Appendix C

Ground Water Sample Results for Contaminants of Concern: August 2006, February 2007, and the Baseline Period

Table C–1. Baseline, August 2006, and February 2007 Molybdenum Concentrations

Well Number	Horizon	Baseline Molybdenum Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Molybdenum Concentration (mg/L)	Feb 2007 Molybdenum Concentration (mg/L)
0686	A	0.0015U	2002	0.00086BU	NS
0687	A	0.0113	2002	0.0041	NS
0688	A	0.0015U	2002	0.0033	NS
0901	A	0.00078	2001	0.0007BU	NS
0906	A	0.0137	2002	NS	NS
0929	A	0.0015U	2002	0.00047BU	0.00047BU
0940	A	0.0015U	2002	NS	NS
0941	A	0.0284	2002	0.024N	0.017
0945	A	0.0015U	2002	0.0006BU	NS
0946	A			0.0023U	NS
0262	B	0.432	2001	0.81	0.89
0263	B	0.192	2001	0.015	0.015
0265	B	0.00046	2001	0.0005BU	0.00034BU
0267	B	0.0015U	2002	0.00048BU	0.00039BU
0271	B	0.0015U	2002	0.00059BU	NS
0281	B			0.001U	0.00079BU
0282	B			0.0014U	0.001U
0283	B			0.0045	0.0047
0908	B	0.0015U	2002	0.0017	0.00045BU
0909	B	0.0015U	2002	0.00035B	0.00042BU
0910	B			0.00051BU	NS
0934	B	0.0015U	2002	0.00087B	0.00039BU
0935	B	0.0015U	2002	0.00026U	0.00037BU
0936	B	0.0015U	2002	0.00056BU	NS
0938	B	0.001U	1999	0.033	0.046
0942	B	0.021	2002	0.014	0.014
0943	B	0.0015U	2002	0.00077BU	NS
0947	B	0.0015U	2002	0.0005BU	NS
1126	B			0.00026U	NS
1128	B			0.00026U	NS
1129	B			0.67	NS
1130	B			0.065	NS
1131	B			0.0012U	NS
1132	B			0.25	NS
0274	C			0.0016U	0.00048BU
0276	C			0.00073BU	0.00054BU
0279	C			0.00065BU	NS
0280	C			0.00062BU	NS
0683	C	0.0015U	2002	0.00058BU	NS
0684	C	0.0015U	2002	0.00055BU	NS
0685	C	0.0015U	2002	0.00049BU	NS
0689	C	0.0015U	2002	0.00056BU	NS
0691	C	0.0015U	2002	0.0006BU	0.0005BU
0903	C	0.0015U	2002	0.00048BU	NS
0912	C	0.0003U	2001	0.0003B	NS
0914	C	0.00081	2001	0.00074BU	NS

Table C–1 (continued). Baseline, August 2006, and February 2007 Molybdenum Concentrations

Well Number	Horizon	Baseline Molybdenum Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Molybdenum Concentration (mg/L)	Feb 2007 Molybdenum Concentration (mg/L)
0917	C	0.0013	2001	NS	NS
0930	C	0.0015U	2002	0.00039BU	0.0004BU
0932	C	0.0018U	2002	0.00051BU	0.00051BU
1008	C	0.0004U	2000	NS	NS
1116	C	0.0015U	2002	0.0003BU	NS
1117	C	0.0015U	2002	0.00027BU	NS
1118	C	0.0015U	2002	0.00047BU	NS
0258	D	0.00063	2000	0.00077BU	0.0006BU
0261	D	0.0026	2001	0.00079BU	NS
0264	D	0.0031	2001	0.00086BU	0.00054BU
0266	D	0.00058	2001	0.00056BU	0.00049BU
0272	D			0.00051BU	0.00043BU
0273	D			0.028	0.02
0275	D			0.021	0.00054BU
0277	D			0.00073BU	NS
0278	D			0.00058BU	NS
0690	D	0.0015U	2002	0.00055BU	NS
0692	D	0.0015U	2002	0.00066BU	NS
0695	D	0.0015U	2002	NS	NS
0904	D	0.00077	2001	0.00059BU	NS
0915	D	0.00054	2001	0.00056BU	NS
1003	D	0.0004U	2000	0.00042BU	NS
1004	D	0.0004U	2000	0.00043BU	NS
1005	D	0.0004U	2000	NS	NS
1006	D	0.0004U	2000	0.00037B	NS
1007	D	0.0004U	2000	0.00053BU	NS
1101	D	0.0015U	2002	0.00032B	NS
1102	D	0.0015U	2002	0.00032B	NS
1103	D	0.0015U	2002	0.0027	NS
1104	D	0.0916	2002	0.037	NS
1105	D	2.96	2002	0.55	NS
1106	D	1.26	2002	0.24	0.26
1107	D	0.16	2002	0.022	NS
1108	D	0.0015U	2002	0.0007BU	NS
1109	D	0.0015U	2002	0.00028BU	NS
1110	D	0.0015U	2002	0.00028BU	NS
1111	D	0.0015U	2002	0.00026U	NS
1112	D	0.0015U	2002	0.0014U	NS
1113	D	0.0015U	2002	0.00044BU	NS
1114	D	0.0027	2002	NS	NS
1115	D	0.0015U	2002	0.00034BU	NS
1119	D	0.0053	2002	0.0028	NS
1120	D	0.0815	2002	0.039	0.028
1121	D	0.105	2002	0.058	NS
1122	D	0.0015U	2002	0.00038BU	NS
1123	D	0.0015U	2002	0.00039BU	NS

Table C–1 (continued). Baseline, August 2006, and February 2007 Molybdenum Concentrations

Well Number	Horizon	Baseline Molybdenum Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Molybdenum Concentration (mg/L)	Feb 2007 Molybdenum Concentration (mg/L)
1124	D	0.0015U	2002	0.00032BU	NS
1125	D	0.0015U	2002	0.00035BU	NS
0251	E	0.0015U	2002	0.00064BU	0.00057BU
0268	E	0.0015U	2002	0.00053BU	0.00041BU
0920	E	0.0003U	2001	0.00047BU	NS
0911	F			0.00035BU	NS
0913	G	0.0003U	2001	0.00035BU	NS
0916	G	0.00096	2001	0.0013U	NS
0252	I	0.0015U	2002	0.00055BU	0.0005BU
0921	I	0.0003U	2001	0.00039BU	NS

Table C– 2. Baseline, August 2006, and February 2007 Nitrate Concentrations

Well Number	Horizon	Baseline Nitrate Concentration (mg/L as NO_3)	Year Sampled, Baseline	Aug 2006 Nitrate Concentration (mg/L as NO_3)	Feb 2007 Nitrate Concentration (mg/L as NO_3)
0686	A	32.2	2002	8	NS
0687	A	60.6	2002	12	NS
0688	A	35.1	2002	44	NS
0901	A	13	2001	14	NS
0906	A	1470	2002	NS	NS
0929	A	69.5	2002	53	49
0940	A	1800	2002	NS	NS
0941	A	358	2002	620	620
0945	A	12.7	2002	11	NS
0946	A			15	NS
0262	B	380	2001	430	487
0263	B	1140	2001	620	664
0265	B	720	2001	620	531
0267	B	1640	2002	1370	1370
0271	B	15.6	2002	15	NS
0281	B			150	170
0282	B			150	150
0283	B			443	531
0908	B	651	2002	664	753
0909	B	485	2002	664	708
0910	B			10	NS
0934	B	2320	2002	1860	1900
0935	B	525	2002	930	930
0936	B	2950	2002	1280	NS
0938	B	1450	1999	576	576
0942	B	1360	2002	1150	1200
0943	B	22.1	2002	29	NS
0947	B	12.5	2002	12	NS
1126	B			1150	NS
1128	B			420	NS
1129	B			487	NS
1130	B			753	NS
1131	B			160	NS
1132	B			320	NS
1133	B			NS	NS
0274	C			15	15
0276	C			10	14
0279	C			41	NS
0280	C			12	NS
0683	C	14.1	2002	10	NS
0684	C	13.9	2002	14	NS
0685	C	14.3	2002	14	NS
0689	C	14.3	2002	13	NS
0691	C	298	2002	53	62
0903	C	54.8	2002	49	NS
0912	C	403	2001	230	NS

Table C–2 (continued). Baseline, August 2006, and February 2007 Nitrate Concentrations

Well Number	Horizon	Baseline Nitrate Concentration (mg/L as NO_3)	Year Sampled, Baseline	Aug 2006 Nitrate Concentration (mg/L as NO_3)	Feb 2007 Nitrate Concentration (mg/L as NO_3)
0914	C	13	2001	12	NS
0917	C	15.7	2001	NS	NS
0930	C	50.9	2002	58	62
0932	C	25.3	2002	27	29
1008	C	15.7	2000	NS	NS
1116	C	106	2002	180	NS
1117	C	225	2002	420	NS
1118	C	164	2002	620	NS
0258	D	15	2000	15	15
0261	D	14	2001	15	NS
0264	D	24.3	2001	39	41
0266	D	14	2001	14	14
0272	D			15	15
0273	D			190	140
0275	D			974	1060
0277	D			14	NS
0278	D			10	NS
0690	D	12.5	2002	12	NS
0692	D	12.5	2002	13	NS
0695	D	25.4	2002	NS	NS
0904	D	5.13	2001	4	NS
0915	D	14.1	2001	14	NS
1003	D	176	2000	89	NS
1004	D	49.1	2000	39	NS
1005	D	14.5	2000	NS	NS
1006	D	14.1	2000	10	NS
1007	D	15.3	2000	14	NS
1101	D	438	2002	410	NS
1102	D	650	2002	487	NS
1103	D	1120	2002	753	NS
1104	D	993	2002	664	NS
1105	D	648	2002	290	NS
1106	D	614	2002	230	260
1107	D	1060	2002	200	NS
1108	D	1410	2002	576	NS
1109	D	798	2002	350	NS
1110	D	227	2002	443	NS
1111	D	421	2002	370	NS
1112	D	617	2002	140	NS
1113	D	143	2002	58	NS
1114	D	228	2002	NS	NS
1115	D	766	2002	320	NS
1119	D	468	2002	576	NS
1120	D	493	2002	280	270
1121	D	573	2002	390	NS
1122	D	954	2002	531	NS
1123	D	643	2002	62	NS

Table C–2 (continued). Baseline, August 2006, and February 2007 Nitrate Concentrations

Well Number	Horizon	Baseline Nitrate Concentration (mg/L as NO_3)	Year Sampled, Baseline	Aug 2006 Nitrate Concentration (mg/L as NO_3)	Feb 2007 Nitrate Concentration (mg/L as NO_3)
1124	D	781	2002	210	NS
1125	D	104	2002	43	NS
0251	E	426	2002	17	17
0268	E	15.4	2002	71	89
0920	E	14.8	2001	15	NS
0911	F			14	NS
0913	G	12.4	2001	12	NS
0916	G	11.6	2001	10	NS
0252	I	15.3	2002	11	10
0921	I	11	2001	11	NS

Table C–3. Baseline, August 2006, and February 2007 Selenium Concentrations

Well Number	Horizon	Baseline Selenium Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Selenium Concentration (mg/L)	Feb 2007 Selenium Concentration (mg/L)
0686	A	0.0088	2002	0.00015	NS
0687	A	0.0145	2002	0.00036	NS
0688	A	0.0033	2002	0.022	NS
0901	A	0.0024	2001	0.0023	NS
0906	A	0.0335	2002	NS	NS
0929	A	0.0028	2002	0.0028	0.0025
0940	A	0.105	2002	NS	NS
0941	A	0.0348	2002	0.058	0.059
0945	A	0.0035	2002	0.0023	NS
0946	A			0.0021	NS
0262	B	0.0621	2001	0.064	0.073
0263	B	0.0632	2001	0.027	0.026
0265	B	0.0071	2001	0.0057	0.0065
0267	B	0.0532	2002	0.043	0.043
0271	B	0.0016	2002	0.0009	NS
0281	B			0.0019	0.0023
0282	B			0.0015	0.0022
0283	B			0.0094	0.016
0908	B	0.0163	2002	0.021	0.024
0909	B	0.0224	2002	0.052	0.052
0910	B			0.00096	NS
0934	B	0.0116	2002	0.01	0.013
0935	B	0.0195	2002	0.023	0.025
0936	B	0.0869	2002	0.026	NS
0938	B	0.0432	1999	0.032	0.035
0942	B	0.0348	2002	0.048	0.045
0943	B	0.0021	2002	0.0021	NS
0947	B	0.0019	2002	0.0012	NS
1126	B			0.048	NS
1128	B			0.0075	NS
1129	B			0.057	NS
1130	B			0.028	NS
1131	B			0.0023	NS
1132	B			0.036	NS
0274	C			0.0009	0.0017
0276	C			0.00099	0.0019
0279	C			0.0021	NS
0280	C			0.0019	NS
0683	C	0.0022	2002	0.0017	NS
0684	C	0.0019	2002	0.0011	NS
0685	C	0.0017	2002	0.0013	NS
0689	C	0.0014	2002	0.00078	NS
0691	C	0.0046	2002	0.0015	0.0023
0903	C	0.0023	2002	0.002	NS
0912	C	0.0137	2001	0.0062	NS
0914	C	0.0016	2001	0.00067	NS

Table C–3 (continued). Baseline, August 2006, and February 2007 Selenium Concentrations

Well Number	Horizon	Baseline Selenium Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Selenium Concentration (mg/L)	Feb 2007 Selenium Concentration (mg/L)
0917	C	0.0017	2001	NS	NS
0930	C	0.002	2002	0.0017	0.0021
0932	C	0.0019	2002	0.0011	0.0018
1008	C	0.0015	2000	NS	NS
1116	C	0.0018	2002	0.0025	NS
1117	C	0.0028	2002	0.012	NS
1118	C	0.0028	2002	0.019	NS
0258	D	0.0018	2000	0.0015	0.0019
0261	D	0.0021	2001	0.0012	NS
0264	D	0.0018	2001	0.001	0.0019
0266	D	0.0013	2001	0.00065	0.0013
0272	D			0.00071	0.0013
0273	D			0.015	0.013
0275	D			0.018	0.022
0277	D			0.00087	NS
0278	D			0.00069	NS
0690	D	0.0014	2002	0.00075	NS
0692	D	0.0022	2002	0.0016	NS
0695	D	0.0019	2002	NS	NS
0904	D	0.0131	2001	0.015	NS
0915	D	0.0019	2001	0.0012	NS
1003	D	0.003	2000	0.0017	NS
1004	D	0.0021	2000	0.0013	NS
1005	D	0.0014	2000	NS	NS
1006	D	0.0013	2000	0.00075	NS
1007	D	0.0013	2000	0.00078	NS
1101	D	0.0188	2002	0.027	NS
1102	D	0.0121	2002	0.017	NS
1103	D	0.0613	2002	0.022	NS
1104	D	0.0344	2002	0.028	NS
1105	D	0.0871	2002	0.021	NS
1106	D	0.0925	2002	0.018	0.03
1107	D	0.0903	2002	0.013	NS
1108	D	0.0704	2002	0.026	NS
1109	D	0.0372	2002	0.014	NS
1110	D	0.0081	2002	0.017	NS
1111	D	0.0172	2002	0.014	NS
1112	D	0.0154	2002	0.0038	NS
1113	D	0.0025	2002	0.0011	NS
1114	D	0.0035	2002	NS	NS
1115	D	0.0362	2002	0.011	NS
1119	D	0.029	2002	0.025	NS
1120	D	0.0563	2002	0.025	0.024
1121	D	0.0455	2002	0.018	NS
1122	D	0.0558	2002	0.035	NS
1123	D	0.0449	2002	0.0036	NS
1124	D	0.0186	2002	0.0061	NS

Table C-3 (continued). Baseline, August 2006, and February 2007 Selenium Concentrations

Well Number	Horizon	Baseline Selenium Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Selenium Concentration (mg/L)	Feb 2007 Selenium Concentration (mg/L)
1125	D	0.0025	2002	0.0022	NS
0251	E	0.0035	2002	0.00055	0.0011
0268	E	0.0018	2002	0.0018	0.002
0920	E	0.0014	2001	0.00077	NS
0911	F			0.00061	NS
0913	G	0.00063	2001	0.00054	NS
0916	G	0.001	2001	0.00059	NS
0252	I	0.00092	2002	0.00039	0.0009
0921	I	0.00091	2001	0.00053	NS

Table C–4. Baseline, August 2006, and February 2007 Sulfate Concentrations

Well Number	Horizon	Baseline Sulfate Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Sulfate Concentration (mg/L)	Feb 2007 Sulfate Concentration (mg/L)
0686	A	98.6	2002	25	NS
0687	A	329	2002	33	NS
0688	A	40	2002	310	NS
0901	A	26.2	2001	32	NS
0906	A	1660	2002	NS	NS
0929	A	28.1	2002	27	23
0940	A	7550	2002	NS	NS
0941	A	745	2002	750	780
0945	A	32.1	2002	24	NS
0946	A			51	NS
0262	B	931	2001	960	1000
0263	B	1990	2001	2000	2100
0265	B	1520	2001	1100	990
0267	B	3680	2002	3600	3400
0271	B	16.4	2002	15	NS
0281	B			110	120
0282	B			160	130
0283	B			540	730
0908	B	2430	2002	2700	2900
0909	B	666	2002	810	870
0910	B			15	NS
0934	B	7360	2002	2300	2600
0935	B	2690	2002	2500	2600
0936	B	4360	2002	1600	NS
0938	B	2120	1999	980	990
0942	B	3030	2002	2900	3100
0943	B	29	2002	97	NS
0947	B	18.7	2002	17	NS
1126	B			3300	NS
1128	B			550	NS
1129	B			970	NS
1130	B			1500	NS
1131	B			310	NS
1132	B			570	NS
1133	B			NS	NS
0274	C			15	15
0276	C			16	17
0279	C			60	NS
0280	C			21	NS
0683	C	21.6	2002	18	NS
0684	C	18	2002	16	NS
0685	C	26.2	2002	19	NS
0689	C	13.7	2002	14	NS
0691	C	587	2002	91	100
0903	C	76.5	2002	68	NS
0912	C	846	2001	390	NS

Table C-4 (continued). Baseline, August 2006, and February 2007 Sulfate Concentrations

Well Number	Horizon	Baseline Sulfate Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Sulfate Concentration (mg/L)	Feb 2007 Sulfate Concentration (mg/L)
0914	C	15.6	2001	12	NS
0917	C	13.9	2001	NS	NS
0930	C	59.8	2002	65	59
0932	C	30.2	2002	27	37
1008	C	13	2000	NS	NS
1116	C	176	2002	240	NS
1117	C	255	2002	800	NS
1118	C	163	2002	1700	NS
0258	D	17.4	2000	18	18
0261	D	18.2	2001	18	NS
0264	D	37.7	2001	62	58
0266	D	10.9	2001	11	11
0272	D			11	11
0273	D			230	140
0275	D			2000	2200
0277	D			18	NS
0278	D			12	NS
0690	D	13.8	2002	12	NS
0692	D	20.8	2002	18	NS
0695	D	50.4	2002	NS	NS
0904	D	96.5	2001	100	NS
0915	D	17.8	2001	17	NS
1003	D	302	2000	55	NS
1004	D	66.2	2000	58	NS
1005	D	12.7	2000	NS	NS
1006	D	12.2	2000	11	NS
1007	D	11.7	2000	13	NS
1101	D	960	2002	1300	NS
1102	D	1320	2002	1100	NS
1103	D	2570	2002	1400	NS
1104	D	1870	2002	1200	NS
1105	D	1590	2002	560	NS
1106	D	1050	2002	410	490
1107	D	1200	2002	260	NS
1108	D	3400	2002	1400	NS
1109	D	3280	2002	900	NS
1110	D	512	2002	1000	NS
1111	D	988	2002	930	NS
1112	D	1140	2002	210	NS
1113	D	136	2002	49	NS
1114	D	328	2002	NS	NS
1115	D	1930	2002	610	NS
1119	D	1560	2002	1300	NS
1120	D	2330	2002	1800	1700
1121	D	2590	2002	940	NS
1122	D	2960	2002	2300	NS

Table C–4 (continued). Baseline, August 2006, and February 2007 Sulfate Concentrations

Well Number	Horizon	Baseline Sulfate Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Sulfate Concentration (mg/L)	Feb 2007 Sulfate Concentration (mg/L)
1123	D	1240	2002	160	NS
1124	D	1170	2002	320	NS
1125	D	165	2002	66	NS
0251	E	617	2002	14	14
0268	E	17.4	2002	130	140
0920	E	12.7	2001	12	NS
0911	F			9	NS
0913	G	8.43	2001	7.7	NS
0916	G	13.5	2001	10	NS
0252	I	19.2	2002	6.5	6.7
0921	I	8.52	2001	7.6	NS

Table C–5. Baseline, August 2006, and February 2007 Uranium Concentrations

Well Number	Horizon	Baseline Uranium Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Uranium Concentration (mg/L)	Feb 2007 Uranium Concentration (mg/L)
0686	A	0.0021	2002	0.000058BU	NS
0687	A	0.0208	2002	0.00041	NS
0688	A	0.002	2002	0.0062	NS
0901	A	0.0026	2001	0.0028	NS
0906	A	0.951	2002	NS	NS
0929	A	0.0012	2002	0.0013	0.0013
0940	A	0.546	2002	NS	NS
0941	A	0.0886	2002	0.093N	0.078
0945	A	0.0031	2002	0.0022	NS
0946	A			0.00017U	NS
0262	B	0.379	2001	0.78	0.93
0263	B	0.485	2001	0.1	0.098
0265	B	0.0897	2001	0.061	0.053
0267	B	0.0731	2002	0.077	0.061
0271	B	0.0014	2002	0.0012	NS
0281	B			0.0086	0.008
0282	B			0.01	0.0073
0283	B			0.023	0.03
0908	B	0.122	2002	0.089	0.092
0909	B	0.0389	2002	0.051	0.047
0910	B			0.001	NS
0934	B	0.312	2002	0.25	0.21
0935	B	0.0868	2002	0.13	0.11
0936	B	0.267	2002	0.2	NS
0938	B	0.21	1999	0.3	0.31
0942	B	0.246	2002	0.62	0.46
0943	B	0.0049	2002	0.022	NS
0947	B	0.0024	2002	0.001	NS
1126	B			0.068	NS
1128	B			0.034	NS
1129	B			0.72	NS
1130	B			0.27	NS
1131	B			0.076	NS
1132	B			0.37	NS
0274	C			0.0015	0.0012
0276	C			0.0014	0.0013
0279	C			0.0015	NS
0280	C			0.0013	NS
0683	C	0.0012	2002	0.0011	NS
0684	C	0.0019	2002	0.0013	NS
0685	C	0.0012	2002	0.0011	NS
0689	C	0.0011	2002	0.001	NS
0691	C	0.0657	2002	0.013	0.014
0903	C	0.0022	2002	0.0019	NS
0912	C	0.0342	2001	0.021	NS
0914	C	0.0013	2001	0.000042BU	NS

Table C–5 (continued). Baseline, August 2006, and February 2007 Uranium Concentrations

Well Number	Horizon	Baseline Uranium Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Uranium Concentration (mg/L)	Feb 2007 Uranium Concentration (mg/L)
0917	C	0.0013	2001	NS	NS
0930	C	0.0023	2002	0.0028	0.0025
0932	C	0.0016	2002	0.0015	0.0013
1008	C	0.001	2000	NS	NS
1116	C	0.0081	2002	0.017	NS
1117	C	0.0151	2002	0.036	NS
1118	C	0.0098	2002	0.086	NS
0258	D	0.0018	2000	0.0011	0.0011
0261	D	0.0018	2001	0.0011	NS
0264	D	0.0033	2001	0.0031	0.0028
0266	D	0.0019	2001	0.0015	0.0014
0272	D			0.0013	0.0012
0273	D			0.048	0.033
0275	D			0.47	0.46
0277	D			0.0024	NS
0278	D			0.0011	NS
0690	D	0.0018	2002	0.0015	NS
0692	D	0.0015	2002	0.0015	NS
0695	D	0.002	2002	NS	NS
0904	D	0.0044	2001	0.0051	NS
0915	D	0.0017	2001	0.00004BU	NS
1003	D	0.0205	2000	0.0084	NS
1004	D	0.0053	2000	0.0065	NS
1005	D	0.0013	2000	NS	NS
1006	D	0.0014	2000	0.001	NS
1007	D	0.0012	2000	0.0011	NS
1101	D	0.245	2002	0.39	NS
1102	D	0.533	2002	0.33	NS
1103	D	0.355	2002	0.32	NS
1104	D	0.194	2002	0.43	NS
1105	D	2.1	2002	0.73	NS
1106	D	2.1	2002	0.44	0.45
1107	D	0.118	2002	0.039	NS
1108	D	0.646	2002	0.22	NS
1109	D	0.565	2002	0.24	NS
1110	D	0.0528	2002	0.22	NS
1111	D	0.161	2002	0.16	NS
1112	D	0.13	2002	0.039	NS
1113	D	0.0149	2002	0.0061	NS
1114	D	0.0277	2002	NS	NS
1115	D	0.41	2002	0.076	NS
1119	D	0.555	2002	0.29	NS
1120	D	1.3	2002	0.35	0.28
1121	D	0.857	2002	0.23	NS
1122	D	0.878	2002	0.5	NS
1123	D	0.261	2002	0.035	NS
1124	D	0.171	2002	0.051	NS

Table C–5 (continued). Baseline, August 2006, and February 2007 Uranium Concentrations

Well Number	Horizon	Baseline Uranium Concentration (mg/L)	Year Sampled, Baseline	Aug 2006 Uranium Concentration (mg/L)	Feb 2007 Uranium Concentration (mg/L)
1125	D	0.0176	2002	0.01	NS
0251	E	0.0481	2002	0.0016	0.0018
0268	E	0.0014	2002	0.021	0.022
0920	E	0.0017	2001	0.0011	NS
0911	F			0.0011	NS
0913	G	0.0016	2001	0.0011	NS
0916	G	0.0014	2001	0.000044BU	NS
0252	I	0.0024	2002	0.0016	0.0017
0921	I	0.0047	2001	0.0046	NS

