

**CAMECO RESOURCES  
CROW BUTTE OPERATION**



**86 Crow Butte Road  
P.O. Box 169  
Crawford, Nebraska 69339-0169**

**(308) 665-2215  
(308) 665-2341 – FAX**

February 25, 2008

United States Nuclear Regulatory Commission  
Region IV  
Material Radiation Protection Section  
611 Ryan Plaza Drive  
Suite 400  
Arlington, Texas 76011-4005

RECEIVED

MAR 3 2008

DNMS

Subject: Semiannual Radiological Effluent and Environmental Monitoring Report  
Source Materials License No. SUA-1534, Docket No. 40-8943

Dear Sir or Madam:

Enclosed please find one copy of the Semiannual Radiological Effluent and Environmental Monitoring Report for the Crow Butte Uranium Project. The report is provided in accordance with License Condition 12.1 of Source Materials License SUA-1534 and 10 CFR Part 40. This report covers the third and fourth quarters of 2007.

If you have any questions concerning the report, please feel free to call me at (308) 665-2215.

Sincerely,  
CAMECO RESOURCES

Larry Teahon  
Manager of Environmental, Health and Safety

cc: Mr. Keith I. McConnell, Deputy Director  
Decommissioning and Uranium Recovery Licensing Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental Management Programs  
U.S. Nuclear Regulatory Commission  
Mailstop T8-F5  
Washington D.C. 20555-0001

Mr. Dave Miesbach  
Unit Supervisor  
Nebraska Department of Environmental Quality  
PO Box 98922  
Lincoln, Nebraska 68509-8922



**CROW BUTTE URANIUM PROJECT  
RADIOLOGICAL EFFLUENT  
AND  
ENVIRONMENTAL MONITORING  
REPORT**

**for**

**THIRD AND FOURTH QUARTERS, 2007**

**USNRC Source Materials License SUA 1534**

**CAMECO RESOURCES  
CROW BUTTE OPERATION**



**Second Half 2007 Semiannual Radiological Effluent  
and Environmental Monitoring Report**

---

**Table of Contents**

<b>1</b>	<b>WATER QUALITY MONITORING DATA.....</b>	<b>1</b>
1.1	Excursion Monitoring.....	1
1.2	Water Supply Wells and Surface Water .....	1
<b>2</b>	<b>OPERATIONAL.....</b>	<b>2</b>
2.1	Production Data Summary.....	2
2.2	Wastewater Summary .....	2
2.3	Effluent Release .....	2
2.4	Restoration.....	4
<b>3</b>	<b>ENVIRONMENTAL MONITORING .....</b>	<b>4</b>
3.1	Air Monitor Stations .....	4
3.2	TLD Monitors .....	4
3.3	Stream Sediments .....	4

# CAMECO RESOURCES CROW BUTTE OPERATION



## Second Half 2007 Semiannual Radiological Effluent and Environmental Monitoring Report

---

### 1 WATER QUALITY MONITORING DATA

#### 1.1 Excursion Monitoring

Biweekly excursion monitoring in the shallow aquifer and perimeter monitor wells was continued in Mine Units 2 through 10 during the third and fourth quarters of 2007.

PR-8, PR-15, and IJ-13 remain on excursion status. These monitor wells are associated with Mine Units 2 and 3, which are currently undergoing groundwater restoration.

On September 26, 2006, Mine Unit 2 perimeter monitor well PR-15 was placed on excursion status. PR-15 is a baseline restoration well in Mine Unit 1 that was chosen to monitor the boundary of Mine Unit 2 following the approval of restoration. The current restoration activities in Mine Unit 2 adjacent to PR-15 include groundwater transfer and wellfield recirculation. IJ-13 and PR-8, two other baseline restoration wells from Mine Unit 1, have remained on excursion status since December 27, 2002 and December 23, 2003 respectively. Due to the geometry of Mine Units 2 and 3, CBR is of the opinion that PR-15 will continue to exhibit the same trend as IJ-13 and PR-8 until Mine Units 2 and 3 can be fully restored along the perimeter of Mine Unit 1.

Excursion reports have been submitted to NRC as required in License Condition 12.2. Complete excursion monitoring results are available on site for inspection. A summary table for monitor wells on excursion status during the second half of 2007 follows.

