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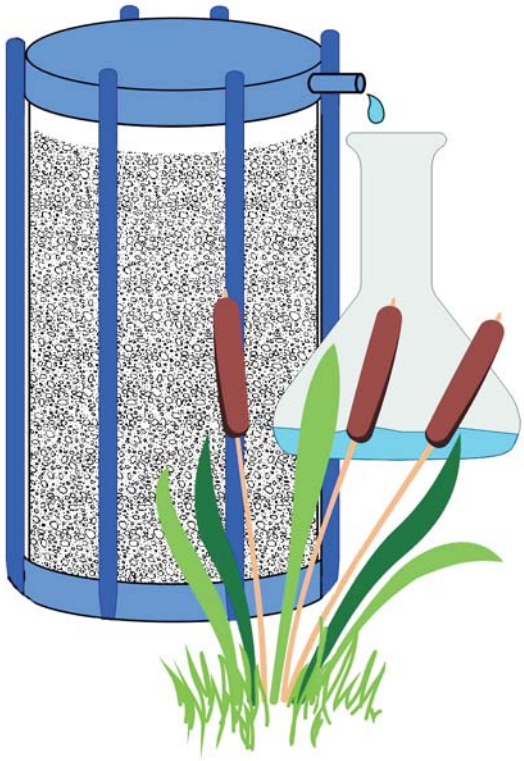
Environmental Sciences Laboratory

Analysis of Contaminant Rebound in Ground Water in Extraction Wells at the Tuba City, Arizona, Site

April 2004



Prepared for
U.S. Department of Energy
Grand Junction, Colorado

Work Performed Under DOE Contract No. DE–AC01–02GJ79491 for the U.S. Department of Energy
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at the Tuba City, Arizona, Site

April 2004

Work Performed by S.M. Stoller Corporation under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management, Grand Junction, Colorado

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Signature Page

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April 2004

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Contents

Tables

Figures

Appendices

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Executive Summary

Ground water at the Tuba City, Arizona, Uranium Mill Tailings Remedial Action (UMTRA) Project site is contaminated as a result of uranium ore-milling activities that took place between 1956 and 1966. A pump-and-treat system that includes extraction wells and a distillation unit is being used to treat the contaminated water. Analyses of weekly composite and monthly grab samples of ground water from extraction wells, established that contaminant concentrations in extraction well samples are relatively low when the wells have been in service for extended periods of time, but the contaminant concentrations are higher immediately after the wells are restarted following shut down for several days. This tendency is referred to as the "rebound" effect.

The extraction and treatment systems were shut down for two periods in January 2004. For this study, extraction wells were intensively sampled after pumping resumed to help quantify the effects of rebound on individual wells. Water samples were collected from 23 extraction wells currently in use at Tuba City. Samples were analyzed for chloride, conductivity, nitrate, sulfate, and uranium. These data are particularly useful in developing plans to increase the efficiency of ground water remediation, such as the use of pulsed pumping.

Nearly all the extraction well samples show some rebound effect. In contrast, samples from two wells had trends that were reversed. Increasing or decreasing concentration trends for chloride, conductivity, nitrate, sulfate, and uranium are similar for a given well.

On the basis of several lines of evidence, desorption is likely not the dominant process causing rebound at the Tuba City site. A more probable explanation for the rebound effect is a change in the source of ground water delivered to the extraction wells during pumping. As the wells are pumped, the ground water elevation near the well decreases. Flow of ground water from the upper portion of the strata may decrease because the lower water table causes a higher proportion of ground water from deeper and less contaminated horizons to enter the well as pumping progresses.

More removal of contaminants from the subsurface occurs if concentrations are high in the extracted water. If concentrations increase in a well during resting periods, it may be efficient to pump the well for a period of time and then let it rest. This type of cyclic pumping is referred to as "pulsed pumping," but this technique will be ineffective if concentrations decrease rapidly during pumping. In many of the wells, concentrations decreased fairly rapidly in ground water samples during the rebound study. Pulsed pumping may be impractical for these wells. Pulsed pumping may be effective for some of the wells that have relatively low rebound rate parameters. Some wells can probably maintain relatively high concentrations of contaminants with continuous pumping and would not need to be pulsed. The two wells with reverse rebound could be pumped continuously because mass removal increases as these wells are pumped.

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1.0 Introduction

Ground water at the Tuba City, Arizona, Uranium Mill Tailings Remedial Action (UMTRA) Project site is contaminated as a result of uranium ore-milling activities between 1956 and 1966. The Tuba City site is located on Navajo Nation land in northeast Arizona.

The aquifer underlying the site is referred to as the N-aquifer and consists of, in descending order, the Navajo Sandstone, the Kayenta Formation, and the Moenave Formation. Under natural conditions, depth to the top of the saturated zone at the site (in the Navajo Sandstone) is approximately 35 to 50 feet (ft). Millsite-related ground water contaminants at the Tuba City site include cadmium, molybdenum, nitrate, selenium, strontium, sulfate, and uranium. As part of the effort to restore local ground water quality, a remedial system consisting of extraction wells, a distillation unit (for water treatment), and an infiltration trench is in operation.

Analyses of Tuba City weekly composite and monthly grab samples of ground water from extraction wells established that contaminant concentrations in the extraction wells are stable and relatively low when the wells have been in service for extended periods of time, but concentrations in the samples are higher immediately after the wells are restarted following shut down of the wells for several days. This tendency is referred to as the “rebound” effect. Analyses of daily influent samples suggest that rebound is of short duration and that contaminant concentrations in the wells stabilize within about 3 days. Analytical results of well samples collected on a monthly basis show that the rebound effect is more pronounced in some wells than in others.

The extraction and treatment systems were shut down from January 19, 2004, until 9:07 p.m. on January 28, 2004. The system was shut down a second time from 6:28 a.m. on January 30, 2004, through 12:07 a.m. January 31, 2004. Baseline samples were collected on January 15, 2004, several days before shutdown. Prior to baseline sampling, the wells had been pumping for approximately 4 months without interruption. For this study, extraction wells were intensively sampled from January 28 through February 3, 2004. The goal of the sampling was to evaluate the extent and duration of rebound for individual wells. These data are particularly useful in developing plans to increase the efficiency of ground water remediation with pulsed pumping.

This work was funded by ESL and Tuba City subtasks of the LM task order. Field and laboratory work were conducted collaboratively with ESL and Tuba City site personnel. Appendix A contains a complete set of tabulated data and graphical portrayals of key data. Appendix B contains field and laboratory notes.

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2.0 Methods

Water samples were collected from 23 extraction wells currently in use at Tuba City. The treatment system was restarted January 28, 2004, and the pumps were turned on at 9:07 p.m. Samples were collected immediately (within 30 minutes of restart) and every 4 hours until the morning of January 30, 2004, for a total of nine sampling events. At that time, a system failure occurred necessitating shutdown for repairs. Sampling (round 10) resumed at approximately 12:30 a.m. January 31, 2004, 30 minutes after the pumps were restarted after about 18 hours (h) when the pumps did not operate. Additional samples were collected 4 hours later (round 11). At that time, the decision was made to reduce sampling frequency. Samples (round 12) were collected at 1 p.m. (7-hour interval) January 31, 2004, and then daily for the next 3 days.

All extraction wells were sampled using the same sampling method and in the same order during each sampling event. A ladder was lowered into the well vault for safe access. The well sampling port was opened and allowed to run for approximately 15 seconds before a 125-milliter (mL) Nalgene bottle was filled with ground water. The ladder was removed and moved to the next well vault. The normal time between vaults was 2 to 3 minutes. Each bottle was labeled with the well number, the date, and the time the bottle was filled. The pumps were off in two or three wells (regular cycling) and a return trip was necessary to collect a sample about 20 minutes after the other samples were obtained.

After all the wells were sampled, the bottles were taken to the site laboratory where pH and conductivity values of unfiltered samples were measured. The pH and conductivity sensors were calibrated before each round of measurements. The pH and conductance values were recorded on worksheets that were used to track the measurements of each sample.

Upon completion of pH and conductivity measurements, a 30-mL syringe was used to extract two 30 mL splits of water from the sample container. These splits were filtered through a 0.45-micron filter and discarded. A third split, using the same filter, was filtered into a centrifuge tube that was marked with the well number, the date, and the time the filtered sample was collected. Filtered samples were refrigerated until analyses were performed.

All samples were analyzed for uranium content by kinetic phosphorescence on a Chemchek KPA uranium analyzer following Environmental Sciences Laboratory (ESL) analytical procedure AP(U-2). Chloride, nitrate, and sulfate were analyzed by ion chromatography following ESL analytical procedures AP(Cl-2), AP(NO_3-4), and AP(SO_4-4).

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3.0 Results and Discussion

3.1 Rebound Concentration Trends

Nearly all the extraction wells indicated some rebound effect. For example, the uranium concentration in samples from well 1120 increased from a baseline value of 437 micrograms per liter (µg/L) to 1,264 µg/L during the first shutdown period (Figure 1). After pumping was initiated, the concentration decreased rapidly to 506 µg/L. During the second shutdown period, the uranium concentration in the samples increased to 1,057 µg/L. Shortly after pumping resumed, it fell to 301 µg/L, slightly less than the baseline value. Concentration trends showing well-defined rebound for chloride, conductivity, nitrate, and sulfate in samples from well 1120 were similar to uranium concentration trends (Appendix A). Most of the well samples had concentration trends similar to those of well 1120 samples, although some deviations exist.

In contrast to the typical rebound trend as exemplified by well 1120, samples from two wells (wells 1103 and 1119) had reversed trends. In these two wells, the uranium concentrations increased during pumping and decreased when the wells were at rest (Figure 1). Conductivity, chloride, nitrate, and sulfate concentrations followed the reversed uranium trend in samples from wells 1103 and 1119 (Appendix A). These two wells are adjacent to each other, suggesting that the reversed trend is a localized phenomena. The wells are located adjacent to the disposal cell boundary near its southeast corner (Figure 1).

The rebound effect does not appear to depend on the magnitude of the constituent concentrations, as exemplified by comparing the uranium concentration trend in samples from well 1120 to those in samples from well 1113 (Figure 1). The baseline uranium concentrations in samples from wells 1120 and 1113 are 437 and 3.3 µg/L, respectively, but samples from both wells have concentration trends consistent with rebound. Concentration trends for chloride, conductivity, nitrate, sulfate, and uranium are similar in samples from an individual well.

3.2 Rebound Rates

The initial baseline concentration (*baseline*), peak concentration following the second shutdown period (*peak*), and the concentration in the first sample following peak (*first*) were used to compare rebound rates among individual wells. Concentrations in *peak* and *first* were normalized to *baseline* and the difference (in percent) was divided by the time between *peak* and *first* (3.8 h). Normalization is needed to avoid overemphasizing rebound effects in well samples that have high concentrations of constituents. This approach is useful in comparing relative concentration trends among wells, but it does not differentiate among wells with variable absolute concentrations. Thus, a well that has only 20 µg/L uranium could have the same rate parameter as a well with 1,000 µg/L uranium if the concentrations decrease at the same rate relative to their respective baseline concentrations.

The following example describes the calculation of a rate parameter and its significance. At well 1102, *baseline*, *peak*, and *first* concentrations are 366, 594, and 399 µg/L, respectively (Appendix A). The normalized *peak* and *first* concentrations are 1.623 and 1.090, respectively. The difference in the normalized concentrations is 0.533, or 53.3 percent. Dividing the percent difference by the time period (3.8 h) produces a rate parameter of 14.02 percent per hour (%/h) (Table 1), i.e., the uranium concentration decreases by 14.02 percent of the baseline

concentration 1 h after pumping resumes. Higher values of the rate parameter indicate a faster rebound. Negative rate parameters indicate that concentrations increase during pumping.

For samples from a specific well, the parameters for all five constituents are similar (Table 1). For example, the rate parameters for all five constituents in samples from well 1108 are between 10 and 15 %/h; whereas, all rate parameters from samples from well 1107 are more than 50 %/h. The rate parameters are negative for most of the constituents in samples from wells 1103 and 1119, indicating that concentrations increase during pumping in these two wells. The rebound effects in samples from three of the wells (wells 1101, 1124, and 1125) are relatively minor as indicated by the low, and sometimes negative, rate parameters. These three wells are located east of the disposal cell (Figure 1) near the evaporation pond.

Table 1. Calculated Rebound Rate Parameters
(percent per hour; see text for discussion)

Well	Conductivity	Uranium	Chloride	Nitrate	Sulfate
1101	-0.77	0.00	0.00	0.27	0.91
1102	1.75	14.02	4.98	7.82	3.29
1103	-8.18	-2.98	-6.66	-8.80	-9.34
1104	15.61	14.77	18.45	26.61	26.50
1105	2.23	9.89	3.45	4.29	5.73
1106	49.47	112.53	51.13	77.14	93.14
1107	59.62	97.65	58.58	110.18	106.92
1108	13.01	14.31	10.60	14.14	10.17
1109	24.82	37.74	16.12	23.95	40.91
1110	52.89	105.44	48.73	70.04	87.94
1111	20.78	38.86	21.99	26.36	27.63
1112	18.67	34.60	13.94	27.63	26.10
1113	29.71	73.37	20.84	68.39	86.78
1114	5.35	10.81	4.42	5.70	6.97
1115	27.02	90.93	15.42	24.21	57.65
1118	1.17	2.97	1.36	2.11	1.10
1119	-3.01	5.96	1.91	-7.43	-3.75
1120	28.88	41.73	36.12	36.13	37.88
1121	2.17	8.37	1.27	1.49	2.05
1122	5.73	14.51	3.78	6.38	6.90
1123	12.53	19.72	11.06	19.22	39.05
1124	-0.43	1.74	-1.15	-1.20	-0.97
1125	0.28	-3.49	1.69	2.60	-0.83

3.3 Causes of Rebound

A possible cause of the rebound effect is the slow release of sorbed contamination during nonpumping. Some contaminants desorb from sediments slowly, and periods of ground water stagnation allow the desorption process to proceed further than it can in ground water flowing under a forced gradient. However, several lines of evidence indicate that desorption is not likely the dominant process causing rebound at the Tuba City site. Chloride, nitrate, and sulfate partition strongly into the aqueous phase and would not be sorbed on host grains of the aquifer

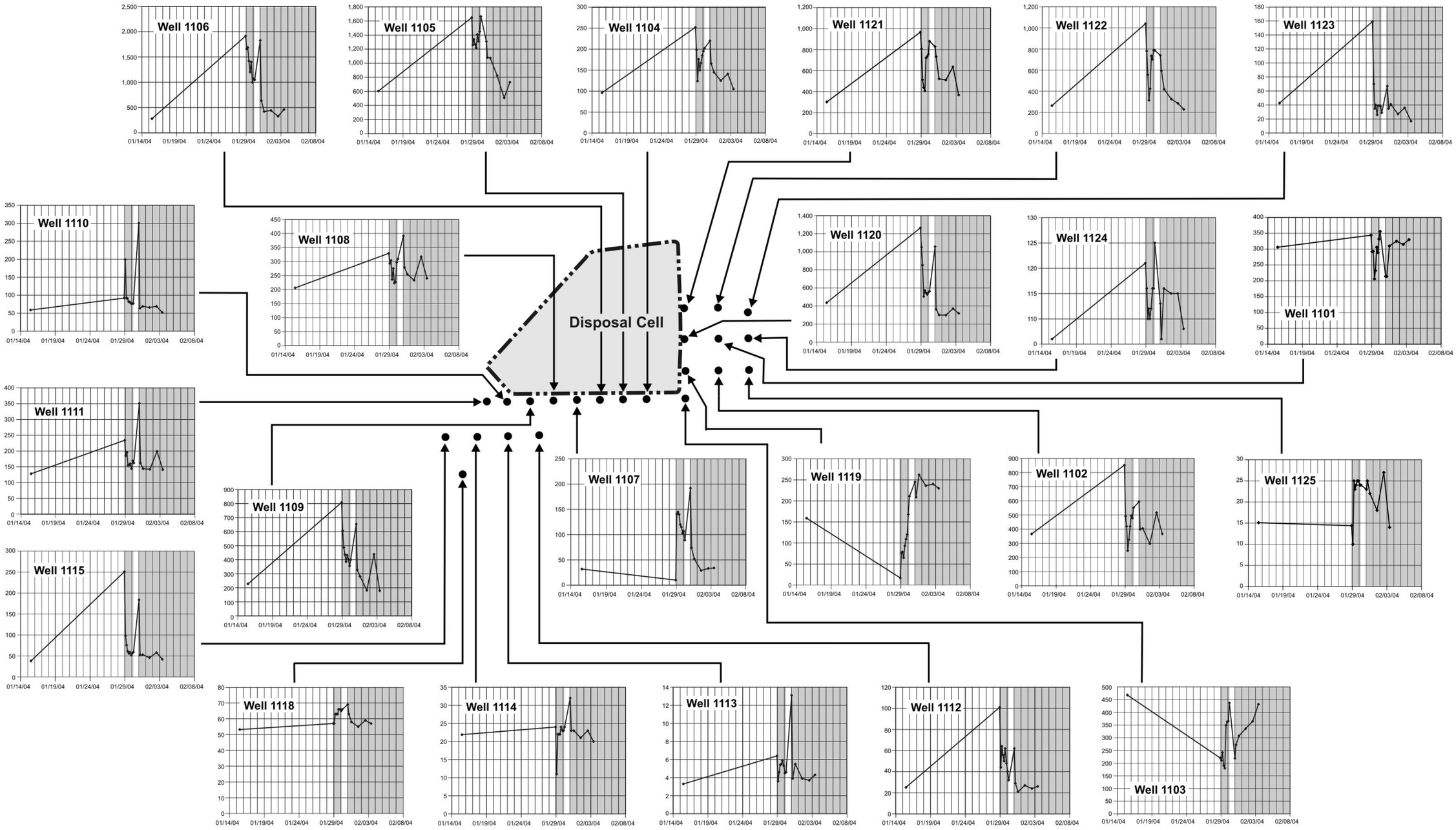

Figure 1. Locations of extraction wells showing uranium concentrations in relation to time, during the rebound study.
(The y axis on each coordinate grid represents uranium concentrations in micrograms per liter. The grids differ in uranium concentrations.
The disposal cell outline is shown for reference. Shaded portions of the graphs indicate times the wells were pumping.

Thus, these constituents would not be available for desorption. Additional evidence is provided by the low nitric acid-leachable concentrations of uranium in cores of Navajo Sandstone collected within the plume area at Tuba City (DOE 2004). The concentrations in the four cores, collected within the concentrated portion of the uranium plume, were less than average crustal abundance for sandstone, indicating that only a small amount of uranium is sorbed to the aquifer substrate at the site.

A more probable explanation for the rebound effect is a change in the source of ground water delivered to the extraction wells during pumping. As the wells are pumped, the ground water elevation near the well decreases. Flow of ground water from the upper portion of the strata may decrease because of the lower water table, causing a higher proportion of ground water from deeper horizons to enter the well as pumping progresses. Previous investigations suggest that contaminant concentrations decrease with depth; thus, pumping may cause decreasing concentrations. The reverse rebound, observed in wells 1003 and 1119, is inconsistent with this hypothesis. Perhaps during pumping, ground water is brought into these wells from contaminated strata beneath the southeast corner of the disposal cell.

Another explanation for rebound is that water is withdrawn from a different portion of the sandstone matrix during pumping than it is during nonpumping. For example, pumping may enhance the migration of ground water through preferential channels and macropores. Diffusion-controlled release of contamination from smaller pores and hydraulically isolated areas to macropores or fractures may contribute to the rebound effect. Similar to desorption, contaminant diffusion to macropores or fractures under pumping conditions would not maintain concentrations as high as would occur under the natural flow gradient.

3.4 Implications

The relatively rapid decreases in contaminant concentrations has implications for remediation. Efficient removal of contaminants from the subsurface is enhanced if concentrations are high in the extracted water. If concentrations increase in a well during resting periods, it may be efficient to pump the well for a period of time and then let it rest. Cyclic pumping such as this is referred to as “pulsed pumping.” Pulsed pumping will be ineffective if concentrations decrease rapidly during pumping. In many of the wells, concentrations decreased fairly rapidly during the rebound study. For example, in well 1106, nearly 5 times the mass of uranium can be removed for a given volume of ground water if the extracted water contains the peak concentration (1,914 µg/L) instead of the typical pumping concentration of about 400 µg/L. Wells with high rate parameters are likely to be the least effective in a pulsed pumping operation. Wells 1102, 1106, 1110, and 1115 have rate parameters for uranium of more than 50 %/h; these wells may not respond efficiently to pulsed pumping (Table 1). For pulsed pumping to be effective, the pumping would need to be pulsed rapidly, causing maintenance and operational costs to be high.

Some of the wells have relatively low rate parameters and pulsed pumping may be more effective for these. For example, well 1121 has a relatively low uranium rate parameter of 8.37 %/h. Uranium concentrations in samples from well 1121 decreased from a peak of about 950 µg/L to about 400 µg/L following pumping (Figure 1). Pulsing the pumping on a daily basis may significantly enhance uranium removal from this well. The magnitude of the concentration in a well needs to be considered, as well as the rebound rate, when designing a pumping program. For example, the uranium rate parameter of 10.81 %/h for well 1114 is low, suggesting

that it might be a candidate for pulsed pumping. However, uranium removal will be minimal regardless of the efficiency in maintaining the peak concentration because the uranium concentration is only about 25 µg/L.

Some wells can probably maintain relatively high concentrations of contaminants with continuous pumping and would not need to be pulsed. For example, well 1101 has a uranium rate parameter of 0.00 %/h and the concentration is about 300 µg/L; it appears that the uranium concentration would be near 300 µg/L even with continuous pumping (Figure 1). Similarly, samples from well 1102 maintained a concentration of about 400 µg/L throughout the rebound test (Figure 1) except for a single high uranium concentration of 852 µg/L.

The two wells with reverse rebound (wells 1103 and 1119) could be pumped continuously because mass removal increases as these wells are pumped. With continuous pumping, wells 1003 and 1119 appear to be able to sustain uranium concentrations in samples of about 425 and 250 µg/L, respectively (Figure 1).

4.0 Reference

DOE (U.S. Department of Energy) 2004. *Analysis of MSE Cores, Tuba City, Arizona, Site*, Environmental Sciences Laboratory report ESL-RPT-2004-03, GJO-2004-591-TAC, U.S. Department of Energy, Grand Junction, Colorado.

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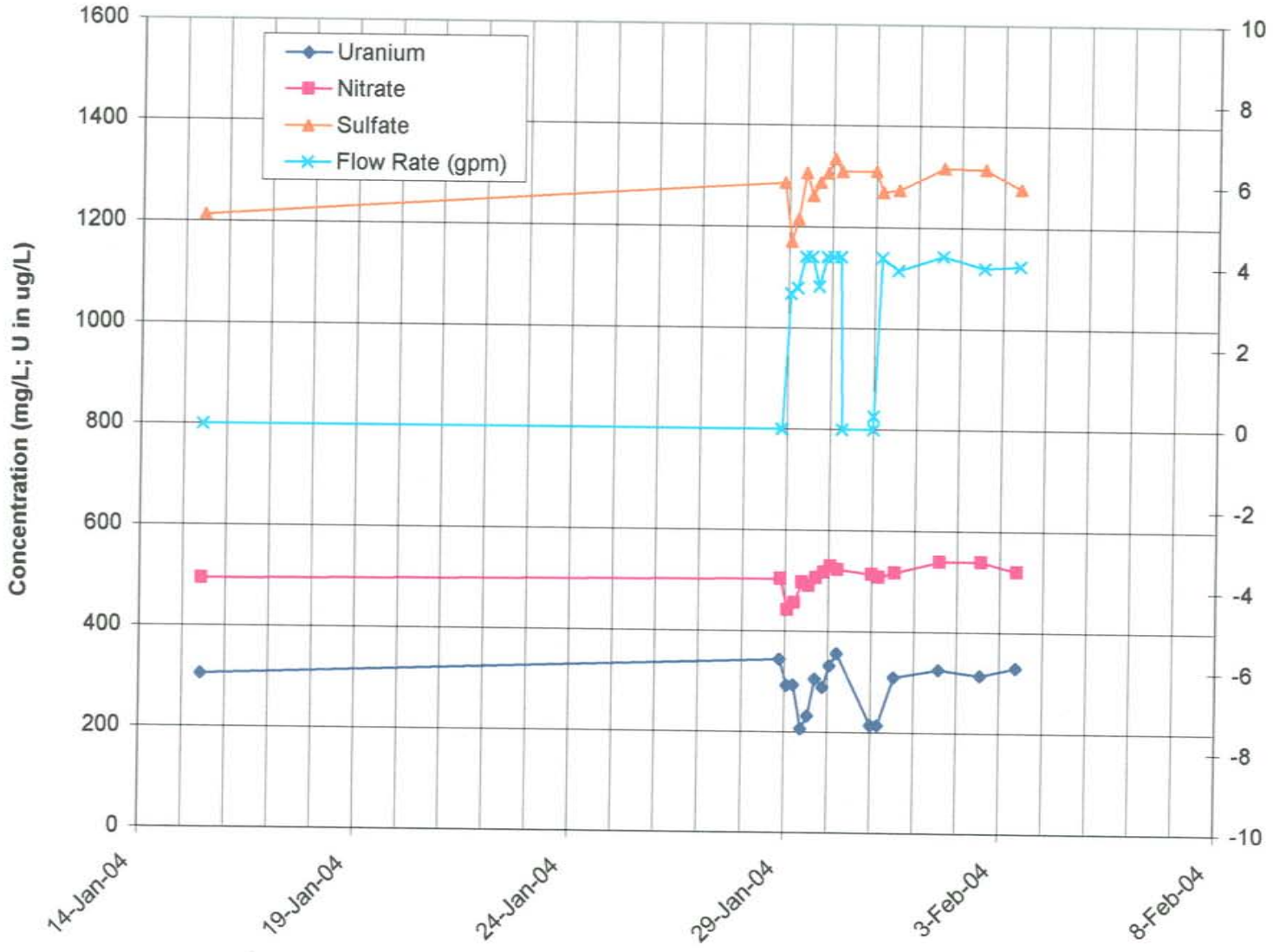
Appendix A

Comprehensive Tabulation of Data Collected During Rebound Study and Plots of Selected Data for Each Well

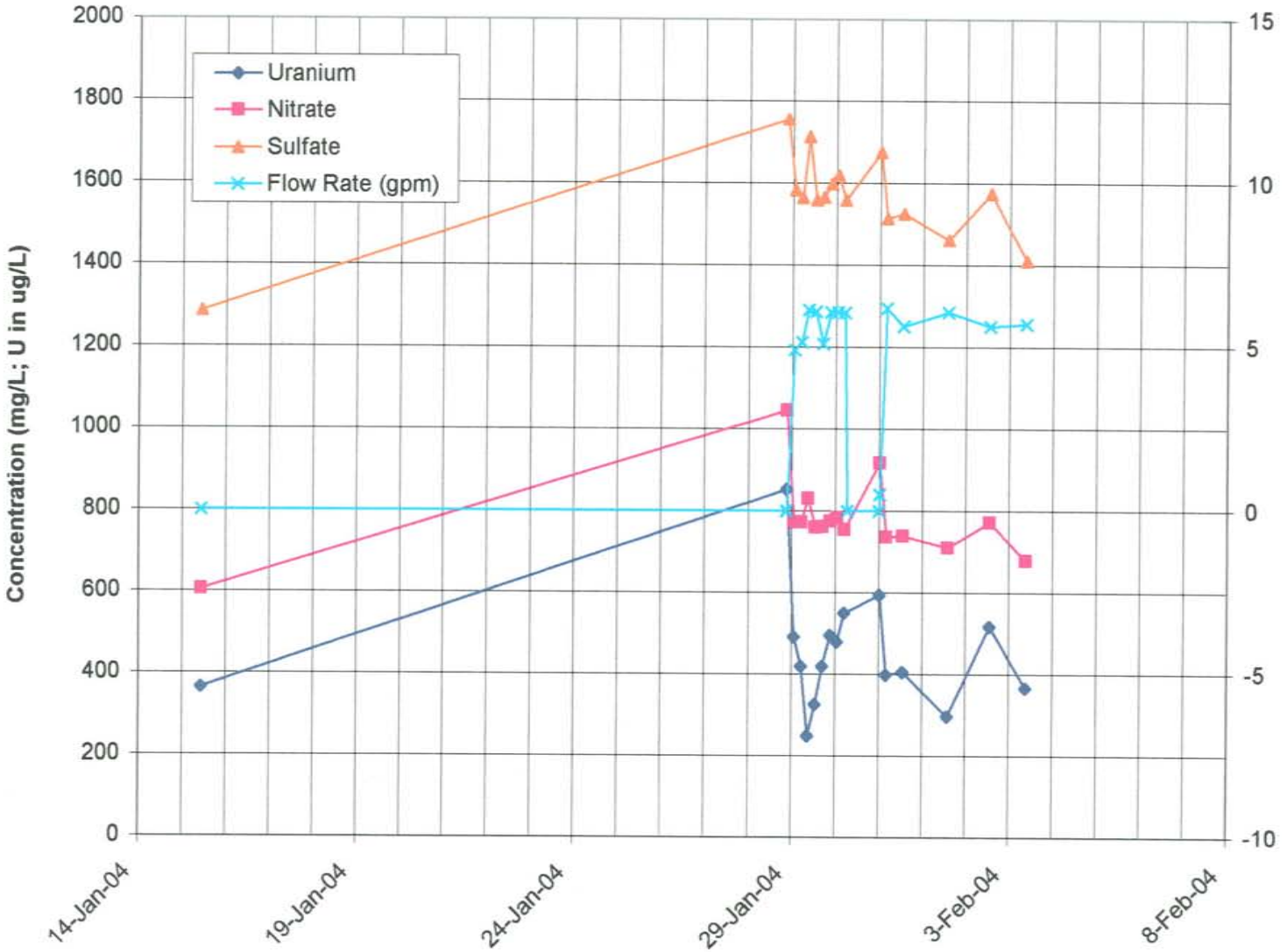
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1101												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:21	1/15/04 10:21 AM	6.67	3400	306	78.9	494.6	1212.8	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:16	1/28/04 9:16 PM	6.89	3460	344	82	504	1287	39	39	0.00
8	2	01/29/04	1:22	1/29/04 1:22 AM	6.63	3270	292	73	442	1171	824	863	3.35
9	3	01/29/04	5:08	1/29/04 5:08 AM	6.68	3330	293	75	457	1215	788	1,651	3.49
10	4	01/29/04	9:20	1/29/04 9:20 AM	6.68	3390	206	79	498	1307	1075	2,726	4.27
11	5	01/29/04	13:04	1/29/04 1:04 PM	6.74	3380	232	77	491	1261	954	3,680	4.26
12	6	01/29/04	17:04	1/29/04 5:04 PM	6.67	3390	306	79	506	1288	847	4,527	3.53
13	7	01/29/04	21:20	1/29/04 9:20 PM	6.63	3400	289	79	517	1306	1090	5,617	4.26
14	8	01/30/04	1:08	1/30/04 1:08 AM	6.63	3420	332	81	530	1335	972	6,589	4.26
15	9	01/30/04	5:06	1/30/04 5:06 AM	6.62	3460	356	87	523	1310	1016	7,605	4.27
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:14	1/31/04 12:14 AM	6.73	3350	214	80	514	1311	384	7,989	0.33
19	11	01/31/04	4:02	1/31/04 4:02 AM	6.65	3450	214	80	509	1269	968	8,957	4.25
20	12	01/31/04	13:12	1/31/04 1:12 PM	6.60	3460	310	80	517	1273	2165	11,122	3.94
21	13	02/01/04	13:57	2/1/04 1:57 PM	6.09	3510	325	83	540	1317	6379	17,501	4.30
22	14	02/02/04	13:09	2/2/04 1:09 PM	6.70	3510	315	83	540	1315	5576	23,077	4.01
23	15	02/03/04	9:08	2/3/04 9:08 AM	6.74	3500	330	82	521	1277	4865	27,942	4.06
24													
25													
26		start time	stop time										
27		1/28/04 9:07 PM	1/29/04 12:19 AM										
28		1/29/04 1:14 AM	1/29/04 3:12 AM										
29		1/29/04 3:53 AM	1/29/04 2:09 PM										
30		1/29/04 2:50 PM	1/30/04 6:28 AM										
31		1/31/04 12:07 AM	1/31/04 4:56 AM										
32		1/31/04 5:38 AM	2/2/04 5:03 AM										
33		2/2/04 5:39 AM	2/2/04 12:18 PM										
34		2/2/04 12:58 PM	2/2/04 10:13 PM										
35		2/2/04 10:55 PM	2/3/04 10:48 AM										