End of current text

Appendix D

Monitor Well Water Level Hydrographs

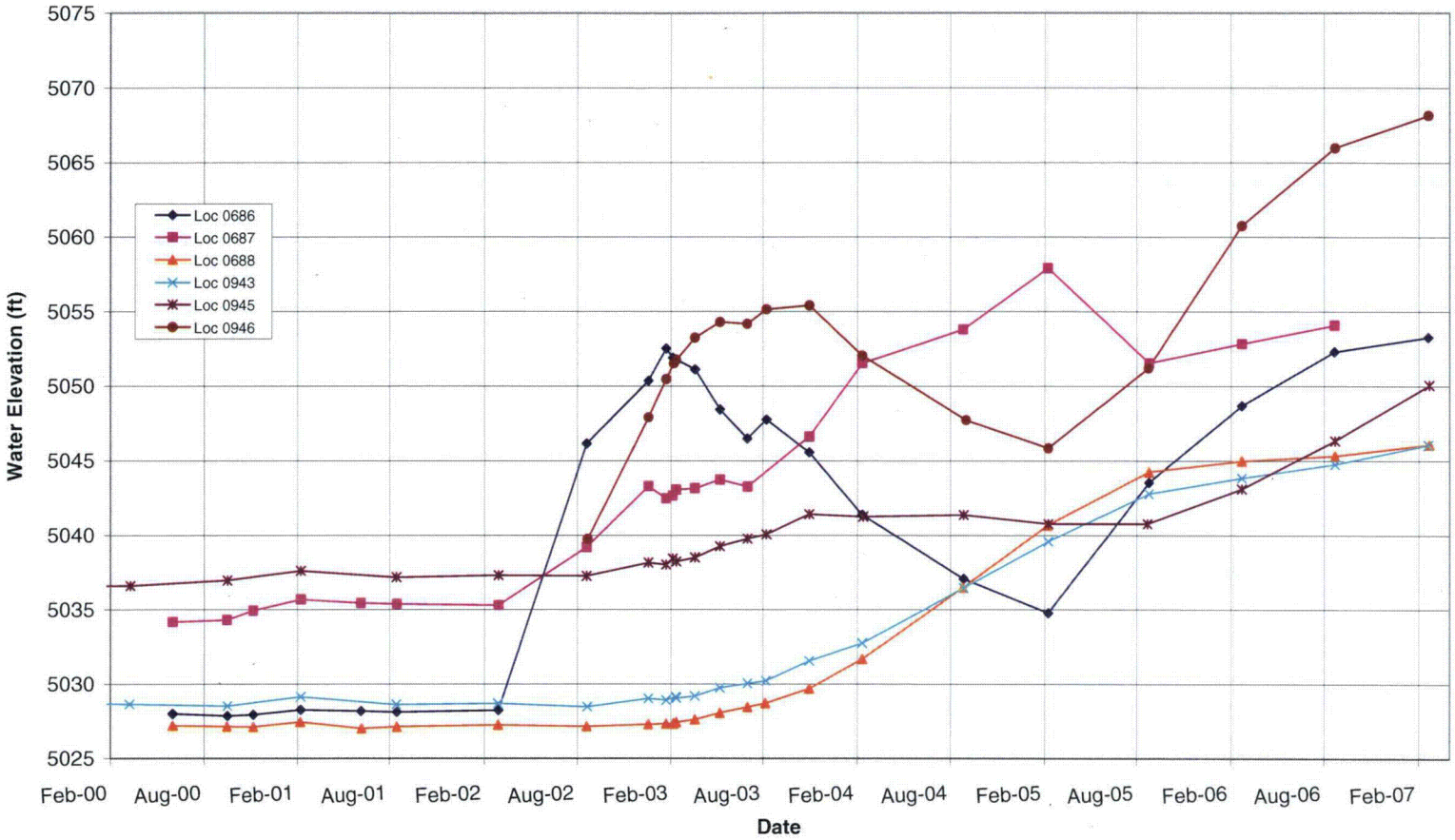

Figure D–1. Monitor Wells at Infiltration Trench

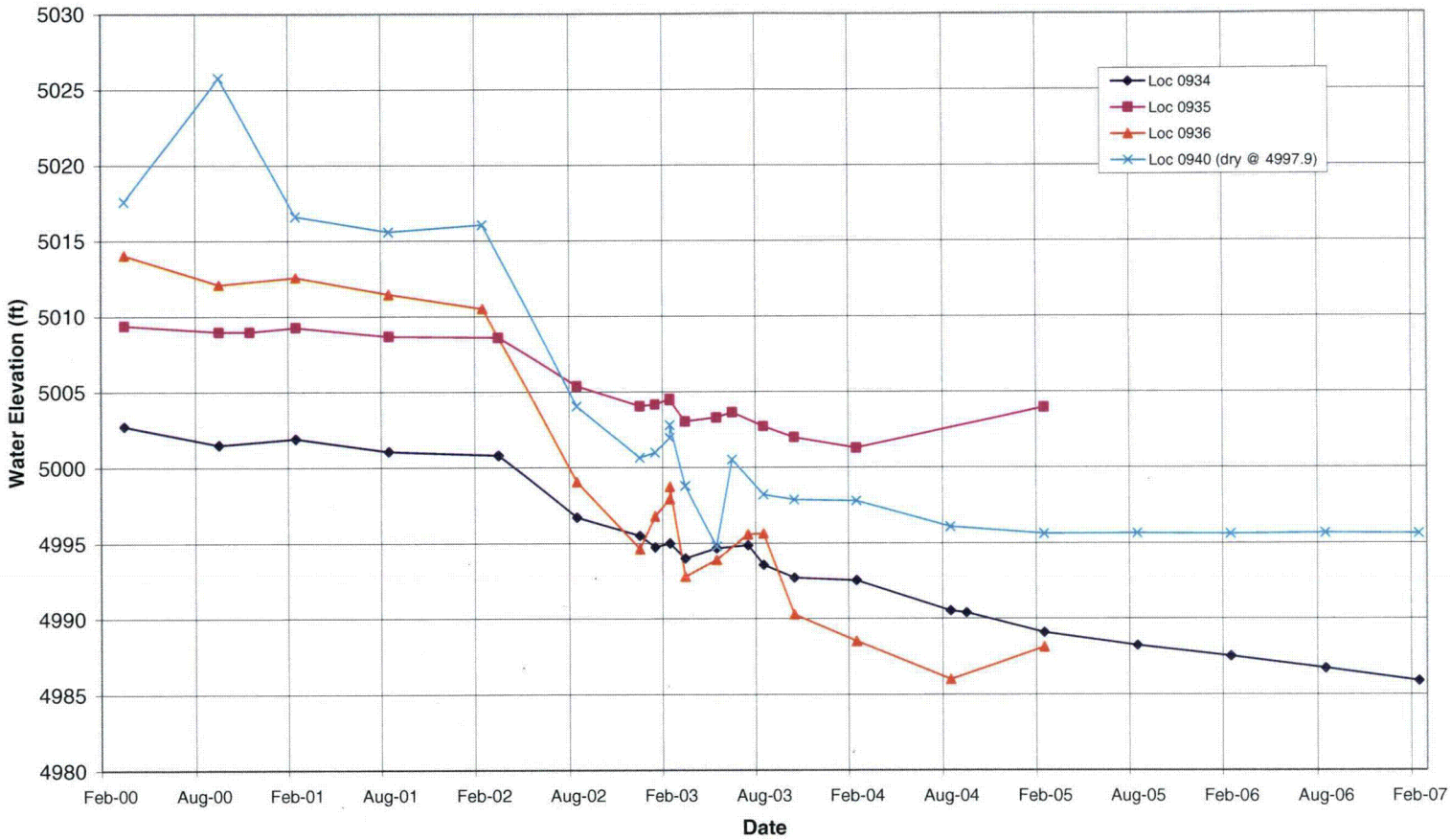

Figure D–2. Selected Horizon A and B Monitor Wells

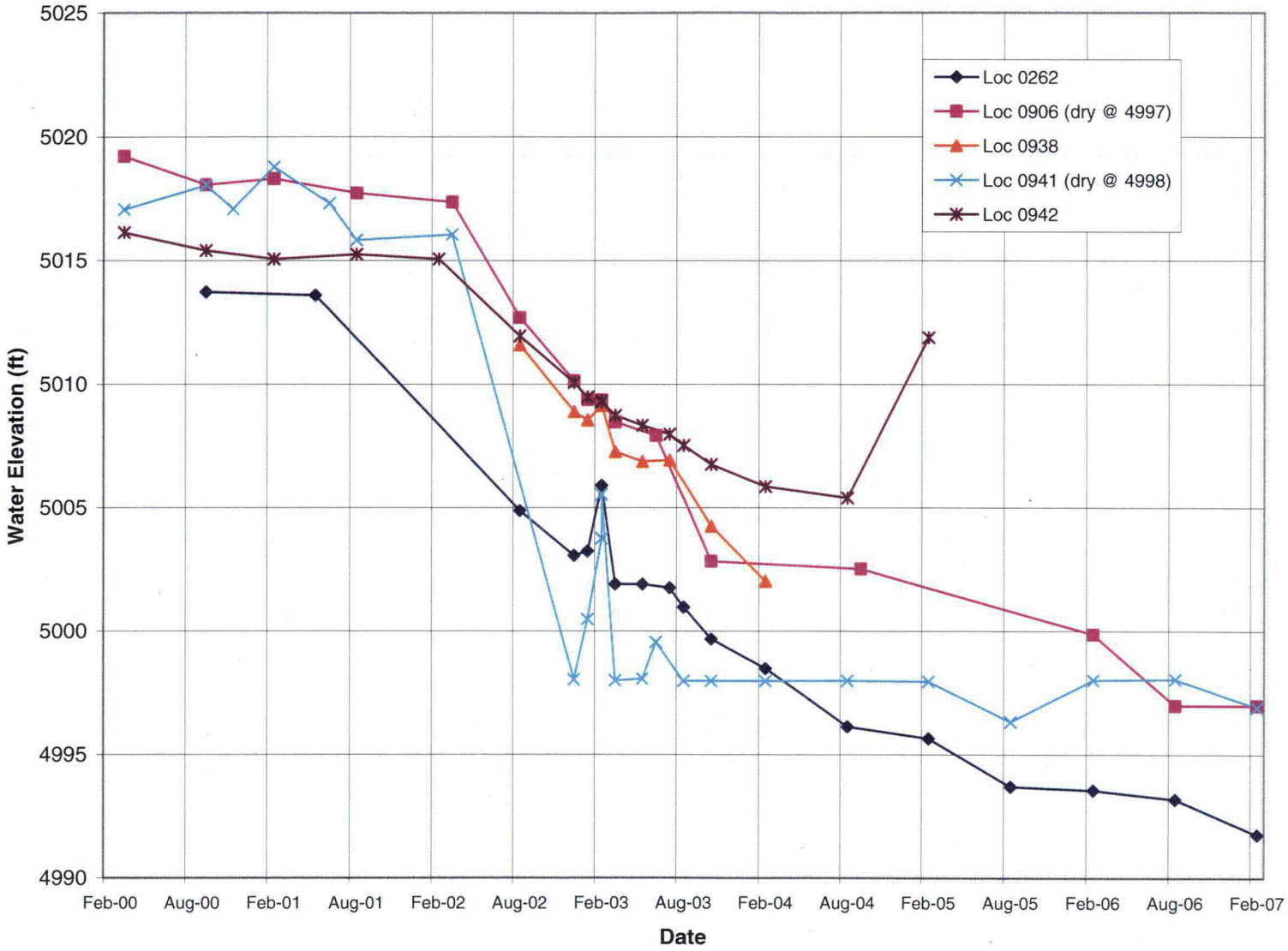

Figure D–3. Selected Horizon A and B Monitor Wells

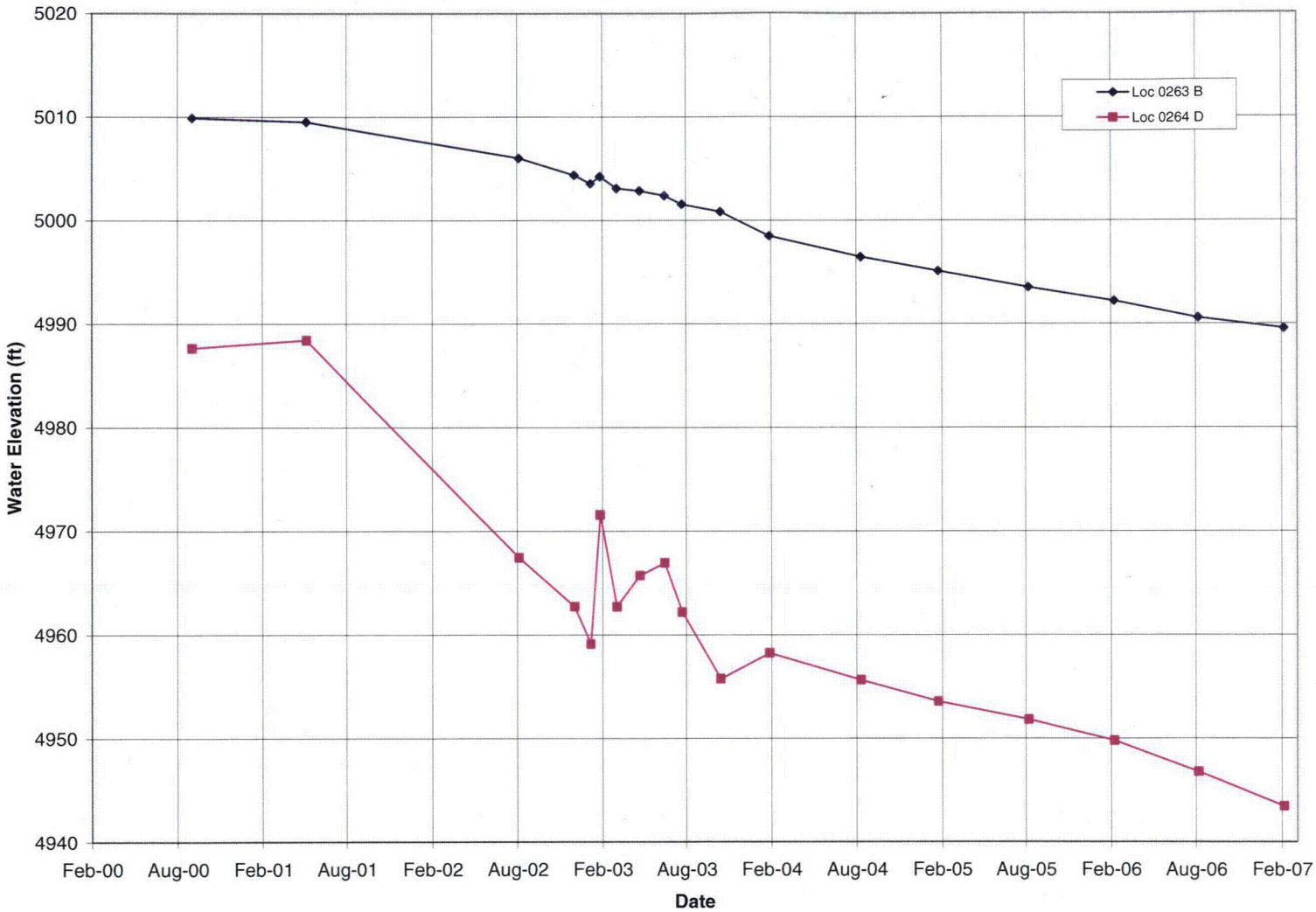

Figure D–4. Middle Terrace Well Pair

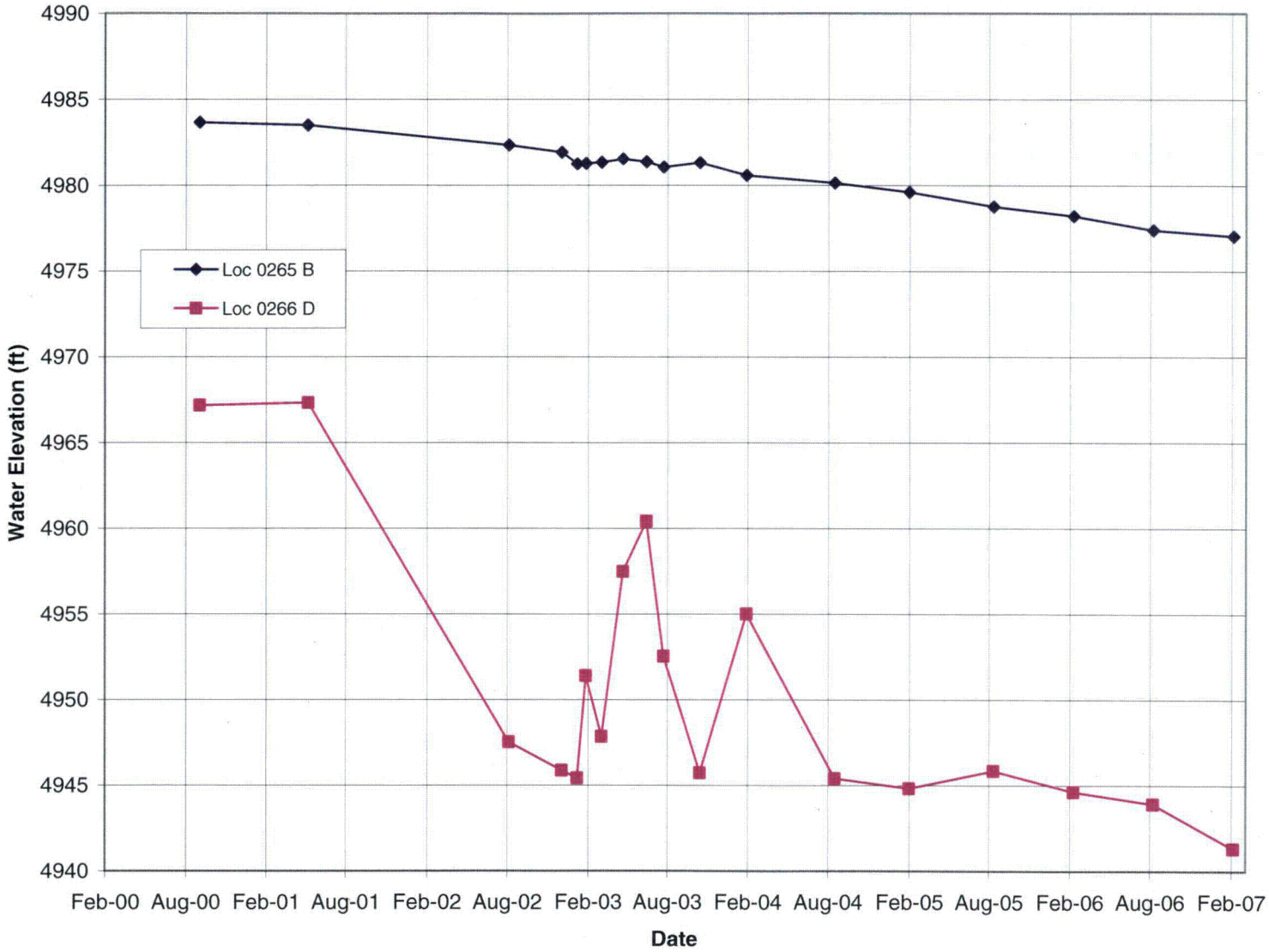

Figure D–5. Middle Terrace Well Pair

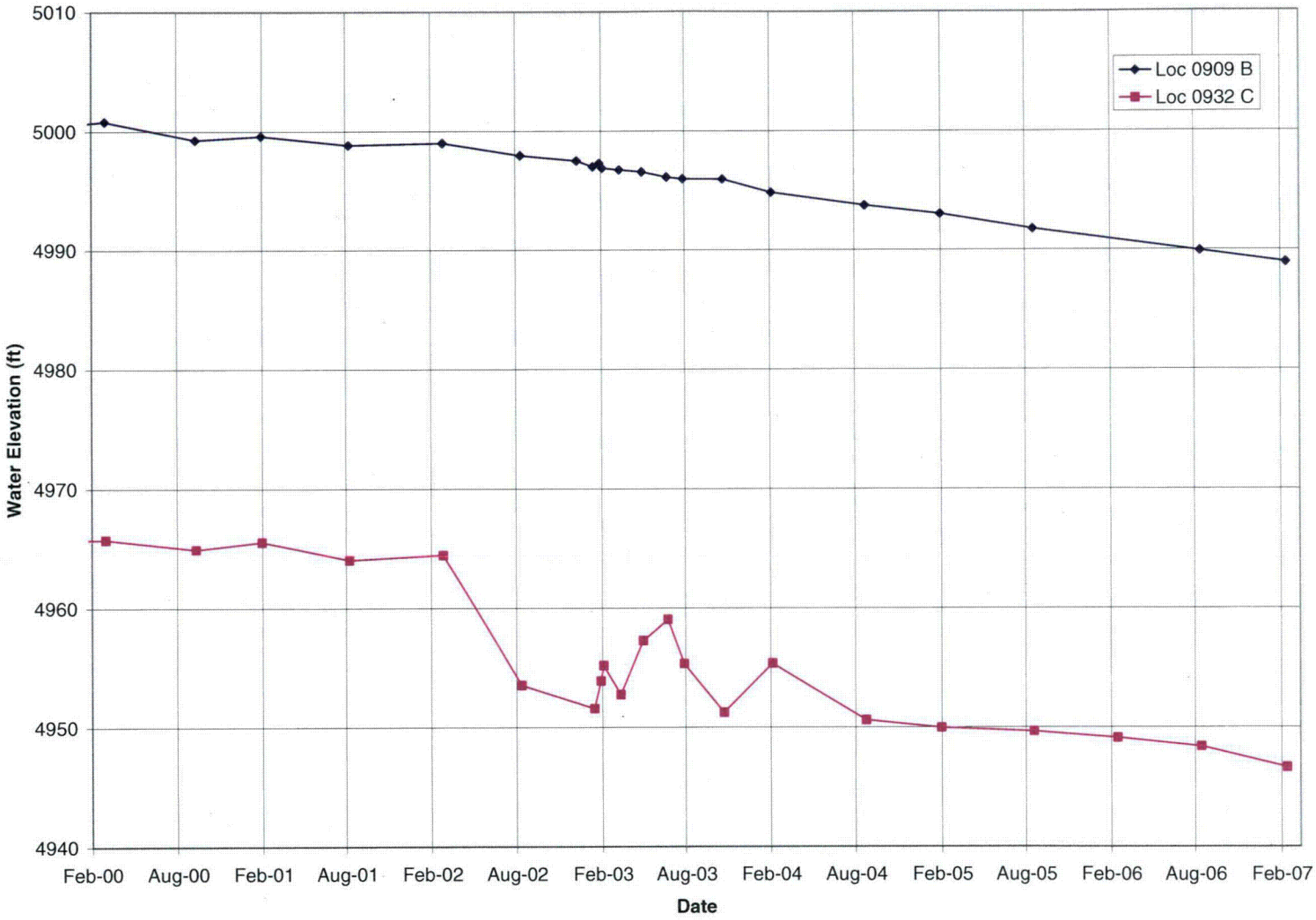

Figure D–6. Middle Terrace Well Pair

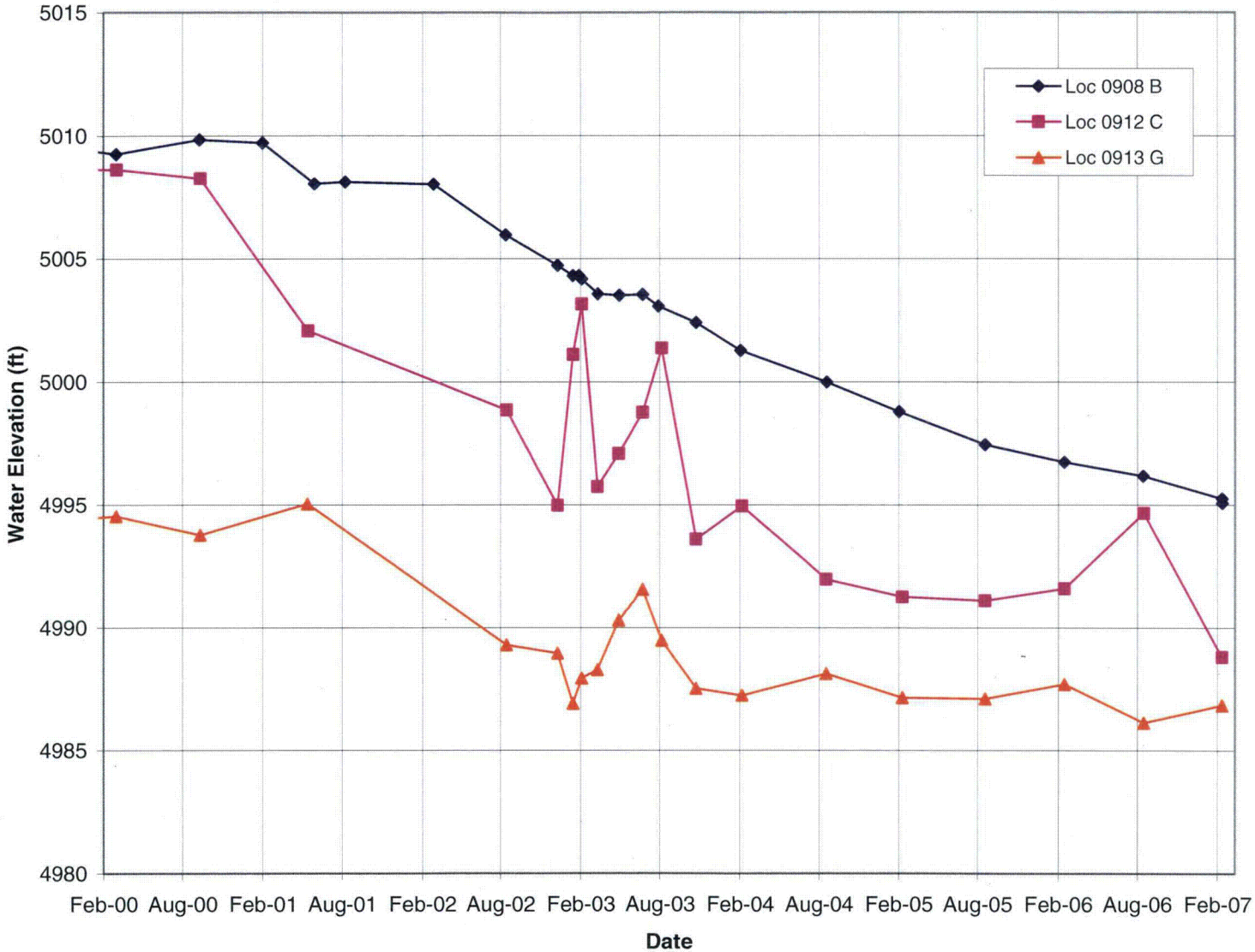

Figure D–7. Middle Terrace Well Pair

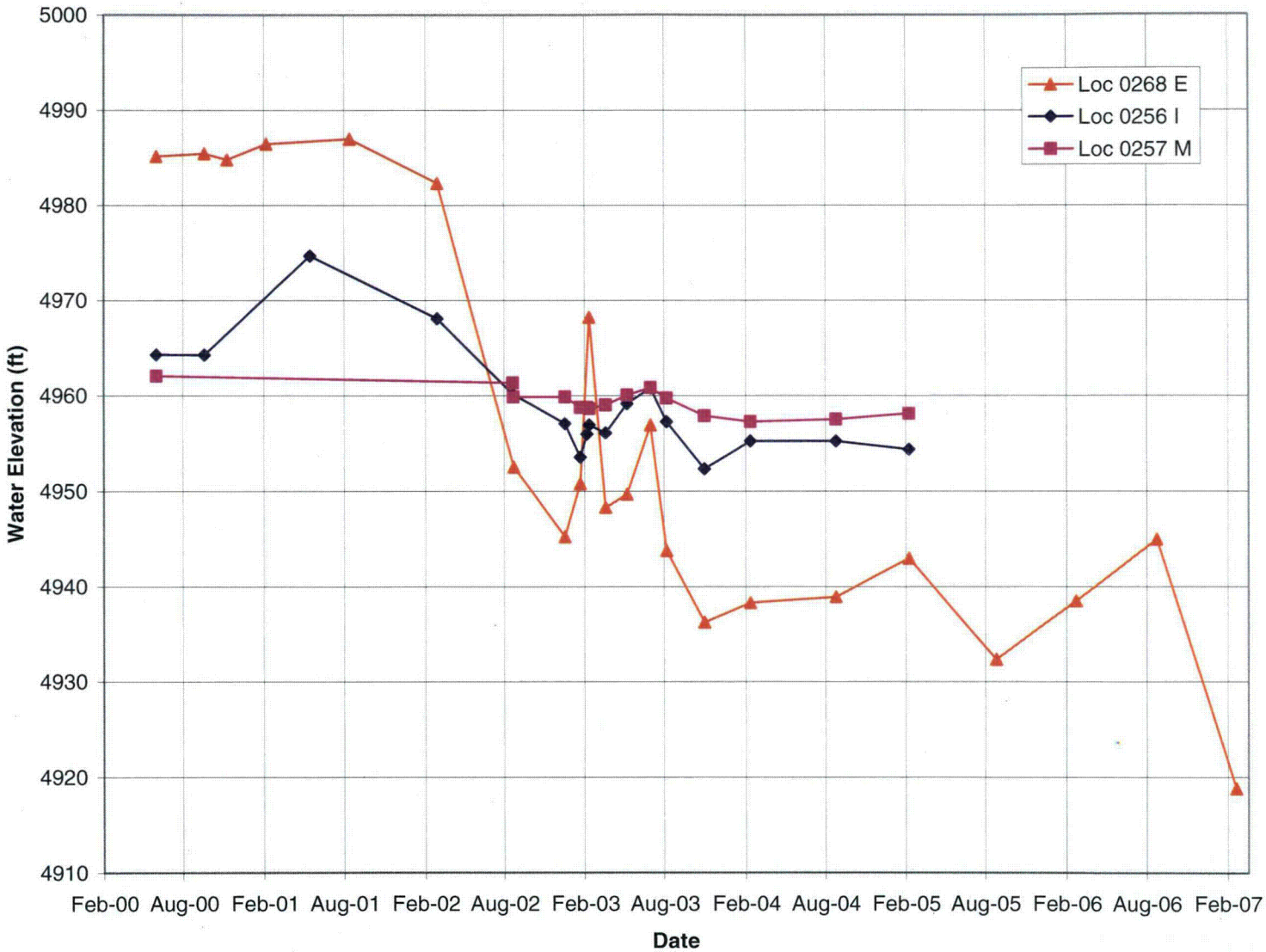

Figure D–8. Middle Terrace Well Cluster

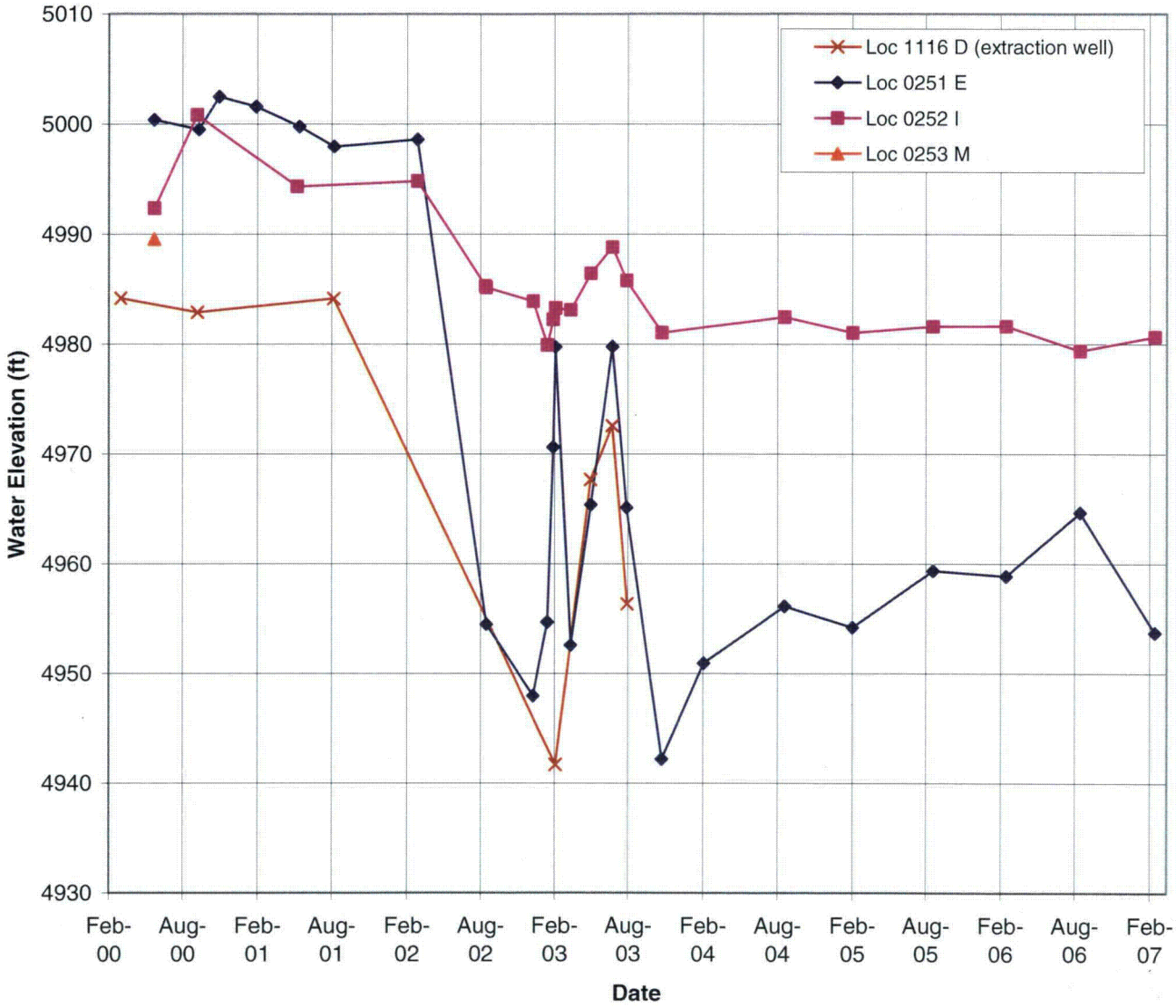

