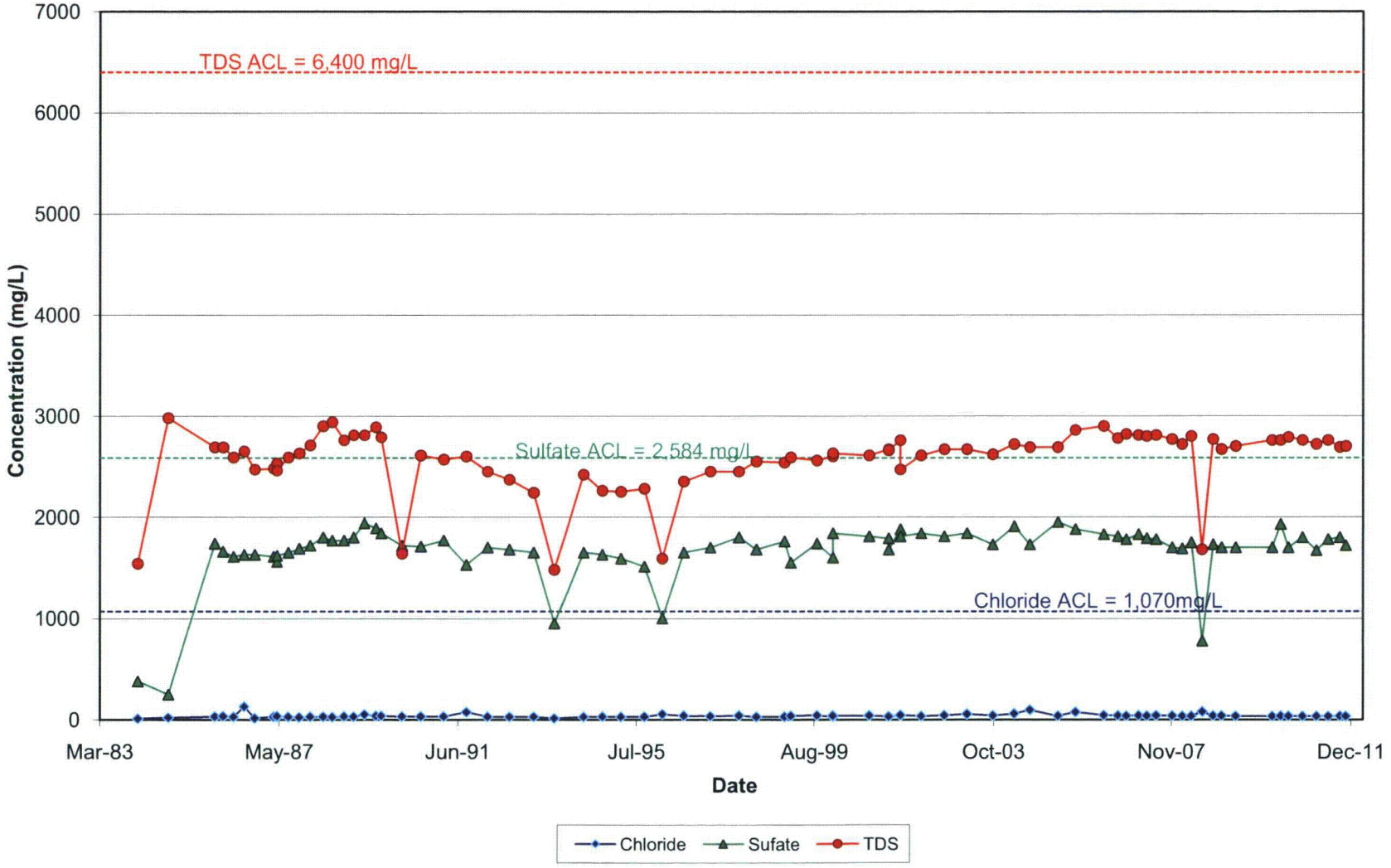
Nitrate in Monitoring Well 31-01



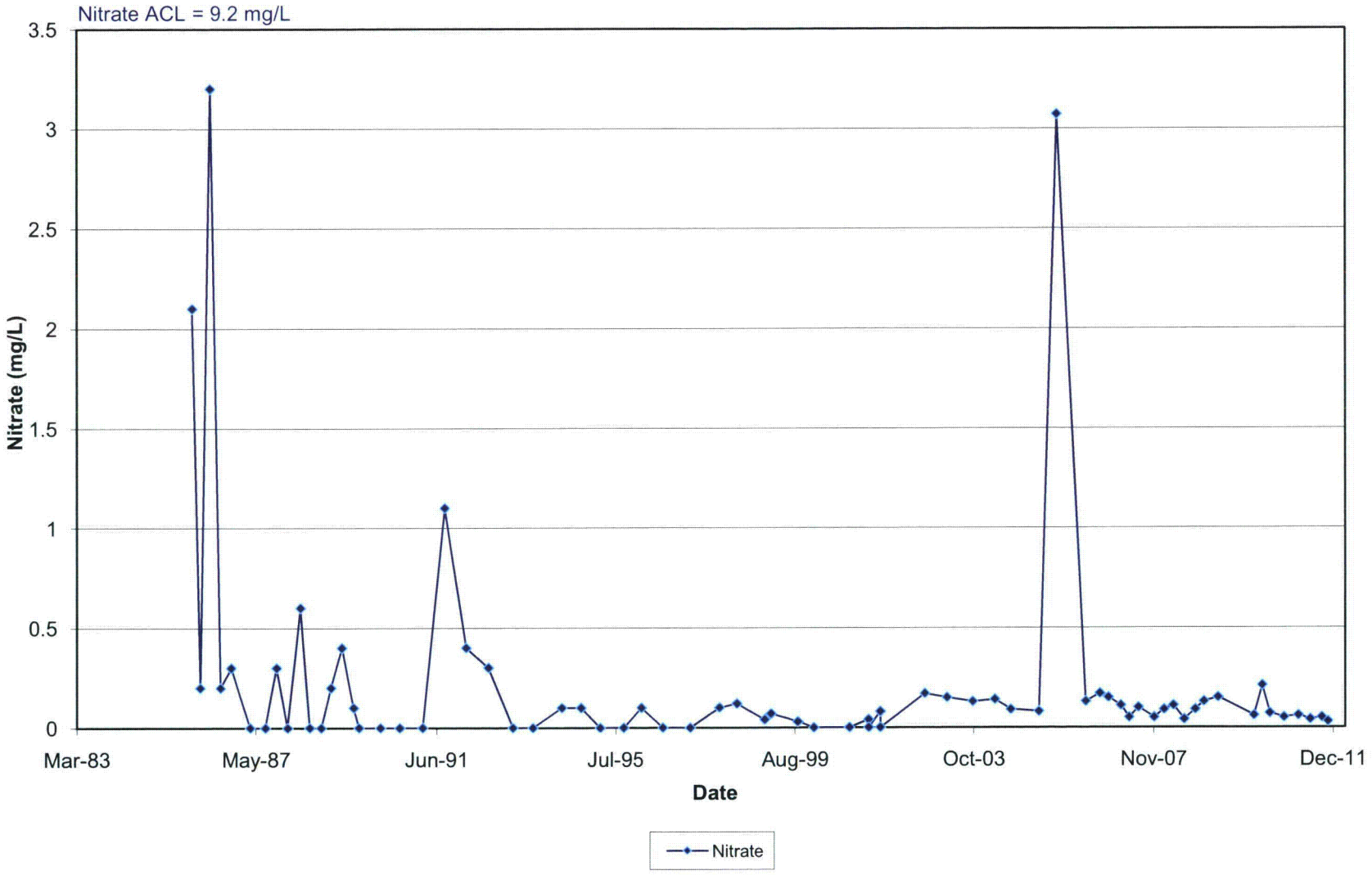
Radionuclides in Well 31-01



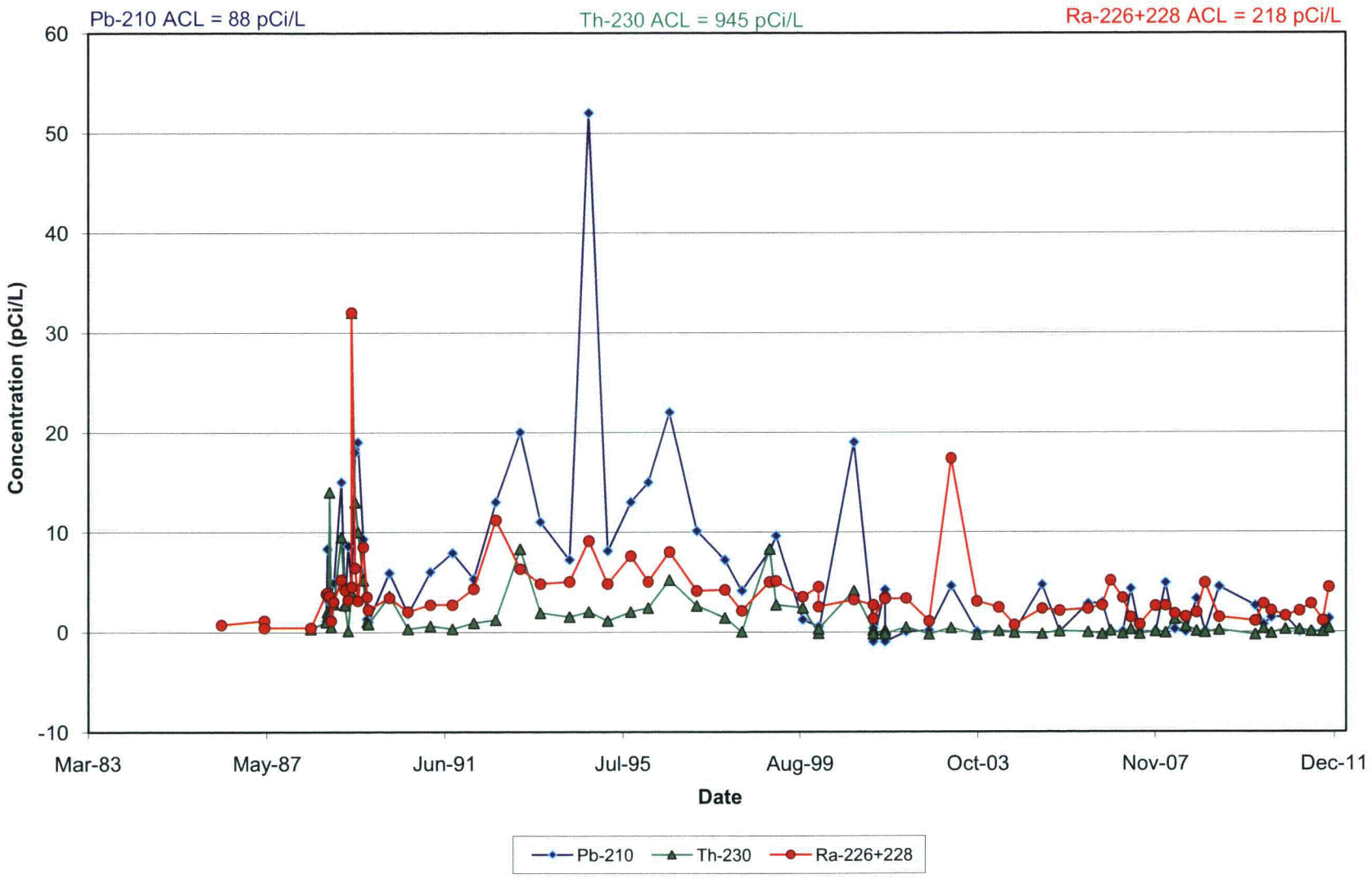
Anions and TDS in Monitoring Well 33-01TRA



