

The 1989 Grant report includes groundwater elevation contours and flow directional maps for both the shallow and deep wells. The 1996 sampling event confirmed that groundwater flow directions have remained essentially the same. Area shallow groundwater flow is to the northwest where it discharges to the surface or to the Cimarron River alluvium.

2.2 1996 Sampling Event Analytical Data and Trend Analysis

This section presents the sample analysis results for the independent samples taken during 1996 for Assessment Area #2, and historic highs for the entire sampling period. Table 2.1 presents the radiochemical analytical results for the April 1996 sampling event; Table 2.2 presents the historical peak concentrations for wells #1314, #1315, #1316 #1317, and surface water locations; Table 2.3 presents the chemical analytical results for the 1996 independent sampling event; and Table 2.4 presents the additional metals and ion chemistry data for well #1314. A tabulation of historical environmental groundwater and surface water data for the monitoring wells and surface locations discussed in this section can be found in Attachment B.

**TABLE 2.1
RADIOCHEMICAL CONCENTRATIONS FOR
1996 SAMPLING EVENT**

	GROSS ALPHA pCi/l	GROSS BETA pCi/l	U-238 pCi/l	U-234 pCi/l	U-235 pCi/l	TOTAL U ISOTOPIC* pCi/l	TOTAL U mg/l	TOTAL U pCi/l (calculated)***	TOTAL Ra pCi/l	TOTAL Th pCi/l
1314	0.7	1.6	0.56	1.24	0.012	1.812	<.001	<1.5	1.92	0.019
1315	2,600	474	999	1,710	87	2,796	1.9	2,850	0.44	0.34
1315D**	2,800	386	1,081	1,720	90	2,891	3.1	4,650	0.44	0.624
1316	85	15.5	29.8	70.8	4.1	104.7	.087	123	1.73	0
1317	156	87	67	109.8	7.33	184.13	0.12	180	1.1	1.56
1202	10	15	2.5	3.29	0.25	6.06	.0085	12.8	.29	.03
1205	1.01	3.61	0.54	.079	0.1	1.43	.0011	1.7	0.47	0

* Summation of U-238, U-234 and U-235 isotopic

** D - Represents a duplicate sample.

*** Calculated from total uranium results in mg/l multiplied by conversion factor of 1500 for enriched uranium. Note that for natural uranium the conversion factor would be 670.