Figure D–9. Middle Terrace Well Cluster

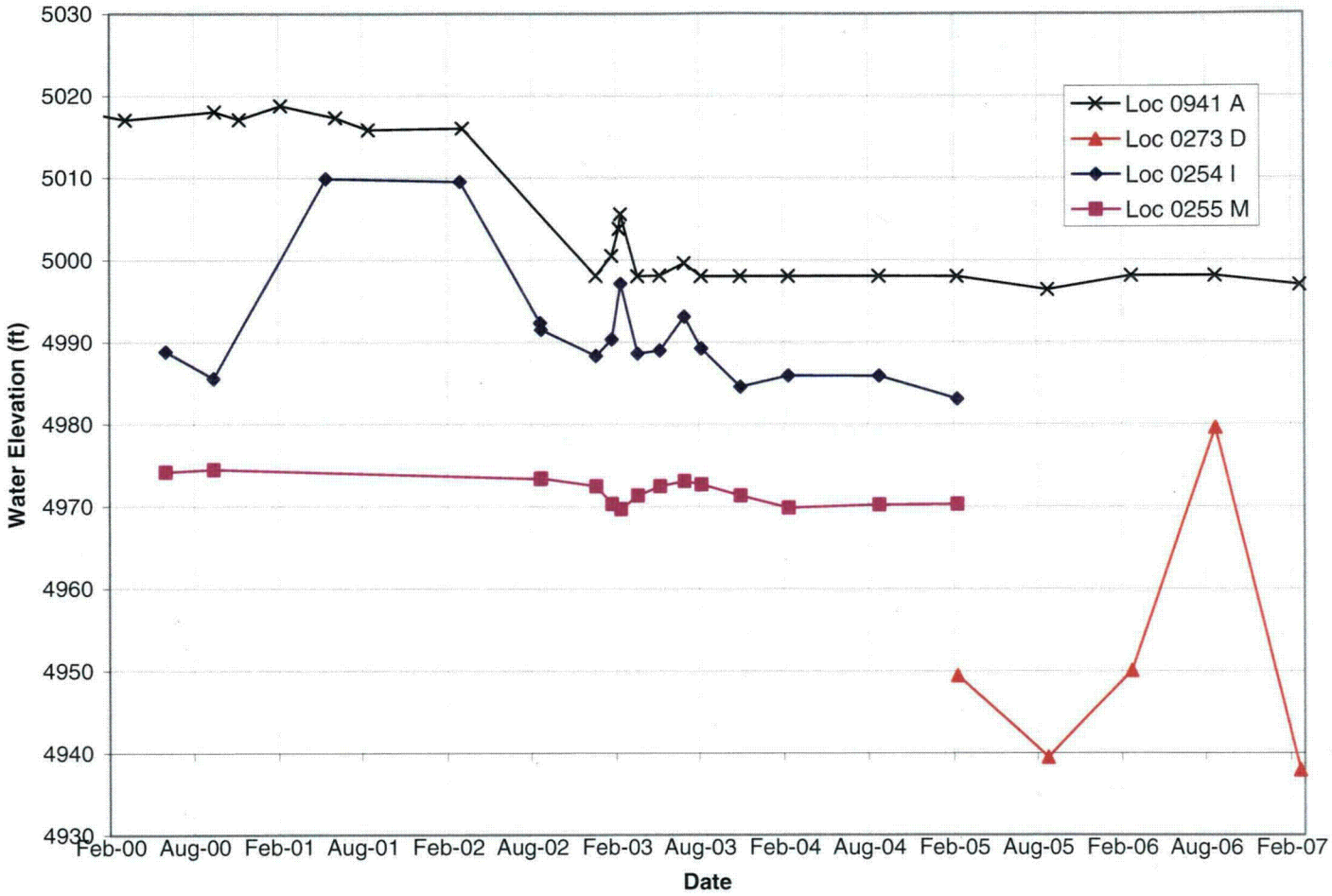

Figure D–10. Middle Terrace Well Cluster

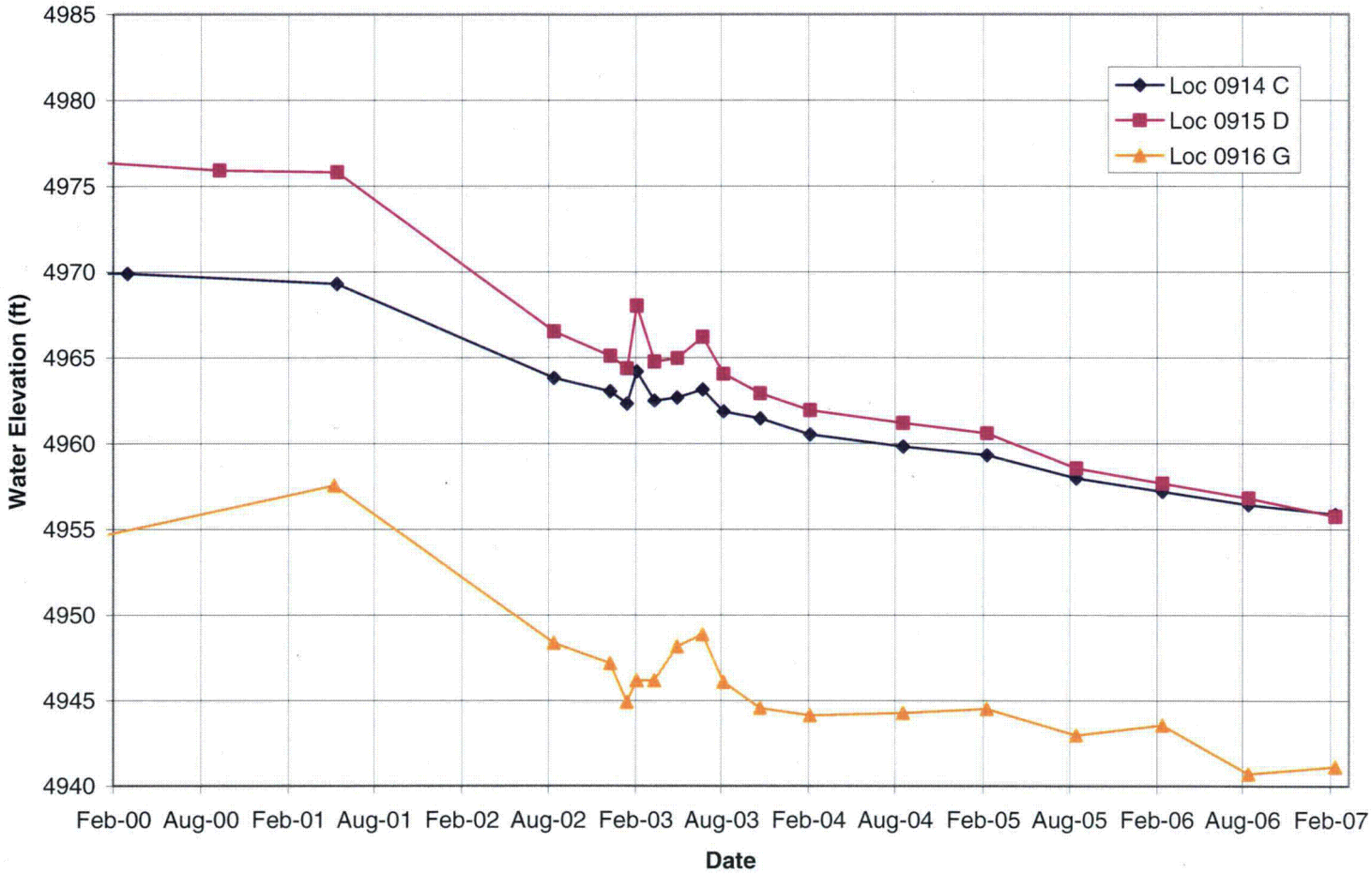

Figure D–11. Middle Terrace Well Cluster

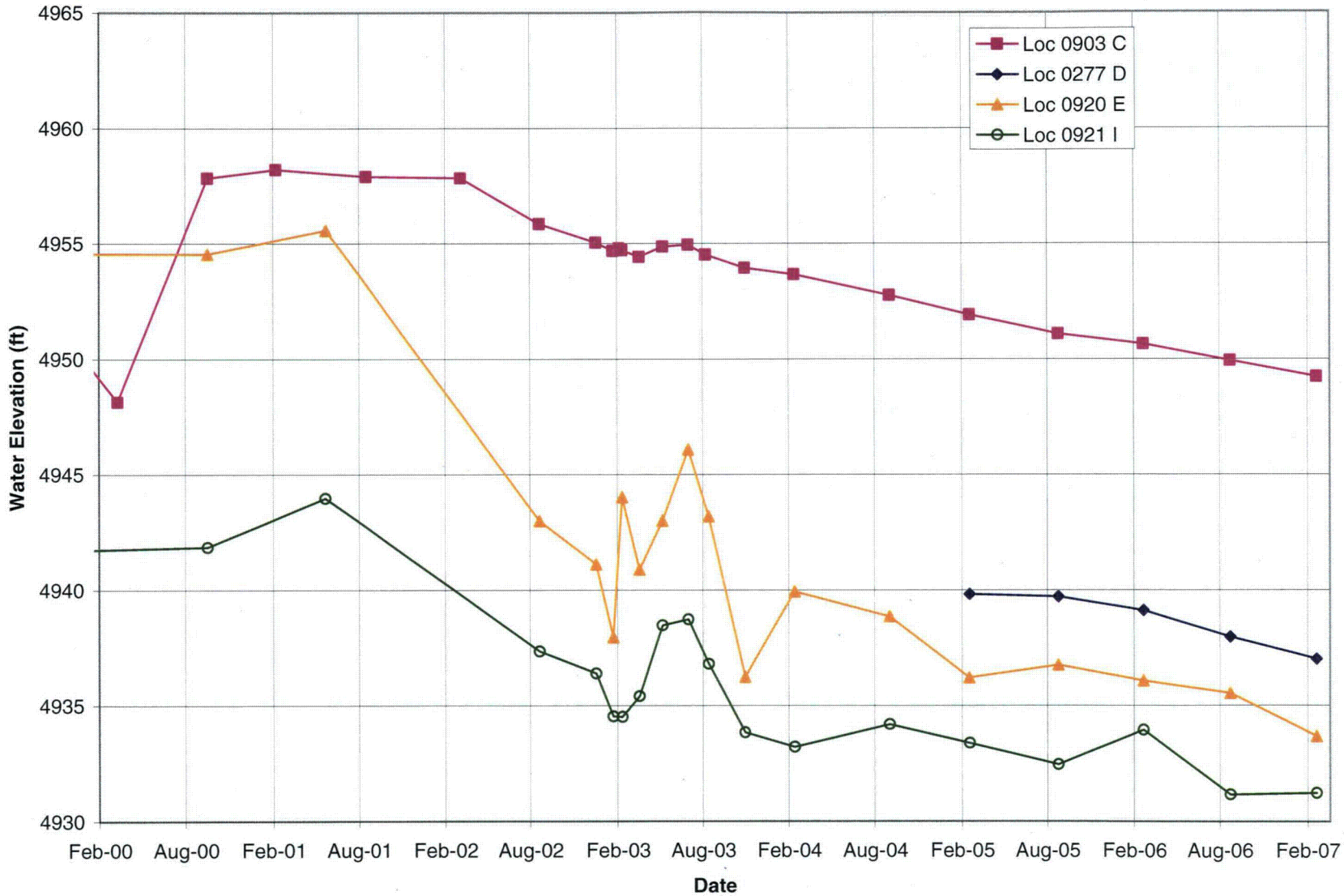

Figure D–12. Lower Terrace Well Cluster

Appendix E

Contaminant Concentration Trends at Monitor Wells

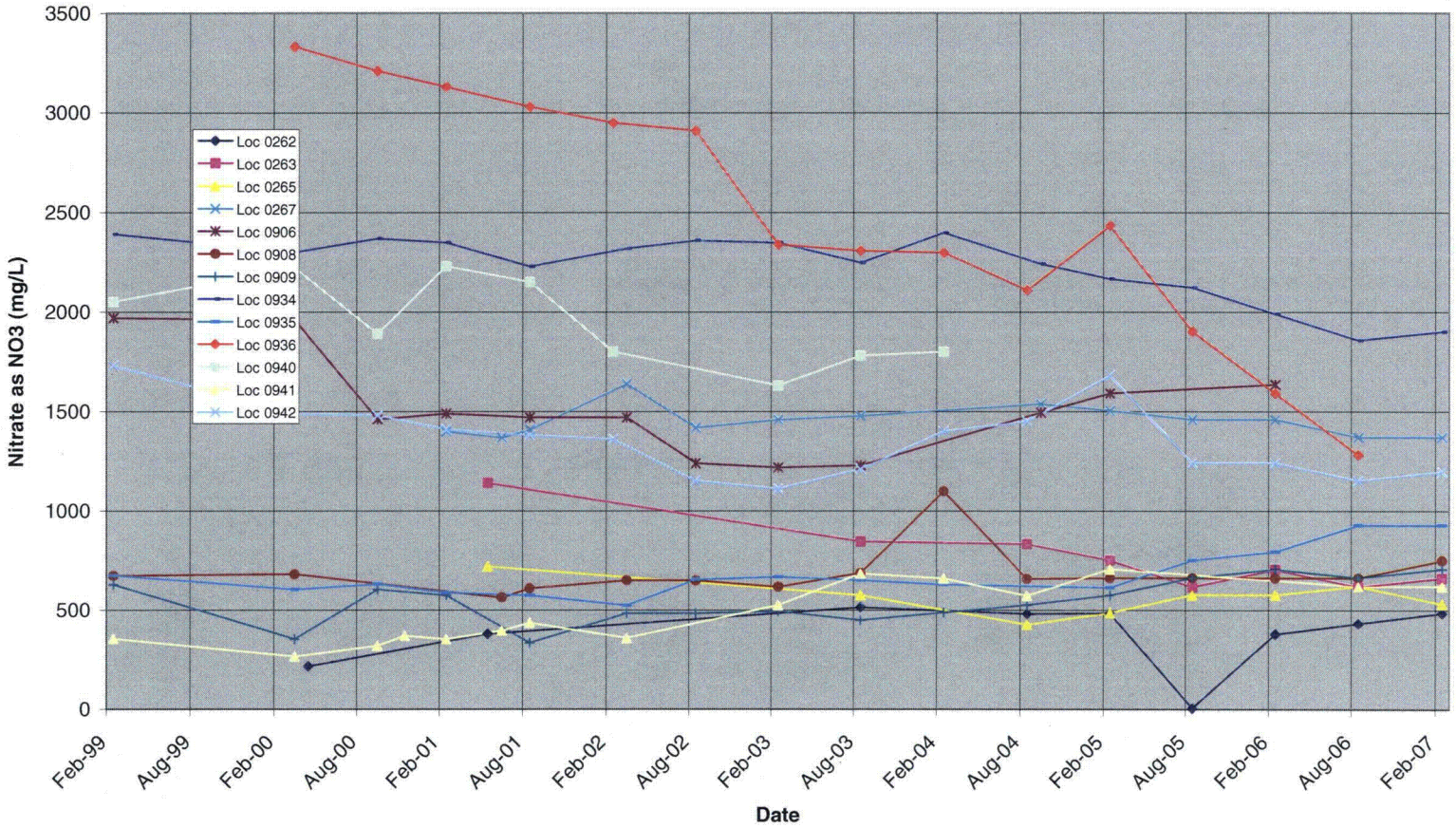

Figure E–1. Horizons A and B Monitor Wells, Nitrate as $N0_3$ Concentration

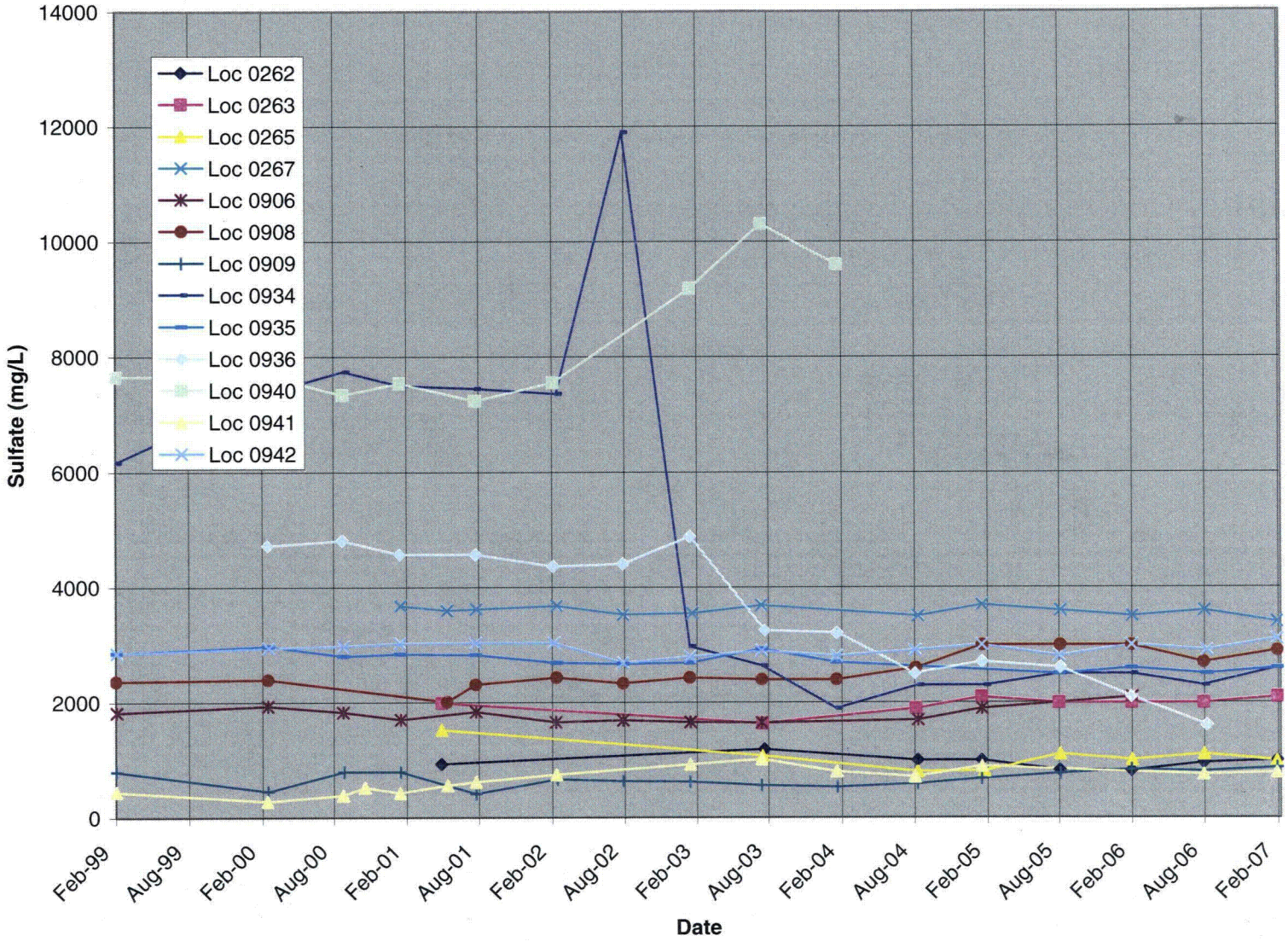

Figure E–2. Horizons A and B Monitor Wells, Sulfate Concentration

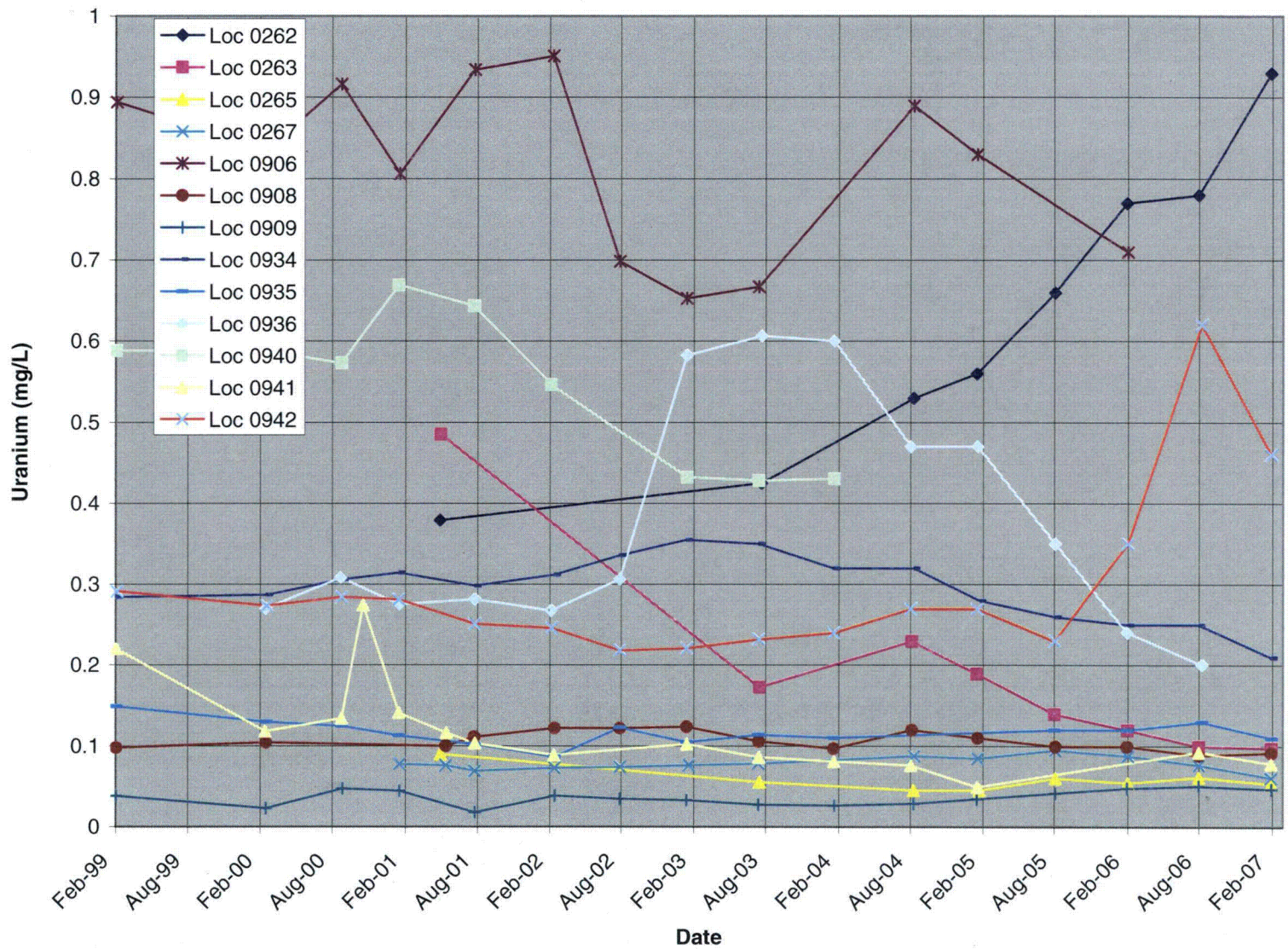

Figure E–3. Horizons A and B Monitor Wells, Uranium Concentration

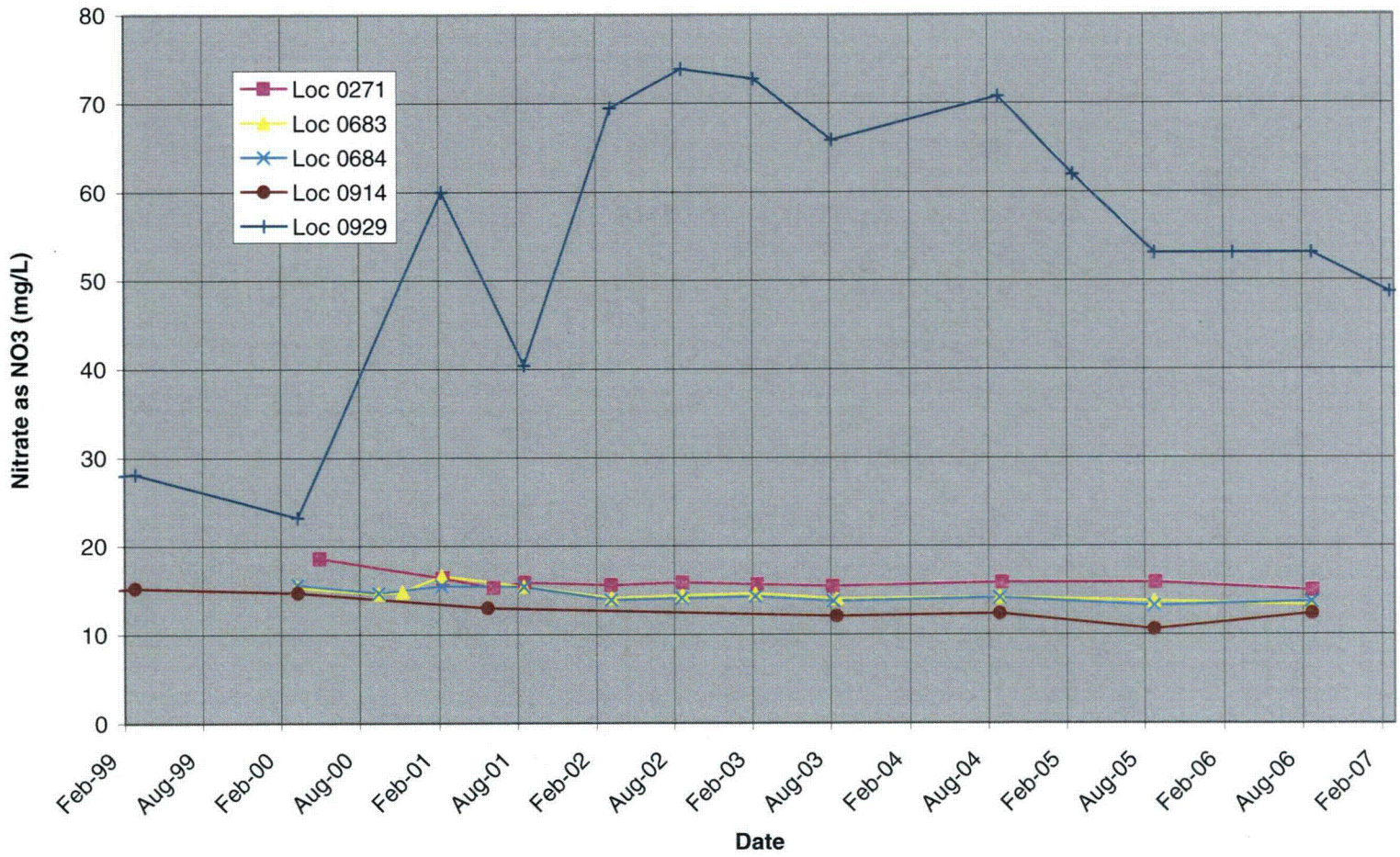