Monitor Well ID	Date On Excursion	Date Off Excursion	Biweekly Sampling Resumed	Causal Factor(s)
PR-8	23 Dec 03			Wellfield geometry
IJ-13	27 Dec 03			Wellfield geometry
PR-15	26 Sep 06			Wellfield geometry

#### 1.2 Water Supply Wells and Surface Water

# **CAMECO RESOURCES**

## **CROW BUTTE OPERATION**



### **Second Half 2007 Semiannual Radiological Effluent and Environmental Monitoring Report**

---

Summary sheets of quarterly radiological analytical data for the reporting period from all surface waters and water supply wells within one kilometer of the active wellfield boundary are included in Appendix A. Well #24 and well #25 have had the electrical service removed from them and will not be put back into service until after mining activities are completed.

The reported radiological data are within the expected ranges for each well or stream. Samples were obtained from all sample locations with the exceptions noted in Appendix A.

## **2 OPERATIONAL**

### **2.1 Production Data Summary**

Mining operations continued through the third and fourth quarters of 2007. The average operating production flow rate was 4100 gpm for the third quarter and 4279 gpm for the fourth quarter. Injection and production totals from the totalizers and the calculated bleed totals for the reporting period are included in Appendix B.

The main injection trunkline is equipped with a continuous pressure sensor. The average and maximum injection pressures for each wellhouse are included in Appendix C in the Wellfield Injection Pressure table.

### **2.2 Wastewater Summary**

The total volume of wastewater discharged to the ponds was 1,734,390 gallons during the third quarter and 2,062,030 gallons during the fourth quarter. Currently, all five evaporation ponds contain wastewater.

Wastewater that is not disposed of in the evaporation ponds is injected into the Deep Disposal Well (DDW). Currently, the well is operated on a nearly continuous basis and 20,132,845 gallons of wastewater was injected into the well during the second half of 2007. A summary of the total volume of wastewater injected and the average radionuclide content is contained in Appendix D.

### **2.3 Effluent Release**

10 CFR §40.65 requires licensees to report quantities of radionuclides in liquid and gaseous effluent releases to the environment. In the Application for Renewal of Source Materials License SUA-1534, submitted December 1995, Table 7.3(A) presented calculations of the annual radon emissions for the Crow Butte Plant. These calculations assumed a  $7.04 \times 10^{-4}$  Curies/m<sup>3</sup> radon

## **CAMECO RESOURCES CROW BUTTE OPERATION**



### **Second Half 2007 Semiannual Radiological Effluent and Environmental Monitoring Report**

---

release from leaching operations and the radon release calculations for the second half of 2007 use this release rate estimate.

During the third quarter production occurred at an average flow rate of 4,100 gpm (15,520 lpm). Production was maintained nearly continuously for 92 days during the third quarter with an operating factor of 99.8 %. The production flow for the third quarter results in a calculated radon release of 1,040 Curies. During the fourth quarter production occurred at an average flow rate of 4,279 gpm (16,197 lpm). Production was maintained nearly continuously for 92 days during the fourth quarter with an operating factor of 99.9%. The production flow for the fourth quarter results in a calculated radon release of 1,087 Curies. Calculations for radon release from production operations are shown in Appendix E.

Additional wells were brought on line during the second half of 2007. Calculations for the start-up of 9.6 acres of a new wellfield are shown in Appendix E. The calculated radon released from start-up of 9.6 acres is 12 Curies.

The total radon emission due to leaching operations from the Crow Butte plant for the second half of 2007 was 2,139 Curies. This calculated release rate is comparable with the releases estimated in CBR's License Renewal Application.

Radon gas is also released from restoration activities. For restoration water that is treated by ion exchange only, the radon concentration is 0.697  $\mu\text{Ci/l}$ . Of the total restoration production flow it is assumed that 25% of the radon is released through wellfield loss and 10% of the remaining radon is released during pressurized ion exchange treatment. For water that is treated by reverse osmosis, it is assumed that 100% of the remaining radon is released. For water treated by reverse osmosis the radon concentration is 0.470  $\mu\text{Ci/l}$  after adjusting for wellfield loss and ion exchange loss.

During the second half of 2007, a total of 36,155,139 gallons (136,858,946 l) of restoration water was produced from Mine Units 2, 3, 4, and 5. Based upon an estimated radon concentration of 0.697  $\mu\text{Ci/l}$ , the total amount of radon in the restoration solution was calculated to be 95 Curies as shown in Appendix E. The estimated release of radon through wellfield loss at 25% of this total was 24 Curies. The plant loss for ion exchange treatment of the restoration water is estimated at 10% of the remaining radon, or 7 Curies.