9702180094 970127
PDR ADOCK 07000925
C PDR

Figure 2.2 Gross Alpha Area 1
Well 1315

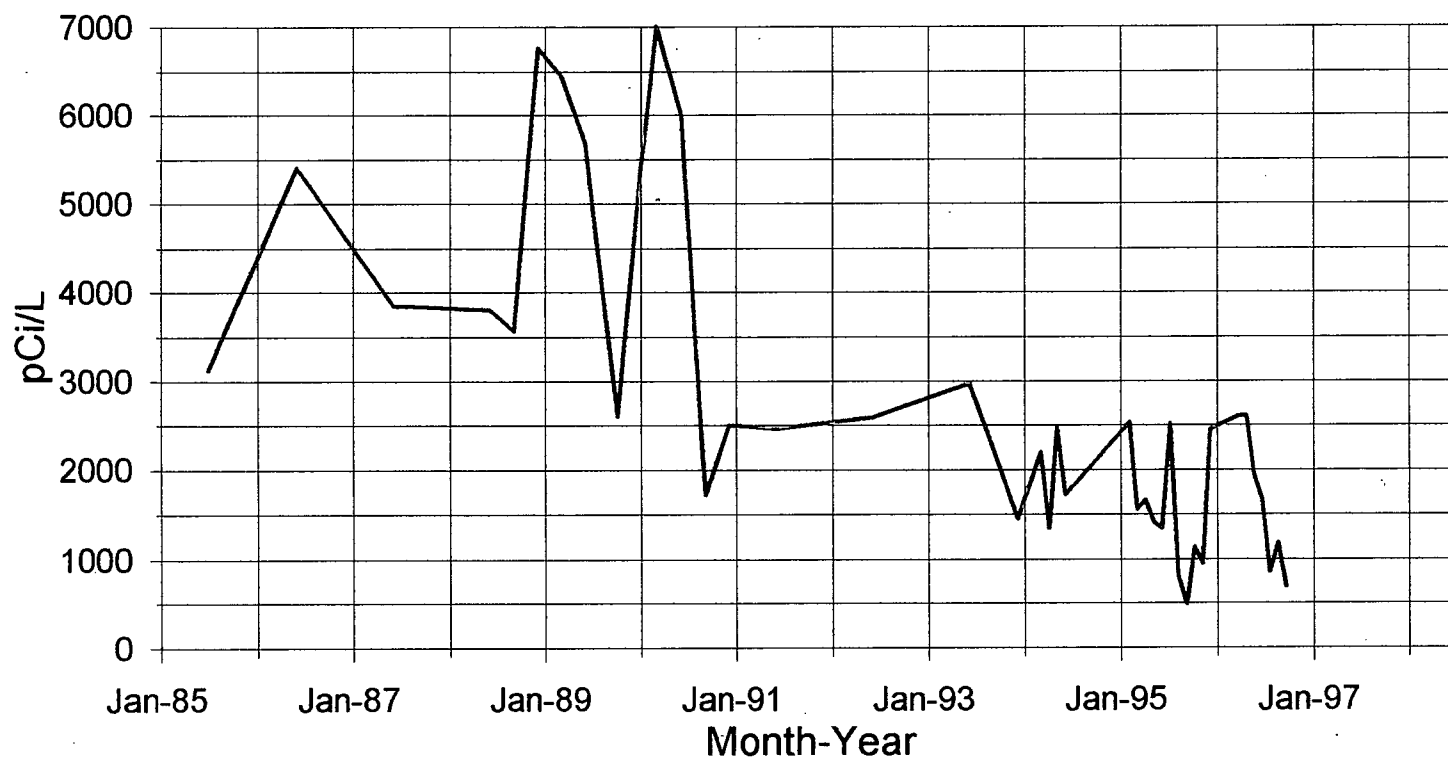


TABLE B-13
CIMARRON FACILITY - ENVIRONMENTAL GROUNDWATER SAMPLE RESULTS

ENVIRONMENTAL WELL NO. 1316	GROSS ALPHA	GROSS BETA	F	NO3 (N)	U	238 U	234 U	235 U
SAMPLE DATE	pCi/L	pCi/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
7/85	200	<20	<0.2	11	0.19			
6/86	608	140	0.8	4	1.6			
6/87	420	300	0.6	4.6	0.54			
6/88	378	116	<1	12	0.3			
3/89	331	100	<0.20	16		67	210	10
6/89	820	160	<1	57	0.73			
10/89	320	200	0.14	12	0.539	236	590	11.6
6/90	680	77	<0.5	9.2	0.57	215	547	22
6/91	2030	138	0.52	17	1.7	556.1	1262	62.4
6/92	776	85	0.4	5.9	0.68	222.62	505.1	23.79
6/93	473	37	0.5	7.7	0.35	164	388	23.4
12/93	474	43.3	0.6	1.1	0.37	50.7	111	5.6
3/94	163	28.6			0.23	96.5	174	4
4/94	89.7	23.1			0.21	63.1	143	6.1
5/94	232	57.8			0.27	71.8	155	13.4
6/94	233	<20	1.1	<0.1	0.18	84	166	14.6
7/94					0.18	40.5	93.7	5
8/94					0.14	37	89.2	3.2
9/94					0.07	20.1	48.2	2.1
10/94					0.07			
11/94						64.8	79.3	25.8
12/94					0.10			
1/95					0.17	64.8	152	6.8
5/95	120	51.2			0.187	58.7	137	13.5
6/95	290	46.4			0.267	67.2	153	5.9
7/95	204	25.4			0.28	89	186	12.3
8/95	146	62.1			0.146	48.2	107	4.5
9/95	135	39.4			0.288	73.5	157	6.1
10/95	154	18.2			0.16	47.4	108	3.5
11/95	73.6	25			0.151	43.4	100	4.6
12/95	116	60.8			0.164	40.3	94.1	4.7
1/96	165	20.5			0.137	48	106	12.7
2/96	131	40.2			0.158	67.6	166	29.1
3/96	61.8	15.6			0.109	24.5	73.9	7.9
4/96	85	15.5	0.52	6.2	0.082	29.8	70.8	4.1
5/96	102	21.8			0.087	36.7	73.1	9.4
6/96	86	17.6			0.063	28.8	65	2.7
7/96	74.2	28.9			0.052	19.4	40.9	2.3
8/96	47.4	18			0.042	19	37.3	1.5
9/96	49.4	11.3			0.087	18.8	51.7	4.8
10/96	72.7	19.9			0.051	24.5	47.8	7.4