Figure E–4. Horizons A and B Sentinel Wells, Nitrate as NO_3 Concentration

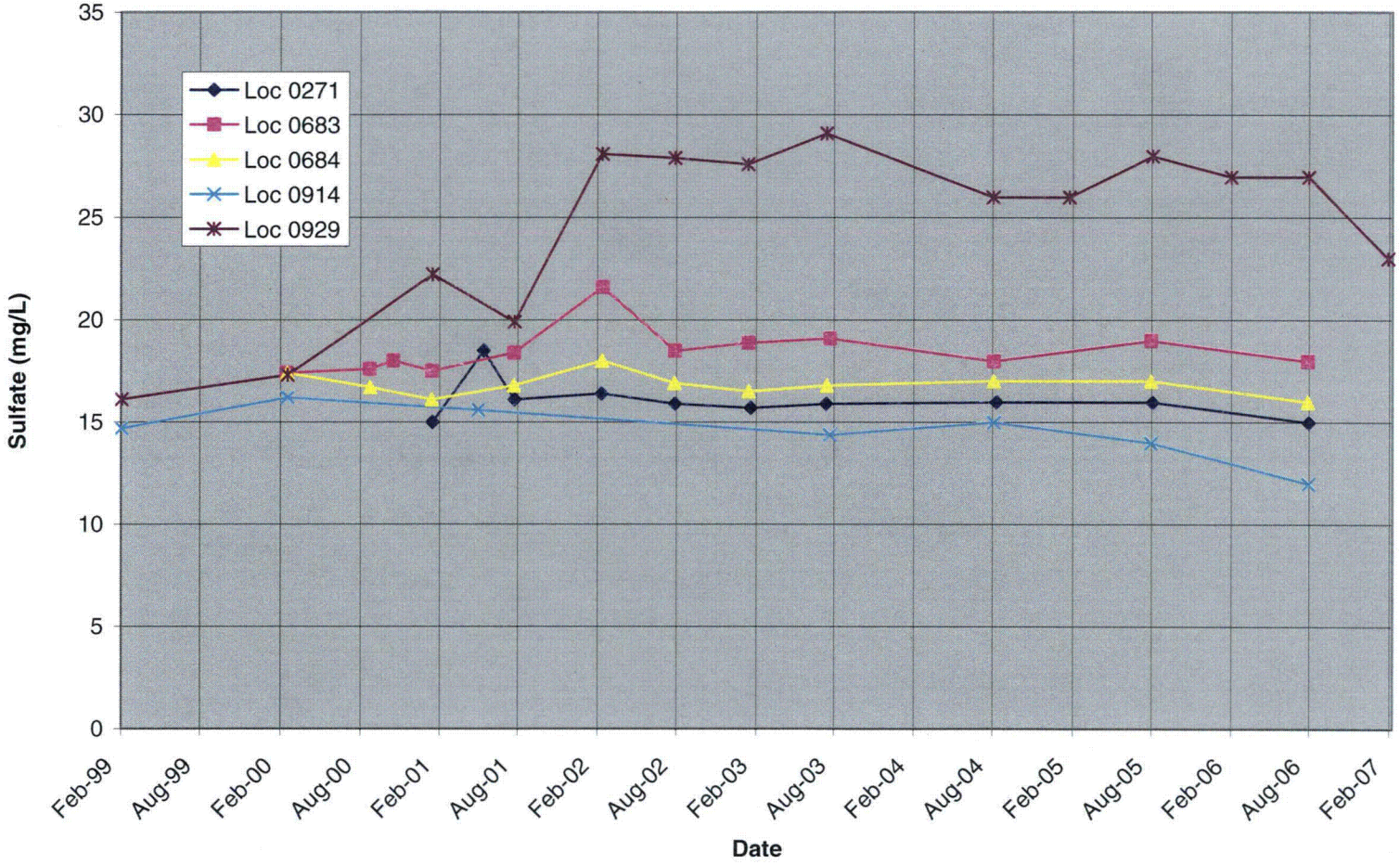

Figure E–5. Horizons A and B Sentinel Wells, Sulfate Concentration

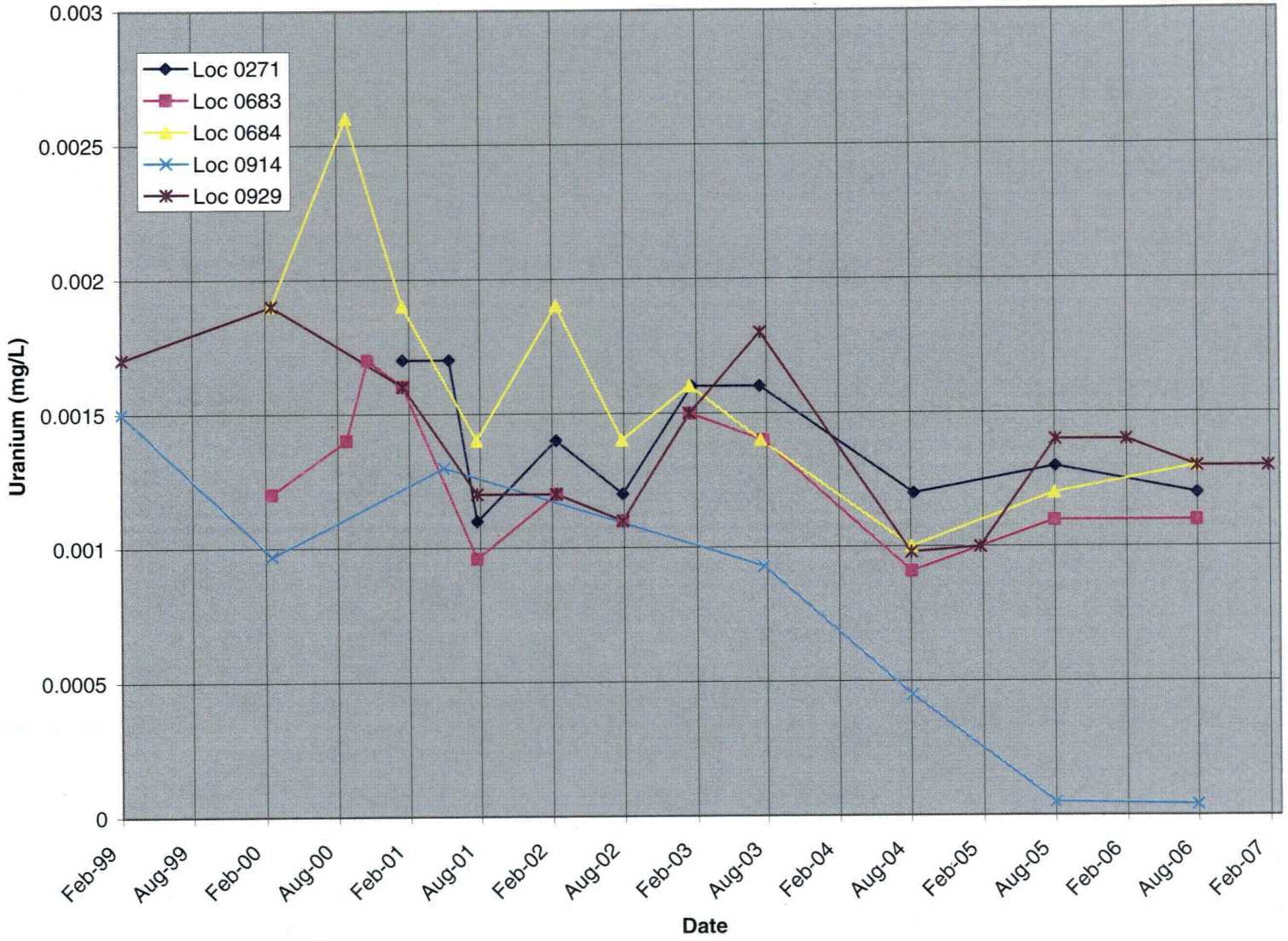

Figure E–6. Horizons A and B Sentinel Wells, Uranium Concentration

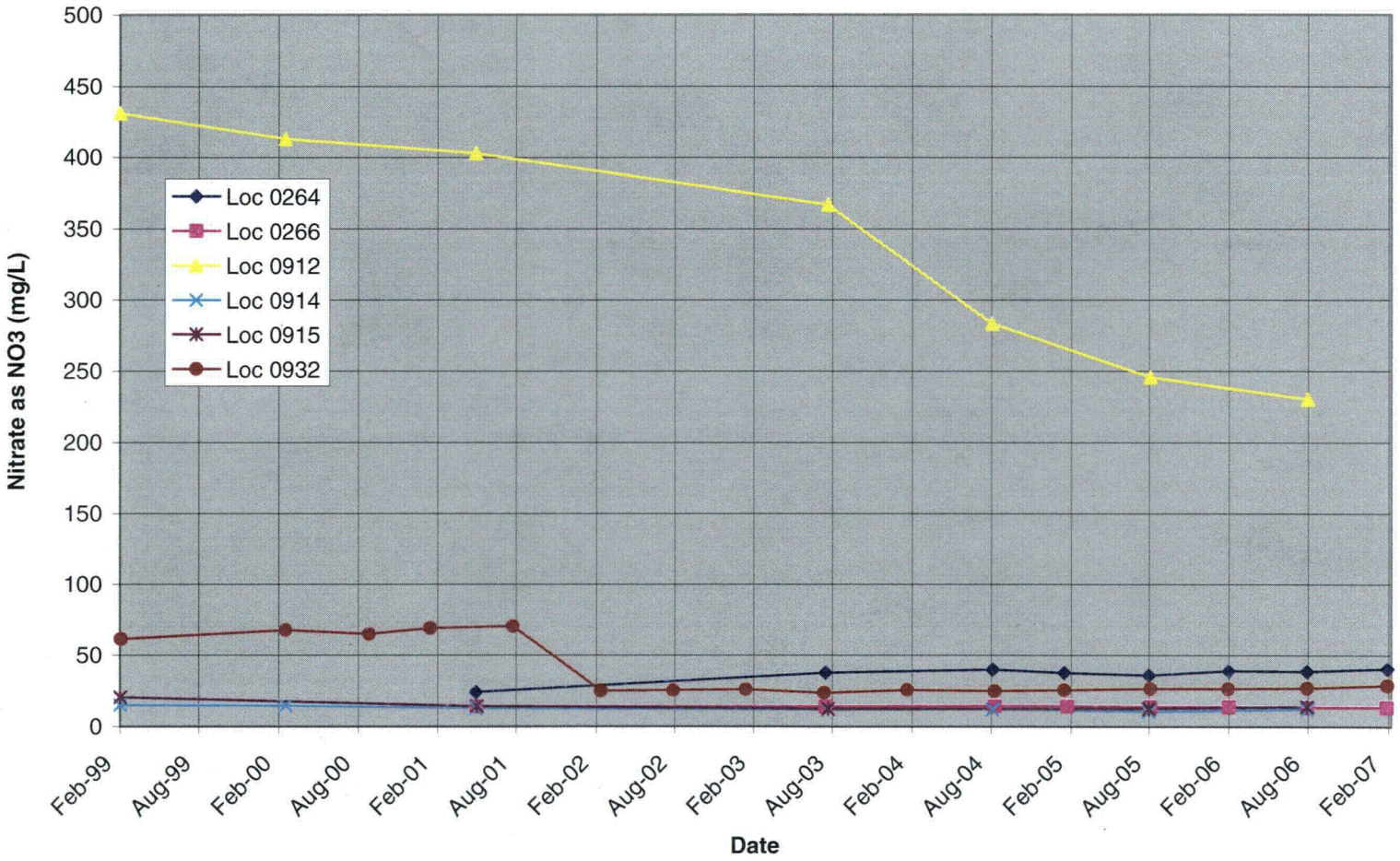

Figure E–7. Horizons C and D Monitor Wells, Nitrate as NO_3 Concentration

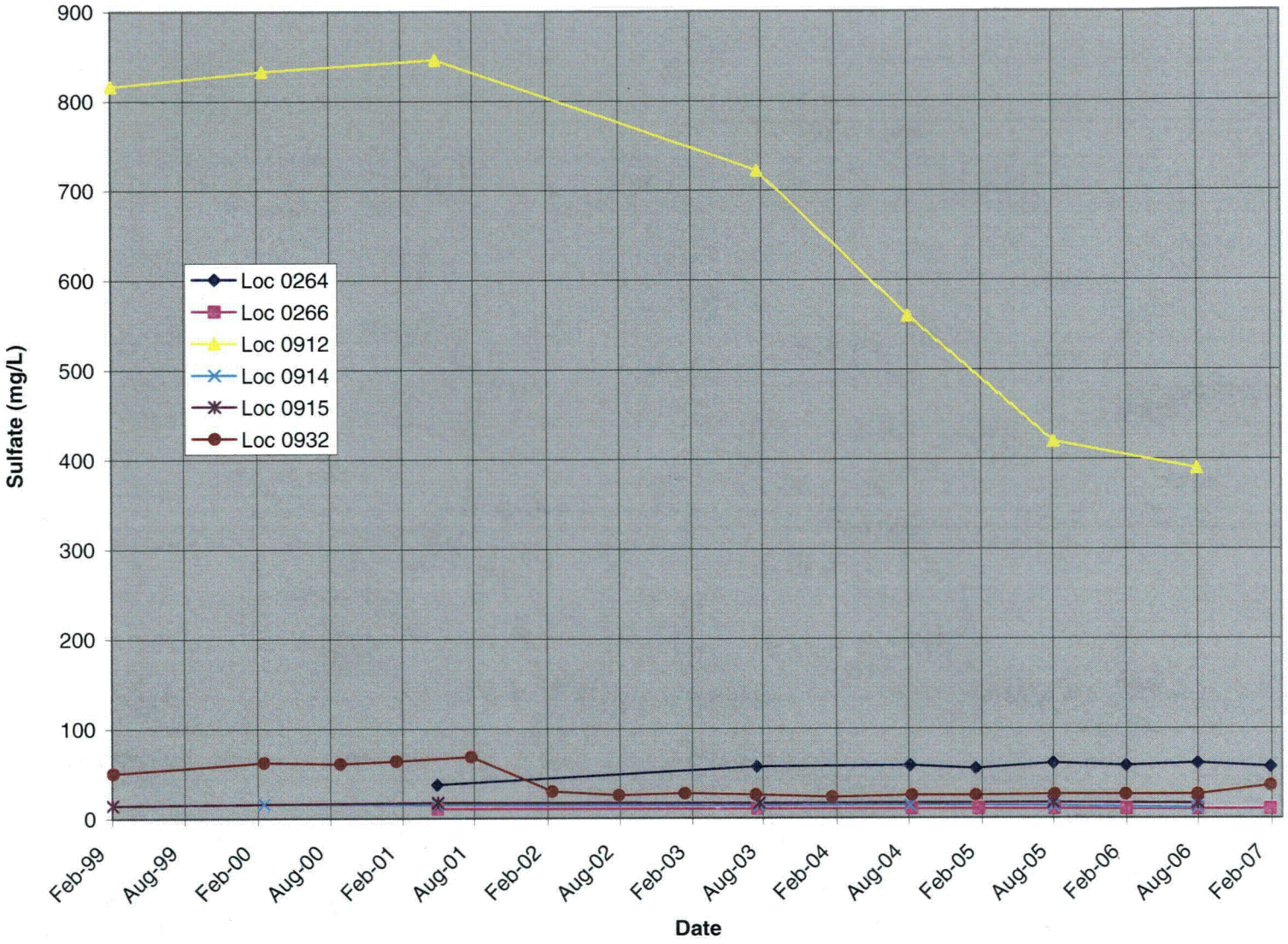

Figure E–8. Horizons C and D Monitor Wells, Sulfate Concentration

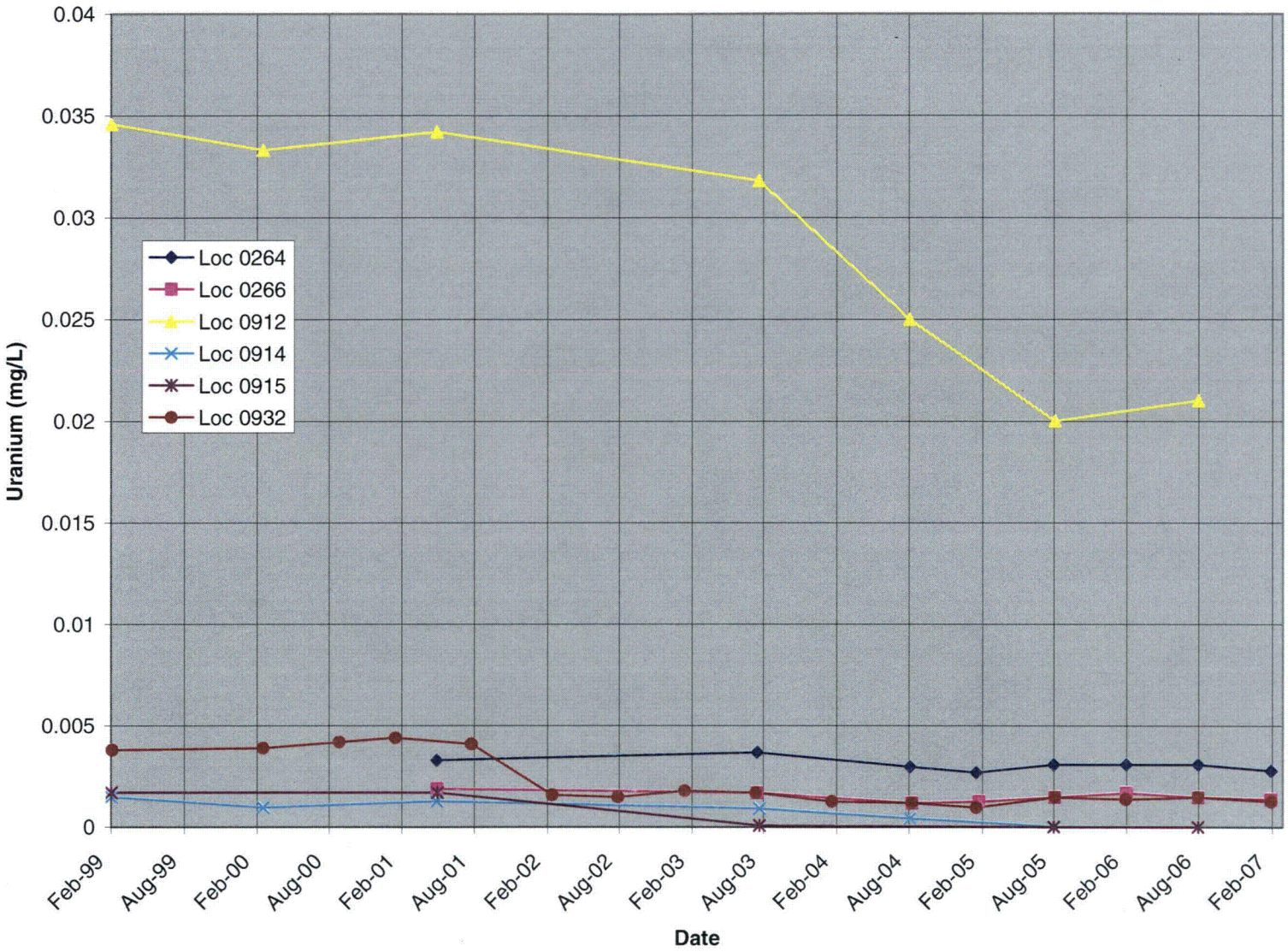

Figure E–9. Horizons C and D Monitor Wells, Uranium Concentration

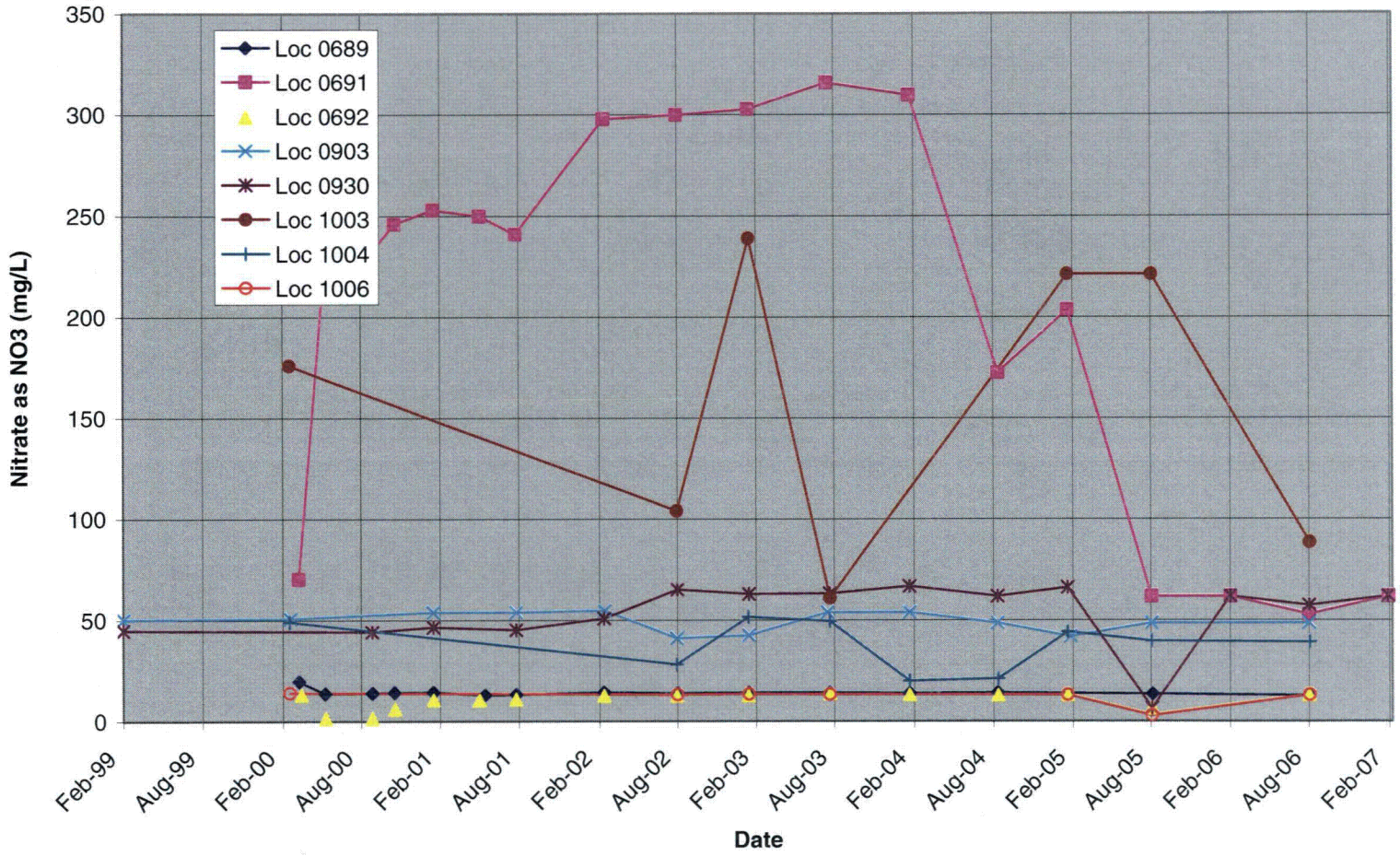

Figure E–10. Lower Terrace Monitor Wells, Nitrate as NO_3 Concentration

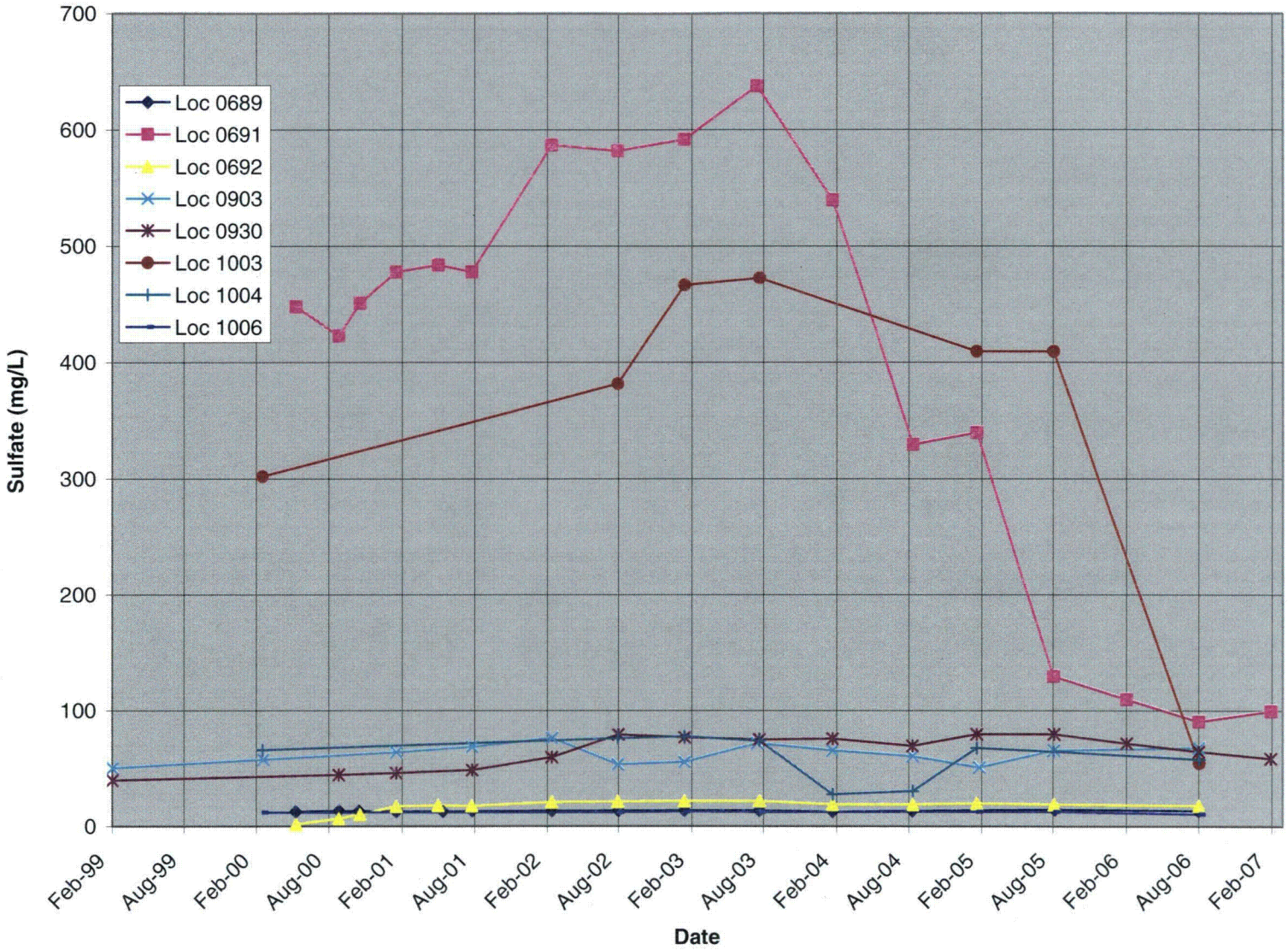