1101


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
1600
1400
1200
1000
800
600
400
200
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

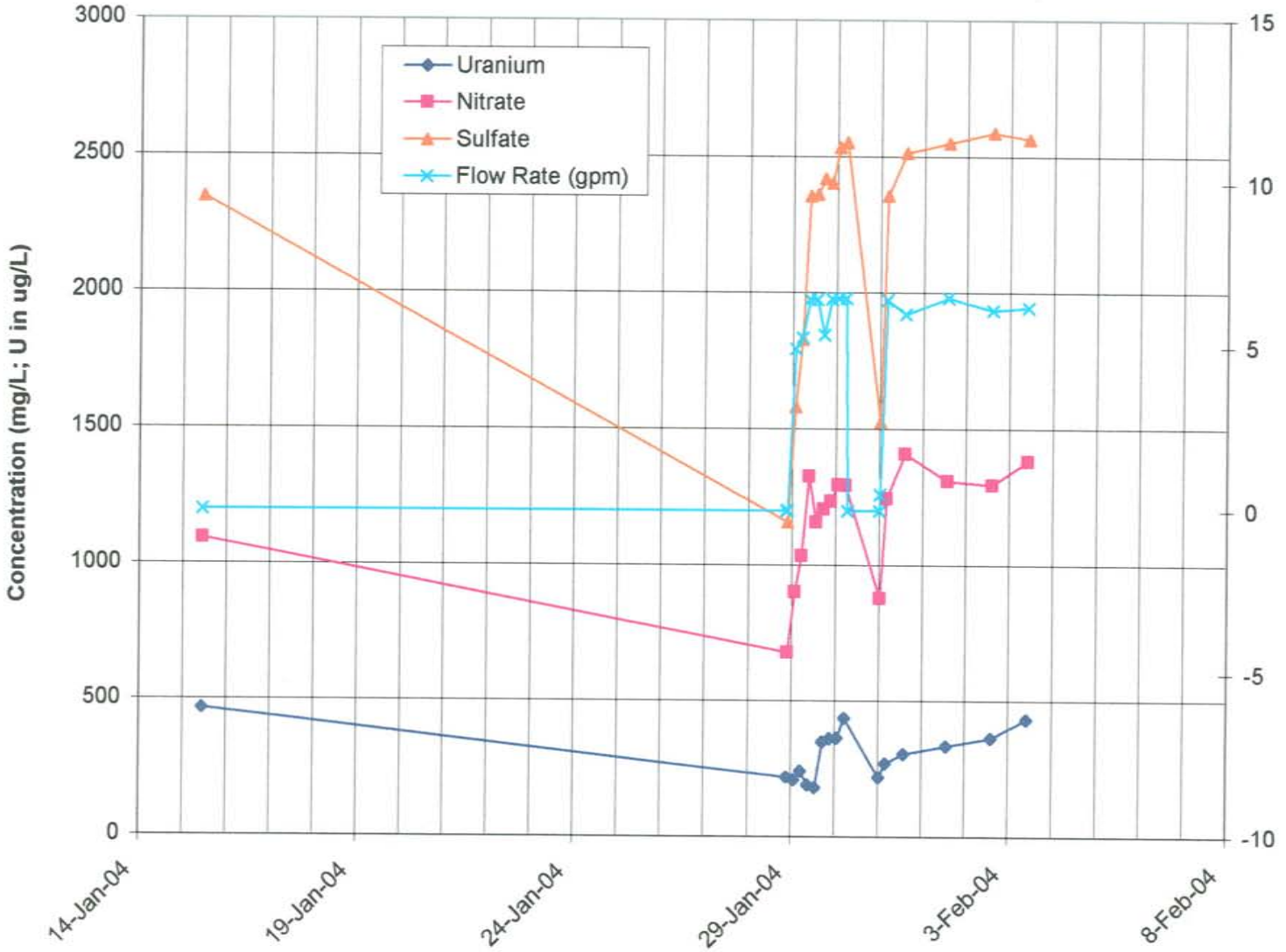
Well 1102												
Round #	Date	Time	Sample Collect Time	pH	Cond.	U (ug/L)	Cl (mg/L)	No3 (mg/L)	S04 (mg/L)	Gal prior to Sample	Cum gal	Flow Rate (GPM)
Baseline	01/15/2004	10:24	1/15/04 10:24 AM	6.64	3600	366	79.3	606.1	1286.8	NA	0	0
start pump			1/28/04 9:07 PM									0
1	01/28/04	21:21	1/28/04 9:21 PM	6.71	4780	852	127	1046	1756	96	96	0.00
2	01/29/04	1:24	1/29/04 1:24 AM	6.52	4270	491	91	773	1584	1196	1,292	4.92
3	01/29/04	5:11	1/29/04 5:11 AM	6.58	4190	420	91	773	1564	1170	2,462	5.15
4	01/29/04	9:04	1/29/04 9:04 AM	6.60	4160	248	96	831	1713	1430	3,892	6.14
5	01/29/04	13:06	1/29/04 1:06 PM	6.73	4110	326	89	760	1559	1472	5,364	6.08
6	01/29/04	17:06	1/29/04 5:06 PM	6.58	4090	420	89	761	1565	1225	6,589	5.10
7	01/29/04	21:18	1/29/04 9:18 PM	6.56	4080	495	91	775	1598	1530	8,119	6.07
8	01/30/04	1:09	1/30/04 1:09 AM	6.55	4050	478	92	783	1620	1401	9,520	6.06
9	01/30/04	5:03	1/30/04 5:03 AM	6.55	4030	551	89	754	1559	1417	10,937	6.06
stop pump			1/30/04 6:28 AM									0.00
start pump			1/31/04 12:07 AM									0.00
10	01/31/04	0:16	1/31/04 12:16 AM	6.66	4310	594	104	917	1676	580	11,517	0.50
11	01/31/04	4:04	1/31/04 4:04 AM	6.58	4070	399	89	737	1515	1412	12,929	6.19
12	01/31/04	13:14	1/31/04 1:14 PM	6.55	3960	405	91	740	1525	3105	16,034	5.65
13	02/01/04	13:55	2/1/04 1:55 PM	6.58	3850	297	87	710	1462	8984	25,018	6.07
14	02/02/04	13:12	2/2/04 1:12 PM	6.62	4150	517	92	773	1575	7869	32,887	5.63
15	02/03/04	9:10	2/3/04 9:10 AM	6.61	3800	367	86	679	1411	6835	39,722	5.71

1102


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
15
10
5
0
-5
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

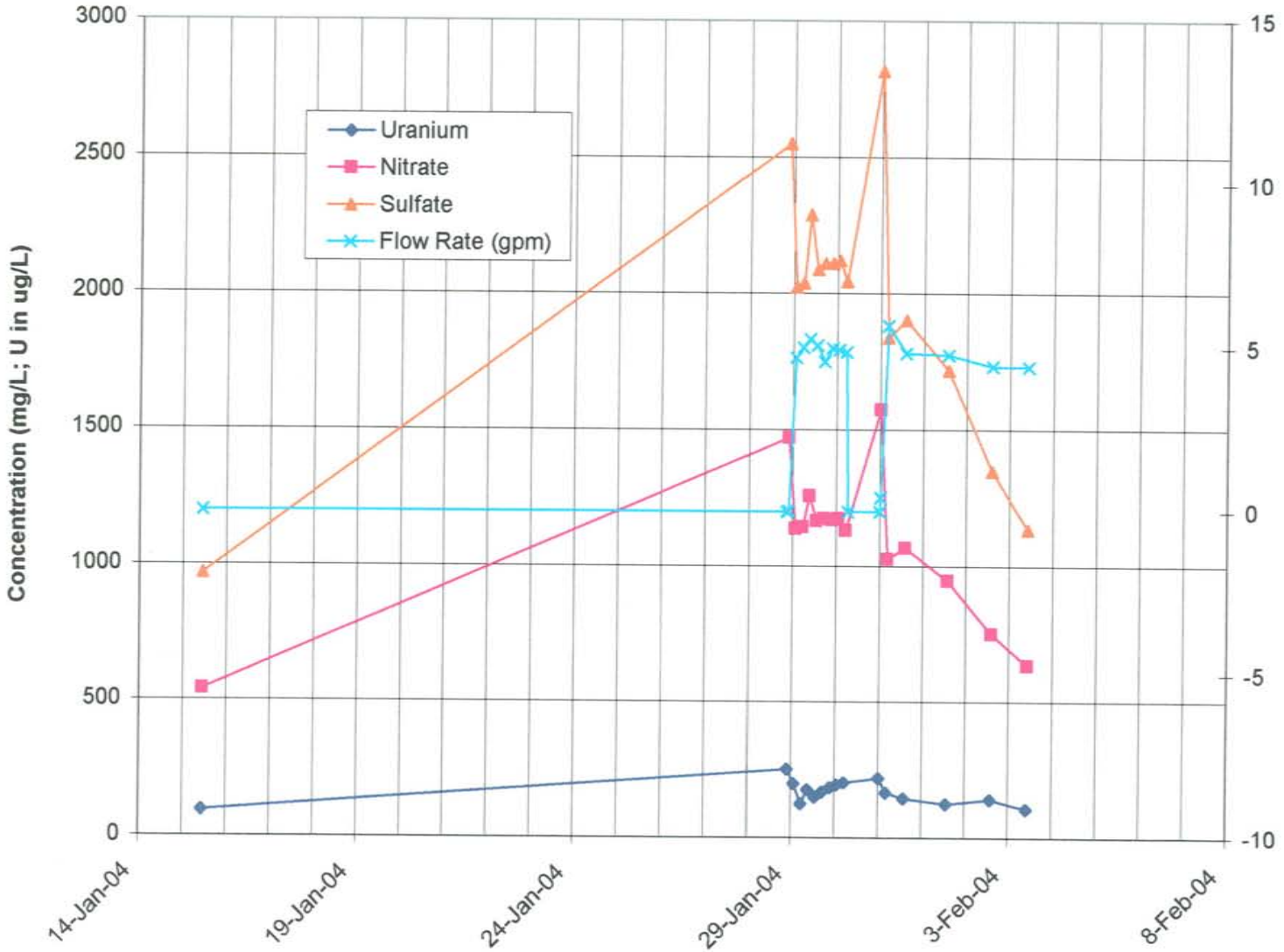
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1103												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:40	1/15/04 10:40 AM	6.61	6210	468	138.4	1094.4	2345.2	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:38	1/28/04 9:38 PM	6.60	3680	220	852	679	1159	203	203	0.01
8	2	01/29/04	1:30	1/29/04 1:30 AM	6.46	4590	210	96	903	1581	1149	1,352	4.95
9	3	01/29/04	5:17	1/29/04 5:17 AM	6.51	5050	242	105	1034	1829	1200	2,552	5.29
10	4	01/29/04	9:11	1/29/04 9:11 AM	6.50	5410	191	134	1327	2355	1511	4,063	6.46
11	5	01/29/04	13:16	1/29/04 1:16 PM	6.49	5600	180	118	1159	2361	1585	5,648	6.47
12	6	01/29/04	17:17	1/29/04 5:17 PM	6.49	5740	349	123	1207	2419	1297	6,945	5.38
13	7	01/29/04	21:28	1/29/04 9:28 PM	6.45	5910	363	137	1236	2403	1628	8,573	6.49
14	8	01/30/04	1:16	1/30/04 1:16 AM	6.44	6050	365	144	1296	2532	1481	10,054	6.50
15	9	01/30/04	5:14	1/30/04 5:14 AM	6.44	6170	437	133	1294	2551	1546	11,600	6.50
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:22	1/31/04 12:22 AM	6.57	4160	219	94	879	1525	583	12,183	0.51
19	11	01/31/04	4:09	1/31/04 4:09 AM	6.46	6090	272	129	1245	2357	1463	13,646	6.44
20	12	01/31/04	14:12	1/31/04 2:12 PM	6.67	6260	307	151	1408	2514	3629	17,275	6.02
21	13	02/01/04	13:43	2/1/04 1:43 PM	6.46	6380	336	141	1310	2549	9203	26,478	6.52
22	14	02/02/04	14:12	2/2/04 2:12 PM	6.58	6390	365	139	1295	2587	9017	35,495	6.14
23	15	02/03/04	10:04	2/3/04 10:04 AM	6.56	6410	432	154	1382	2563	7411	42,906	6.22

1103


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
3000
2500
2000
1500
1000
500
0
15
10
5
0
-5
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

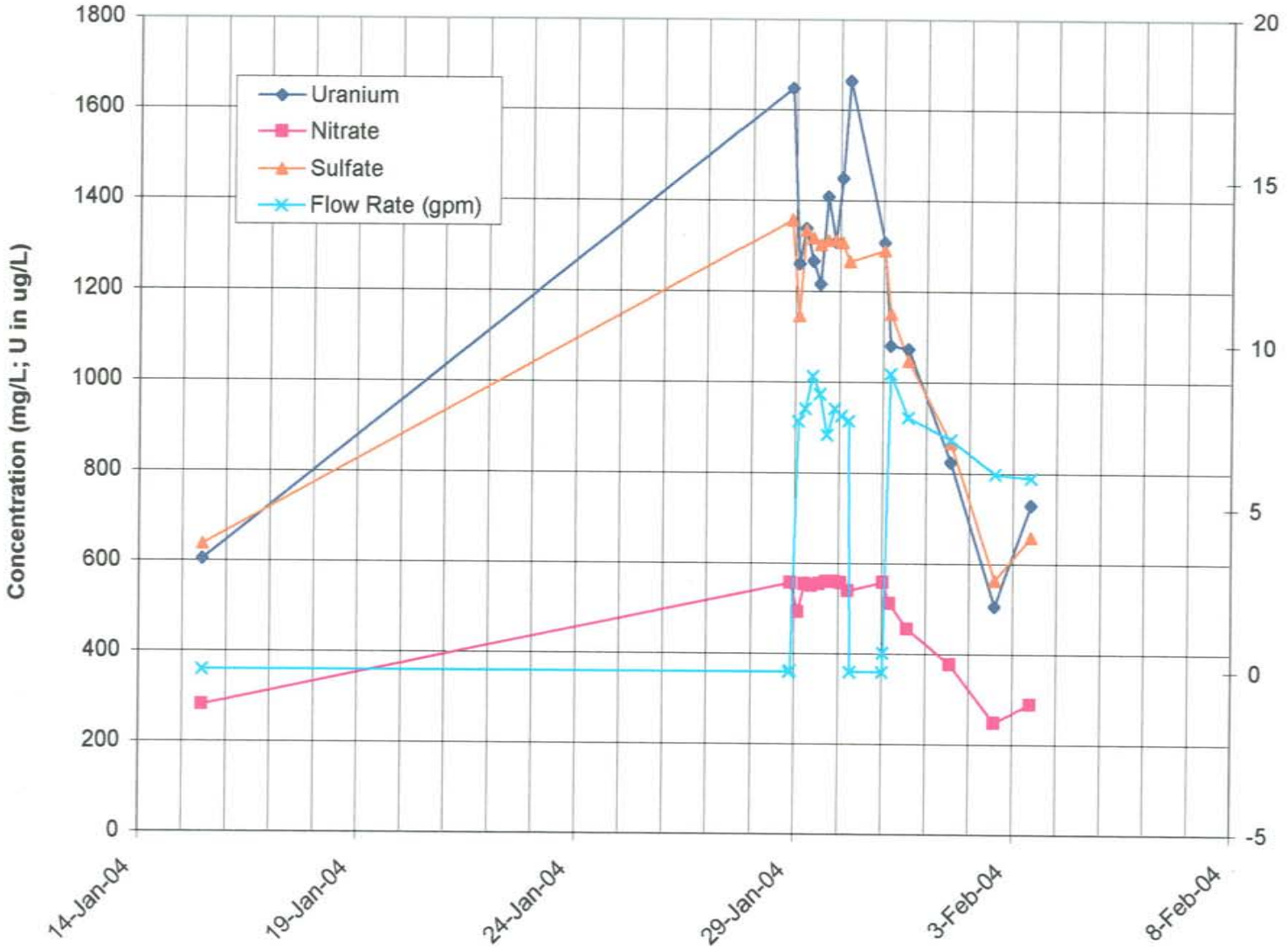
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1104												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:43	1/15/04 10:43 AM	6.72	3220	96.2	81.3	542	969.1	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:52	1/28/04 9:52 PM	6.56	7110	252	188	1471	2549	336	336	0.02
8	2	01/29/04	1:42	1/29/04 1:42 AM	6.46	5930	198	149	1137	2023	1082	1,418	4.70
9	3	01/29/04	5:28	1/29/04 5:28 AM	6.54	5800	124	150	1145	2038	1134	2,552	5.02
10	4	01/29/04	9:19	1/29/04 9:19 AM	6.55	5870	176	162	1258	2288	1219	3,771	5.28
11	5	01/29/04	13:27	1/29/04 1:27 PM	6.53	5810	150	152	1167	2088	1262	5,033	5.09
12	6	01/29/04	17:25	1/29/04 5:25 PM	6.55	5780	167	154	1176	2110	1090	6,123	4.58
13	7	01/29/04	21:40	1/29/04 9:40 PM	6.48	5740	185	154	1172	2111	1274	7,397	5.00
14	8	01/30/04	1:26	1/30/04 1:26 AM	6.49	5690	195	156	1176	2121	1117	8,514	4.94
15	9	01/30/04	5:24	1/30/04 5:24 AM	6.53	5640	202	151	1132	2044	1162	9,676	4.88
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:31	1/31/04 12:31 AM	6.52	7190	220	199	1575	2816	496	10,172	0.43
19	11	01/31/04	4:18	1/31/04 4:18 AM	6.57	5280	166	142	1027	1840	1293	11,465	5.70
20	12	01/31/04	14:09	1/31/04 2:09 PM	6.43	5440	145	147	1067	1904	2860	14,325	4.84
21	13	02/01/04	13:40	2/1/04 1:40 PM	6.57	4930	125	135	948	1720	6756	21,081	4.79
22	14	02/02/04	14:09	2/2/04 2:09 PM	6.67	4090	141	116	751	1350	6543	27,624	4.45
23	15	02/03/04	10:02	2/3/04 10:02 AM	6.67	3630	105	107	635	1136	5295	32,919	4.44

1104


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
3000
2500
2000
1500
1000
500
0
15
10
5
0
-5
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

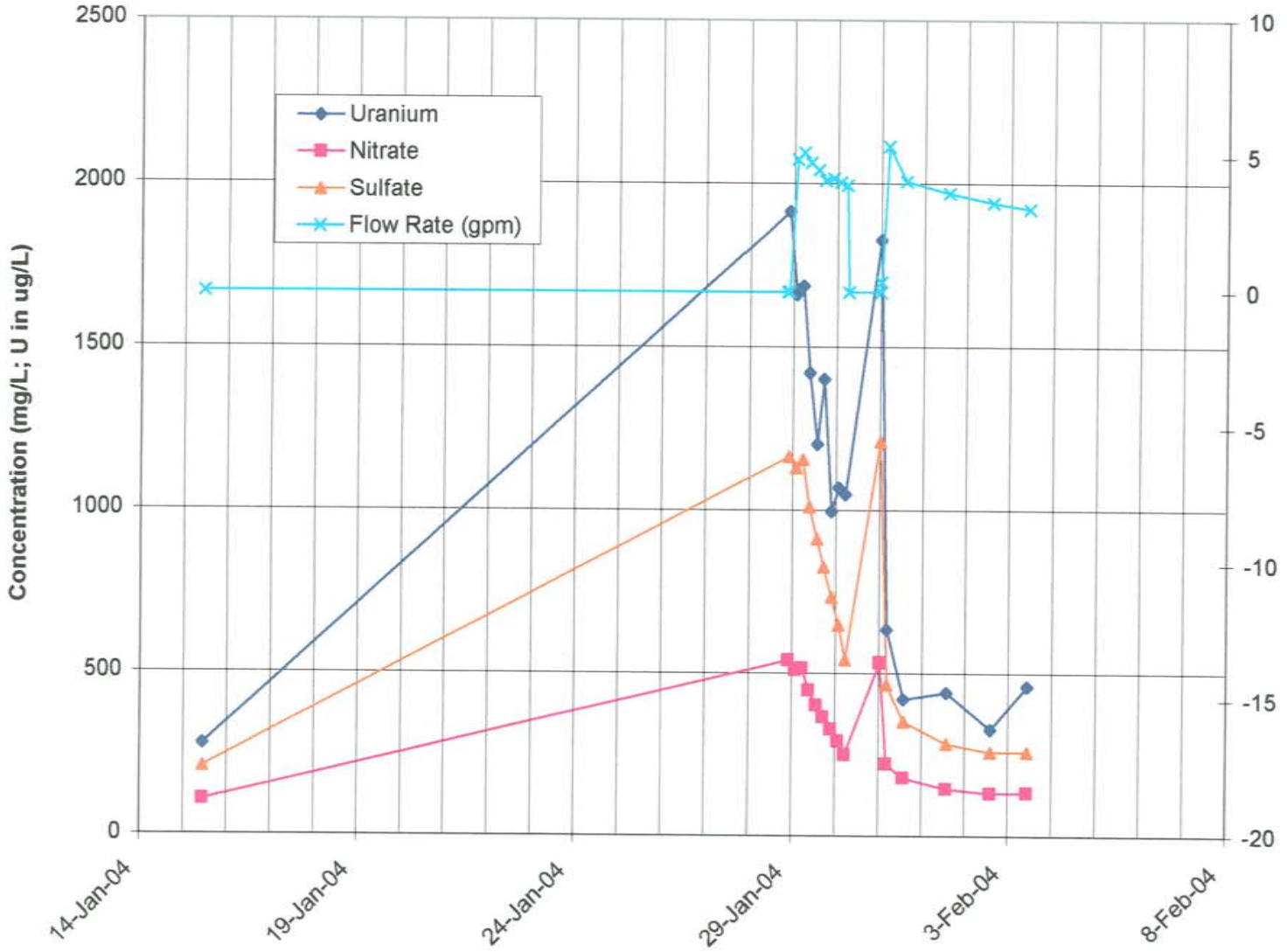
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1105												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:46	1/15/04 10:46 AM	6.99	2120	604	45.8	282.3	638.2	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:54	1/28/04 9:54 PM	6.78	3790	1648	88	557	1358	517	517	0.03
8	2	01/29/04	1:44	1/29/04 1:44 AM	6.68	3440	1261	77	493	1147	1767	2,284	7.68
9	3	01/29/04	5:31	1/29/04 5:31 AM	6.74	3760	1339	84	555	1336	1837	4,121	8.09
10	4	01/29/04	9:21	1/29/04 9:21 AM	6.74	3700	1268	83	551	1318	2090	6,211	9.09
11	5	01/29/04	13:29	1/29/04 1:29 PM	6.74	3660	1217	83	555	1303	2115	8,326	8.53
12	6	01/29/04	17:30	1/29/04 5:30 PM	6.71	3630	1409	84	560	1314	1754	10,080	7.28
13	7	01/29/04	21:42	1/29/04 9:42 PM	6.68	3590	1310	84	560	1314	2037	12,117	8.08
14	8	01/30/04	1:28	1/30/04 1:28 AM	6.69	3550	1450	84	557	1308	1777	13,894	7.86
15	9	01/30/04	5:26	1/30/04 5:26 AM	6.68	3480	1665	82	540	1266	1834	15,728	7.71
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:32	1/31/04 12:32 AM	6.78	3560	1308	85	559	1291	671	16,399	0.59
19	11	01/31/04	4:20	1/31/04 4:20 AM	6.73	3380	1081	79	513	1152	2087	18,486	9.15
20	12	01/31/04	14:02	1/31/04 2:02 PM	6.65	3110	1074	72	455	1048	4549	23,035	7.82
21	13	02/01/04	13:37	2/1/04 1:37 PM	6.80	2630	824	63	377	867	10111	33,146	7.15
22	14	02/02/04	14:07	2/2/04 2:07 PM	6.81	1901	507	57	248	563	8940	42,086	6.08
23	15	02/03/04	10:00	2/3/04 10:00 AM	6.79	2200	730	54	289	659	7123	49,209	5.97

1105


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
1800
1600
1400
1200
1000
800
600
400
200
0
20
15
10
5
0
-5
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

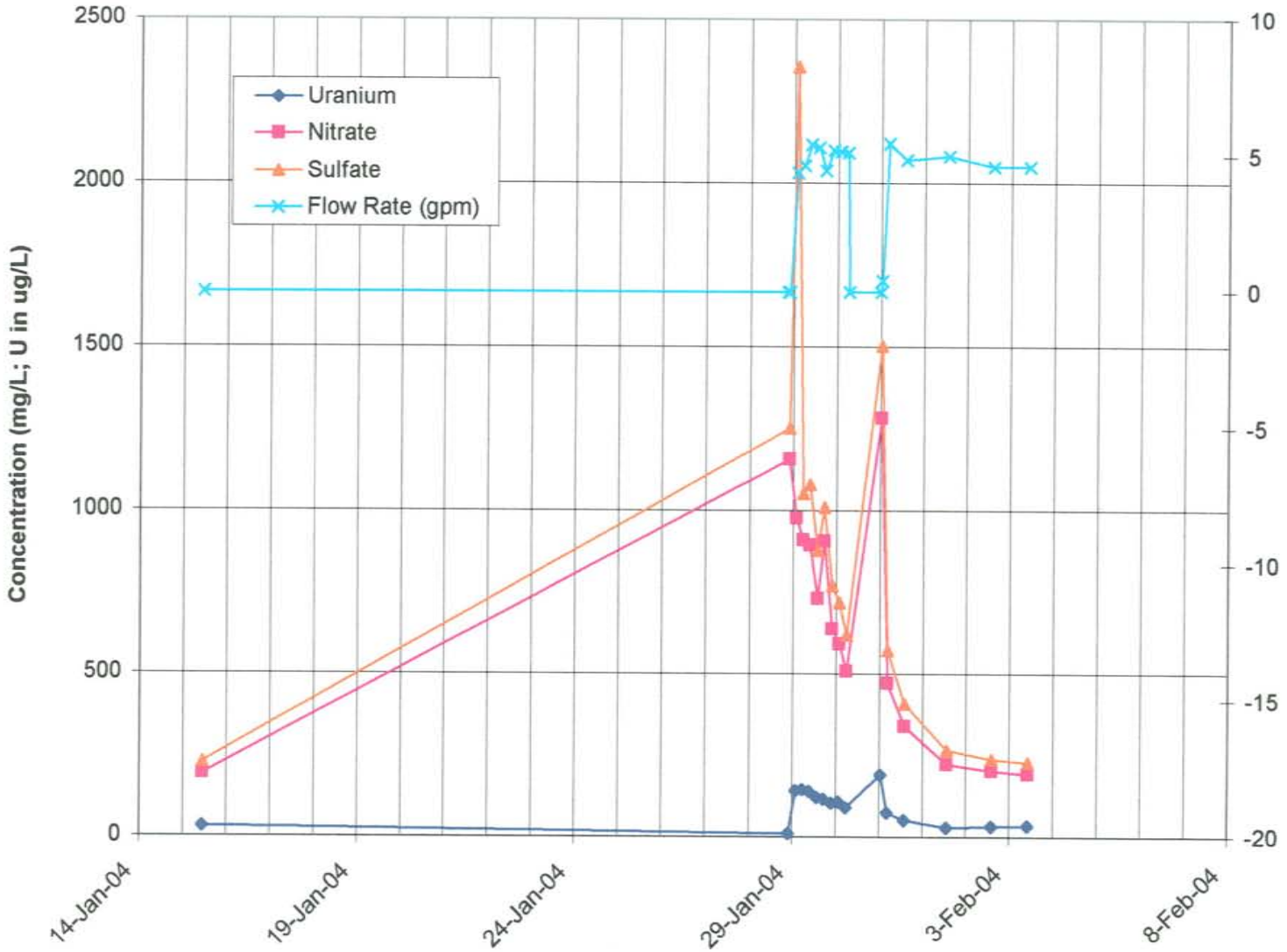
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1106												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:48	1/15/04 10:48 AM	7.16	924	279	21.1	106.1	210.5	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:57	1/28/04 9:57 PM	6.90	3540	1914	80	539	1164	358	358	0.02
8	2	01/29/04	1:46	1/29/04 1:46 AM	6.81	3440	1660	74	511	1129	1119	1,477	4.89
9	3	01/29/04	5:33	1/29/04 5:33 AM	6.88	3450	1687	75	516	1155	1166	2,643	5.14
10	4	01/29/04	9:23	1/29/04 9:23 AM	6.86	3130	1421	68	449	1011	1094	3,737	4.76
11	5	01/29/04	13:32	1/29/04 1:32 PM	6.91	2840	1202	63	402	912	1119	4,856	4.49
12	6	01/29/04	17:27	1/29/04 5:27 PM	6.91	2600	1401	59	366	826	966	5,822	4.11
13	7	01/29/04	21:45	1/29/04 9:45 PM	6.90	2320	996	55	327	735	1078	6,900	4.18
14	8	01/30/04	1:30	1/30/04 1:30 AM	6.90	2100	1069	52	291	648	909	7,809	4.04
15	9	01/30/04	5:28	1/30/04 5:28 AM	6.81	1872	1048	55	250	541	937	8,746	3.94
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:34	1/31/04 12:34 AM	6.94	3450	1828	79	533	1210	431	9,177	0.38
19	11	01/31/04	4:21	1/31/04 4:21 AM	6.94	1713	635	~~138~~ 38	222	465	1218	10,395	5.37
20	12	01/31/04	13:58	1/31/04 1:58 PM	6.80	1325	421	32	180	352	2350	12,745	4.07
21	13	02/01/04	13:35	2/1/04 1:35 PM	6.94	1134	442	25	145	285	5169	17,914	3.65
22	14	02/02/04	14:05	2/2/04 2:05 PM	7.00	1042	327	24	131	258	4839	22,753	3.29
23	15	02/03/04	10:23	2/3/04 10:23 AM	6.97	1114	460	26	132	259	3750	26,503	3.08

