

**CROW BUTTE RESOURCES, INC.**

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October 11, 2002

Mr. Daniel M. Gillen  
Branch Chief  
Fuel Cycle Licensing Branch  
Division of Fuel Cycle Safety and Safeguards  
c/o Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington D.C. 20555

Subject: Mine Unit 1 Groundwater Stability Data  
Source Materials License SUA-1534  
Docket Number 40-8943

Dear Mr. Gillen:

On June 28, 2002, Crow Butte Resources, Inc. (CBR) submitted a proposed monitoring plan to the U.S. Nuclear Regulatory Commission (NRC) to confirm the stability of restored groundwater in Mine Unit 1. NRC accepted CBR's proposal by letter dated August 2, 2002 and allowed 90 days for completion of the additional monitoring and trend analysis. Attached is a report that summarizes the stability data. Based on the results of the additional monitoring, CBR believes that the stability of the groundwater in the mine unit has been demonstrated and requests that NRC approved restoration for Mine Unit 1.

If you have any questions, please feel free to contact me at (308) 665-2215.

Sincerely,  
CROW BUTTE RESOURCES, INC.

Michael L. Griffin  
Manager of Health, Safety, and Environmental Affairs

Attachments: As Stated

NMSS01

**CROW BUTTE RESOURCES, INC.**



Mr. Daniel Gillen  
October 11, 2002  
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**Crow Butte Resources, Inc.**  
**Additional Stability Monitoring Data**  
**for**  
**Mine Unit 1 Groundwater Restoration**

**Crow Butte Uranium Project**

**October 11, 2002**

**United States Nuclear Regulatory Commission**  
**Source Materials License SUA-1534**

**Submitted To:** US Nuclear Regulatory Commission  
Office of Nuclear Material Safety and Safeguards  
11545 Rockville Pike  
Rockville, Maryland 20850

**Prepared By:** Crow Butte Resources, Inc.  
P.O. Box 169  
Crawford, Nebraska 69339



**Mine Unit 1 Groundwater Restoration  
Additional Stability Monitoring Data**

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# CROW BUTTE RESOURCES, INC.



## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data

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### 1 INTRODUCTION

Crow Butte Resources, Inc. (CBR) operates a uranium solution mine in Dawes County, Nebraska. The permitted area includes approximately 2,800 acres in all or portions of Sections 11, 12, and 13 of Township 31N, Range 52W and Sections 18, 19, 20, 29 and 30 of Township 31N, Range 51W. The process plant is located in Section 19, Township 31 North, Range 51 West. The wellfields for current mining operations are located in Sections 18 and 19. Mining operations are conducted under a Class III Underground Injection Control (UIC) permit issued by the Nebraska Department of Environmental Quality (NDEQ) and source materials license SUA-1534 issued by the U. S. Nuclear Regulatory Commission (NRC).

CBR is required by NDEQ permit and NRC license condition as well as Nebraska State statute to restore groundwater in the affected area following mining operations. On September 3, 1999, CBR submitted the Mine Unit 1 Restoration Report to the NDEQ. NDEQ determined that the groundwater restoration met the requirements of Nebraska statute and regulations and the conditions of the Class III UIC permit. On November 18, 1999, the NDEQ accepted the groundwater restoration of Mine Unit 1.

On January 10, 2000, CBR submitted the Mine Unit 1 Restoration Report<sup>1</sup> to the NRC. The report reviewed the mining history in Mine Unit 1, groundwater restoration efforts including the post-restoration stabilization monitoring, and provided an analysis of the effectiveness of the restoration. CBR requested that NRC amend portions of the source materials license governing groundwater restoration and approve the restoration of groundwater in Mine Unit 1.

On June 26, 2001, NRC sought additional data from CBR in a Request for Additional Information. The Request for Additional Information addressed three areas where NRC required supplementary information before approval of Mine Unit 1 restoration. The areas requiring additional information were a description of the efforts made by CBR to achieve the primary restoration goals and to ensure the restoration of wellfield flare as well as further data supporting the stability of the groundwater restoration. CBR provided the requested information in a report dated August 24, 2001.

On March 29, 2002, NRC denied the restoration of Mine Unit 1 based on concerns related to the stability of six groundwater parameters during the stabilization monitoring period. Specifically, NRC was concerned with increasing trends for uranium, radium-226, ammonium, iron, selenium, and total dissolved solids (TDS). NRC directed that CBR resume restoration stability monitoring and provide the results of this monitoring to NRC.

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<sup>1</sup> Crow Butte Resources, Inc., *Mine Unit 1 Restoration Report, Crow Butte Uranium Project*, January 10, 2000.

# **CROW BUTTE RESOURCES, INC.**



## **Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data**

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On June 28, 2002, CBR submitted a proposed monitoring plan that was subsequently approved by NRC. The plan entailed performing supplementary monitoring in six Mine Unit 1 restoration wells. The monitoring was performed for the six parameters of concern to NRC. A minimum of three samples were proposed, with a total period of three months allowed for CBR to collect and interpret the monitoring data.

This report provides the results of the supplementary monitoring. These results indicate that the quality of the groundwater in Mine Unit 1 is stable at concentrations below the restoration standards. The results from monitoring for individual parameters is discussed in Section 2. A summary and requested regulatory action is provided in Section 3.

## **2 STABILITY OF GROUNDWATER RESTORATION**

In the denial of Mine Unit 1 restoration, the NRC staff noted what it referred to as “strongly increasing” trends in six restoration parameters during the six month stabilization period in early 1999. NRC staff believed that these trends indicated “...a reasonable likelihood that license limits would be exceeded in the near future.” NRC argued that there were increasing trends in uranium, radium-226, ammonium, iron, selenium, and total dissolved solids.

In response to these concerns, CBR proposed to sample six representative restoration wells (IJ-13, PR-8, PR-15, IJ-28, IJ-45, and IJ-25) in Mine Unit 1 to provide additional stability monitoring data. These wells would be sampled for the six parameters of concern on at least three occasions with a minimum time between samples of fourteen days. The data would be reviewed to determine whether any strongly increasing trend were present that would indicate a future likely exceedance of the approved restoration standards.

CBR sampled the six representative restoration wells on four occasions on July 25, August 8, August 22, and September 19, 2002. The first three sets of samples were analyzed for uranium, radium-226, ammonium, iron, selenium, and total dissolved solids. The final set of samples was analyzed for uranium, radium-226, iron, and selenium. The samples were sent to Energy Laboratories, Inc. in Casper, Wyoming for analysis. Summary tables and copies of the analytical results are contained in Appendix A. The following sections discuss the monitoring results for each parameter and include figures that compare the results for the six wells from the stabilization period in 1999 and the additional monitoring performed in 2002.



**Mine Unit 1 Groundwater Restoration  
Additional Stability Monitoring Data**

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**2.1 Uranium**

Average Mine Unit 1 concentrations of natural uranium during the stabilization period in 1999 ranged from 1.09 to 2.33 mg/L, with an average concentration of 1.73 mg/L (CBR, 2000). These concentrations compare with the NDEQ restoration standard of 5 mg/L. Figure 1 plots the average uranium concentration for the six representative restoration wells during stabilization monitoring in 1999 and the additional monitoring performed in 2002. The figure also includes additional data obtained by CBR from selected wells beginning in early 2000 through 2002.

As shown in Figure 1, uranium concentrations are stable at concentrations well below the restoration standard of 5 mg/L. The average uranium concentrations for the six representative wells ranged from 1.6 to 1.8 mg/L between June and September 2002, with an average concentration of 1.66 mg/L.