Nitrate in Monitoring Well 33-01TRA



Radionuclides in Monitoring Well 33-01TRA

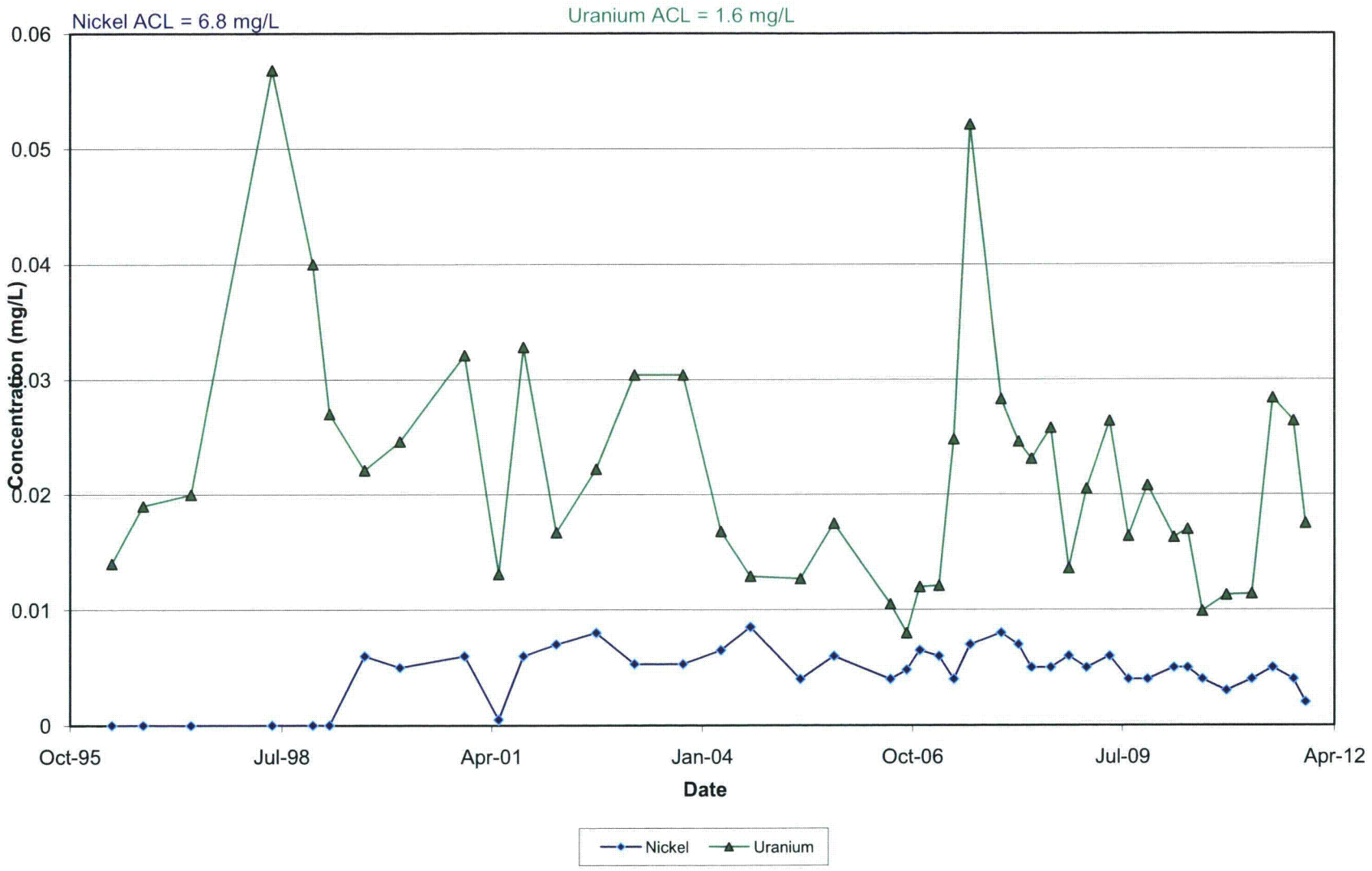


Stability Monitoring Plan
Time Versus Concentration Plots

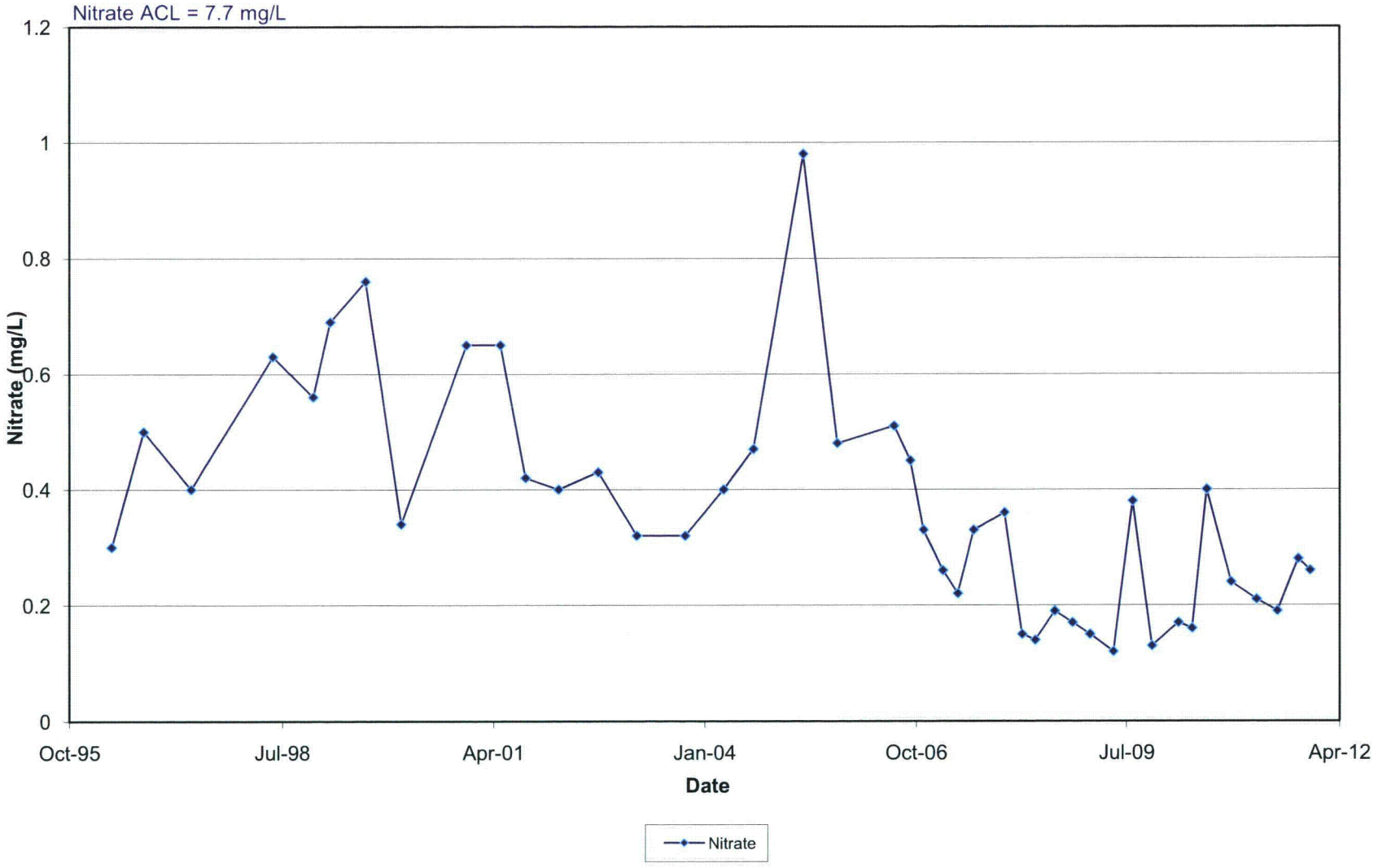
Tres Hermanos B

Anions and TDS in Monitoring Well 19-77

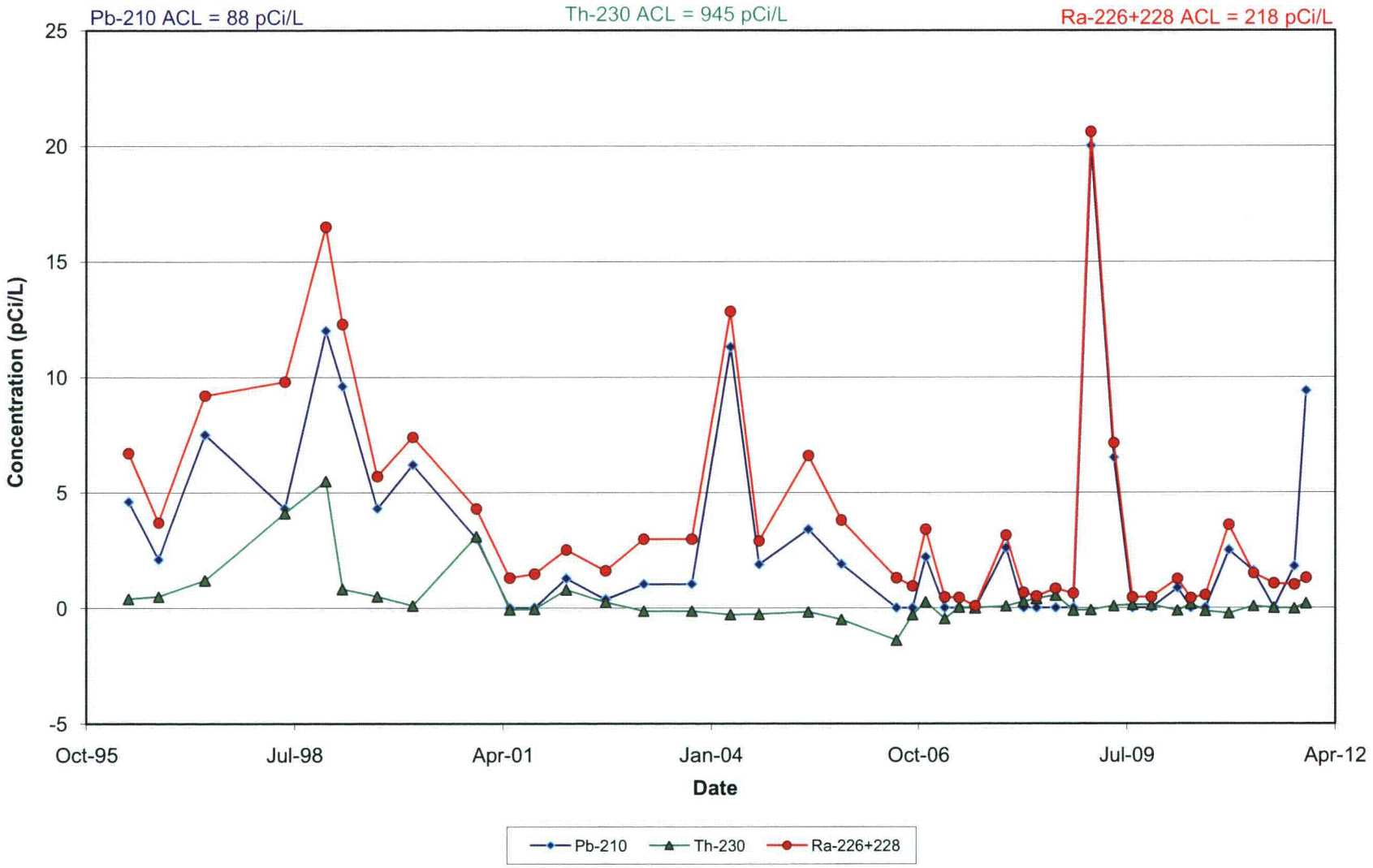
Metals in Monitoring Well 19-77



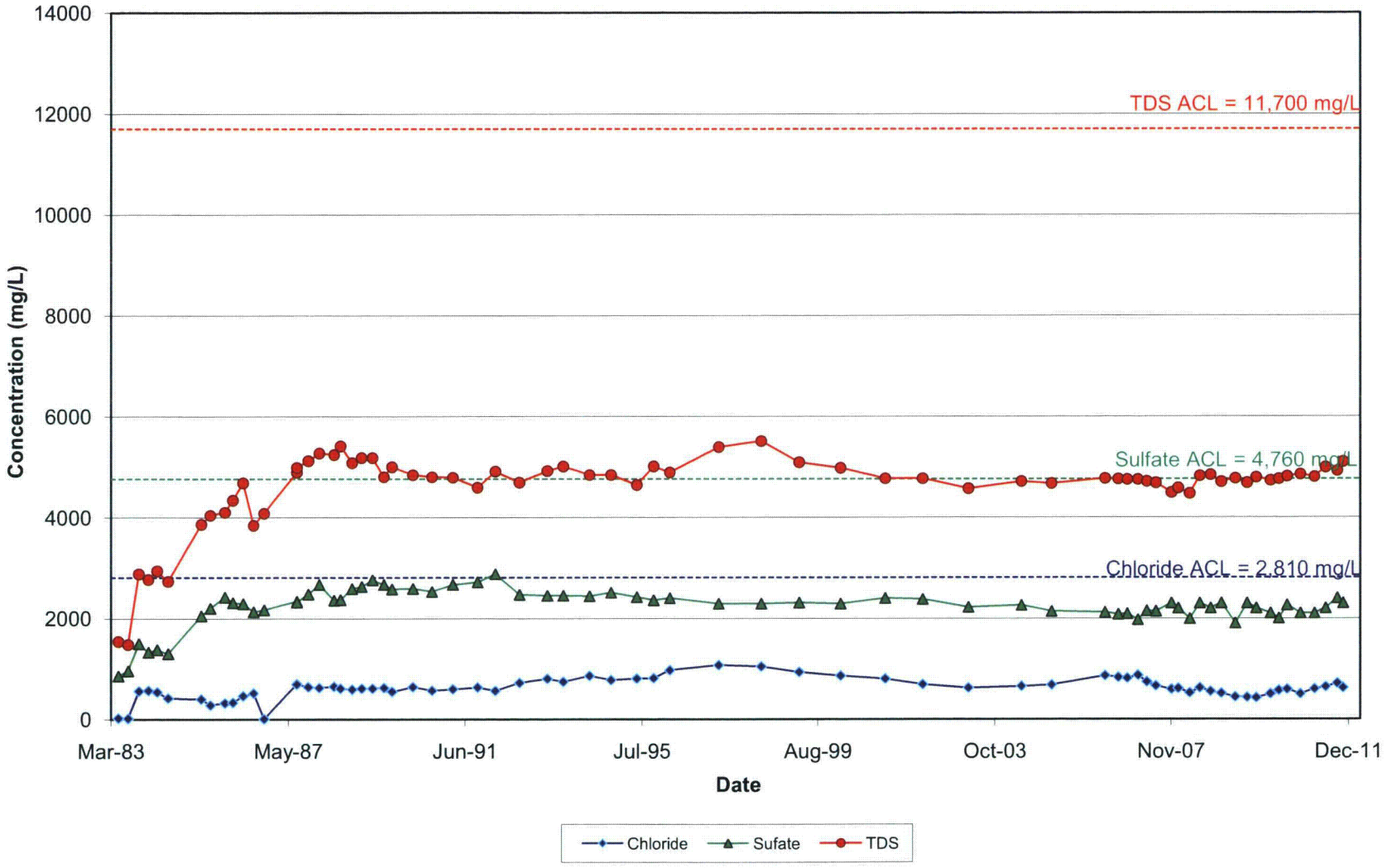
Nitrate in Monitoring Well 19-77



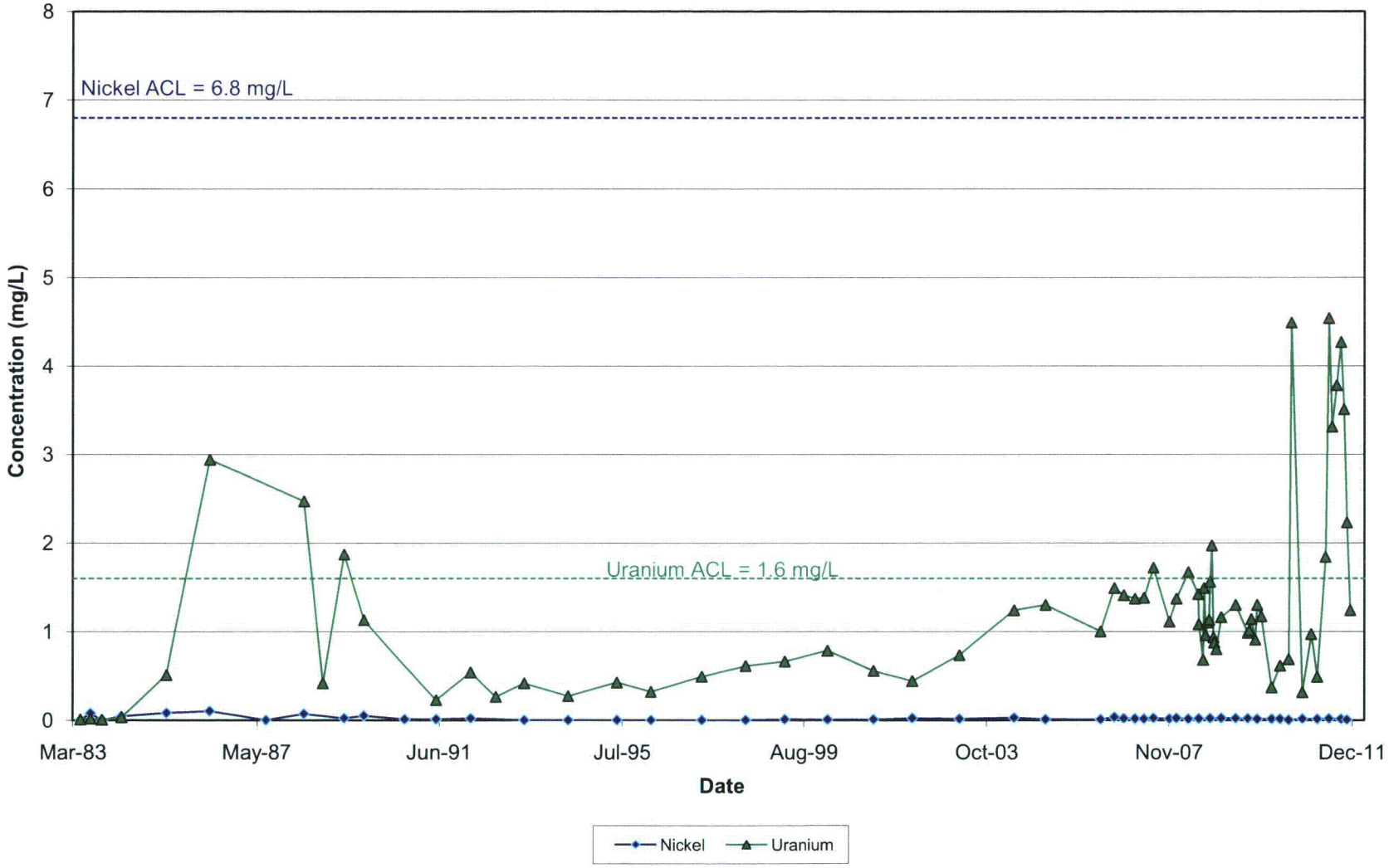
Radionuclides in Monitoring Well 19-77



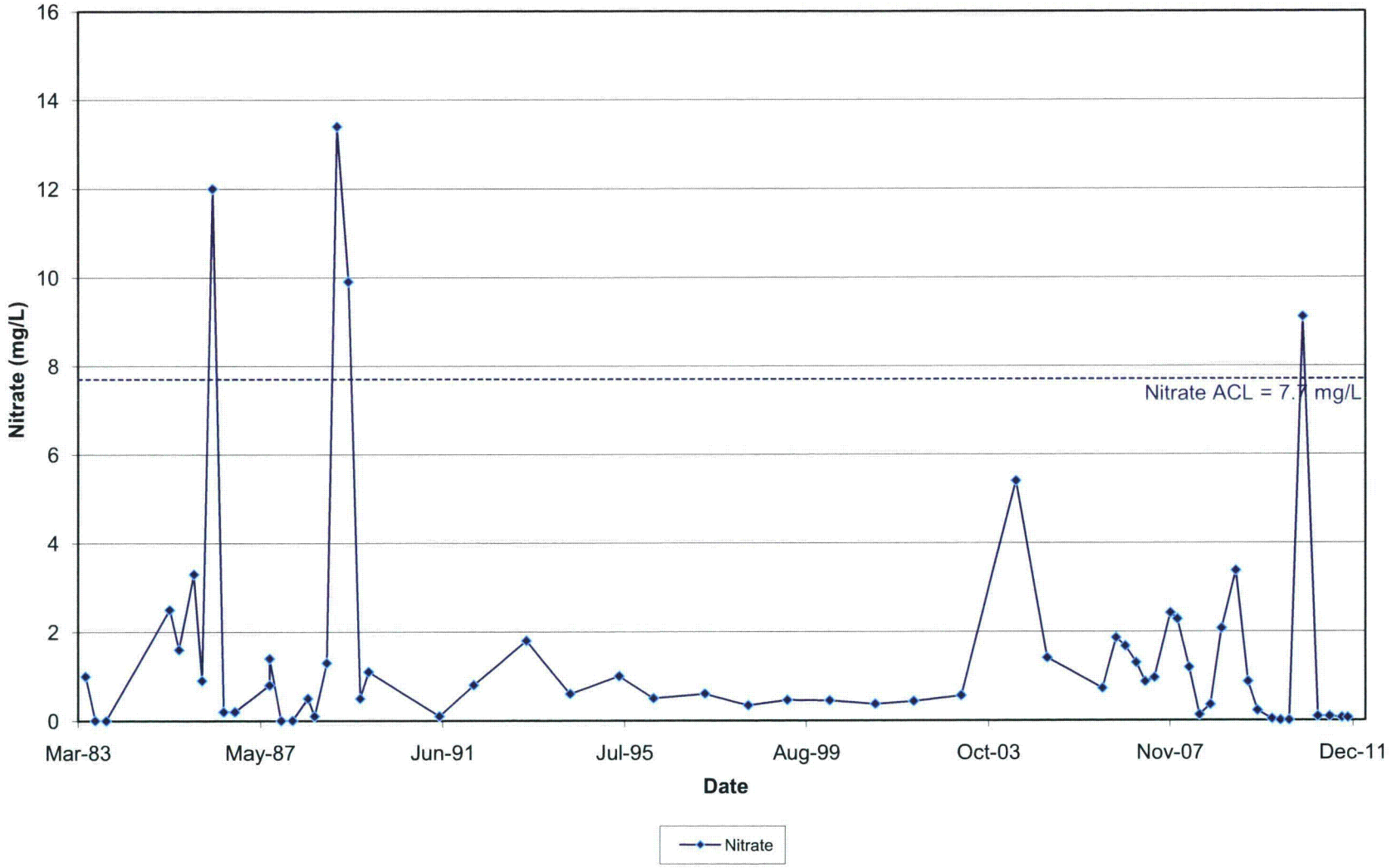
Anions and TDS in Monitoring Well 31-02



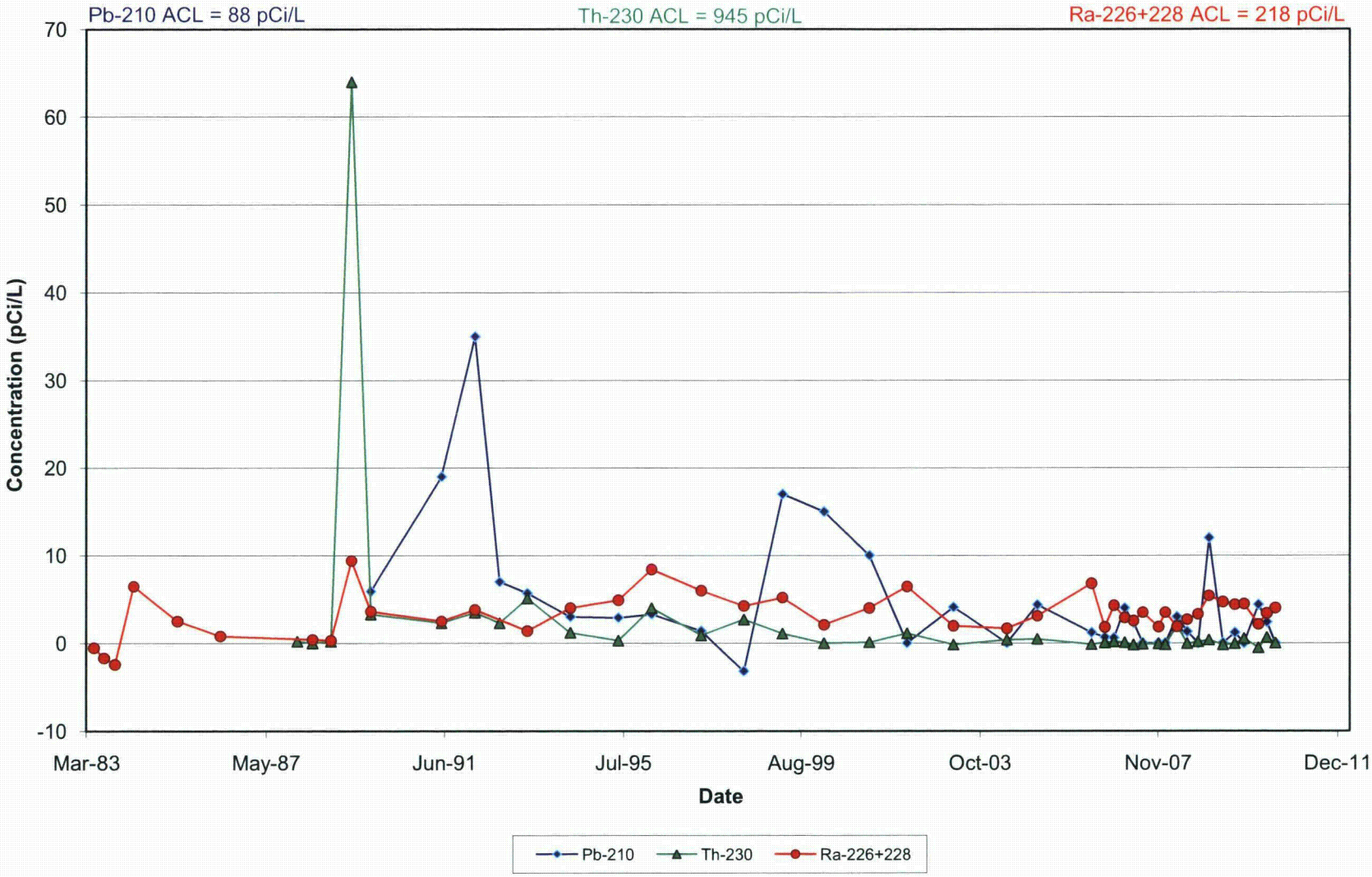
Metals in Monitoring Well 31-02



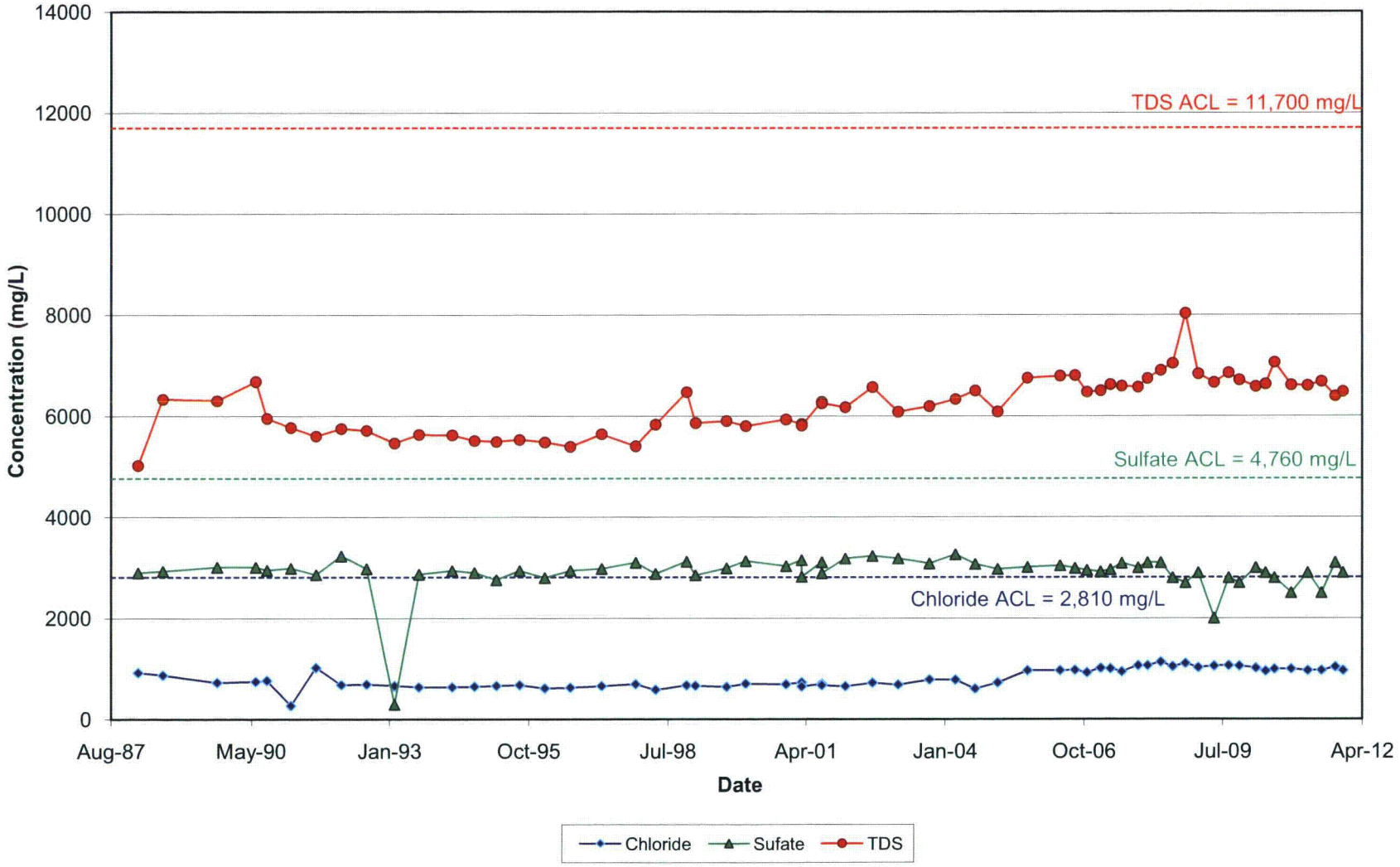
Nitrate in Monitoring Well 31-02



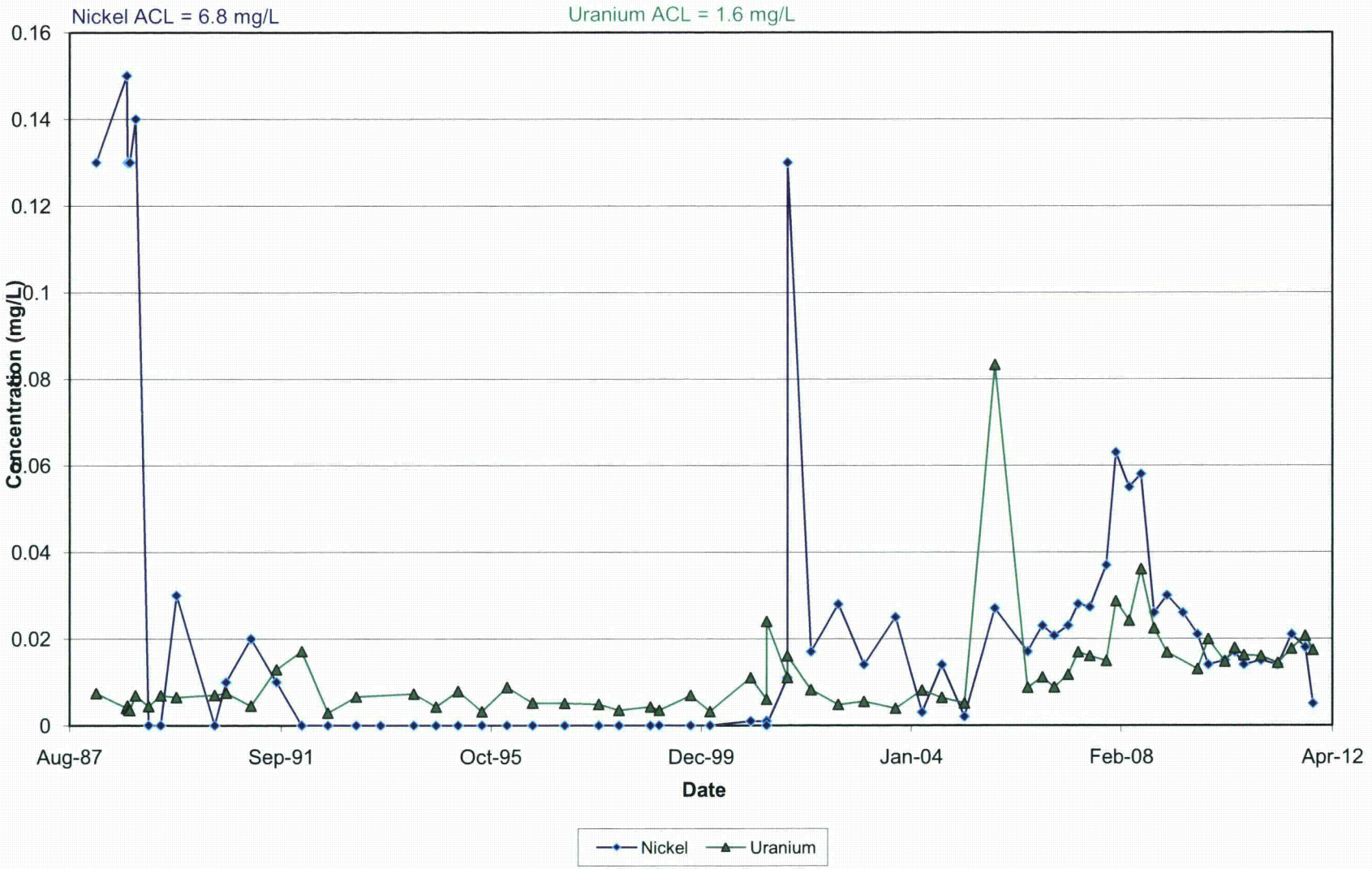
Radionuclides in Monitoring Well 31-02



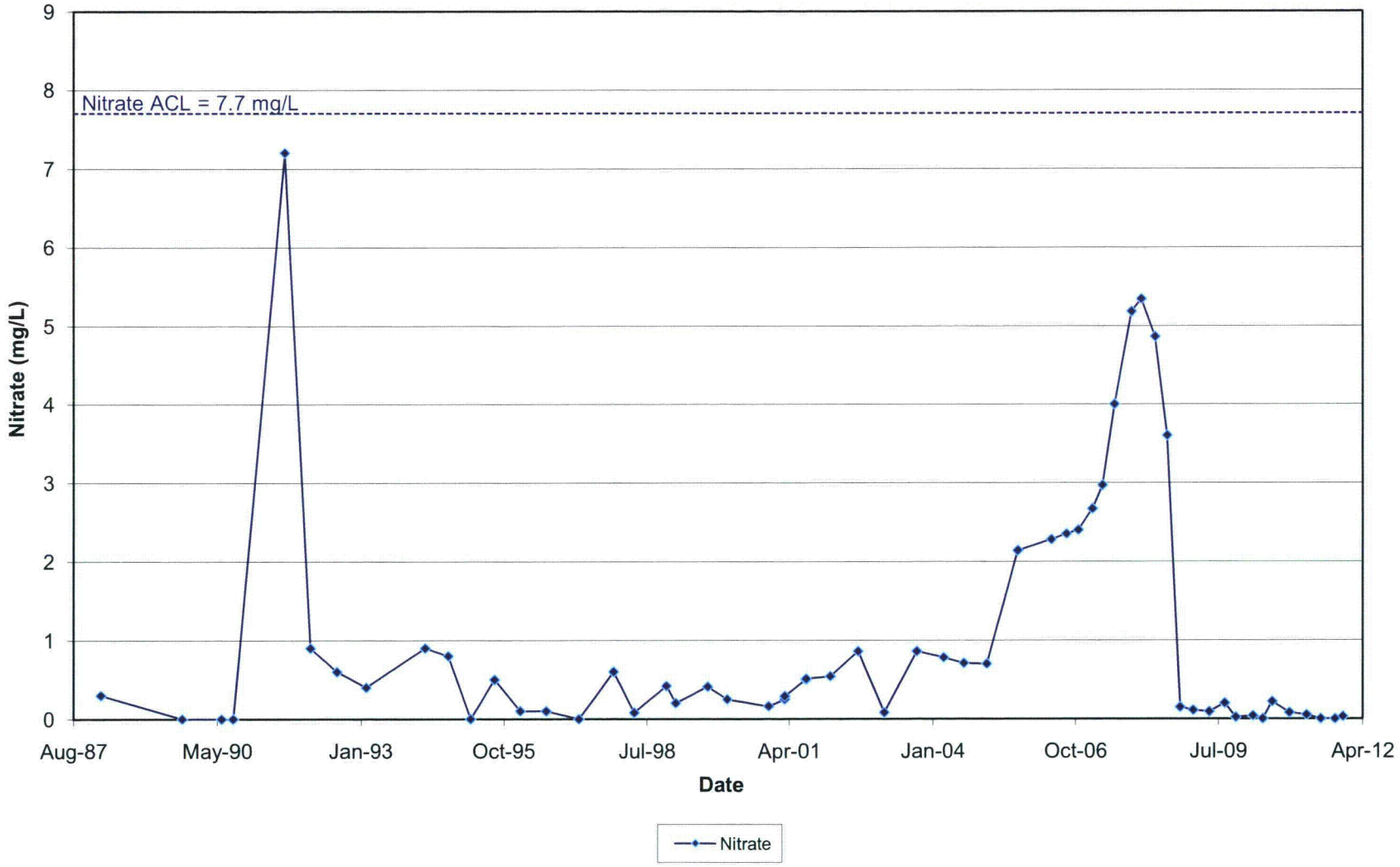
Anions and TDS in Monitoring Well 31-67



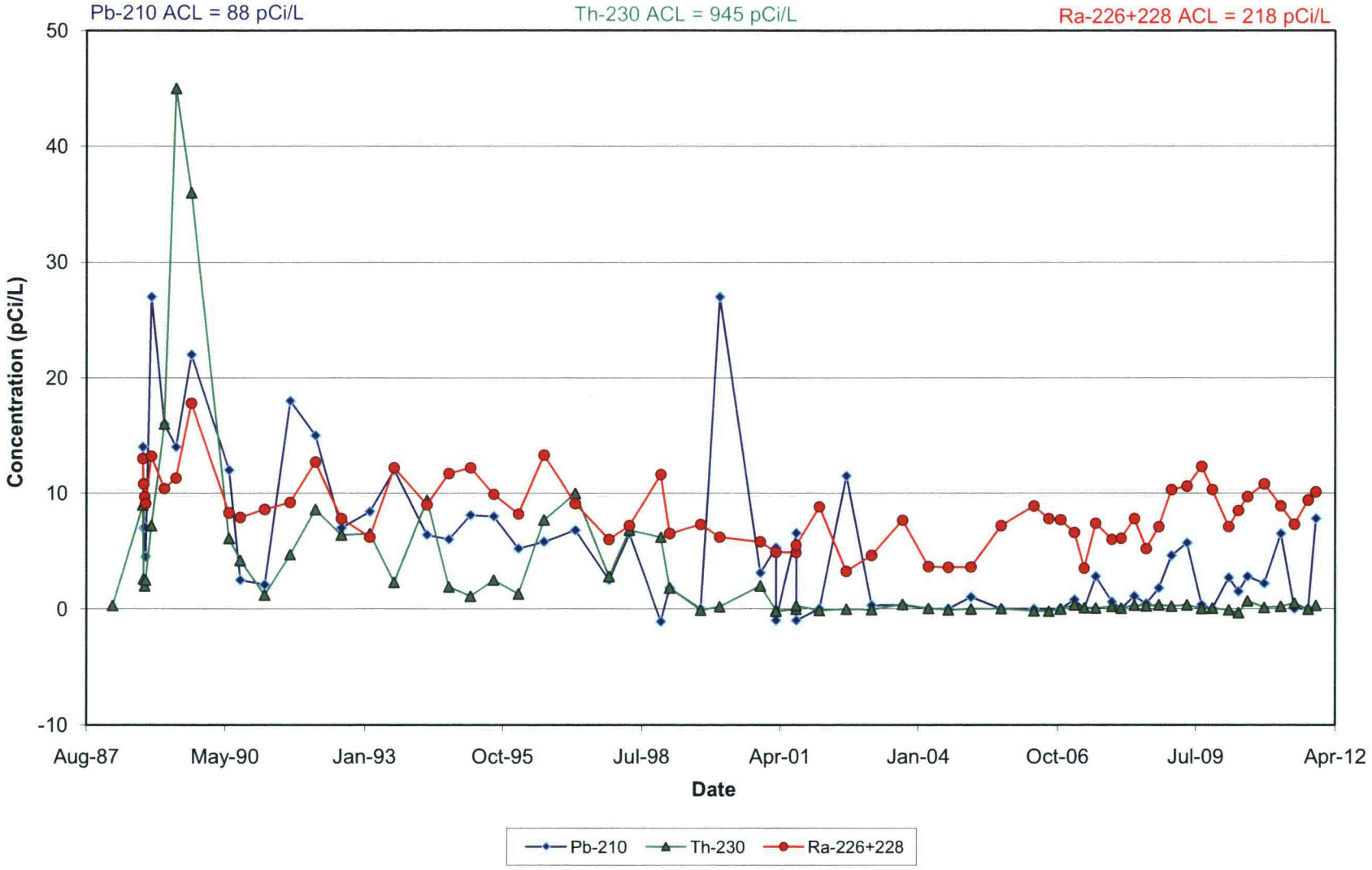
Metals in Monitoring Well 31-67



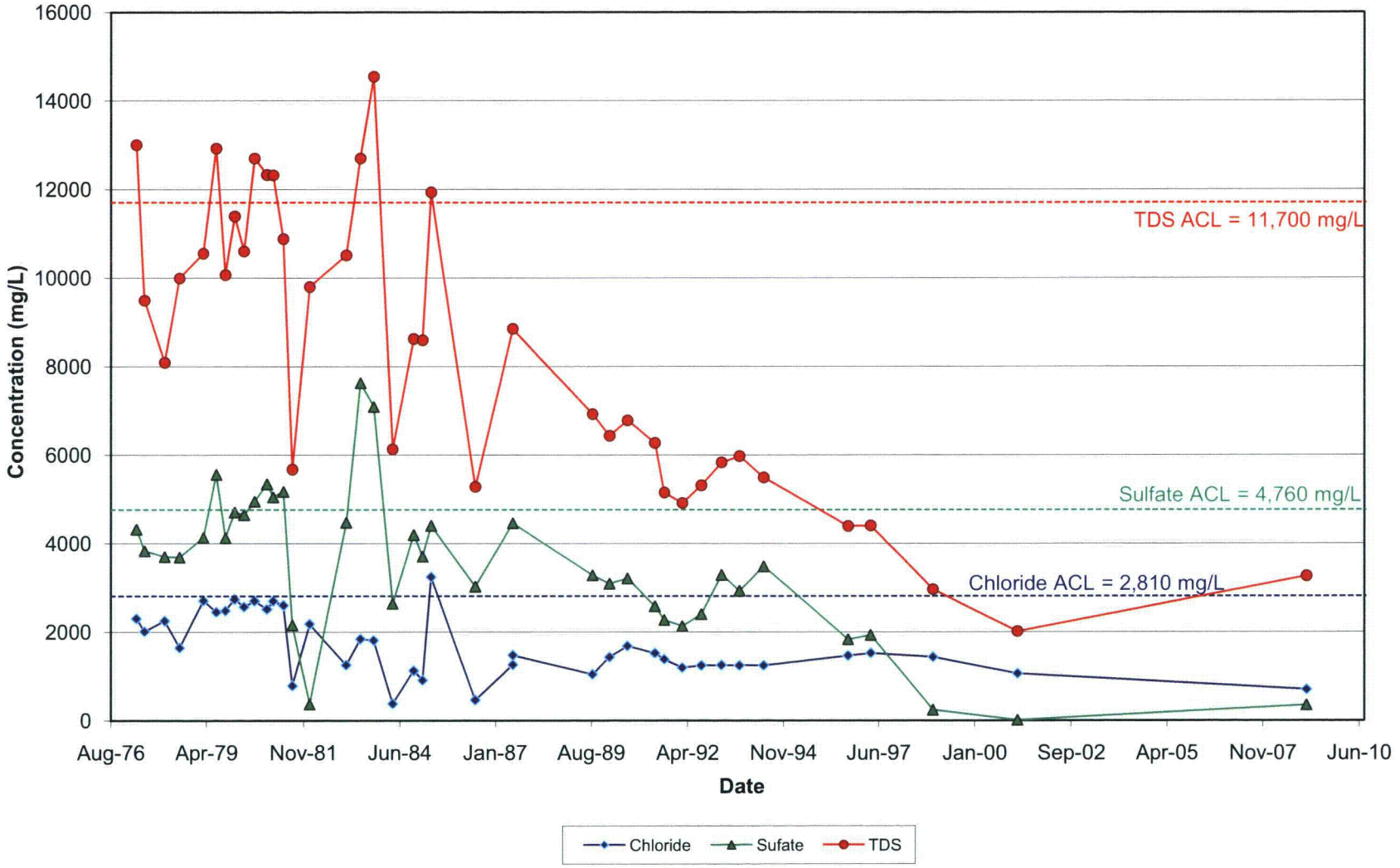
Nitrate in Monitoring Well 31-67



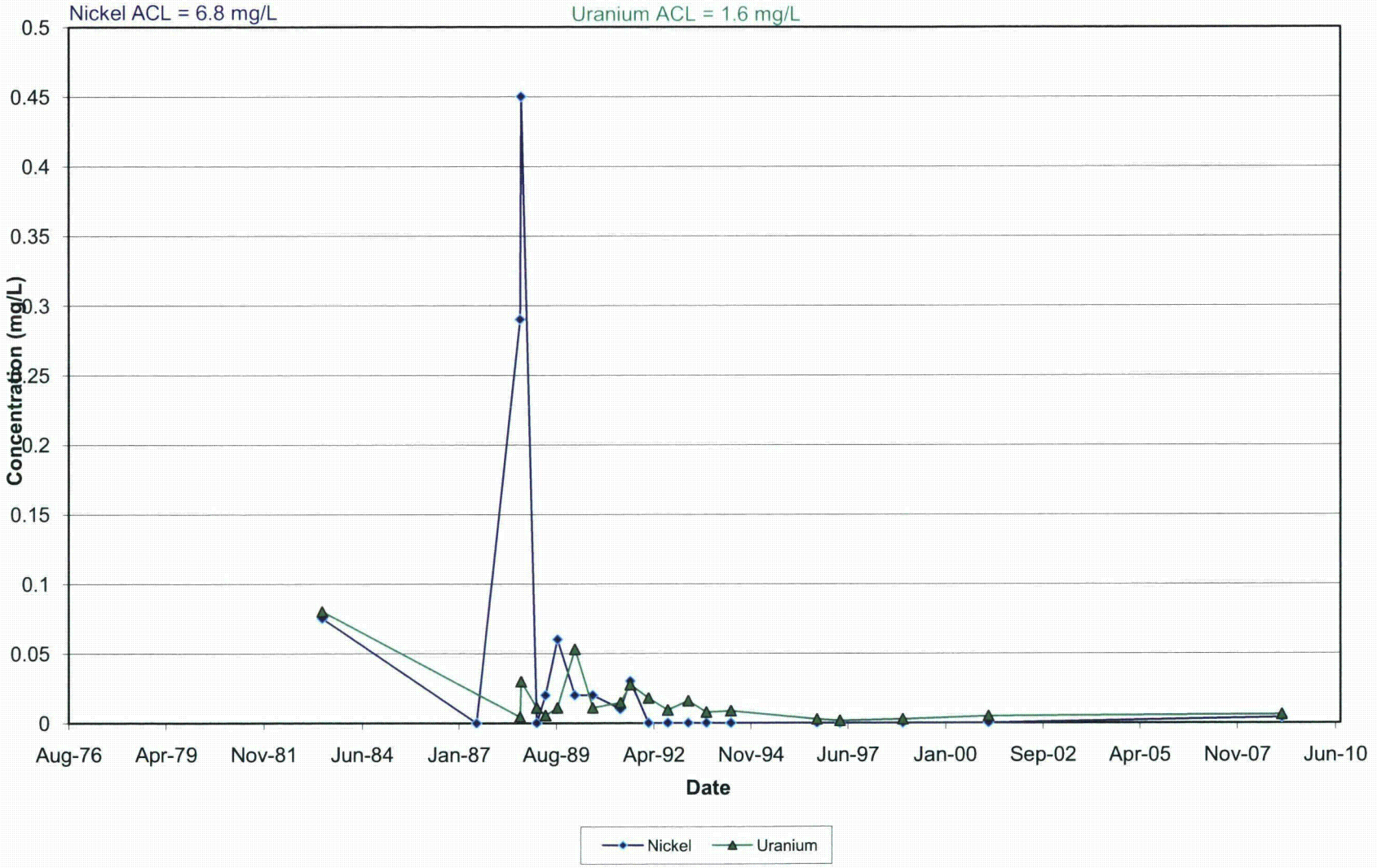
Radionuclides in Monitoring Well 31-67



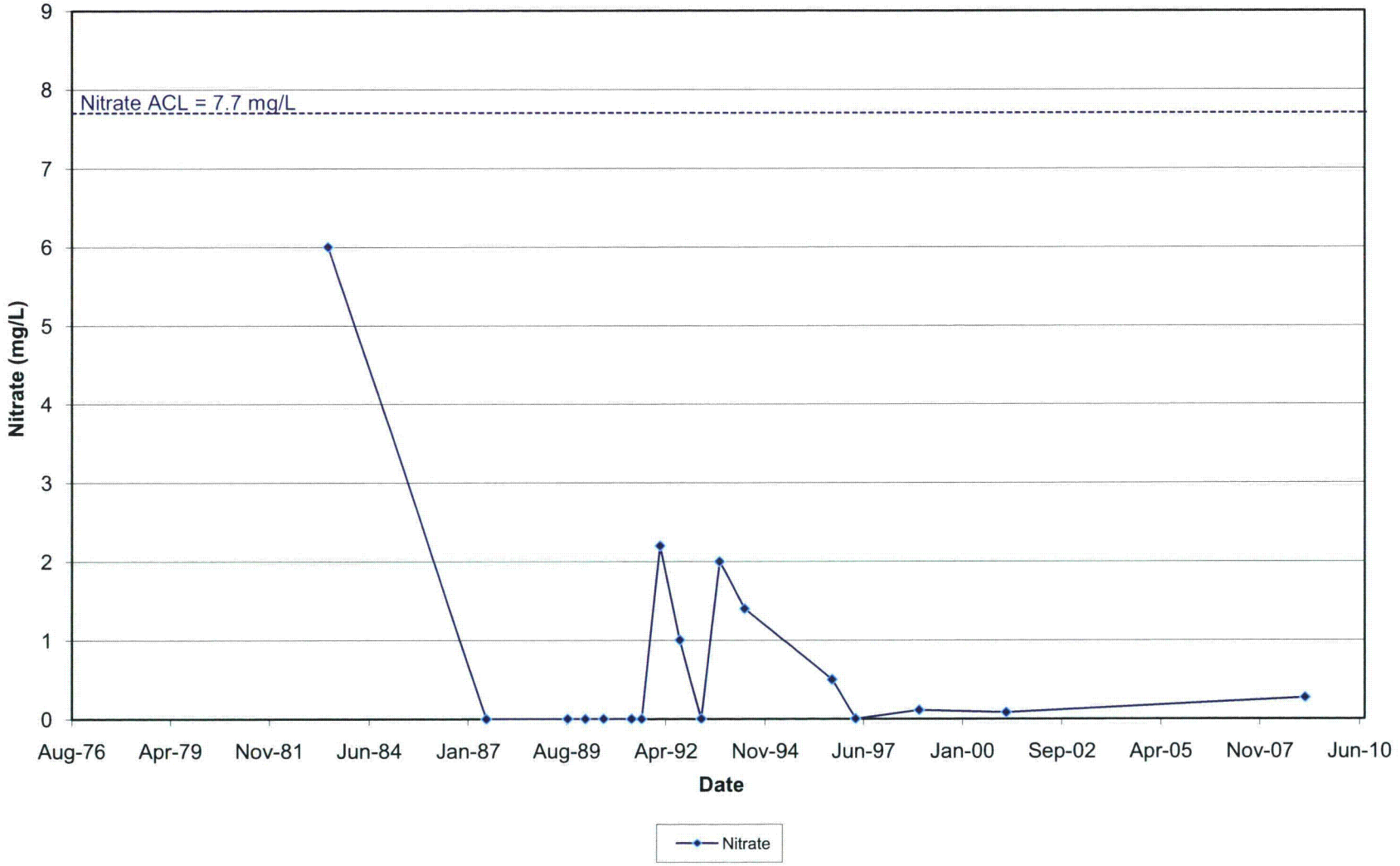
Anions and TDS in Monitoring Well 36-01TRB