1106

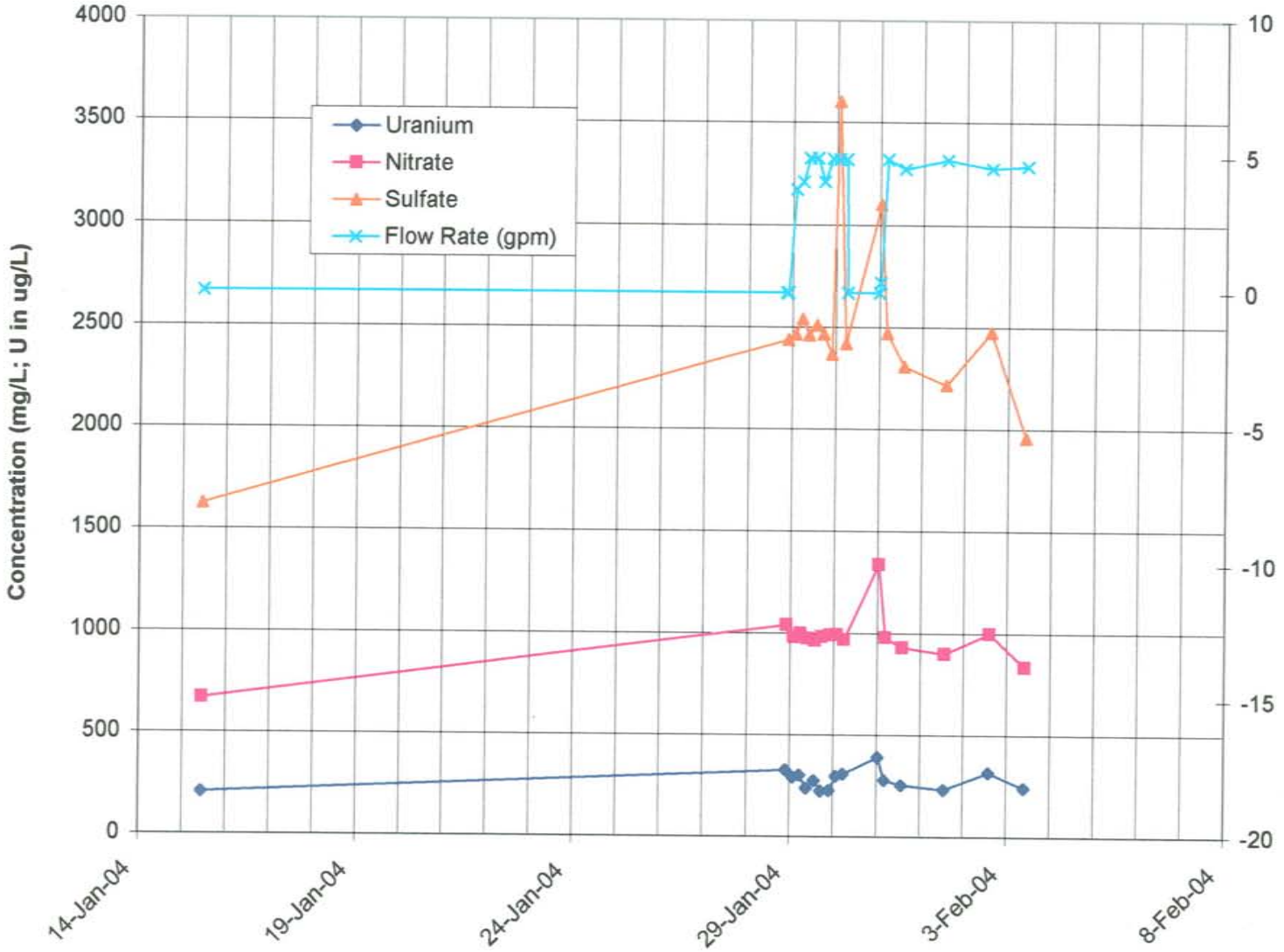

Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
2500
2000
1500
1000
500
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1107												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:50	1/15/04 10:50 AM	6.95	1183	31.8	28.3	193.7	228.9	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:00	1/28/04 10:00 PM	6.53	4710	10	108	1157	1252	326	326	0.02
8	2	01/29/04	1:48	1/29/04 1:48 AM	6.50	3930	141	96	978	2355	996	1,322	4.37
9	3	01/29/04	5:35	1/29/04 5:35 AM	6.56	4020	145	92	911	1051	1054	2,376	4.64
10	4	01/29/04	9:25	1/29/04 9:25 AM	6.58	3870	140	92	894	1079	1243	3,619	5.40
11	5	01/29/04	13:33	1/29/04 1:33 PM	6.61	3450	120	80	731	878	1314	4,933	5.30
12	6	01/29/04	17:25	1/29/04 5:25 PM	6.59	3250	115	77	907	1011	1032	5,965	4.45
13	7	01/29/04	21:46	1/29/04 9:46 PM	6.60	3000	103	73	638	771	1359	7,324	5.21
14	8	01/30/04	1:32	1/30/04 1:32 AM	6.63	2810	107	70	591	719	1165	8,489	5.15
15	9	01/30/04	5:29	1/30/04 5:29 AM	6.67	2550	89	64	509	619	1211	9,700	5.11
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:36	1/31/04 12:36 AM	6.52	5140	192	124	1283	1503	480	10,180	0.42
19	11	01/31/04	4:23	1/31/04 4:23 AM	6.71	2460	74	61	472	573	1236	11,416	5.44
20	12	01/31/04	13:57	1/31/04 1:57 PM	6.67	1901	52	51	340	409	2788	14,204	4.86
21	13	02/01/04	13:20	2/1/04 1:20 PM	6.87	1303	29	31	225	268	7019	21,223	5.00
22	14	02/02/04	14:03	2/2/04 2:03 PM	6.86	1186	33	28	203	240	6811	28,034	4.59
23	15	02/03/04	9:54	2/3/04 9:54 AM	6.88	1250	34	30	193	230	5467	33,501	4.59

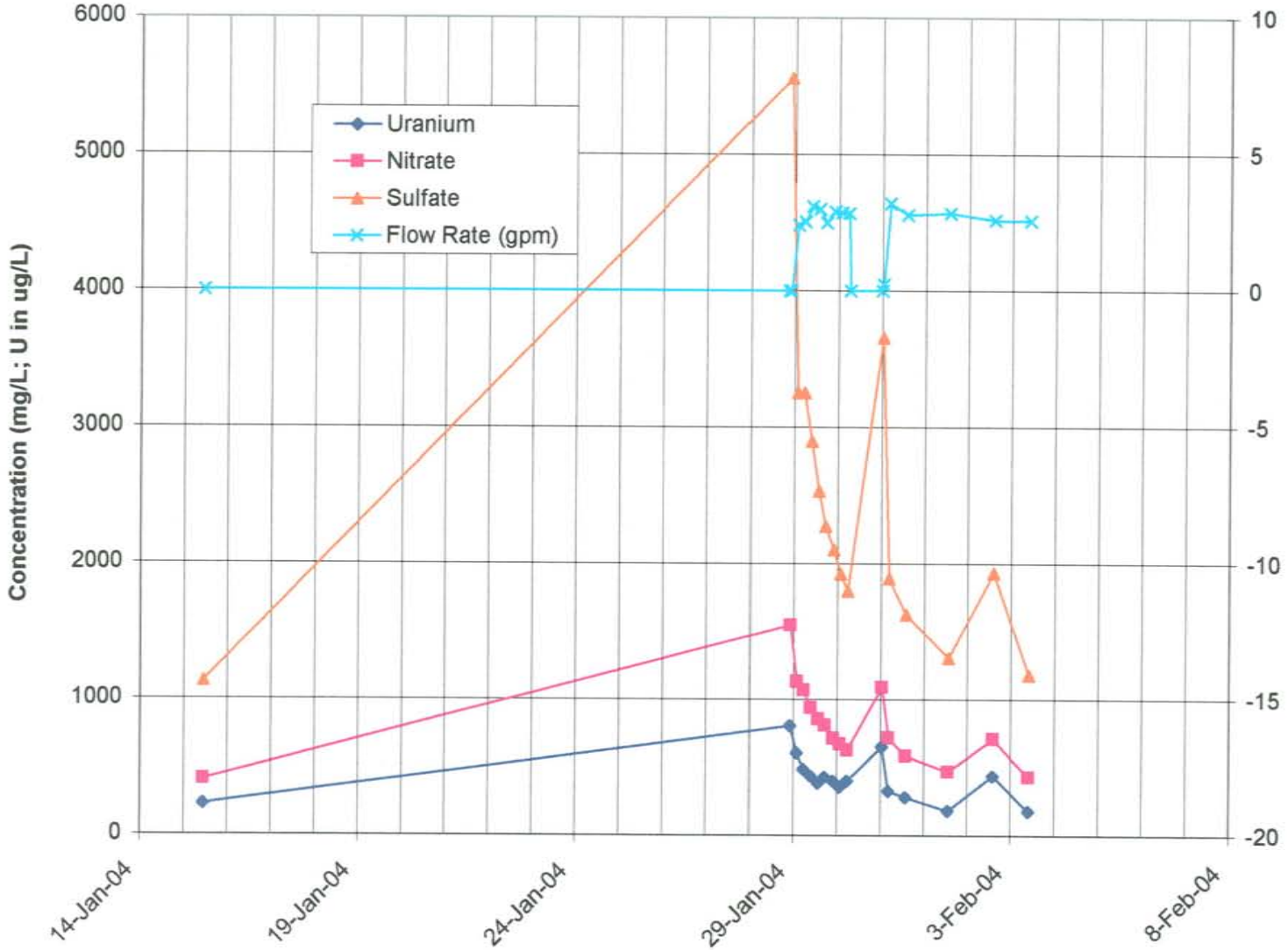
1107


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
2500
2000
1500
1000
500
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1108												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:52	1/15/04 10:52 AM	6.64	4310	206	74.5	670.2	1625.6	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:02	1/28/04 10:02 PM	6.54	5990	329	107	1039	2438	282	282	0.01
8	2	01/29/04	1:50	1/29/04 1:50 AM	6.41	5830	293	96	980	2467	863	1,145	3.79
9	3	01/29/04	5:37	1/29/04 5:37 AM	6.48	5920	304	98	1000	2540	927	2,072	4.08
10	4	01/29/04	9:27	1/29/04 9:27 AM	6.49	5810	236	96	974	2461	1138	3,210	4.95
11	5	01/29/04	13:35	1/29/04 1:35 PM	6.48	5680	275	94	962	2509	1226	4,436	4.94
12	6	01/29/04	17:23	1/29/04 5:23 PM	6.53	5660	223	98	982	2467	929	5,365	4.07
13	7	01/29/04	21:48	1/29/04 9:48 PM	6.44	5570	227	97	989	2366	1304	6,669	4.92
14	8	01/30/04	1:34	1/30/04 1:34 AM	6.46	5520	297	98	993	3604	1111	7,780	4.92
15	9	01/30/04	5:32	1/30/04 5:32 AM	6.48	5500	309	96	967	2420	1167	8,947	4.90
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:37	1/31/04 12:37 AM	6.46	7200	391	129	1338	3101	431	9,378	0.38
19	11	01/31/04	4:25	1/31/04 4:25 AM	6.52	5070	279	99	978	2473	1121	10,499	4.92
20	12	01/31/04	13:55	1/31/04 1:55 PM	6.41	5400	255	96	929	2310	2596	13,095	4.55
21	13	02/01/04	13:22	2/1/04 1:22 PM	6.49	5180	233	92	900	2218	6894	19,989	4.90
22	14	02/02/04	14:00	2/2/04 2:00 PM	6.48	5720	317	100	998	2476	6778	26,767	4.59
23	15	02/03/04	9:52	2/3/04 9:52 AM	6.54	4960	240	89	835	1960	5565	32,332	4.67

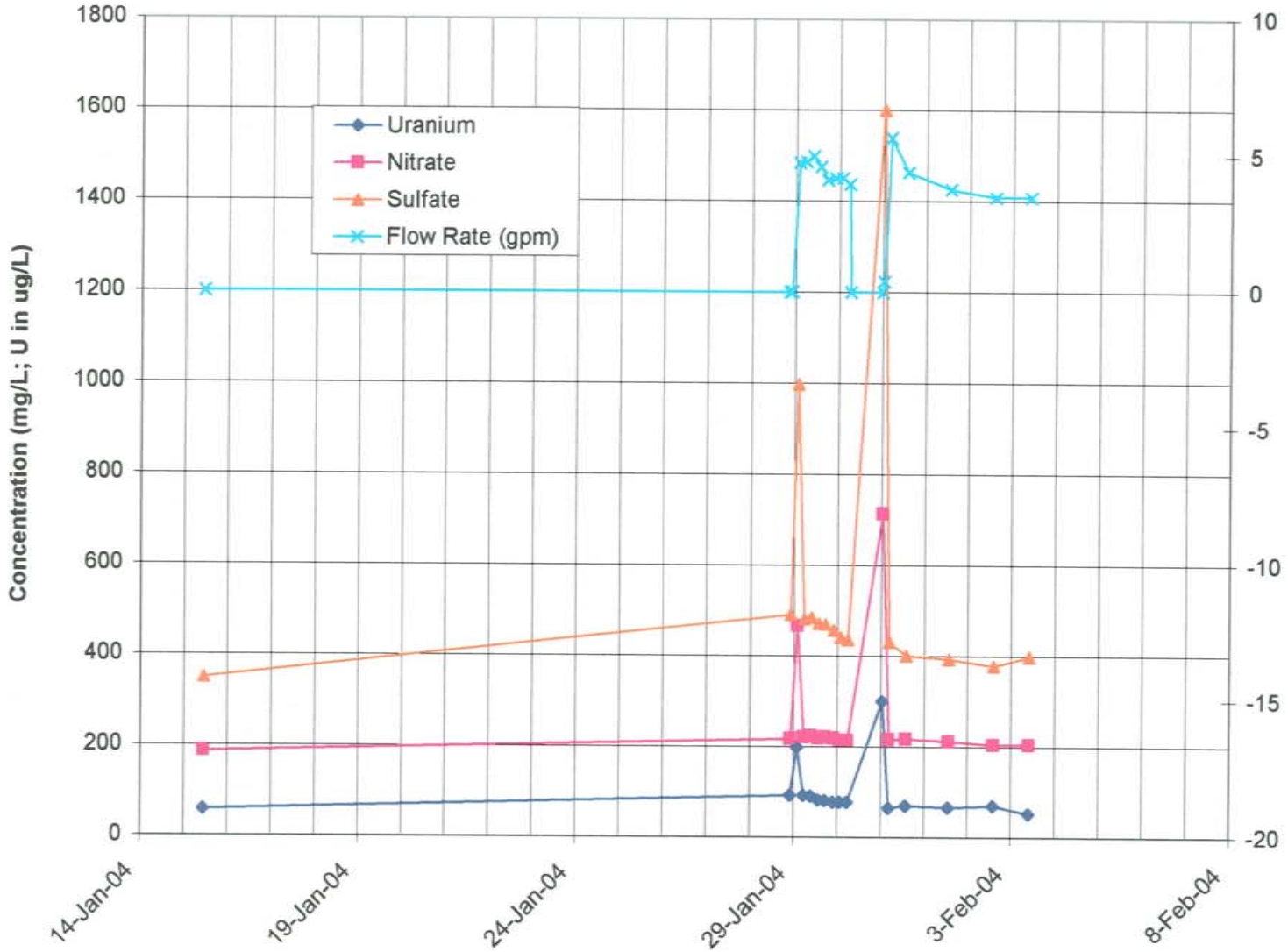

Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
4000
3500
3000
2500
2000
1500
1000
500
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1109												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:54	1/15/04 10:54 AM	6.67	3000	228	50.6	410.9	1135.3	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:05	1/28/04 10:05 PM	6.23	10190	808	145	1548	5556	191	191	0.01
8	2	01/29/04	1:53	1/29/04 1:53 AM	6.30	7050	607	104	1135	3253	547	738	2.40
9	3	01/29/04	5:39	1/29/04 5:39 AM	6.40	6600	487	99	1070	3252	574	1,312	2.54
10	4	01/29/04	9:28	1/29/04 9:28 AM	6.41	6020	437	87	941	2898	706	2,018	3.08
11	5	01/29/04	13:37	1/29/04 1:37 PM	6.50	5460	386	82	855	2532	744	2,762	2.99
12	6	01/29/04	17:20	1/29/04 5:20 PM	6.45	5040	432	77	810	2276	553	3,315	2.48
13	7	01/29/04	21:50	1/29/04 9:50 PM	6.43	4480	402	71	717	2101	784	4,099	2.90
14	8	01/30/04	1:36	1/30/04 1:36 AM	6.45	4190	356	68	676	1924	646	4,745	2.86
15	9	01/30/04	5:33	1/30/04 5:33 AM	6.46	4060	400	65	629	1801	673	5,418	2.84
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:39	1/31/04 12:39 AM	6.36	7290	654	104	1092	3657	267	5,685	0.23
19	11	01/31/04	4:26	1/31/04 4:26 AM	6.47	4460	327	73	718	1892	723	6,408	3.19
20	12	01/31/04	13:53	1/31/04 1:53 PM	6.39	3860	281	63	588	1628	1575	7,983	2.78
21	13	02/01/04	13:20	2/1/04 1:20 PM	6.51	3210	182	54	473	1309	3987	11,970	2.83
22	14	02/02/04	13:58	2/2/04 1:58 PM	6.45	4510	439	71	711	1931	3829	15,799	2.59
23	15	02/03/04	9:50	2/3/04 9:50 AM	6.51	3010	179	53	431	1183	3074	18,873	2.58

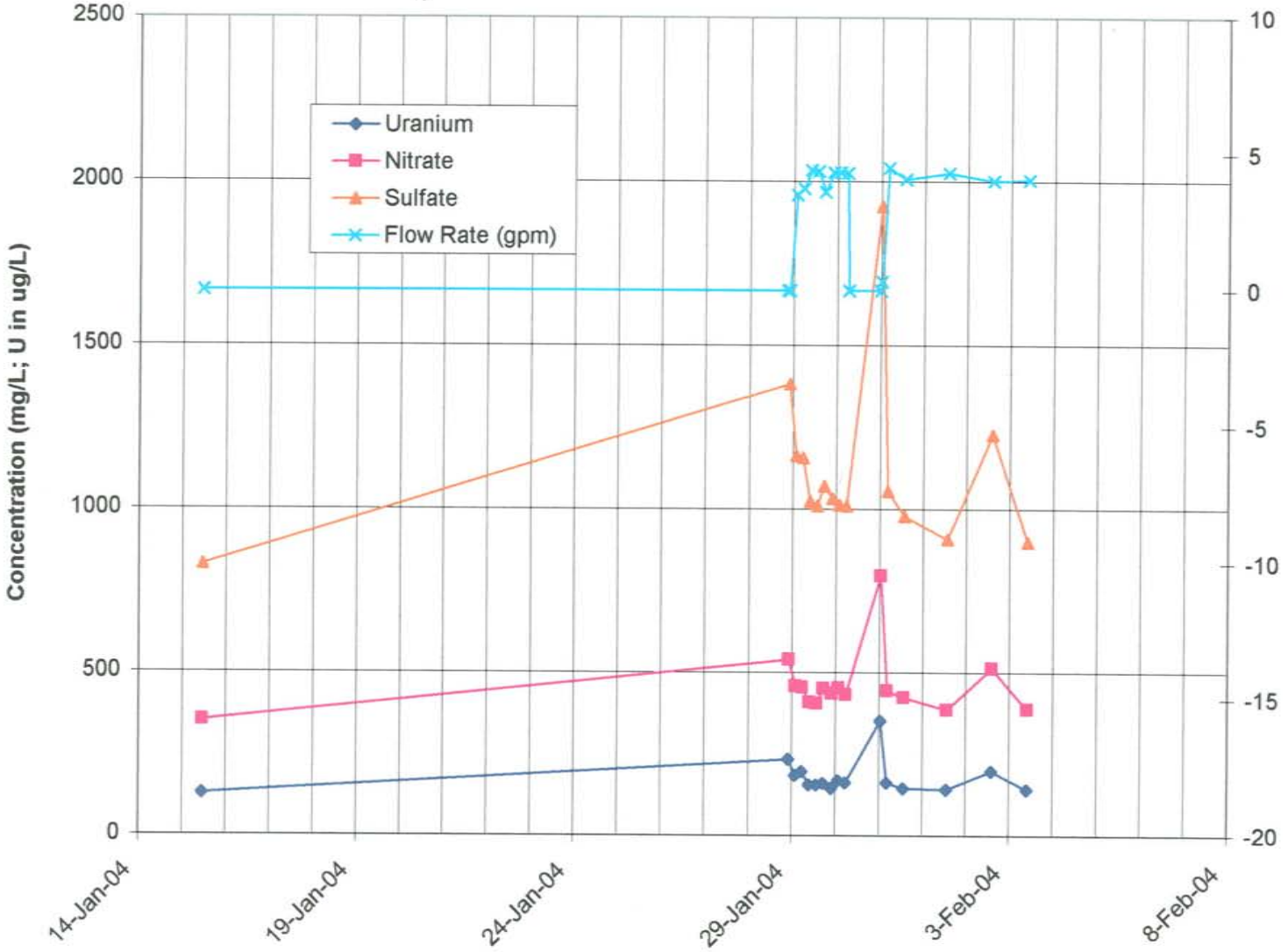

Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
6000
5000
4000
3000
2000
1000
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1110												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:57	1/15/04 10:57 AM	6.84	1327	58.9	24.3	187.1	349.8	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:07	1/28/04 10:07 PM	6.73	1676	92	32	217	491	442	442	0.02
8	2	01/29/04	1:55	1/29/04 1:55 AM	6.56	2960	199	50	467	998	1080	1,522	4.74
9	3	01/29/04	5:41	1/29/04 5:41 AM	6.68	1644	92	29	221	482	1082	2,604	4.79
10	4	01/29/04	9:30	1/29/04 9:30 AM	6.70	1639	91	29	224	485	1145	3,749	5.00
11	5	01/29/04	13:41	1/29/04 1:41 PM	6.78	1609	82	29	219	472	1157	4,906	4.61
12	6	01/29/04	17:19	1/29/04 5:19 PM	6.73	1577	81	30	221	471	894	5,800	4.10
13	7	01/29/04	21:52	1/29/04 9:52 PM	6.72	1520	77	29	218	457	1143	6,943	4.19
14	8	01/30/04	1:38	1/30/04 1:38 AM	6.73	1502	77	29	214	441	948	7,891	4.19
15	9	01/30/04	5:35	1/30/04 5:35 AM	6.76	1477	77	29	214	436	940	8,831	3.97
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:41	1/31/04 12:41 AM	6.57	4190	300	75	714	1600	451	9,282	0.39
19	11	01/31/04	4:28	1/31/04 4:28 AM	6.73	1523	64	30	216	431	1283	10,565	5.65
20	12	01/31/04	13:51	1/31/04 1:51 PM	6.61	1443	69	27	217	401	2479	13,044	4.40
21	13	02/01/04	13:17	2/1/04 1:17 PM	6.71	1444	66	25	212	394	5316	18,360	3.78
22	14	02/02/04	13:55	2/2/04 1:55 PM	6.75	1394	69	25	205	379	5135	23,495	3.47
23	15	02/03/04	9:47	2/3/04 9:47 AM	6.81	1447	52	30	205	398	4160	27,655	3.49

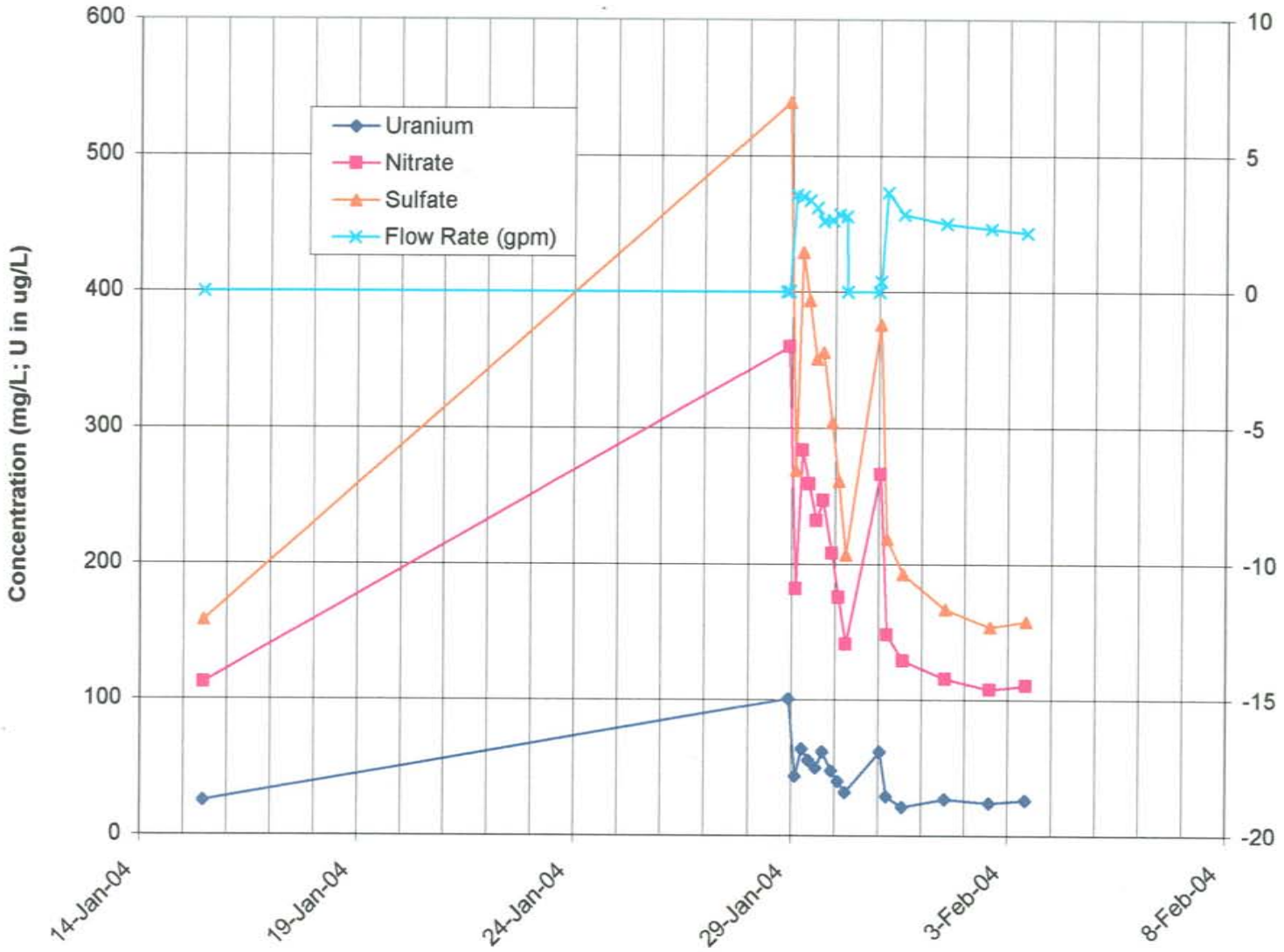
1110


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
1800
1600
1400
1200
1000
800
600
400
200
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