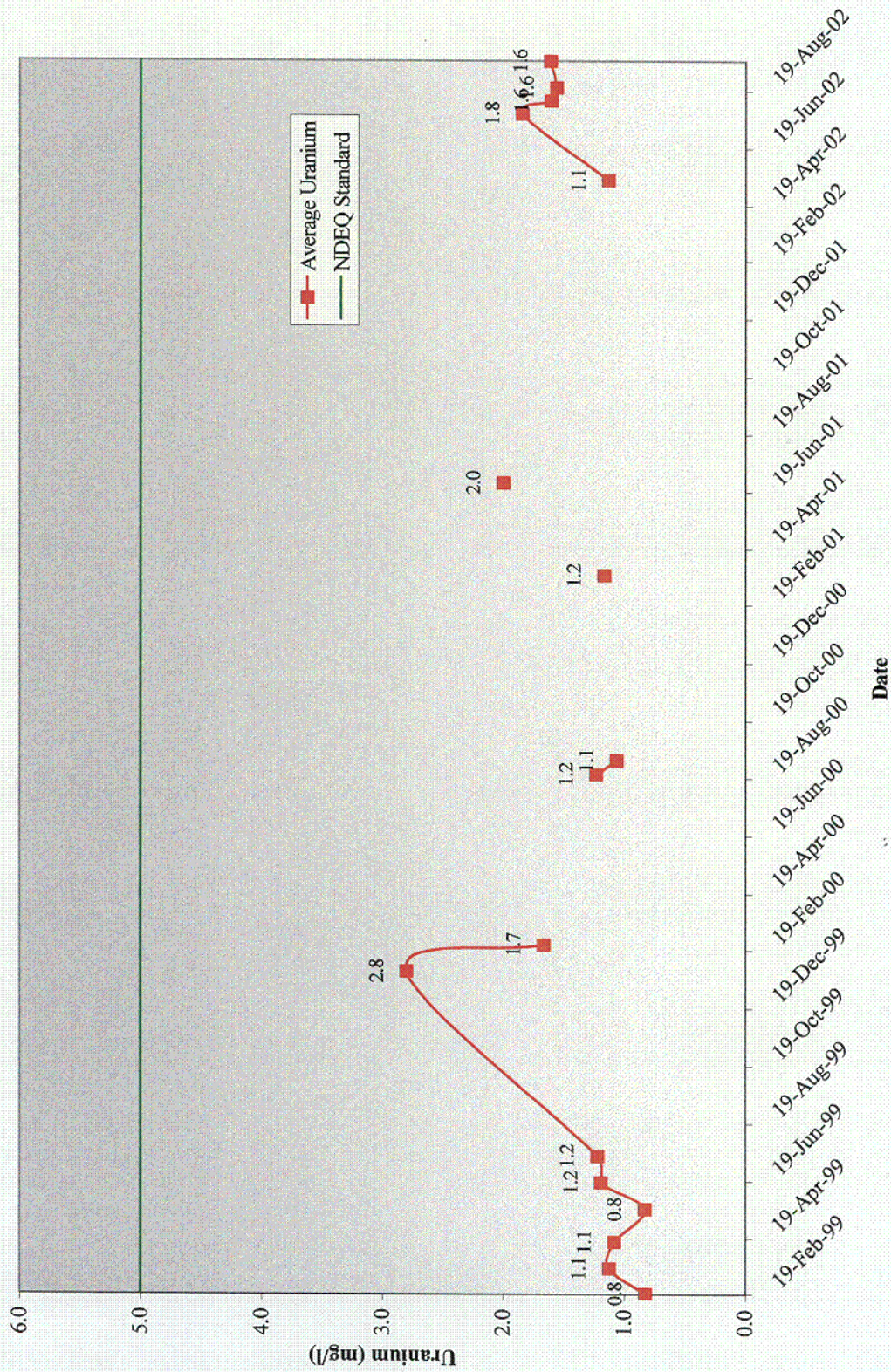


# CROW BUTTE RESOURCES, INC.

## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data



**Figure 1**  
**Mine Unit 1 Average Uranium Concentration**





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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data

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### 2.2 Radium 226

Average Mine Unit 1 concentrations of radium-226 during the stabilization period in 1999 ranged from 216 to 385 pCi/L, with an average concentration of 303 pCi/L (CBR, 2000). These concentrations compare with the baseline average concentration of 230 pCi/L and the NDEQ restoration standard for Mine Unit 1 of 584 pCi/L<sup>2</sup>. Figure 2 plots the average radium-226 concentration from the six representative restoration wells during stabilization and during the additional monitoring period approved by NRC.

As shown in Figure 2, radium-226 concentrations are stable at concentrations well below the restoration standard of 584 pCi/L. The average radium-226 concentrations ranged from 298 to 330 pCi/L between June and September 2002, with an average concentration of 314 pCi/L.

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<sup>2</sup> The NDEQ restoration standard for radium-226 is based upon the drinking water standard of 5 pCi/L from NDEQ Rules and Regulations, Title 118. If the baseline mean for radium-226 exceeds the drinking water standard, the restoration standard is then based upon a statistical determination of the potential range of baseline concentrations, calculated by determining the wellfield mean and adding two standard deviations.

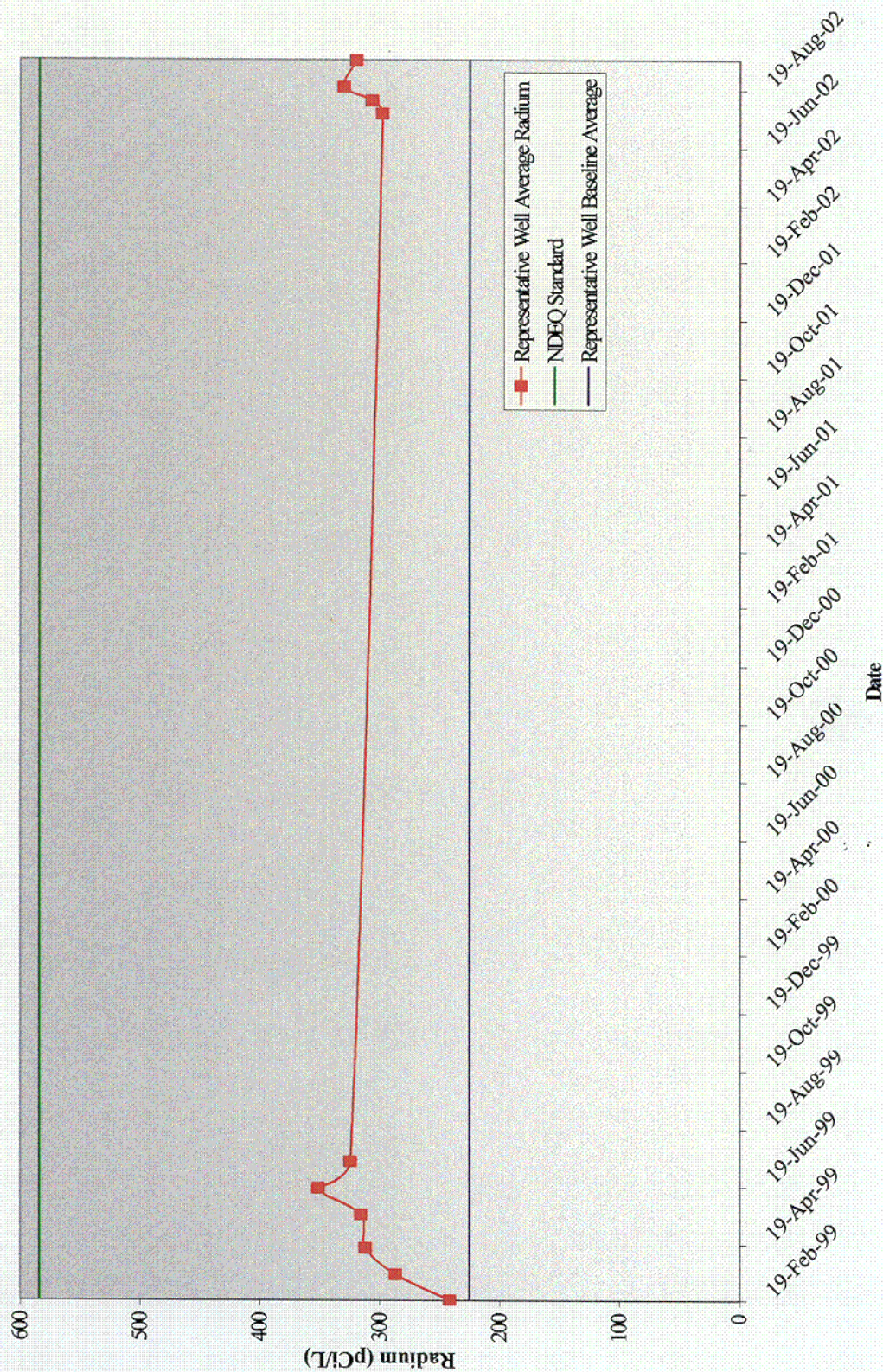


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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data



Figure 2  
Mine Unit 1 Average Radium Concentration





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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data

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### 2.3 Ammonium

Average Mine Unit 1 concentrations of ammonium during the stabilization period in 1999 ranged from 0.07 to 0.18 mg/L, with an average concentration of 0.12 mg/L (CBR, 2000). These concentrations compare with the baseline average concentration of 0.37 mg/L and the NDEQ restoration standard for Mine Unit 1 of 10 mg/L<sup>3</sup>. Figure 3 plots the average ammonium concentration from the six representative restoration wells during stabilization and during the additional monitoring period approved by NRC. (Note that the restoration standard of 10 mg/L cannot be plotted due to the useful scale of the graph).