Of the total amount of restoration water produced in the second half of 2007, 9,007,464 gallons (34,096,177 l) of the water was treated by reverse osmosis. The release of radon from reverse osmosis treatment is estimated to be 100% of the remaining radon, after correction for wellfield and ion exchange losses. These corrections result in an estimated radon concentration of 0.470  $\mu\text{Ci/l}$ . The total estimated radon release from reverse osmosis treatment was 47 Curies.

## **CAMECO RESOURCES CROW BUTTE OPERATION**



### **Second Half 2007 Semiannual Radiological Effluent and Environmental Monitoring Report**

---

Based upon the calculations shown in Appendix E, the total estimated semiannual radon emission for the second half of 2007 from restoration activities was 47 Curies. This resulted in a total estimated radon release from the Crow Butte project during the second half of 2007 of 2,186 Curies.

#### **2.4 Restoration**

Restoration activities continued in Mine Units 2, 3, 4, and 5 during the second half of 2007. Restoration was shut off on August 9, 2007 so that an upgrade could be made to the restoration circuit. Additional IX and R.O. treatment is being added to this circuit. Restoration injection and production totals are included in Appendix B. Restoration injection pressures are included in Appendix C.

### **3 ENVIRONMENTAL MONITORING**

#### **3.1 Air Monitor Stations**

Seven air monitoring stations are used to monitor the Crow Butte Plant. Ambient radon-222 concentrations and radionuclide concentrations in air for each monitoring site are listed in Appendix F. All air monitoring results were within expected historical ranges.

#### **3.2 TLD Monitors**

Environmental TLD monitors are located at each air monitoring station. The results of the area TLD monitors fall within the expected ranges and are listed in Appendix G.

#### **3.3 Stream Sediments**

Sediment samples are collected from three locations on Squaw Creek (S-1, S-2, and S-5), two locations on English Creek (E-1, and E-5), and from three impoundments on English Creek (I-3, I-4, and I-5) on an annual basis during the fourth quarter. The results of sediment sampling for 2007 are included in Appendix H.

The concentrations of natural uranium in several English Creek samples were well above regional background levels. CBR has noted these elevated concentrations in the English Creek drainage during preoperational monitoring, which indicates that these levels are anomalous natural background concentrations. Composite samples obtained from E-1 and E-2 as part of the preoperational sampling program from 1982 through 1986 had average results with elevated natural uranium (3.4 pCi/g) and lead-210 (1.4 pCi/g) when compared with the other surface water sample

## **CAMECO RESOURCES CROW BUTTE OPERATION**



### **Second Half 2007 Semiannual Radiological Effluent and Environmental Monitoring Report**

---

locations. Samples obtained in 1998 before mining operations began in this area showed similar elevated uranium concentrations.

The sample locations are in a wetland area in the upper course of English Creek and downstream impoundments. The area has a large amount of organic matter and low water flows as compared with the other surface water sampling locations for the project. CBR believes that the upper courses of English Creek are an area with reducing conditions that favor deposition of radionuclides. Due to the drought conditions in this area, the streams and wetland areas have been dry. Appendix H contains a trend graph for English Creek sediment sample points since 1998 that shows the elevated uranium concentrations noted in past sediment samples along with a trend graph for Squaw Creek showing the elevated uranium concentrations upstream from the current operation.