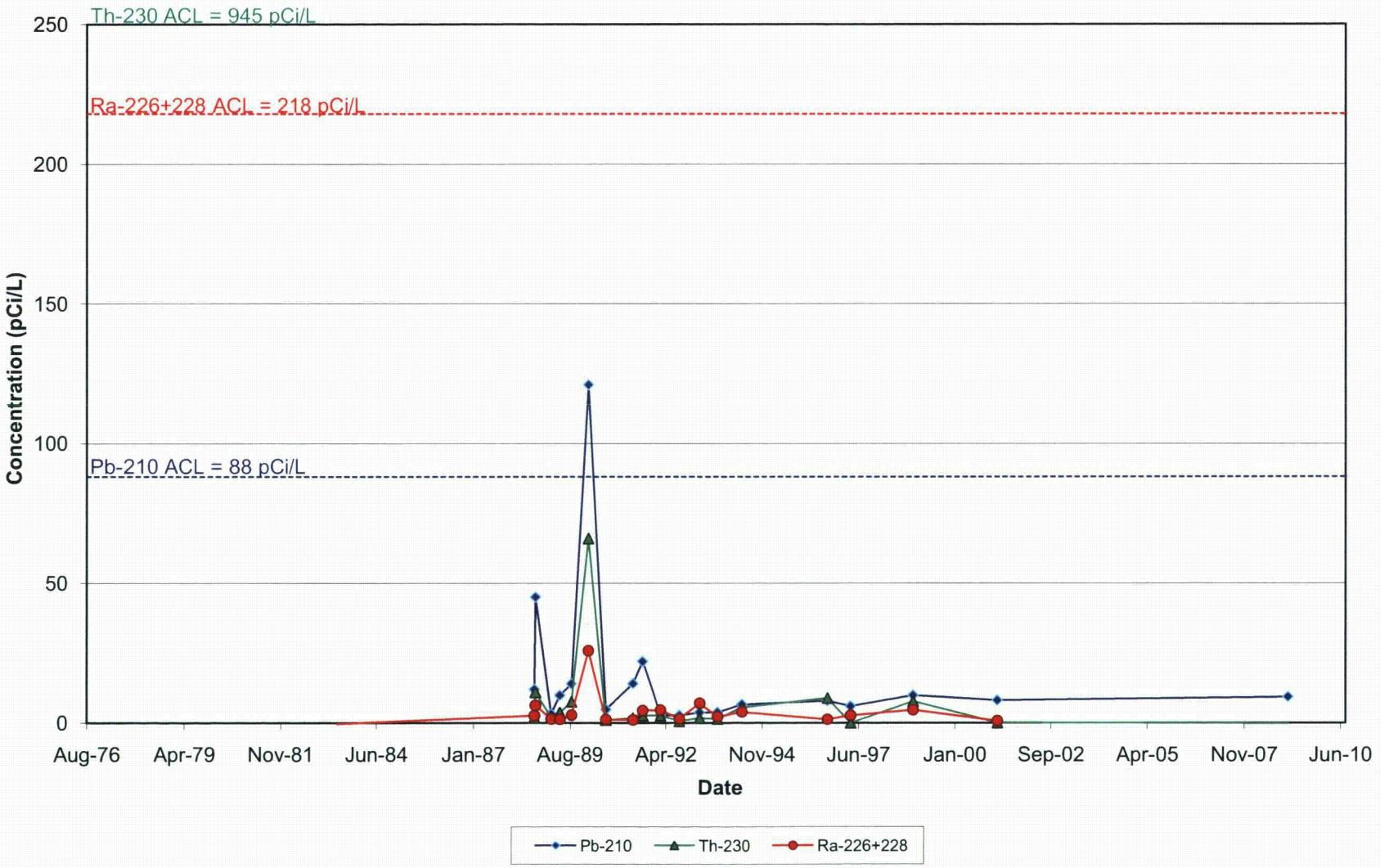
Metals in Monitoring Well 36-01TRB



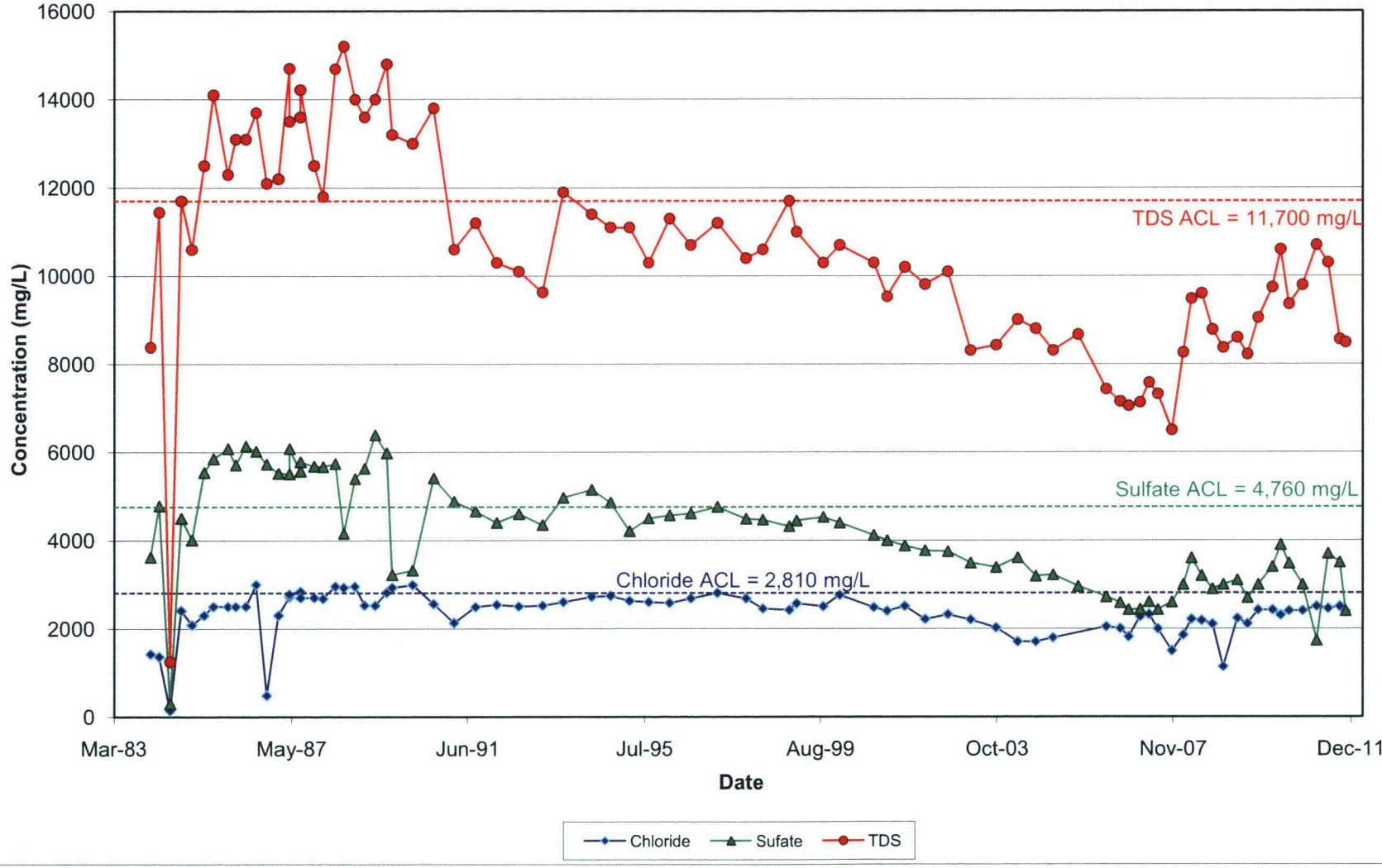
Nitrate in Monitoring Well 36-01TRB



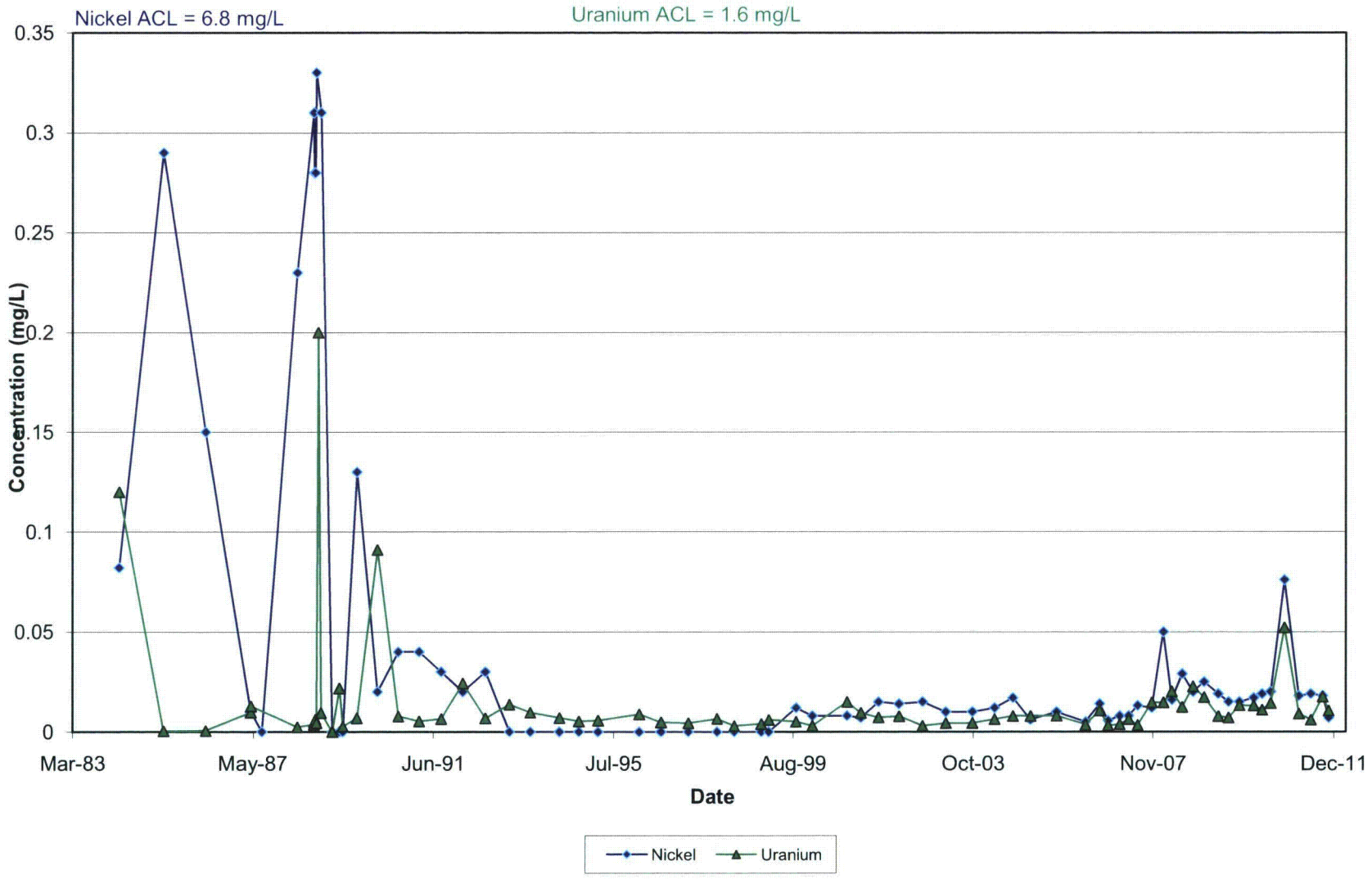
Radionuclides in Monitoring Well 36-01TRB



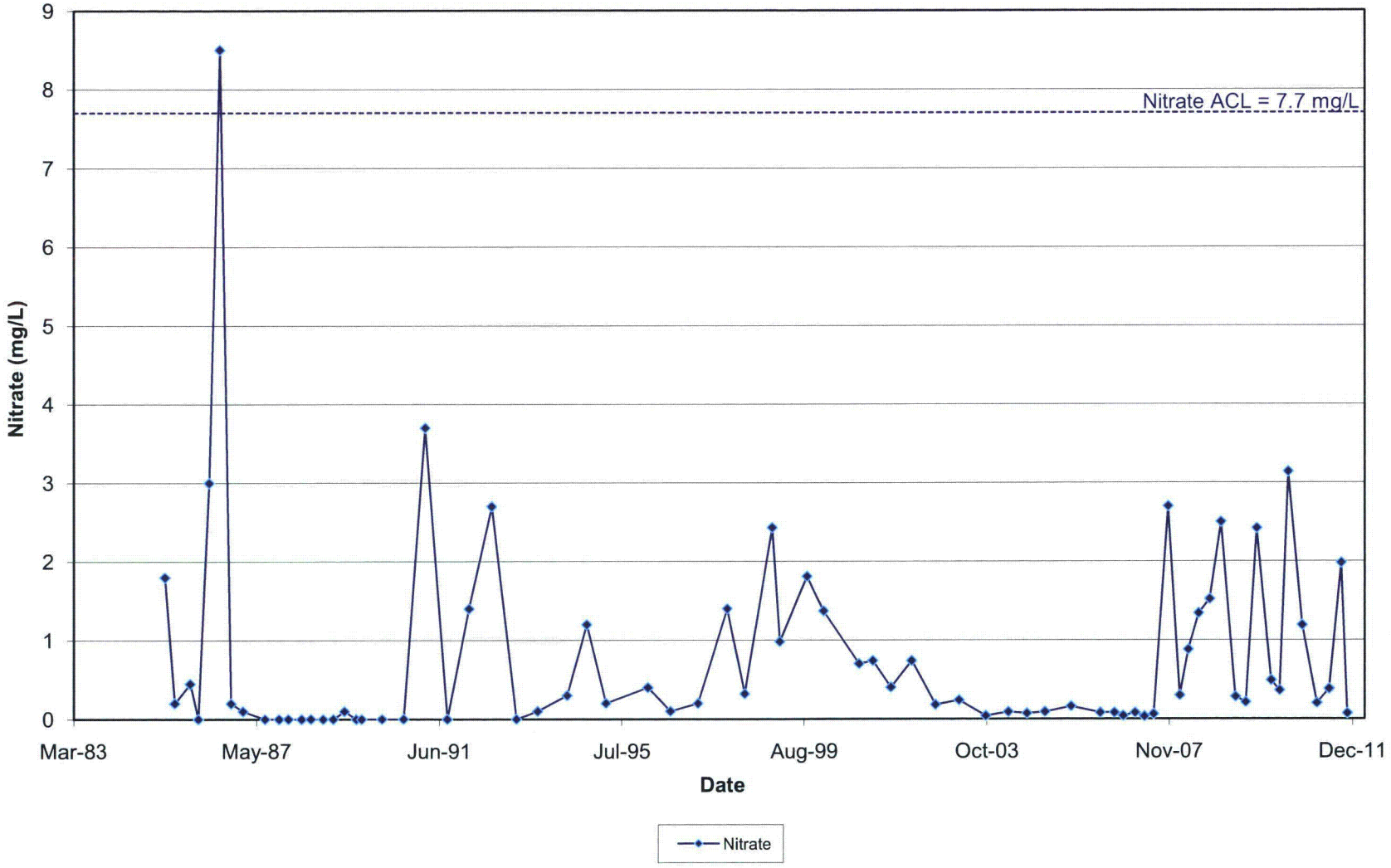
Chloride, Sulfate, and TDS in Monitoring Well 36-02



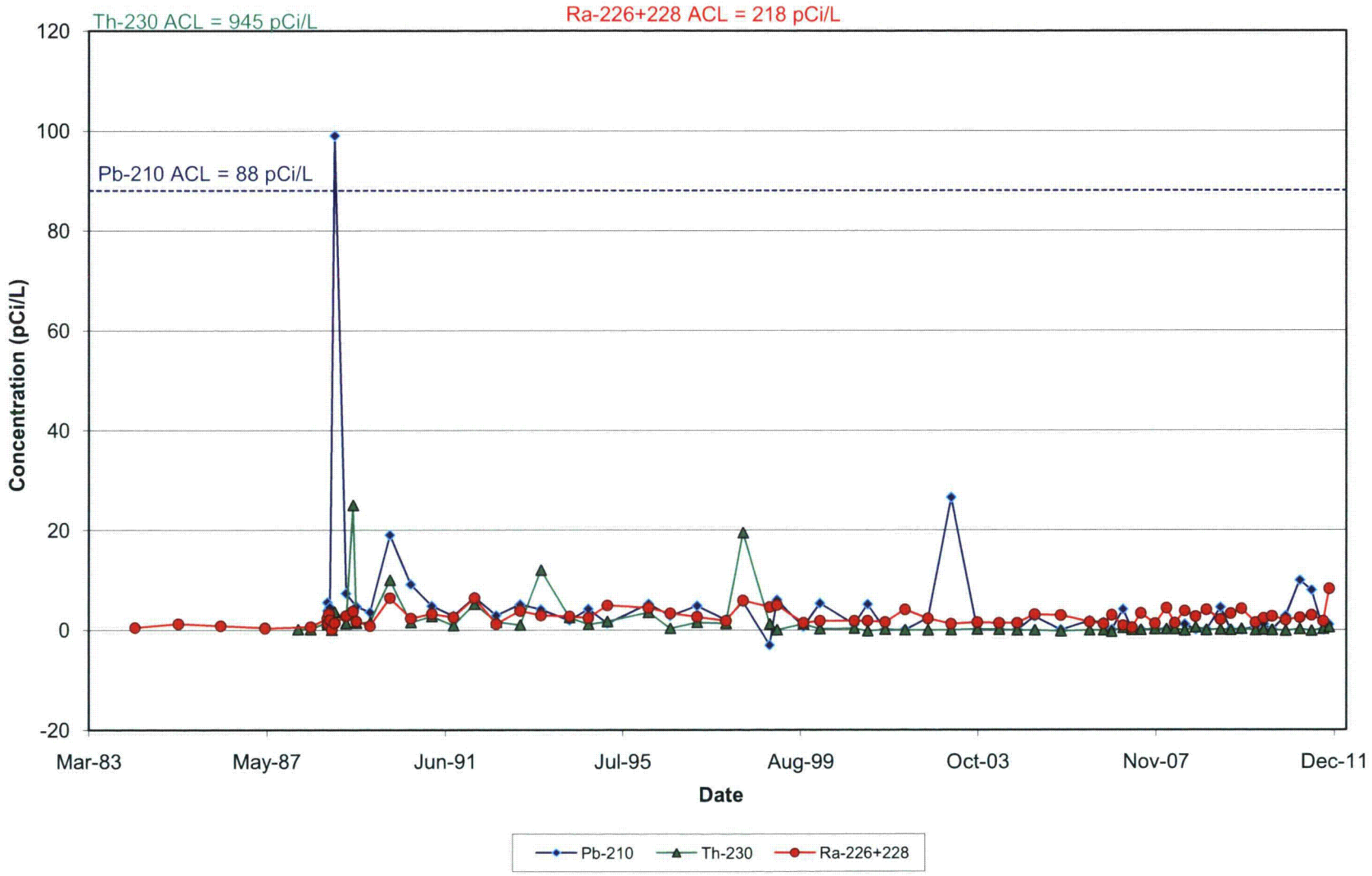
Metals in Monitoring Well 36-02



Nitrate in Monitoring Well 36-02



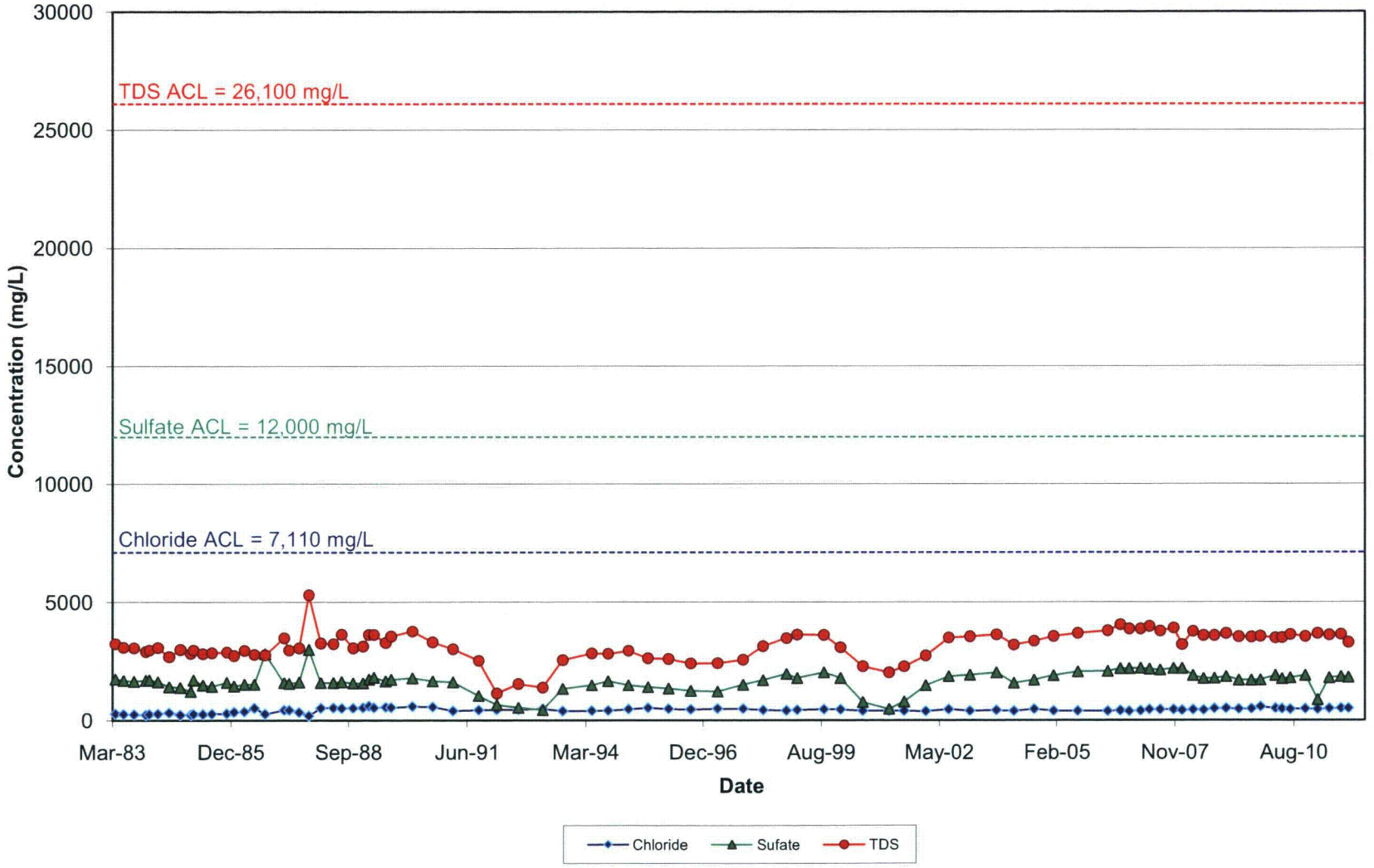
Radionuclides in Monitoring Well 36-02



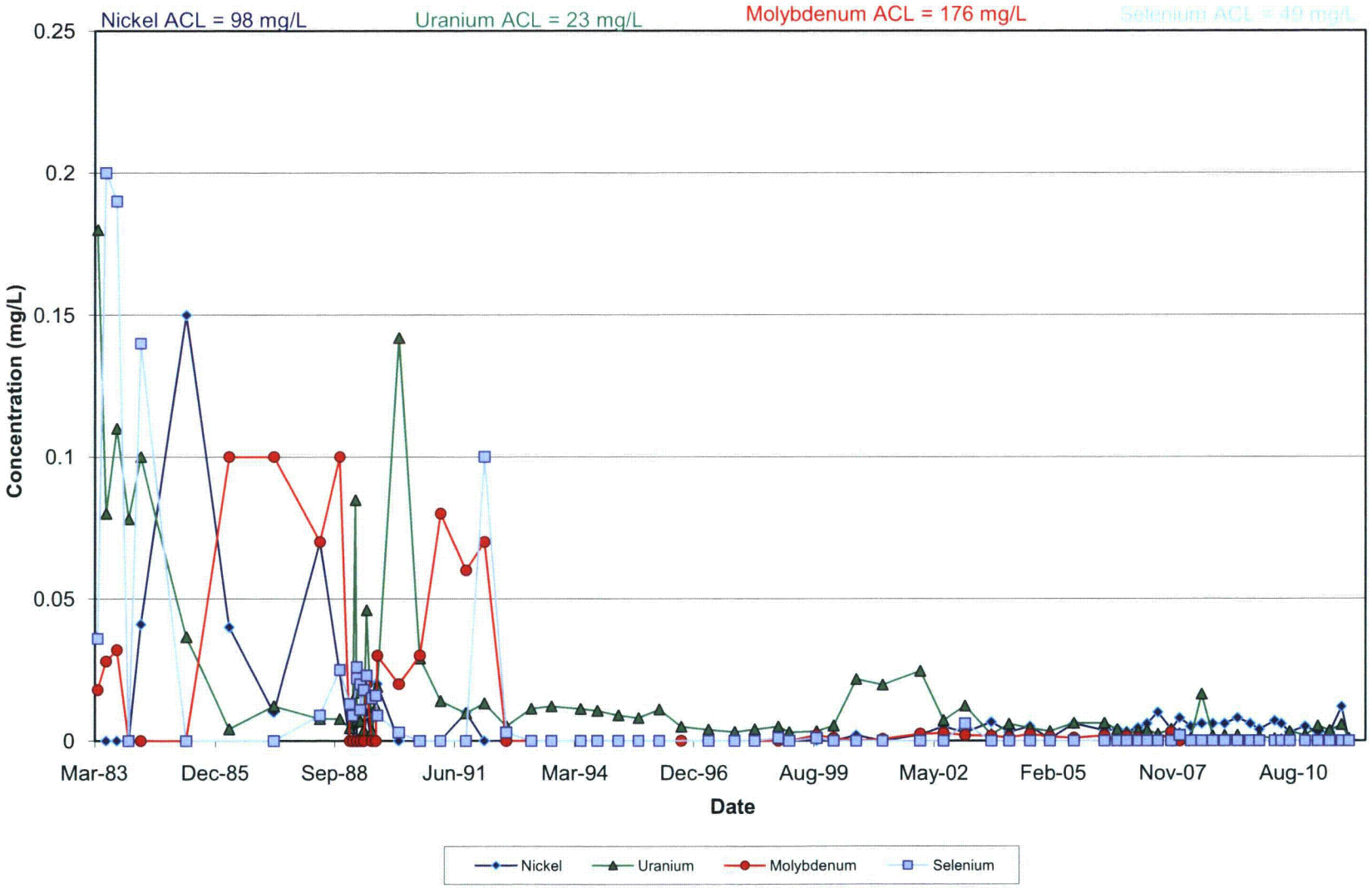
Stability Monitoring Plan
Time Versus Concentration Plots