As shown in Figure 3, ammonium concentrations are stable at concentrations well below the premining baseline concentration of 0.37 mg/L. The average ammonium concentrations ranged from 0.05 to 0.06 mg/L between June and September 2002, with an average concentration of 0.05 mg/L. These current concentrations are 0.5 percent of the restoration standard of 10 mg/L.

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<sup>3</sup> The NDEQ standard of 10 mg/L is contained in the Class III UIC Permit and is based upon an EPA draft health advisory for a drinking water equivalent level (DWEL). The DWEL is a lifetime exposure concentration protective of adverse, non-cancer health effects assuming all of the exposure is from a drinking water source.

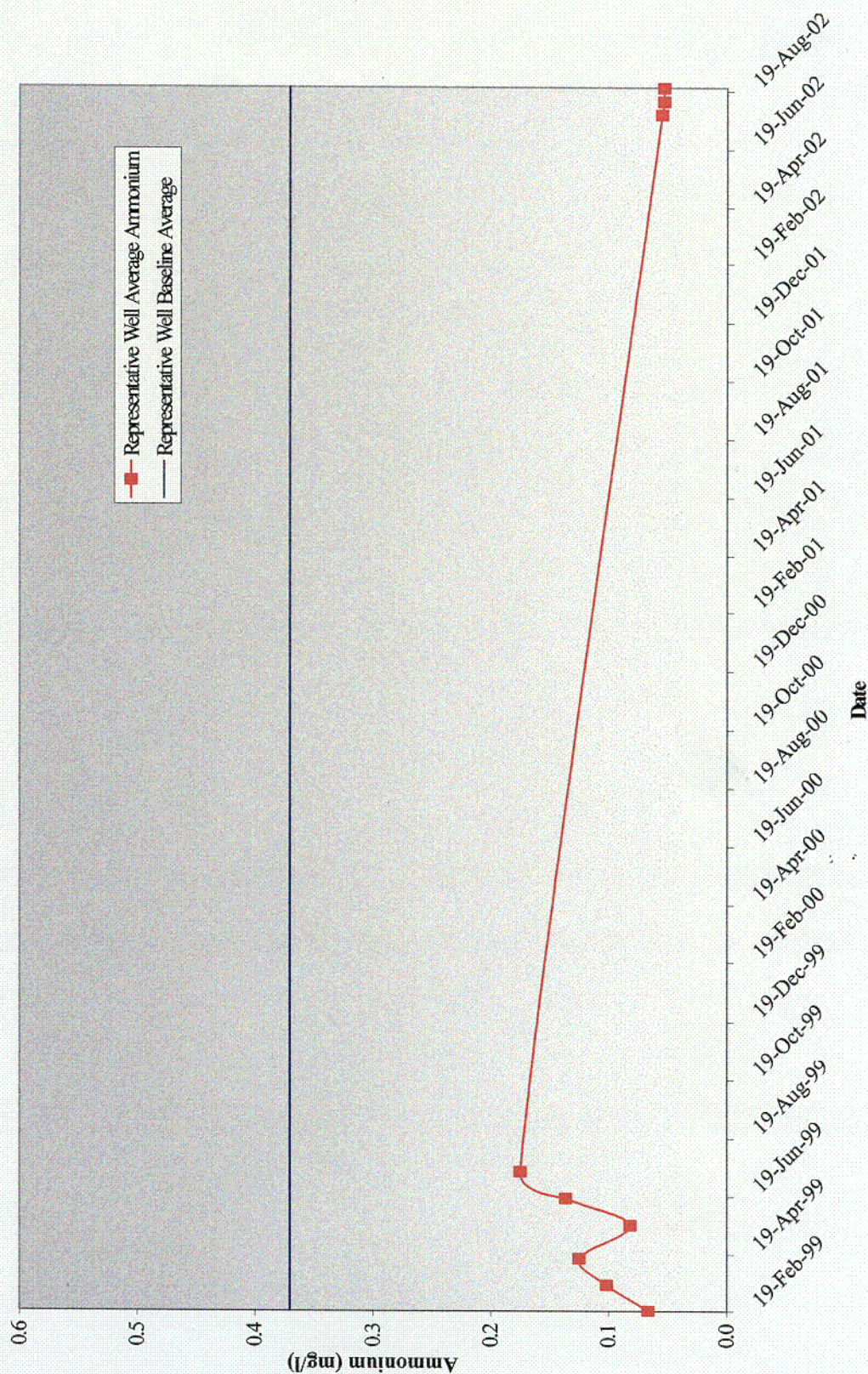


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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data



Figure 3  
Mine Unit 1 Average Ammonium Concentration







## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data

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### 2.4 Iron

Average Mine Unit 1 concentrations of iron during the stabilization period in 1999 ranged from 0.049 to 0.127 mg/L, with an average concentration of 0.089 mg/L (CBR, 2000). These concentrations compare with the baseline average concentration of 0.044 mg/L and the NDEQ restoration standard for Mine Unit 1 of 0.3 mg/L<sup>4</sup>. Figure 4 plots the average iron concentration from the six representative restoration wells during stabilization and during the additional monitoring period approved by NRC. As shown in Figure 4, iron concentrations have increased since the stabilization period to a concentration that is near the restoration standard. The average iron concentrations ranged from 0.24 to 0.31 mg/L between June and September 2002, with an average concentration of 0.278 mg/L.

CBR believes that the elevated iron concentrations are due to the restoration process and will ultimately decrease to concentrations well below the restoration standard. During the in situ mining process, when the groundwater is oxygenated and the Eh is positive, the iron contained in pyrites is oxidized to ferric iron and forms ferric oxyhydroxides. The ferric oxyhydroxides are extremely insoluble, which explains the very low concentrations of iron in solution during mining, indicated by the end of mining values which, with the exception of one restoration well (PR-19), were below the detection limit of 0.05 mg/L. During the active restoration process, however, sodium sulfide is used as a reductant to decrease the Eh of the groundwater. As the Eh drops, the stable solid iron phase is reduced from ferric iron to ferrous iron, which is more soluble. During the transition from ferric to ferrous iron, the iron concentration in the groundwater increases significantly. This increase in the iron concentration is transitory and, as the Eh continues to decrease, iron sulfide minerals will be the dominant iron phase. Because of the relative insolubility of these iron sulfide minerals, this will cause a significant decrease in the iron concentration in solution. Based on these mechanisms, CBR expects that the elevated concentrations of iron at the current time will ultimately decrease.

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<sup>4</sup> The NDEQ restoration standard for iron is based upon the drinking water standard of 0.3 mg/L from NDEQ Rules and Regulations, Title 118. This concentration is listed in Title 118 as an "Other Parameter Affecting Use" and is based on an EPA Secondary Maximum Contaminant Level (SMCL). These SCMLs are unenforceable federal guidelines regarding taste, odor, color and certain other non-aesthetic effects of drinking water.