## **Appendix A**

### **Private Well and Surface Water Radiological Monitoring Results**

**Third and Fourth Quarter, 2007**

**CROW BUTTE RESOURCES, INC.**

**PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS**

**THIRD QUARTER, 2007**

<b>SAMPLE ID</b>	<b>DATE SAMPLED</b>	<b>URANIUM mg/l</b>	<b>URANIUM <math>\mu</math>Ci/ml</b>	<b>RADIUM-226 pCi/l</b>	<b>RADIUM-226 precision <math>\pm</math></b>
Well #8	8/27/2007	0.021	1.40E-08	ND	-
Well #11	8/29/2007	0.009	6.10E-09	ND	-
Well #12	8/27/2007	0.004	2.90E-09	ND	-
Well #24	WELL INOPERABLE - NO SAMPLE COLLECTED				
Well #25	WELL INOPERABLE - NO SAMPLE COLLECTED				
Well #26	8/27/2007	0.007	4.70E-09	ND	-
Well #28	8/28/2007	0.007	4.5E-09	ND	-
Well #41	8/29/2007	0.007	4.80E-09	ND	-
Well #63	8/29/2007	0.018	1.20E-08	ND	-
Well #125	8/31/2007	0.007	4.90E-09	ND	-
Well #129	8/31/2007	0.007	5.00E-09	ND	-
Well #131	8/27/2007	0.005	3.20E-09	ND	-
Well #133	8/29/2007	0.009	6.30E-09	ND	-
Well #134	8/28/2007	0.011	7.60E-09	ND	-
Well #135	8/28/2007	0.018	1.20E-08	0.6	0.2
Well #138	8/29/2007	0.024	1.60E-08	0.5	0.2
Well #140	8/28/2007	0.011	7.60E-09	ND	-
Well #435	8/29/2007	0.008	5.20E-09	ND	-
Drinking Water Well	8/31/2007	0.008	5.30E-09	ND	-
Stream S-1	8/27/2007	0.004	2.60E-09	ND	-
Stream S-2	NO WATER IN STREAM - NO SAMPLE COLLECTED				
Stream S-5	NO WATER IN STREAM - NO SAMPLE COLLECTED				
Stream E-1 & E-2	NO WATER IN STREAM - NO SAMPLE COLLECTED				
Stream E-5	NO WATER IN STREAM - NO SAMPLE COLLECTED				
Impoundment I-3	NO WATER IN IMPOUNDMENT - NO SAMPLE COLLECTED				
Impoundment I-4	8/29/2007	0.038	2.60E-08	ND	-
Impoundment I-5	8/28/2007	0.002	1.60E-09	ND	-
<b>Reporting Limit</b>		<b>0.0003</b>	<b>2.00E-10</b>	<b>0.2</b>	<b>-</b>

ND-Not detected at the reporting limit

**CROW BUTTE RESOURCES, INC.**

**PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS**

**Fourth QUARTER, 2007**

<b>SAMPLE ID</b>	<b>DATE SAMPLED</b>	<b>URANIUM mg/l</b>	<b>URANIUM <math>\mu</math>Ci/ml</b>	<b>RADIUM-226 pCi/l</b>	<b>RADIUM-226 precision <math>\pm</math></b>
Well #8	12/20/2007	0.013	9.10E-09	ND	-
Well #11	11/17/2007	0.008	5.30E-09	ND	-
Well #12	12/20/2007	0.003	2.10E-09	ND	-
Well #24	WELL NO LONGER IN SERVICE - REMOVED FROM SAMPLING QUEUE				
Well #25	WELL NO LONGER IN SERVICE - REMOVED FROM SAMPLING QUEUE				
Well #26	11/19/2007	0.006	4.10E-09	ND	-
Well #28	11/30/2007	0.006	0.000	ND	-
Well #41	11/30/2007	0.007	0.000	ND	-
Well #61	12/18/2007	ND	0.000	3.5	0.6
Well #63	11/20/2007	0.014	9.80E-09	ND	-
Well #66	12/18/2007	0.018	-	ND	-
Well #125	11/20/2007	0.006	3.90E-09	ND	-
Well #129	11/20/2007	0.006	3.70E-09	ND	-
Well #131	11/19/2007	0.004	2.60E-09	ND	-
Well #133	11/20/2007	0.008	5.10E-09	ND	-
Well #134	11/20/2007	0.010	6.50E-09	ND	-
Well #135	11/20/2007	0.015	1.00E-08	0.6	0.2
Well #138	11/19/2007	0.017	1.20E-08	0.6	0.4
Well #140	11/30/2008	0.011	7.30E-09	ND	-
Well #435	11/30/2007	0.007	4.80E-09	ND	-
Drinking Water Well	11/20/2007	0.006	4.10E-09	ND	-
Stream S-1	11/30/2007	0.004	2.60E-09	ND	-
Stream S-2	11/30/2007	0.005	3.20E-09	ND	-
Stream S-5	NO WATER IN STREAM - NO SAMPLE COLLECTED				
Stream E-1 & E-2	NO WATER IN STREAM - NO SAMPLE COLLECTED				
Stream E-5	11/30/2007	0.017	1.20E-08	ND	-
Impoundment I-3	NO WATER IN IMPOUNDMENT - NO SAMPLE COLLECTED				
Impoundment I-4	NO WATER IN IMPOUNDMENT - NO SAMPLE COLLECTED				
Impoundment I-5	11/30/2007	0.017	1.10E-08	ND	-
<b>Reporting Limit</b>		<b>0.0003</b>	<b>2.00E-10</b>	<b>0.2</b>	<b>-</b>