TABLE B-22

CIMARRON FACILITY - ENVIRONMENTAL GROUNDWATER SAMPLE RESULTS

ENVIRONMENTAL WELL NO. 1326	GROSS ALPHA	GROSS BETA	F	NO3 (N)	U	238 U	234 U	235 U
SAMPLE DATE	pCi/L	pCi/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
3/89	14	25	<0.20	14		1.48	4.43	0.058
6/89	175	9640	1.2	21	0.014			
10/89	16	<20	<0.2	16	<0.005	2.25	5.2	0.11
6/90	16	21	<0.5	17	0.007	2.3	5.8	0.79
6/91	14	<20	<1	10				
6/92	17	20	0.3	15	0.006	1.98	0.74	0.09
6/93	16	<20	<.2	14	<.005	2.6	5.1	0
6/94	19	<20	0.5	14.5	<0.005	6.3	14.3	0.6
6/95	62.9	56.9	0.30	300.00	0.006	1.4	3.6	0.2
4/96	96	457	0.39	5.5	0.0053	2.41	5.15	0.45

TABLE B-23

CIMARRON FACILITY - ENVIRONMENTAL GROUNDWATER SAMPLE RESULTS

ENVIRONMENTAL WELL NO. 1327 B	GROSS ALPHA	GROSS BETA	F	NO3 (N)	U	238 U	234 U	235 U
SAMPLE DATE	pCi/L	pCi/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
3/89	<10	<20	0.2	8.2		1.52	2.8	0.14
6/89	<10	<20	0.36	6.6	<0.005			
10/89	<10	<20	<0.2	8.3	0.007	4.18	6.8	0.069
6/90	<10	<20	<0.5	7.2	<0.005	1.43	2	0.29
6/91	<10	<20	<0.5	7.5				
6/92	<10	<20	0.5	10	<0.005			
6/93	11	<20	10	10	0.006			
6/94	<10	<20	0.8	7.9	<0.005			
6/95	5.2	1.4	0.40	8.20	0.004	1.8	2.3	ND
4/96	1.6	2.9	0.48	5.8	0.0046	1.53	3.24	0.165

The 1989 Grant report includes groundwater elevation contours and flow directional maps for both the shallow and deep wells. The 1996 sampling event confirmed that groundwater flow directions have remained essentially the same. Area shallow groundwater flow is to the northwest where it discharges to the surface or to the Cimarron River alluvium.

2.2 1996 Sampling Event Analytical Data and Trend Analysis

This section presents the sample analysis results for the independent samples taken during 1996 for Assessment Area #2, and historic highs for the entire sampling period. Table 2.1 presents the radiochemical analytical results for the April 1996 sampling event; Table 2.2 presents the historical peak concentrations for wells #1314, #1315, #1316 #1317, and surface water locations; Table 2.3 presents the chemical analytical results for the 1996 independent sampling event; and Table 2.4 presents the additional metals and ion chemistry data for well #1314. A tabulation of historical environmental groundwater and surface water data for the monitoring wells and surface locations discussed in this section can be found in Attachment B.

**TABLE 2.1
RADIOCHEMICAL CONCENTRATIONS FOR
1996 SAMPLING EVENT**

	GROSS ALPHA pCi/l	GROSS BETA pCi/l	U-238 pCi/l	U-234 pCi/l	U-235 pCi/l	TOTAL U ISOTOPIC* pCi/l	TOTAL U mg/l	TOTAL U pCi/l (calculated)***	TOTAL Ra pCi/l	TOTAL Th pCi/l
1314	0.7	1.6	0.56	1.24	0.012	1.812	< .001	< 1.5	1.92	0.019
1315	2,600	474	999	1,710	87	2,796	1.9	2,850	0.44	0.34
1315D**	2,800	386	1,081	1,720	90	2,891	3.1	4,650	0.44	0.624
1316	85	15.5	29.8	70.8	4.1	104.7	.087	123	1.73	0
1317	156	87	67	109.8	7.33	184.13	0.12	180	1.1	1.56
1202	10	15	2.5	3.29	0.25	6.06	.0085	12.8	.29	.03
1205	1.01	3.61	0.54	.079	0.1	1.43	.0011	1.7	0.47	0

* Summation of U-238, U-234 and U-235 isotopic

** D - Represents a duplicate sample.

*** Calculated from total uranium results in mg/l multiplied by conversion factor of 1500 for enriched uranium. Note that for natural uranium the conversion factor would be 670.