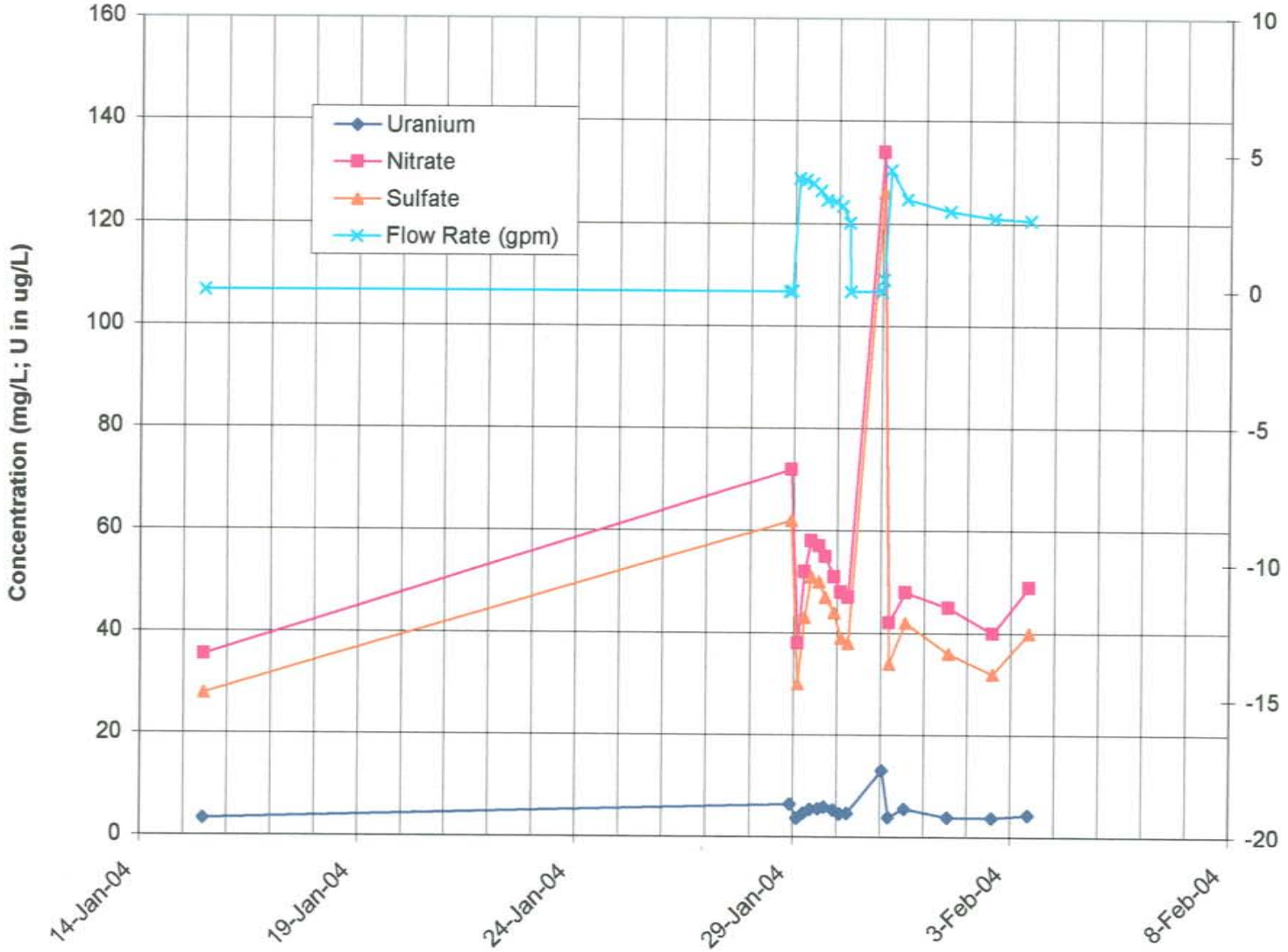
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1111												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:59	1/15/04 10:59 AM	6.76	2520	128	39.5	351.4	828.7	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:09	1/28/04 10:09 PM	6.62	3650	234	63	540	1383	303	303	0.02
8	2	01/29/04	1:57	1/29/04 1:57 AM	6.57	3250	185	53	458	1164	799	1,102	3.50
9	3	01/29/04	5:43	1/29/04 5:43 AM	6.64	3180	196	53	455	1157	844	1,946	3.73
10	4	01/29/04	9:32	1/29/04 9:32 AM	6.64	2920	155	57	408	1024	1012	2,958	4.42
11	5	01/29/04	13:42	1/29/04 1:42 PM	6.65	2860	156	57	405	1011	1091	4,049	4.36
12	6	01/29/04	17:16	1/29/04 5:16 PM	6.60	2920	160	45	451	1071	771	4,820	3.60
13	7	01/29/04	21:53	1/29/04 9:53 PM	6.59	2820	144	45	437	1032	1202	6,022	4.34
14	8	01/30/04	1:40	1/30/04 1:40 AM	6.61	2820	169	46	454	1014	982	7,004	4.33
15	9	01/30/04	5:37	1/30/04 5:37 AM	6.60	2810	162	45	432	1010	1022	8,026	4.31
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:42	1/31/04 12:42 AM	6.52	4940	351	79	796	1925	393	8,419	0.34
19	11	01/31/04	4:30	1/31/04 4:30 AM	6.62	2950	162	46	444	1055	1026	9,445	4.50
20	12	01/31/04	13:48	1/31/04 1:48 PM	6.58	2830	144	44	425	979	2276	11,721	4.08
21	13	02/01/04	13:15	2/1/04 1:15 PM	7.04	2710	142	42	387	908	6072	17,793	4.32
22	14	02/02/04	13:52	2/2/04 1:52 PM	6.65	3290	199	54	513	1227	5939	23,732	4.02
23	15	02/03/04	9:45	2/3/04 9:45 AM	6.68	2640	141	43	388	900	4851	28,583	4.07


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
2500
2000
1500
1000
500
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

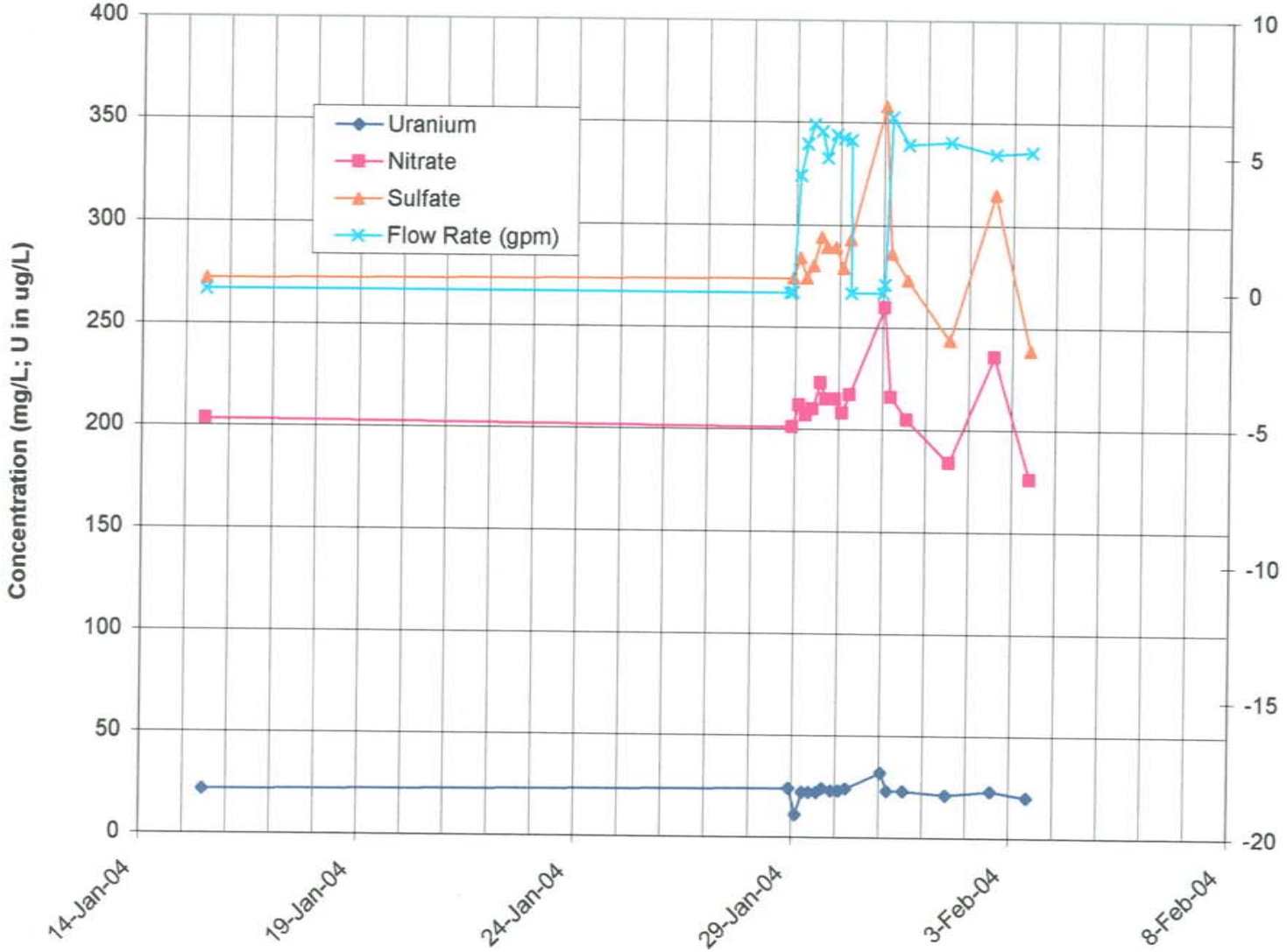
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1112												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:04	1/15/04 11:04 AM	7.22	792	25.1	15.1	112.4	158.3	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:30	1/28/04 10:30 PM	6.82	1980	101	34	360	539	510	510	0.03
8	2	01/29/04	2:16	1/29/04 2:16 AM	6.89	1205	44	27	182	269	807	1,317	3.57
9	3	01/29/04	5:59	1/29/04 5:59 AM	6.90	1627	64	28	284	429	782	2,099	3.51
10	4	01/29/04	9:34	1/29/04 9:34 AM	6.95	1530	56	27	259	394	720	2,819	3.35
11	5	01/29/04	13:45	1/29/04 1:45 PM	7.03	1402	50	26	232	351	777	3,596	3.10
12	6	01/29/04	17:13	1/29/04 5:13 PM	7.01	1388	62	23	247	356	540	4,136	2.60
13	7	01/29/04	22:09	1/29/04 10:09 PM	6.96	1219	48	21	208	304	779	4,915	2.63
14	8	01/30/04	1:56	1/30/04 1:56 AM	7.40	1087	40	20	176	261	644	5,559	2.84
15	9	01/30/04	5:53	1/30/04 5:53 AM	7.05	906	32	18	141	207	659	6,218	2.78
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:58	1/31/04 12:58 AM	7.00	1535	62	26	266	376	431	6,649	0.38
19	11	01/31/04	4:44	1/31/04 4:44 AM	7.18	973	29	18	148	219	826	7,475	3.65
20	12	01/31/04	13:44	1/31/04 1:44 PM	7.06	879	21	17	129	193	1533	9,008	2.84
21	13	02/01/04	13:11	2/1/04 1:11 PM	6.63	809	27	15	116	167	3525	12,533	2.51
22	14	02/02/04	13:46	2/2/04 1:46 PM	7.09	755	24	15	108	154	3442	15,975	2.33
23	15	02/03/04	9:40	2/3/04 9:40 AM	7.07	777	26	15	111	158	2610	18,585	2.19


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
600
500
400
300
200
100
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

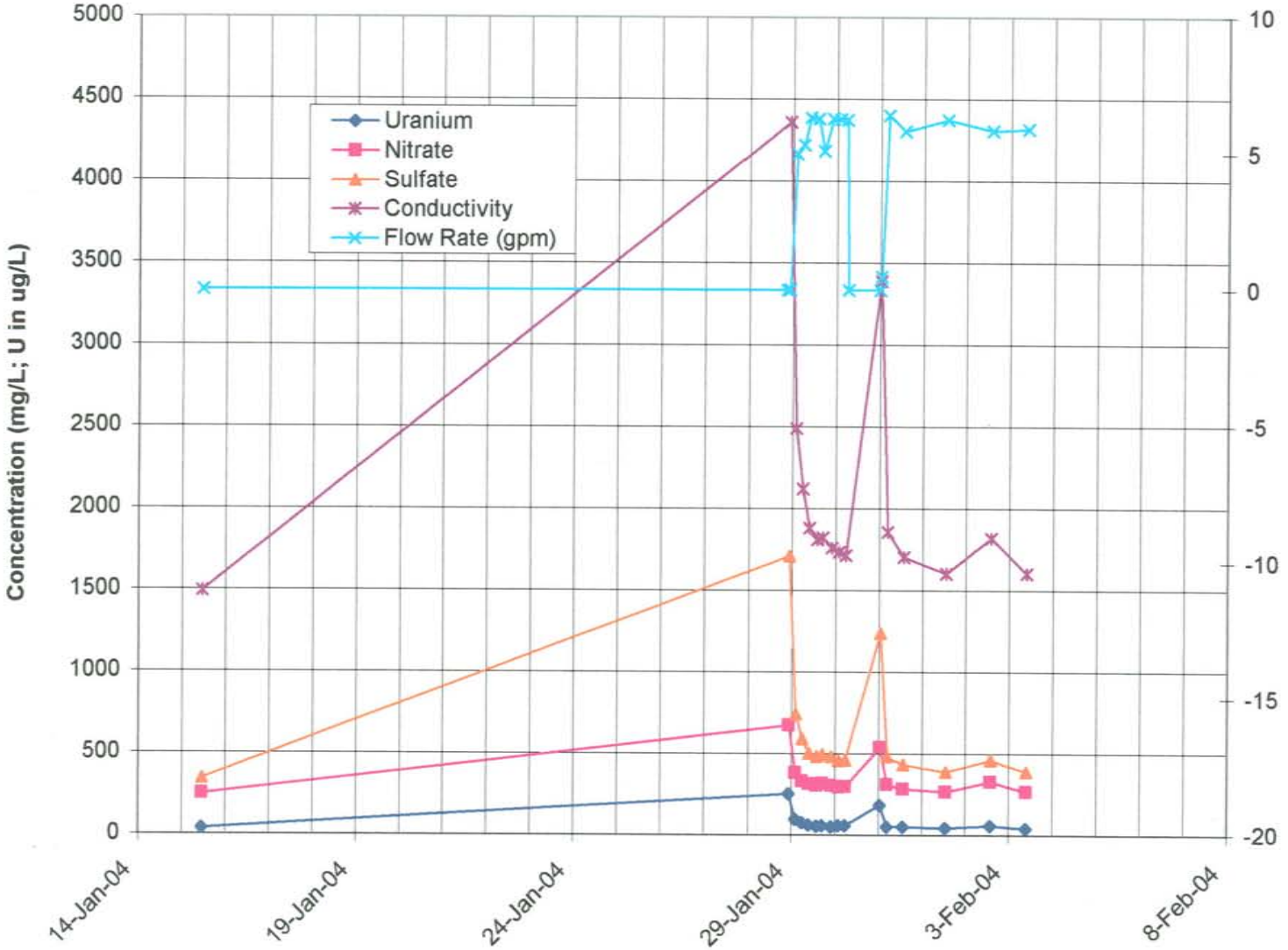
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1113												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:06	1/15/04 11:06 AM	7.95	349	3.3	10.1	35.4	27.9	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:26	1/28/04 10:26 PM	7.57	541	6.4	20	72	62	509	509	0.03
8	2	01/29/04	2:14	1/29/04 2:14 AM	7.75	378	3.6	10	38	30	945	1,454	4.14
9	3	01/29/04	5:57	1/29/04 5:57 AM	7.75	433	4.6	12	52	43	912	2,366	4.09
10	4	01/29/04	9:36	1/29/04 9:36 AM	7.69	462	5.4	12	58	51	869	3,235	3.97
11	5	01/29/04	13:47	1/29/04 1:47 PM	7.75	458	5.5	13	57	50	926	4,161	3.69
12	6	01/29/04	17:10	1/29/04 5:10 PM	7.74	444	5.9	13	55	47	676	4,837	3.33
13	7	01/29/04	22:07	1/29/04 10:07 PM	7.77	425	5.3	13	51	44	982	5,819	3.31
14	8	01/30/04	1:54	1/30/04 1:54 AM	7.78	404	4.5	11	48	39	712	6,531	3.14
15	9	01/30/04	5:50	1/30/04 5:50 AM	7.77	391	4.6	11	47	38	596	7,127	2.53
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:56	1/31/04 12:56 AM	7.52	782	13.1	20	134	126	501	7,628	0.44
19	11	01/31/04	4:42	1/31/04 4:42 AM	7.87	388	3.9	12	42	34	1009	8,637	4.46
20	12	01/31/04	13:43	1/31/04 1:43 PM	7.79	412	5.5	13	48	42	1830	10,467	3.38
21	13	02/01/04	13:26	2/1/04 1:26 PM	7.04	396	3.9	11	45	36	4192	14,659	2.95
22	14	02/02/04	13:42	2/2/04 1:42 PM	7.85	371	3.7	11	40	32	3914	18,573	2.69
23	15	02/03/04	9:38	2/3/04 9:38 AM	7.91	409	4.3	12	49	40	3114	21,687	2.60


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
160
140
120
100
80
60
40
20
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

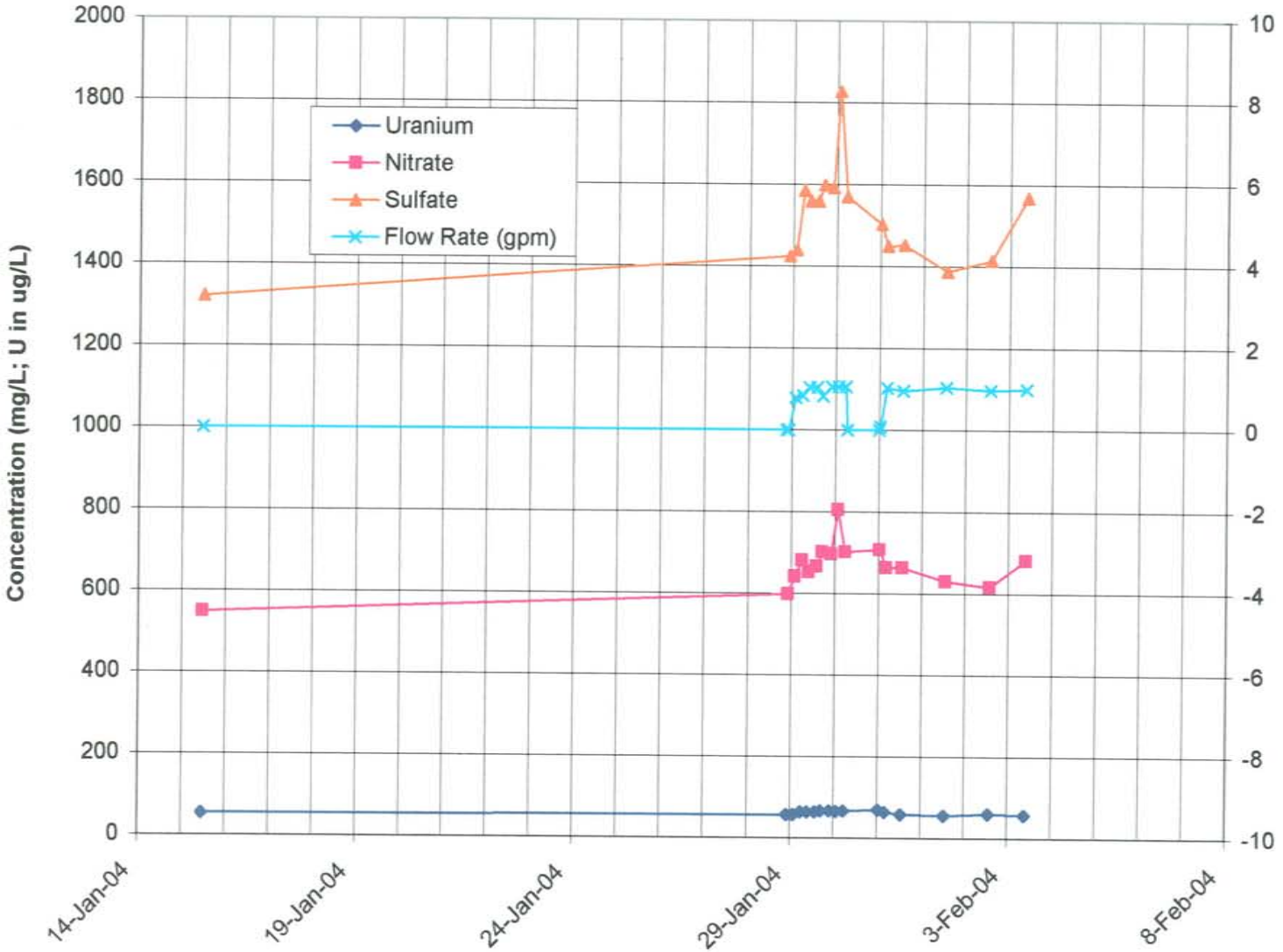
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1114												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:08	1/15/04 11:08 AM	7.20	1265	21.9	23.8	203.3	272	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:25	1/28/04 10:25 PM	7.17	1321	24	25	201	274	562	562	0.03
8	2	01/29/04	2:11	1/29/04 2:11 AM	7.06	1316	11	23	212	284	973	1,535	4.31
9	3	01/29/04	5:55	1/29/04 5:55 AM	7.16	1261	22	22	207	274	1224	2,759	5.46
10	4	01/29/04	9:37	1/29/04 9:37 AM	7.13	1270	22	24	210	280	1371	4,130	6.18
11	5	01/29/04	13:49	1/29/04 1:49 PM	7.13	1264	22	25	223	294	1495	5,625	5.93
12	6	01/29/04	17:09	1/29/04 5:09 PM	7.16	1261	24	23	215	289	991	6,616	4.95
13	7	01/29/04	22:05	1/29/04 10:05 PM	7.11	1247	23	24	215	289	1714	8,330	5.79
14	8	01/30/04	1:52	1/30/04 1:52 AM	7.11	1246	23	23	208	279	1290	9,620	5.68
15	9	01/30/04	5:48	1/30/04 5:48 AM	7.11	1245	24	24	217	293	1326	10,946	5.62
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:54	1/31/04 12:54 AM	7.12	1542	32	28	260	358	363	11,309	0.32
19	11	01/31/04	4:41	1/31/04 4:41 AM	7.13	1285	23	24	216	286	1467	12,776	6.46
20	12	01/31/04	13:38	1/31/04 1:38 PM	7.06	1239	23	23	205	273	2931	15,707	5.46
21	13	02/01/04	13:06	2/1/04 1:06 PM	7.82	1144	21	21	184	244	7810	23,517	5.55
22	14	02/02/04	13:39	2/2/04 1:39 PM	7.19	1367	23	26	236	315	7534	31,051	5.11
23	15	02/03/04	9:36	2/3/04 9:36 AM	7.24	1109	20	22	176	239	6228	37,279	5.20


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
400
350
300
250
200
150
100
50
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

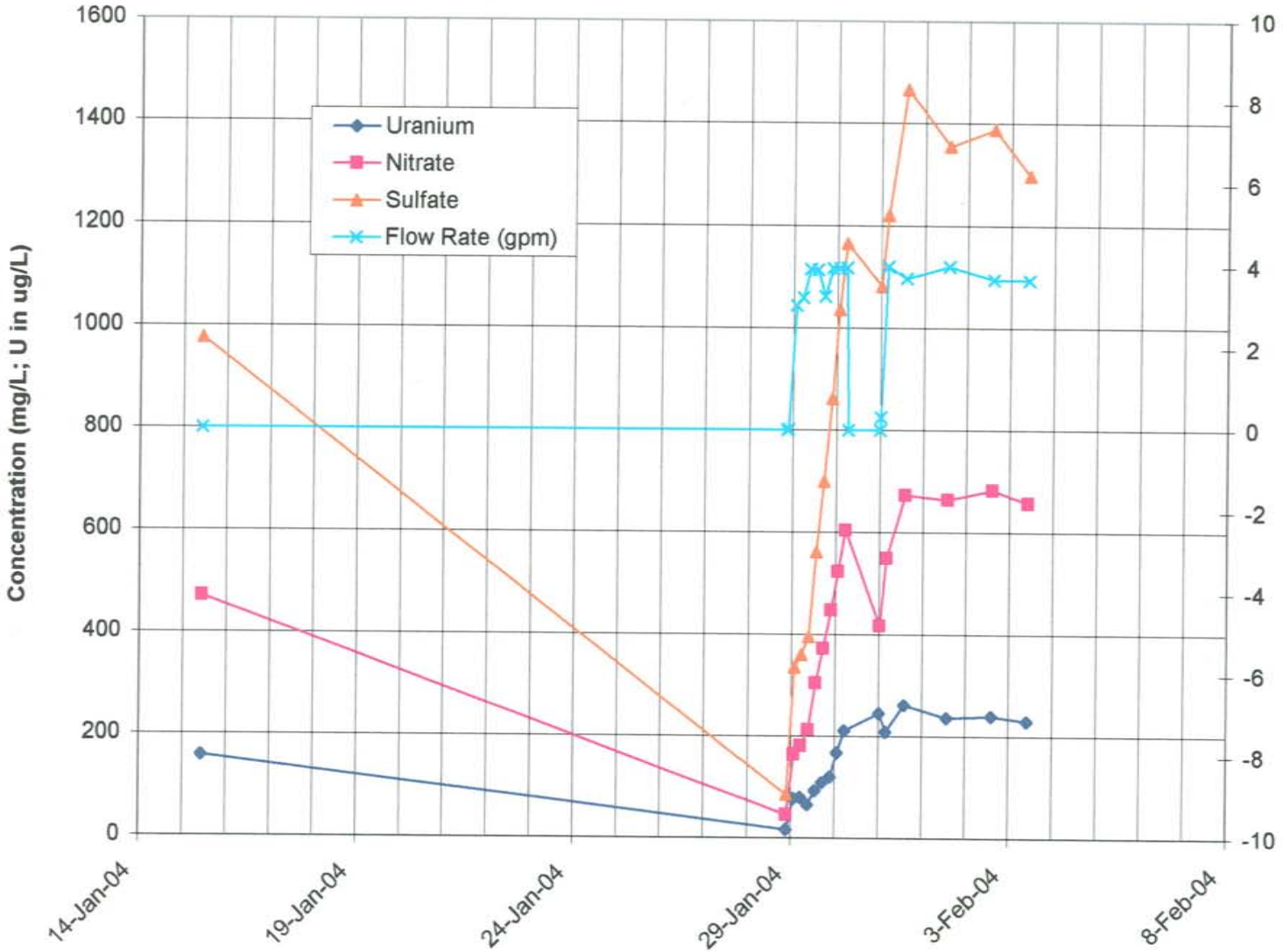
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1115												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:11	1/15/04 11:11 AM	6.96	1493	38.2	25.6	247.87	344.2	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:23	1/28/04 10:23 PM	6.64	4360	251	66	674	1711	537	537	0.03
8	2	01/29/04	2:09	1/29/04 2:09 AM	6.73	2490	98	48	382	742	1129	1,666	5.00
9	3	01/29/04	5:53	1/29/04 5:53 AM	6.84	2120	76	44	332	588	1191	2,857	5.32
10	4	01/29/04	9:39	1/29/04 9:39 AM	6.82	1883	61	32	313	505	1430	4,287	6.33
11	5	01/29/04	13:50	1/29/04 1:50 PM	6.87	1810	56	31	304	483	1573	5,860	6.27
12	6	01/29/04	17:07	1/29/04 5:07 PM	6.83	1825	59	32	318	498	1004	6,864	5.10
13	7	01/29/04	22:03	1/29/04 10:03 PM	6.80	1760	52	31	304	482	1855	8,719	6.27
14	8	01/30/04	1:51	1/30/04 1:51 AM	6.80	1736	57	30	293	460	1424	10,143	6.25
15	9	01/30/04	5:47	1/30/04 5:47 AM	6.80	1714	59	31	296	462	1473	11,616	6.24
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:52	1/31/04 12:52 AM	6.69	3390	184	47	537	1237	578	12,194	0.50
19	11	01/31/04	4:39	1/31/04 4:39 AM	6.89	1857	52	32	309	483	1452	13,646	6.40
20	12	01/31/04	13:35	1/31/04 1:35 PM	6.79	1703	53	30	284	433	3123	16,769	5.83
21	13	02/01/04	13:04	2/1/04 1:04 PM	7.16	1602	46	29	264	389	8778	25,547	6.23
22	14	02/02/04	13:35	2/2/04 1:35 PM	6.88	1822	58	33	326	462	8578	34,125	5.83
23	15	02/03/04	9:33	2/3/04 9:33 AM	6.96	1602	42	30	267	391	7082	41,207	5.91


Uranium
Nitrate
Sulfate
Conductivity
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
10
5
0
-5
-10
-15
-20
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

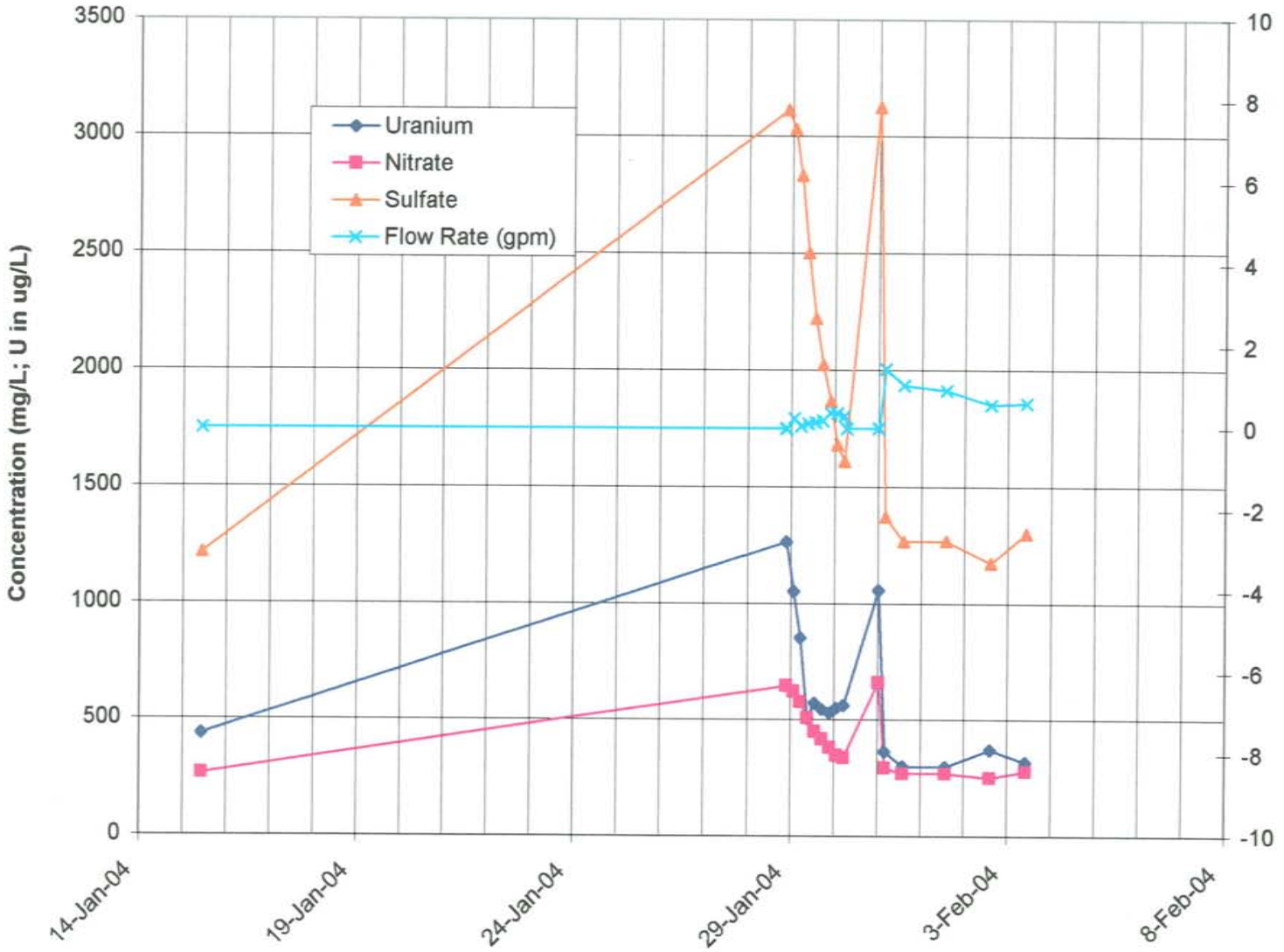
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1118												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:17	1/15/04 11:17 AM	6.69	3610	53.2	58	548.3	1320.8	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	22:18	1/28/04 10:18 PM	6.66	3750	57	62	598	1425	73	73	0.00
8	2	01/29/04	2:02	1/29/04 2:02 AM	6.58	3890	57	62	641	1440	175	248	0.78
9	3	01/29/04	5:48	1/29/04 5:48 AM	6.66	4090	63	65	682	1585	191	439	0.85
10	4	01/29/04	9:45	1/29/04 9:45 AM	6.65	4030	63	62	653	1558	248	687	1.05
11	5	01/29/04	13:55	1/29/04 1:55 PM	6.62	4000	63	63	666	1559	262	949	1.05
12	6	01/29/04	17:02	1/29/04 5:02 PM	6.62	4000	66	66	702	1598	154	1,103	0.82
13	7	01/29/04	21:58	1/29/04 9:58 PM	6.61	3990	66	66	697	1592	314	1,417	1.06
14	8	01/30/04	1:45	1/30/04 1:45 AM	6.62	3970	65	73	805	1827	241	1,658	1.06
15	9	01/30/04	5:42	1/30/04 5:42 AM	6.62	3940	66	67	702	1569	251	1,909	1.06
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:47	1/31/04 12:47 AM	6.67	4080	69	68	708	1504	91	2,000	0.08
19	11	01/31/04	4:34	1/31/04 4:34 AM	6.68	3920	63	65	664	1449	236	2,236	1.04
20	12	01/31/04	13:30	1/31/04 1:30 PM	6.57	3880	58	65	664	1453	517	2,753	0.96
21	13	02/01/04	13:00	2/1/04 1:00 PM	6.66	3770	55	62	631	1388	1479	4,232	1.05
22	14	02/02/04	13:29	2/2/04 1:29 PM	6.67	3730	59	62	617	1415	1437	5,669	0.98
23	15	02/03/04	9:28	2/3/04 9:28 AM	6.68	3700	57	59	681	1568	1200	6,869	1.00