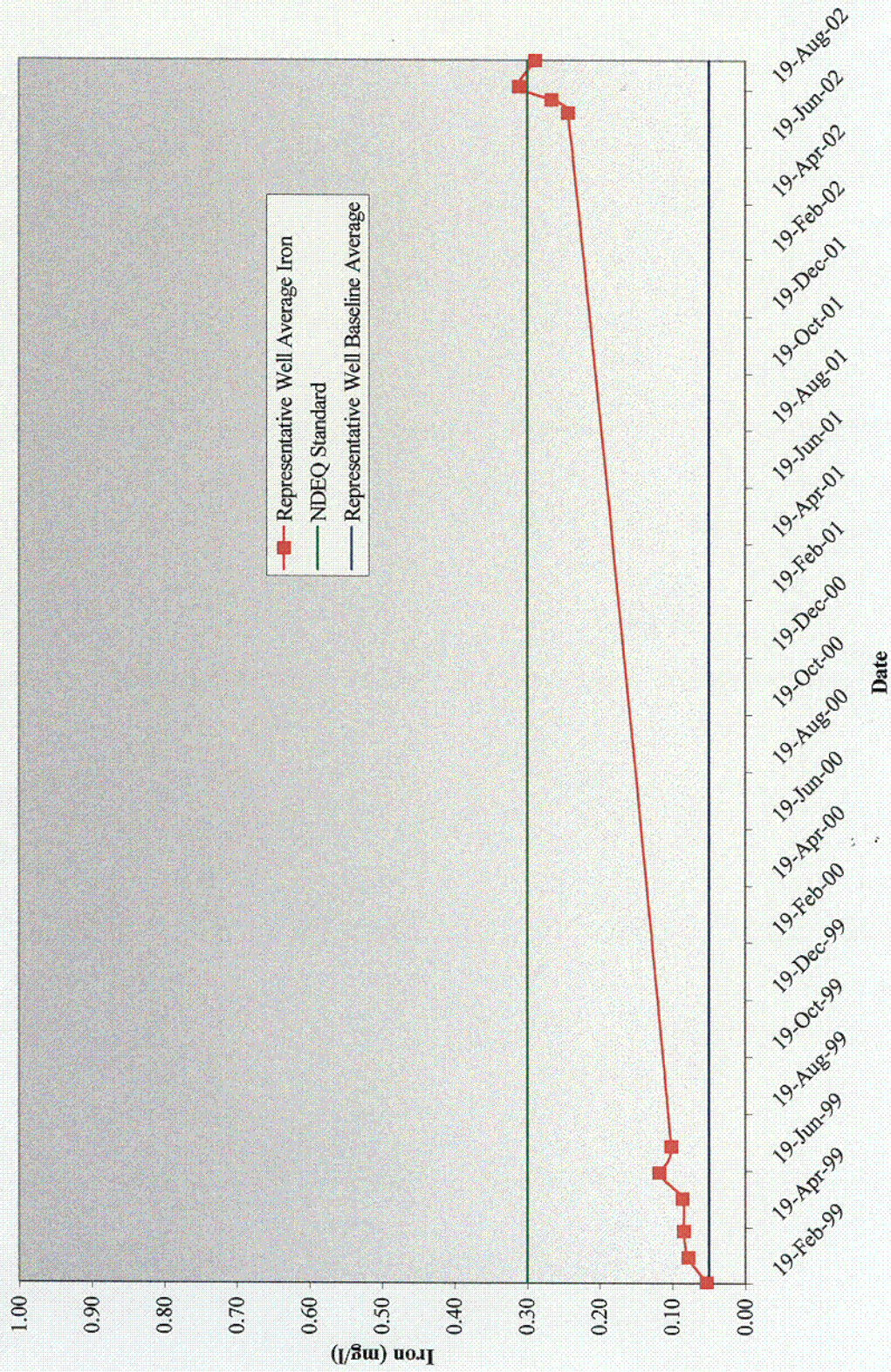


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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data



Figure 4  
Mine Unit 1 Average Iron Concentration







**Mine Unit 1 Groundwater Restoration  
Additional Stability Monitoring Data**

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**2.5 Selenium**

Average Mine Unit 1 concentrations of selenium during the stabilization period in 1999 ranged from 0.001 to 0.003 mg/L, with an average concentration of 0.002 mg/L (CBR, 2000). These concentrations compare with the baseline concentration of 0.003 mg/L and the NDEQ restoration standard for Mine Unit 1 of 0.05 mg/L<sup>5</sup>. Figure 5 plots the average selenium concentration from the six representative restoration wells during stabilization and during the additional monitoring period approved by NRC.

As shown in Figure 5, selenium concentrations are stable at concentrations near baseline and well below the restoration standard of 0.05 mg/L. The average selenium concentrations ranged from 0.0013 to 0.002 mg/L between June and September 2002, with an average concentration of 0.0016 mg/L.

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<sup>5</sup> The NDEQ restoration standard for selenium is based upon the drinking water standard of 0.05 mg/L from NDEQ Rules and Regulations, Title 118.

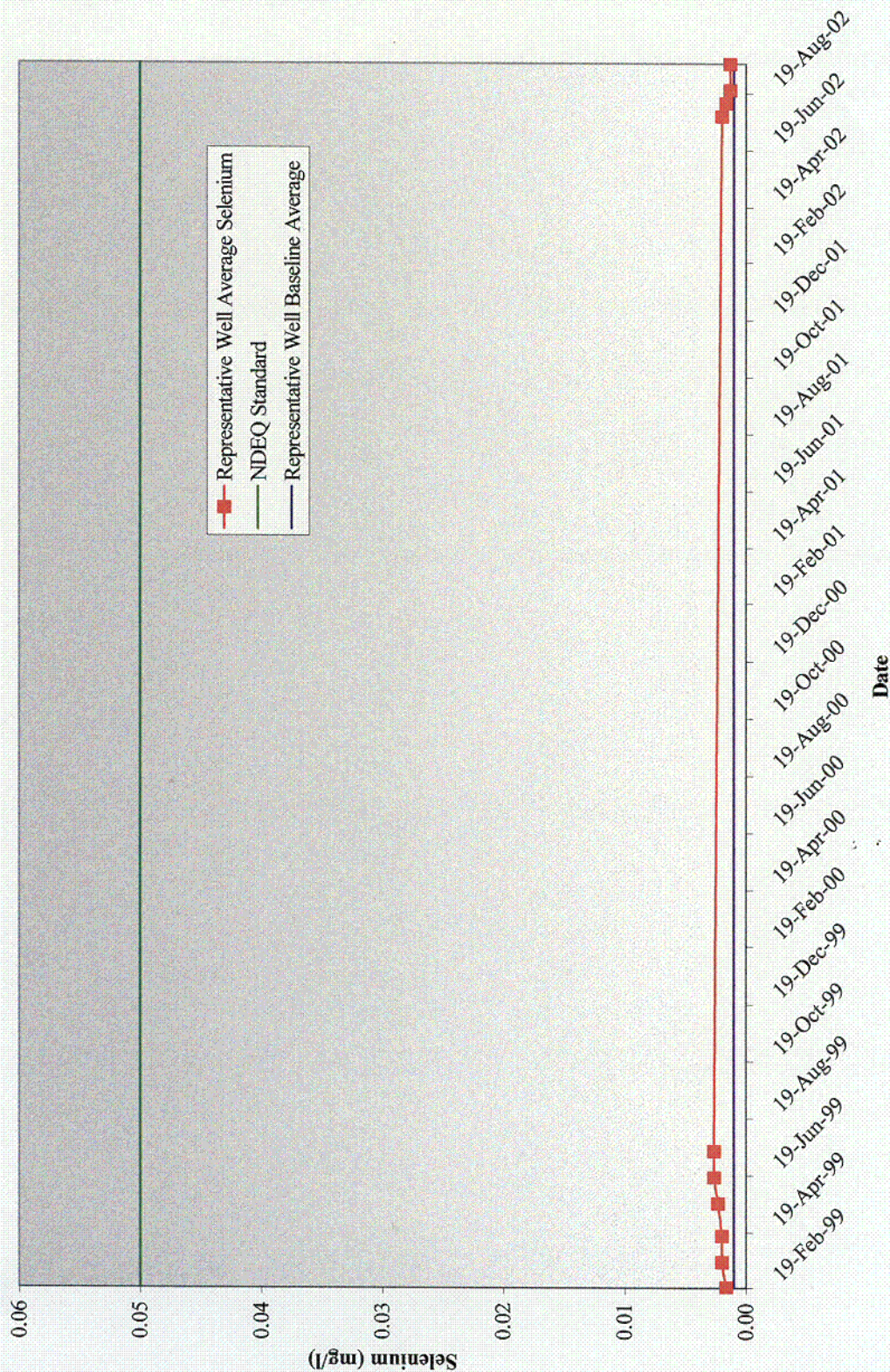


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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data



Figure 5  
Mine Unit 1 Average Selenium Concentration







**Mine Unit 1 Groundwater Restoration  
Additional Stability Monitoring Data**

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**2.6 Total Dissolved Solids**

Average Mine Unit 1 Total Dissolved Solids (TDS) concentrations during the stabilization period in 1999 ranged from 1026 to 1153 mg/L, with an average concentration of 1094 mg/L (CBR, 2000). These concentrations compare with the baseline concentration of 1170 mg/L and the NDEQ restoration standard for Mine Unit 1 of 1218 mg/L<sup>6</sup>. Figure 6 plots the average TDS concentration from the six representative restoration wells during stabilization and during the additional monitoring period approved by NRC.

As shown in Figure 6, TDS concentrations are stable at concentrations below baseline and the restoration standard. The average TDS concentrations ranged from 1078 to 1089 mg/L between June and September 2002, with an average concentration of 1084 mg/L.

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<sup>6</sup> The NDEQ restoration standard for TDS is contained in the Class III UIC Permit. There is no drinking water standard for TDS contained in the NDEQ Rules and Regulations, Title 118. The restoration standard is based upon a statistical determination of the potential range of baseline concentrations, calculated by determining the wellfield mean and adding one standard deviation.