Figure 2.2 Gross Alpha Area 1
Well 1315

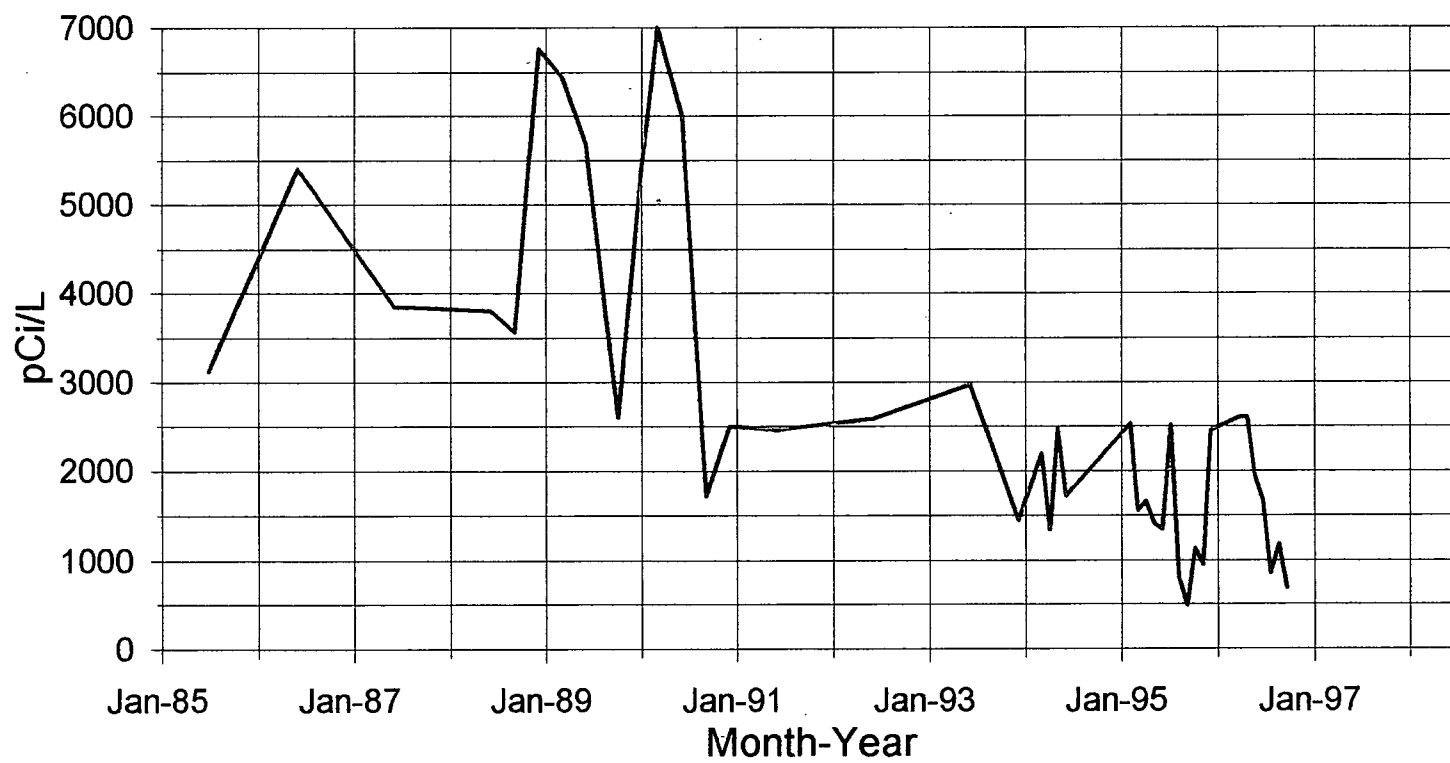


TABLE B-13
CIMARRON FACILITY - ENVIRONMENTAL GROUNDWATER SAMPLE RESULTS

ENVIRONMENTAL WELL NO. 1316	GROSS ALPHA	GROSS BETA	F	NO3 (N)	U	238 U	234 U	235 U
SAMPLE DATE	pCi/L	pCi/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
7/85	200	<20	<0.2	11	0.19			
6/86	608	140	0.8	4	1.6			
6/87	420	300	0.6	4.6	0.54			
6/88	378	116	<1	12	0.3			
3/89	331	100	<0.20	16		67	210	10
6/89	820	160	<1	57	0.73			
10/89	320	200	0.14	12	0.539	236	590	11.6
6/90	680	77	<0.5	9.2	0.57	215	547	22
6/91	2030	138	0.52	17	1.7	556.1	1262	62.4
6/92	776	85	0.4	5.9	0.68	222.62	505.1	23.79
6/93	473	37	0.5	7.7	0.35	164	388	23.4
12/93	474	43.3	0.6	1.1	0.37	50.7	111	5.6
3/94	163	28.6			0.23	96.5	174	4
4/94	89.7	23.1			0.21	63.1	143	6.1
5/94	232	57.8			0.27	71.8	155	13.4
6/94	233	<20	1.1	<0.1	0.18	84	166	14.6
7/94					0.18	40.5	93.7	5
8/94					0.14	37	89.2	3.2
9/94					0.07	20.1	48.2	2.1
10/94					0.07			
11/94						64.8	79.3	25.8
12/94					0.10			
1/95					0.17	64.8	152	6.8
5/95	120	51.2			0.187	58.7	137	13.5
6/95	290	46.4			0.267	67.2	153	5.9
7/95	204	25.4			0.28	89	186	12.3
8/95	146	62.1			0.146	48.2	107	4.5
9/95	135	39.4			0.288	73.5	157	6.1
10/95	154	18.2			0.16	47.4	108	3.5
11/95	73.6	25			0.151	43.4	100	4.6
12/95	116	60.8			0.164	40.3	94.1	4.7
1/96	165	20.5			0.137	48	106	12.7
2/96	131	40.2			0.158	67.6	166	29.1
3/96	61.8	15.6			0.109	24.5	73.9	7.9