Concentration (mg/L; U in ug/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
Uranium
Nitrate
Sulfate
Flow Rate (gpm)
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

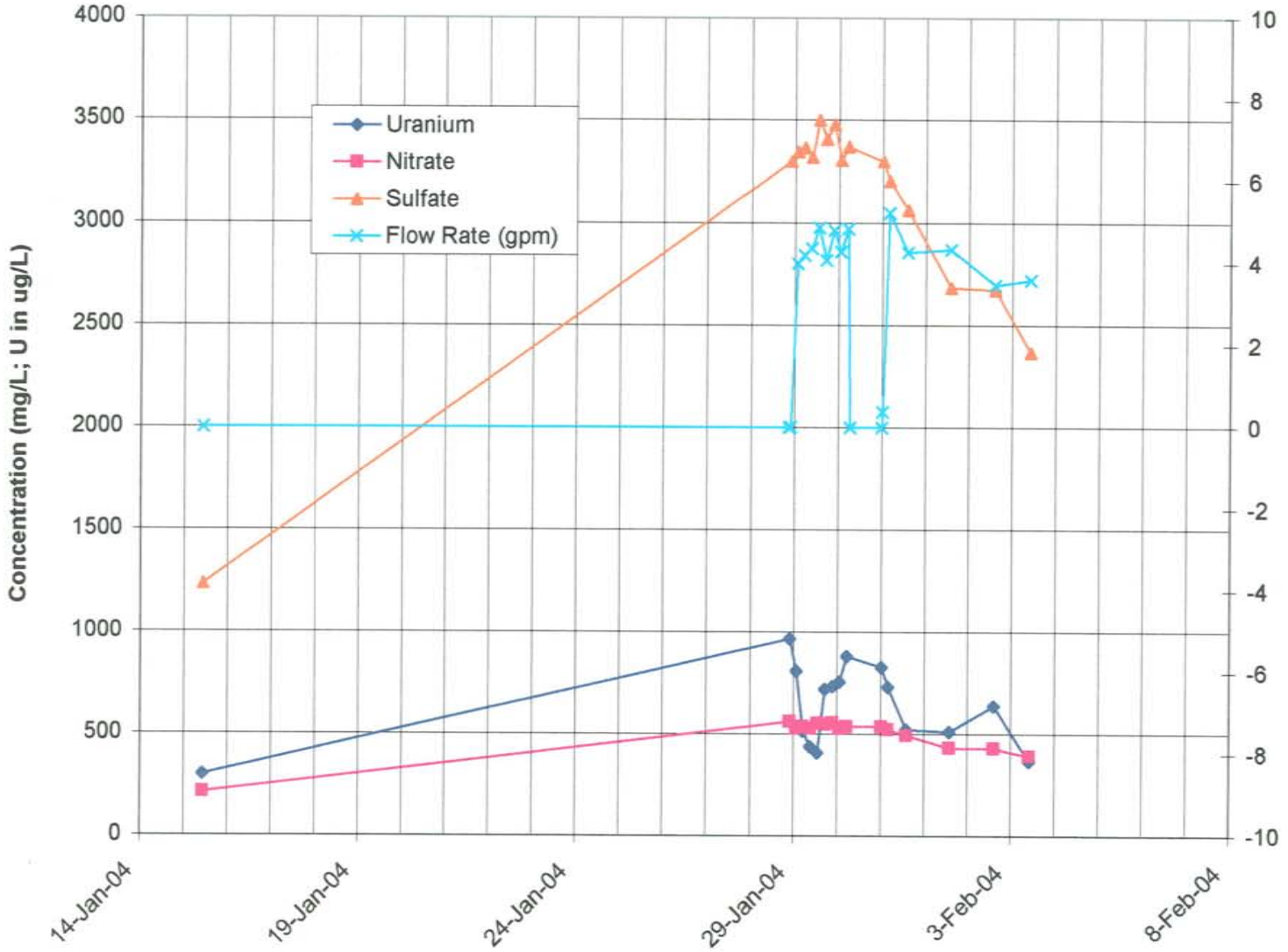
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1119												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:37	1/15/04 10:37 AM	6.64	3060	159	69	470.8	976.7	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:42	1/28/04 9:42 PM	7.40	511	17	15	45	85	144	144	0.01
8	2	01/29/04	1:33	1/29/04 1:33 AM	6.79	1278	77	34	164	335	705	849	3.05
9	3	01/29/04	5:20	1/29/04 5:20 AM	6.88	1364	79	37	181	360	736	1,585	3.24
10	4	01/29/04	9:14	1/29/04 9:14 AM	6.76	1494	65	36	212	395	920	2,505	3.93
11	5	01/29/04	13:18	1/29/04 1:18 PM	6.67	1935	93	46	305	562	955	3,460	3.91
12	6	01/29/04	17:19	1/29/04 5:19 PM	6.64	2250	109	54	372	700	789	4,249	3.27
13	7	01/29/04	21:31	1/29/04 9:31 PM	6.57	2630	120	61	448	862	997	5,246	3.96
14	8	01/30/04	1:18	1/30/04 1:18 AM	6.56	3090	168	71	523	1036	900	6,146	3.96
15	9	01/30/04	5:16	1/30/04 5:16 AM	6.56	3450	211	82	605	1165	945	7,091	3.97
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:24	1/31/04 12:24 AM	6.67	3100	245	86	417	1081	357	7,448	0.31
19	11	01/31/04	4:11	1/31/04 4:11 AM	6.60	3450	209	81	550	1220	907	8,355	4.00
20	12	01/31/04	14:14	1/31/04 2:14 PM	6.47	4030	262	98	673	1467	2238	10,593	3.71
21	13	02/01/04	13:45	2/1/04 1:45 PM	6.59	3890	236	87	664	1355	5647	16,240	4.00
22	14	02/02/04	14:15	2/2/04 2:15 PM	6.59	3910	240	89	683	1388	5414	21,654	3.68
23	15	02/03/04	10:06	2/3/04 10:06 AM	6.55	3790	230	92	658	1298	4367	26,021	3.67


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
1600
1400
1200
1000
800
600
400
200
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

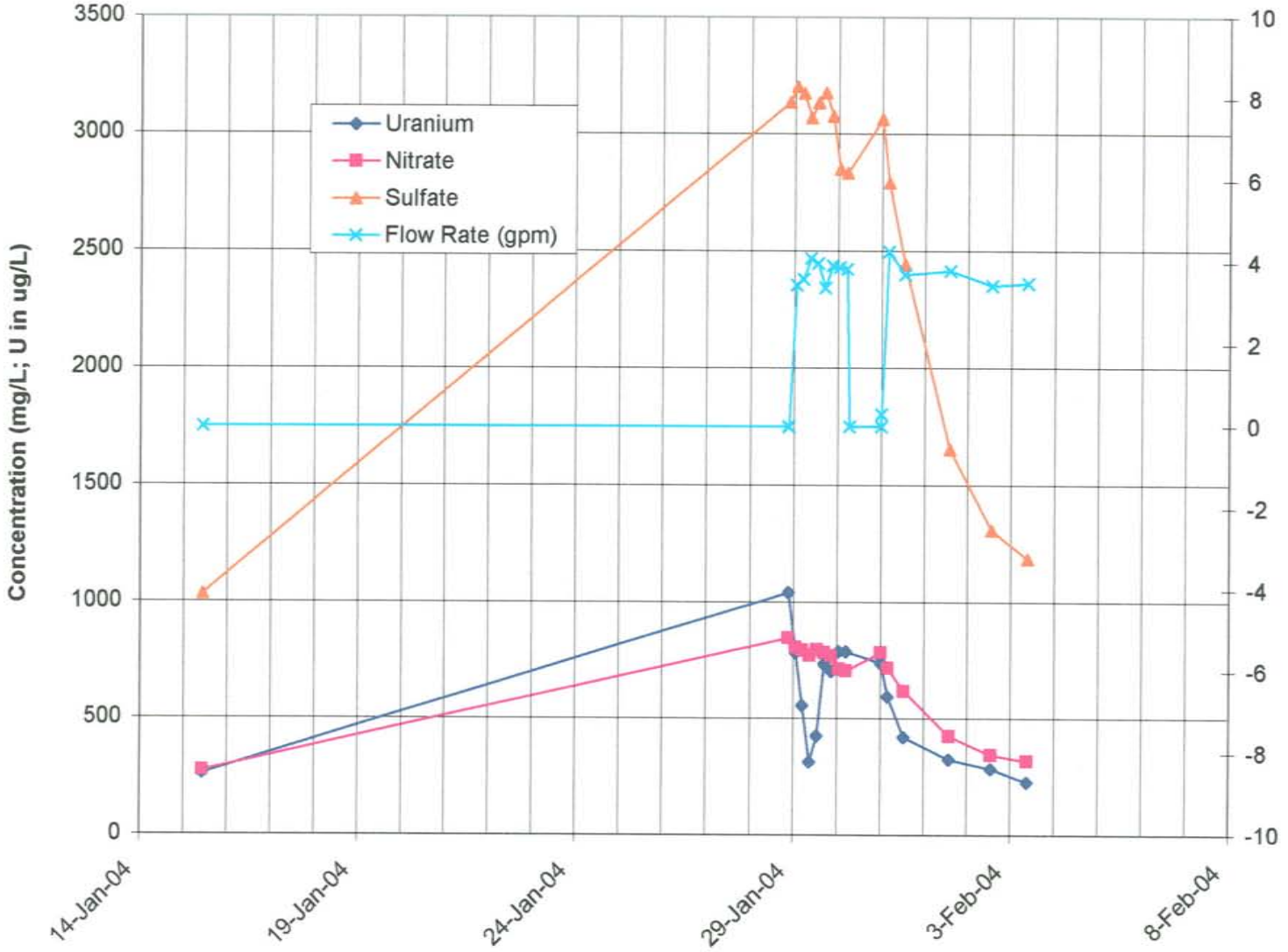
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1120												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:35	1/15/04 10:35 AM	6.69	3080	437	76.5	267.3	1217	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:45	1/28/04 9:45 PM	6.57	6580	1264	193	647	3115	1	1	0.00
8	2	01/29/04	1:36	1/29/04 1:36 AM	6.43	6360	1052	175	623	3031	57	58	0.25
9	3	01/29/04	5:22	1/29/04 5:22 AM	6.57	5890	852	162	576	2833	11	69	0.05
10	4	01/29/04	9:15	1/29/04 9:15 AM	6.54	5320	506	145	508	2502	30	99	0.13
11	5	01/29/04	13:23	1/29/04 1:23 PM	6.57	4800	572	131	450	2223	36	135	0.15
12	6	01/29/04	17:20	1/29/04 5:20 PM	6.58	4370	546	123	417	2024	45	180	0.19
13	7	01/29/04	21:33	1/29/04 9:33 PM	6.54	4030	528	115	381	1869	96	276	0.38
14	8	01/30/04	1:20	1/30/04 1:20 AM	6.57	3780	550	108	348	1679	83	359	0.37
15	9	01/30/04	5:18	1/30/04 5:18 AM	6.58	3580	563	105	337	1611	73	432	0.31
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:26	1/31/04 12:26 AM	6.53	6680	1057	188	661	3126	17	449	0.01
19	11	01/31/04	4:13	1/31/04 4:13 AM	6.63	3300	364	83	294	1374	332	781	1.46
20	12	01/31/04	14:17	1/31/04 2:17 PM	6.54	3100	301	78	271	1267	641	1,422	1.06
21	13	02/01/04	13:48	2/1/04 1:48 PM	6.63	3120	299	78	271	1270	1321	2,743	0.94
22	14	02/02/04	14:17	2/2/04 2:17 PM	6.66	2880	371	73	250	1173	842	3,585	0.57
23	15	02/03/04	10:08	2/3/04 10:08 AM	6.63	3110	319	81	280	1301	733	4,318	0.62


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
3500
3000
2500
2000
1500
1000
500
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

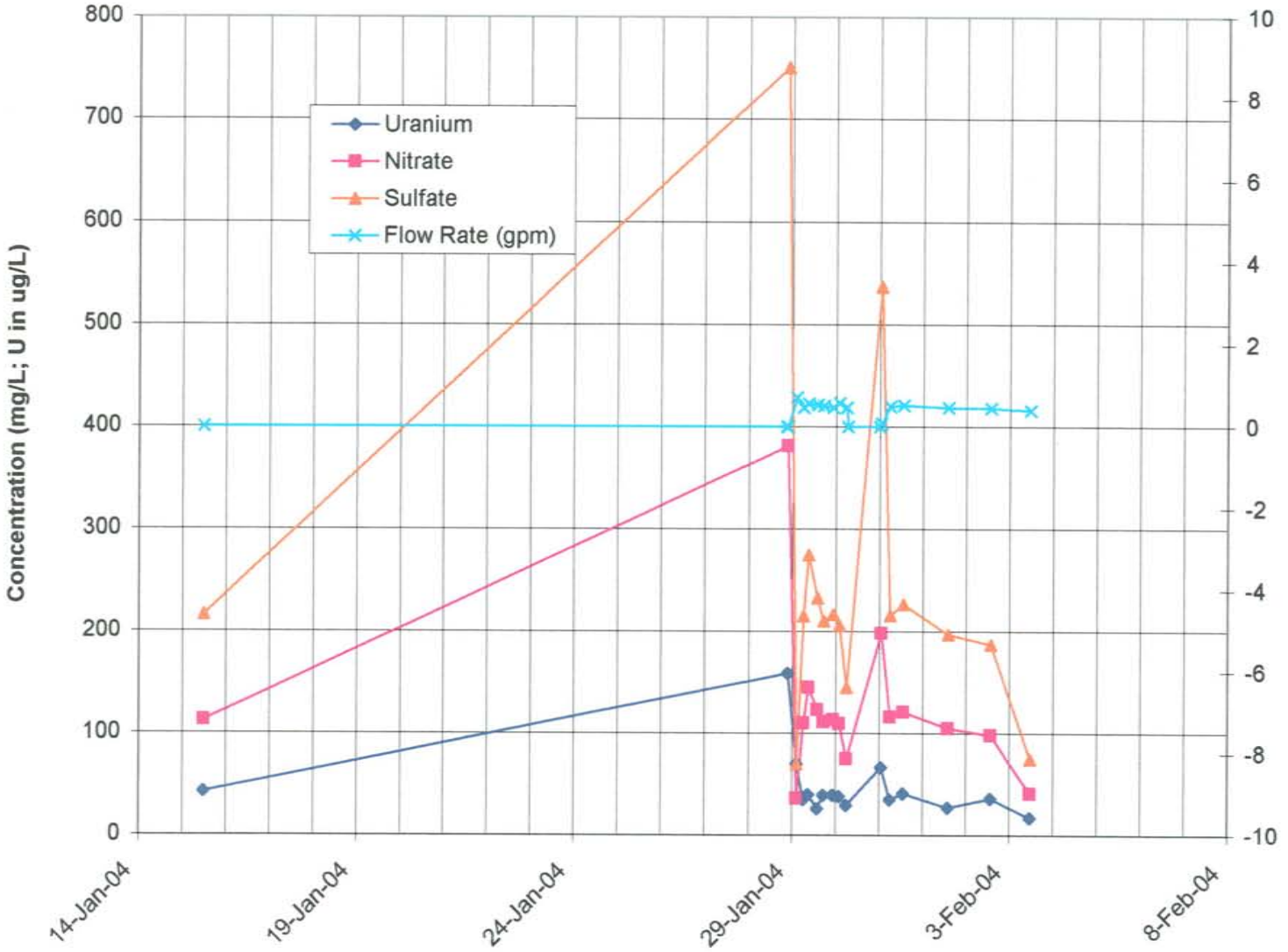
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1121												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:32	1/15/04 10:32 AM	6.59	3280	302	62	211.5	1232.7	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:48	1/28/04 9:48 PM	6.42	6510	966	141	561	3298	233	233	0.01
8	2	01/29/04	1:38	1/29/04 1:38 AM	6.38	6460	808	140	528	3347	921	1,154	4.00
9	3	01/29/04	5:25	1/29/04 5:25 AM	6.47	6460	513	143	534	3365	954	2,108	4.20
10	4	01/29/04	9:17	1/29/04 9:17 AM	6.41	6490	439	140	528	3320	1015	3,123	4.37
11	5	01/29/04	13:24	1/29/04 1:24 PM	6.42	6450	408	146	553	3500	1206	4,329	4.88
12	6	01/29/04	17:22	1/29/04 5:22 PM	6.43	6430	720	144	546	3408	972	5,301	4.08
13	7	01/29/04	21:36	1/29/04 9:36 PM	6.40	6380	735	146	554	3478	1224	6,525	4.82
14	8	01/30/04	1:23	1/30/04 1:23 AM	6.41	6350	756	141	528	3304	973	7,498	4.29
15	9	01/30/04	5:20	1/30/04 5:20 AM	6.40	6280	880	143	536	3370	1151	8,649	4.86
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:27	1/31/04 12:27 AM	6.46	6580	828	144	534	3300	446	9,095	0.39
19	11	01/31/04	4:15	1/31/04 4:15 AM	6.46	6310	732	141	522	3204	1195	10,290	5.24
20	12	01/31/04	14:19	1/31/04 2:19 PM	6.39	5910	522	135	494	3062	2586	12,876	4.28
21	13	02/01/04	13:51	2/1/04 1:51 PM	6.47	5380	511	121	432	2683	6128	19,004	4.34
22	14	02/02/04	14:20	2/2/04 2:20 PM	6.45	5290	636	121	430	2673	5105	24,109	3.48
23	15	02/03/04	10:10	2/3/04 10:10 AM	6.52	4840	368	102	391	2368	4277	28,386	3.59


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
4000
3500
3000
2500
2000
1500
1000
500
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1122												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	10:28	1/15/04 10:28 AM	6.72	2800	263	62.7	276.3	1034.1	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:12	1/28/04 9:12 PM	6.51	6830	1040	157	845	3136	27	27	0.00
8	2	01/29/04	1:18	1/29/04 1:18 AM	6.45	6740	781	156	804	3204	853	880	3.47
9	3	01/29/04	5:05	1/29/04 5:05 AM	6.54	6680	556	154	792	3175	816	1,696	3.59
10	4	01/29/04	9:00	1/29/04 9:00 AM	6.53	6640	315	150	770	3069	965	2,661	4.11
11	5	01/29/04	13:01	1/29/04 1:01 PM	6.53	6490	424	155	793	3133	961	3,622	3.99
12	6	01/29/04	17:00	1/29/04 5:00 PM	6.50	6370	735	152	783	3177	810	4,432	3.39
13	7	01/29/04	21:09	1/29/04 9:09 PM	6.48	6270	702	151	768	3074	979	5,411	3.93
14	8	01/30/04	1:05	1/30/04 1:05 AM	6.51	6040	788	142	712	2851	917	6,328	3.89
15	9	01/30/04	5:02	1/30/04 5:02 AM	6.53	5910	787	141	706	2834	912	7,240	3.85
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	0:09	1/31/04 12:09 AM	6.55	6680	739	153	783	3064	343	7,583	0.30
19	11	01/31/04	4:00	1/31/04 4:00 AM	6.56	6070	594	144	716	2793	988	8,571	4.28
20	12	01/31/04	13:08	1/31/04 1:08 PM	6.57	5360	419	128	617	2443	2035	10,606	3.71
21	13	02/01/04	13:59	2/1/04 1:59 PM	6.60	3970	326	116	425	1653	5672	16,278	3.80
22	14	02/02/04	13:07	2/2/04 1:07 PM	6.67	3300	285	99	345	1308	4791	21,069	3.45
23	15	02/03/04	9:05	2/3/04 9:05 AM	6.66	3050	228	70	318	1186	4204	25,273	3.51

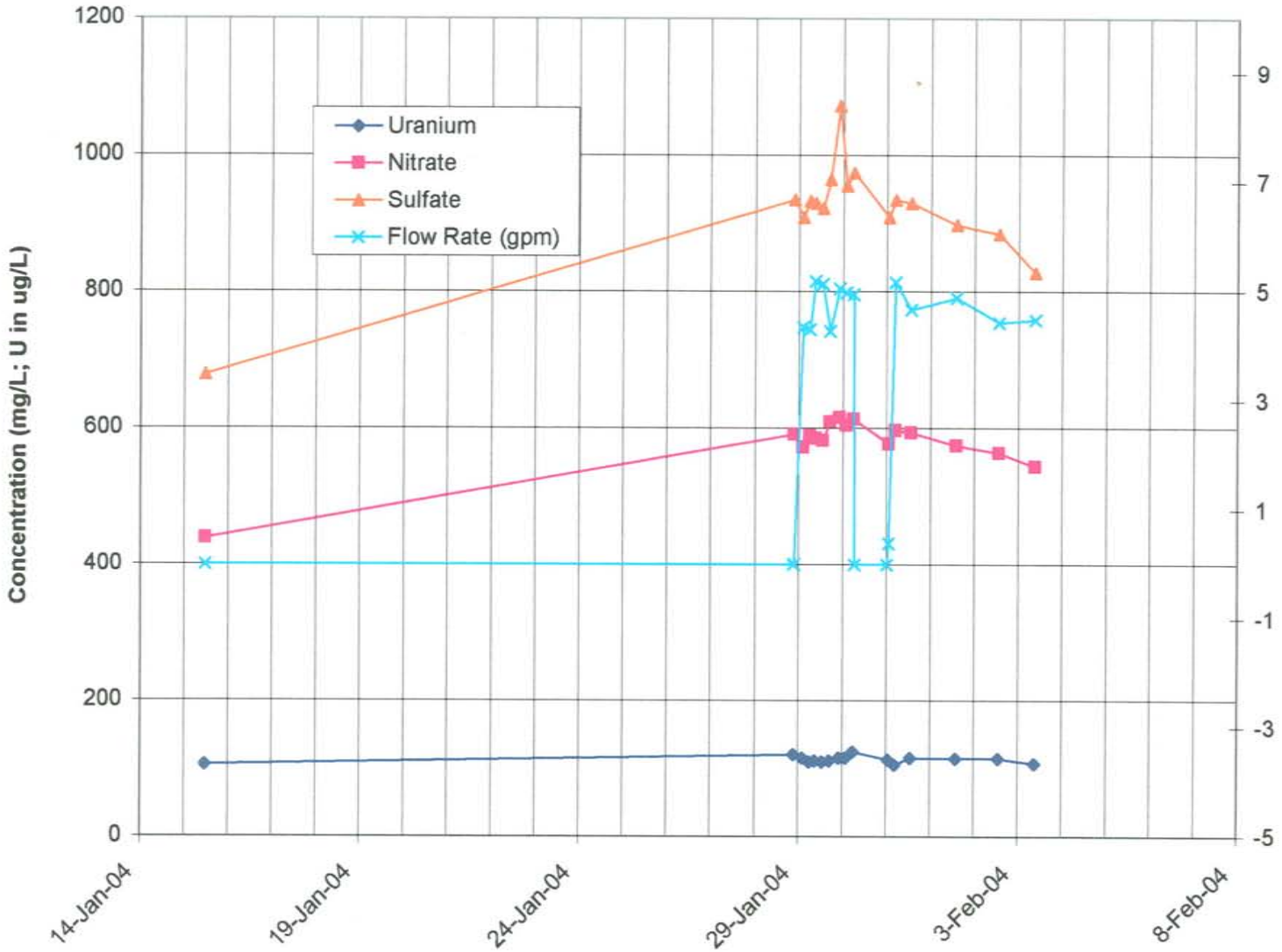

Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
3500
3000
2500
2000
1500
1000
500
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1123												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:39	1/15/04 11:39 AM	7.25	958	42.7	23.8	112.3	216.3	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:29	1/28/04 9:29 PM	7.03	2460	159	68	381	751	37	37	0.00
8	2	01/29/04	2:25	1/29/04 2:25 AM	6.95	1425	70	9	36	70	211	248	0.71
9	3	01/29/04	6:07	1/29/04 6:07 AM	7.24	941	35	23	110	215	103	351	0.46
10	4	01/29/04	9:06	1/29/04 9:06 AM	7.17	1129	40	27	145	275	101	452	0.56
11	5	01/29/04	14:00	1/29/04 2:00 PM	7.17	993	26	24	123	233	160	612	0.54
12	6	01/29/04	17:10	1/29/04 5:10 PM	7.18	907	39	23	111	210	96	708	0.51
13	7	01/29/04	22:35	1/29/04 10:35 PM	7.19	913	39	24	113	217	154	862	0.47
14	8	01/30/04	2:02	1/30/04 2:02 AM	7.18	893	38	23	109	206	119	981	0.57
15	9	01/30/04	6:00	1/30/04 6:00 AM	7.32	701	29	19	75	145	111	1,092	0.47
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	1:04	1/31/04 1:04 AM	7.11	1399	67	34	198	537	97	1,189	0.08
19	11	01/31/04	5:56	1/31/04 5:56 AM	7.21	943	35	24	116	216	143	1,332	0.49
20	12	01/31/04	13:18	1/31/04 1:18 PM	7.23	971	41	25	121	227	232	1,564	0.52
21	13	02/01/04	14:01	2/1/04 2:01 PM	7.25	887	27	22	105	197	700	2,264	0.47
22	14	02/02/04	13:16	2/2/04 1:16 PM	7.27	848	36	22	98	187	626	2,890	0.45
23	15	02/03/04	11:25	2/3/04 11:25 AM	7.53	494	17	16	41	75	532	3,422	0.40

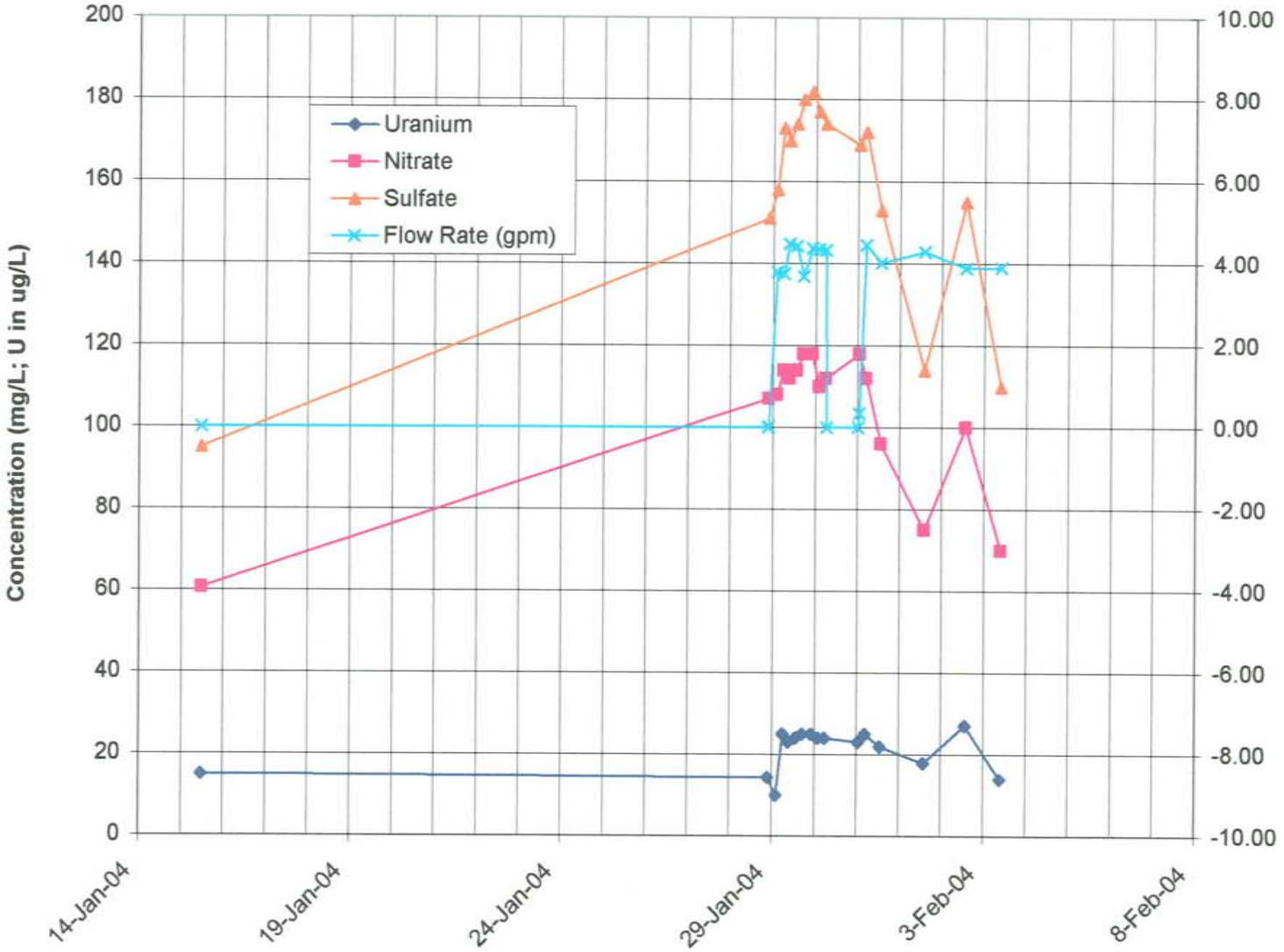

Concentration (mg/L; U in ug/L)
800
700
600
500
400
300
200
100
0
10
8
6
4
2
0
-2
-4
-6
-8
-10
Uranium
Nitrate
Sulfate
Flow Rate (gpm)
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1124												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:26	1/15/04 11:26 AM	7.03	2420	106	68.7	438.8	678.8	NA	0	0
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:32	1/28/04 9:32 PM	6.94	3070	121	93	591	934	140	140	0.01
8	2	01/29/04	2:22	1/29/04 2:22 AM	6.83	3070	116	88	572	909	1261	1,401	4.35
9	3	01/29/04	6:05	1/29/04 6:05 AM	6.94	3060	110	90	589	933	961	2,362	4.31
10	4	01/29/04	9:07	1/29/04 9:07 AM	6.94	3080	112	90	585	929	945	3,307	5.19
11	5	01/29/04	13:11	1/29/04 1:11 PM	6.92	3060	110	90	582	922	1254	4,561	5.14
12	6	01/29/04	17:12	1/29/04 5:12 PM	6.90	3060	112	93	609	964	1032	5,593	4.28
13	7	01/29/04	22:15	1/29/04 10:15 PM	6.87	3060	116	94	616	1072	1531	7,124	5.05
14	8	01/30/04	2:01	1/30/04 2:01 AM	6.87	3060	116	92	604	955	1127	8,251	4.99
15	9	01/30/04	5:58	1/30/04 5:58 AM	6.88	3050	125	94	613	974	1174	9,425	4.95
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	1:02	1/31/04 1:02 AM	6.97	3030	113	90	577	909	441	9,866	0.39
19	11	01/31/04	4:52	1/31/04 4:52 AM	6.91	3070	106	93	597	934	1189	11,055	5.17
20	12	01/31/04	13:21	1/31/04 1:21 PM	6.84	3040	116	92	593	929	2376	13,431	4.67
21	13	02/01/04	14:06	2/1/04 2:06 PM	6.92	2990	115	89	574	898	7257	20,688	4.89
22	14	02/02/04	13:18	2/2/04 1:18 PM	6.90	2920	115	88	564	885	6169	26,857	4.43
23	15	02/03/04	9:20	2/3/04 9:20 AM	6.95	2780	108	83	544	828	5388	32,245	4.48