Alluvium

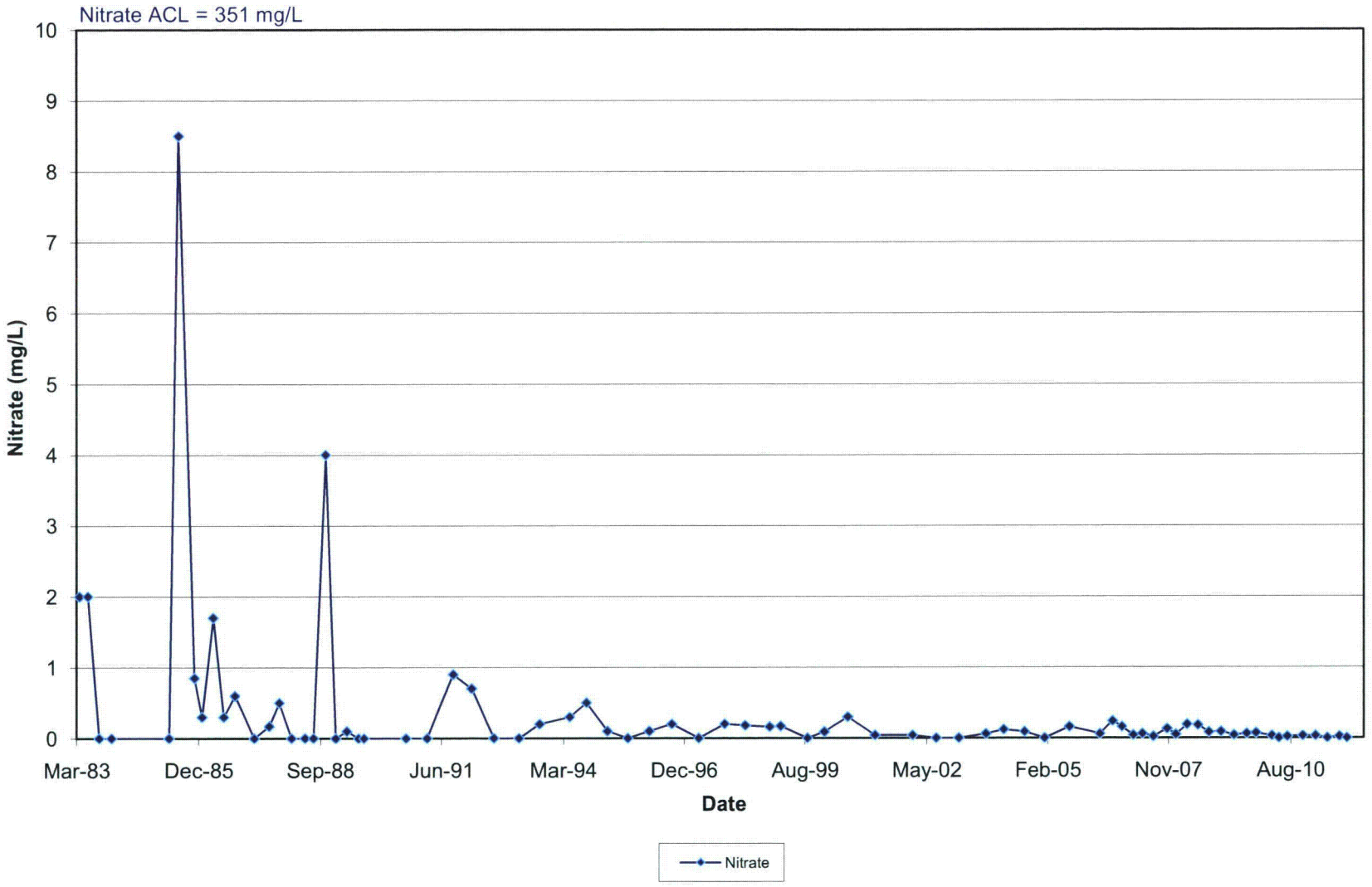
Anions and TDS in Monitoring Well 5-03



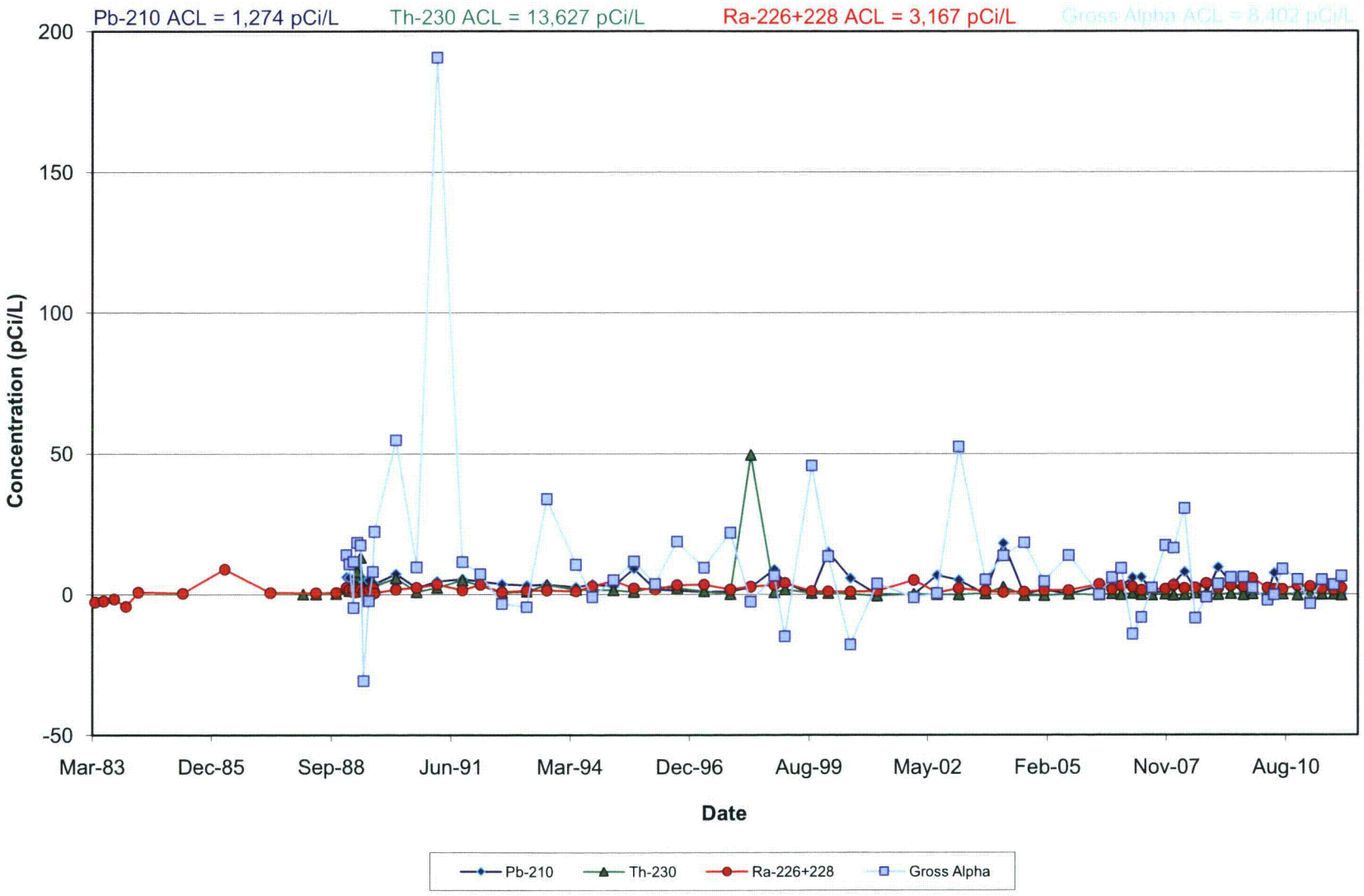
Metals in Monitoring Well 5-03



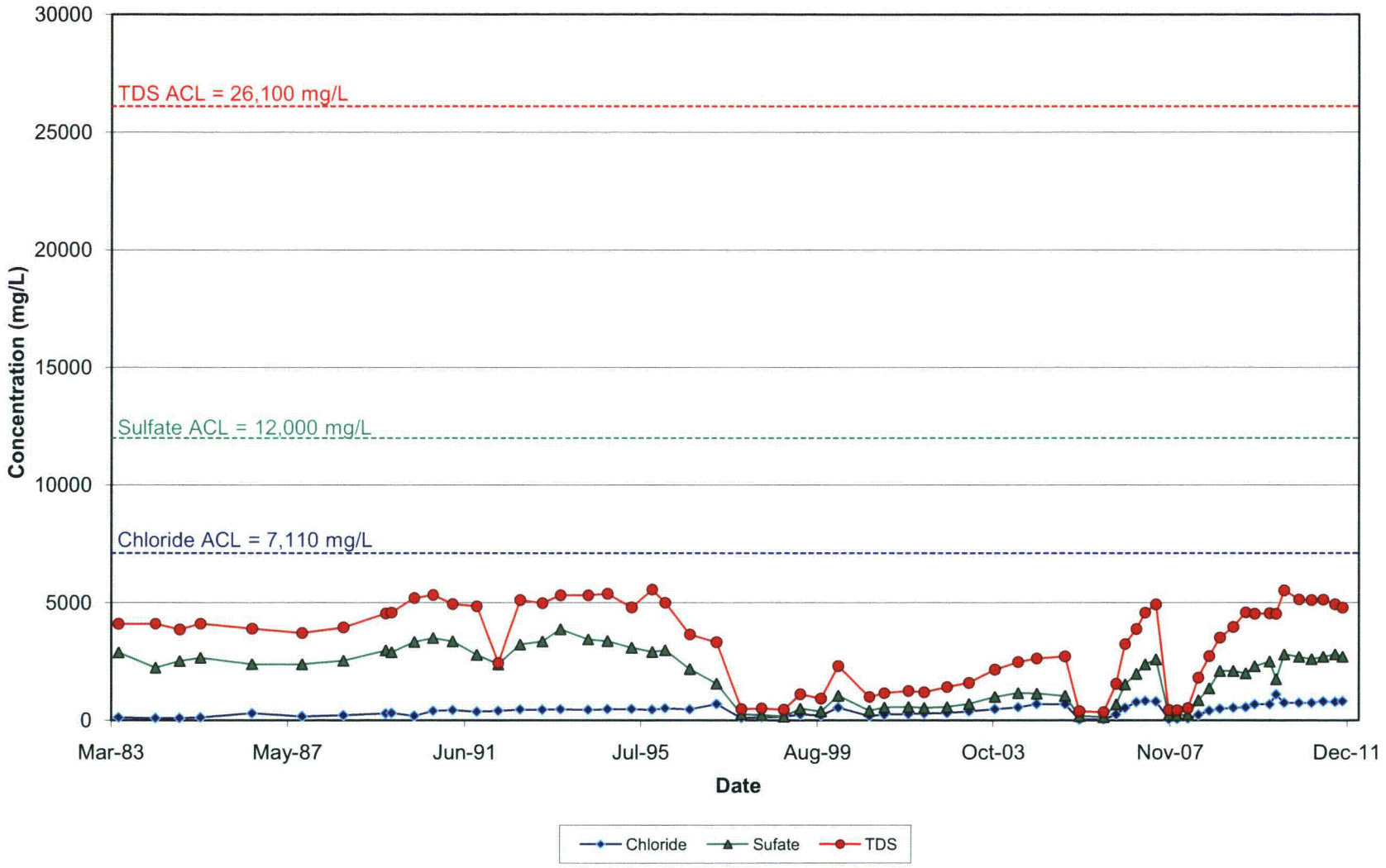
Nitrate in Monitoring Well 5-03



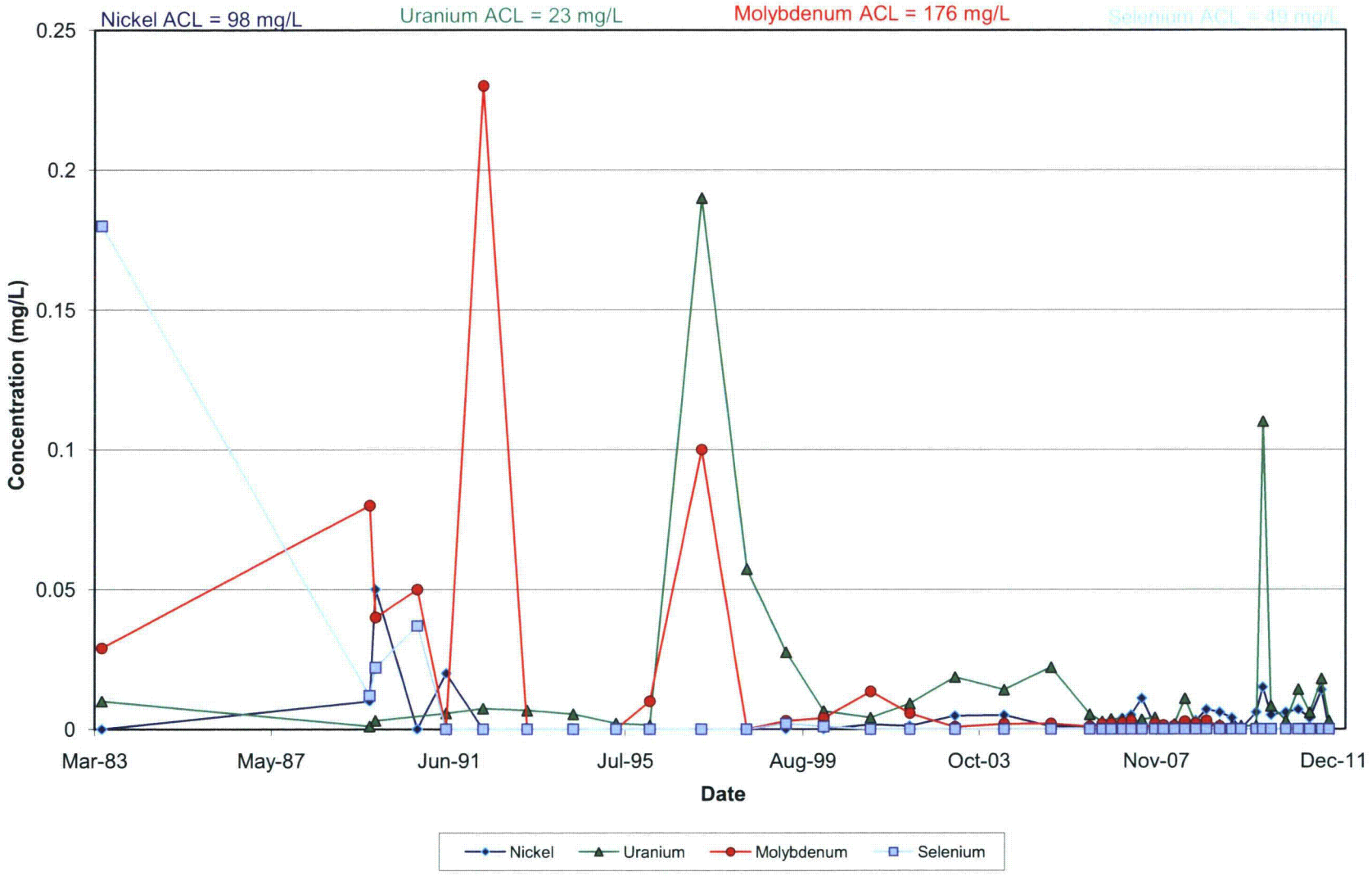
Radionuclides in Monitoring Well 5-03



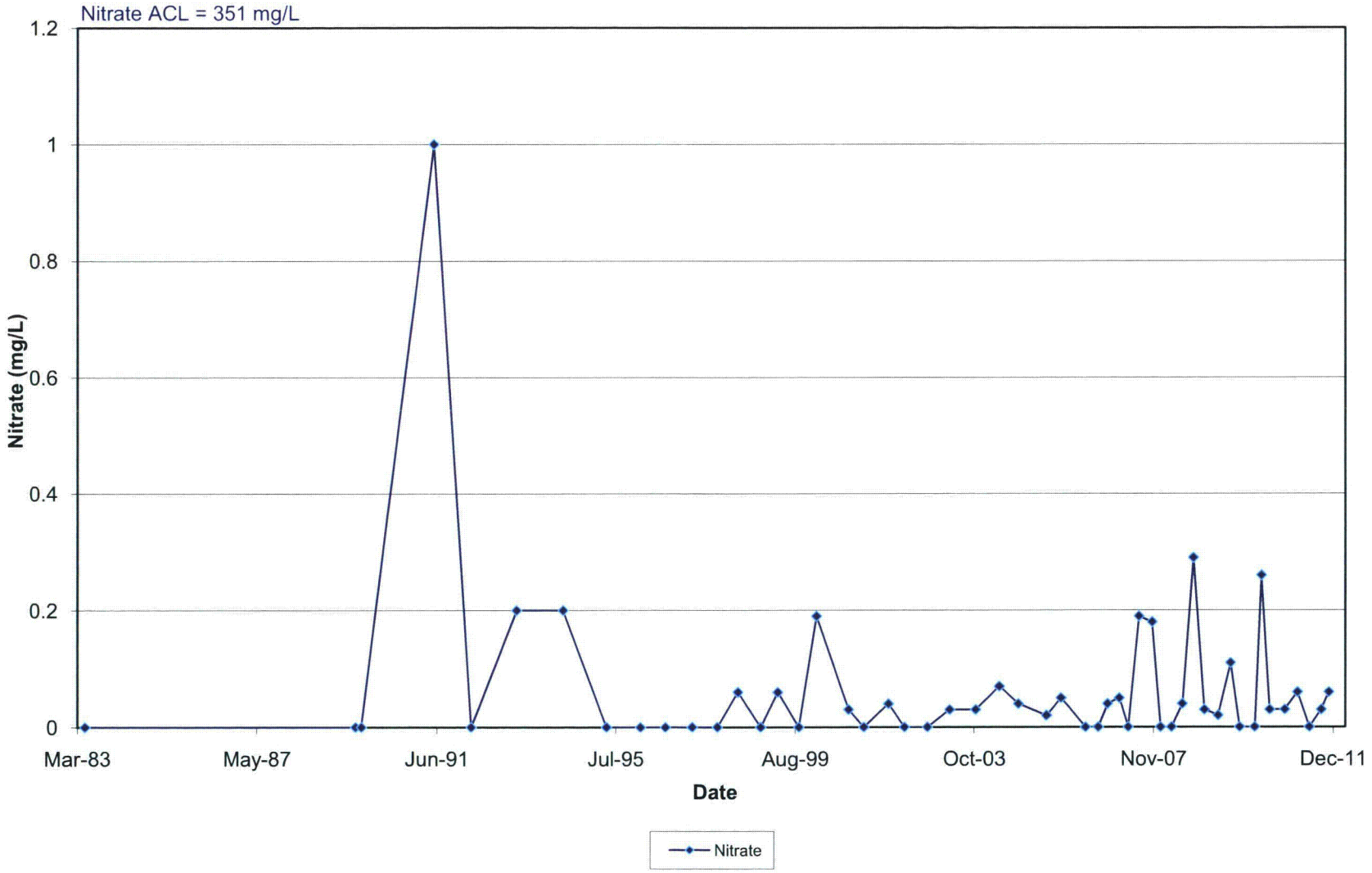
Anions and TDS in Monitoring Well 5-04



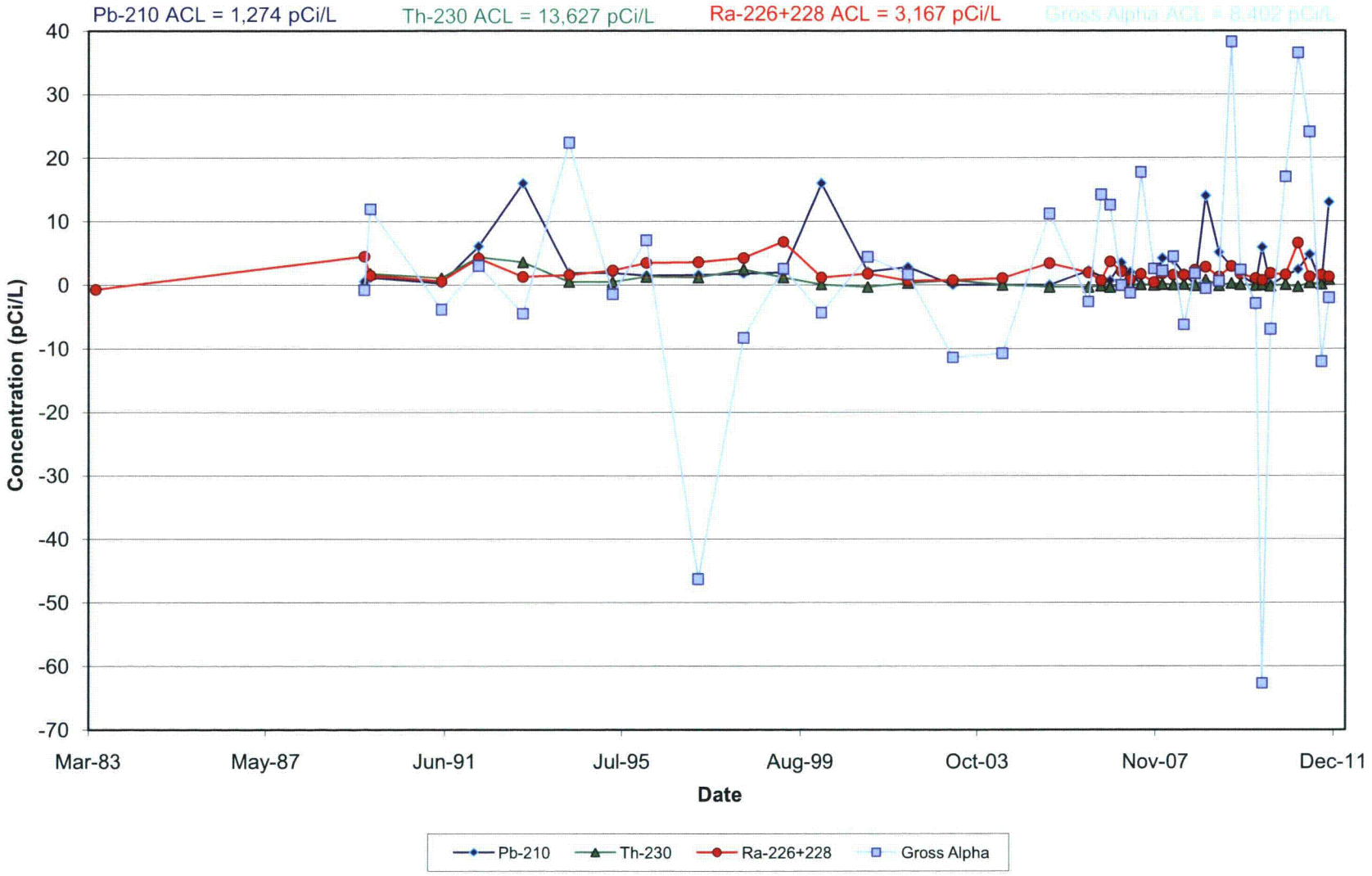
Metals in Monitoring Well 5-04



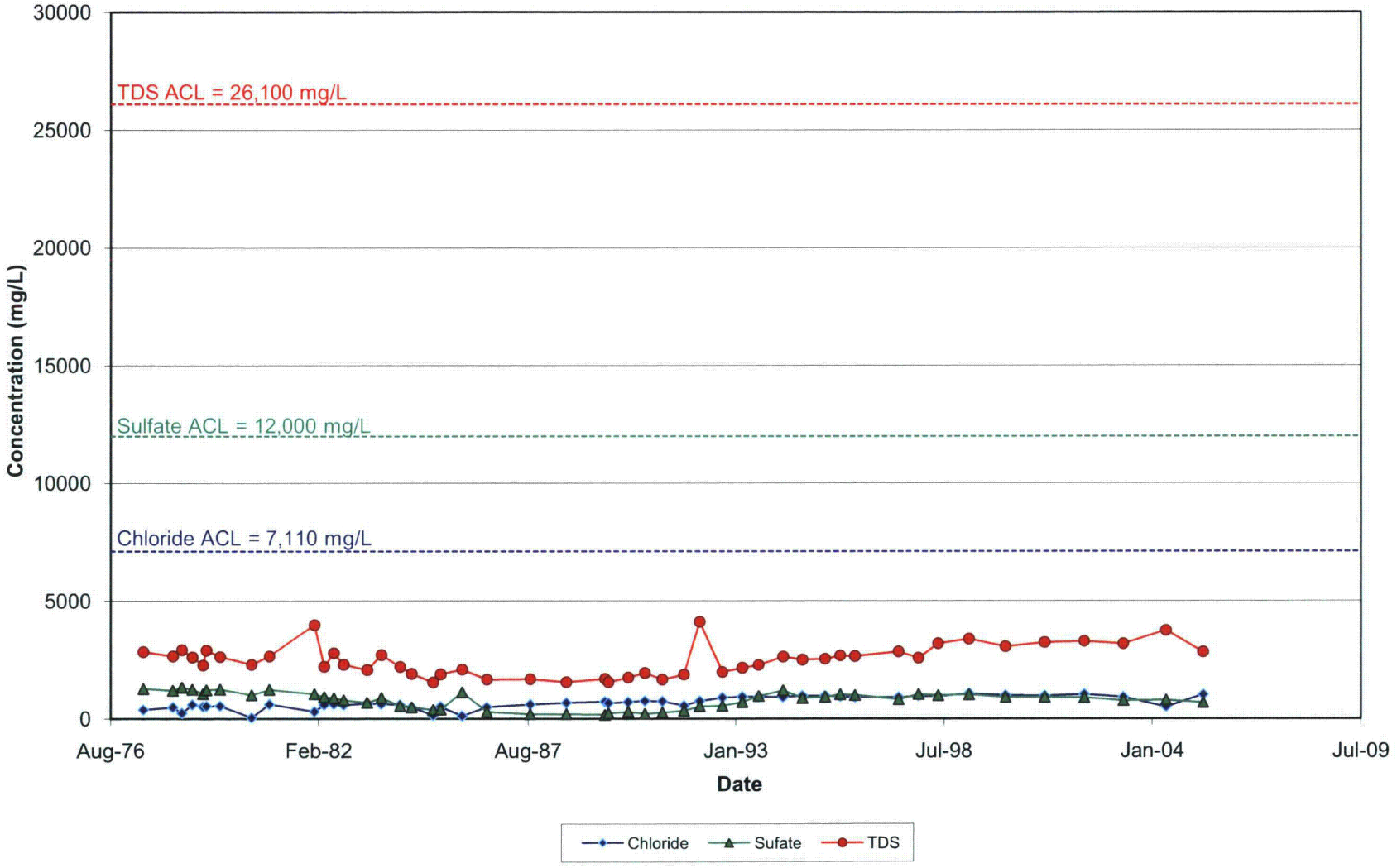
Nitrate in Monitoring Well 5-04



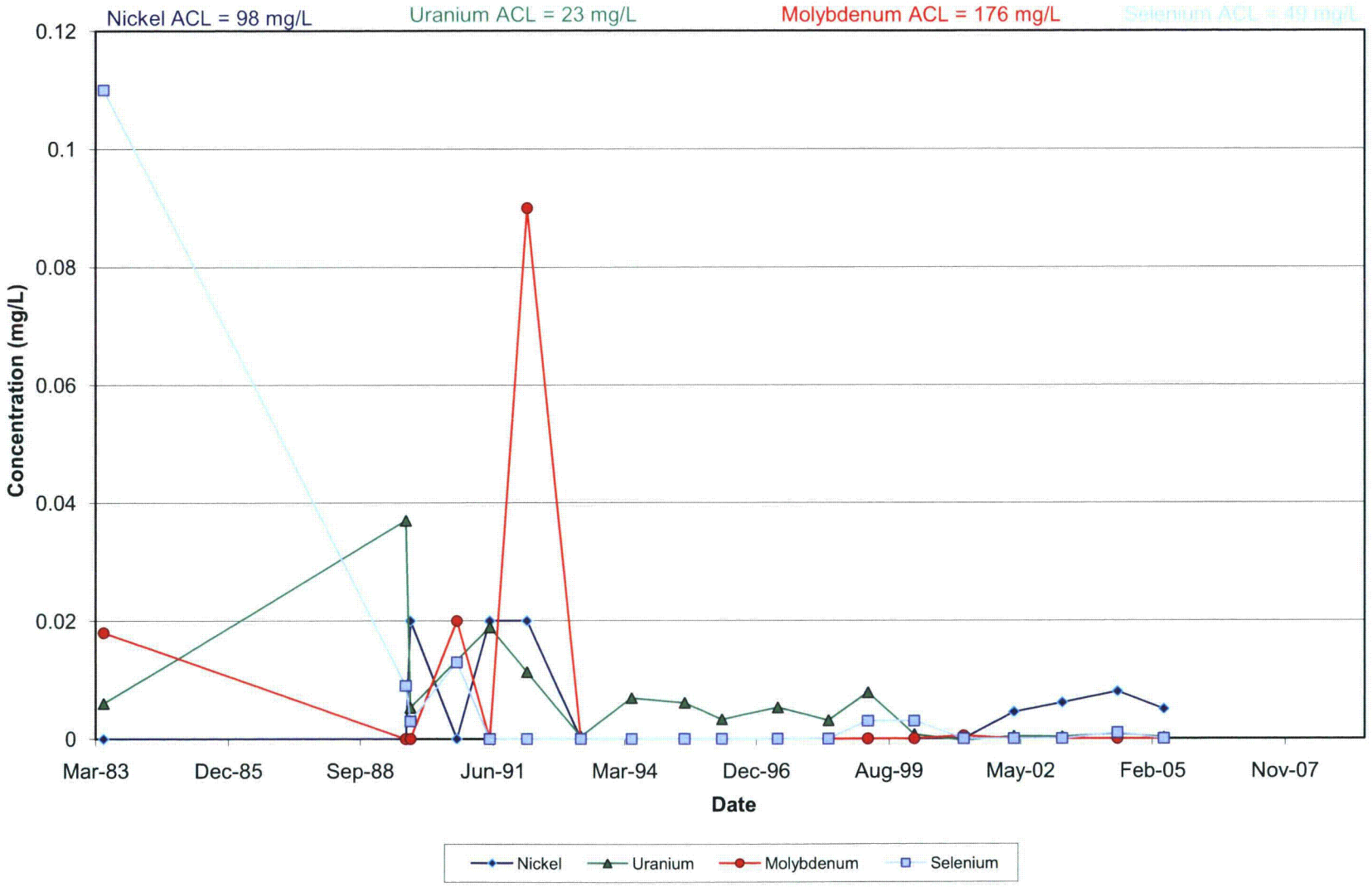
Radionuclides in Monitoring Well 5-04



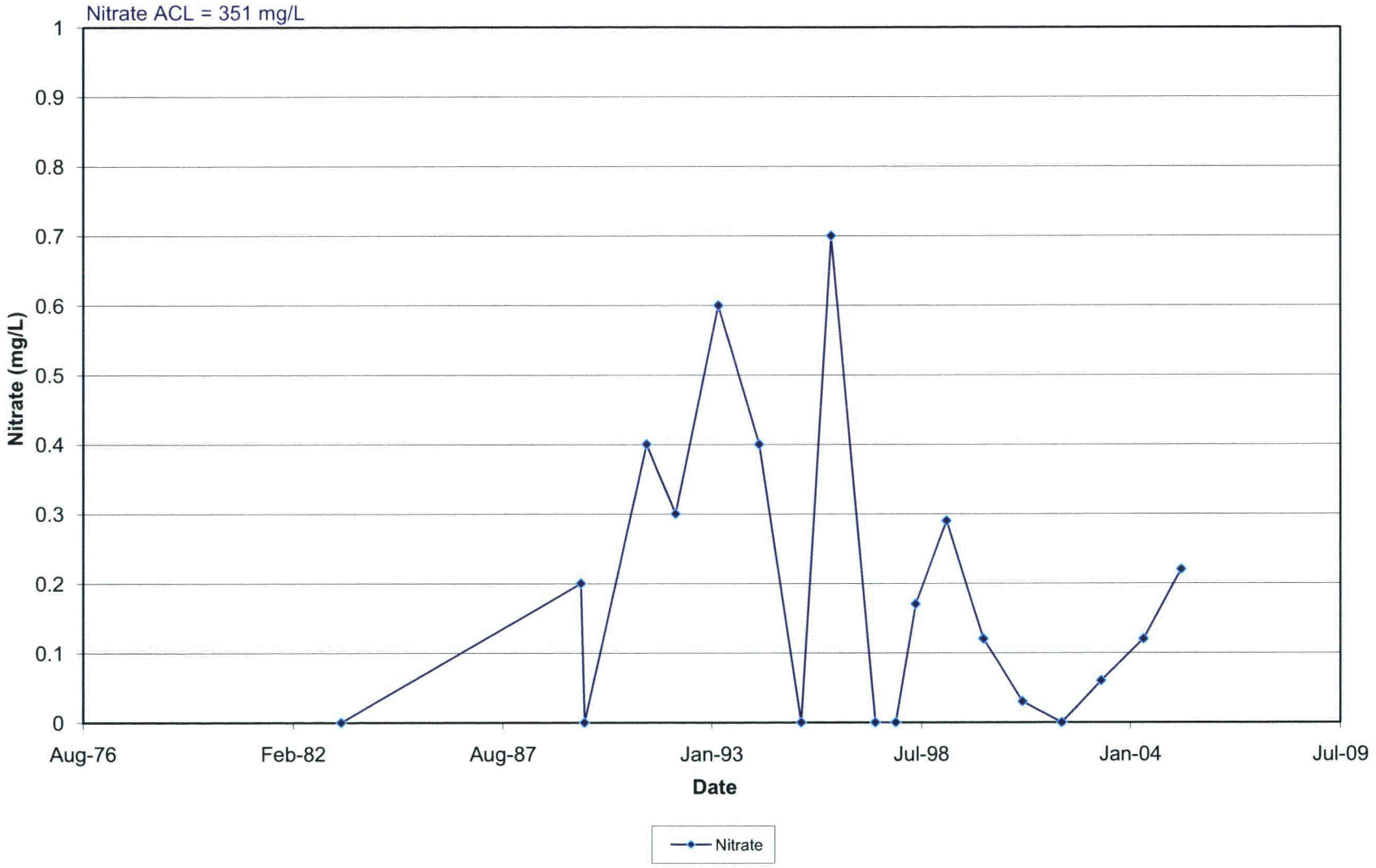
Anions and TDS in Monitoring Well 5-05



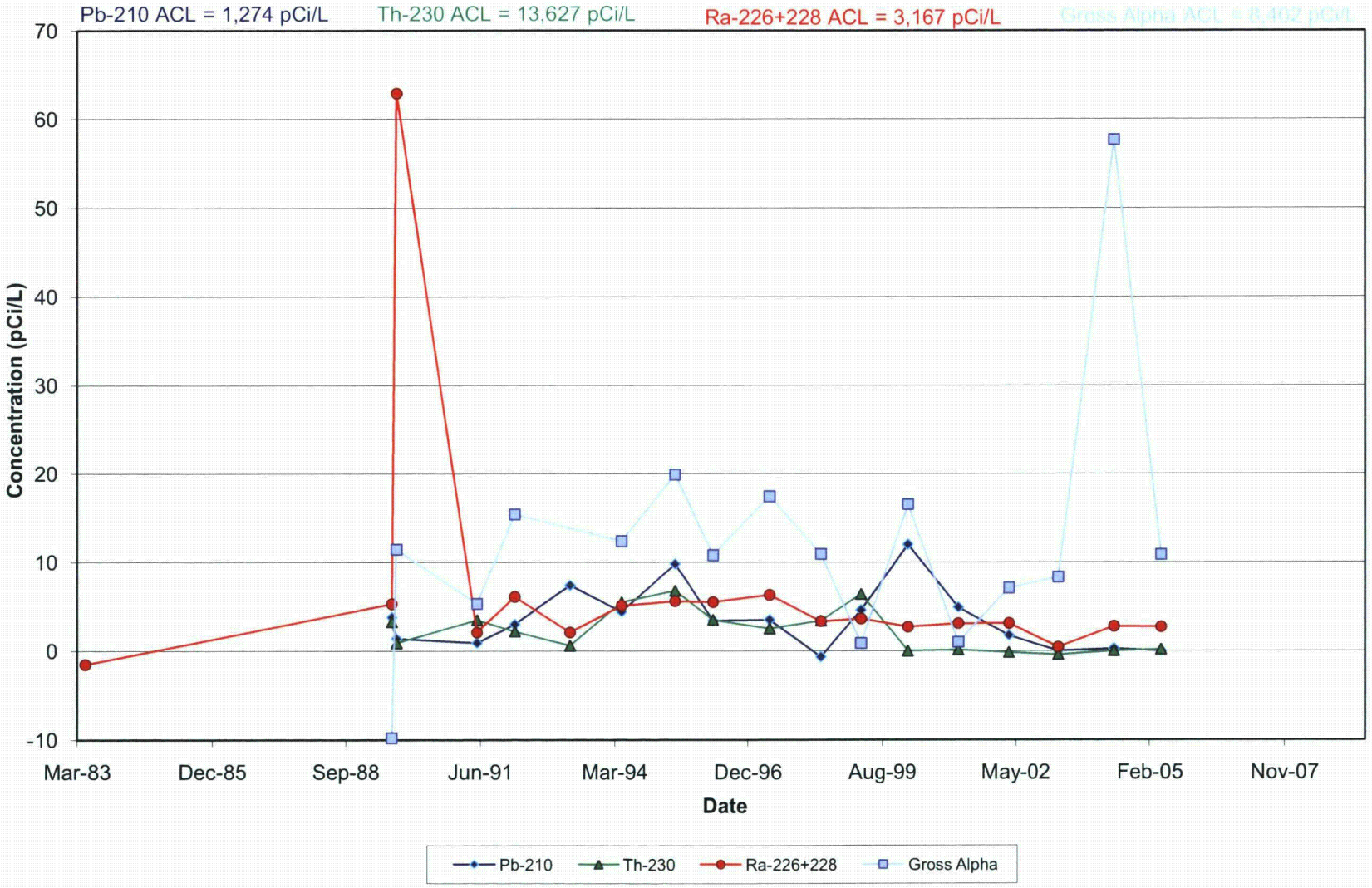
Metals in Monitoring Well 5-05



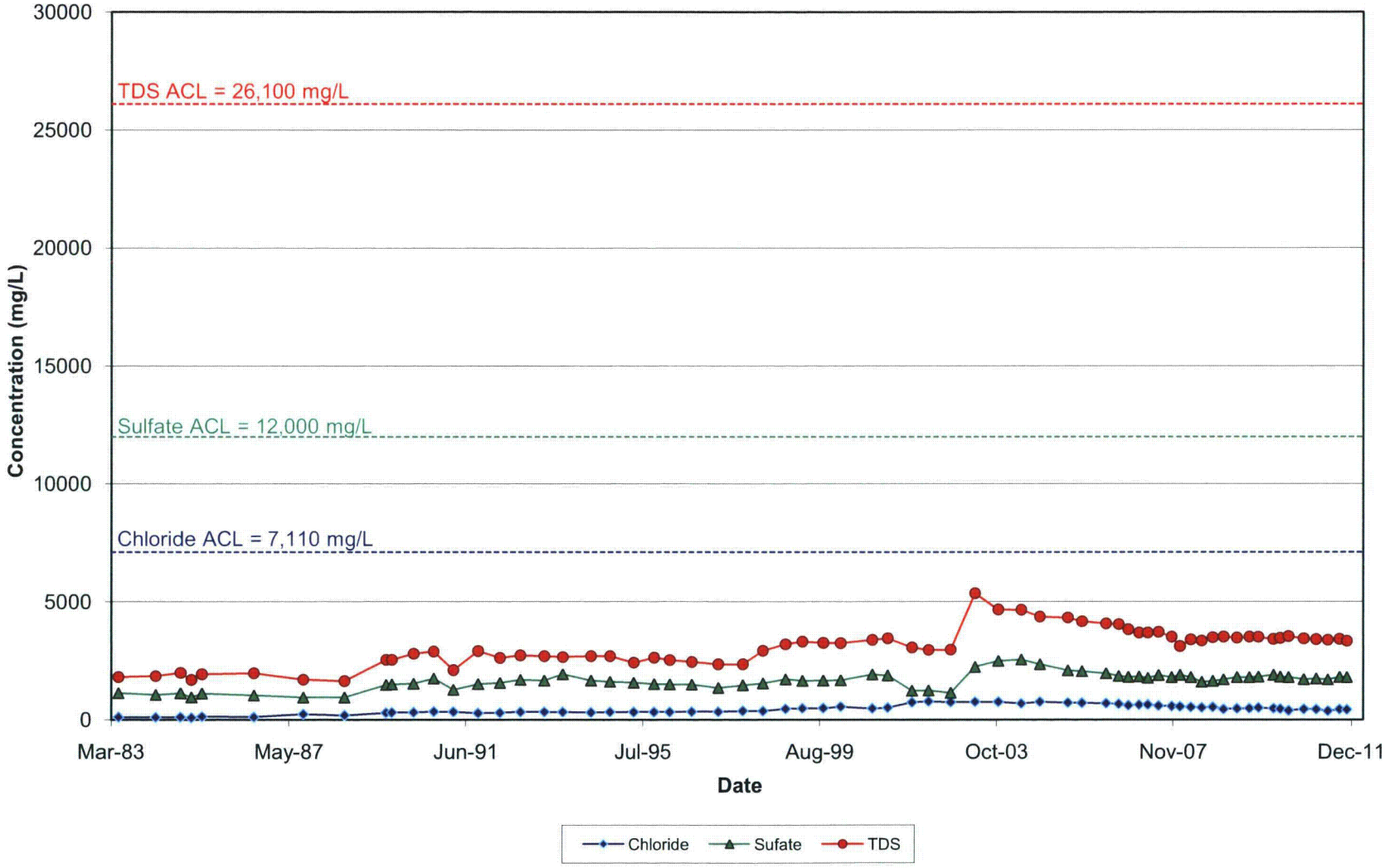
Nitrate in Monitoring Well 5-05



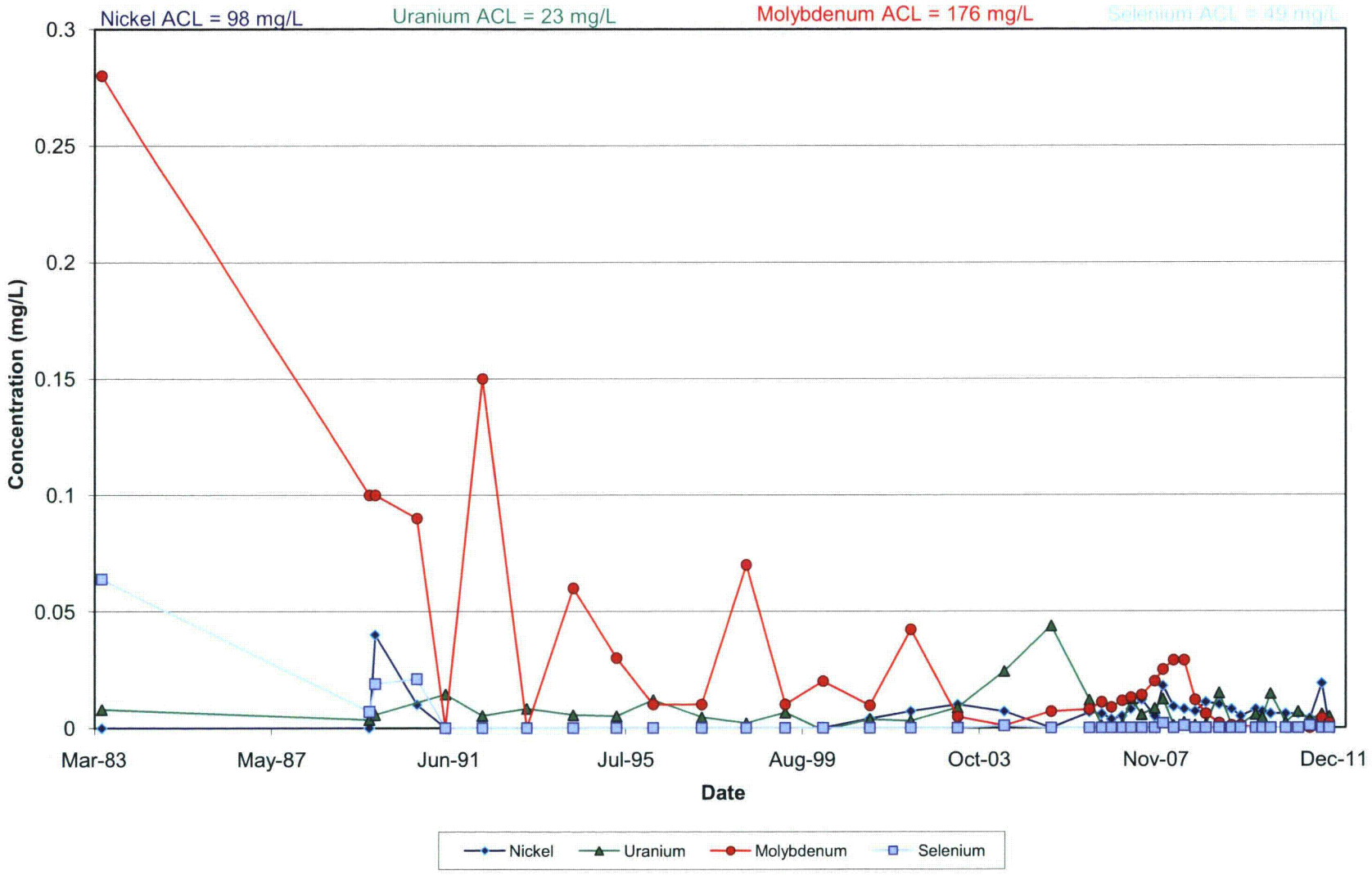
Radionuclides in Monitoring Well 5-05



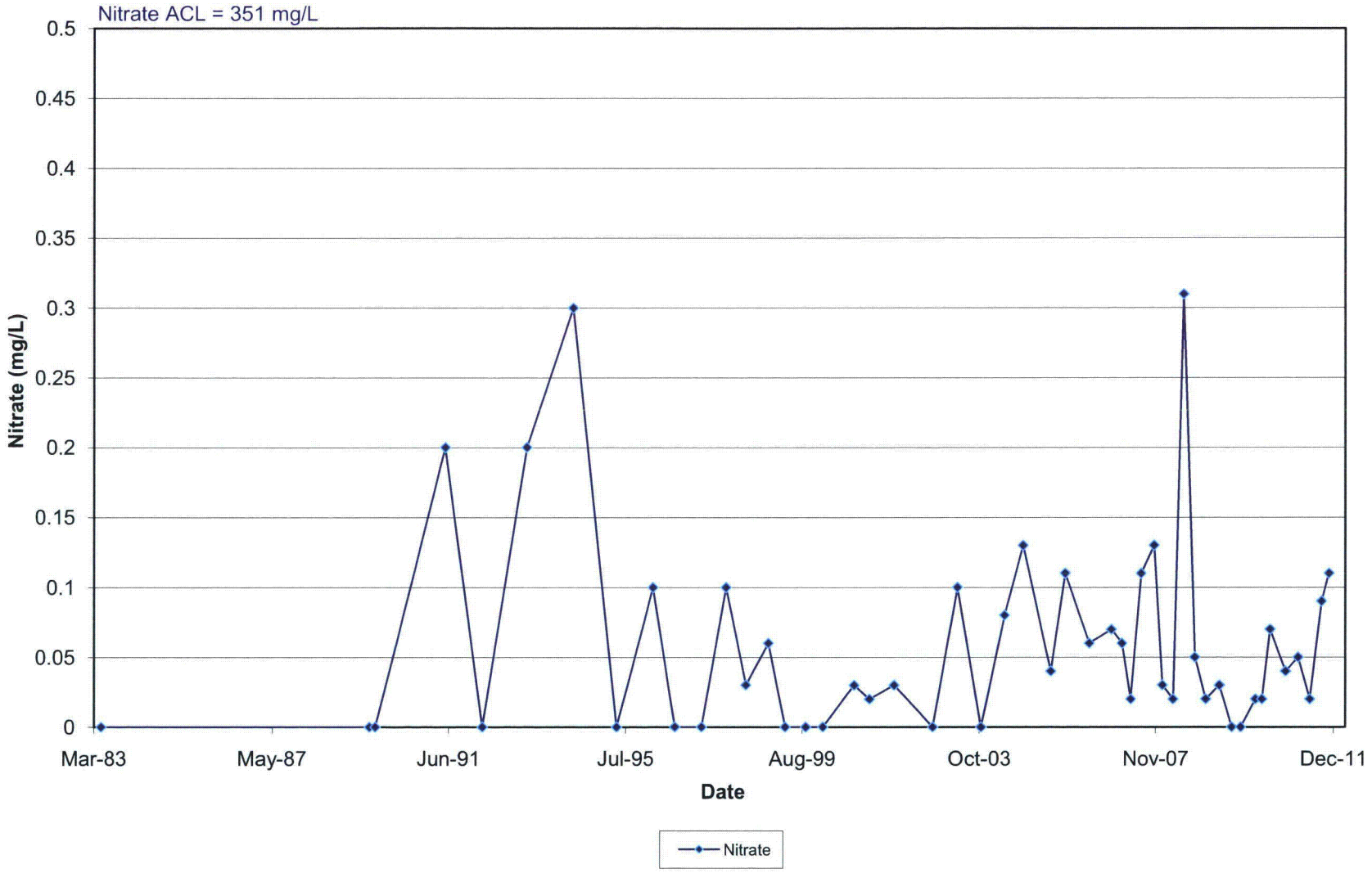
Anions and TDS in Monitoring Well 5-08



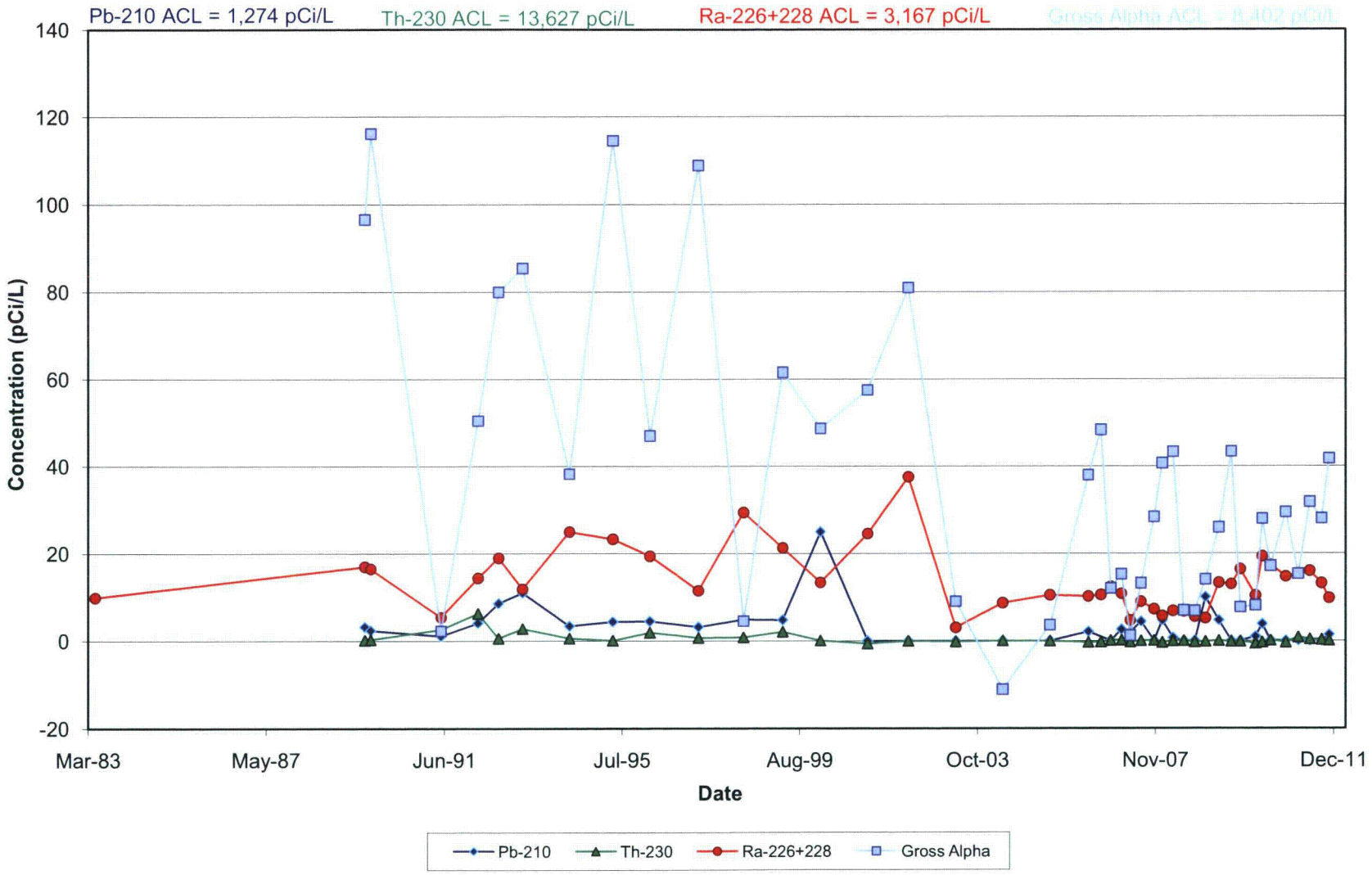
Metals in Monitoring Well 5-08