4/96	85	15.5	0.52	6.2	0.082	29.8	70.8	4.1
5/96	102	21.8			0.087	36.7	73.1	9.4
6/96	86	17.6			0.063	28.8	65	2.7
7/96	74.2	28.9			0.052	19.4	40.9	2.3
8/96	47.4	18			0.042	19	37.3	1.5
9/96	49.4	11.3			0.087	18.8	51.7	4.8
10/96	72.7	19.9			0.051	24.5	47.8	7.4

TABLE B-22

CIMARRON FACILITY - ENVIRONMENTAL GROUNDWATER SAMPLE RESULTS

ENVIRONMENTAL WELL NO. 1326	GROSS ALPHA	GROSS BETA	F	NO3 (N)	U	238 U	234 U	235 U
SAMPLE DATE	pCi/L	pCi/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
3/89	14	25	<0.20	14		1.48	4.43	0.058
6/89	175	9640	1.2	21	0.014			
10/89	16	<20	<0.2	16	<0.005	2.25	5.2	0.11
6/90	16	21	<0.5	17	0.007	2.3	5.8	0.79
6/91	14	<20	<1	10				
6/92	17	20	0.3	15	0.006	1.98	0.74	0.09
6/93	16	<20	<.2	14	<.005	2.6	5.1	0
6/94	19	<20	0.5	14.5	<0.005	6.3	14.3	0.6
6/95	62.9	56.9	0.30	300.00	0.006	1.4	3.6	0.2
4/96	96	457	0.39	5.5	0.0053	2.41	5.15	0.45

TABLE B-23

CIMARRON FACILITY - ENVIRONMENTAL GROUNDWATER SAMPLE RESULTS

ENVIRONMENTAL WELL NO. 1327 B	GROSS ALPHA	GROSS BETA	F	NO3 (N)	U	238 U	234 U	235 U
SAMPLE DATE	pCi/L	pCi/L	mg/L	mg/L	mg/L	pCi/L	pCi/L	pCi/L
3/89	<10	<20	0.2	8.2		1.52	2.8	0.14
6/89	<10	<20	0.36	6.6	<0.005			
10/89	<10	<20	<0.2	8.3	0.007	4.18	6.8	0.069
6/90	<10	<20	<0.5	7.2	<0.005	1.43	2	0.29
6/91	<10	<20	<0.5	7.5				
6/92	<10	<20	0.5	10	<0.005			
6/93	11	<20	10	10	0.006			
6/94	<10	<20	0.8	7.9	<0.005			
6/95	5.2	1.4	0.40	8.20	0.004	1.8	2.3	ND
4/96	1.6	2.9	0.48	5.8	0.0046	1.53	3.24	0.165