Figure E–11. Lower Terrace Monitor Wells, Sulfate Concentration

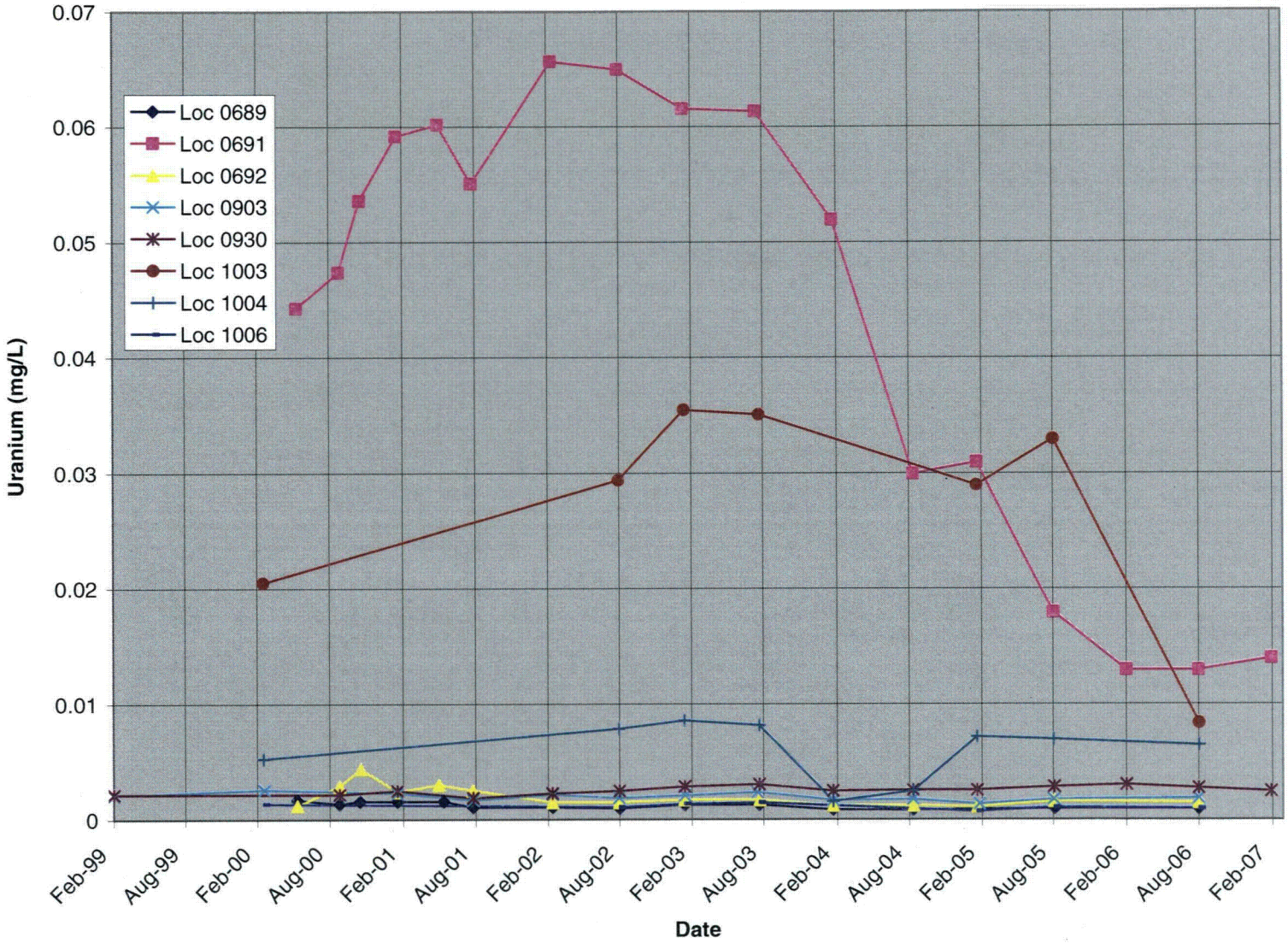

Figure E–12. Lower Terrace Monitor Wells, Uranium Concentration

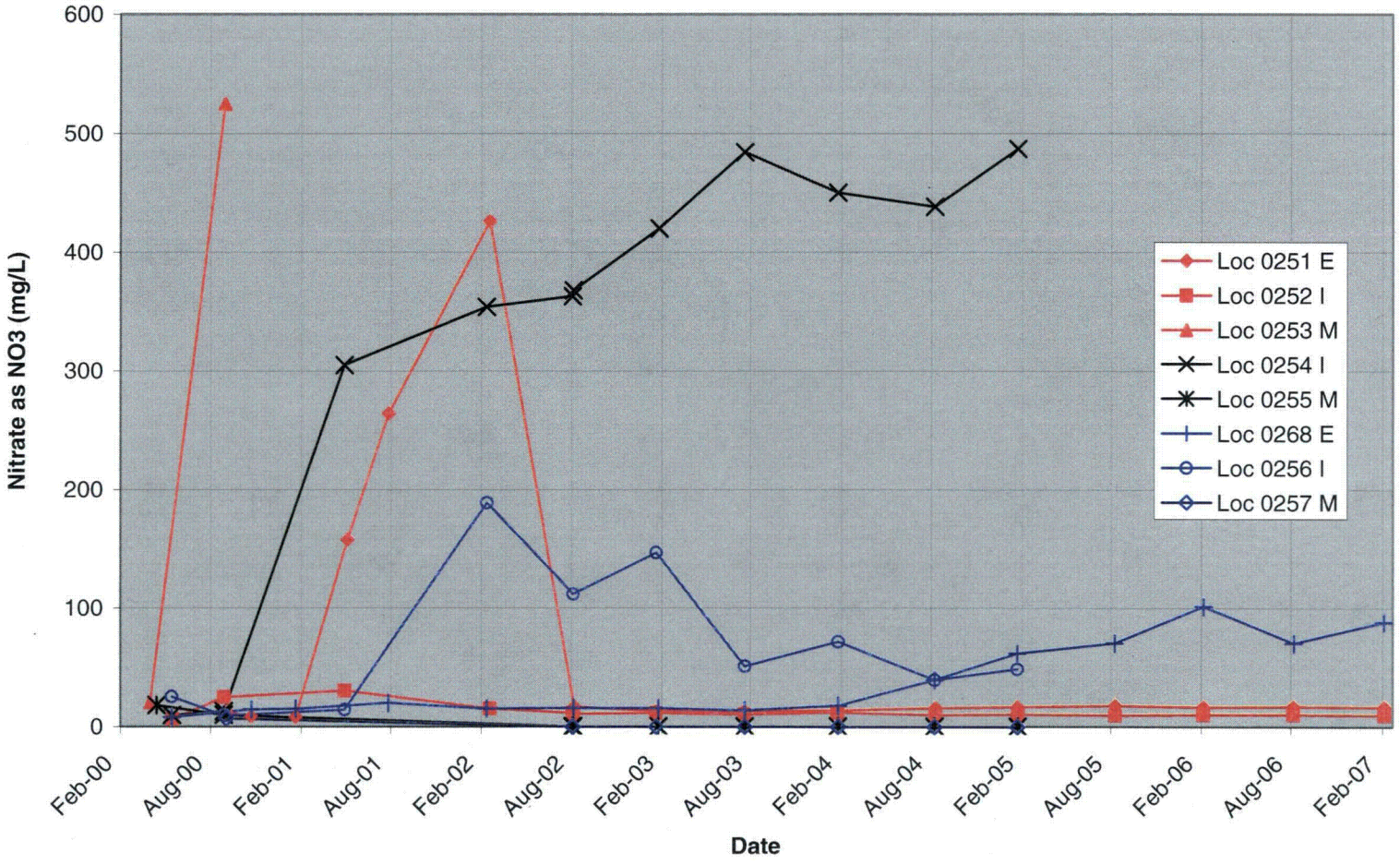

Figure E–13. Deep Monitor Wells, Nitrate as NO_3 Concentration

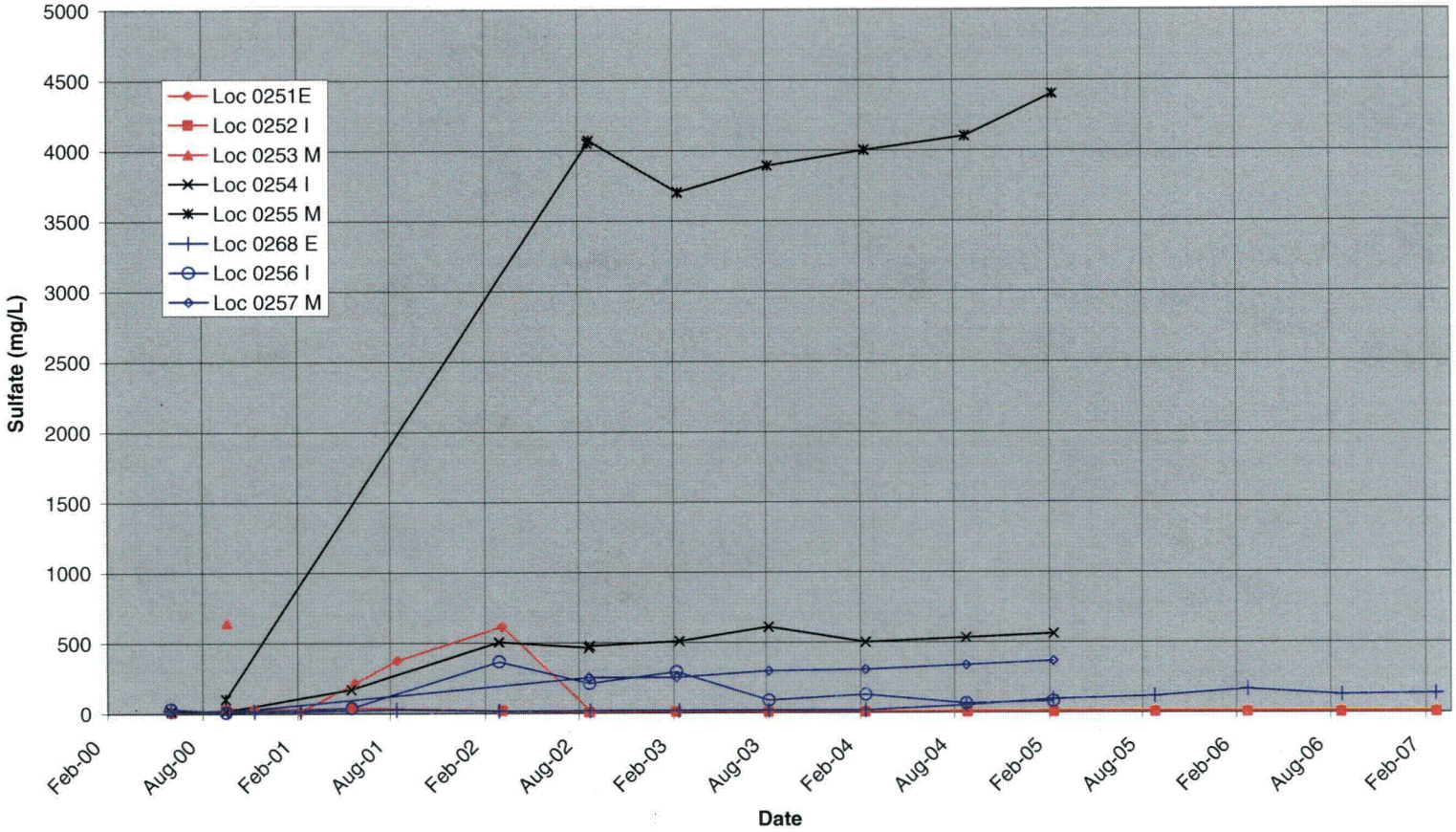

Figure E–14. Deep Monitor Wells, Sulfate Concentration

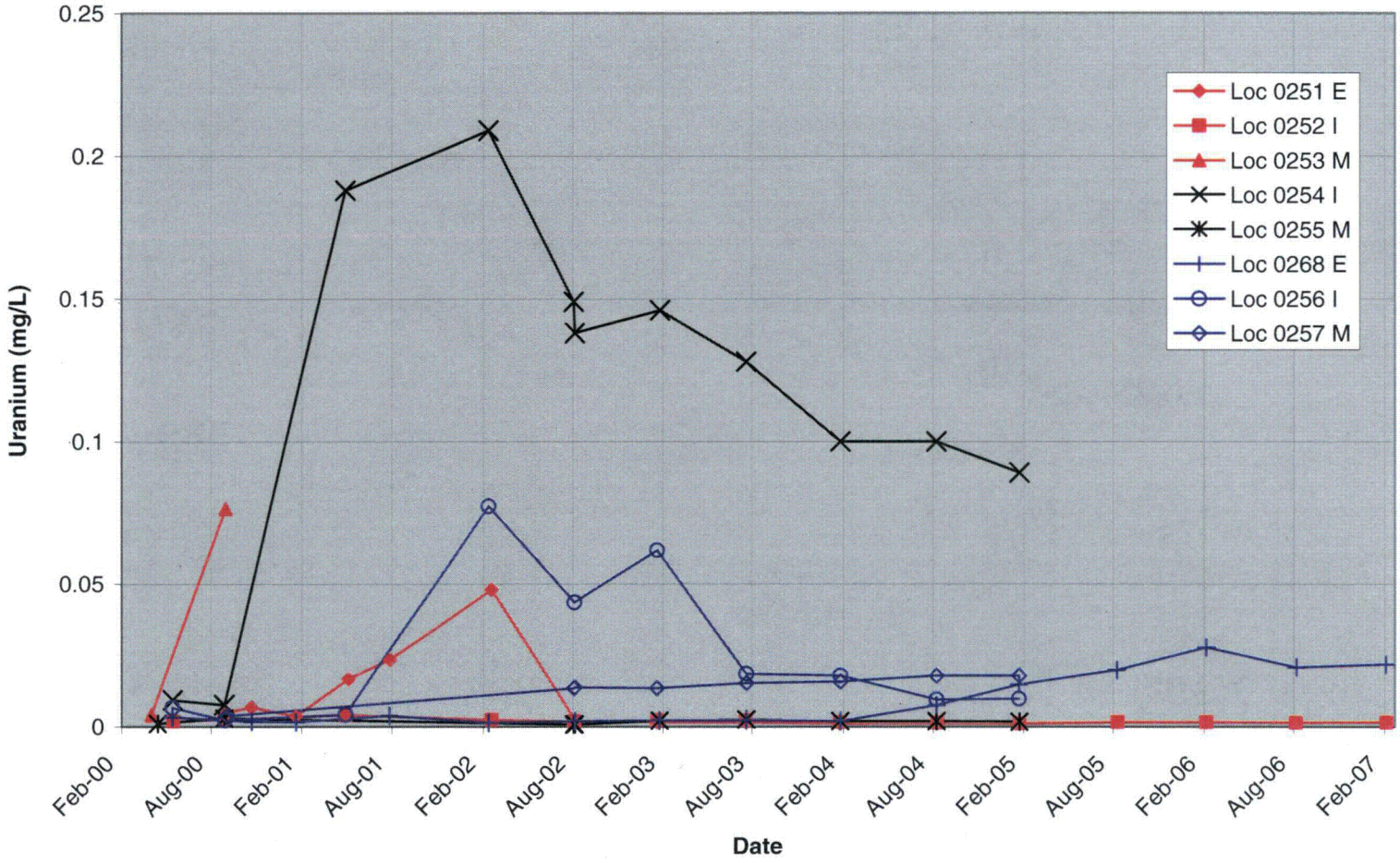

Figure E–15. Deep Monitor Wells, Uranium Concentration

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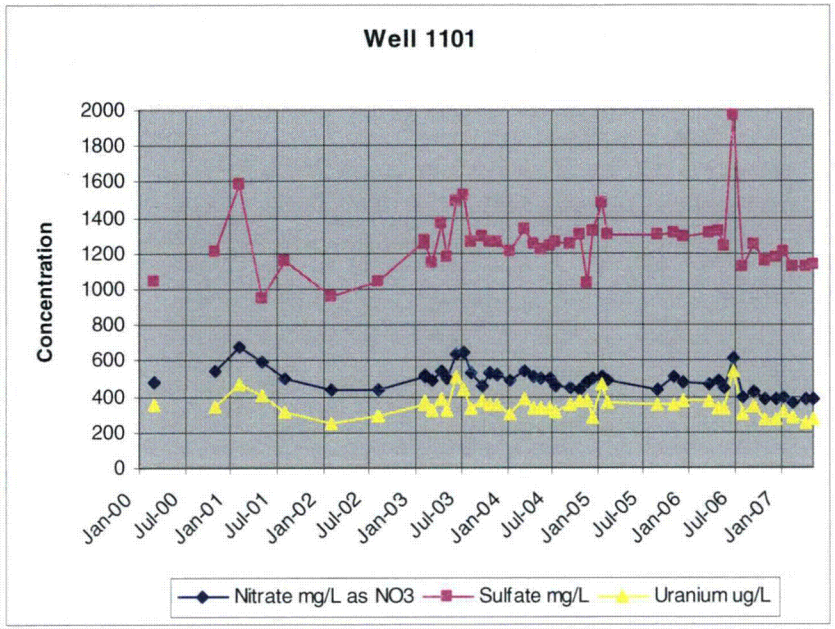
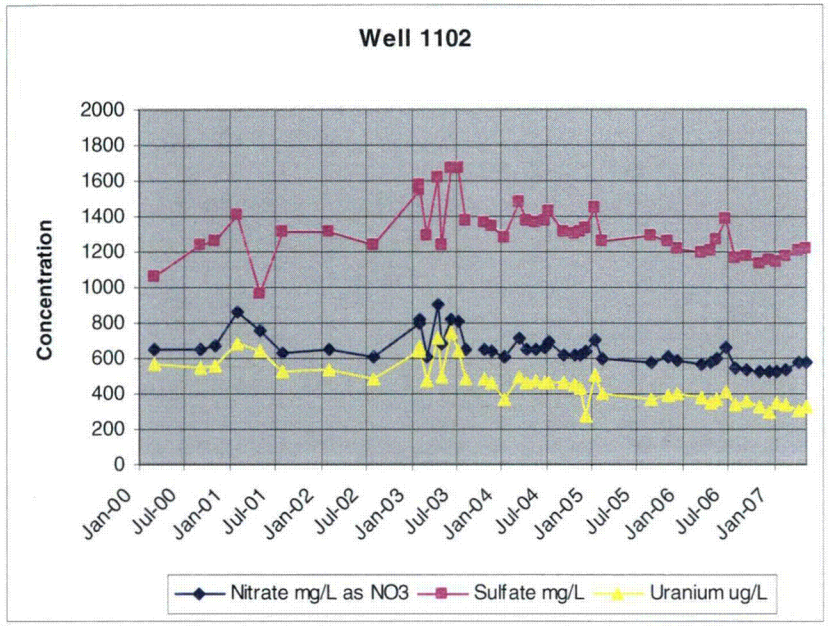
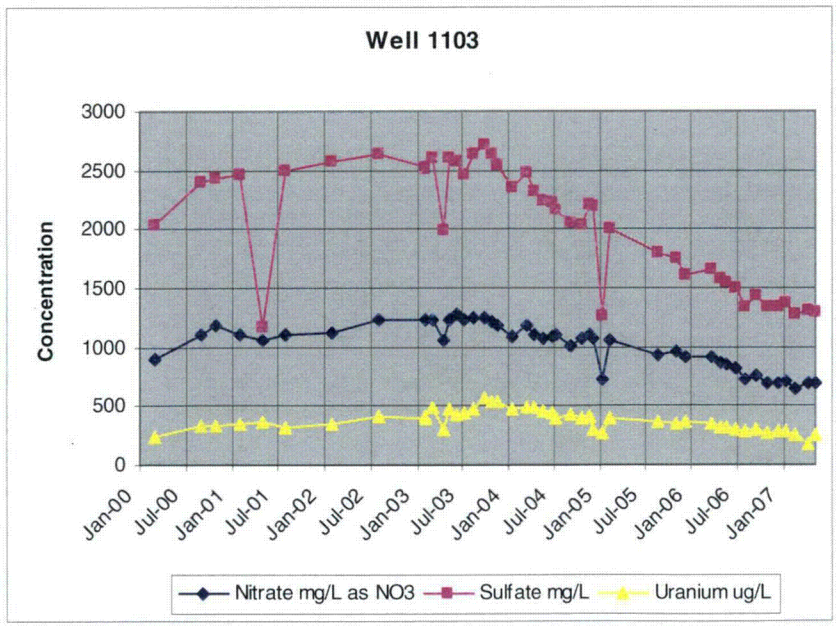
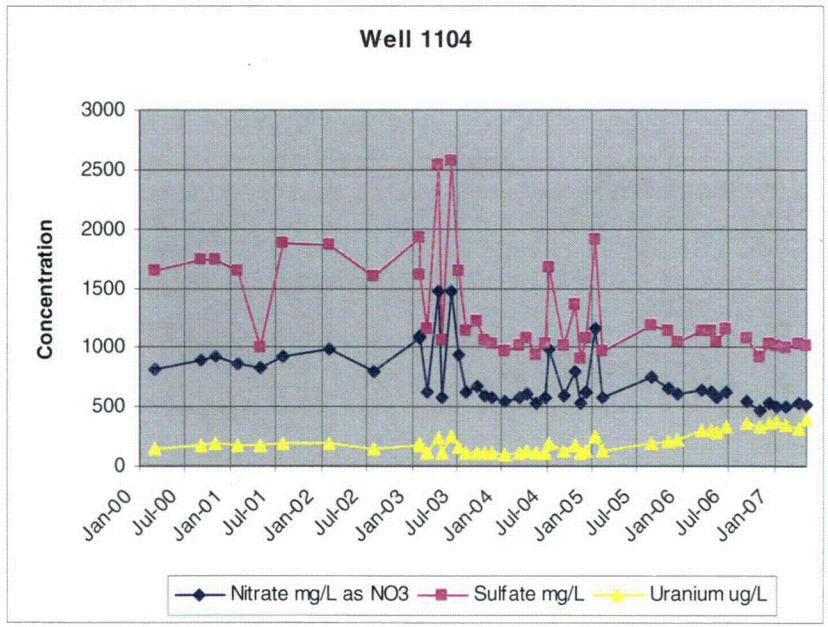
Appendix F

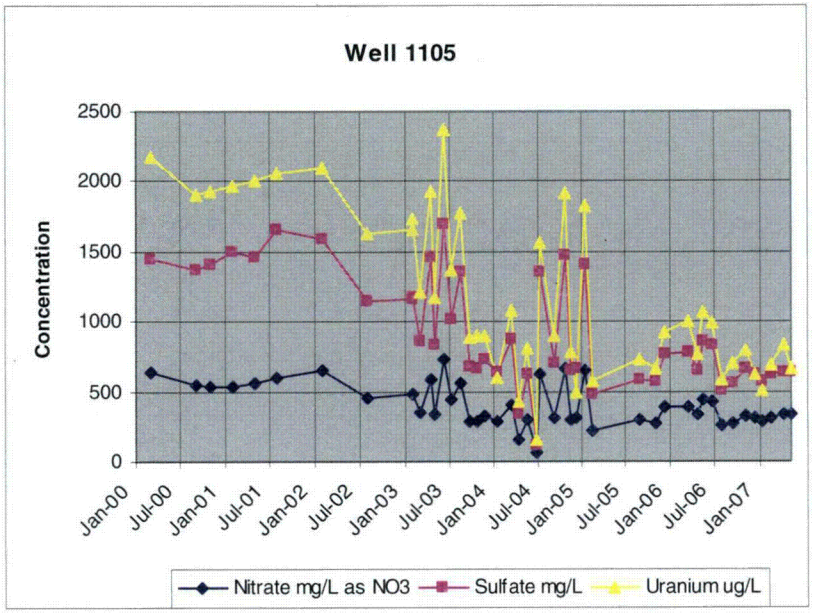
Contaminant Concentrations at Extraction Wells