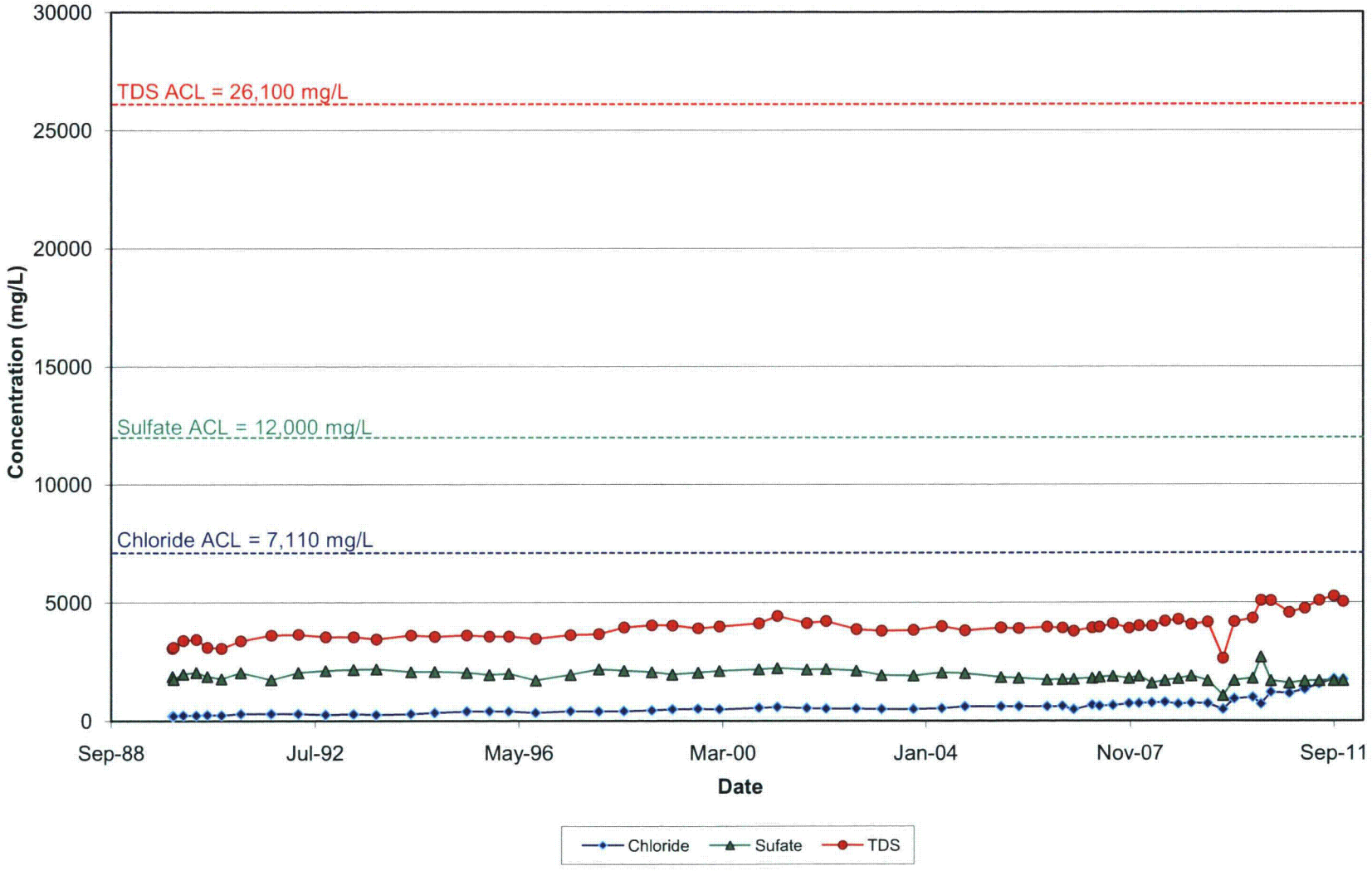
Nitrate in Monitoring Well 5-08



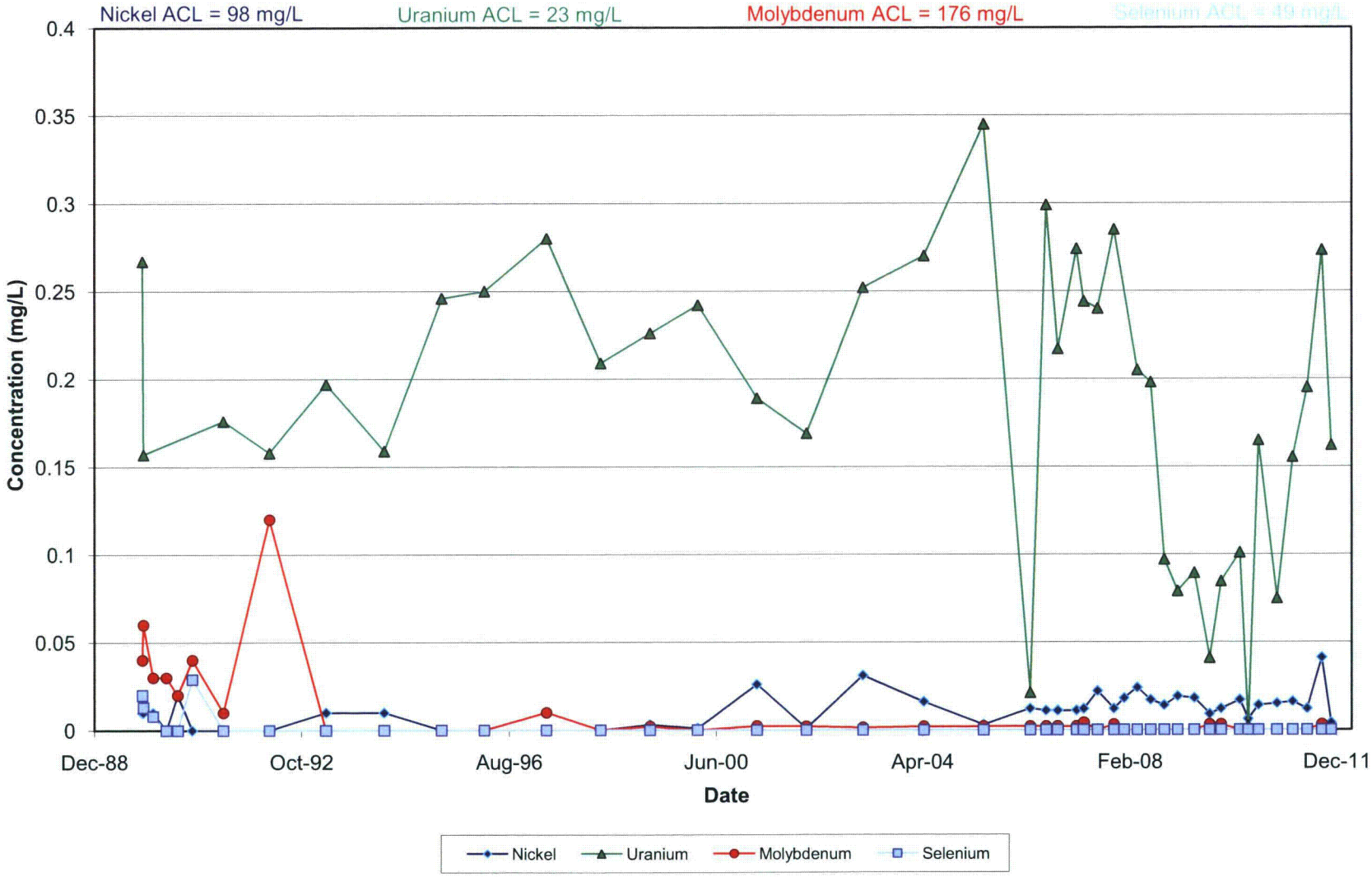
Radionuclides in Monitoring Well 5-08



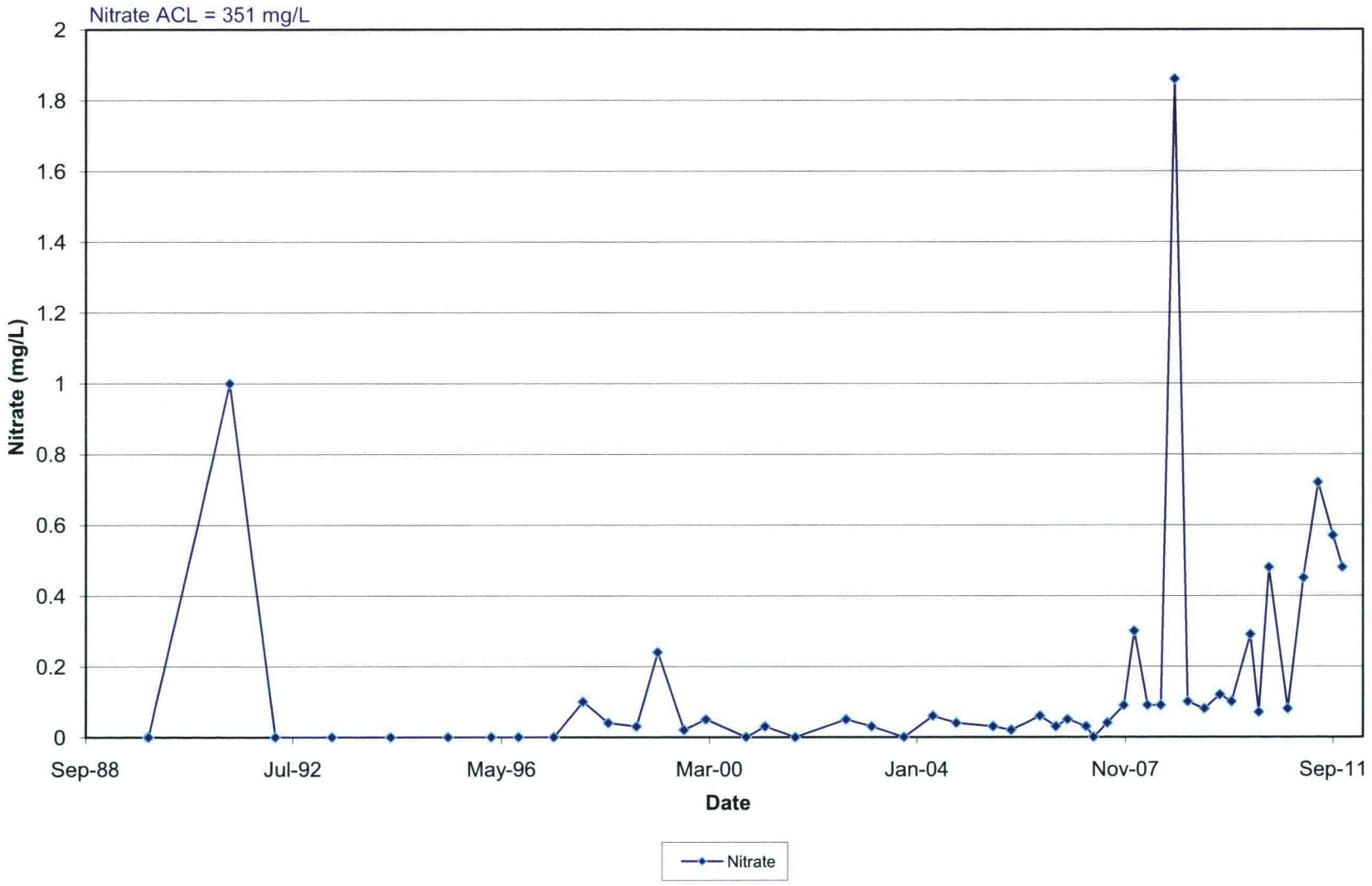
Anions and TDS in Monitoring Well 5-73



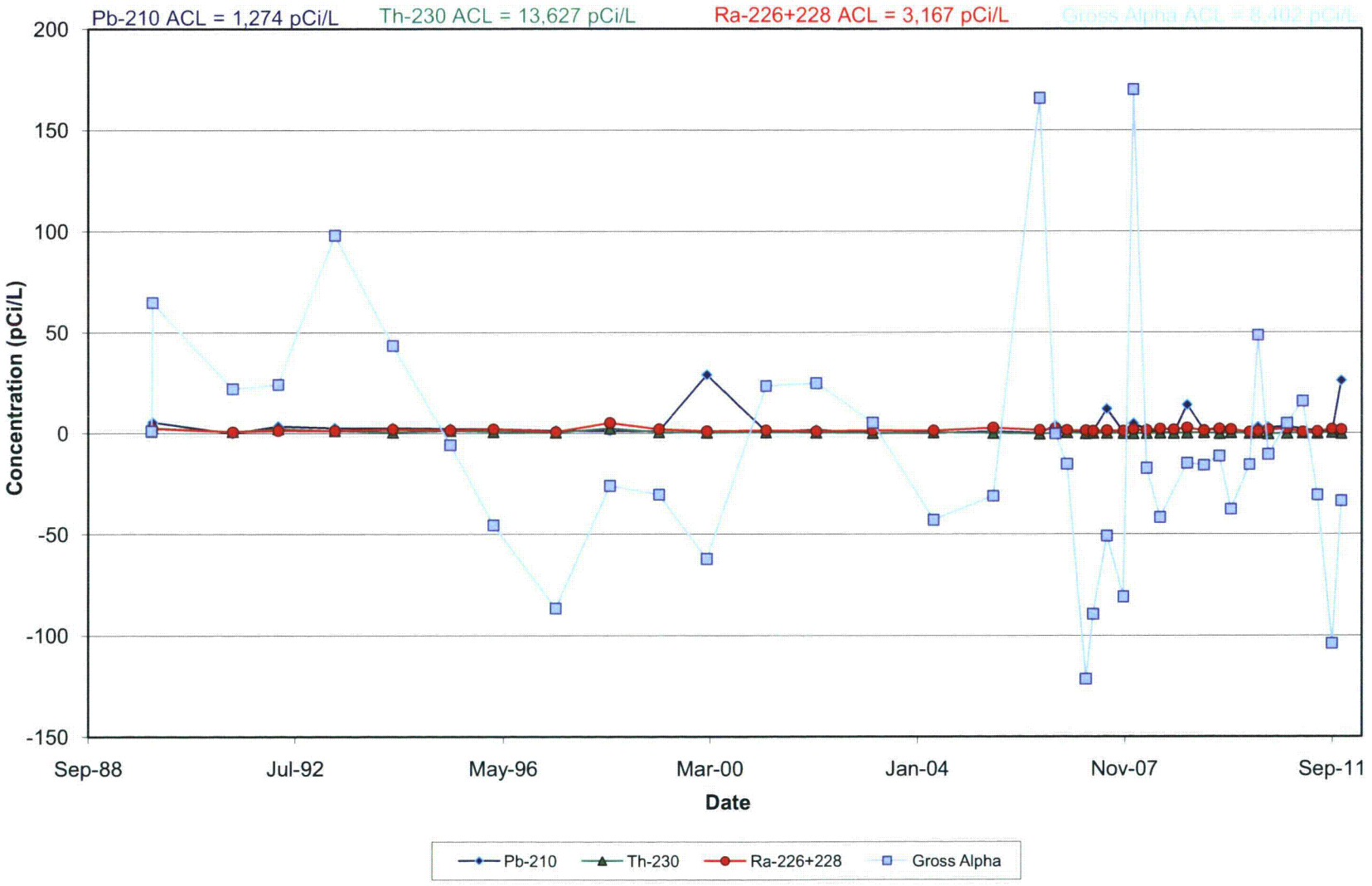
Metals in Monitoring Well 5-73



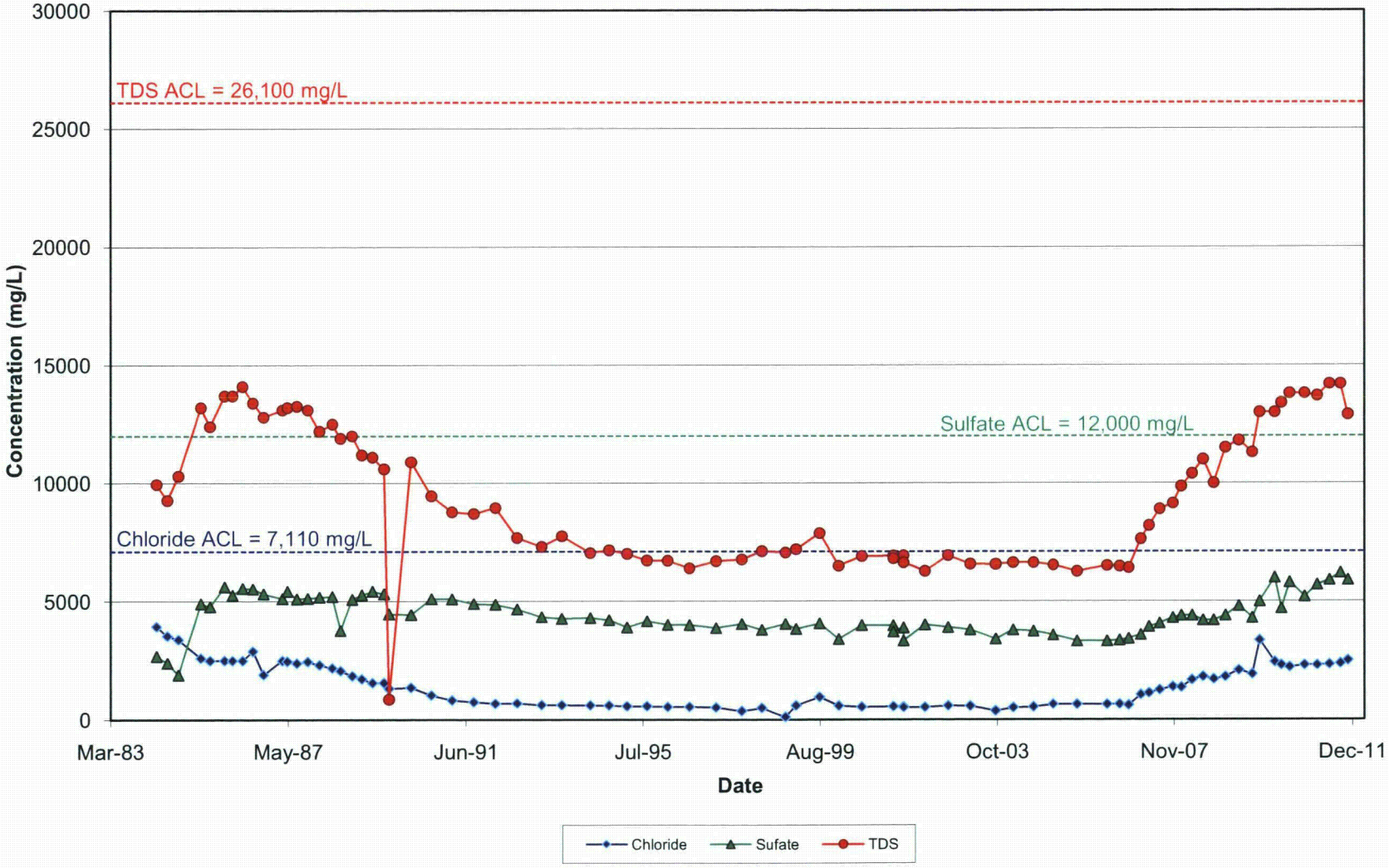
Nitrate in Monitoring Well 5-73



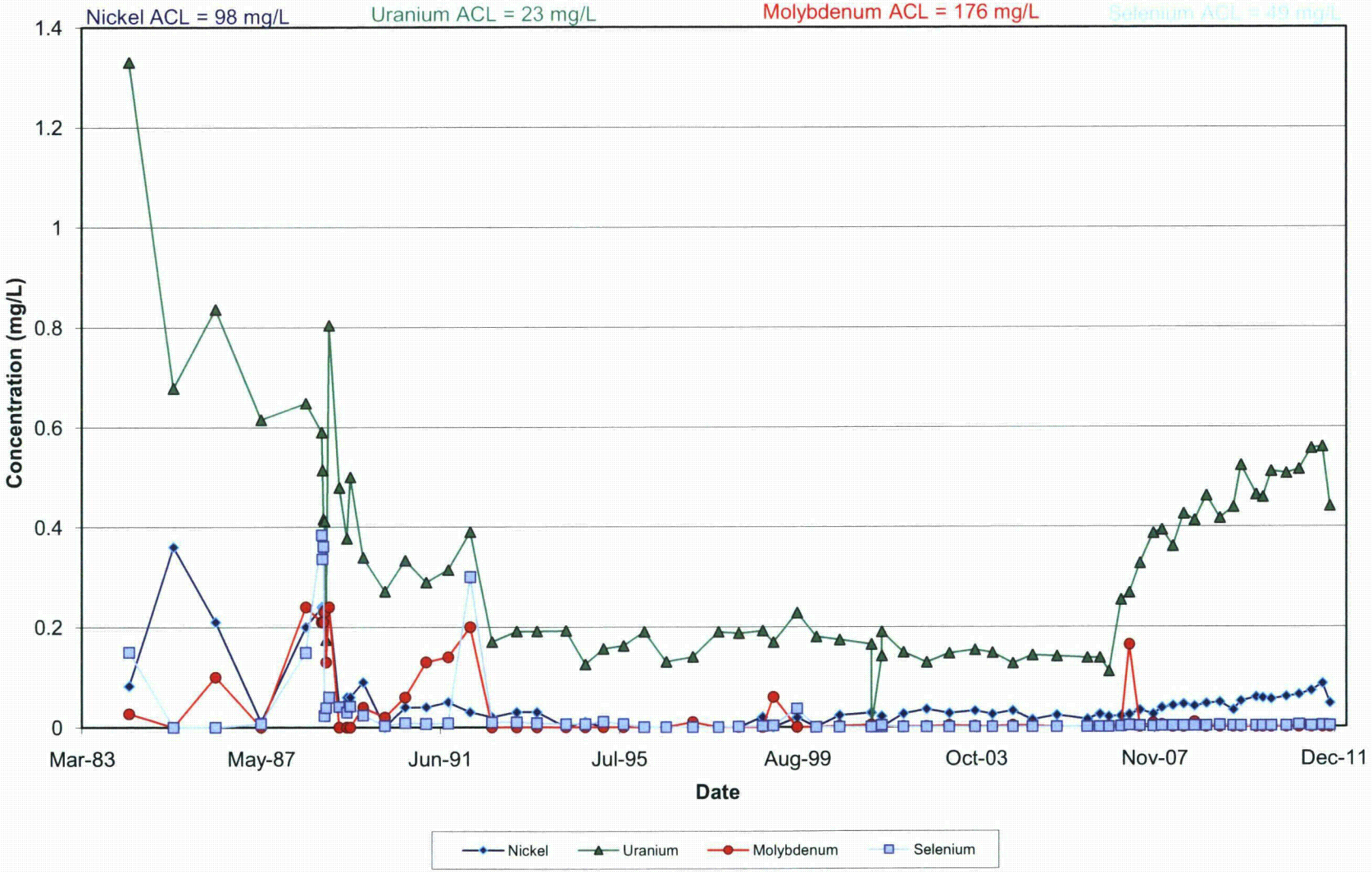
Radionuclides in Monitoring Well 5-73



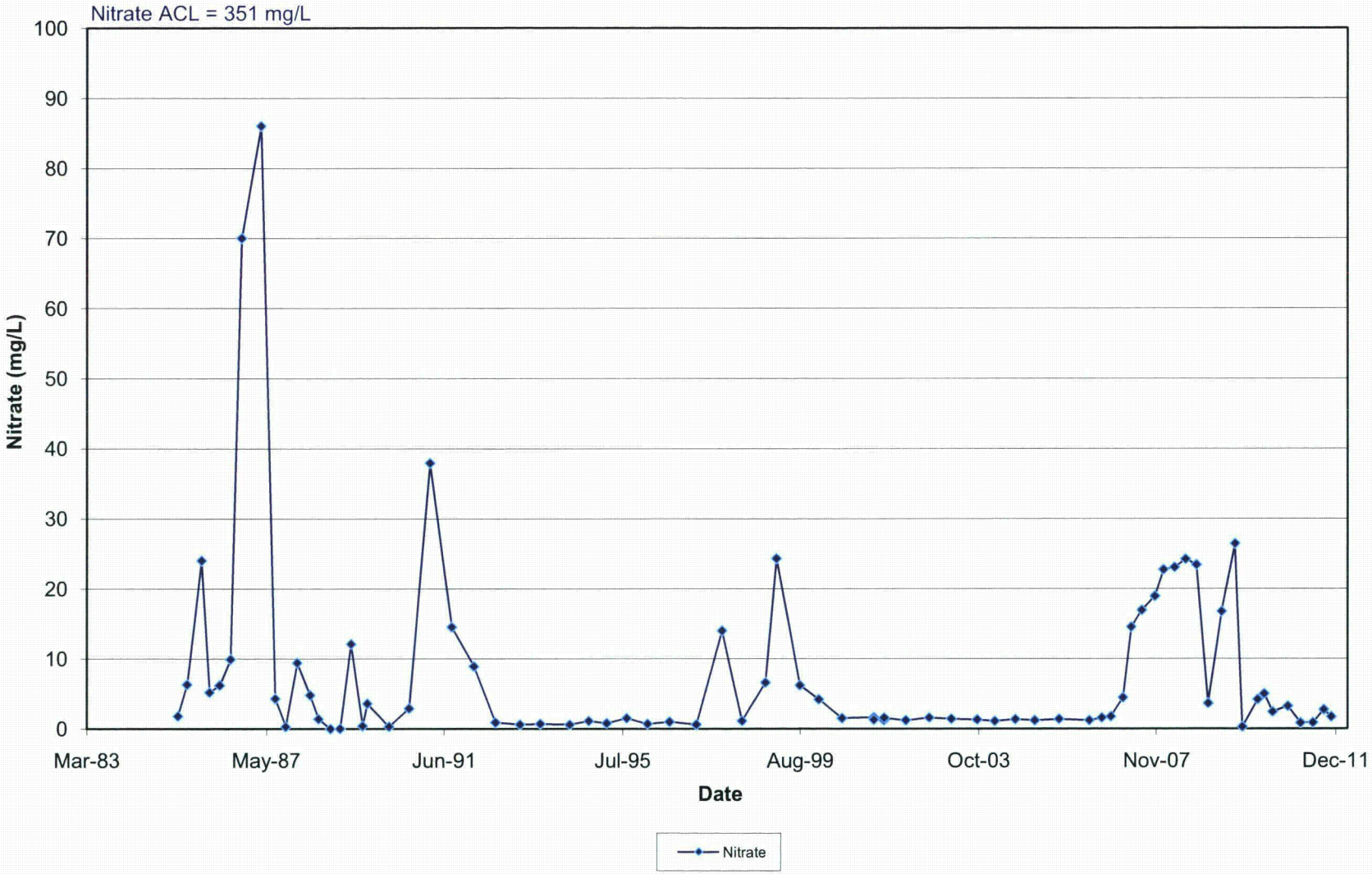
Anions and TDS in Monitoring Well 31-61



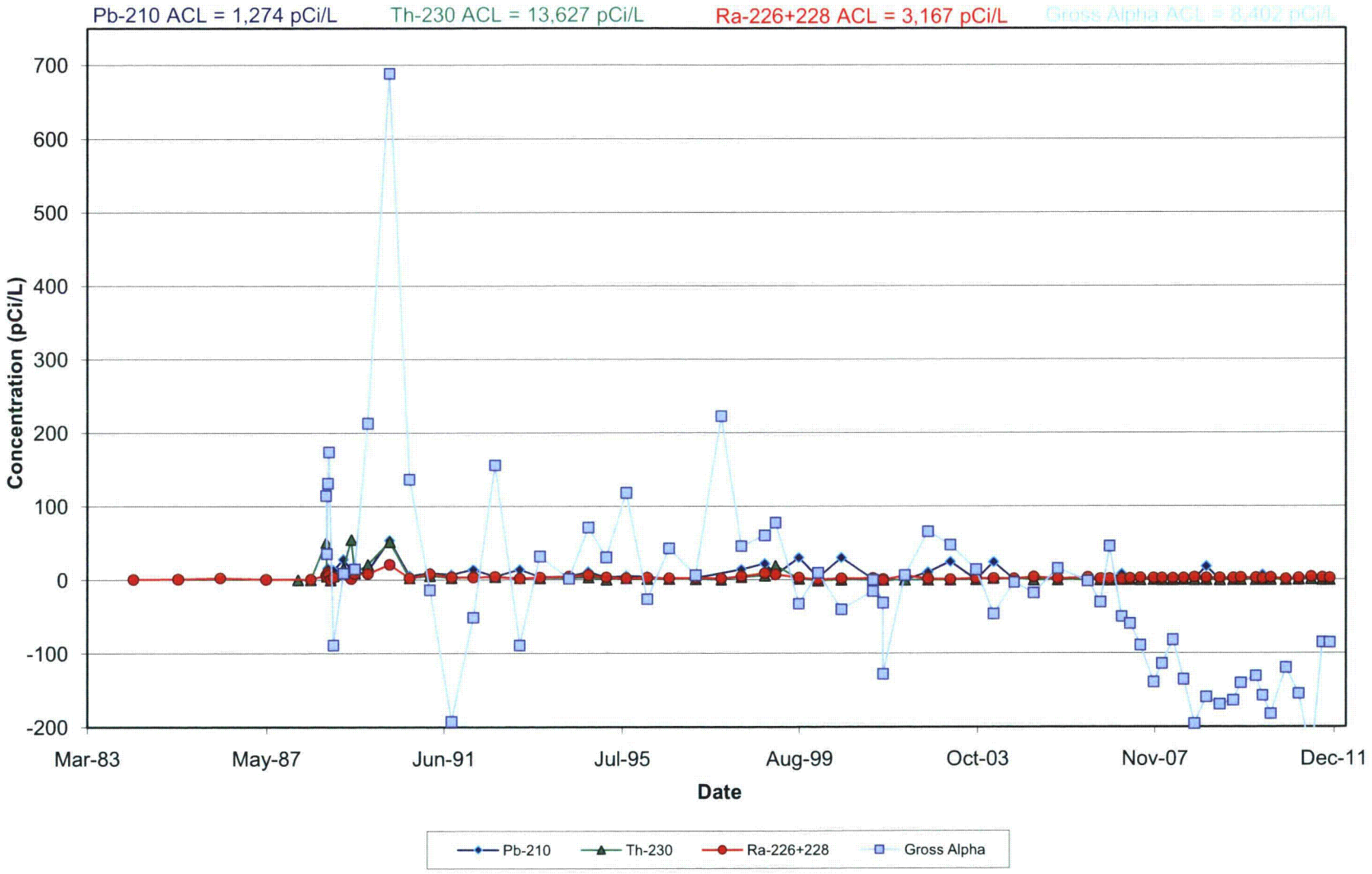
Metals in Monitoring Well 31-61



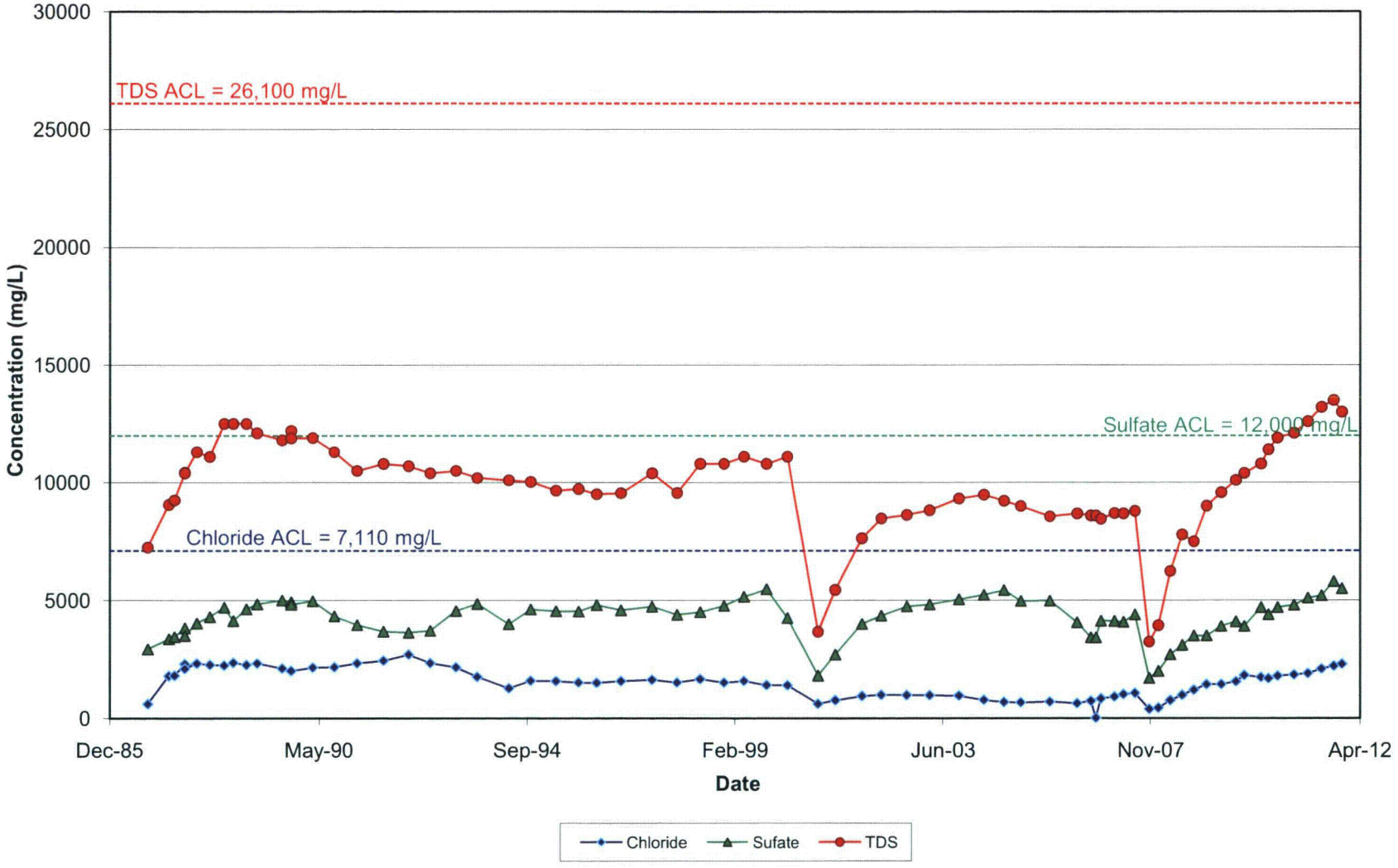
Nitrate in Monitoring Well 31-61



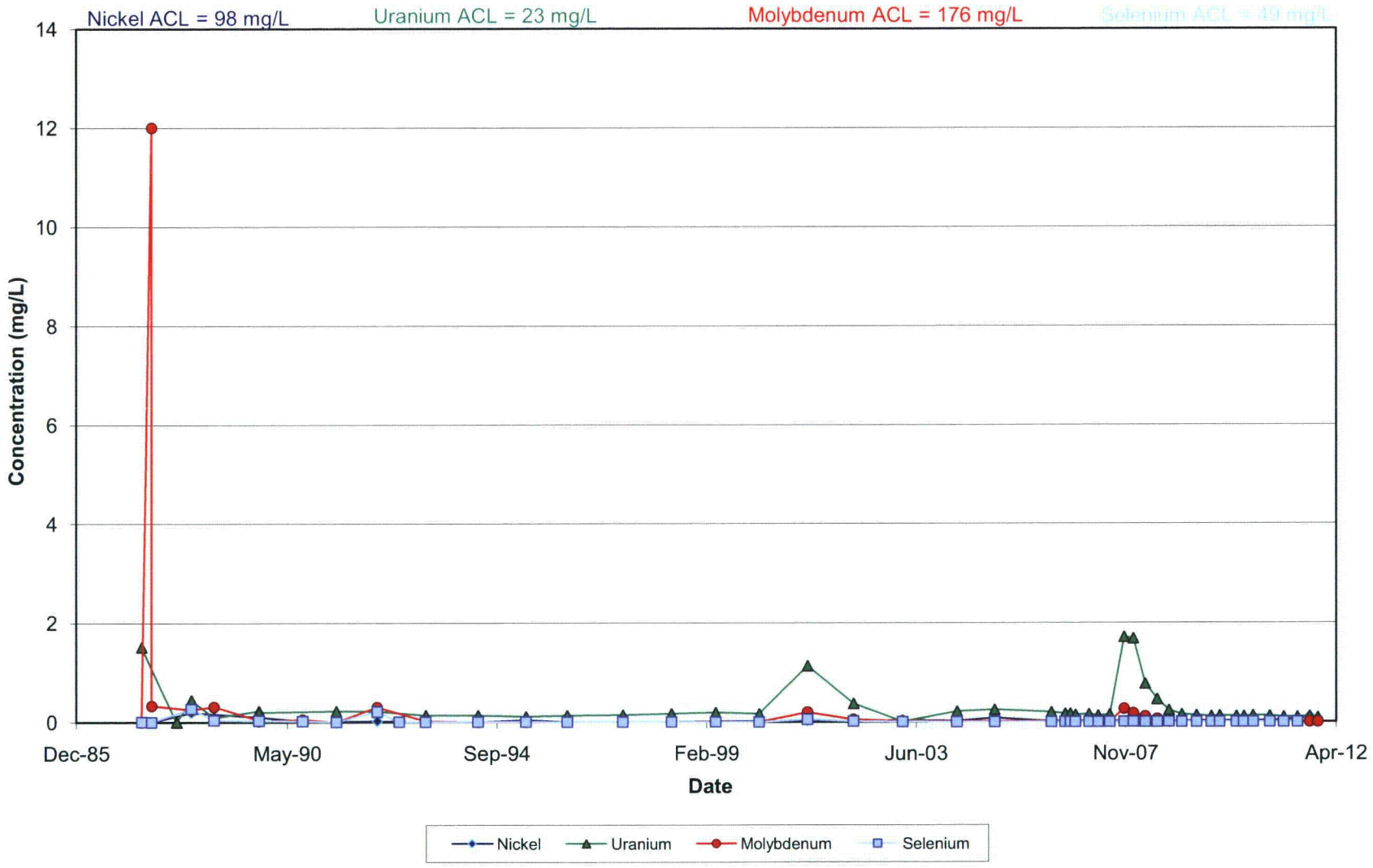
Radionuclides in Monitoring Well 31-61



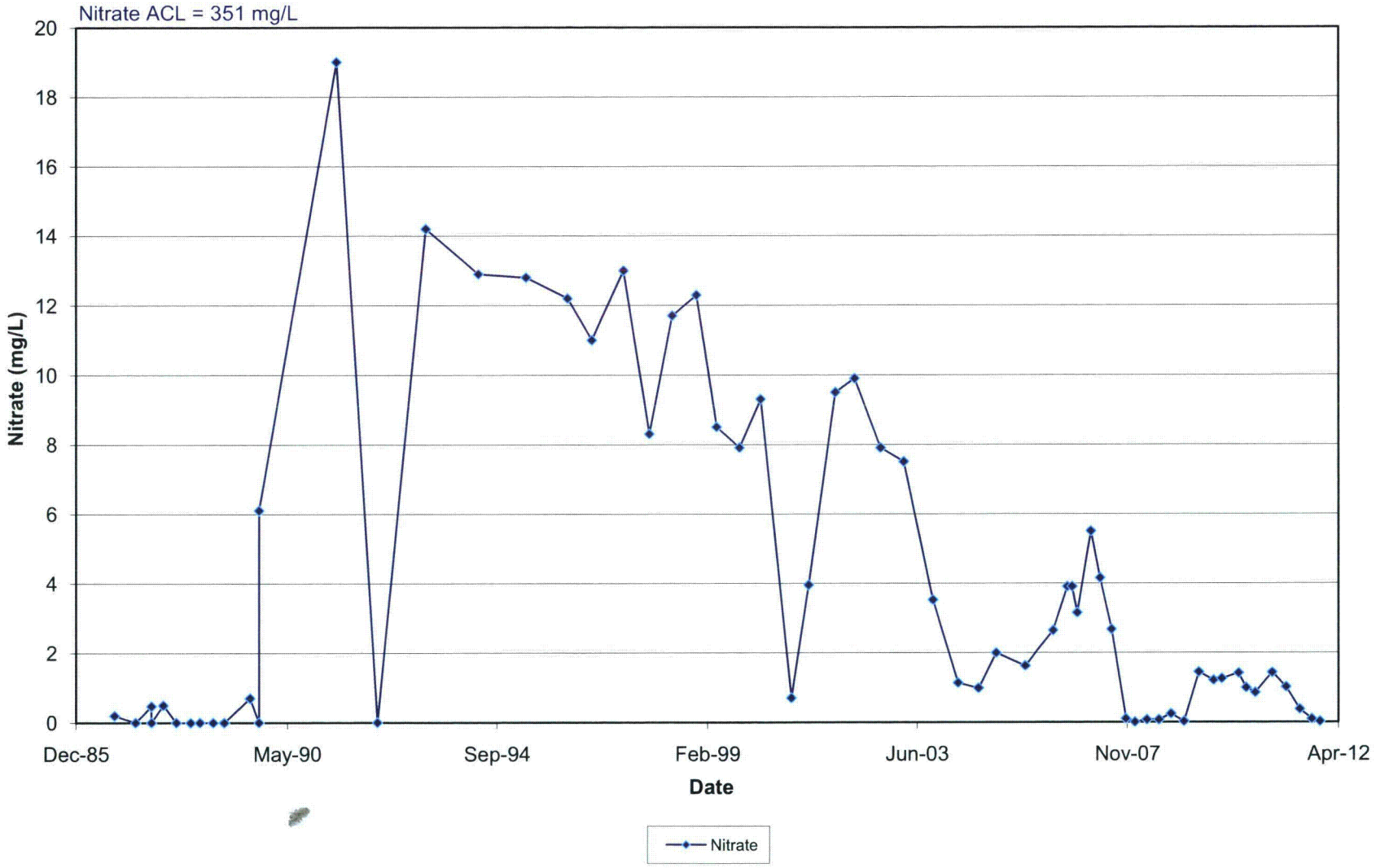
Anions and TDS in Monitoring Well 31-65



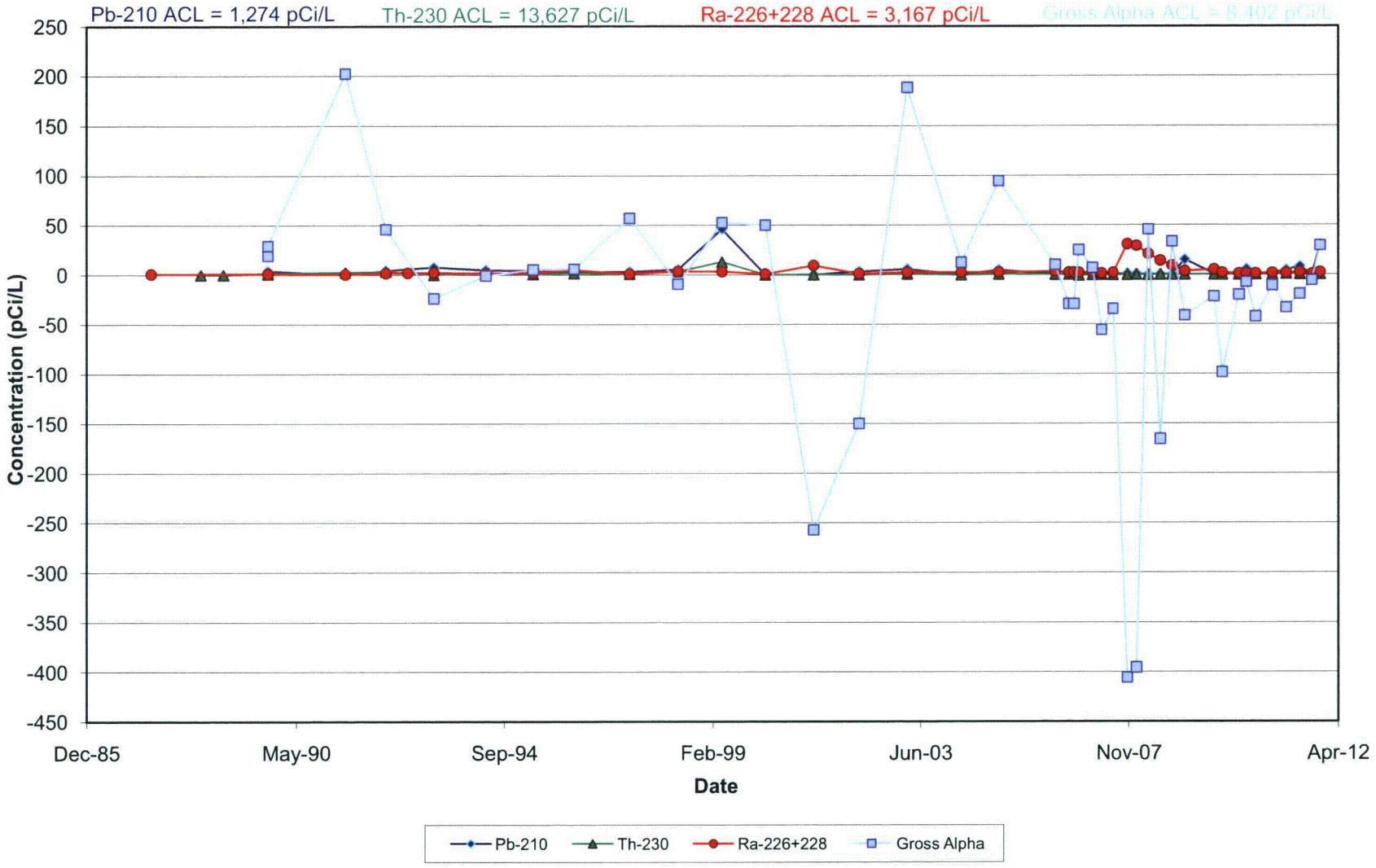
Metals in Monitoring Well 31-65



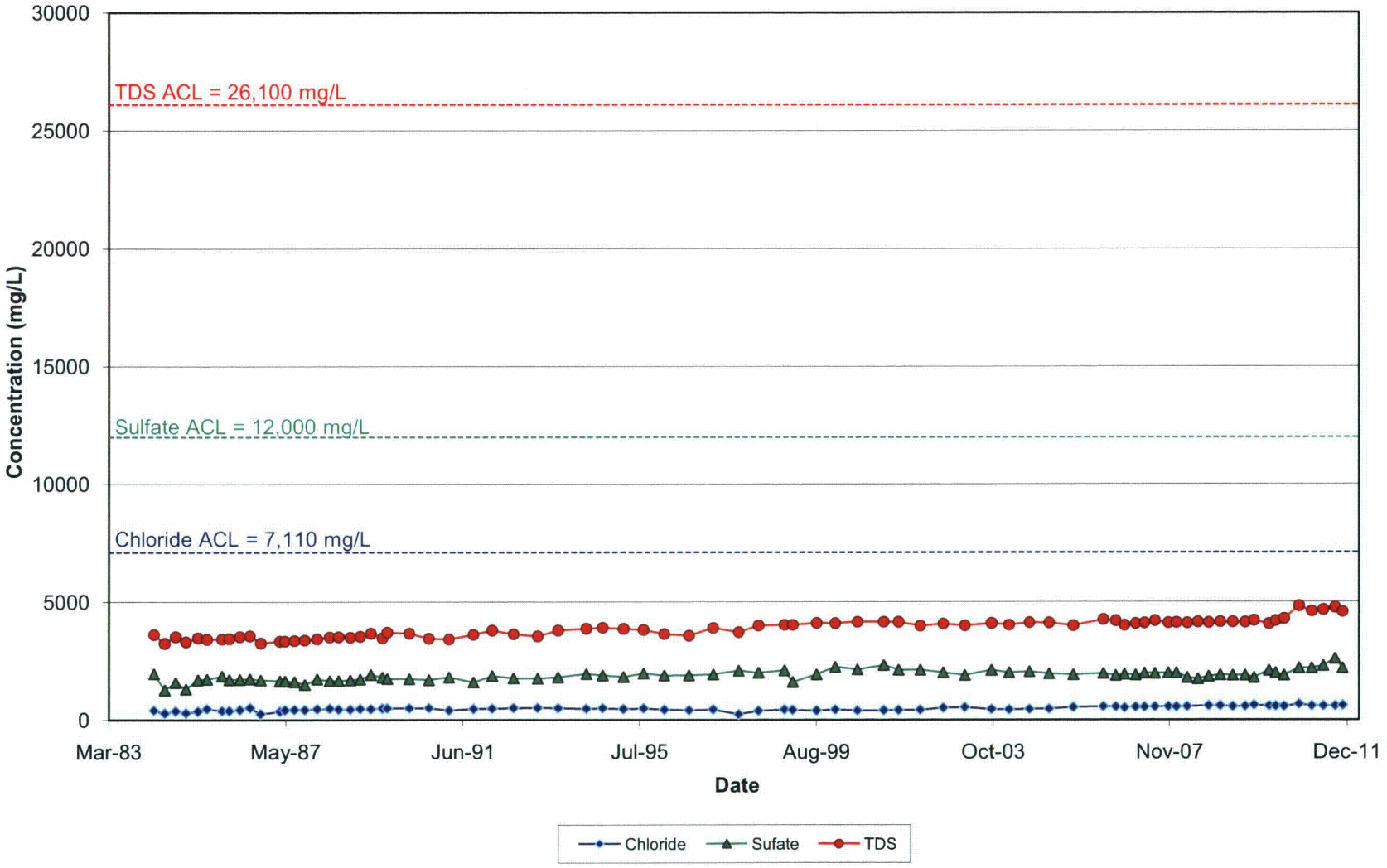
Nitrate in Monitoring Well 31-65



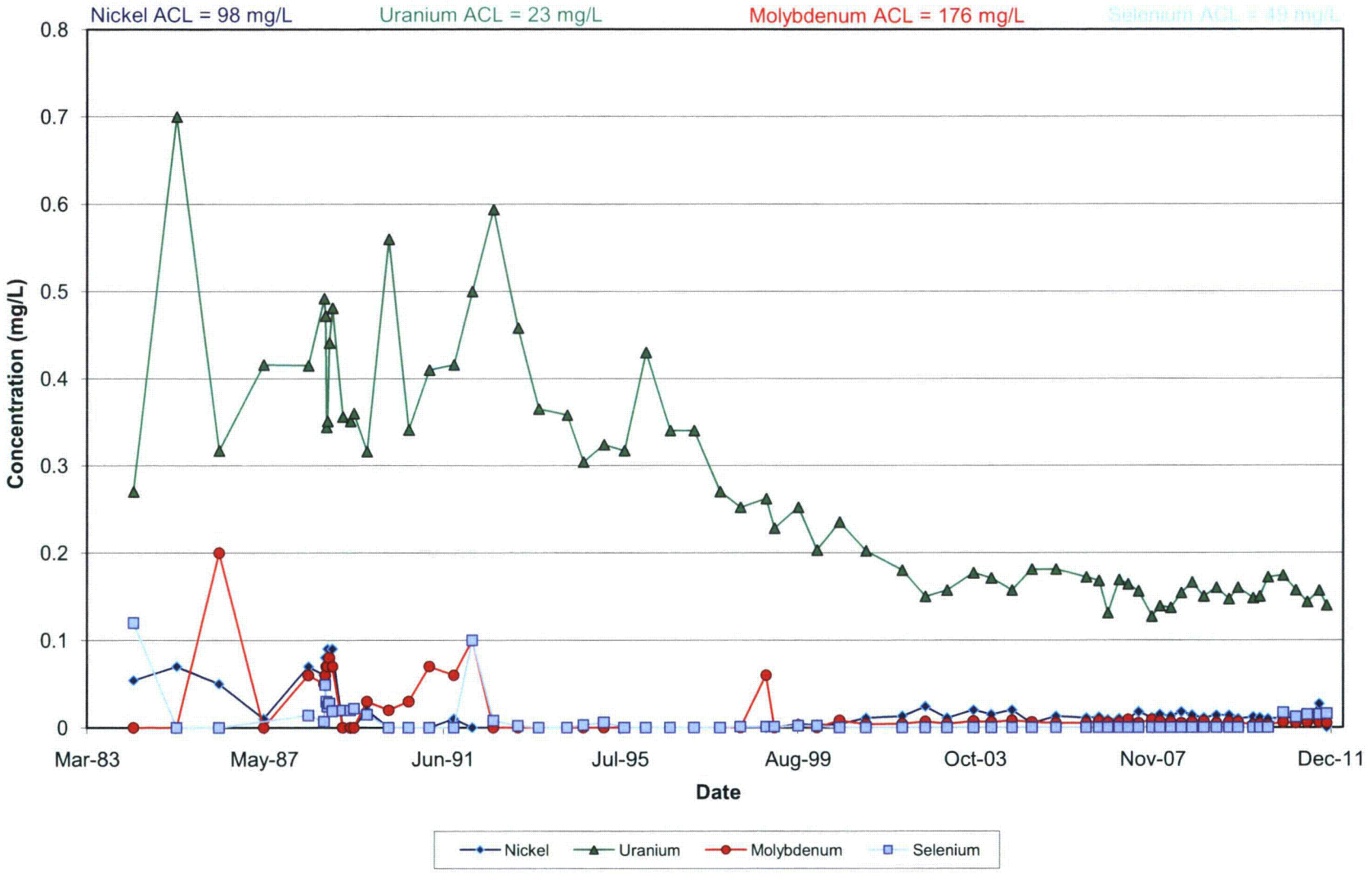
Radionuclides in Monitoring Well 31-65