1124


Uranium
Nitrate
Sulfate
Flow Rate (gpm)
Concentration (mg/L; U in ug/L)
1200
1000
800
600
400
200
0
9
7
5
3
1
-1
-3
-5
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Well 1125												
2													
3	Round #	Date	Time	Sample Collect	pH	Cond.	U	Cl	No3	S04	Gal prior to	Cum gal	Flow Rate
4				Time			(ug/L)	(mg/L)	(mg/L)	(mg/L)	Sample		(GPM)
5	Baseline	01/15/2004	11:24	1/15/04 11:24 AM	7.72	569	15.1	15.6	60.7	95	NA	0	0.00
6	start pump			1/28/04 9:07 PM									0
7	1	01/28/04	21:35	1/28/04 9:35 PM	7.57	762	14.4	20	107	151	141	141	0.01
8	2	01/29/04	2:20	1/29/04 2:20 AM	7.43	814	10	20	108	158	1081	1,222	3.79
9	3	01/29/04	6:03	1/29/04 6:03 AM	7.51	830	25	20	114	173	837	2,059	3.75
10	4	01/29/04	9:09	1/29/04 9:09 AM	7.49	827	23	20	112	170	834	2,893	4.48
11	5	01/29/04	13:13	1/29/04 1:13 PM	7.46	823	24	20	114	174	1080	3,973	4.43
12	6	01/29/04	17:14	1/29/04 5:14 PM	7.47	827	25	21	118	180	889	4,862	3.69
13	7	01/29/04	22:13	1/29/04 10:13 PM	7.48	824	25	21	118	182	1307	6,169	4.37
14	8	01/30/04	1:59	1/30/04 1:59 AM	7.49	813	24	30	110	177	982	7,151	4.35
15	9	01/30/04	5:56	1/30/04 5:56 AM	7.52	801	24	20	112	174	1025	8,176	4.32
16	stop pump			1/30/04 6:28 AM									0.00
17	start pump			1/31/04 12:07 AM									0.00
18	10	01/31/04	1:01	1/31/04 1:01 AM	7.56	830	23	21	118	169	391	8,567	0.34
19	11	01/31/04	4:50	1/31/04 4:50 AM	7.53	824	25	20	112	172	1021	9,588	4.46
20	12	01/31/04	13:24	1/31/04 1:24 PM	7.52	752	22	19	96	153	2063	11,651	4.01
21	13	02/01/04	14:04	2/1/04 2:04 PM	7.58	632	18	17	75	114	6350	18,001	4.29
22	14	02/02/04	13:22	2/2/04 1:22 PM	7.49	763	27	19	100	155	5434	23,435	3.89
23	15	02/03/04	9:22	2/3/04 9:22 AM	7.63	605	14	17	70	110	4687	28,122	3.91


Concentration (mg/L; U in ug/L)
200
180
160
140
120
100
80
60
40
20
0
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
-4.00
-6.00
-8.00
-10.00
Uranium
Nitrate
Sulfate
Flow Rate (gpm)
14-Jan-04
19-Jan-04
24-Jan-04
29-Jan-04
3-Feb-04
8-Feb-04

	A	B	C	D	E	F	G	H	I	J	K
1		Well Operation Cycles									
2	Sample Rounds	Start		Stop		Duration, mins	Flow, gallons				
3		Date	Time	Date	Time			flow gpm	start time	stop time	duration off min
4	1	01/28/2004	21:07	01/29/2004	0:19	192	22,291	116	1/28/04 21:07	01/29/2004 0:19	na
5	2	01/29/2004	1:14	01/29/2004	3:12	118	13,186	112	1/29/04 1:14	01/29/2004 3:12	55.00
6	3 thru 5	01/29/2004	3:53	01/29/2004	14:09	616	63,431	103	1/29/04 3:53	01/29/2004 14:09	41.00
7	6 thru 9	01/29/2004	14:50	01/30/2004	6:28	938	91,706	98	1/29/04 14:50	01/30/2004 6:28	41.00
8	10 and 11	01/31/2004	0:07	01/31/2004	4:56	289	31,613	109	1/31/04 0:07	01/31/2004 4:56	1059.00
9	12 and 13	01/31/2004	5:38	02/02/2004	5:03	2845	267,222	94	1/31/04 5:38	02/02/2004 5:03	42.00
10		02/02/2004	5:39	02/02/2004	12:18	399	35,813	90	2/2/04 5:39	02/02/2004 12:18	36.00
11	14	02/02/2004	12:58	02/02/2004	22:13	555	49,631	89	2/2/04 12:58	02/02/2004 22:13	40.00
12	15	02/02/2004	22:55	02/03/2004	10:48	713	63,280	89	2/2/04 22:55	02/03/2004 10:48	42.00

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		Total Gallons Pumped Prior To Sample Time for Each Round														
2	Well No.	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth	Eleve nth	Twelfth	13th	14th	15th
3	1101	39	824	788	1,075	954	847	1,090	972	1,016	384	968	2,165	6,379	5,576	4,865
4	1102	96	1,196	1,170	1,430	1,472	1,225	1,530	1,401	1,417	580	1,412	3,105	8,984	7,869	6,835
5	1103	203	1,149	1,200	1,511	1,585	1,297	1,628	1,481	1,546	583	1,463	3,629	9,203	9,017	7,411
6	1104	336	1,082	1,134	1,219	1,262	1,090	1,274	1,117	1,162	496	1,293	2,860	6,756	6,543	5,295
7	1105	517	1,767	1,837	2,090	2,115	1,754	2,037	1,777	1,834	671	2,087	4,549	10,111	8,940	7,123
8	1106	358	1,119	1,166	1,094	1,119	966	1,078	909	937	431	1,218	2,350	5,169	4,839	3,750
9	1107	326	996	1,054	1,243	1,314	1,032	1,359	1,165	1,211	480	1,236	2,788	7,019	6,811	5,467
10	1108	282	863	927	1,138	1,226	929	1,304	1,111	1,167	431	1,121	2,596	6,894	6,778	5,565
11	1109	191	547	574	706	744	553	784	646	673	267	723	1,575	3,987	3,829	3,074
12	1110	442	1,080	1,082	1,145	1,157	894	1,143	948	940	451	1,283	2,479	5,316	5,135	4,160
13	1111	303	799	844	1,012	1,091	771	1,202	982	1,022	393	1,026	2,276	6,072	5,939	4,851
14	1112	510	807	782	720	777	540	779	644	659	431	826	1,533	3,525	3,442	2,610
15	1113	509	945	912	869	926	676	982	712	596	501	1,009	1,830	4,192	3,914	3,114
16	1114	562	973	1,224	1,371	1,495	991	1,714	1,290	1,326	363	1,467	2,931	7,810	7,534	6,228
17	1115	537	1,129	1,191	1,430	1,573	1,004	1,855	1,424	1,473	578	1,452	3,123	8,778	8,578	7,082
18	1116															
19	1117															
20	1118	73	175	191	248	262	154	314	241	251	91	236	517	1,479	1,437	1,200
21	1119	144	705	736	920	955	789	997	900	945	357	907	2,238	5,647	5,414	4,367
22	1120	1	57	11	30	36	45	96	83	73	17	332	641	1,321	842	733
23	1121	233	921	954	1,015	1,206	972	1,224	973	1,151	446	1,195	2,586	6,128	5,105	4,277
24	1122	27	853	816	965	961	810	979	917	912	343	988	2,035	5,672	4,791	4,204
25	1123	37	211	103	101	160	96	154	119	111	97	143	232	700	626	532
26	1124	140	1,261	961	945	1,254	1,032	1,531	1,127	1,174	441	1,189	2,376	7,257	6,169	5,388
27	1125	141	1,081	837	834	1,080	889	1,307	982	1,025	391	1,021	2,063	6,350	5,434	4,687

Appendix B

Rebound Study Field and Laboratory Notes

WORK SUBMITTAL TO ENVIRONMENTAL SCIENCES LABORATORY

Submittal Date 1/7/2004 Date Required ~3/15/2004
Submitted By SMorrison Signature SMorrison by SM
Formal ESL Report ? Yes ✓ No ___
Data Report Only? Yes ___ No ✓
Electronic Data Deliverable? Yes ___ No ✓
Project: Tuba City TX Charge No. 11 GM 1106
Analysis Type (check one): Kd ___ Leaching ___
Expedited Site Characterization ___ Other (Specify) ✓
Well Rebound Test

Sample Numbers Tuba City Extraction Wells 1101→1115, 1118-1125

Analytes pH, cond., U, Cl, NO_3, SO4

Solution Composition
groundwater.

Comments (attach procedure if needed)

See attached procedure

Environmental Sciences Laboratory (ESL) Workplan

Project Title: Analysis of Ground Water Rebound in Extraction Wells; Rev. 1
Site: Tuba City, Arizona
Date: December 31, 2003.
Desired Completion Date: Field work by January 31, 2004. Report by February 2004.
Work Requested By: Carl Jacobson, Tuba City Site Manager
Work Approved By: Clay Carpenter, ESL Task Order Manager
ESL Lead: Stan Morrison
Tuba City Project Lead: Randy Richardson

Objectives:

Analyses of Tuba City weekly composite samples and monthly well grab samples have established that contaminant concentrations in the extraction wells are stable and relatively low when the wells have been in service for extended periods of time, but that these concentrations are much higher immediately after the wells are restarted after being down for several days. This tendency has become known as the "rebound" effect. Daily influent samples suggest that the "rebound" is of short duration and that well concentrations have stabilized within about three days. Monthly well samples suggest that "rebound" is much more pronounced among some wells than others.

A shutdown of the treatment system, of approximately one week's duration, is scheduled for the end of January, 2004. This test program proposes an intensive sampling of the extraction wells for the first six days after the wells are restarted, coupled with a single grab sample from each well immediately prior to the shutdown. The goal is to evaluate the extent and duration of "rebound" for each individual well.

Description of Work:

Task 1. Field Sampling. The shutdown is presently scheduled to begin on the morning of January 19, 2004. A set of baseline samples will be collected the day before the shutdown and additional sets of "rebound" samples will be collected at regular intervals upon startup. One set consists of 25 samples including 1 sample from each of 24 extraction wells and 1 raw feed sample. The collection time for each sample will be logged (preferably using "atomic" watches which will be synchronized with the PLC computer clock). Collecting the set of 25 samples typically takes 2 persons about 1-1/2 to two hours.

The rebound samples will be collected after the treatment system is restored to boil and begins to draw water from the wells. Sets of well samples will be taken every 4 hours for the first 2 days of the test. For the duration of the test (total of about four to six days based on experience to date) sets of samples will be collected every 12 hours; probably one round of sampling first thing in the morning and the other round at the end of the day. The duration of the test will be determined by the conductivity of the raw feed, which will be sampled at the same time as the wells. The conductivity of the raw feed

determines the gross composition trend. As long as the raw feed conductivity is decreasing from one sample to the next, at least some of the wells are still in rebound and the sampling should continue. Once the raw feed conductivity has leveled off, the rebound effect is effectively concluded and the test can be terminated.

Individual well samples will be checked for conductivity before additional analysis is done. The conductivity will be used to determine the rebound extent for individual wells in the same fashion as with the overall system, i.e., once the conductivity of the water from an individual well has stabilized, additional samples from that well may not be taken.

Although time-consuming, the sampling work will not be a full-time job, and can be performed by the site operators on an overtime basis with minimal interference with their regular duties. Given the fact that the sampling calls for traveling to outer areas of the site and for the sampler to physically enter the well vaults, in the interests of safety, the sampling must be performed by a 2 person team. Therefore, the sampling would require the operators to work an overtime shift of probably about thirteen hours per day. Operators will not be able to collect samples during the night shift, so ESL is providing funds for additional sampling support. Samplers will probably be Brandon Danforth and Dave Traub.

Task 2. Analysis. All analytical work will be conducted at the Tuba City site laboratory. An ion chromatograph will be used for analysis of chloride, nitrate, and sulfate, and a KPA uranium analyzer for uranium. Analysts will filter each samples prior to analysis and measure the pH and conductivity of each sample. Analytical work will continue for about three days after the completion of all sampling.

Task 3. Data Entry. Data from the test will be entered into Excel spread sheet. The data will not be entered into See_Pro.

Task 4. Interpretation and Report. An ESL report will be prepared that describes the methods, presents the results, and discusses interpretations of the data.

ESL Budget and Project Cost Sharing:

Costs will be shared between the ESL and the Tuba City Project. Tuba City will provide oversight (Randy Richardson), samplers for the 12 hour daytime shift, one analyst (Teri Richardson), laboratory equipment, and most of the laboratory and sampling consumable items (sample bottles, chemicals, etc). ESL will provide collaboration (Stan Morrison), one full time analyst (Sarah Morris), 2 night-shift samplers (probably Brandon Danforth and Dave Traub), and sampling equipment.

Table 1 lists the personnel required, including those provided by the Tuba City project. Total cost to the ESL is approximately $26, 184 (Table 2).

Schedule:

The plant is currently scheduled to shutdown on January 19, 2004 and startup is anticipated on January 26. The schedule for the rebound study will need to be modified to accommodate changes to the shutdown/startup schedule. Baseline samples will be collected January 18 by Tuba City site personnel. ESL personnel will mobilize to the site on January 25 to prepare for startup. Four-hour samples will be collected January 26 and 27. Twelve-hour samples will be collected January 28 through 31. A report will be prepared in February.

Table 1. Labor (nc = no charge to ESL)

Person	**Hrs**	**Activities**
Task 1. Field Sampling		
Sarah M.	4	Coordination
Tim B.	32	On site collaboration (2 days at site)
Dave T.	48	Travel and night shift sampling for 2 nights
Brandon D.	48	Travel and night shift sampling for 2 nights
Operators	40 (nc)	Day shift sampling for 6 days.
Randy R.	20 (nc)	Oversight
Tasks 2 and 3. Analysis and Data Entry		
Sarah M.	106	Travel to site. Analysis.
Terry R.	60 (nc)	Analysis.
Task 4. Interpretation and Report		
Stan M.	40	Data interpretation. Report preparation.
Tim B.	20	Data interpretation. Report preparation.
Randy R.	40 (nc)	Data interpretation. Report preparation.
Sarah M.	10	Prepare data for report
Dennis D.	30	Report preparation.
Wyatt S.	10	Figure preparation
Clay C.	4	Review Report

Table 2. ESL Budget (Fully Burdened Costs)

	Task 1	**Tasks 2 and 3**	**Task 4**
Labor	$8258	$5150	$8213
Travel	$1883	$2079	0
Supplies	$280	$140	0
Subtotal	*$10,421*	*$7369*	*$8213*
TOTAL ESL	**$26,003**		

AMPAD EFFICIENCY LINE® 22-210

TUB01-09-01

Tuba City Well Rebound Test 1/2004

1/15/2004	1	Baseline samples obtained from extraction wells.
1/19/2004	2	Treatment system and extraction wells shut down for annual maintenance
1/28/2004	3	Treatment system and wells restarted. Sampling of extraction wells starts
	4	approx 30" after pumps turned on. Rounds 1 through 9 of sampling occur
	5	every 4 hours.
1/30/2004	6	0630 Treatment system shutdown. Valve failure
1/31/2004	7	0015 System restated sampling resumes.
	8	0400 Round 11
	9	1300 Round 12
2/1/2004	10	1300 Round 13
2/2/2004	11	1300 Round 14
2/3/2004	12	0900 Round 15 Last round of sampling
	13	
	14	
	15	Samples were brought to the Tuba City Lab. Conductivity and pH were measured
	16	on all unpreserved samples. Instrument calibration and checks were performed.
	17	Samples were filtered – some discarded after filtration through 0.45 μm syringe
	18	filter. ML 61-90 retained for analysis. Samples refrigerated until analysis
	19	performed
	20	
	21	U, Cl, NO_3, SO_4 analyzed per ESL procedures (AP(U-2), AP(Cl-2), AP(NO_3-4), AP(SO_4-4))
	22	
	23	Spikes, blanks, and standards performed on all analytes.
	24	
	25	Dionex 120 system failure (suppressor) caused delays in IC analysis. Some
	26	samples returned to GJ ESL for analysis.
	27	
	28	Chemcheck KPA11 working well
	29	
	30	Data entered into Excel spread sheet. QA check on all data. SM. 3/3/2004
	31	

Tuba City Extraction Well Samples TUB01-09-02

Date: 1/15/04 Data Set: BASELINE

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	10:21	6.67	3400	306	78.9	494.6	1212.8
1102	10:24	6.64	3600	366	79.3	606.1	1286.8
1103	10:40	6.61	6210	468	138.4	1094.4	2345.2
1104	10:43	6.72	3220	96.2	81.3	542.0	969.1
1105	10:46	6.99	2120	604	45.8	282.3	638.2
1106	10:48	7.16	924	279	21.1	106.1	210.5
1107	10:50	6.95	1183	31.8	283	193.7	228.9
1108	10:52	6.64	4310	206	74.5	670.2	1625.6
1109	10:54	6.67	3000	228	50.6	410.9	1135.3
1110	10:57	6.84	1327	58.9	24.3	187.1	349.8
1111	10:59	6.76	2520	128	39.5	351.4	828.7
1112	11:04	7.22	792	25.1	15.1	112.4	158.3
1113	11:06	7.95	349	3.3	10.1	35.4	27.9
1114	11:08	7.20	1265	21.9	23.8	203.3	272
1115	11:11	6.96	1493	38.2	25.6	247.8	344.2
1116							
1117							
1118	11:19	6.69	3610	53.2	58.0	548.3	1320.8
1119	10:37	6.64	3060	159	69.0	470.8	976.7
1120	10:35	6.69	3080	437	76.5	267.3	1217.0
1121	10:32	6.59	3280	302	62.0	211.5	1232.7
1122	10:28	6.72	2800	263	62.7	276.3	1034.1
1123	11:39	7.25	958	42.7	23.8	112.3	216.3
1124	11:26	7.03	2420	106	68.7	438.8	678.8
1125	11:24	7.72	569	15.1	15.6	60.7	95.0

STDS. AT END 180 - 184.2
1000 - 1003

TUCC01-04-03

Tuba City Extraction Well Samples All pumps turned on @ ~~0~~ 2108 1-28-04

Date: 1-28-04 Data Set: 1st Round

Well No.	Time	pH	~~Cond.~~ µS/cm Cond.	ug/L Uranium	Chloride	Nitrate	Sulfate
1101	2116	6.89	3460	344	82	504	1287
1102	2121	6.71	4780	852	127	1046	1756
1103	2138	6.60	3680	220	852	679	1159
1104	2152	6.56	7110	252	188	1471	2549
1105	2154	6.78	3790	1648	88	557	1358
1106	2157	6.90	3540	1914	80	539	1164
1107	2200	6.53	4710	10	108	1157	1252
1108	2202	6.54	5990	329	107	1039	2438
1109	2205	6.23	10190	808	145	1548	5556
1110	2207	6.73	1676	92	32	217	491
1111	2209	~~7.30~~ 6.62	3650	234	63	540	1383
1112	2230	6.82	1980	101	34	360	539
1113	2220	7.57	541	6.4	20	72	62
1114	2225	7.17	1321	24	25	201	274
1115	2223	6.64	4360	251	66	674	1711
1116	off	—	—	—	—	—	—
1117	off 2217	—	—	—	—	—	—
1118	2218	6.60	3750	57	62	598	1425
1119	2142	7.40	511	17	15	45	85
1120	2145	6.57	6580	1264	193	647	3115
1121	2148	6.42	6510	966	141	561	3298
1122	2112	6.51	6830	1040	157	845	3136
1123	2129	7.03	2460	159	68	381	751
1124	2132	6.94	3070	121	93	591	934
1125	2135	7.57	762	14.4	20	107	151

TUB01-04-04

1 of 2

#1

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/28/04	22:54	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	✓	
pH 7	6.9	7.1	7.03	✓	
Slope	92	102	99	✓	[redacted]

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/28/04	23:00	Standard	BvD	7.03	
	23:11	1101		6.89	
	23:10	1102		6.71	
	23:32	1103		6.60	
	23:23	1104		6.56	
	23:16	1105		6.79	
	23:07	1106		6.90	
	23:22	1107		6.53	
	23:14	1108		6.54	
	23:29	1109		6.23	
	23:36	1110		6.73	
	23:17	Standard		7.10	
	23:12	1111		6.62	
	23:02	1112		6.82	
	23:05	1113		7.57	
	23:34	1114		7.17	
	23:15	1115		6.64	
	23:33	1118		6.66	
	23:30	1119		7.40	
	23:37	1120		6.57	
↓	23:04	1121	↓	6.42	

TUB01-09-05

#1

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/28/04	22:54	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	✓	
pH 7	6.9	7.1	7.03	✓	
Slope	92	102	99	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/28/04	23:28	Standard	BVD	7.09	
	23:09	1122	"	6.51	
	23:20	1123	"	7.03	
	23:25	1124	"	6.94	
↓	23:26	1125	↓	7.57	
		Standard			

3/4/2004

TUB01-09-06

Special Conductivity Analyses using Hach sension 7

Date 1-28-04 #1

Calibration Results			Time	Analyst
			2255	D. Travis
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
2256	Standard	DT	1000	
2312	1101		3.46. m	
2312	1102		4.78 m	
2333	1103		3.68 m	
2324	1104		7.11 m	
2318	1105		3.79 m	
2309	1106		3.54 m	
2323	1107		4.71 m	
2315	1108		5.99 m	
2330	1109		10.19 m	
2305	1110	~~1676 DT~~	1676 µ	1676 @ 2337
2317	Standard		1001 µ	
~~2203~~	11 11	@ 2342	~~1984 µ DT~~	3.65 m
2340	1112		1980 µ	
2307	1113	DT	541 µ	
2335	1114		1321 µ	
2316	1115		4.36 m	
2334	~~1116~~ 1118		3.75 m	
2331	~~1117~~ 1119		511 µ	
2338	1120		6.58 m	
2306	1121		6.51 m	
2310	1122		6.83 m	16.3°

TUBOI-09-07

2072

Special Conductivity Analyses using Hach sension 7

Date 1/28/04 #1

Calibration Results			Time	Analyst
				D. TRAUB
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
2336	Standard	DT	1000	
2321	1123		2.46 m	
2336	1124		3.07 m	
2327	1125		762 u	
	Standard			

3/4/2004

TUB01-09-08

Tuba City Extraction Well Samples

Pumps back on @ 1:15 am

Date: 1-29-04

Data Set: 2nd Round.

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0122	6.63	3270	292	73	442	1171
1102	0124	6.52	4270	491	91	773	1584
1103	0130	6.46	4590	210	96	903	1581
1104	0142	6.46	5930	198	149	1137	2023
1105	0144	6.68	3440	1261	77	493	1147
1106	0146	6.81	3440	1660	74	511	1129
1107	0148	6.50	3930	141	96	978	2355
1108	0150	6.41	5830	293	96	980	2467
1109	0153	6.30	7050	607	104	1135	3253
1110	0155	6.56	2960	199	50	467	998
1111	0157	6.57	3250	185	53	458	1164
1112	0216	6.89	1205	44	27	182	269
1113	0214	7.75	328	3.6	10	38	30
1114	0211	7.06	1316	11	23	212	284
1115	0209	6.73	2490	98	48	382	742
1116	off						
1117	off						
1118	0202	6.58	3890	57	62	641	1440
1119	0133	6.79	1278	77	34	164	335
1120	0136	6.43	6360	1052	175	623	3031
1121	0138	6.38	6460	808	140	528	3347
1122	0218	6.45	6740	781	156	804	3204
1123	0225	6.95	1425	70	9	36	70
1124	0222	6.83	3070	116	88	572	909
1125	0220	7.43	814	10	20	108	158

TUB01-09-09

1 of 2

Special pH Analyses using Orion 420A

Round 2

Calibration Results			Date	Time	Analyst
			1/29/04	02:35	Brandon Dalforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.97	✓	
pH 7	6.9	7.1	7.03	✓	
Slope	92	102	102.3	X	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/29/04	02:37	Standard	BVD	7.03	
	02:40	1101		6.63	
	02:42	1102		6.52	
	02:44	1103		6.46	
	02:46	1104		6.46	
	02:47	1105		6.68	
	02:48	1106		6.81	
	02:49	1107		6.50	
	02:50	1108		6.41	
	02:52	1109		6.[illegible]30	
	02:[illegible]9	1110		6.[illegible]56	
	02:54	Standard		6.98	
	03:01	1111		6.57	
	03:02	1112		6.89	
	03:03	1113		7.75	
	03:05	1114		7.06	
	03:06	1115		6.73	
	03:07	1118		6.58	
	03:09	1119		6.79	
	03:10	1120		6.43	
	03:12	1121		6.38	
↓	03:13	1122	↓	6.45	

TUB01-09-10

2 of 2

Round 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/29/04	02:35	BVD
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.97	✓	
pH 7	6.9	7.1	7.03	✓	
Slope	92	102	102.3	×	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/29/04	03:14	Standard	BVD	7.00	
↓	03:16	1123	↓	6.95	
	03:17	1124		6.83	
↓	03:18	1125	↓	7.43	
		Standard			

3/4/2004

TUB01-09-11

1 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-29-04 2nd Round

Calibration Results			Time	Analyst
			0237	DT
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard			
0245	1101	DT	3.27 m	
0245	1102		4.27 m	15.9°
0246	1103		4.59 m	
0247	1104		5.93 m	
0249	1105		3.44 m	3.43 @ 0252
0250	1106		3.44 m	
0252	1107		3.93 m	
0253	1108		5.83 m	
0255	1109		7.05 m	
0300	1110		2.96 m	
0257	Standard		1001	
0302	1111		3.25 m	
0303	1112		1205 µ	
0305	1113		378 µ	
0306	1114		1316 µ	
0307	1115		2.49 m	
0308	1118		3.89 m	
0310	1119		1278 µ	
0311	1120		6.36 m	16.8
0313	1121		6.46 m	
0314	1122	↓	6.74 m	

TUB01-09-12

2 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-29-04 2nd Round

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
0316	Standard	DT	1000 u	
0318	1123	↓	1425 u	
0318	1124		3.07 m	
0319	1125	↓	814 u	
	Standard			

3/4/2004

TUBO1-09-13

Tuba City Extraction Well Samples

Date: 1-29-04 Data Set: 3rd Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0508	6.68	3370	293	75	457	1215
1102	0511	6.58	4190	420	91	773	1564
1103	0517	6.51	5050	242	105	1034	1829
1104	0528	6.54	5800	124	150	1145	2038
1105	0531	6.74	3760	1339	.84	555	1336
1106	0533	6.88	3450	1687	75	516	1155
1107	0535	6.56	4020	145	92	911	1051
1108	0537	6.48	5920	304	98	1000	2540
1109	0539	6.40	6600	487	99	1070	3252
1110	0541	6.68	1644	92	29	221	482
1111	0543	~~7.~~ 6.64	3180	196	53	455	1157
1112	0559	~~6.~~ 6.90	1627	64	28	284	429
1113	0557	~~6.~~ 7.75	433	4.6	12	52	43
1114	0555	7.16	1261	22	22	207	274
1115	0553	6.84	2120	76	44	332	588
1116	OFF						
1117	OFF						
1118	0548	6.66	4090	63	65	682	1585
1119	0520	6.88	1364	79	37	181	360
1120	0522	6.57	5890	852	162	576	2833
1121	0525	6.47	6460	513	143	534	3365
1122	0505	6.54	6680	556	154	792	3157
1123	0607	7.24	941	35	23	110	215
1124	0605	6.94	3060	110	90	589	933
1125	0603	7.51	830	25	20	114	173