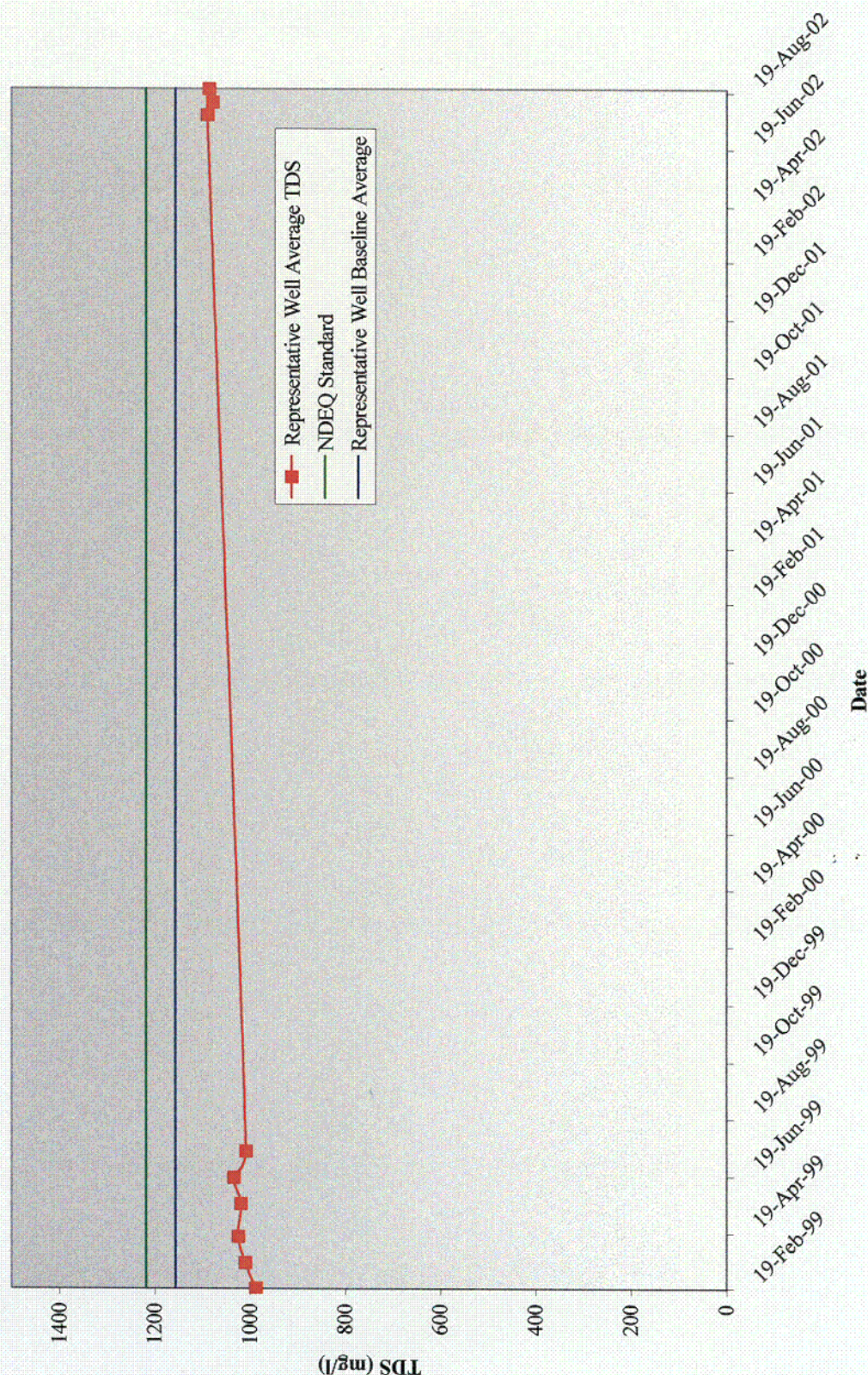


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## Mine Unit 1 Groundwater Restoration Additional Stability Monitoring Data



Figure 6  
Mine Unit 1 Average TDS Concentration







### **3 SUMMARY AND REQUESTED ACTION**

CBR has provided additional, updated monitoring data to address NRC questions concerning increasing trends noted in selected restoration parameters during the stabilization monitoring period for Mine Unit 1. This data was provided by sampling six restoration wells that were selected by CBR and approved by NRC as representative of the Mine Unit as a whole. The data has indicated very stable concentrations of these parameters considering the intervening three years since stabilization monitoring was completed. One parameter (i.e., iron) has shown an increase since 1999, with concentrations near the restoration standard. As explained above, this increase is likely a result of the use of a chemical reductant to restore the mining zone and is transitory.

The additional monitoring data collected by CBR clearly demonstrates that the groundwater in Mine Unit 1 has been successfully restored to the NRC-approved standards and is stable. The average concentration during the additional monitoring period for each parameter is below the approved restoration standard. In two cases (i.e., ammonium and TDS), the average concentrations are below premining baseline concentrations. There are no significant increasing trends evident, particularly when the current water quality conditions are compared with those noted during the 1999 stabilization period for the same six wells.

CBR has met the requirements contained in SUA-1534 and the licensing basis. In addition, CBR has provided additional monitoring data that confirms wellfield stability over an extended period. Based on these results, CBR requests that NRC approve the restoration of the groundwater in Mine Unit 1 in an expeditious manner to allow well abandonment and surface reclamation to proceed.



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**Appendix A**

**Mine Unit 1 Data Summary Tables  
and  
Analytical Results**

Mine Unit 1 Monitor Well Uranium Monitoring Data

Sample Date	PR-15	LI-13	PR-8	LI-25	LI-28	LI-45	Average Uranium
19-Feb-99	0.3	0.2	2.3	0.8	0.5	0.9	0.8
18-Mar-99	0.4	1.3	2.1	1.0	0.7	1.2	1.1
15-Apr-99	0.4	1.6	1.6	1.0	0.7	1.2	1.1
20-May-99	0.5	1.5	1.1	0.7	0.5	0.8	0.8
17-Jun-99	0.8	1.8	1.6	1.1	0.8	1.2	1.2
15-Jul-99	0.9	1.7	1.6	1.3	0.7	1.2	1.2
27-Jan-00		2.8					2.8
24-Feb-00	0.6	3.1	1.3				1.7
10-Mar-00							
23-Mar-00							
6-Apr-00							
20-Apr-00							
4-May-00							
18-May-00							
1-Jun-00							
15-Jun-00							
29-Jun-00							
13-Jul-00							
27-Jul-00							
10-Aug-00							
23-Aug-00	0.6	2.2	0.9				1.2
7-Sep-00	0.5	0.9	1.8				1.1
21-Sep-00							
5-Oct-00							
19-Oct-00							
2-Nov-00							
16-Nov-00							
30-Nov-00							
14-Dec-00							
28-Dec-00							
11-Jan-01							
25-Jan-01							
8-Feb-01							
22-Feb-01							
8-Mar-01							
22-Mar-01	0.7	2.1	0.7				1.2
5-Apr-01							
19-Apr-01							
3-May-01							
17-May-01							
31-May-01							
14-Jun-01							
28-Jun-01	1.4	2.6	2.0				2.0
12-Jul-01							
26-Jul-01							
9-Aug-01							
23-Aug-01							
6-Sep-01							
20-Sep-01							
4-Oct-01							
18-Oct-01							
1-Nov-01							
15-Nov-01							
29-Nov-01							
13-Dec-01							
27-Dec-01							
10-Jan-02							
24-Jan-02							
7-Feb-02							
21-Feb-02							
7-Mar-02							
21-Mar-02							
4-Apr-02							
18-Apr-02							
2-May-02							
16-May-02	1.5	0.4	1.5	2.2	2.8	2.1	1.1
25-Jul-02	0.5	1.7	1.9	1.8	2.4	1.8	1.8
8-Aug-02	0.4	1.6	1.6	1.6	1.6	1.6	1.6
22-Aug-02	0.4	1.8	1.5	1.5	2.4	1.7	1.6
19-Sep-02	0.3	2.2	1.6	1.5	2.3	1.7	1.6

**Mine Unit 1 Monitor Well TDS Monitoring Data**

<b>Sample Date</b>	<b>PR-15</b>	<b>IJ-13</b>	<b>PR-8</b>	<b>IJ-25</b>	<b>IJ-28</b>	<b>IJ-45</b>	<b>Representative Well Average TDS</b>	<b>Representative Well Baseline Average</b>	<b>NDEQ Standard</b>
19-Feb-99	606	1060	1160	1030	1010	1060	988	1156	1218
18-Mar-99	651	1080	1160	1050	1050	1070	1010	1156	1218
15-Apr-99	670	1110	1150	1050	1080	1090	1025	1156	1218
20-May-99	675	1100	1160	1040	1050	1090	1019	1156	1218
17-Jun-99	685	1120	1190	1070	1060	1080	1034	1156	1218
15-Jul-99	669	1080	1160	1030	1020	1090	1008	1156	1218
25-Jul-02	763	1310	1230	1120	1060	1050	1089	1156	1218
8-Aug-02	699	1310	1230	1110	1080	1040	1078	1156	1218
22-Aug-02	720	1320	1210	1110	1110	1040	1085	1156	1218