ND-Not detected at the reporting limit

## **Appendix B**

### **Plant Production and Waste Totals**

**Third and Fourth Quarter, 2007**

**WASTE VOLUME**  
Third Quarter 2007

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	DDW TOTAL INJECTED	TRUCKS TO POND
July	591,630	1,505,222	2,586,546	N/A	4,091,768	82,000
August	400,950	2,224,129	843,929	N/A	3,068,058	118,700
September	479,010	2,024,284	271,301	N/A	2,295,585	62,100
TOTAL GAL. EOQ	1,471,590	5,753,635	3,701,776	0	9,455,411	262,800

TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS =	1,734,390 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO DEEP WELL =	9,455,411 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	11,189,801 GALLONS
TOTAL 3rd QTR VOLUME WF BLEED FROM WELLFIELDS =	10,927,001 GALLONS

**WELLFIELD BLEED**

Third Quarter 2007			
MONTH	July	August	September
BLEED	1.1%	1.5%	1.4%

**PLANT FLOW**

Third Quarter 2007		
AVERAGE OPERATING FLOW RATE =	4,100 GPM EOQ	
TOTAL GALLONS PRODUCED =	543,195,538 GALLONS EOQ	
TOTAL GALLONS INJECTED =	520,591,395 GALLONS EOQ	

	TOTAL GALS. PRODUCED	TOTAL GALS. INJECTED	HOURS IN MONTH	HOURS IN PRODUCTION	AVERAGE PROD. GPM	AVERAGE COM INJ GPM	AVERAGE REST INJ GPM	HRS. DOWN TIME
Prev. YTD	1,136,191,312	1,085,021,232	4,344	4,335	4,359	4,163	282	9
July	185,491,530	176,858,355	744	744	4,155	3,962	310	0
August	178,999,516	173,149,171	744	744	4,010	3,879	99	0
September	178,704,492	170,583,869	720	720	4,137	3,949	0	0
EOQ TOTAL	543,195,538	520,591,395	2,208	2,208	4,100	3,930	138	0
YTD TOTAL	1,679,386,850	1,605,612,627	6,552	6,543	4,272	4,084	233	9

	TOTAL MUJI GALS PRODUCED	TOTAL MUJII GALS PRODUCED	TOTAL MUIV GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	COMM BLEED TO RO FEED	MUJII BLEED TO DDW	MUIV BLEED TO DDW
Prev. YTD	6,191,184	45,579,723	46,372,211	5,708,166	33,957,447	0	5,708,166	12,124,701
July	1,892,092	7,982,668	7,441,822	684,646	6,420,469	0	684,646	1,901,900
August	710,440	2,332,477	2,741,334	4	1,902,343	0	4	843,925
September	0	0	271,364	2	0	0	2	271,299
EOQ TOTAL	2,602,532	10,315,145	10,454,520	684,652	8,322,812	0	684,652	3,017,124
YTD TOTAL	8,793,716	55,894,868	56,826,731	6,392,818	42,280,259	0	6,392,818	15,141,825

WASTE VOLUME Fourth Quarter 2007						
TOTALIZER	PLANT TO POND	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	DDW TOTAL INJECTED	TRUCKS TO POND
October	614,150	2,062,338	1,379,747	N/A	3,442,085	119,300
November	566,220	1,574,164	1,134,109	N/A	2,708,273	121,300
December	590,750	1,517,713	3,009,363	N/A	4,527,076	50,300
TOTAL GAL. EOQ	1,771,130	5,154,215	5,523,219	0	10,677,434	290,900

TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS =	2,062,030 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO DEEP WELL =	10,677,434 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	12,739,464 GALLONS
TOTAL 4th QTR VOLUME WF BLEED FROM WELLFIELDS =	12,448,564 GALLONS

WELLFIELD BLEED Fourth Quarter 2007			
MONTH	October	November	December
BLEED	1.8%	1.5%	1.1%