TUB01-09-14

3rd Round

1 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/29/04	6:12	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	✓	
pH 7	6.9	7.1	6.97	✓	
Slope	92	102	102.3	x	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/29/04	6:14	Standard	BVD	6.97	
	6:17	1101		6.68	
	6:18	1102		6.58	
	6:19	1103		6.51	
	6:21	1104		6.54	
	6:22	1105		6.74	
	6:23	1106		6.88	
	6:24	1107		6.56	
	6:25	1108		6.48	
	6:26	1109		6.40	
	6:27	1110		6.68	
	6:29	Standard		7.06	
	6:30	1111		6.64	
	6:31	1112		6.90	
	6:32	1113		7.75	
	6:33	1114		7.16	
	6:35	1115		6.84	
		~~1116~~			
		~~1117~~			
	6:36	1118		6.66	
	6:38	1119		6.88	
	6:39	1120		6.57	

TUB01-09-15

3rd Round

2092

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/29/04	6:12	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	✓	
pH 7	6.9	7.1	6.97	✓	
Slope	92	102	102.3	X	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/29/04	6:40	Standard	BVD	7.10	
	6:41	1121		6.47	
	6:42	1122		6.54	
	6:43	1123		7.24	
	6:44	1124		6.94	
	6:45	1125		7.51	
		Standard			
				3/4/2004	

BVD

TUB01-09-16

1 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-29-04 3rd Round

Calibration Results			Time	Analyst
			0612	DT
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	19.3° yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard	DT	~~3.33~~ m	16.9°
0619	1101		~~4.19~~ m DT 1-29	3.33m
0620	1102		~~5.05~~ m	4.19m
0621	1103		5.05 m	
0623	1104		5.80m	
0624	1105		3.76m	
0625	1106		3.45m	
0626	1107		4.02m	
0627	1108		5.92m	
0629	1109		6.60m	
0630	1110		1644 u	
0632	Standard		1001	
0631	1111		3.18m	
0634	1112		1627 u	
0635	1113		433 u	
0637	1114		1261 u	
0638	1115		2.12m	
0639	1118		4.09m	
0640	1119		1364 u	
0641	1120		5.89m	
0642	1121		~~6.47~~m DT	6.46m
0644	1122		6.68m	17.3°

TUB01-09-17

2 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-29-04 3rd Round

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
0646	Standard	DT	999 u	
0647	1123	↓	941 u	
0648	1124		3.06 m	
0649	1125	↓	830 u	
	Standard			

3/4/2004

TJB01-09-18

Tuba City Extraction Well Samples

Date: 1/29/2004 Data Set: 4th round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0902	6.68	3390	206	79	498	1307
1102	0904	6.60	4160	248	96	831	1713
1103	0911	6.50	5410.	191	134	1327	2355
1104	0919	6.55	5870	176	~~222~~ 162	1258	2288
1105	0921	6.74	3700.	1268	83	551	1318
1106	0923	6.86	3130.	1421	68	449	1011
1107	0925	6.58	3870	140	92	894	1079
1108	0927	6.49	5810.	236	96	974	2461
1109	0928	6.41	6020	437	87	941	2898
1110	0930	6.70	1639	91	29	224	485
1111	0932	6.64	2920	155	57	408	1024
1112	0934	6.95	1530.	56	27	259	394
1113	0936	7.69	462	5.4	12	58	51
1114	0937	7.13	1270.	22	24	210	280
1115	0939	6.82	1883	61	32	313	505
1116		—	—	—	—	—	—
1117		—	—	—	—	—	—
1118	0945	6.65	4030	63	62	653	1558
1119	0914	6.76	1494	65	36	212	395
1120	0915	6.54	5320	506	145	508	2502
1121	0917	6.41	6490.	439	140	528	3320
1122	0900	6.53	6640	315	150	770	3069
1123	0906	7.17	1129.	40	27	145	275
1124	0907	6.94	3080.	112	90	585	929
1125	0909	7.49	827	23	20	112	170

TUB01-09-19

1 of 1 sm

Round 4

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1-29-04	1030	JeriR
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.01	yes	@19.5°C
pH 7	6.9	7.1	7.00	yes	@ 19.5°C
Slope	92	102	—	—	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1-29-04	1138	Standard	JeriR	3.98@ 19.8°C	4.00 std
		1101-4		6.68 @ 18.8°C	
		1102-4		6.60 @ 18.2°C	
		1103-4		6.50 @ 18.2°C	
		1104-4		6.55@ 18.4°C	
		1105-4		6.74@ 18.8°C	
		1106-4		6.86@ 18.9°C	
		1107-4		6.58@ 18.4°C	
		1108-4		6.49 @ 18.0°C	
		1109-4		6.41@ 18.1°C	
		1110-4		6.70@ 18.5°C	
		Standard		7.02@ 19.7°C	
		1111-4		6.64@ 18.4°C	
		1112-4		6.95@ 18.6°C	
		1113-4		7.69@ 18.6°C	
		1114-4		7.13 @ 18.5°C	
		1115-4		6.82 @ 18.7°C	
		1116-4		—	
		1117-4		—	
		1118-4		6.65@18.7°C	
		1119-4		6.76@ 18.7°C	
		1120-4	JeriR	6.54@ 18.9°C	
1-29-04	1215	Standard	JeriR	7.04@ 19.8°C	
		1121-4		6.41 @ 19.1°C	
		1122-4		6.53 @ 18.8°C	
		1123-4		7.17@ 18.9°C	
		1124-4		6.94@ 19.0°C	
		1125-4	JeriR	7.49@ 19.3°C	

TUB01-09-20

1 of 2

Special Conductivity Analyses using Hach sension 7 Round 4

Date 1-29-04 Extraction Wells

Calibration Results			Time	Analyst
			1040	Jeri R
Standard	Minimum	Maximum	Reading	Acceptable?
99.7 µS/cm	89.7	109.7	107.0 @ 20.6°C	yes
1006 µS/cm	905	1107	1017 @ 20.4°C	yes
10154 µS/cm	9138	11,169	10340 @ 20.5°C	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1055	Standard	Jeri	181.3 @ 19.1°C	std 180.0 µS/cm
	1101-4		3.39mS @ 17.6°C	
	1102-4		4.16mS @ 17.0°C	
	1103-4		5.41mS @ 17.0°C	
	1104-4		5.87mS @ 17.3°C	
	1105-4		3.70mS @ 17.7°C	
	1106-4		3.13mS @ 18.3°C	
	1107-4		3.87mS @ 17.6°C	
	1108-4		5.81mS @ 17.1°C	
	1109-4		6.02mS @ 17.1°C	
	1110-4		1639µS @ 17.4°C	
	Standard		182.4 @ 19.8°C	
	1111-4		2.92mS @ 17.5°C	
	1112-4		1530µS @ 18.3°C	
	1113-4		462µS @ 18.2°C	
	1114-4		1270µS @ 17.7°C	
	1115-4		1883µS @ 17.8°C	
	1116-4		———	
	1117-4		———	
	1118-4		4.03mS @ 17.9°C	
	1119-4		1494µS @ 17.9°C	
1130	1120-4		5.32mS @ 18.6°C	

TUB01-09-21

Special Conductivity Analyses using Hach sension 7

Date 1-29-04 Extraction Wells Round 4 (page 2)

Calibration Results			Time	Analyst
				Teri R
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1131	Standard	Teri R	182.1 @ 20.1°C	
	1121-4		6.49 mS @ 18.7°C	
	1122-4		6.64 mS @ 18.4°C	
	1123-4		1129 µS @ 18.3°C	
	1124-4		3.08 mS @ 18.3°C	
1136	1125-4		827 µS @ 18.9°C	
	Standard			

3/4/2004

TUB01-09-22

Tuba City Extraction Well Samples

Date: 1/29/2004 Data Set: 5th round ~ 1300 hrs.

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	1304	6.74	3380	232	77	491	1261
1102	1306	6.73	4110	326	89	760	1559
1103	1316	6.49	5600	180	118	1159	2361 ~~2090~~
1104	1327	6.53	5810	150	152	1167	2088
1105	1329	6.74	3660	1217	83	555	1303
1106	1332	6.91	2840	1202	63	402	912
1107	1333	6.61	3450	120	80	731	878
1108	1335	6.48	5680	275	94	962	2509
1109	1337	6.50	5460	386	82	855	2534
1110	1341	6.78	1609	82	29	219	472
1111	1342	6.65	2860	156	57	405	1011
1112	1345	7.03	1402	50	26	232	351
1113	1347	7.75	458	5.5	13	57	50
1114	1349	7.13	1264	22	25	223	294
1115	1350	6.87	1810	56	31	304	483
1116	~~1355~~	—	—	—	—	—	—
1117	—	—	—	—	—	—	—
1118	1355	6.62	4000	63	63	666	1559
1119	1318	6.67	1935	93	46	305	562
1120	1323	6.57	4800	572	131	450	2223
1121	1324	6.42	6450	408	146	553	3500
1122	1301	6.53	6490	424	155	793	3133
1123	1400	7.17	993	26	24	123	233
1124	1311	6.92	3060	110	90	582	922
1125	1313	7.46	823	24	20	114	174

TUB01-09-23

1061

Round 5

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/29/04	1535	Teri R.
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	yes	@ 16.8°C
pH 7	6.9	7.1	7.04	yes	@ 16.7°C
Slope	92	102	99.4	yes	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1-29-04	1537	Standard	Teri R	7.04@16.7°C	
		1101-5		6.74@20.2°C	
		1102-5		6.73 @ 20.3°C	
		1103-5		6.49 @ 20.3°C	
		1104-5		6.53@20.5°C	
		1105-5		6.74@20.7°C	
		1106-5		6.91 @ 20.6°C	
		1107-5		6.61@ 20.3°C	
		1108-5		6.48@ 20.1°C	
		1109-5		6.50 @ 20.0°C	
		1110-5		6.78 @ 19.9°C	
		Standard		7.06@ 17.9°C	
		1111-5		6.65@ 19.7°C	
		1112-5		7.03 @ 19.7°C	
		1113-5		7.75 @ 19.6°C	
		1114-5		7.13 @ 19.8°C	
		1115-5		6.87@ 20.2°C	
		1118-5		6.62@ 20.1°C	
		1119-5		6.67@ 19.9°C	
		1120-5		6.57@ 19.7°C	
		1121-5		6.42@ 19.8°C	
		1122-5		6.53@ 20.1°C	
		Std		7.06@ 18.7°C	
		1123-5		7.17 @ 20.2°C	
		1124-5		6.92@ 20.2°C	
1-29-04		1125-5		7.46@ 20.1°C	

TUB01-09-24 161

Special Conductivity Analyses using Hach sension 7

Date 1/29/2004 ~1300hrs rounds

Calibration Results			Time	Analyst
			1420	Jeri R
Standard	Minimum	Maximum	Reading	Acceptable?
99.7 µS/cm	89.7	109.7	106.1 @ 20.9°C	yes
1006 µS/cm	905	1107	1012 @ 20.9°C	yes
10154 µS/cm	9138	11169	10260 @ 21.0°C	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
~~1424~~ 1424	Standard	Jeri R	180.5 µS/cm	
	1101-5		3380 µS/cm @ 19.1°C	
	1102-5		4110 µS/cm @ 19.4°C	
	1103-5		5600 µS/cm @ 19.7°C	
	1104-5		5810 µS/cm @ 20.0°C	
	1105-5		3660 @ 20.4°C	
	1106-5		2840 @ 19.5°C	
	1107-5		3450 @ 18.8°C	
	1108-5		5680 @ 19.1°C	
	1109-5		5460 @ 18.9°C	
	1110-5		1609 @ 18.8°C	
	Standard		180.6 @ 20.7°C	
	1111-5		2860 @ 19.0°C	
	1112-5		1402 @ 18.9°C	
	1113-5		458 @ 18.6°C	
	1114-5		1264 @ 18.6°C	
	1115-5		1810 @ 19.3°C	
	1118-5		4000 @ 19.7°C	
	1119-5		1935 @ 19.1°C	
	1120-5		4800 @ 18.7°C	
	1121-5		6450 @ 18.6°C	
	1122-5		6490 @ 19.4°C	
	1123-5		993 @ 19.4°C	
	1124-5		3060 @ 19.2°C	
	1125-5		832 @ 19.4°C	
	Std		180.0 @ 21.0°C	

TUB01-09-25

Tuba City Extraction Well Samples

Date: 1-29-04 Data Set: Sixth round ≈ 1700 hrs.

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	1704	6.67	3390	306	79	506	1288
1102	1706	6.58	4090	420	89	761	1565
1103	1717	6.49	5740	349	123	1207	2419
1104	1725	6.55	5780	167	154	1176	2110
1105	1730	6.71	3630	1409	84	560	1314
1106	1727	6.91	2600	1401	59	366	826
1107	1725	6.59	3250	115	77	907	1011
1108	1723	6.53	5660	223	98	982	2467
1109	1720	6.45	5040	432	77	810	2276
1110	1719	6.73	1577	81	30	221	471
1111	1716	6.60	2920	160	45	451	1071
1112	1713	7.01	1388	62	23	247	356
1113	1710	7.74	444	5.9	13	55	47
1114	1709	7.16	1261	24	23	215	289
1115	1707	6.83	1825	59	32	318	498
1116	~~1702~~	—	—	—	—	—	—
1117	—	—	—	—	—	—	—
1118	1702	6.62	4000	66	66	702	1598
1119	1719	6.64	2250	109	54	372	700
1120	1720	6.58	4370	546	123	417	2024
1121	1722	6.43	6430	720	144	546	3408
1122	1700	6.50	6370	735	152	783	3177
1123	1710	7.18	907	39	23	111	210
1124	1712	6.90	3060	112	93	609	964
1125	1714	7.47	827	25	21	118	180

TUB01-09-26

1 of 1

Special pH Analyses using Orion 420A Round 6

Calibration Results			Date	Time	Analyst
			1-29-04		JriR
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1			
pH 7	6.9	7.1			
Slope	92	102			

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
129-04	1730	Standard	JriR	7.00@20.6°C	
		1101-6		6.67@17.2°C	
		1102-6		6.58@ 16.9°C	
		1103-6		6.49@16.8°C	
		1104-6		6.55@16.4°C	
		1105-6		6.71@ 17.4°C	
		1106-6		6.91@ 17.7°C	
		1107-6		6.59 @17.5°C	
		1108-6		6.53@ 17.7°C	
		1109-6		6.45@18.1°C	
		1110-6		6.73@17.7°C	
		Standard		7.04@20.6°C	
		1111-6		6.60@17.7°C	
		1112-6		7.01@16.5°C	
		1113-6		7.74@17.5°C	
		1114-6		7.16@17.6°C	
		1115-6		6.83@17.8°C	
		1118-6		6.62@18.5°C	
		1119-6		6.64@17.9°C	
		1120-6		6.58@17.9°C	
		1121-6		6.43@17.6°C	
		1122-6		6.50@17.8°C	
		Std		7.03@20.8°C	
		1123-6		7.18@18.3°C	
		1124-6		6.90@18.4°C	
1-29-04	1825	1125-6		7.47@18.3°C	

TUB01-09-27

Special Conductivity Analyses using Hach sension 7

Date 1-29-04

Round 6

Calibration Results			Time	Analyst
				JuriR
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1725	Standard	JuriR	180.3@ 22.2°C	
	1101-6		3390 @ 16.9°C	
	1102-6		4090 @ 16.7°C	
	1103-6		5740 @ 16.9°C	
	1104-6		5780 @ 16.2°C	
	1105-6		3630 @ 17.3°C	
	1106-6		2600 @ 17.7°C	
	1107-6		3250 @ 17.4°C	
	1108-6		5660 @ 17.5°C	
	1109-6		5040 @ 18.0°C	
	1110-6		1577 @ 17.6°C	
	Standard		179.6 @ 21.7°C	
	1111-6		2920 @ 17.5°C	
	1112-6		1388 @ 16.2°C	
	1113-6		444 @ 17.4°C	
	1114-6		1261 @ 17.5°C	
	1115-6		1825 @ 17.7°C	
	1118-6		4000 @ 18.4°C	
	1119-6		2250 @ 17.7°C	
	1120-6		4370 @ 17.9°C	
	1121-6		6430 @ 17.5°C	
	1122-6		6370 @ 17.7°C	
	Stand		179.0 @ 21.6°C	
	1123-6		907 @ 18.1°C	
	1124-6		3060 @ 18.3°C	
1824	1125-6		827 @ 18.2°C	

TUB01-09-28

Tuba City Extraction Well Samples

Date: 1-29-04 Data Set: 7th Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	2120	6.63	3400	289	79	517	1306
1102	2118	6.56	4080	495	91	775	1598
1103	2128	6.45	5910	363	137	1236	2403
1104	2140	6.48	5740	185	154	1172	2111
1105	2142	6.68	3590	1310	84	560	1314
1106	2145	6.89	2320	996	55	327	735
1107	2146	6.60	3000	103	73	638	771
1108	2148	6.44	5570	227	97	989	2366
1109	2150	6.43	4480	402	71	717	2101
1110	2152	6.72	1520	77	29	218	457
1111	2153	6.59	2820	144	45	437	1032
1112	2209	6.96	1219	48	21	208	304
1113	2207	7.77	425	5.3	13	51	44
1114	2205	7.11	1247	23	24	215	289
1115	2203	6.80	1760	52	31	304	482
1116	Off	~~6.61~~					
1117	Off	~~6.57~~					
1118	2158	~~6.61~~ 6.54	3990	66	66	697	1592
1119	2131	~~6.57~~ 6.40	2630	120	61	448	862
1120	2133	~~6.5~~ 6.46	~~4080~~ 4030	528	115	381	1869
1121	2136	6.60	6380	735	146	554	3478
1122	2109	6.48	6270	702	151	768	3074
1123	2235	7.19	913	39	24	113	217
1124	2215	6.87	3060	116	94	616	1072
1125	2213	7.48	824	25	21	118	182

@ 2133, # 1120 pump came on as we entered pit

1123, pump was off on 1st visit, came on ~15 min later

TUB01-09-29

7th round

1 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/29/04	22:38	Brandon Dawson
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.95	✓	
pH 7	6.9	7.1	6.99	✓	
Slope	92	102	98.5	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/29/04	22:44	Standard	BVD	6.99	
	22:45	1101		6.63	
	22:46	1102		6.56	
	22:47	1103		6.45	
	22:48	1104		6.48	
	22:49	1105		6.68	
	22:50	1106		6.89	
	22:51	1107		6.60	
	22:52	1108		6.44	
	22:54	1109		6.43	
	22:55	1110		6.72	
	22:56	Standard		7.03	
	22:57	1111		6.59	
	22:58	1112		6.96	
	22:59	1113		7.77	
	23:00	1114		7.11	
	23:01	1115		6.80	
	23:02	1116		6.61	
	23:03	1119		6.57	
	23:04	1120		6.54	
	23:05	1121		6.40	
✓	23:06	1122	✓	6.48	

TUB01-09-30

7th round

2 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/29/04	23:38	Brian Dan Forth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.95	✓	
pH 7	6.9	7.1	6.99	✓	
Slope	92	102	98.5	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/29/04	23:08	Standard	BUD	7.04	
↓	23:09	1123	↓	7.19	
	23:10	1124		6.87	
	23:11	1125		7.48	
		Standard			
				3/4/2004	

TUB01-09-31

1 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-29-04 7th Round

Calibration Results			Time	Analyst
			2221	PGT
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard	DT		
2236	1101		3.40m	3400
2245	1102		4.08m	
2247	1103		5.91m	
2248	1104		5.74m	17.7°
2250	1105		3.59m	
2251	1106		2.32m	
2253	1107		3.00m	
2253	1108		5.57m	18.1°
2253	1109		4.48m	
2255	1110		1520μ	
2256	Standard		1000	20.5°
2257	1111		2.82m	
2258	1112		1219μ	
2259	1113		425μ	
2301	1114		1247μ	
2302	1115		1760μ	
2303	1118		3.99m	
2304	1119		2.63m	17.9°
2305	1120		4.03m	
2306	1121		6.38m	
2307	1122	↓	6.27m	6.27m

TUB01-09-32

2 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-29-04

7th Round

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
2309	Standard	DT	1000 µ	20.5°
2310	1123	↓	913 µ	
2312	1124		3.06m	
2313	1125	↓	824 µ	18.3°
	Standard		8m 2/4/2004	

TUB01-09-33

Tuba City Extraction Well Samples

Date: 1-30-04 Data Set: 8th Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0108	6.63	3420	332	81	530	1335
1102	0109	6.55	4050	478	92	783	1620
1103	0116	6.44	6050	365	144	1296	2532
1104	0126	6.49	5690	195	156	1176	2121
1105	0128	6.69	3550	1450	84	557	1308
1106	0130	6.90	2100	1069	52	291	648
1107	0132	6.63	2810	107	70	591	719
1108	0134	6.46	5520	297	98	993	~~2370~~ 3604
1109	0136	6.45	4190	356	68	676	1924
1110	0138	6.73	1502	77	29	214	441
1111	0140	6.61	2820	169	46	454	1014
1112	0156	7.04	1087	40	20	176	261
1113	0154	7.78	404	4.5	11	48	39
1114	0152	7.11	1246	23	23	208	279
1115	0151	6.80	1736	57	30	293	460
1116	off						
1117	off						
1118	0145	6.62	3970	65	73	805	1827
1119	0118	6.56	3090	168	71	523	1036
1120	0120	6.57	3786	550	108	348	1679
1121	0123	6.41	6350	756	141	528	3304
1122	0105	6.51	6040	788	142	712	2851
1123	0202	7.18	893	38	23	109	206
1124	0201	6.87	3060	116	92	604	955
1125	0159	7.49	813	24	30	110	177

TUB01-09-34

8th Round

1 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/30/04	2:08	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	7.01	✓	
pH 7	6.9	7.1	3.96	✓	
Slope	92	102	99.9	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/30/04	2:10	Standard	BVD	7.01	
	2:13	1101		6.63	
	2:14	1102		6.55	
	2:15	1103		6.44	
	2:16	1104		6.49	
	2:17	1105		6.69	
	2:18	1106		6.90	
	2:19	1107		6.63	
	2:20	1108		6.46	
	2:21	1109		6.45	
	2:22	1110		6.73	
	2:24	Standard		7.03	
	2:25	1111		6.61	
	2:26	1112		7.04	
	2:27	1113		7.78	
	2:28	1114		7.11	
	2:29	1115		6.80	
	2:30	1118		6.62	
	2:31	1119		6.56	
	2:32	1120		6.57	
	2:33	1121		6.41	
↓	2:34	1122	↓	6.51	

TUB01-09-35

8th Round

Special pH Analyses using Orion 420A

2 of 2

Calibration Results			Date	Time	Analyst
			1/30/04	2:08	BVD
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	7.01	✓	
pH 7	6.9	7.1	3.96	✓	
Slope	92	102	99.9	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/30/04	2:36	Standard	BVD	7.03	
↓	2:37	1123	↓	7.18	
	2:38	1124		6.87	
	2:39	1125		7.49	
		Standard			

BVD 3/4/2004

TUB01-09-36

Special Conductivity Analyses using Hach sension 7

1 of 2

Date 1-30-04 8th Round

Calibration Results			Time	Analyst
			0207	D.T.
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000µ	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard	DT	~~3.42m DT~~	
0213	1101	3.42m	~~4.05m DT~~	16.2°
0215	1102	4.05m	~~6~~ DT	
0216	1103		6.05m	
0218	1104		5.69m	
0219	1105		3.55m	
0220	1106		2.10m	
0221	1107		2.81m	
0222	1108		5.52m	
0223	1109		4.19m	17.3°
0224	1110		1502µ	
0226	Standard		1001	19.4°
0227	1111		2.82m	
0228	1112		1087µ	
0229	1113		404µ	
0231	1114		1246µ	
0232	1115		1736µ	
~~0233~~	~~1116~~		~~3.97m DT~~	
	~~1117~~			
0233	1118		3.97m	
0234	1119		3.09m	
0235	1120		3.78m	

TUB01-09-37

Special Conductivity Analyses using Hach sension 7

Date 1-30-04 8th Round

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
0236	Standard	DT	1001 µ	
0237	1121		6.35m	
0238	1122		6.04m	
0240	1123		893 µ	
0241	1124		3.06m	17.5°
0243	1125		813 µ	
	Standard			

3/4/2004

TUBO1-09-38

Tuba City Extraction Well Samples

Date: 1-30-04 Data Set: 9th Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0506	6.62	3460	356	87	523	1310
1102	0503	6.55	4030	551	89	754	1559
1103	0514	6.44	6170	437	133	1294	~~2386~~ 2351
1104	0524	6.53	5640	202	151	1132	2044
1105	0526	6.68	3480	1665	82	540	1266
1106	0528	6.81	1872	1048	55	250	541
1107	0529	6.67	2550	89	64	509	619
1108	0532	6.48	5500	309	96	967	2420
1109	0533	6.46	4060	400	65	629	1801
1110	0535	6.76	1477	77	~~29~~ 88	~~214~~ 618	~~1865~~ 936
1111	0537	6.60	2810	162	45	432	1010
1112	0553	7.05	906	32	18	141	207
1113	0550	7.77	391	4.6	11	47	38
1114	0548	7.11	1245	24	24	217	293
1115	0547	6.80	1714	59	31	296	462
1116	Off						
1117	Off						
1118	0542	6.62	3940	66	67	702	1569
1119	0516	6.56	3450	211	82	605	1165
1120	0518	6.58	3580	563	105	337	1611
1121	0520	6.40	6280	880	143	536	3370
1122	0502	6.53	5910	787	141	706	2834
1123	0600	7.32	701	29	19	75	145
1124	0558	6.88	3050	125	94	613	974
1125	0556	7.52	801	24	20	112	174

TUB01-09-39

9th Round

1 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/30/04	6:06	Brandon Dunforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.03	✓	
pH 7	6.9	7.1	7.03	✓	
Slope	92	102	99.7	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/30/04	6:07	Standard	BVD	7.03	
	6:09	1101		6.62	
	6:10	1102		6.55	
	6:11	1103		6.44	
	6:12	1104		6.53	
	6:13	1105		6.68	
	6:14	1106		6.81	
	6:15	1107		6.67	
	6:16	1108		6.48	
	6:17	1109		6.46	
	6:18	1110		6.76	
	6:19	Standard		7.03	
	6:20	1111		6.60	
	6:21	1112		7.05	
	6:22	1113		7.77	
	6:23	1114		7.11	
	6:24	1115		6.80	
		~~1116~~			
		1117			
	6:25	1118		6.62	
	6:26	1119		6.56	
↓	6:27	1120	↓	6.58	

TJB01-09-40

9th Round

Special pH Analyses using Orion 420A

2 of 2

Calibration Results			Date	Time	Analyst
			1/30/04	6:06	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.03	✓	
pH 7	6.9	7.1	7.03	✓	
Slope	92	102	98.7	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/30/04	6:29	Standard	BVD	7.05	
	6:30	1121		6.40	
	6:31	1122		6.53	
	6:32	1123		7.32	
	6:33	1124		6.88	
↓	6:34	1125	↓	7.52	
		Standard			

3/4/2004

TUB01-09-41

Special Conductivity Analyses using Hach sension 7

1 of 2

Date 1-30-04 9th ~~8th~~ Round

Calibration Results			Time	Analyst
			0604	DT
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	yes 19.3°

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
—	Standard	~~DT~~	—	
0609	1101		3.46m	
0610	1102		4.03m	
0612	1103		6.17m	16.9°
0613	1104		5.64m	
0614	1105		3.48m	
0615	1106		1872µ	
0616	1107		2.55m	
0617	1108		5.50m	
0619	1109		4.06m	
0620	1110		1477µ	
0623	Standard		1001	19.3°
0622	1111		2.81m	17.6°
0625	1112		906µ	
0625	1113		391µ	
0627	1114		1245µ	
0629	1115		1714µ	
0630	1118		3.94m	18.3°
0631	1119		3.45m	
0633	1120		3.58m	
0634	1121		6.28m	
0635	1122	↓	5.91m	

TUB01-09-42

Special Conductivity Analyses using Hach sension 7

2 of 2

Date 1-30-04

~~8~~ 9th Round

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
0637	Standard	DT	1000u	19.4°
0638	1123	↓	701u	
0640	1124		3.05m	
0641	1125	↓	801u	18.0°
	Standard			
			DM 3/4/2004	

TUB01-09-43

Tuba City Extraction Well Samples

Sys back on ~10 min ago

Date: 1-31-04 Data Set: 10th Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0014	6.73	3350	214	80	514	1311
1102	0016	6.66	4310	594	104	917	1676
1103	0022	6.57	4160	219	94	879	1525
1104	0031	6.52	7190	220	199	1575	2876
1105	0032	6.78	3560	1308	85	559	1291
1106	0034	6.94	3450	1828	79	533	1210
1107	0036	6.52	5140	192	124	1283	1503
1108	0037	6.46	7200	391	129	1338	3101
1109	0039	6.36	7290	654	104	1092	3057
1110	0041	6.57	4190	*274/300	75	714	1600
1111	0042	6.52	4940	351	79	796	1925
1112	0058	7.06	1535	62	26	266	376
1113	0056	7.52	782	13.1	20	134	126
1114	0054	7.12	1542	32	28	260	358
1115	0052	6.69	3390	184	47	537	1237
1116	OFF						
1117	Off						
1118	0047	6.67	4080	69	68	708	1504
1119	0024	6.67	3100	245	86	417	1081
1120	0026	6.53	6680	1057	188	661	3126
1121	0027	6.46	6580	828	144	534	3300
1122	0009	6.55	6680	739	153	783	3064
1123	0104	7.11	1399	67	34	198	537
1124	0102	6.97	3090	113	90	577	909
1125	0101	7.56	830	23	21	118	169

* Use 300 ug/L result, remade dilution

TJB01-09-44

10th Round

1 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/31/04	1:10	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	✓	
pH 7	6.9	7.1	7.02	✓	
Slope	92	102	98.0	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/31/04	1:12	Standard	BVD	7.02	
	1:15	1101		6.73	
	1:16	1102		6.66	
	1:18	1103		6.57	
	1:19	1104		6.52	
	1:20	1105		6.78	
	1:21	1106		6.94	
	1:22	1107		6.52	
	1:23	1108		6.46	
	1:24	1109		6.36	
	1:25	1110		6.57	
	1:26	Standard		7.10	
	1:27	1111		6.52	
	1:28	1112		7.00	
	1:29	1113		7.52	
	1:30	1114		7.12	
	1:31	1115		6.68	
	1:32	1118		6.67	
	1:33	1119		6.67	
	1:34	1120		6.53	
	1:35	1121		6.46	
↓	1:36	1122	↓	6.55	

TUB01-09-45

10th Round

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/31/04	1:10	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	3.99	✓	
pH 7	6.9	7.1	7.02	✓	
Slope	92	102	98.0	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1/31/04	1:38	Standard	BvD	7.11	
↓	1:39	1123	↓	7.11	
	1:41	1124		6.97	
↓	1:42	1125	↓	7.56	
		Standard			
				3/4/2004	

2 of 2

TUB01-09-46

1 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-31-04 Round 10

Calibration Results			Time	Analyst
			0109	DT
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard	DT		
0116	1101		3.35m	
0117	1102		4.31m	
0119	1103		4.16m	
0120	1104		7.19m	
0121	1105		3.56m	
0122	1106		3.45m	
0123	1107		5.14m	
0124	1108		7.20m	
0125	1109		7.29m	
0126	1110		4.19m	17.8°
0129	Standard		1002µ	20.7°
0129	1111		4.94m	
0130	1112		1535µ	
0131	1113		782µ	
0132	1114		1542µ	
0133	1115		3.39m	
0135	1118		4.08m	
0136	1119		3.10m	
0137	1120		6.68m	
0139	1121		6.58m	18.0°
0140	1122		6.68m	

TUB01-09-47

2 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-31-04 Round 10

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
0141	Standard	DT	1001 µ	20.6°
0141	1123	"	1394 µ	
0143	1124		3.03 m	
0144	1125		830 µ	
	Standard		1001 µ 3/4/2004 SM	

TUB01-09-48

Tuba City Extraction Well Samples

Date: 1-31-04 Data Set: 11th Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0402	6.65	3450	214	80	509	1269
1102	0404	6.58	4070	399	89	737	1515
1103	0409	6.46	6090	272	129	1245	2357
1104	0418	6.57	5280	166	142	1027	1840
1105	0420	6.73	3380	1081	79	513	1152
1106	0421	6.94	1713	635	~~1383~~ 30	222	465
1107	0423	6.71	2460	74	61	472	573
1108	0425	6.52	5070	279	99	978	2473
1109	0426	6.47	4460	327	73	718	1892
1110	0428	6.73	1523	64	30	216	431
1111	0430	6.62	2950	162	46	444	1055
1112	0444	7.18	973	29	18	148	219
1113	0442	7.87	388	3.9	12	42	34
1114	0441	7.13	1285	23	24	216	286
1115	0439	6.89	1857	52	32	309	483
1116	OFF	~~6.68~~					
1117	Off	~~6.88~~					
1118	0434	6.68	3920	63	65	664	1449
1119	0411	6.60	3450	209	81	550	1220
1120	0413	6.63	3300	364	83	294	1374
1121	0415	6.46	6310	732	141	522	3204
1122	0400	6.56	6070	594	144	716	2793
1123	0556*	7.21	943	35	24	116	216
1124	0452	6.91	3070	106	93	597	934
1125	0450	7.53	824	25	20	~~108~~ 112 SM	172

Sys shut down @ last well

TUB01-09-49 11th Round

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1-31-04	5:27	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.01	✓	
pH 7	6.9	7.1	7.08	✓	
Slope	92	102	99.6	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1-31/04	5:28	Standard	BUD	7.08	
	5:30	1101		6.65	
	5:32	1102		6.58	
	5:33	1103		6.46	
	5:34	1104		6.57	
	5:35	1105		6.73	
	5:36	1106		6.94	
	5:37	1107		6.71	
	5:38	1108		6.52	
	5:39	1109		6.47	
	5:40	1110		6.73	
	5:41	Standard		7.07	
	5:42	1111		6.62	
	5:43	1112		7.18	
	5:44	1113		7.87	
	5:45	1114		7.13	
	5:46	1115		6.89	
	5:48	1118		6.68	
	5:49	1119		6.60	
	5:50	1120		6.63	
	5:51	1121		6.46	
↓	5:52	1122	↓	6.56	

TUB01-09-~~B~~50
SM.