**Mine Unit 1 Monitor Well Radium Monitoring Data**

<b>Sample Date</b>	<b>PR-15</b>	<b>IJ-13</b>	<b>PR-8</b>	<b>IJ-25</b>	<b>IJ-28</b>	<b>IJ-45</b>	<b>Representative Well Average Radium</b>	<b>Representative Well Baseline Average</b>	<b>NDEQ Standard</b>
19-Feb-99	13	376	204	253	160	445	242	225	584
18-Mar-99	25	665	190	218	192	431	287	225	584
15-Apr-99	30	764	184	236	212	447	312	225	584
20-May-99	30	770	199	225	203	468	316	225	584
17-Jun-99	26	920	206	242	206	509	351	225	584
15-Jul-99	32	849	192	202	185	487	324	225	584
25-Jul-02	22	744	218	216	169	418	298	225	584
8-Aug-02	20	778	239	210	188	405	307	225	584
22-Aug-02	17	852	251	203	207	451	330	225	584
19-Sep-02	13	778	310	231	180	407	320	225	584



**Mine Unit 1 Monitor Well Selenium Monitoring Data**

<b>Sample Date</b>	<b>PR-15</b>	<b>IJ-13</b>	<b>PR-8</b>	<b>IJ-25</b>	<b>IJ-28</b>	<b>IJ-45</b>	<b>Representative Well Average Selenium</b>	<b>Representative Well Baseline Average</b>	<b>NDEQ Standard</b>
19-Feb-99	0.002	0.001	0.001	0.002	0.002	0.002	0.0017	0.001	0.05
18-Mar-99	0.002	0.001	0.003	0.002	0.003	0.002	0.0020	0.001	0.05
15-Apr-99	0.002	0.001	0.003	0.003	0.003	0.002	0.0020	0.001	0.05
20-May-99	0.003	0.001	0.003	0.002	0.003	0.001	0.0023	0.001	0.05
17-Jun-99	0.003	0.001	0.004	0.002	0.003	0.002	0.0027	0.001	0.05
15-Jul-99	0.003	0.001	0.004	0.003	0.003	0.002	0.0027	0.001	0.05
25-Jul-02	0.002	0.002	0.002	0.004	0.002	0.002	0.0020	0.001	0.05
8-Aug-02	0.001	0.002	0.002	0.003	0.002	0.002	0.0017	0.001	0.05
22-Aug-02	0.001	0.001	0.002	0.003	0.002	0.001	0.0013	0.001	0.05
19-Sep-02	0.001	0.001	0.002	0.002	0.001	0.002	0.0013	0.001	0.05

**Mine Unit 1 Monitor Well Iron Monitoring Data**

<b>Sample Date</b>	<b>PR-15</b>	<b>IJ-13</b>	<b>PR-8</b>	<b>IJ-25</b>	<b>IJ-28</b>	<b>IJ-45</b>	<b>Representative Well Average Iron</b>	<b>Representative Well Baseline Average</b>	<b>NDEQ Standard</b>
19-Feb-99	0.02	0.02	0.12	0.04	0.04	0.10	0.05	0.050	0.3
18-Mar-99	0.02	0.10	0.17	0.04	0.04	0.10	0.08	0.050	0.3
15-Apr-99	0.02	0.13	0.15	0.06	0.05	0.10	0.09	0.050	0.3
20-May-99	0.01	0.05	0.23	0.05	0.06	0.12	0.09	0.050	0.3
17-Jun-99	0.02	0.07	0.25	0.05	0.06	0.26	0.12	0.050	0.3
15-Jul-99	0.05	0.06	0.20	0.04	0.06	0.20	0.10	0.050	0.3
25-Jul-02	0.03	0.92	0.30	0.06	0.06	0.09	0.24	0.050	0.3
8-Aug-02	0.03	0.96	0.32	0.07	0.11	0.11	0.27	0.050	0.3
22-Aug-02	0.03	1.06	0.40	0.08	0.14	0.15	0.31	0.050	0.3
19-Sep-02	0.03	1.01	0.40	0.08	0.08	0.14	0.29	0.050	0.3

[illegible][illegible]



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources

Project: MU-1

Lab ID: C02070929-001

Client Sample ID: Well PR8

Report Date: 08/06/02

Collection Date: 07/25/02

Date Received: 07/29/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	0.08	mg/L		0.05		A4500-NH3 G	07/29/02 14:56 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1230	mg/L		10		A2540 C	07/29/02 16:22 / es
METALS - DISSOLVED							
Iron	0.300	mg/L		0.030		E200.7	07/31/02 20:06 / cp
Selenium	0.002	mg/L		0.001		E200.8	07/31/02 15:24 / smd
Uranium	1.88	mg/L		0.001		E200.8	07/31/02 15:24 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	218	pCi/L		0.2		E903.0	08/05/02 22:03 / rs
Radium 226 precision	7.8	±				E903.0	08/05/02 22:03 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit

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### LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02070929-002  
Client Sample ID: Well IJ13P

Report Date: 08/06/02  
Collection Date: 07/25/02  
Date Received: 07/29/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	0.05	mg/L		0.05		A4500-NH3 G	07/29/02 14:58 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1310	mg/L		10		A2540 C	07/29/02 16:22 / es
METALS - DISSOLVED							
Iron	0.923	mg/L		0.030		E200.7	07/31/02 20:09 / cp
Selenium	0.002	mg/L		0.001		E200.8	07/31/02 15:45 / smd
Uranium	1.67	mg/L		0.001		E200.8	07/31/02 15:45 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	744	pCi/L		0.2		E903.0	08/05/02 22:23 / rs
Radium 226 precision	26.6	±				E903.0	08/05/02 22:23 / rs

Report Definitions: RL - Analyte reporting limit  
QCL - Quality control limit

MCL - Maximum contaminant level  
ND - Not detected at the reporting limit

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## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02070929-003  
Client Sample ID: Well RP15

Report Date: 08/06/02  
Collection Date: 07/25/02  
Date Received: 07/29/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>						
Nitrogen, Ammonia as N	ND	mg/L		0.05	A4500-NH3 G	07/29/02 15:00 / rwk
<b>PHYSICAL PROPERTIES</b>						
Solids, Total Dissolved TDS @ 180 C	763	mg/L		10	A2540 C	07/29/02 16:23 / es
<b>METALS - DISSOLVED</b>						
Iron	ND	mg/L		0.030	E200.7	07/31/02 20:12 / cp
Selenium	0.002	mg/L		0.001	E200.8	07/31/02 15:50 / smd
Uranium	0.491	mg/L		0.001	E200.8	07/31/02 15:50 / smd
<b>RADIONUCLIDES - DISSOLVED</b>						
Radium 226	21.7	pCi/L		0.2	E903.0	08/05/02 23:27 / rs
Radium 226 precision	1.4	±			E903.0	08/05/02 23:27 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level  
ND - Not detected at the reporting limit.

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70929R00003



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02070929-004  
Client Sample ID: Well IJ45P

Report Date: 08/06/02  
Collection Date: 07/25/02  
Date Received: 07/29/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>						
Nitrogen, Ammonia as N	ND	mg/L		0.05	A4500-NH3 G	07/29/02 15:02 / rwk
<b>PHYSICAL PROPERTIES</b>						
Solids, Total Dissolved TDS @ 180 C	1050	mg/L		10	A2540 C	07/29/02 16:23 / es
<b>METALS - DISSOLVED</b>						
Iron	0.092	mg/L		0.030	E200.7	07/31/02 20:15 / cp
Selenium	0.002	mg/L		0.001	E200.8	07/31/02 15:55 / smd
Uranium	2.05	mg/L		0.001	E200.8	07/31/02 15:55 / smd
<b>RADIONUCLIDES - DISSOLVED</b>						
Radium 226	418	pCi/L		0.2	E903.0	08/05/02 23:38 / rs
Radium 226 precision	15.0	±			E903.0	08/05/02 23:38 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources

Project: MU-1

Lab ID: C02070929-005

Client Sample ID: Well IJ28P

Report Date: 08/06/02

Collection Date: 07/25/02

Date Received: 07/29/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	07/29/02 15:04 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1060	mg/L		10		A2540 C	07/29/02 16:24 / es
METALS - DISSOLVED							
Iron	0.056	mg/L		0.030		E200.7	07/31/02 20:19 / cp
Selenium	0.002	mg/L		0.001		E200.8	07/31/02 16:00 / smd
Uranium	2.83	mg/L		0.001		E200.8	07/31/02 16:00 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	169	pCi/L		0.2		E903.0	08/06/02 00:03 / rs
Radium 226 precision	6.1	±				E903.0	08/06/02 00:03 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02070929-006  
Client Sample ID: Well IJ25P