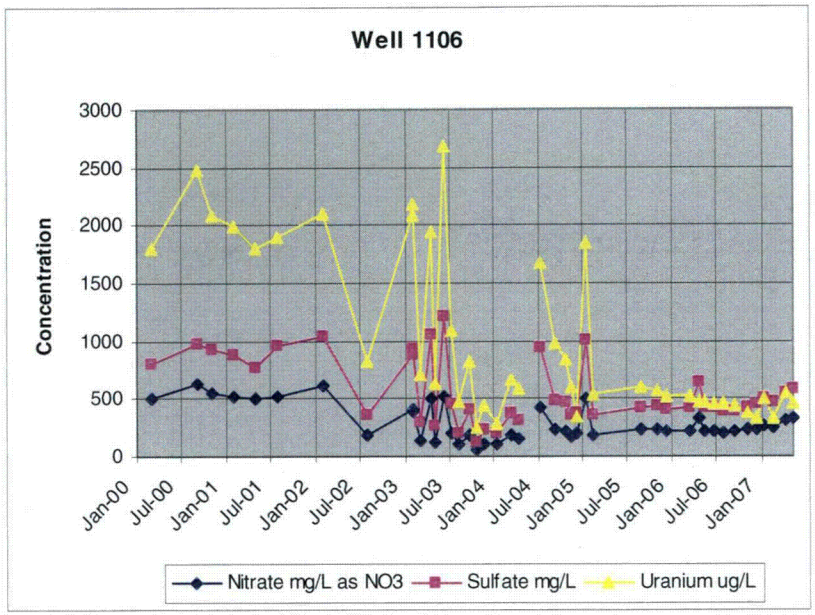

Well 1101
Concentration
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

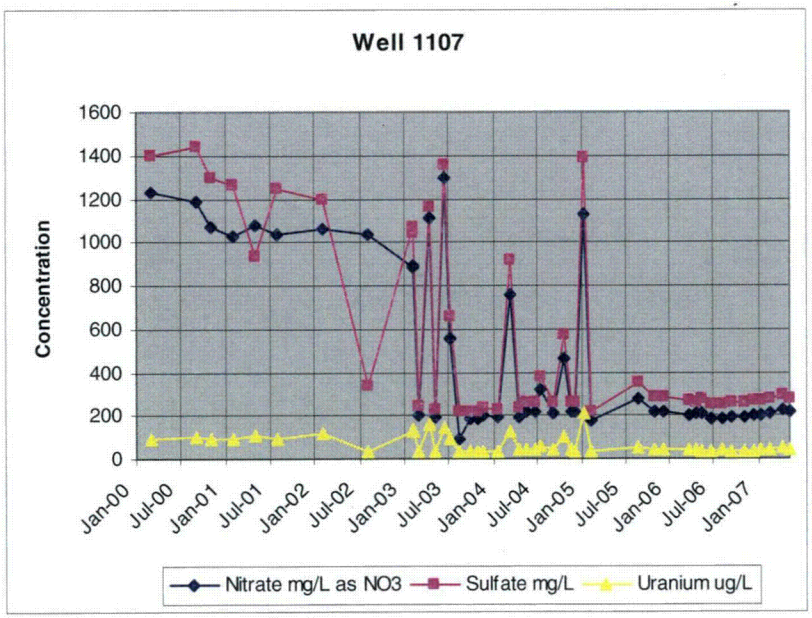

Well 1102
Concentration
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

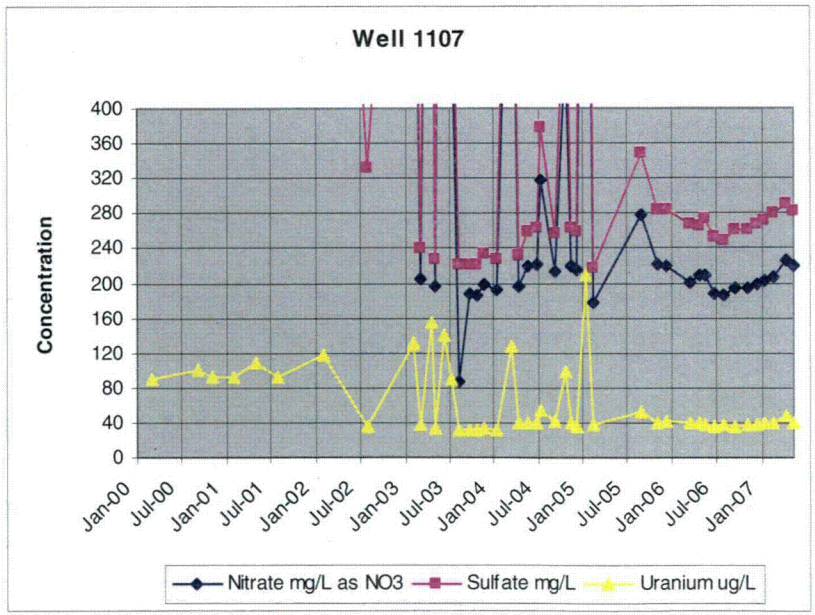

Well 1103
Concentration
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

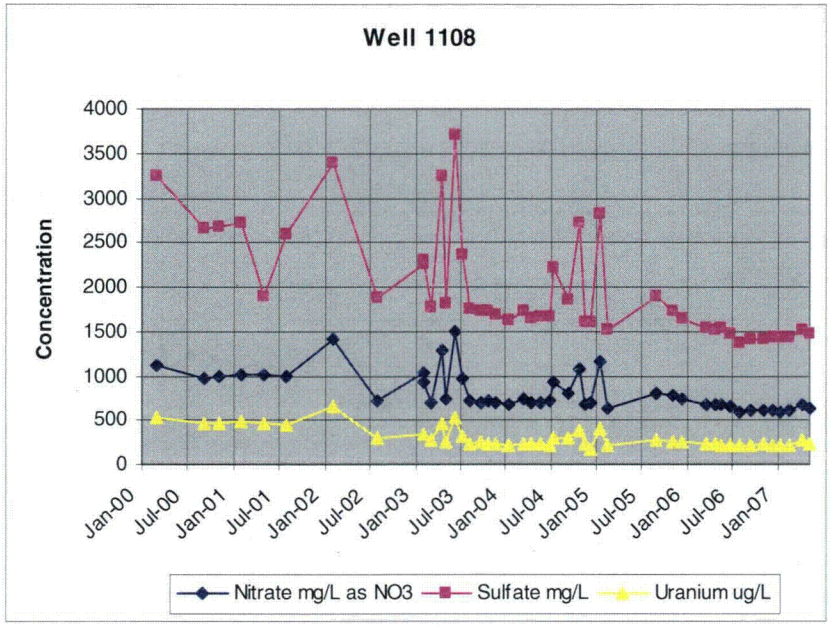

Well 1104
Concentration
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

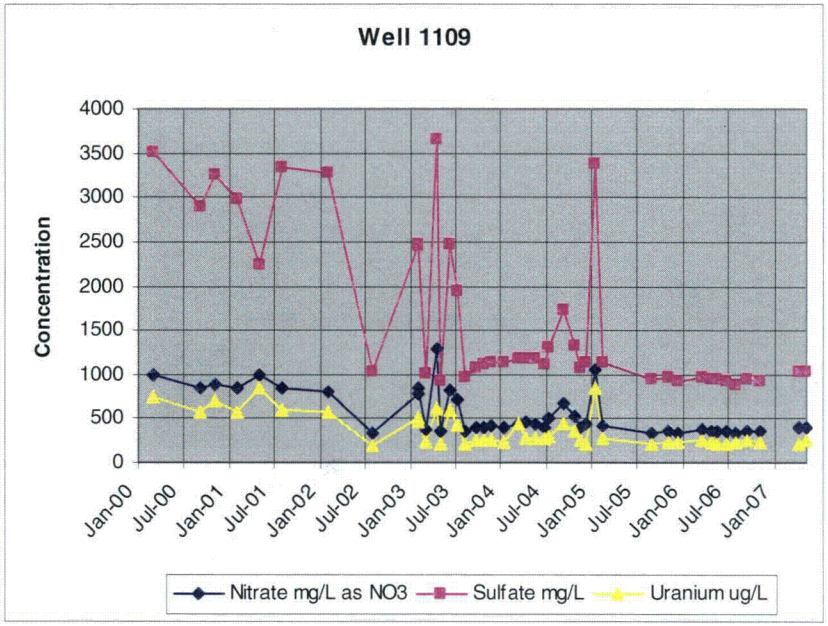

Well 1105
Concentration
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

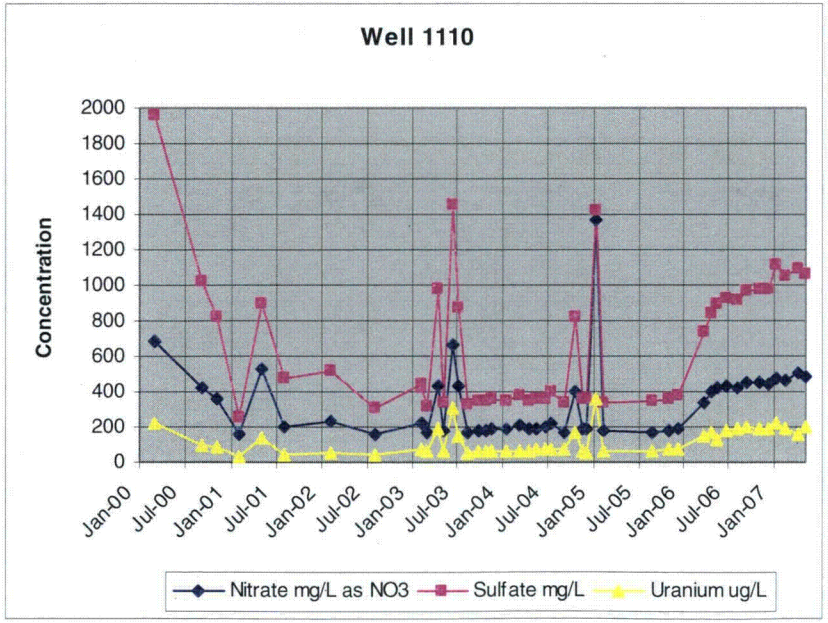

Well 1106
Concentration
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

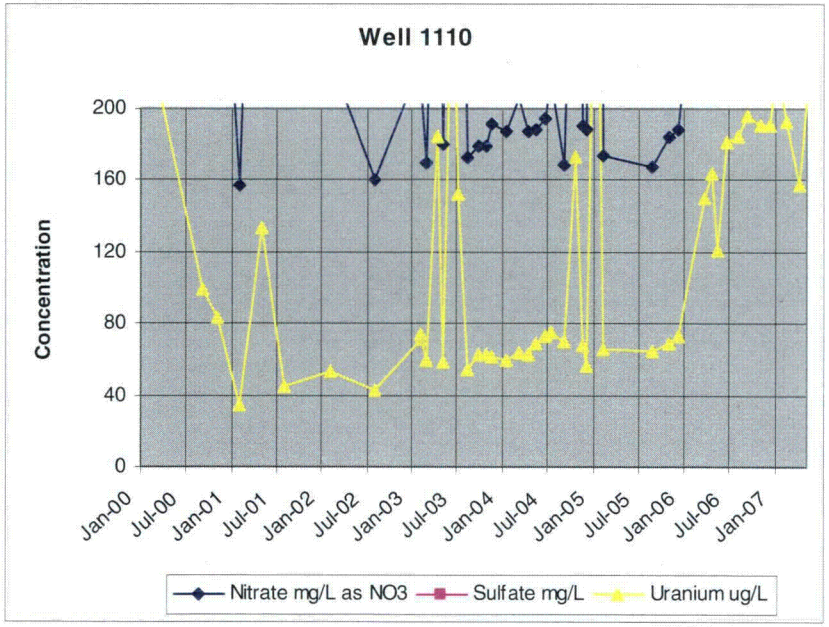

Well 1107
Concentration
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

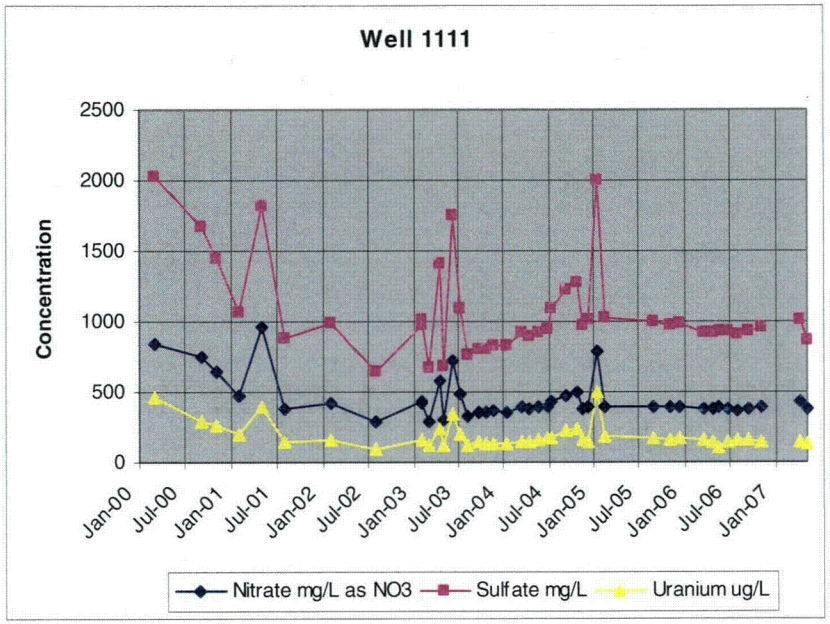

Well 1107
Concentration
400
360
320
280
240
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

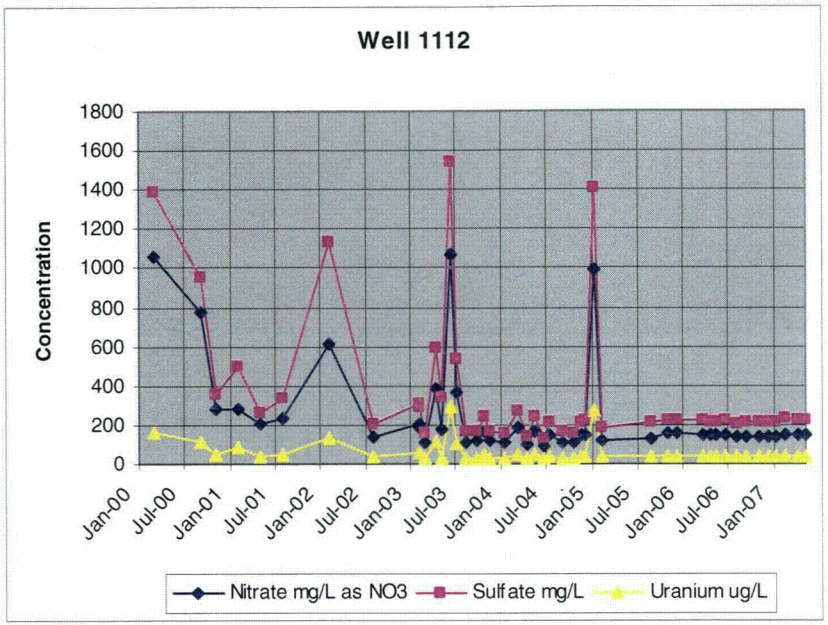

Well 1108
Concentration
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

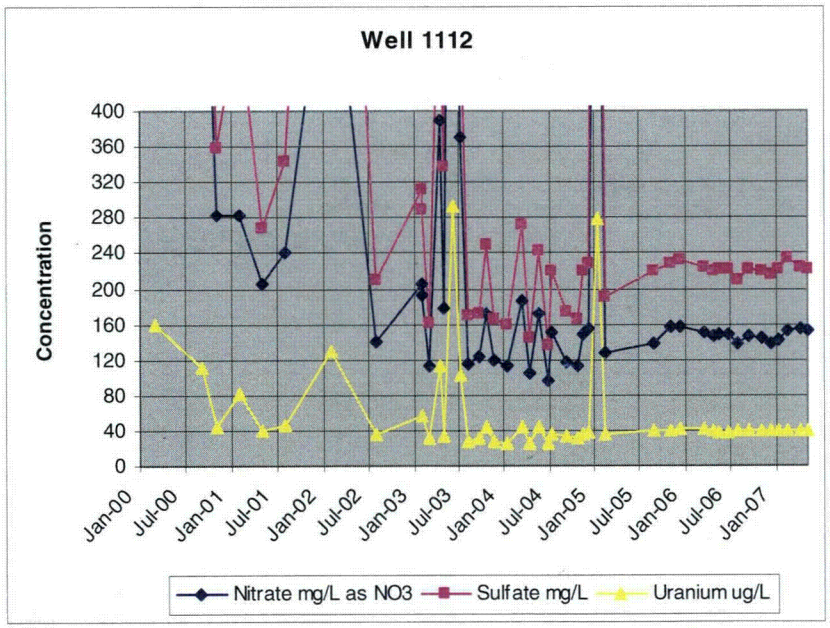

Well 1109
Concentration
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

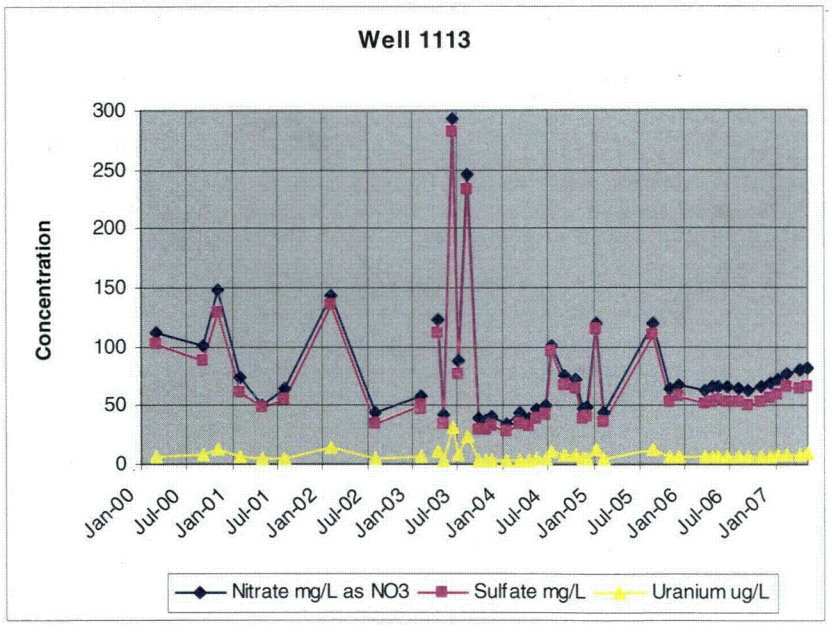

Well 1110
Concentration
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

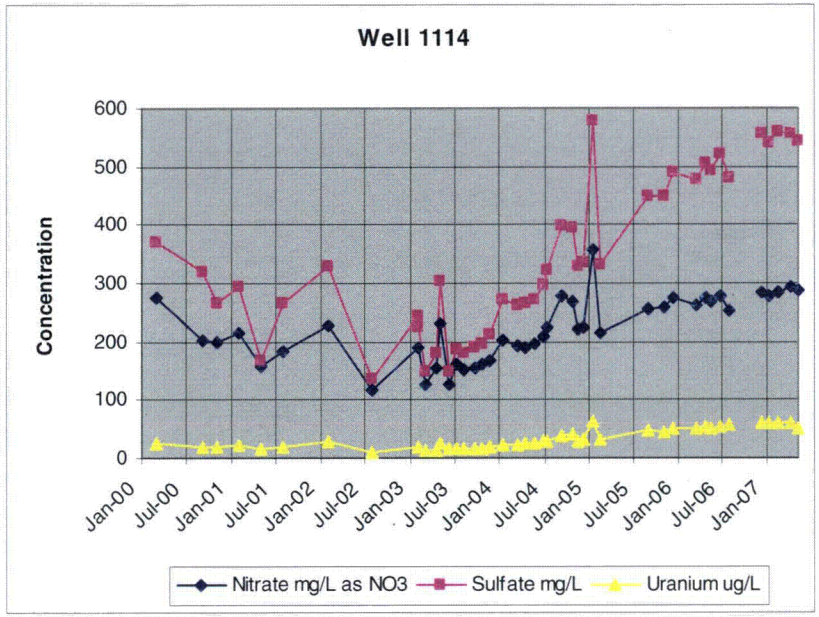

Well 1110
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

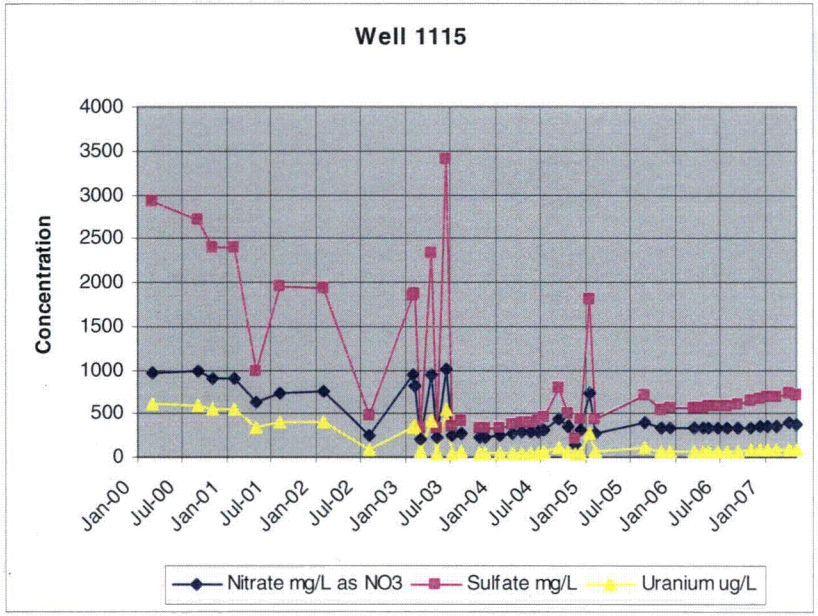

Well 1111
Concentration
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

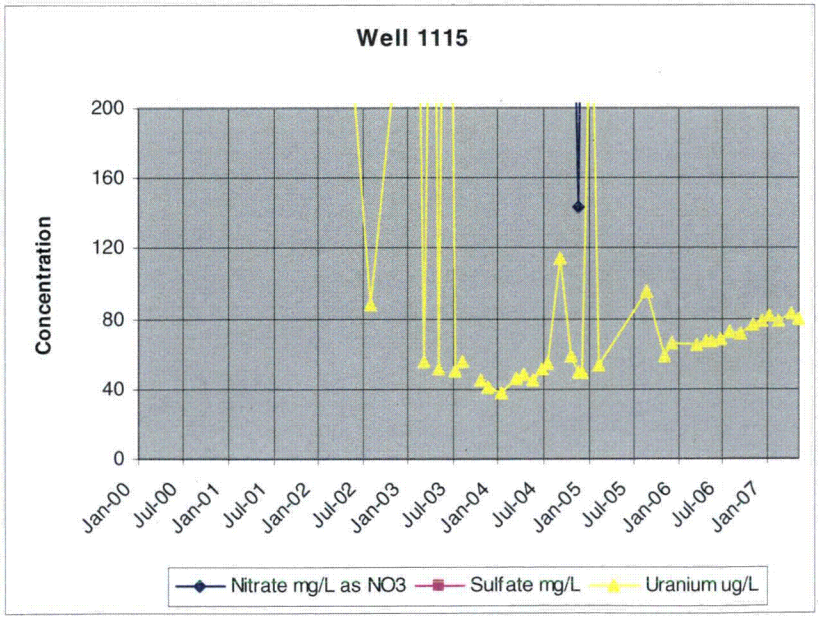

Well 1112
Concentration
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

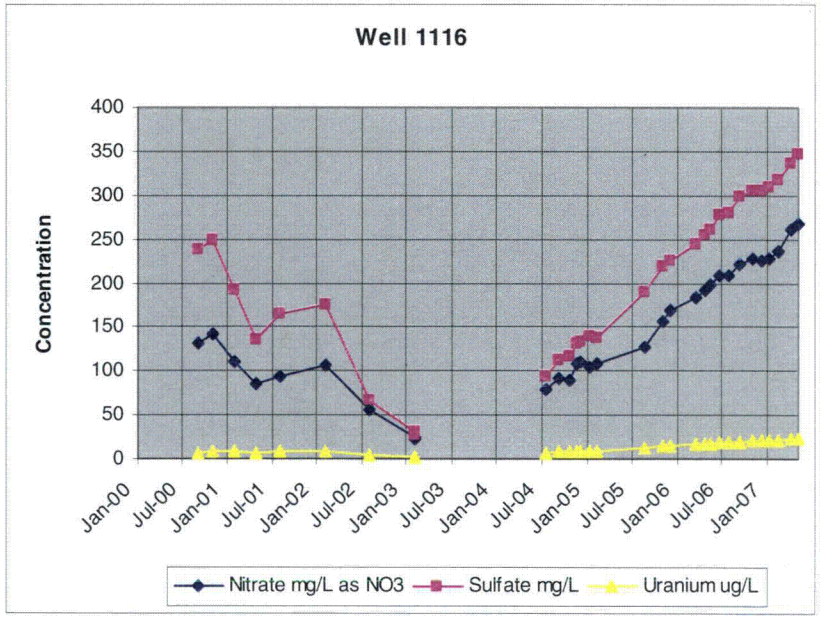

Well 1112
Concentration
400
360
320
280
240
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

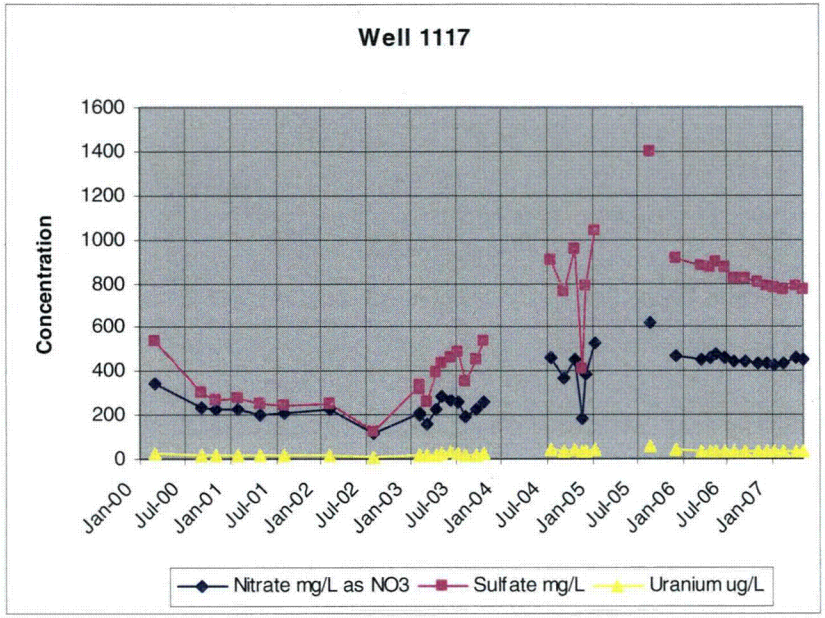

Well 1113
Concentration
300
250
200
150
100
50
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

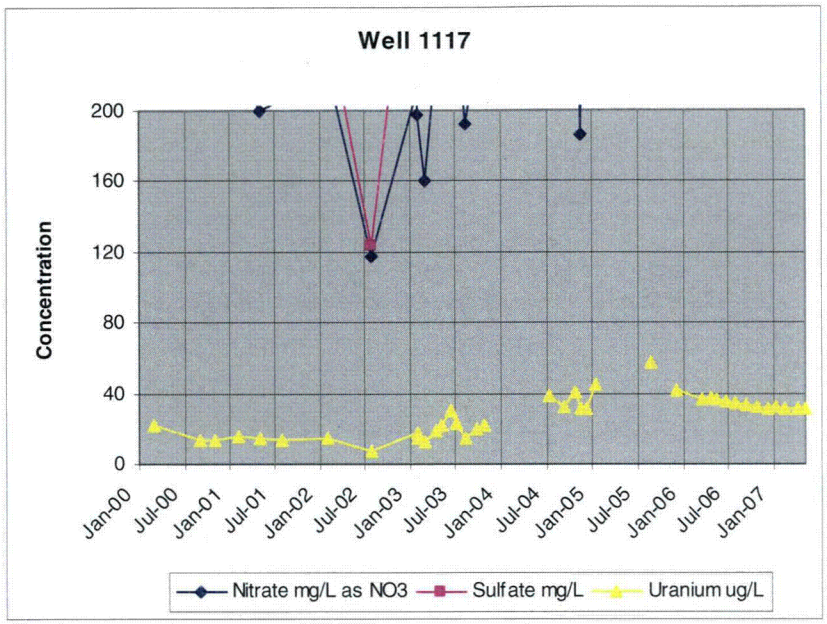

Well 1114
Concentration
600
500
400
300
200
100
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

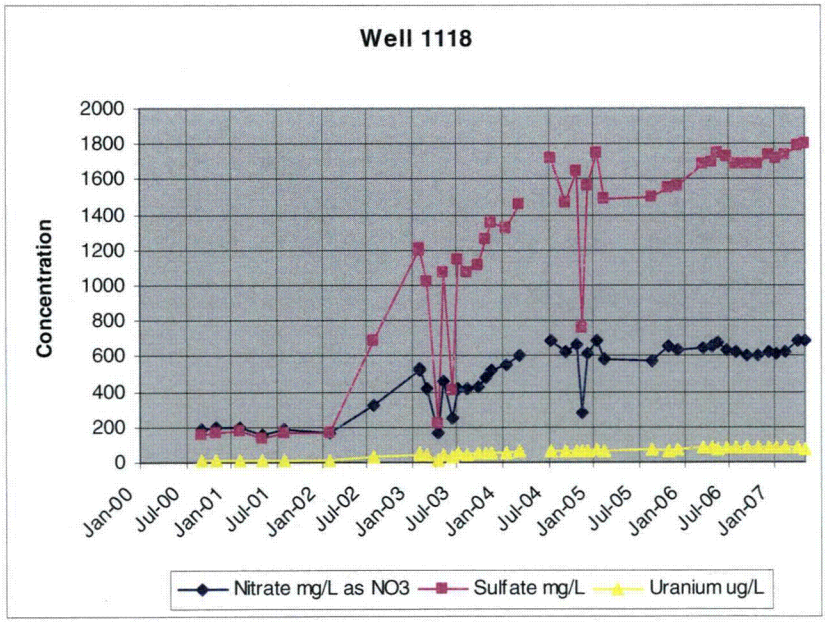

Well 1115
Concentration
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

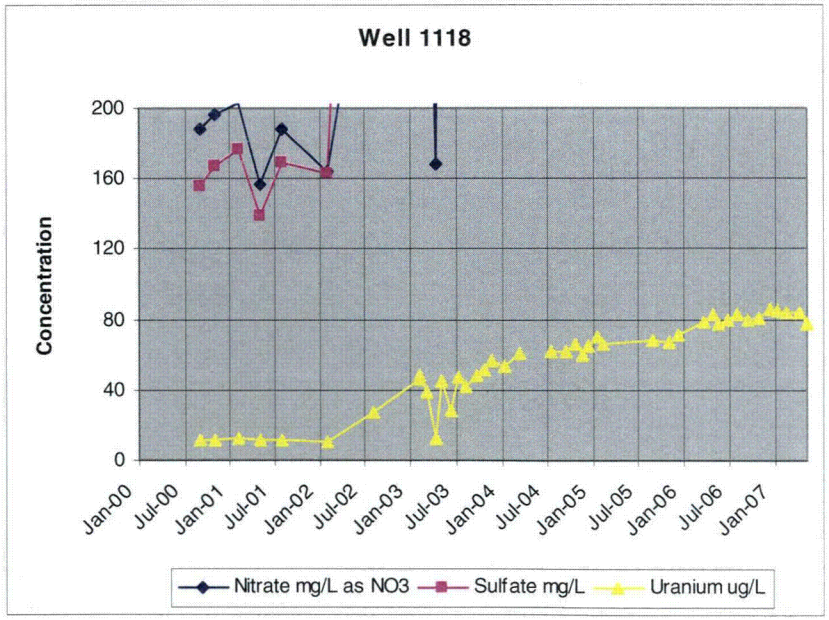

Well 1115
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

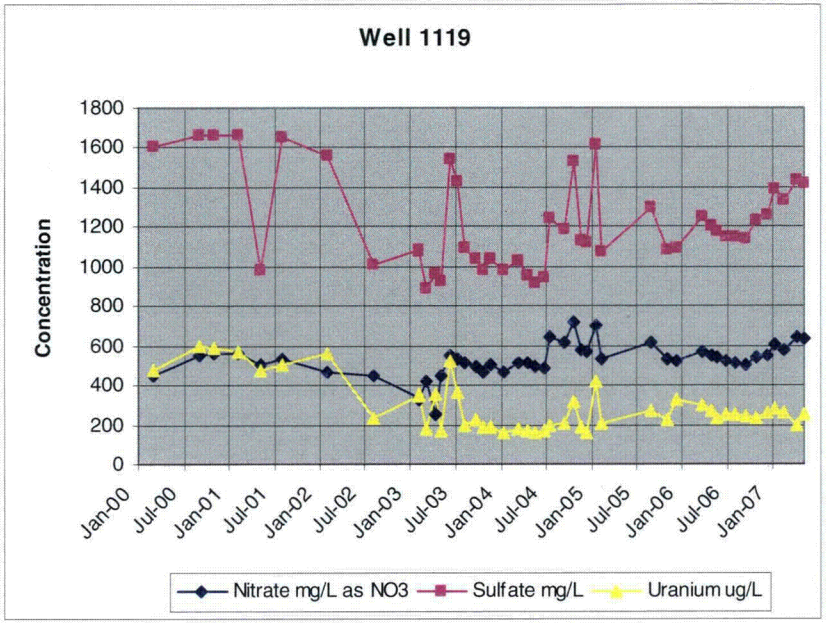

Well 1116
Concentration
400
350
300
250
200
150
100
50
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