11th Round 2nd

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1-31-04	5:27	Brandon Danforth
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.01	✓	
pH 7	6.9	7.1	7.08	✓	
Slope	92	102	99.8	✓	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
1-31-04	~~5:54~~ ~~1-31-04~~	Standard	BVD	7.08	
↓	6:00	1123	↓	~~6~~ 7.21	
	5:55	1124		6.91	
↓	5:56	1125	↓	7.53	
		Standard			
			SM 2/4/2004		

TUB01-09-51

1 of 2

Special Conductivity Analyses using Hach sension 7

Date 1-31-04 11th Round

Calibration Results			Time	Analyst
			0524	DT
Standard	Minimum	Maximum	Reading	Acceptable?
1000			1000	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard	DT	—	
0531	1101		3.45m	
0532	1102		4.07m	
0534	1103		6.09m	
0535	1104		5.28m	16.6°
0536	1105		3.38m	
0537	1106		1713µ	
0538	1107		2.46m	
0539	1108		5.70m	
0540	1109		4.46m	
0542	1110		1523µ	
0545	Standard		1000µ	20.1°
0544	1111		2.95m	
0547	1112		973µ	
0548	1113		388µ	
0549	1114		1285µ	
0550	1115		1857µ	
0552	1118		3.92m	17.9°
0553	1119		3.45m	
0559	1120		3.30m	
0600	1121		6.31m	
0602	1122	↓	6.07m	

TUB01-09-52

-- 258

Special Conductivity Analyses using Hach sension 7

Date 1-31-04 11th Round

Calibration Results			Time	Analyst
				DT
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
0606 ~~0603 DT~~	Standard	DT	~~943 µ DT~~	1001 @ 20.2°
0603 0604	1123	↓	943 µ	
0604	1124		3.07m	
0607	1125		824 µ	
	Standard			
			7/4/2004	

TUBA01-09-53

Tuba City Extraction Well Samples

Date: 1/31/04 Data Set: 12th Round

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	1312	6.60	3460	310	80	517	1273
1102	1314	6.55	3960	405	91	740	1525
1103	1417	6.67	6260	307	151	1408	2514
1104	1409	6.43	5440	145	147	1067	1904
1105	1402	6.65	3110	1074	72	455	1048
1106	1358	6.80	1325	421	~~40~~ 32	~~163~~ 180	352
1107	1357	6.67	1901	52	51	340	409
1108	1355	6.41	5400	255	96	929	2310
1109	1353	6.39	3860	281	63	588	1628
1110	1351	6.61	1443	69	27 ~~20~~	112 ~~196~~ 217	172 ~~385~~ 401
1111	1348	6.58	2830	144	~~78~~ 44	~~273~~ 425	~~1600~~ 979
1112	1344	7.06	879	21	17	129	193
1113	1343	7.79	412	5.5	13	48	42
1114	1338	7.06	1239	23	23	205	273
1115	1335	6.79	1703	53	30	284	433
1116				—	—	—	—
1117				—	—	—	—
1118	1330	6.57	3880	58	65	664	1453
1119	1414	6.47	4030	262	98	673	1467
1120	1417	6.54	3100	301	78	271	1267
1121	1419	6.39	5910	522	135	494	3062
1122	1308	6.57	5360	419	128	617	2443
1123	1318	7.23	971	41	25	121	227
1124	1321	6.84	3040	116	92	593	929
1125	1324	7.52	752	22	19	96	153

TUB01-09-SW

1 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			1/31/04	1545	KM
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.00	yes	
pH 7	6.9	7.1	7.00	yes	
Slope	92	102	100.3	yes	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
		Standard	KM		
1/31/04	1312	1101		6.60	
	1314	1102		6.55	
	1412	1103		6.67	
	1409	1104		6.43	
	1402	1105		6.65	
	1358	1106		6.80	
	1359	1107		6.67	
	1355	1108		6.41	
	1353	1109		6.39	
	1351	1110		6.66	
		Standard			
	1348	1111		6.58	
	1344	1112		7.06	
	1343	1113		7.79	
	1338	1114		7.06	
	1335	1115		6.79	
	1330	1118		6.57	
	1414	1119		6.47	
	1417	1120		6.54	
	1419	1121		6.39	
	1308	1122		6.57	

TUB01-09-55

2 of 2

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
					KM
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1			
pH 7	6.9	7.1			
Slope	92	102			

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
		Standard			
	1318	1123	Km	7.23	
	1321	1124	↓	6.84	
	1324	1125	↓	7.52	
		Standard			

KM 2/14/2004

TUB01-09-S6

12 pp
1 of 2

Special Conductivity Analyses using Hach sension 7

Date 1/31/04

Calibration Results			Time	Analyst
			1540	KM
Standard	Minimum	Maximum	Reading	Acceptable?
1006	905	1107	1005	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard			
1312	1101	KM	3.46 m	
1314	1102		3.96 m	
1412	1103		6.26 m	
1409	1104		5.44 m	
1402	1105		3.11 m	
1358	1106		1325 µ	
1357	1107		1901 µ	
1355	1108		5.40 m	
1353	1109		3.86 m	
1351	1110		1443 µ	
	Standard			
1348	1111		2.83 m	
1344	1112		879 µ	
1343	1113		412 µ	
1338	1114		1239 µ	
1335	1115		1703 µ	
1330	1116		3.88 m	
1414	1119		4.03 m	
1417	1120		3.10 m	
1419	1121	↓	5.91 m	
1308	1122		5.36 m	

TUB01-09-S7

Special Conductivity Analyses using Hach sension 7

Date 1/31/04

12th Round

Calibration Results			Time	Analyst
				KM
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
	Standard	KM		
1318	1123	↓	971 µ	
1321	1124		3.04 m	
1324	1125	↓	752 µ	
	Standard			
			3/4/2004	
			KM	

TUB01-09-58

Tuba City Extraction Well Samples

Date: 2-1-04 Data Set: Round 13 ≈ 1300 hrs

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	1357	6.90	3510	325	83	540	1317
1102	1355	6.58	3850	297	87	710	1462
1103	1343	6.46	6380	336	141	1310	2549
1104	1340	6.57	4930	125	135	948	1720
1105	1337	6.80	2630	824	63	377	867
1106	1335	6.94	1134	442	25	145	285
1107	1330	6.87	1303	29	31	225	268
1108	1322	6.49	5180	233	92	900	2218
1109	1320	6.51	3210	182	54	473	1309
1110	1317	6.71	1444	66	25	212	394
1111	1315	7.04	2710	142	42	387	908
1112	1311	6.63	809	27	15	116	167
1113	1326	7.04	396	3.9	11	45	36
1114	1306	7.82	1144	21	21	184	244
1115	1304	7.16	1602	46	29	264	389
1116	—	—	—	—	—	—	—
1117	—	—	—	—	—	—	—
1118	1300	6.66	3770	55	62	631	1388
1119	1345	6.59	3890	236	87	664	1355
1120	1348	6.63	3120	299	78	271	1870
1121	1351	6.47	5380	511	121	432	2683
1122	1359	6.60	3970	326	116	415	1653
1123	1401	7.25	887	27	22	105	197
1124	1406	6.92	2990	115	89	574	898
1125	1404	7.58	632	18	17	75	114

TVB01-09-59 1 of 2

Special Conductivity Analyses using Hach sension 7

Date 2-1-04 Round 13

Calibration Results			Time	Analyst
			1430	Jeri R
Standard	Minimum	Maximum	Reading	Acceptable?
99.7 µS/cm	89.7	109.7	105.4 @ 20.3°C	yes
1006 µS/cm	905	1107	1010 @ 20.3°C	yes
10154 µS/cm	9138	11,169	10260 @ 20.4°C	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1435	Standard	Jeri R	181.2 @ 19.3°C	180.0 µS/cm std
~~1501~~ tlr	1101		3510 @ 17.7°C	
	1102		3850 @ 17.4°C	
	1103		6380 @ 17.9°C	
	1104		4930 @ 17.8°C	
	1105		2630 @ 18.0°C	
	1106		1134 @ 18.3°C	
	1107		1303 @ 18.5°C	
	1108		5180 @ 18.6°C	
	1109		3210 @ 19.0°C	
	1110		1444 @ 19.1°C	
	Standard		181.1 @ 20.0°C	
	1111		2710 @ 19.1°C	
	1112		809 @ 18.8°C	
	1113		396 @ 19.5°C	
	1114		1144 @ 19.8°C	
	1115		1602 @ 19.2°C	
	1118		3770 @ 19.5°C	
	1119		3890 @ 18.5°C	
	1120		3120 @ 18.5°C	
	1121		5380 @ 17.9°C	
	1122		3970 @ 18.5°C	

TUB01-09-60

2 of 2

Round 13

Special Conductivity Analyses using Hach sension 7

Date 2-1-04

Page 2

Calibration Results			Time	Analyst
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1527	Standard	JeriR	181.4 @ 20.2°C	
	1123		887 @ 18.3°C	
	1124		2990 @ 18.7°C	
	1125		632 @ 19.0°C	
	Standard			
			3/4/2004	

TUB01-09-61 1 of 2

Special pH Analyses using Orion 420A Round 13

Calibration Results			Date	Time	Analyst
			2-1-04	1430	Jeri R
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.00	yes	@ 16.7°C
pH 7	6.9	7.1	7.03	yes	@ 16.8°C
Slope	92	102	99.6	yes	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
2-1-04	1442	Standard	Jeri R	7.01 @ 17.8°C	
		1101		6.90 @ 17.7°C	
		1102		6.58 @ 17.5°C	
		1103		6.46 @ 17.9°C	
		1104		6.57 @ 17.8°C	
		1105		6.80 @ 18.0°C	
		1106		6.94 @ 18.3°C	
		1107		6.87 @ 18.5°C	
		1108		6.49 @ 18.6°C	
		1109		6.51 @ 19.0°C	
		1110		6.71 @ 19.1°C	
		Standard		7.04 @ 18.7°C	
		1111		6.63 @ 19.0°C	
		1112		7.04 @ 18.8°C	
		1113		7.82 @ 18.6°C	
		1114		7.16 @ 18.9°C	
		1115		6.89 @ 19.1°C	
		1118		6.66 @ 19.3°C	
		1119		6.59 @ 18.6°C	
		1120		6.63 @ 18.5°C	
		1121		6.47 @ 17.9°C	
		1122		6.60 @ 18.4°C	

TUB01-09-62

1 of 2

Round 13

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			2-1-04		TR
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1			
pH 7	6.9	7.1			
Slope	92	102			

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
2/1/04	1530	Standard	JriR	7.05 @ 19.2°C	
		1123		7.25 @ 18.3°C	
		1124		6.92 @ 18.6°C	
		1125		7.58 @ 18.8°C	
		Standard			

Jri 2/4/2004

TUB01-09-63

Tuba City Extraction Well Samples

Date: 2-2-04 Data Set: Round 14 ≈ 1300 hrs

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	1309	6.70	3510	315	83	540	1315
1102	1312	6.62	4150	517	92	773	1575
1103	1412	6.58	6390	365	139	1295	2587
1104	1409	6.67	4090	141	116	751	1350
1105	1407	6.81	1901	507	57	248	563
1106	1405	7.00	1042	327	24	131	258
1107	1403	6.86	1186	33	28	203	240
1108	1400	6.48	5720	317	100	998	2476
1109	1358	6.45	4510	439	71	711	1931
1110	1355	6.75	1394	69	25	205	379
1111	1352	6.65	3290	199	54	513	1027
1112	1346	7.09	755	24	15	108	154
1113	1342	7.85	371 tbr 2-4-04	3.7	11	40	32
1114	1339	7.19	1367	23	26	236	315
1115	1335	6.88	1822	58	33	326	462
1116	—	—	—	—	—	—	—
1117	—	—	—	—	—	—	—
1118	1329	6.67	3730	59	62	617	1415
1119	1415	6.59	3910	240	89	683	1388
1120	1417	6.66	2880	371	73	250	1173
1121	1420	6.45	5290	636	121	430	2673
1122	1307	6.67	3300	285	99	345	1308
1123	1316	7.27	848	36	22	98	187
1124	1318	6.90	2920	115	88	564	885
1125	1322	7.49	763	27	19	100	155

TUB01-09-64

1 of 2

pg 1 of 2

Round 14

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			2-2-04	1530	Juri R
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.00	yes	@ 20.2°C
pH 7	6.9	7.1	7.00	yes	@ 20.2°C
Slope	92	102	99.2	yes	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
2-2-04	1550	Standard	Juri R	7.00 @ 20.3°C	
		1101		6.70 @ 19.2°C	
		1102		6.62 @ 18.8°C	
		1103		6.58 @ 18.6°C	
		1104		6.67 @ 18.7°C	
		1105		6.81 @ 18.7°C	
		1106		7.00 @ 19.3°C	
		1107		6.86 @ 19.0°C	
		1108		6.48 @ 19.0°C	
		1109		6.45 @ 19.4°C	
		1110		6.75 @ 19.2°C	
		Standard		7.02 @ 20.3°C	7.00 std
		1111		6.65 @ 19.2°C	
		1112		7.09 @ 19.1°C	
		1113		7.85 @ 19.2°C	
		1114		7.19 @ 19.3°C	
		1115		6.88 @ 19.3°C	
		1118		6.67 @ 19.3°C	
		1119		6.59 @ 19.2°C	
		1120		6.66 @ 19.4°C	
		1121		6.45 @ 19.3°C	
		1122		6.67 @ 19.4°C	

TVB01-09-65 2 of 2 pg 2

Special pH Analyses using Orion 420A

Round 14

Calibration Results			Date	Time	Analyst
					TR
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1			
pH 7	6.9	7.1			
Slope	92	102			

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
2-2-04	1642	Standard	DuriR	7.02@ 20.4°C	
		1123	/	7.27@ 19.7°C	
		1124	/	6.90@ 19.7°C	
		1125	/	7.49@ 19.8°C	
		Standard			
				2/4/2004	

TUB01-09-66

182

Special Conductivity Analyses using Hach sension 7

Date 2-2-04

Round 14

Calibration Results			Time	Analyst
			1540	JuriR
Standard	Minimum	Maximum	Reading	Acceptable?
99.7 µS/cm	89.7	109.7	105.6 µS/cm	yes
1006 µS/cm	905	1107	1012 µS/cm	yes
10154 µS/cm	9138	11,169	10280 µS/cm @ 21.0°C	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1545	Standard	JuriR	180.2	180.0 µS/cm std
	1101		3510 @ 19.2°C	
	1102		4150 @ 18.8°C	
	1103		6390 @ 18.6°C	
	1104		4090 @ 18.7°C	
	1105		1901 @ 18.7°C	
	1106		1042 @ 19.3°C	
	1107		1186 @ 19.1°C	
	1108		5720 @ 19.1°C	
	1109		4510 @ 19.5°C	
	1110		1394 @ 19.3°C	
	Standard		180.5 @ 20.3°C	
	1111		3290 @ 19.3°C	
	1112		755 @ 19.1°C	
	1113		3710 @ 19.3°C	
	1114	ltr 2-20-04	~~5790 @ 19.4°C~~ 13	1367 @ 19.4°C
	1115		1822 @ 19.4°C	
	1118		3730 @ 19.3°C	
	1119		3910 @ 19.3°C	
	1120		2880 @ 19.5°C	
	1121		5290 @ 19.4°C	
	1122		3300 @ 19.4°C	

TUB01-09-07

2 of 2

pg 2

Special Conductivity Analyses using Hach sension 7

Date 8-2-04

Round 14

Calibration Results			Time	Analyst
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1635	Standard	QuiR	180.4 @ 20.9°C	
	1123		848 @ 19.8°C	
	1124		2920 @ 19.8°C	
	1125		763 @ 20.0°C	
	Standard		7/14/2004	

TUB01-09-68

Tuba City Extraction Well Samples

Round 15 ≈ 0900 hrs

Date: 2-3-04 Data Set: _____

Well No.	Time	pH	Cond.	Uranium	Chloride	Nitrate	Sulfate
1101	0908	6.74	3500	330	82	521	1277
1102	0910	6.61	3800	367	86	679	1411
1103	1004	6.56	6410	432	154	1382	2563
1104	1002	6.67	3630	105	107	635	1136
1105	1000	6.79	2200	730	54	289	659
1106	1023	6.97	1114	460	26	132	259
1107	0954	6.88	1250	34	30	193	230
1108	0952	6.54	4960	240	89	835	1960
1109	0950	6.51	3010	179	53	431	1183
1110	0947	6.81	1447	52	30	205	398
1111	0945	6.68	2640	141	43	388	900
1112	0940	7.07	777	26	15	111	158
1113	0938	7.91	409	4.3	12	49	40
1114	0936	7.24	1109	20	22	176	239
1115	0933	6.96	1602	42	30	267	391
1116	—	—	—	—	—	—	—
1117	—	—	—	—	—	—	—
1118	0928	6.68	3700	57	59	681	1568
1119	1006	6.55	3790	230	92	658	1298
1120	1008	6.63	3110	319	81	280	1301
1121	1010	6.52	4840	368	102	391	2368
1122	0905	6.66	3050	228	70	318	1186
1123	1125	7.53	494	17	16	41	75
1124	0920	6.95	2780	108	83	544	828
1125	0922	7.63	605	14	17	70	110

dw 1008?

TVB01-09-69

1 of 2

Round 15 ≈ 0900 hrs

Special Conductivity Analyses using Hach sension 7

Date 2-3-04

Calibration Results			Time	Analyst
			1025	JwiR
Standard	Minimum	Maximum	Reading	Acceptable?
99.7µS/cm	89.7	109.7	105.9 @ 19.6°C	yes
1006µS/cm	905	1107	1010 @ 19.9°C	yes
10154µS/cm	9138	11,169	10250 @ 19.9°C	yes

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1025	Standard	JwiR	180.4@ 18.2°C	180.0 µS/cm std
1045	1101		3500@ 18.1°C	
	1102		3800@ 17.9°C	
	1103		6410@ 17.4°C	
	1104		3630@ 17.5°C	
	1105		2200 @ 17.7°C	
	1106		1114 @ 17.7°C	
	1107		1250 @ 17.8°C	
	1108		4960@ 18.0°C	
	1109		3010 @ 18.2°C	
	1110		1447@ 18.2°C	
1103	Standard		180.3 @ 19.8°C	
	1111		2640@ 18.5°C	
	1112		777 @ 18.0°C	
	1113		409 @ 18.4°C	
	1114		1109@ 18.3°C	
	1115		1602@ 18.4°C	
	1118		3700@ 18.9°C	
	1119		3790@ 18.4°C	
	1120		3110 @ 18.4°C	
	1121		4840@ 18.5°C	
	1122		3050@ 18.8°C	

TUB01-09-70 2 of 2

Special Conductivity Analyses using Hach sension 7

Date 2-3-04 Round 15 ≈ 0900 hrs pg 2

Calibration Results			Time	Analyst
Standard	Minimum	Maximum	Reading	Acceptable?

Sample Analyses				
Time	Sample Name	Analyst	Reading	Comments
1123	Standard	JeriR	180.4 @ 20.4°C	
	1123		494 @ 15.7°C	
	1124		2780 @ 19.0°C	
	1125		605 @ 18.8°C	
	Standard			

3/4/2004

TUB01-09-71 1 of 2

Special pH Analyses using Orion 420A

Round 15

Calibration Results			Date	Time	Analyst
			2-3-04	1035	Juri R
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1	4.00	yes	@ 16.4°C
pH 7	6.9	7.1	7.04	yes	@ 16.6°C
Slope	92	102	98.9	yes	

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
2-3-04	1046	Standard	Juri R	7.02 @ 16.8°C	
		1101		6.74 @ 18.0°C	
		1102		6.61 @ 17.8°C	
		1103		6.56 @ 17.5°C	
		1104		6.67 @ 17.5°C	
		1105		6.79 @ 17.7°C	
		1106		6.97 @ 17.7°C	
		1107		6.88 @ 17.8°C	
		1108		6.54 @ 17.9°C	
		1109		6.51 @ 18.1°C	
		1110		6.81 @ 18.1°C	
	1106	Standard		7.05 @ 17.8°C	
		1111		6.68 @ 18.4°C	
		1112		7.07 @ 18.0°C	
		1113		7.91 @ 18.3°C	
		1114		7.24 @ 18.3°C	
		1115		6.96 @ 18.4°C	
		1118		6.68 @ 18.7°C	
		1119		6.55 @ 18.3°C	
		1120		6.63 @ 18.2°C	
		1121		6.52 @ 18.4°C	
		1122		6.66 @ 18.7°C	

TUB01-09-72

2-02
pg. 2
Round 15

Special pH Analyses using Orion 420A

Calibration Results			Date	Time	Analyst
			2-3-04		DeiR
	Minimum	Maximum	Reading	Acceptable?	Comments
pH 4	3.9	4.1			
pH 7	6.9	7.1			
Slope	92	102			

Sample Analyses					
Date	Time	Sample Name	Analyst	Reading	Comments
2-3-04	1127	Standard	DeiR	7.05@18.5C	
		1123		7.53@15.9C	
		1124		6.95@18.8C	
		1125		7.63@18.7C	
		Standard			
				3/4/2004	

Appendix C

Request for ESL Technical Assistance

Environmental Sciences Laboratory (ESL) Workplan

Project Title: Analysis of Ground Water Rebound in Extraction Wells; Rev. 1
Site: Tuba City, Arizona
Date: December 31, 2003.
Desired Completion Date: Field work by January 31, 2004. Report by February 2004.
Work Requested By: Carl Jacobson, Tuba City Site Manager
Work Approved By: Clay Carpenter, ESL Task Order Manager
ESL Lead: Stan Morrison
Tuba City Project Lead: Randy Richardson

Objectives:

Analyses of Tuba City weekly composite samples and monthly well grab samples have established that contaminant concentrations in the extraction wells are stable and relatively low when the wells have been in service for extended periods of time, but that these concentrations are much higher immediately after the wells are restarted after being down for several days. This tendency has become known as the "rebound" effect. Daily influent samples suggest that the "rebound" is of short duration and that well concentrations have stabilized within about three days. Monthly well samples suggest that "rebound" is much more pronounced among some wells than others.

A shutdown of the treatment system, of approximately one week's duration, is scheduled for the end of January, 2004. This test program proposes an intensive sampling of the extraction wells for the first six days after the wells are restarted, coupled with a single grab sample from each well immediately prior to the shutdown. The goal is to evaluate the extent and duration of "rebound" for each individual well.

Description of Work:

Task 1. Field Sampling. The shutdown is presently scheduled to begin on the morning of January 19, 2004. A set of baseline samples will be collected the day before the shutdown and additional sets of "rebound" samples will be collected at regular intervals upon startup. One set consists of 25 samples including 1 sample from each of 24 extraction wells and 1 raw feed sample. The collection time for each sample will be logged (preferably using "atomic" watches which will be synchronized with the PLC computer clock). Collecting the set of 25 samples typically takes 2 persons about 1-1/2 to two hours.

The rebound samples will be collected after the treatment system is restored to boil and begins to draw water from the wells. Sets of well samples will be taken every 4 hours for the first 2 days of the test. For the duration of the test (total of about four to six days based on experience to date) sets of samples will be collected every 12 hours; probably one round of sampling first thing in the morning and the other round at the end of the day. The duration of the test will be determined by the conductivity of the raw feed, which will be sampled at the same time as the wells. The conductivity of the raw feed determines the gross composition trend. As long as the raw feed conductivity is decreasing from one sample to the next, at least some of the wells are still in rebound and the sampling should continue. Once the raw feed conductivity has leveled off, the rebound effect is effectively concluded and the test can be terminated.

Individual well samples will be checked for conductivity before additional analysis is done. The conductivity will be used to determine the rebound extent for individual wells in the same fashion as with the overall system, i.e., once the conductivity of the water from an individual well has stabilized, additional samples from that well may not be taken.

Although time-consuming, the sampling work will not be a full-time job, and can be performed by the site operators on an overtime basis with minimal interference with their regular duties. Given the fact that the sampling calls for traveling to outer areas of the site and for the sampler to physically enter the well vaults, in the interests of safety, the sampling must be performed by a 2 person team. Therefore, the sampling would require the operators to work an overtime shift of probably about thirteen hours per day. Operators will not be able to collect samples during the night shift, so ESL is providing funds for additional sampling support. Samplers will probably be Brandon Danforth and Dave Traub.

Task 2. Analysis. All analytical work will be conducted at the Tuba City site laboratory. An ion chromatograph will be used for analysis of chloride, nitrate, and sulfate, and a KPA uranium analyzer for uranium. Analysts will filter each samples prior to analysis and measure the pH and conductivity of each sample. Analytical work will continue for about three days after the completion of all sampling.

Task 3. Data Entry. Data from the test will be entered into Excel spread sheet. The data will not be entered into See_Pro.

Task 4. Interpretation and Report. An ESL report will be prepared that describes the methods, presents the results, and discusses interpretations of the data.

ESL Budget and Project Cost Sharing:

Costs will be shared between the ESL and the Tuba City Project. Tuba City will provide oversight (Randy Richardson), samplers for the 12 hour daytime shift, one analyst (Teri Richardson), laboratory equipment, and most of the laboratory and sampling consumable items (sample bottles, chemicals, etc). ESL will provide collaboration (Stan Morrison), one full time analyst (Sarah Morris), 2 night-shift samplers (probably Brandon Danforth and Dave Traub), and sampling equipment.

Table 1 lists the personnel required, including those provided by the Tuba City project. Total cost to the ESL is approximately $26, 184 (Table 2).

Schedule:

The plant is currently scheduled to shutdown on January 19, 2004 and startup is anticipated on January 26. The schedule for the rebound study will need to be modified to accommodate changes to the shutdown/startup schedule. Baseline samples will be collected January 18 by Tuba City site personnel. ESL personnel will mobilize to the site on January 25 to prepare for startup. Four-hour samples will be collected January 26 and 27. Twelve-hour samples will be collected January 28 through 31. A report will be prepared in February.

Table 1. Labor (nc = no charge to ESL)

Person	Hrs	Activities
Task 1. Field Sampling		
Sarah M.	4	Coordination
Tim B.	32	On site collaboration (2 days at site)
Dave T.	48	Travel and night shift sampling for 2 nights
Brandon D.	48	Travel and night shift sampling for 2 nights
Operators	40 (nc)	Day shift sampling for 6 days.
Randy R.	20 (nc)	Oversight
Tasks 2 and 3. Analysis and Data Entry		
Sarah M.	106	Travel to site. Analysis.
Terry R.	60 (nc)	Analysis.
Task 4. Interpretation and Report		
Stan M.	40	Data interpretation. Report preparation.
Tim B.	20	Data interpretation. Report preparation.
Randy R.	40 (nc)	Data interpretation. Report preparation.
Sarah M.	10	Prepare data for report
Dennis D.	30	Report preparation.
Wyatt S.	10	Figure preparation
Clay C.	4	Review Report

Table 2. ESL Budget (Fully Burdened Costs)

	Task 1	Tasks 2 and 3	Task 4
Labor	$8258	$5150	$8213
Travel	$1883	$2079	0
Supplies	$280	$140	0
Subtotal	*$10,421*	*$7369*	*$8213*
TOTAL ESL	**$26,003**		

End of current text