Report Date: 08/06/02  
Collection Date: 07/25/02  
Date Received: 07/29/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	07/29/02 15:06 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1120	mg/L		10		A2540 C	07/29/02 16:24 / es
METALS - DISSOLVED							
Iron	0.061	mg/L		0 030		E200.7	07/31/02 20:22 / cp
Selenium	0.004	mg/L		0 001		E200 8	07/31/02 16:05 / smd
Uranium	2.16	mg/L		0 001		E200.8	07/31/02 16:05 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	216	pCi/L		0 2		E903.0	08/06/02 00:23 / rs
Radium 226 precision	7.8	±				E903.0	08/06/02 00:23 / rs

Report Definitions: RL - Analyte reporting limit  
QCL - Quality control limit

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit

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70929R00006



### LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1 Restoration Round 2

Lab Order: C02080357  
Report Date: 08/21/02

Lab ID: C02080357-001					Collection Date: 08/08/02		
Client Sample ID: Well #IJ 45P					Date Received: 08/12/02		
Matrix: AQUEOUS					MCL/		
Analyses	Result	Units	Qual	RL	QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	08/12/02 14:37 / rwk
<b>PHYSICAL PROPERTIES</b>							
Solids, Total Dissolved TDS @ 180 C	1040	mg/L		10		A2540 C	08/13/02 13:44 / es
<b>METALS - DISSOLVED</b>							
Iron	0.107	mg/L		0.030		E200.7	08/13/02 11:04 / cp
Selenium	0.002	mg/L		0.001		E200.8	08/12/02 18:14 / smd
Uranium	1.80	mg/L		0.001		E200.8	08/12/02 18:14 / smd
<b>RADIONUCLIDES - DISSOLVED</b>							
Radium 226	405	pCi/L		0.2		E903.0	08/20/02 01:40 / rs
Radium 226 precision	14.5	±				E903.0	08/20/02 01:40 / rs

Lab ID: C02080357-002					Collection Date: 08/08/02		
Client Sample ID: Well #PR-15					Date Received: 08/12/02		
Matrix: AQUEOUS					MCL/		
Analyses	Result	Units	Qual	RL	QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	08/12/02 14:40 / rwk
<b>PHYSICAL PROPERTIES</b>							
Solids, Total Dissolved TDS @ 180 C	699	mg/L		10		A2540 C	08/13/02 13:45 / es
<b>METALS - DISSOLVED</b>							
Iron	ND	mg/L		0.030		E200.7	08/13/02 11:34 / cp
Selenium	ND	mg/L		0.001		E200.8	08/12/02 18:35 / smd
Uranium	0.381	mg/L		0.001		E200.8	08/12/02 18:35 / smd
<b>RADIONUCLIDES - DISSOLVED</b>							
Radium 226	19.6	pCi/L		0.2		E903.0	08/20/02 02:40 / rs
Radium 226 precision	1.3	±				E903.0	08/20/02 02:40 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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80357R00001



LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1 Restoration Round 2

Lab Order: C02080357  
Report Date: 08/21/02

Lab ID: C02080357-003					Collection Date: 08/08/02
Client Sample ID: Well #PR-8					Date Received: 08/12/02
Matrix: AQUEOUS	MCL/				
Analyses	Result	Units	Qual	RL QCL	Method Analysis Date / By
<b>MAJOR IONS</b>					
Nitrogen, Ammonia as N	0.06	mg/L		0.05	A4500-NH3 G 08/12/02 14 42 / rwk
<b>PHYSICAL PROPERTIES</b>					
Solids, Total Dissolved TDS @ 180 C	1230	mg/L		10	A2540 C 08/13/02 13 45 / es
<b>METALS - DISSOLVED</b>					
Iron	0.321	mg/L		0.030	E200.7 08/13/02 11:38 / cp
Selenium	0.002	mg/L		0.001	E200.8 08/12/02 18 41 / smd
Uranium	1.63	mg/L		0.001	E200.8 08/12/02 18 41 / smd
<b>RADIONUCLIDES - DISSOLVED</b>					
Radium 226	239	pCi/L		0.2	E903.0 08/20/02 02 03 / rs
Radium 226 precision	8.6	±			E903.0 08/20/02 02.03 / rs

Lab ID: C02080357-004					Collection Date: 08/08/02
Client Sample ID: Well #IJ-13-P					Date Received: 08/12/02
Matrix: AQUEOUS	MCL/				
Analyses	Result	Units	Qual	RL QCL	Method Analysis Date / By
<b>MAJOR IONS</b>					
Nitrogen, Ammonia as N	0.06	mg/L		0.05	A4500-NH3 G 08/12/02 14 51 / rwk
<b>PHYSICAL PROPERTIES</b>					
Solids, Total Dissolved TDS @ 180 C	1310	mg/L		10	A2540 C 08/13/02 13 46 / es
<b>METALS - DISSOLVED</b>					
Iron	0.962	mg/L		0.030	E200.7 08/13/02 11:55 / cp
Selenium	0.002	mg/L		0.001	E200.8 08/12/02 18 46 / smd
Uranium	1.55	mg/L		0.001	E200.8 08/12/02 18 46 / smd
<b>RADIONUCLIDES - DISSOLVED</b>					
Radium 226	778	pCi/L		0.2	E903.0 08/20/02 03 03 / rs
Radium 226 precision	27.8	±			E903.0 08/20/02 03 03 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit

MCL - Maximum contaminant level  
ND - Not detected at the reporting limit

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80357R00002



### LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1 Restoration Round 2

Lab Order: C02080357  
Report Date: 08/21/02

Lab ID: C02080357-005	Collection Date: 08/08/02						
Client Sample ID: Well #IJ-28-P	DateReceived: 08/12/02						
Matrix: AQUEOUS	MCL/						
Analyses	Result	Units	Qual	RL	QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	08/12/02 14:53 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1080	mg/L		10		A2540 C	08/13/02 13:47 / es
METALS - DISSOLVED							
Iron	0.111	mg/L		0.030		E200.7	08/13/02 11:59 / cp
Selenium	0.002	mg/L		0.001		E200.8	08/12/02 18:51 / smd
Uranium	2.44	mg/L		0.001		E200.8	08/12/02 18:51 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	188	pCi/L		0.2		E903.0	08/20/02 03:24 / rs
Radium 226 precision	6.7	±				E903.0	08/20/02 03:24 / rs

Lab ID: C02080357-006	Collection Date: 08/08/02						
Client Sample ID: Well #IJ-25-P	DateReceived: 08/12/02						
Matrix: AQUEOUS	MCL/						
Analyses	Result	Units	Qual	RL	QCL	Method	Analysis Date / By
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05	-	A4500-NH3 G	08/12/02 14:55 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1110	mg/L		10		A2540 C	08/13/02 13:47 / es
METALS - DISSOLVED							
Iron	0.070	mg/L		0.030		E200 7	08/13/02 12 03 / cp
Selenium	0.003	mg/L		0.001		E200.8	08/12/02 18.56 / smd
Uranium	1.84	mg/L		0.001		E200 8	08/12/02 18.56 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	210	pCi/L		0.2		E903 0	08/20/02 03:43 / rs
Radium 226 precision	7.5	±				E903 0	08/20/02 03 43 / rs

Report Definitions: RL - Analyte reporting limit  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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80357R00003



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02080856-001  
Client Sample ID: Well #PR15

Report Date: 09/05/02  
Collection Date: 08/22/02  
Date Received: 08/24/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	08/26/02 14:26 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	720	mg/L		10		A2540 C	08/26/02 16 02 / slb
METALS - DISSOLVED							
Iron	ND	mg/L		0.030		E200.7	08/27/02 16.45 / cp
Selenium	0.001	mg/L		0 001		E200.8	08/26/02 18:58 / smd
Uranium	0.363	mg/L		0 001		E200.8	08/26/02 18:58 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	17.1	pCi/L		0.2		E903 0	09/01/02 06:48 / smc
Radium 226 precision	1.3	±				E903.0	09/01/02 06:48 / smc

Report Definitions: RL - Analyte reporting limit  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit

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80856R00001





## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources

Project: MU-1

Lab ID: C02080856-002

Client Sample ID: Well #IJ13P

Report Date: 09/05/02

Collection Date: 08/22/02

Date Received: 08/24/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	0.07	mg/L		0.05		A4500-NH3 G	08/26/02 14:29 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1320	mg/L		10		A2540 C	08/26/02 16:03 / slb
METALS - DISSOLVED							
Iron	1.06	mg/L		0.030		E200.7	09/04/02 10:38 / cp
Selenium	0.001	mg/L		0.001		E200.8	08/26/02 19:04 / smd
Uranium	1.83	mg/L		0.001		E200.8	08/26/02 19:04 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	852	pCi/L		0.2		E903.0	09/01/02 06:53 / smc
Radium 226 precision	30.5	±				E903.0	09/01/02 06:53 / smc