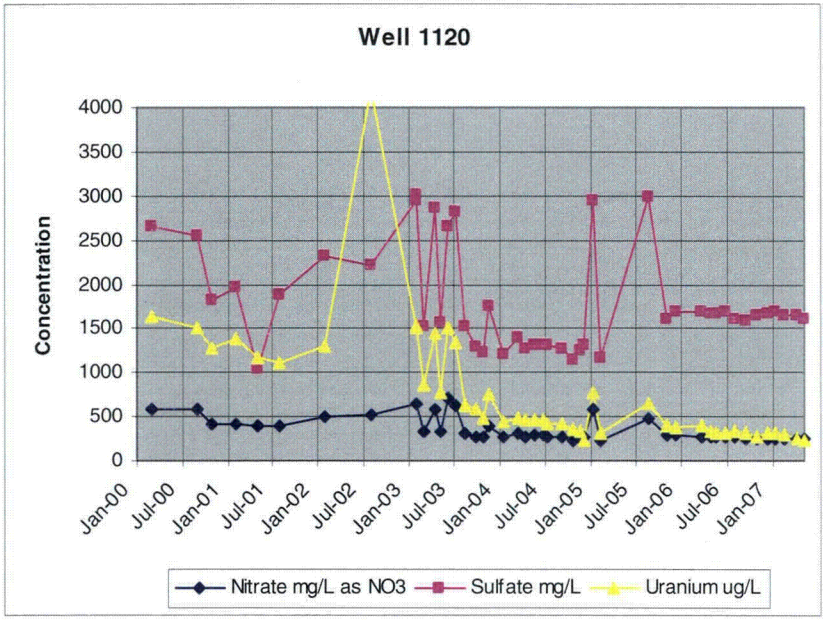

Well 1117
Concentration
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

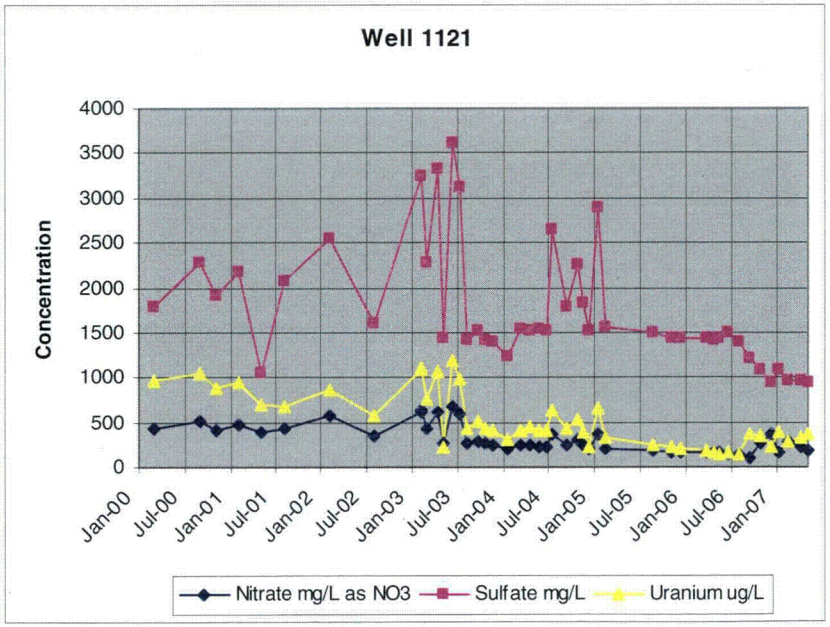

Well 1117
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

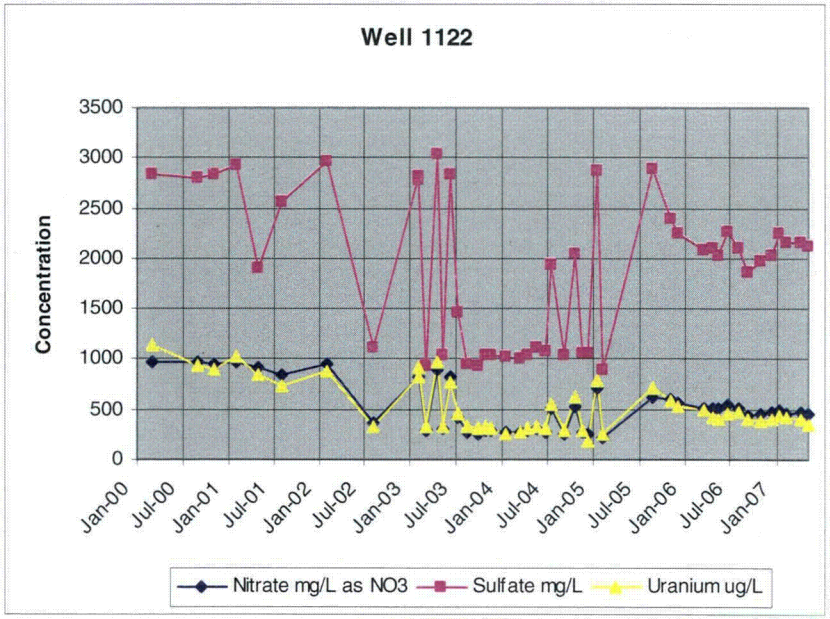

Well 1118
Concentration
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

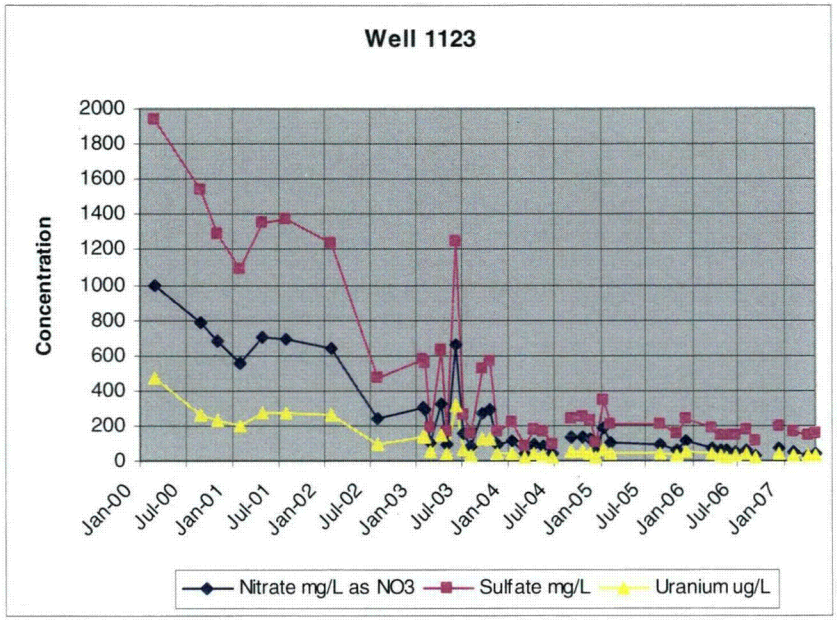

Well 1118
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

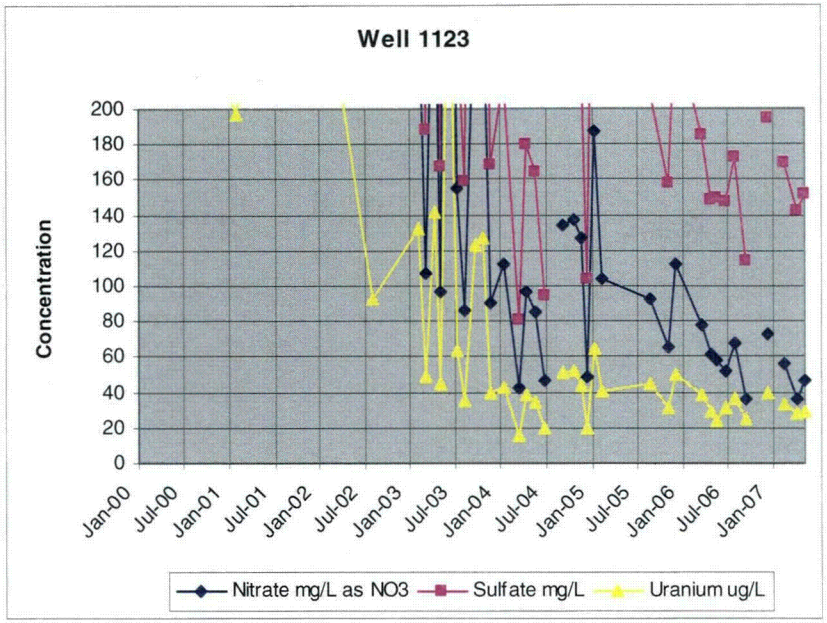

Well 1119
Concentration
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

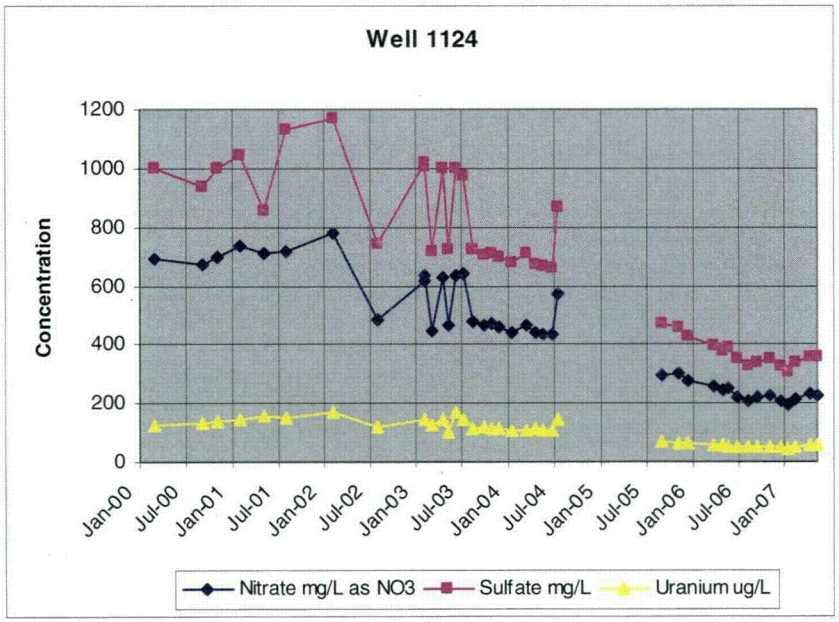

Well 1120
Concentration
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

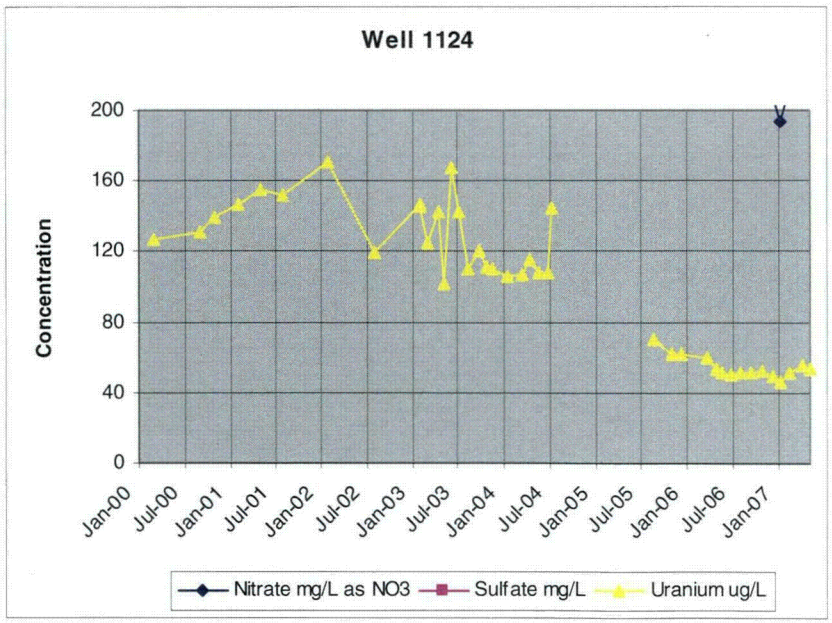

Well 1121
Concentration
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

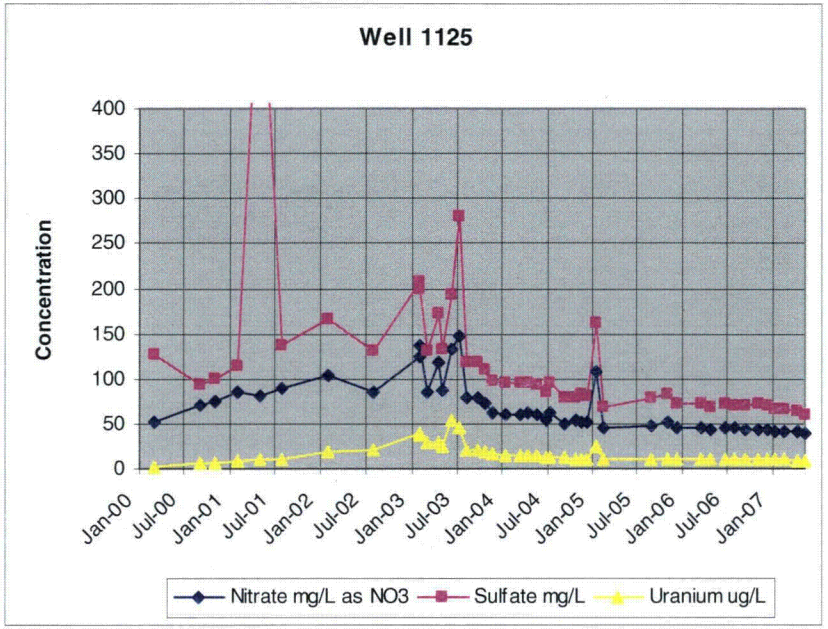

Well 1122
Concentration
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

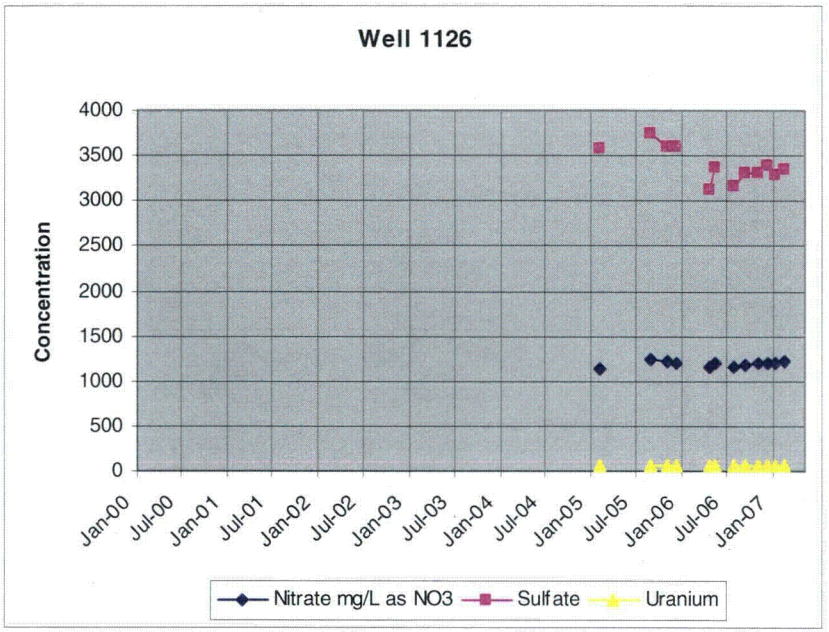

Well 1123
Concentration
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

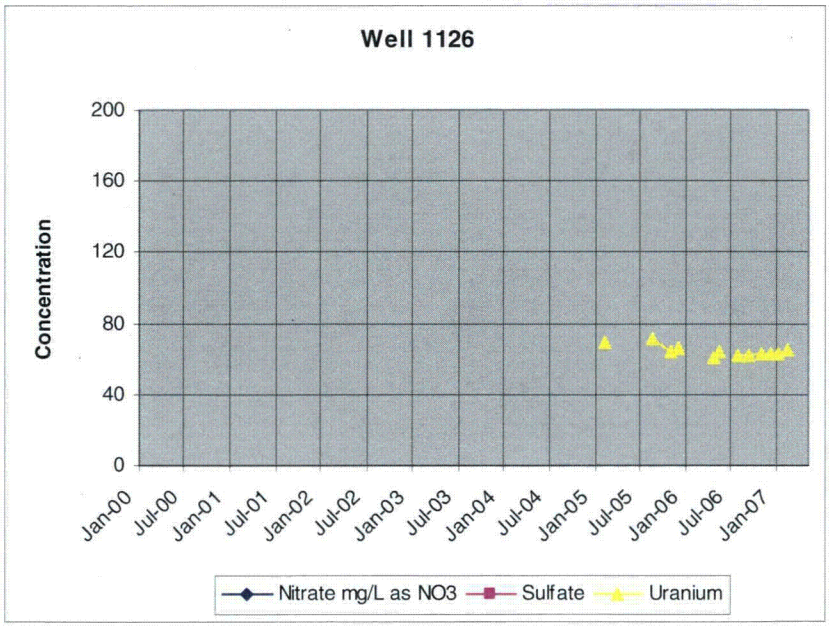

Well 1123
Concentration
200
180
160
140
120
100
80
60
40
20
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

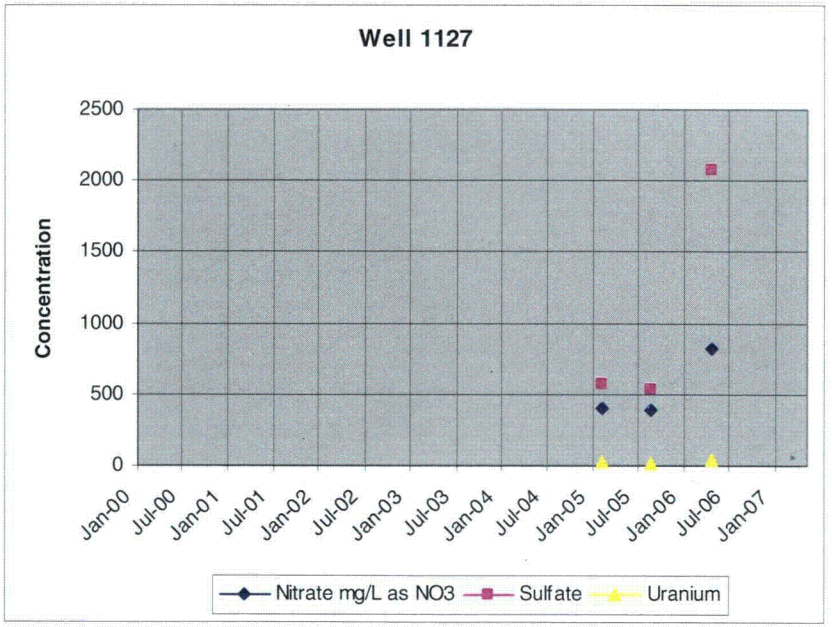

Well 1124
Concentration
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

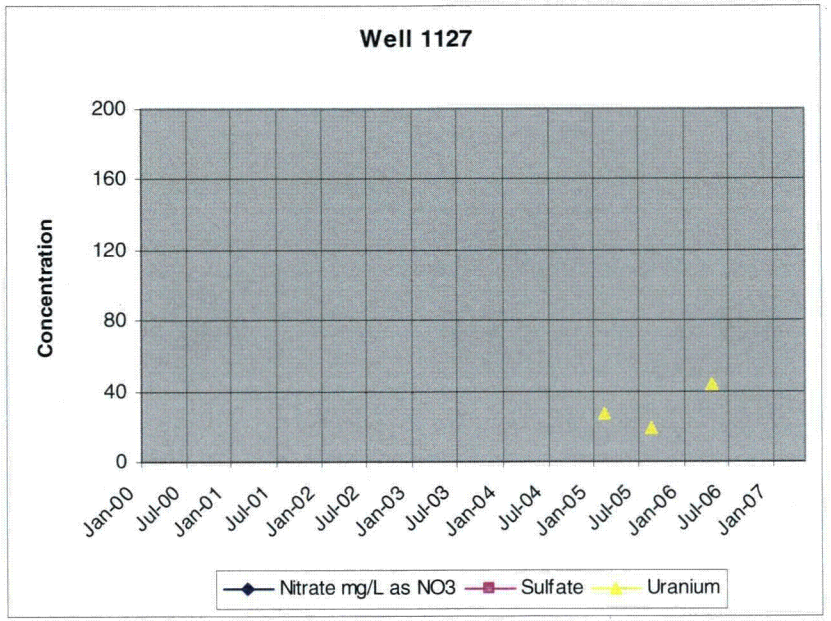

Well 1124
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

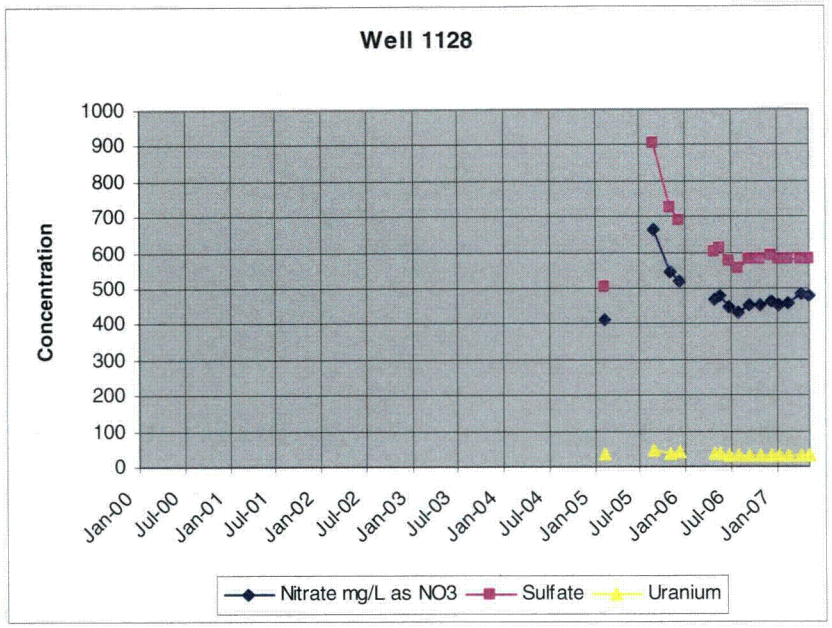

Well 1125
Concentration
400
350
300
250
200
150
100
50
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