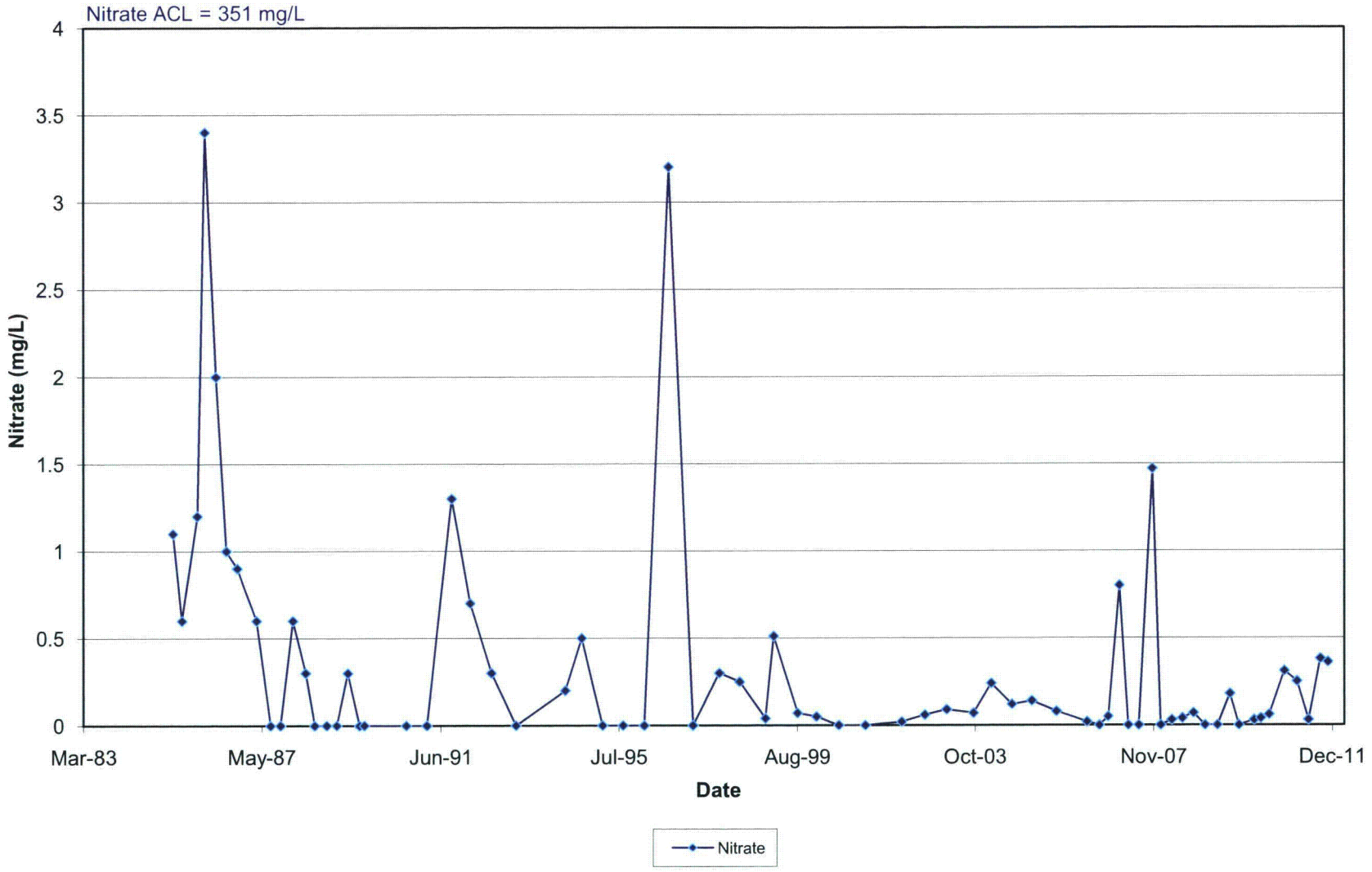
Anions and TDS in Monitoring Well 32-59



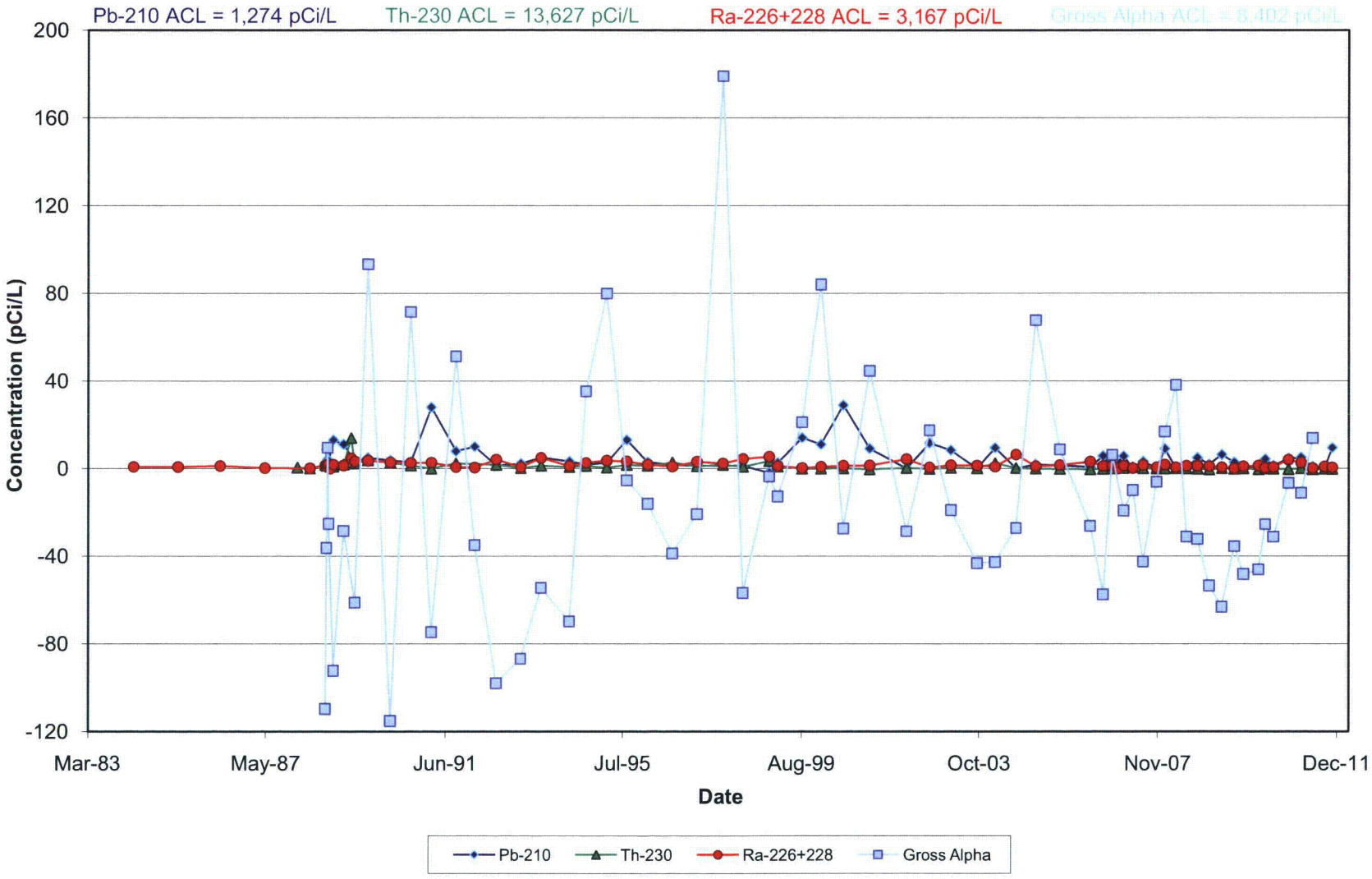
Metals in Monitoring Well 32-59



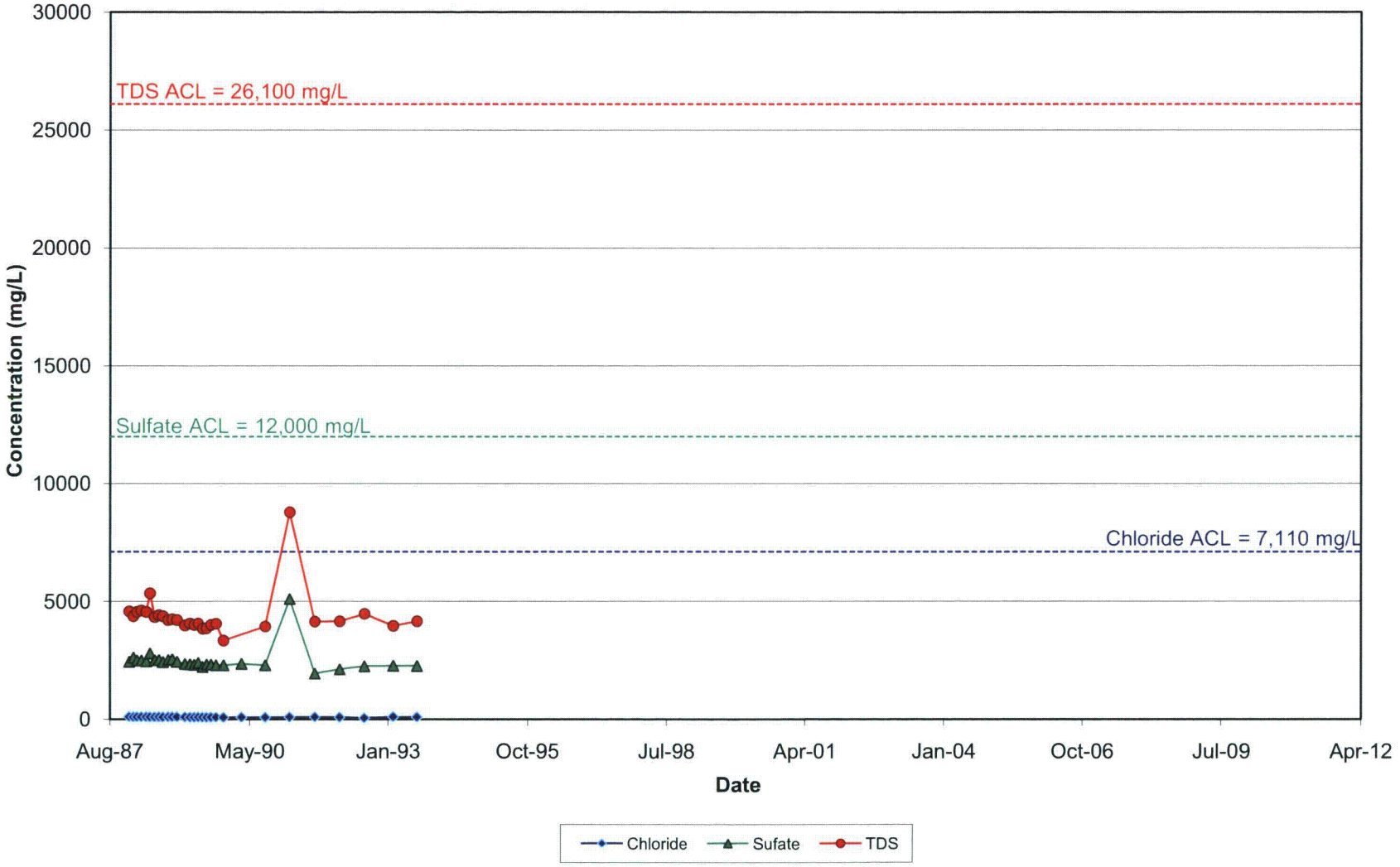
Nitrate in Monitoring Well 32-59



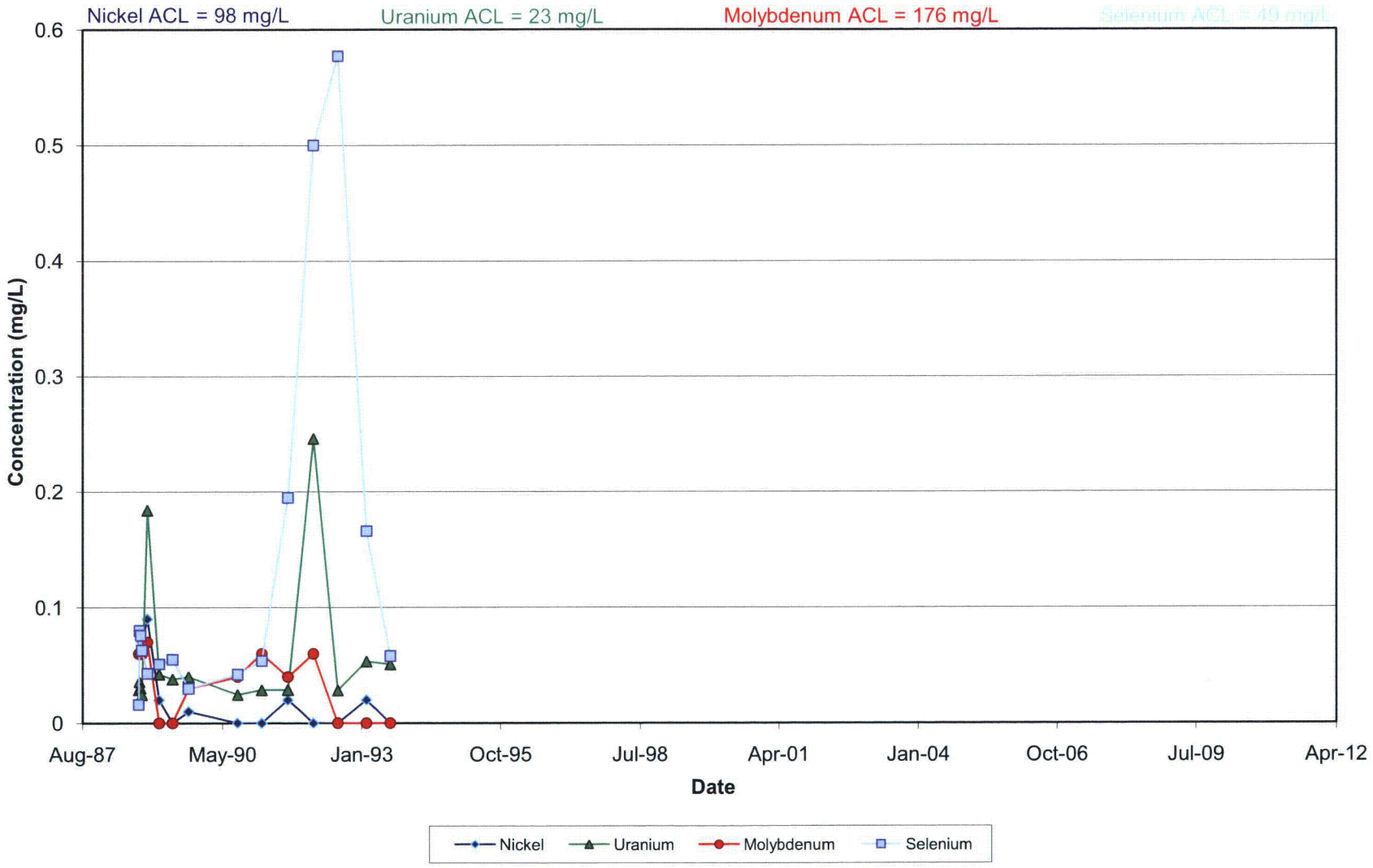
Radionuclides in Monitoring Well 32-59



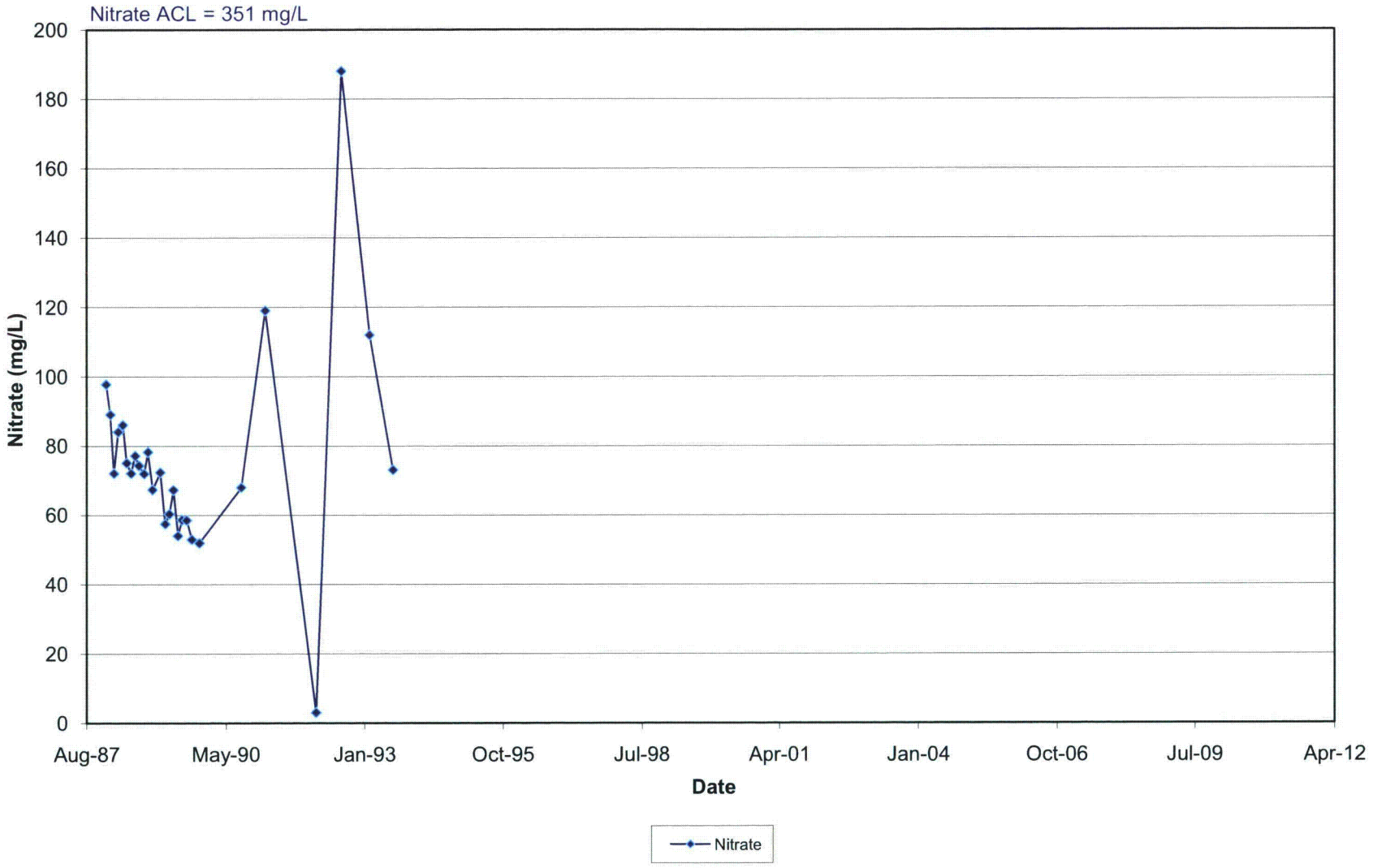
Anions and TDS in Monitoring Well MW-24



Metals in Monitoring Well MW-24



Nitrate in Monitoring Well MW-24

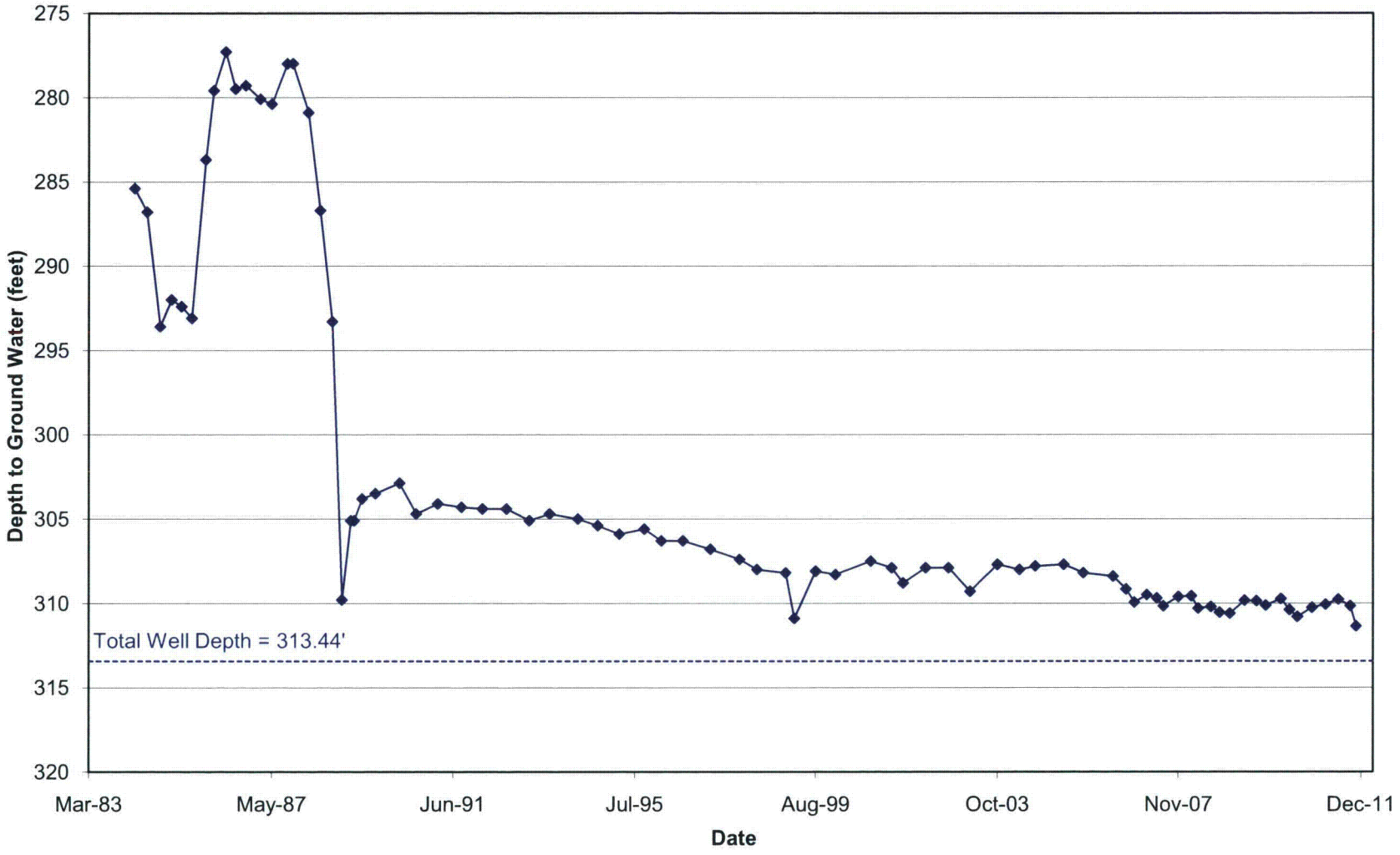


Radionuclides in Monitoring Well MW-24

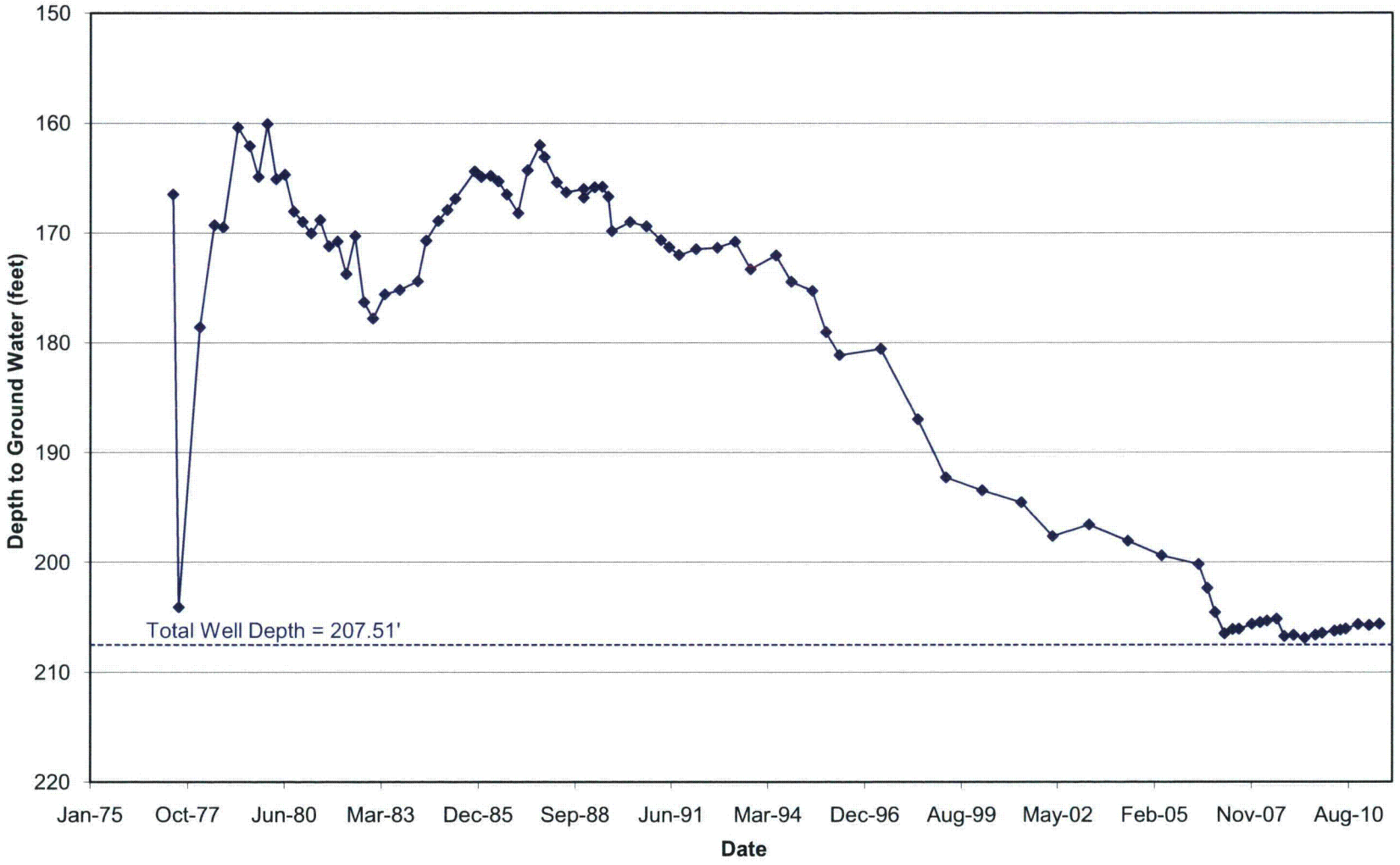
APPENDIX 3

Stability Monitoring Plan
Hydrographs

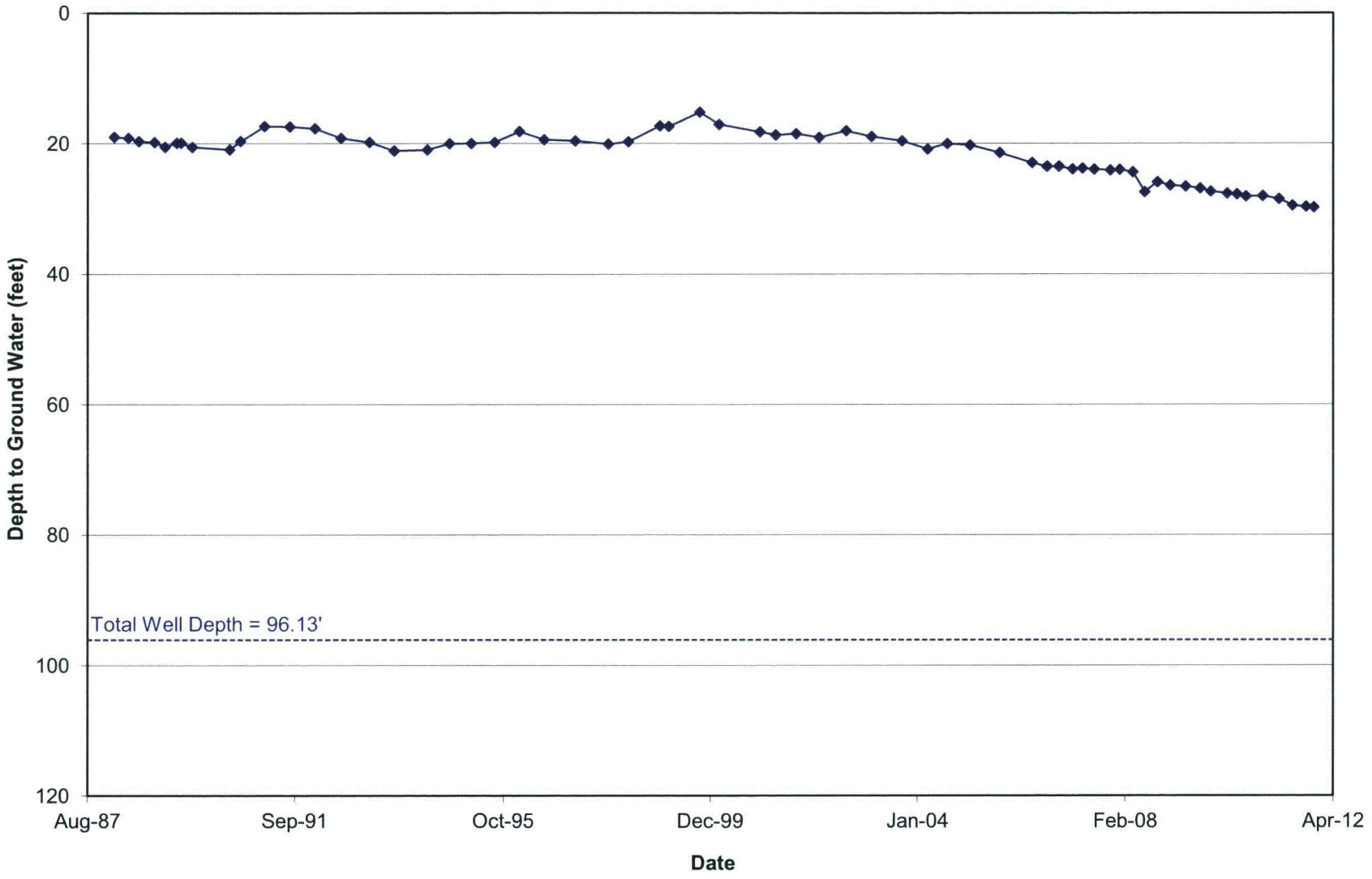
Hydrograph for Dakota Monitoring Well 30-02KD



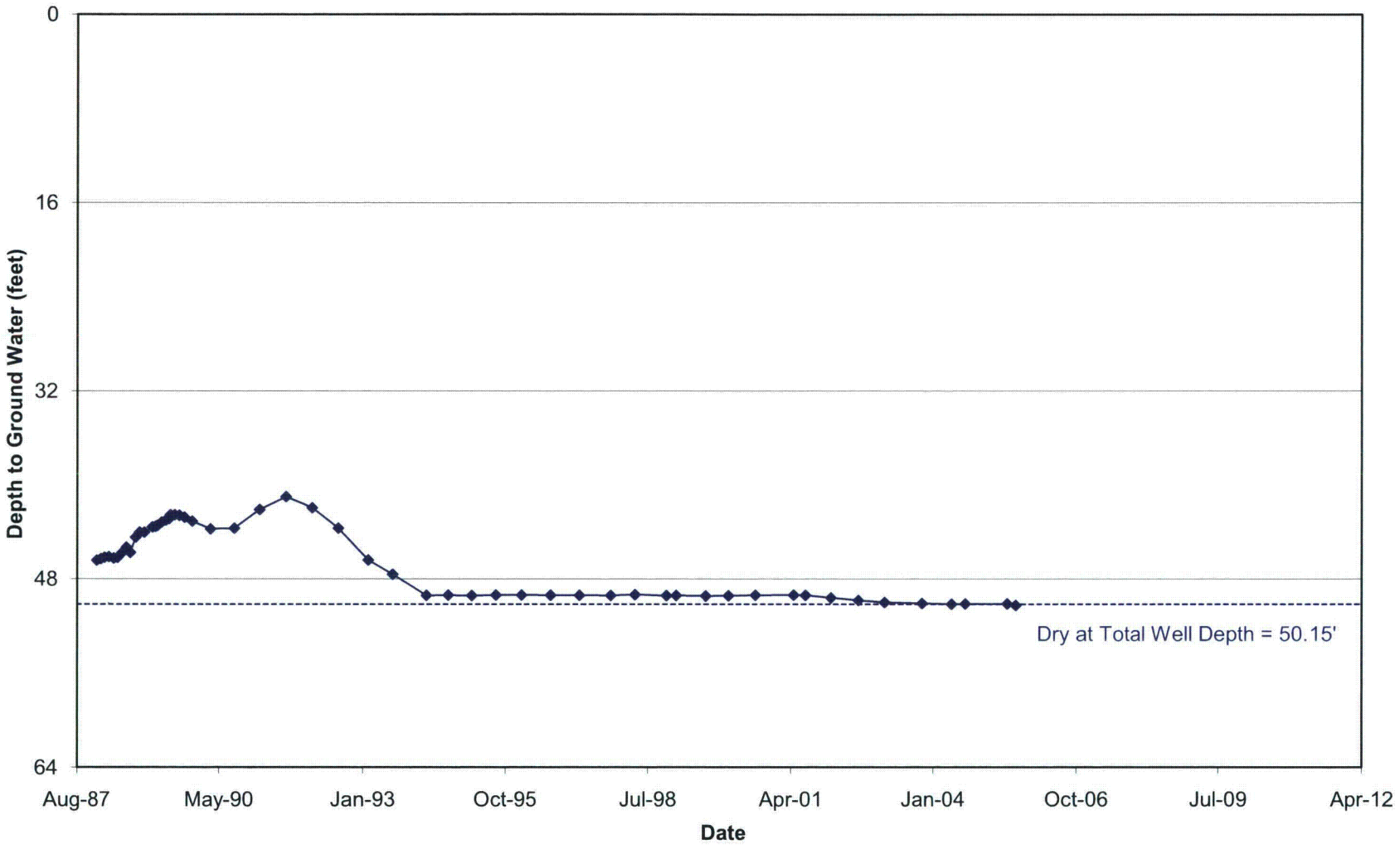
Hydrograph for TRA Monitoring Well 30-01



Hydrograph for TRB Monitoring Well 31-67

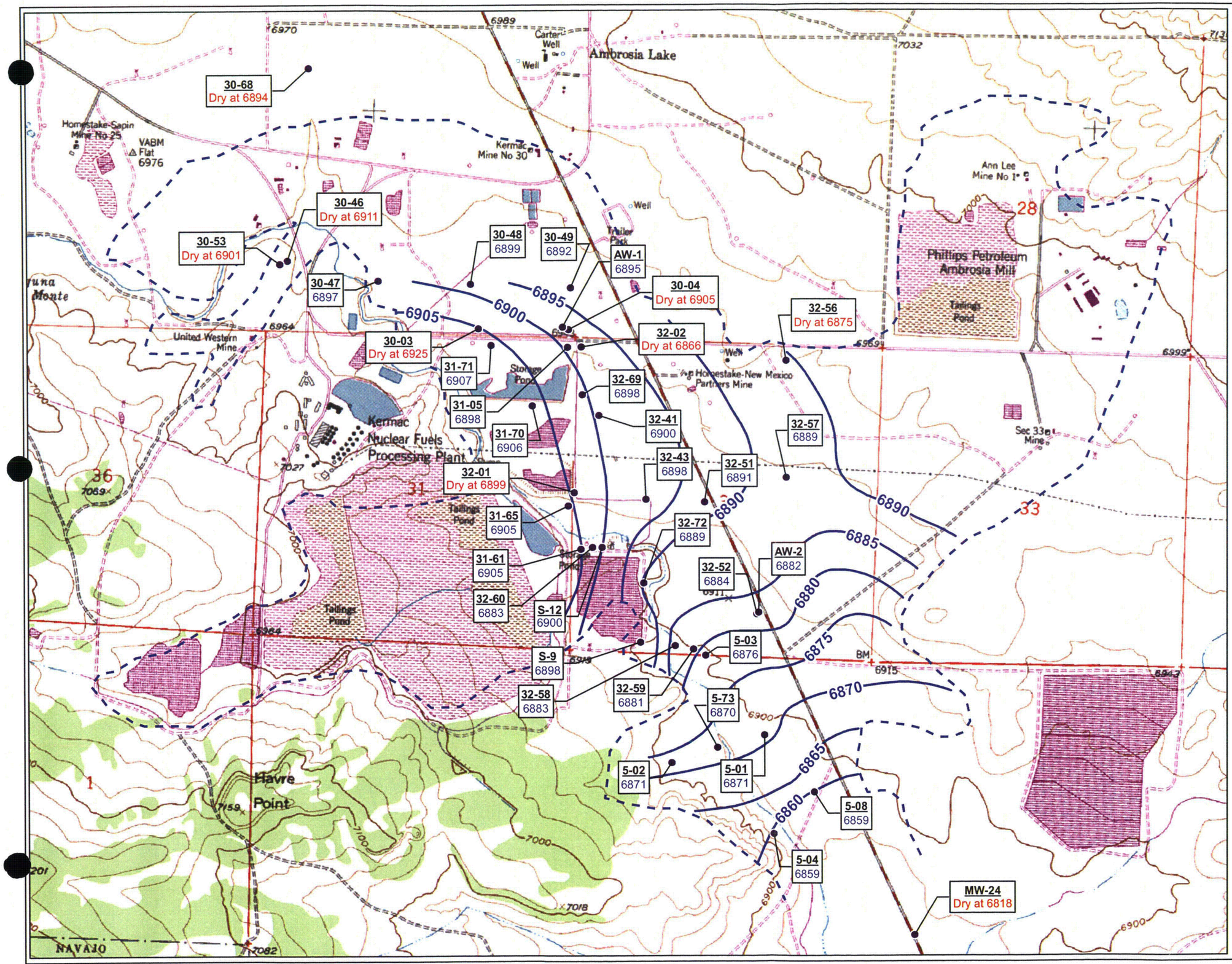


Hydrograph for Alluvial Monitoring Well MW-24



APPENDIX 4

Stability Monitoring Plan
Potentiometric Surface Maps



INTERA

N

0 800 1,600 3,200 Feet

USGS 7.5 Minute Topographic Maps:
Ambosia Lake Quadrangle, 1957/rev.1980;
Contour Interval 20 Feet

Legend

- Alluvial Monitoring Well Location
- Alluvial Groundwater Surface Elevation (ft amsl)
- 1998 Boundary of Saturated Alluvium

Well ID
Groundwater Surface Elevation (ft amsl)

Gradient calculation:
(Difference in Groundwater Elevation Between Point of Compliance Well 31-61 and Trend Well 5-08 = 6,905 - 6,859 = 46 feet) Divided by (Distance Along a Flow Path Between Point of Compliance Well 31-61 and Trend Well 5-08 = 6,875 feet)

= 0.007 feet per foot

2nd Half 2011 Alluvial Groundwater Surface Elevation Iso-Contours

Rio Algom DP-169 ACL
Semi-Annual Report

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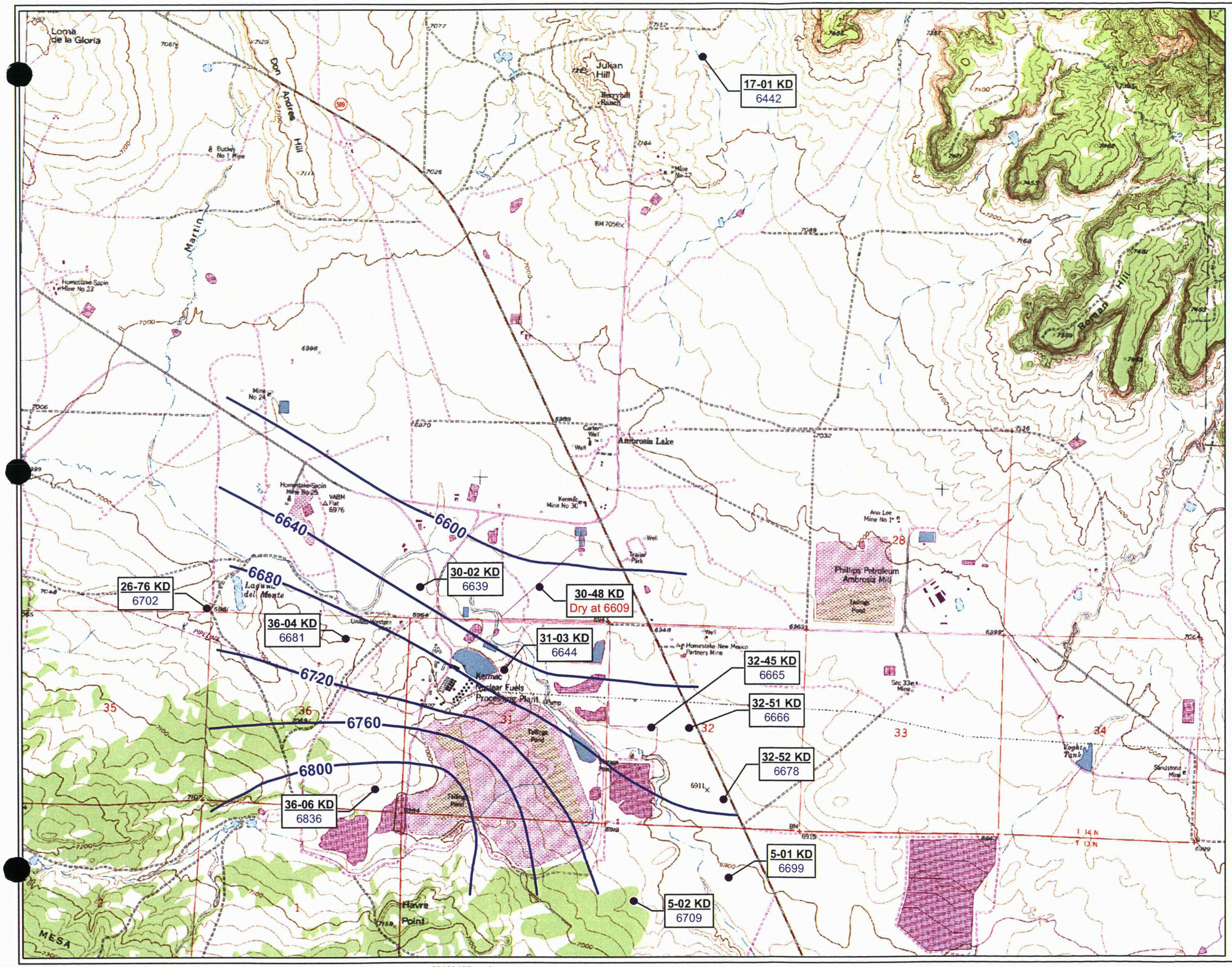

N

0 1,250 2,500 5,000 Feet

USGS 7.5 Minute Topographic Maps:
Ambosia Lake Quadrangle, 1957/rev.1980;
Contour Interval 20 Feet

Legend

- Dakota Monitoring Well Location
- Dakota Potentiometric Iso-Contours (ft amsl)

Well ID
Groundwater Surface Elevation (ft amsl)

Gradient calculation:
(Difference in Groundwater Elevation Between Point of Compliance Well 36-06 KD and Trend Well 30-02 KD= 6,836 - 6,639 = 197 feet) Divided by (Distance Along a Flow Path Between Point of Compliance Well 36-06 KD and Trend Well 32-02 KD = 6,000 feet)

= 0.033 feet per foot

2nd Half 2011 Dakota Potentiometric Surface Elevation Iso-Contours
Rio Algom DP-169 ACL
Semi-Annual Report

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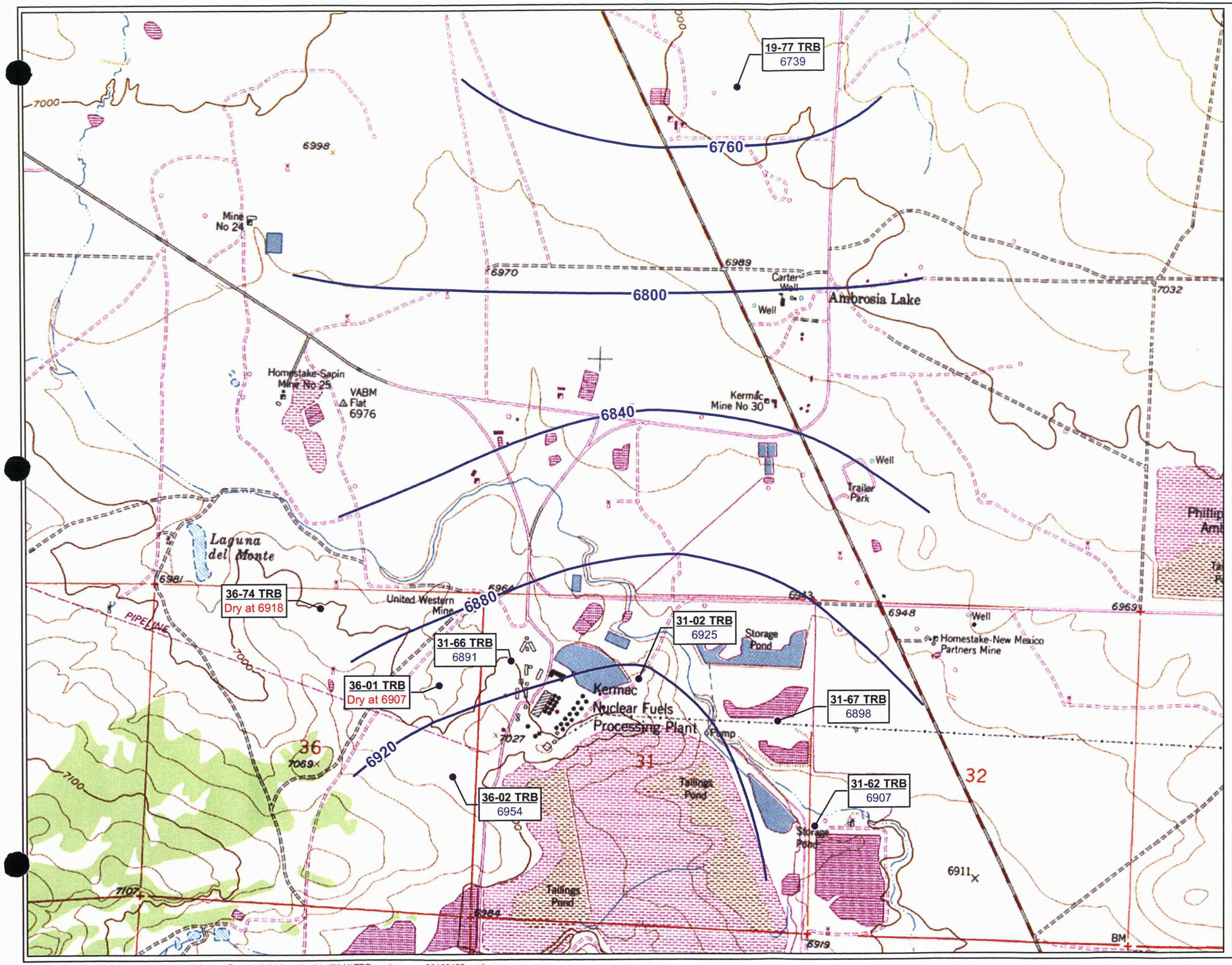

INTERA

N

0 750 1,500 3,000 Feet

USGS 7.5 Minute Topographic Maps:
Ambosia Lake Quadrangle, 1957/rev.1980;
Contour Interval 20 Feet

Legend

- TRB Monitoring Well Location
- TRB Potentiometric Surface Elevations (ft amsl)

Well ID
Groundwater Surface Elevation (ft amsl)

Gradient calculation:
(Difference in Groundwater Elevation Between Point of Compliance Well 31-02 and far downgradient Well 19-77 = 6,925 - 6,739 = 186 feet) Divided by (Distance Along a Flow Path Between Point of Compliance Well 31-02 and far downgradient Well 19-77 = 9,677 feet)

= 0.019 feet per foot

2nd Half 2011 TRB Potentiometric Surface Elevation Iso-Contours
Rio Algom DP-169 ACL
Semi-Annual Report

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