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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80856R00002



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources

Project: MU-1

Lab ID: C02080856-003

Client Sample ID: Well #PR8

Report Date: 09/05/02

Collection Date: 08/22/02

Date Received: 08/24/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	08/26/02 14:32 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1210	mg/L		10		A2540 C	08/26/02 16:03 / slb
METALS - DISSOLVED							
Iron	0.403	mg/L		0.030		E200.7	09/04/02 10:41 / cp
Selenium	0.002	mg/L		0.001		E200.8	08/26/02 19:09 / smd
Uranium	1.52	mg/L		0.001		E200.8	08/26/02 19:09 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	251	pCi/L		0.2		E903.0	09/01/02 07:10 / smc
Radium 226 precision	9.0	±				E903.0	09/01/02 07:10 / smc

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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80856R00003



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02080856-004  
Client Sample ID: Well #IJ45P

Report Date: 09/05/02  
Collection Date: 08/22/02  
Date Received: 08/24/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>						
Nitrogen, Ammonia as N	ND	mg/L		0.05	A4500-NH3 G	08/26/02 14 34 / rwk
<b>PHYSICAL PROPERTIES</b>						
Solids, Total Dissolved TDS @ 180 C	1040	mg/L		10	A2540 C	08/26/02 16 04 / slb
<b>METALS - DISSOLVED</b>						
Iron	0.150	mg/L		0.030	E200.7	09/04/02 10 43 / cp
Selenium	0.001	mg/L		0.001	E200.8	08/26/02 19 31 / smd
Uranium	1.68	mg/L		0.001	E200 8	08/26/02 19 31 / smd
<b>RADIONUCLIDES - DISSOLVED</b>						
Radium 226	451	pCi/L		0.2	E903.0	09/01/02 07.20 / smc
Radium 226 precision	16.1	±			E903 0	09/01/02 07.20 / smc

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level  
ND - Not detected at the reporting limit.

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80856R00004



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02080856-005  
Client Sample ID: Well #IJ28P

Report Date: 09/05/02  
Collection Date: 08/22/02  
Date Received: 08/24/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/ RL QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>						
Nitrogen, Ammonia as N	ND	mg/L		0.05	A4500-NH3 G	08/26/02 14:36 / rwk
<b>PHYSICAL PROPERTIES</b>						
Solids, Total Dissolved TDS @ 180 C	1110	mg/L		10	A2540 C	08/26/02 16:04 / slb
<b>METALS - DISSOLVED</b>						
Iron	0.142	mg/L		0.030	E200 7	09/04/02 10:46 / cp
Selenium	0.002	mg/L		0.001	E200 8	08/26/02 19:36 / smd
Uranium	2.35	mg/L		0.001	E200 8	08/26/02 19:36 / smd
<b>RADIONUCLIDES - DISSOLVED</b>						
Radium 226	207	pCi/L		0.2	E903.0	09/01/02 07:42 / smc
Radium 226 precision	7.4	±			E903.0	09/01/02 07:42 / smc

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

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80856R00005



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1  
Lab ID: C02080856-006  
Client Sample ID: Well #IJ25P

Report Date: 09/05/02  
Collection Date: 08/22/02  
Date Received: 08/24/02  
Matrix: AQUEOUS

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
MAJOR IONS							
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	08/26/02 14:45 / rwk
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	1110	mg/L		10		A2540 C	08/26/02 16:05 / slb
METALS - DISSOLVED							
Iron	0.084	mg/L		0.030		E200.7	09/04/02 10:48 / cp
Selenium	0.003	mg/L		0.001		E200.8	08/26/02 19:41 / smd
Uranium	1.64	mg/L		0.001		E200.8	08/26/02 19:41 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	203	pCi/L		0.2		E903.0	09/01/02 08:02 / smc
Radium 226 precision	7.3	±				E903.0	09/01/02 08:02 / smc

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level  
ND - Not detected at the reporting limit

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## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1 Restoration Round 4

Lab Order: C02090757

Report Date: 10/02/02

Lab ID: C02090757-005

Collection Date: 09/19/02

Client Sample ID: IJ25P

Date Received: 09/20/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - DISSOLVED</b>							
Iron	0.083	mg/L		0.030		E200.7	09/26/02 13:12 / cp
Selenium	0.002	mg/L		0.001		E200.8	09/30/02 22:22 / smd
Uranium	1.54	mg/L		0.001		E200.8	09/30/02 22:22 / smd
<b>RADIONUCLIDES - DISSOLVED</b>							
Radium 226	231	pCi/L		0.2		E903.0	09/30/02 12:33 / rs
Radium 226 precision	5.0	±				E903.0	09/30/02 12:33 / rs

Lab ID: C02090757-006

Collection Date: 09/19/02

Client Sample ID: IJ45P

Date Received: 09/20/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - DISSOLVED</b>							
Iron	0.139	mg/L		0.030		E200.7	09/26/02 13:15 / cp
Selenium	0.002	mg/L		0.001		E200.8	09/30/02 22:27 / smd
Uranium	1.71	mg/L		0.001		E200.8	09/30/02 22:27 / smd
<b>RADIONUCLIDES - DISSOLVED</b>							
Radium 226	407	pCi/L		0.2		E903.0	09/30/02 13:41 / rs
Radium 226 precision	6.6	±				E903.0	09/30/02 13:41 / rs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



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## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1 Restoration Round 4

Lab Order: C02090757  
Report Date: 10/02/02

Lab ID: C02090757-001

Collection Date: 09/19/02

Client Sample ID: PR15

Date Received: 09/20/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - DISSOLVED</b>							
Iron	ND	mg/L		0.030		E200.7	09/26/02 12:49 / cp
Selenium	0.001	mg/L		0.001		E200.8	09/30/02 22:01 / smd
Uranium	0.318	mg/L		0.001		E200.8	09/30/02 22:01 / smd
<b>RADIONUCLIDES - DISSOLVED</b>							
Radium 226	13.3	pCi/L		0.2		E903.0	09/30/02 12:33 / rs
Radium 226 precision	1.2	±				E903.0	09/30/02 12:33 / rs

Lab ID: C02090757-002

Collection Date: 09/19/02

Client Sample ID: PR8

Date Received: 09/20/02

Matrix: AQUEOUS

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - DISSOLVED</b>							
Iron	0.399	mg/L		0.030		E200.7	09/26/02 12:52 / cp
Selenium	0.002	mg/L		0.001		E200.8	09/30/02 22:06 / smd
Uranium	1.60	mg/L		0.001		E200.8	09/30/02 22:06 / smd
<b>RADIONUCLIDES - DISSOLVED</b>							
Radium 226	310	pCi/L		0.2		E903.0	09/30/02 12:33 / rs
Radium 226 precision	5.7	±				E903.0	09/30/02 12:33 / rs

Report Definitions: RL - Analyte reporting limit,  
QCL - Quality control limit,

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



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### LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: MU-1 Restoration Round 4

Lab Order: C02090757  
Report Date: 10/02/02

Lab ID: C02090757-003  
Client Sample ID: IJ13P  
Matrix: AQUEOUS

Collection Date: 09/19/02  
Date Received: 09/20/02

Matrix:	AQUEOUS			MCL/			
Analyses	Result	Units	Qual	RL	QCL	Method	Analysis Date / By
METALS - DISSOLVED							
Iron	1.01	mg/L		0.030		E200.7	09/26/02 13:06 / cp
Selenium	0.001	mg/L		0.001		E200.8	09/30/02 22:12 / smd
Uranium	2.19	mg/L		0.001		E200.8	09/30/02 22:12 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	778	pCi/L		0.2		E903.0	09/30/02 12:33 / rs
Radium 226 precision	9.1	±				E903.0	09/30/02 12:33 / rs

Lab ID: C02090757-004  
Client Sample ID: IJ28P  
Matrix: AQUEOUS

Collection Date: 09/19/02  
Date Received: 09/20/02

Matrix:	AQUEOUS		MCL/				
Analyses	Result	Units	Qual	RL	QCL	Method	Analysis Date / By
METALS - DISSOLVED							
Iron	0.076	mg/L		0.030		E200.7	09/26/02 13:09 / cp
Selenium	0.002	mg/L		0.001		E200.8	09/30/02 22:17 / smd
Uranium	2.33	mg/L		0.001		E200.8	09/30/02 22:17 / smd
RADIONUCLIDES - DISSOLVED							
Radium 226	180	pCi/L		0.2		E903.0	09/30/02 12:33 / rs
Radium 226 precision	4.5	±				E903.0	09/30/02 12:33 / rs

Report: RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.