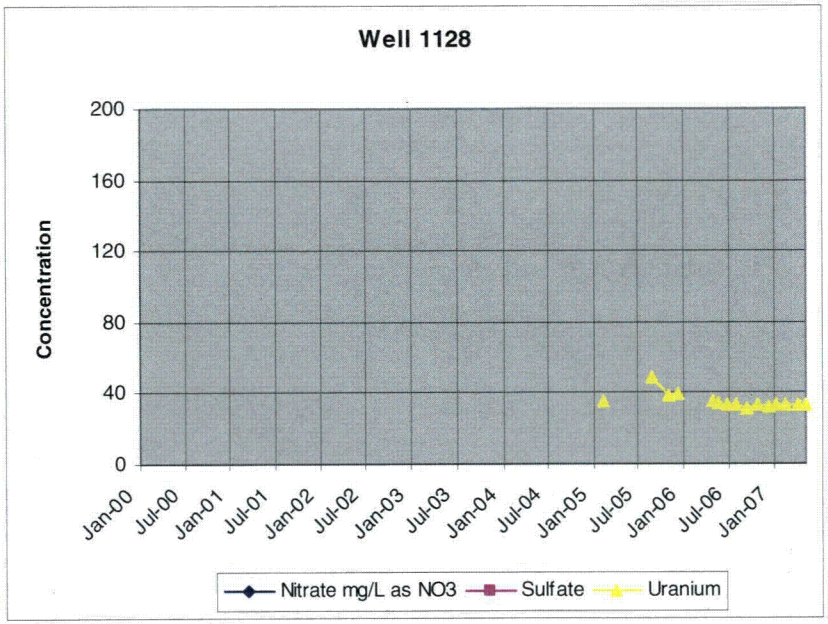

Well 1126
Concentration
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium

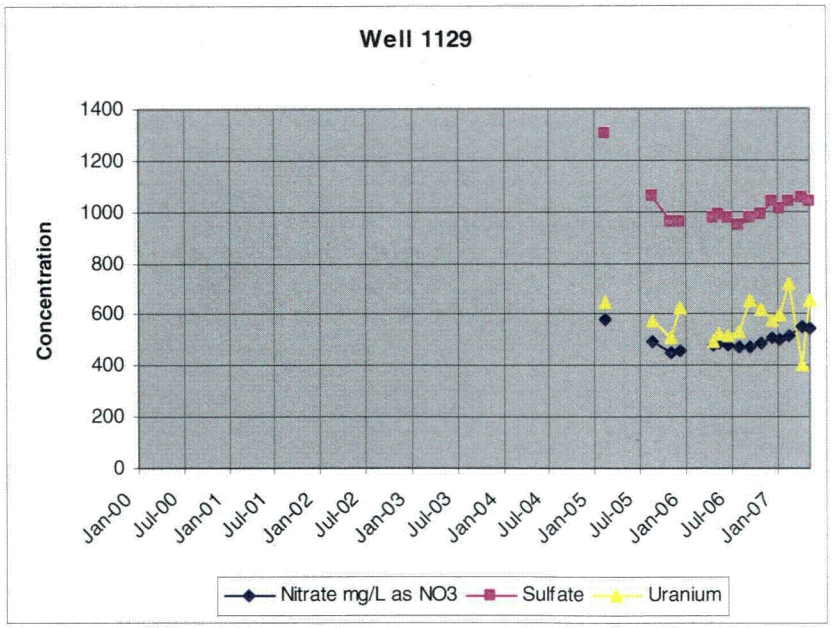

Well 1126
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium

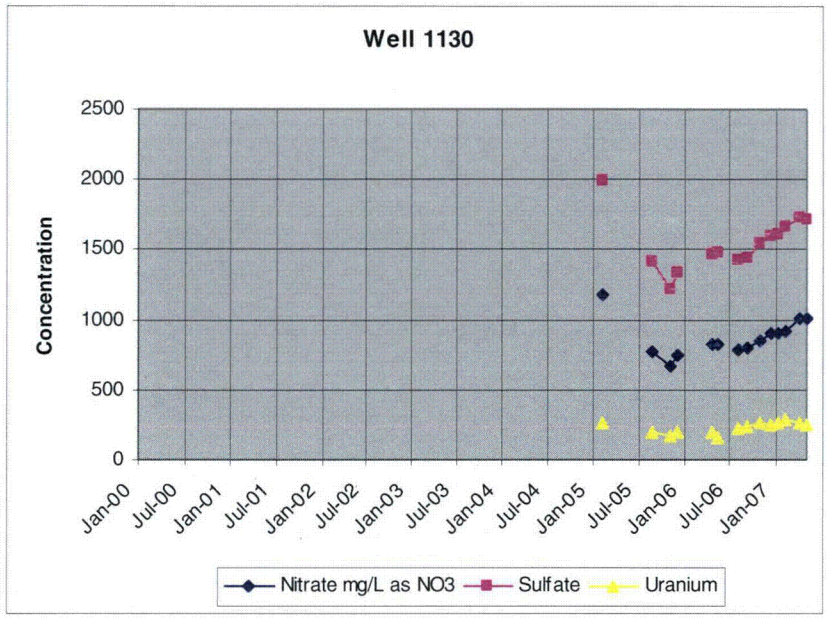

Well 1127
Concentration
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium

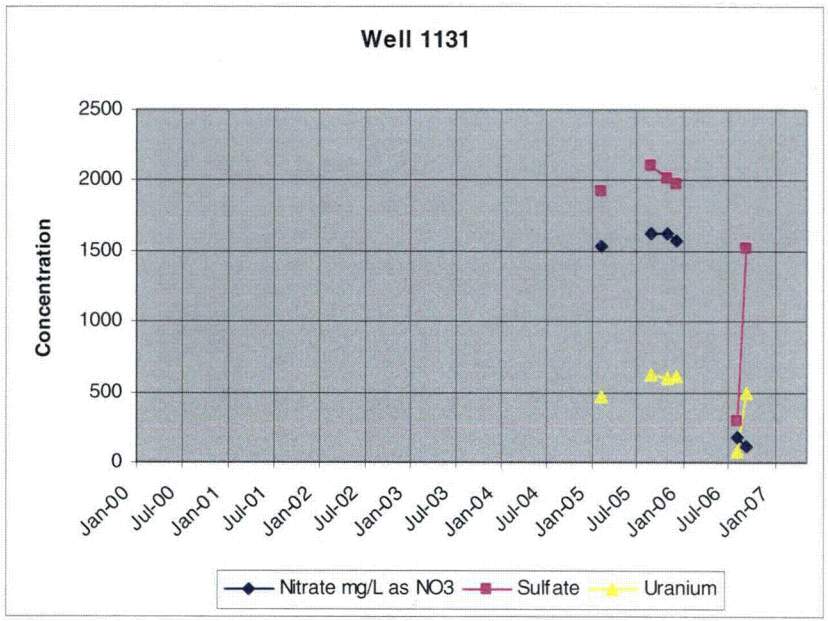

Well 1127
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1128
Concentration
1000
900
800
700
600
500
400
300
200
100
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1128
Concentration
200
160
120
80
40
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1129
Concentration
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1130
Concentration
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1131
Concentration
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2000
1500
1000
500
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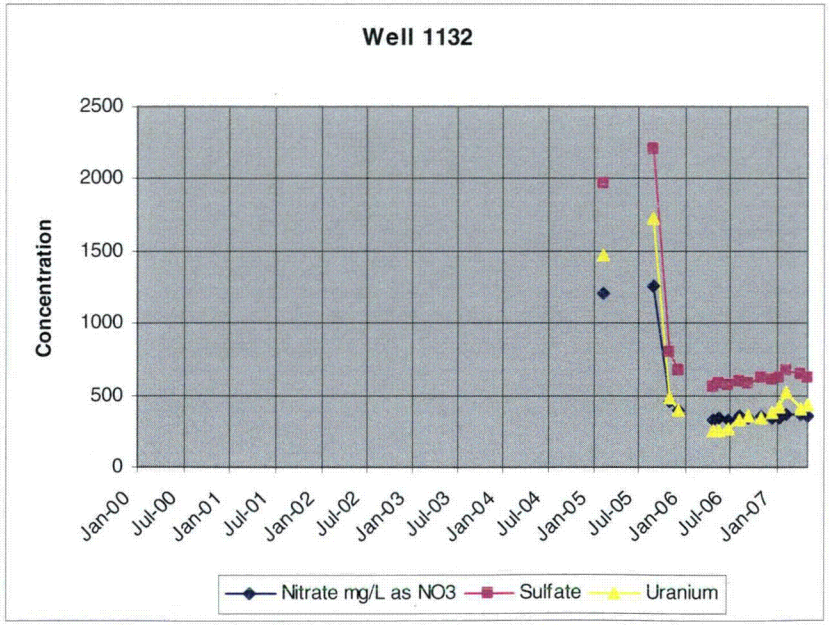
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1132
Concentration
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2000
1500
1000
500
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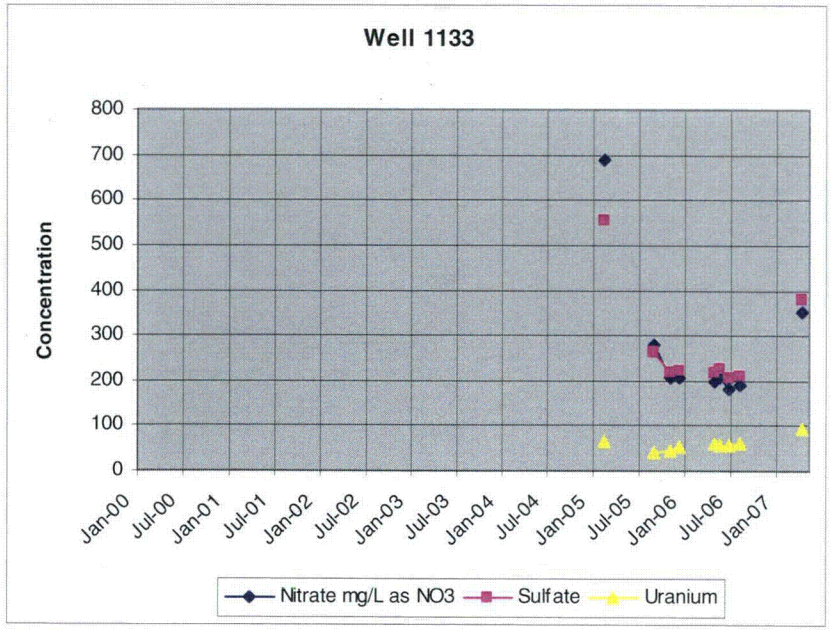
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 1133
Concentration
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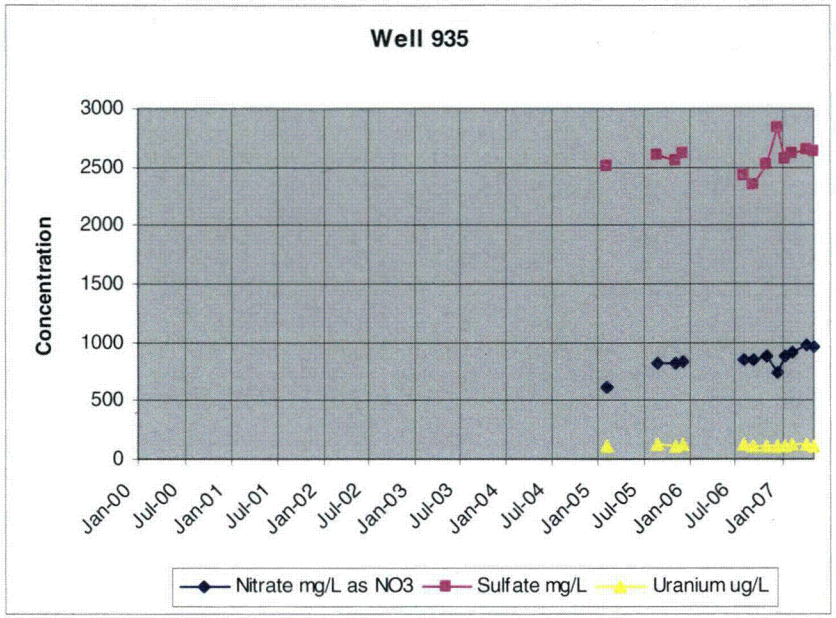
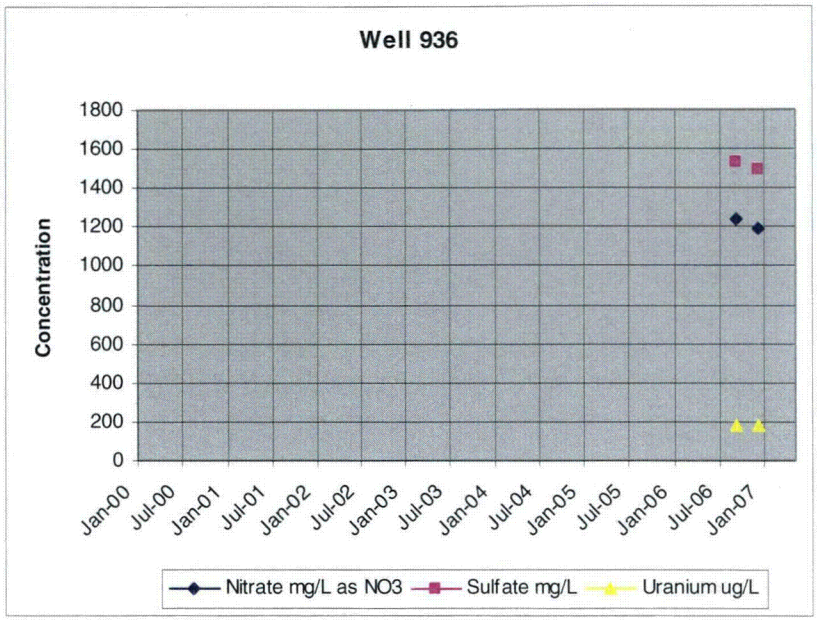
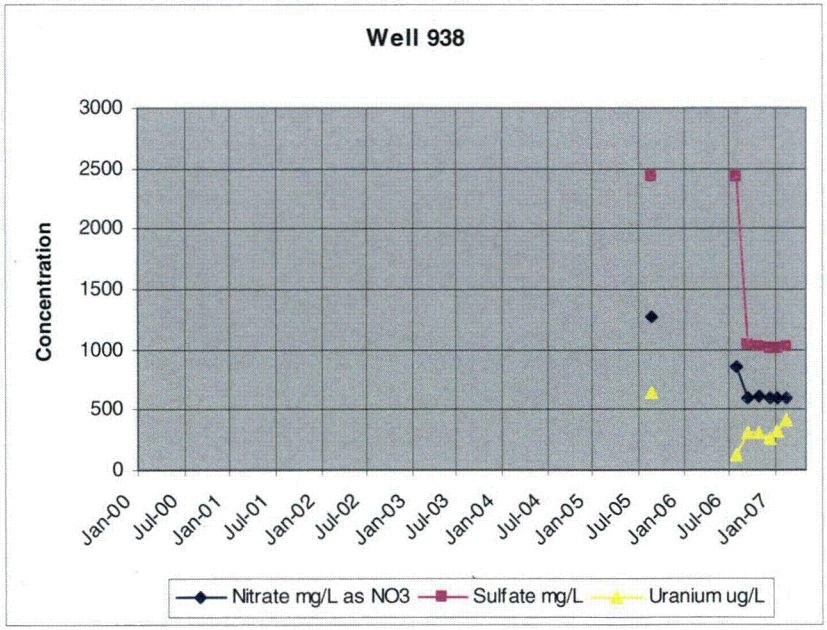
700
600
500
400
300
200
100
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate
Uranium


Well 935
Concentration
3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L


Well 936
Concentration
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L


Well 938
Concentration
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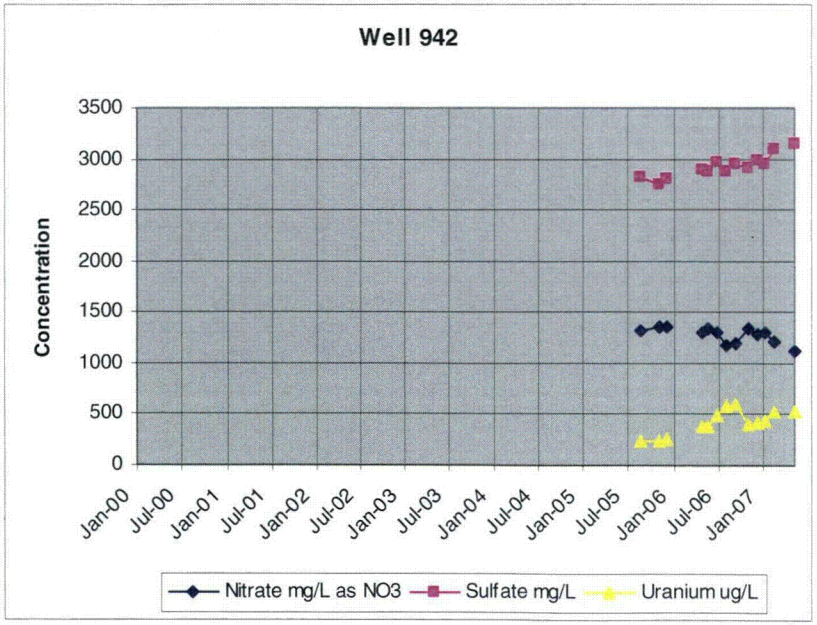
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L


Well 942
Concentration
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3000
2500
2000
1500
1000
500
0
Jan-00
Jul-00
Jan-01
Jul-01
Jan-02
Jul-02
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Nitrate mg/L as NO3
Sulfate mg/L
Uranium ug/L

Appendix G

Calculation Sets

Calculation 1

Estimated Volume and Mass of Ground Water Contamination for the Baseline Period

Calculation Set #1: Estimated Mass and volume of ground water contamination for the baseline period (originally included in July 2005 annual report)
Tuba City, AZ, Disposal Site

Objective: estimate the baseline volume of contaminated groundwater of the Middle Terrace; estimate the baseline mass of dissolved nitrate,sulfate, and uranium in the groundwater

Method:
1) estimate the area of the plume from baseline contaminant maps separately for Horizons A and B combined and Horizons C and D combined
2) estimate the vertical thickness of contamination for Horizons A and B combined and Horizons C and D combined
3) assume 25% porosity and compute the separate plume volumes for Horizons A and B combined and Horizons C and D combined
4) compute separate concentration averages for sulfate and uranium for Horizons A and B combined and Horizons C and D combined from baseline contaminant maps
5) multiply concentration average by plume volume to determine contaminant mass for Horizons A and B combined and Horizons C and D combined
6) sum the volume and mass estimates

Calcualtion:

1) map area of contaminant plume

Horizons A and B	plume length (northeast to southwest	4,000	ft
	plume width	1,800	ft
	area	7,200,000	ft^2
Horizons C and D	plume length (northeast to southwest	2,500	ft
	plume width	1,800	ft
	area	4,500,000	ft^2

2) thickness of contamination

Horizons A and B		Horizons C and D	
thickness Horizon A	25 ft	thickness Horizon C	50 ft
thickness Horizon B	50 ft	thickness Horizon D	25 ft
A&B combined thickness	75 ft	C&D combined thickness	75 ft

assumptions

*approximately the upper half of Horizon A not saturated during baseline period	*entire thickness of Horizon C contaminated
*Horizon B is fully saturated	*Horizon D not contaminated at many locations, assume 50% contaminated thickness

3) plume volumes

Horizons A and B	volume of contaminated groundwater	135,000,000	ft^3	**135,000,000**	**ft^3**
		1,012,500,000	gal	**1,013,000,000**	**gal**
		3,832,312,500	L	**3,832,000,000**	**L**
Horizons C and D	volume of contaminated groundwater	28,125,000	ft^3	**28,000,000**	**ft^3**
		210,937,500	gal	**211,000,000**	**gal**
		798,398,438	L	**798,000,000**	**L**

4) baseline concentrations

Horizons A and B

well	Horizon	U mg/L	sulfate mg/L	nitrate mg/L as NO3
262	B	0.379	931	380
263	B	0.485	1990	1140
265	B	0.090	1520	720
267	B	0.073	3680	1640
906	A	0.951	1660	1470
908	B	0.122	2430	651
909	B	0.040	666	485
934	B	0.312	7360	2320
936	B	0.267	4360	2950
940	A	0.546	7550	1800
941	A	0.089	745	358
942	B	0.246	3030	1360
944	B	0.950	1590	1010
geometric mean mg/L		0.231	2174	1028

Horizons C and D

well	Horizon	U mg/L	sulfate mg/L	N mg/L as NO3
1101	D	0.245	960	438
1102	D	0.533	1320	650
1103	D	0.355	2570	1120
1104	D	0.194	1870	993
1105	D	2.100	1590	648
1106	D	2.100	1050	614
1107	D	0.118	1200	1060
1108	D	0.646	3400	1410
1109	D	0.565	3280	798
1110	D	0.053	512	227
1111	D	0.161	988	421
1112	D	0.130	1140	617
1113	D	0.053	**250**	143
1114	D	0.040	328	228
1115	D	0.410	1930	766
1116	D	0.040	250	106
1117	D	0.040	255	225
1118	D	0.040	250	164
1119	D	0.555	1560	468
1120	D	1.3	2330	493
1121	D	0.849	2590	535
1122	D	0.878	2960	954
1123	D	0.261	1240	643
1124	D	0.171	1170	781
1125	D	0.04	250	104
912	C	0.04	846	403
geometric mean mg/L		0.214	1020	464

5) mass calculation

Horizons A and B	mass uranium	884	kg
		1,949	lb
	mass sulfate	8,330,201	kg
		18,359,764	lb
	mass N as NO3	3,940,636	kg
		8,685,162	lb
Horizons C and D	mass uranium	171	kg
		377	lb
	mass sulfate	814,310	kg
		1,794,738	lb
	mass N as NO3	370,337	kg
		816,223	lb

6) total volume and masses

total volume contaminated groundwater	**163,000,000**	**ft^3**
	1,222,500,000	**gal**
	4,627,162,500	**L**
total mass uranium	**1,055**	**kg**
	2,326	**lb**
total mass sulfate	**9,144,511**	**kg**
	20,154,502	**lb**
total mass nitrate as NO3	**4,310,973**	**kg**
	9,501,384	**lb**

Figure G–1. Calculation Set, Estimated Mass and Volume of Ground Water Contamination, Tuba City, Arizona, Disposal Site

End of current text

Calculation 2

Estimated Aquifer Restoration Time Based on Mass and Volume Removal Rates

Calculation Set #2: Estimated aquifer restoration time based on mass and volume removal rates
Tuba City Site
Annual Performance Evaluation Report
Period of Review: April 2006 through March 2007

Objective: estimate aquifer cleanup times

Method: compare mass and volume removed as of April 1, 2007 to estimates of initial contaminant inventory; predict cleanup time calculated removal rates to date

Calculation: estimate #1: initial contaminant volume and mass estimates from DOE Baseline Performance Evaluation, May 2003.
estimate #2: initial contaminant volume and mass estimates recalculated for April 2005 - March 2006 Performance Evaluation Report - see attached worksheet (Estimate of Baseline Contaminant Volume and Mass)

Estimate #1

	initial mass lb	cumulative removed lb	% removed	initial vol gal	cumulative removed gal	# pore vols removed	% plume vol removed
Nitrate	12,400,000	757,445	6	3.40E+09	223,781,828	0.066	7
Sulfate	17,900,000	1,862,880	10	2.70E+09	223,781,828	0.083	8
Uranium	2,800	493	18	3.00E+09	223,781,828	0.075	7

	mass removal rate % per yr	cleanup time, yrs	cleanup date	# yrs until cleanup	pore volume removal rate % / yr	1-pore volume cleanup time, yrs	1-pore volume cleanup date	# yrs until cleanup
Nitrate	1.3	79	2081	74	1.4	73	2075	68
Sulfate	2.2	46	2048	41	1.7	58	2060	53
Uranium	3.7	27	2029	22	1.6	64	2066	60
t1=	15-Jun-02							
t2=	01-Apr-07							
t2 - t1=	4.8	yrs						

Estimate #2

	initial mass lb	cumulative removed lb	% removed	initial vol gal	cumulative removed gal	# pore vols removed	% plume vol removed
Nitrate	9,500,000	757,445	8	1.20E+09	223,781,828	0.186	19
Sulfate	20,000,000	1,862,880	9	1.20E+09	223,781,828	0.186	19
Uranium	2,300	493.036744	21	1.20E+09	223,781,828	0.186	19

Projection	mass removal rate % per yr	cleanup time, yrs	cleanup date	# yrs until cleanup	pore volume removal rate % / yr	1-pore volume cleanup time, yrs	1-pore volume cleanup date	# yrs until cleanup
Nitrate	1.7	60	2062	55	3.9	26	2028	21
Sulfate	1.9	52	2054	47	3.9	26	2028	21
Uranium	4.5	22	2024	18	3.9	26	2028	21
t1=	15-Jun-02							
t2=	1-Apr-07							
t2 - t1=	4.8	yrs						

Figure G–2. Calculation Set 2, Estimated Aquifer Restoration Time Based on Mass and Volume Removal Rates

End of current text

Calculation 3

Calculate a Bulk Index of Aquifer Restoration for Sulfate

Calculation Set #3: Calculate a bulk index of aquifer restoration for sulfate

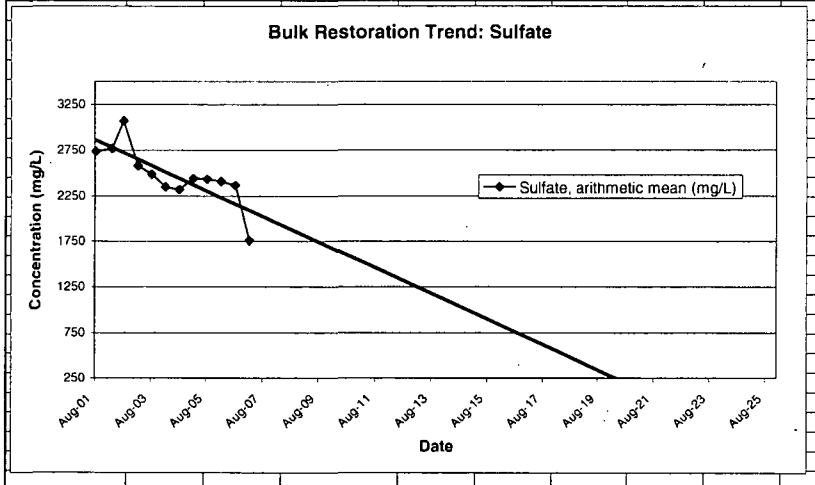
Tuba City, AZ, Disposal Site

Objective: develop a bulk concentration index for measuring restoration progress for sulfate

Method: 1) compute an average concentration of a contaminant for a given sampling date/event for a selected group of monitor wells within the contaminant plume
2) plot the computed averages over time

Calculation: the selected monitor wells below have the most comprehensive data set and are located throughout the contaminant plume in Horizons A and B;
no historical data exists for Horizons C and D within the contaminant plume
note: where data are absent in the table below, concentrations are carried forward from the previous date as shown in ***bold italic***

	Sulfate (mg/L)														Sulfate,	Sulfate,
date_sampled	**Loc 0262**	**Loc 0263**	**Loc 0265**	**Loc 0267**	**Loc 0906**	**Loc 0908**	**Loc 0909**	**Loc 0929**	**Loc 0934**	**Loc 0936**	**Loc 0940**	**Loc 0941**	**Loc 0942**		**arithmetic mean (mg/L)**	**geometric mean (mg/L)**
08/16/2001	***931***	***1990***	***1520***	3620	1840	2310	419	19.9	7450	4570	7230	620	3030	baseline	2735	1482
03/06/2002	***931***	***1990***	***1520***	3680	1660	2430	666	28.1	7360	4360	7550	745	3030	baseline	2765	1594
08/20/2002	***931***	***1990***	***1520***	3530	1690	2330	637	27.9	11900	4400	***7550***	***745***	2680		3072	1625
02/06/2003	***931***	***1990***	***1520***	3550	1660	2430	629	27.6	2970	4880	9180	920	2790		2575	1524
08/06/2003	1190	1640	1070	3690	1650	2400	564	29.1	2640	3240	10300	1010	2890		2486	1453
02/12/2004	***1190***	***1640***	***1070***	***3690***	***1650***	2400	540	***29.1***	1900	3200	9600	800	2800		2347	1375
08/31/2004	1000	1900	800	3500	1700	2600	590	26	2300	2500	***9600***	710	2900		2317	1331
02/10/2005	1000	2100	810	3700	1900	3000	680	26	2300	2700	***9600***	890	3000		2439	1426
08/31/2005	830	2000	1100	3600	***1900***	3000	770	28	2500	2600	***9600***	***890***	2800		2432	1450
02/22/2006	820	2000	1000	3500	2100	3000	840	27	2400	2100	***9600***	***890***	3000		2406	1431
08/31/2006	960	2000	1100	3600		2700	810	27	2300	1600	***9600***	750	2900		2362	1343
02/22/2007	1000	2100	990	3400		2900	870	23	2600	***1600***	1701	780	3100		1755	1176



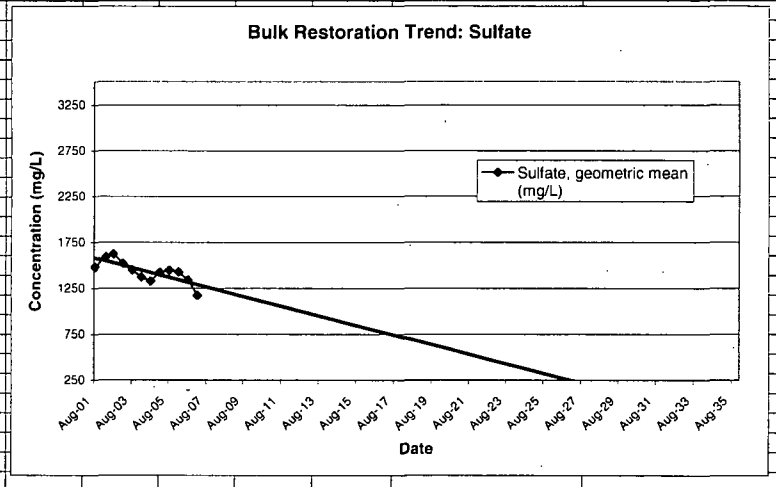


Figure 29

t1=	15-Jun-02		t1=	15-Jun-02	
t2=	1-Apr-07		t2=	1-Apr-07	
t2 - t1=	4.8	yr	t2 - t1=	4.8	yr
t3=	Aug-20	extrapolated	t3=	Aug-26	extrapolated
projected cleanup time from t1=	18	yr	projected cleanup time from t1=	24	yr
projected cleanup time from t2=	13	yr	projected cleanup time from t2=	19	yr

Figure G–3. Calculation Set 3, Calculate a Bulk Index of Aquifer Restoration for Sulfate

End of current text

Calculation 4

Calculate a Bulk Index of Aquifer Restoration for Uranium

Calculation Set #4: Calculate a bulk index of aquifer restoration for uranium

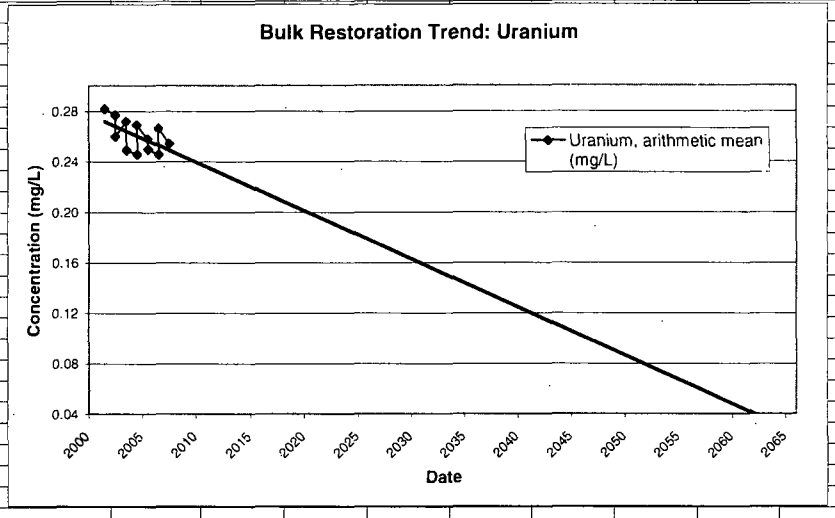
Tuba City, AZ, Disposal Site

Objective: develop a bulk concentration index for measuring restoration progress for uranium

Method: 1) compute an average concentration of a contaminant for a given sampling date/event for a selected group of monitor wells within the contaminant plume
2) compare the computed averages over time

Calculation: the selected monitor wells below have the most comprehensive data set and are located throughout the contaminant plume in Horizons A and B;
no historical data exists for Horizons C and D within the contaminant plume
note: where data are absent in the table below, concentrations are carried forward from the previous date as shown in ***bold italic***

	Uranium mg/L															
date_sampled	**Loc 0262**	**Loc 0263**	**Loc 0265**	**Loc 0267**	**Loc 0906**	**Loc 0908**	**Loc 0909**	**Loc 0929**	**Loc 0934**	**Loc 0936**	**Loc 0940**	**Loc 0941**	**Loc 0942**		**Uranium, arithmetic mean (mg/L)**	**Uranium, geometric mean (mg/L)**
08/16/2001	***0.3790***	***0.4850***	***0.0897***	0.0696	0.9340	0.1110	0.0178	0.0012	0.2980	0.2810	0.6430	0.1030	0.2510	baseline	0.2818	0.1316
03/06/2002	***0.3790***	***0.4850***	***0.0897***	0.0731	0.9510	0.1220	0.0389	0.0012	0.3120	0.2670	0.5460	0.0886	0.2460	baseline	0.2769	0.1378
08/20/2002	***0.3790***	***0.4850***	***0.0897***	0.0742	0.6980	0.1220	0.0349	0.0011	0.3360	0.3060	***0.5460***	***0.0886***	0.2180		0.2599	0.1336
02/06/2003	***0.3790***	***0.4850***	***0.0897***	0.0765	0.6530	0.1240	0.0333	0.0015	0.3550	0.5820	0.4320	0.1020	0.2210		0.2718	0.1428
08/06/2003	0.4250	0.1730	0.0551	0.0784	0.6670	0.1060	0.0279	0.0018	0.3500	0.6060	0.4280	0.0858	0.2320		0.2489	0.1261
02/12/2004	***0.4250***	***0.1730***	***0.0551***	***0.0784***	***0.6670***	0.0970	0.0270	***0.0018***	0.3200	0.6000	0.4300	0.0810	0.2400		0.2458	0.1238
08/31/2004	0.5300	0.2300	0.0450	0.0880	0.8900	0.1200	0.0290	0.0010	0.3200	0.4700	***0.4300***	0.0760	0.2700		0.2692	0.1256
02/10/2005	0.5600	0.1900	0.0450	0.0850	0.8300	0.1100	0.0350	0.0010	0.2800	0.4700	***0.4300***	0.0490	0.2700		0.2581	0.1191
08/31/2005	0.6600	0.1400	0.0600	0.0950	***0.8300***	0.1000	0.0420	0.0014	0.2600	0.3500	***0.4300***	***0.0490***	0.2300		0.2498	0.1205
02/22/2006	0.7700	0.1200	0.0540	0.0880	0.7100	0.1000	0.0480	0.0014	0.2500	0.2400	***0.4300***	***0.0490***	0.3300		0.2454	0.1181
08/31/2006	0.7800	0.1000	0.0610	0.0770	***0.7100***	0.0890	0.0510	0.0013	0.2500	0.2000	***0.4300***	0.0930	0.6200		0.2663	0.1254
02/22/2007	0.9300	0.0980	0.0530	0.0610	***0.7100***	0.0920	0.0470	0.0013	0.2100	***0.2000***	0.3646	0.0780	0.4600		0.2542	0.1154



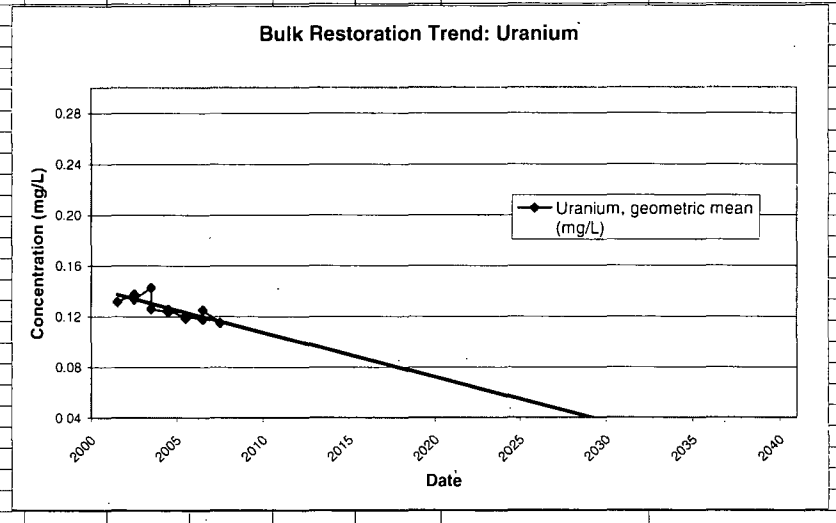


Figure 30

t1=	15-Jun-02	
t2=	1-Apr-07	
t2 - t1=	4.8	yr
t3=	Aug-62	extrapolated
projected cleanup time from t1=	60	yr
projected cleanup time from t2=	55	yr

t1=	15-Jun-02	
t2=	1-Apr-07	
t2 - t1=	4.8	yr
t3=	Aug-29	extrapolated
projected cleanup time from t1=	27	yr
projected cleanup time from t2=	22	yr

Figure G–4. Calculation Set 4, Calculate a Bulk Index of Aquifer Restoration for Uranium

End of current text