PLANT FLOW Fourth Quarter 2007			
AVERAGE OPERATING FLOW RATE =	4,279 GPM EOQ		
TOTAL GALLONS PRODUCED =	566,903,388 GALLONS EOQ		
TOTAL GALLONS INJECTED =	549,025,515 GALLONS EOQ		

	TOTAL GALS. PRODUCED	TOTAL GALS. INJECTED	HOURS IN MONTH	HOURS IN PRODUCTION	AVERAGE PROD. GPM	AVERAGE COM INJ GPM	AVERAGE REST INJ GPM	HRS. DOWN TIME
Prev. YTD	1,679,386,850	1,505,612,627	6,552	6,543	4,272	4,094	233	9
October	188,820,949	181,137,015	744	744	4,230	4,058	87	0
November	187,369,934	182,729,060	720	720	4,337	4,230	53	0
December	190,712,505	185,759,440	744	744	4,272	4,148	34	0
EOQ TOTAL	566,903,388	549,025,515	2,208	2,208	4,279	4,144	58	0
YTD TOTAL	2,246,290,238	2,154,638,142	8,760	8,751	4,274	4,099	189	9

	TOTAL MU/I	TOTAL MU/I	TOTAL MU/I	TOTAL MU/I	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	COMM BLEED TO RO FEED	MU/I BLEED TO DDW	MU/I BLEED TO DDW	MU/I BLEED TO DDW
Prev. YTD	8,793,716	55,894,863	56,826,731	0	6,392,818	42,280,259	0	6,392,818	15,141,825	0
October	0	5	5,005,608	273,006	0	0	0	0	1,106,811	272,936
November	0	502,685	2,184,453	387,075	0	0	0	0	474,122	659,987
December	0	1,440,628	532,347	2,477,135	0	0	0	0	532,326	2,477,037
EOQ TOTAL	0	1,943,316	7,702,408	3,137,216	0	0	0	0	2,113,259	3,409,960
YTD TOTAL	8,793,716	57,838,186	64,529,139	3,137,216	6,392,818	42,280,259	0	6,392,818	17,255,084	3,409,960

**Appendix C**

**Wellfield Injection Pressures**

**Third and Fourth Quarter, 2007**

**WELLFIELD INJECTION PRESSURE - PSI**  
**Third Quarter 2007**

	WF HOUSE #3		WF HOUSE #4		WF HOUSE #5		WF HOUSE #6		WF HOUSE #7	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	1	12	21	65	8	16	36	41	13	16
August	0	0	8	24	4	15	11	38	10	15
September	3	11	0	4	0	0	0	3	11	15
AVERAGE	1	12	10	65	4	16	15	41	11	16
	WF HOUSE #8		WF HOUSE #9		WF HOUSE #10		WF HOUSE #11		WF HOUSE #12	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	27	32	67	85	0	0	0	0	68	83
August	8	30	25	81	0	0	0	0	25	82
September	0	0	0	0	0	0	0	0	0	5
AVERAGE	12	32	30	85	0	0	0	0	31	83
	WF HOUSE #13		WF HOUSE #14		WF HOUSE #15		WF HOUSE #16		WF HOUSE #17	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	61	78	79	96	0	0	0	4	0	0
August	23	78	0	0	0	6	0	0	0	0
September	0	0	0	0	0	5	2	15	7	25
AVERAGE	28	78	26	96	0	6	1	15	2	25
	WF HOUSE #18		WF HOUSE #19		WF HOUSE #20		WF HOUSE #21		WF HOUSE #22	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	0	0	1	12	78	90	19	79	95	97
August	0	0	0	0	55	99	21	57	96	99
September	0	12	0	0	91	98	47	80	94	98
AVERAGE	0	12	0	12	75	99	29	80	95	99
	WF HOUSE #23		WF HOUSE #24		WF HOUSE #25		WF HOUSE #26		WF HOUSE #27	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	91	99	0	0	6	21	91	99	0	0
August	96	99	0	0	19	99	97	99	0	0
September	37	98	3	93	28	87	90	99	0	0
AVERAGE	74	99	1	93	18	99	93	99	0	0
	WF HOUSE #28		WF HOUSE #29		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	0	0	67	70	57	60	32	36	43	48
August	0	0	69	75	60	75	35	39	45	50
September	0	0	67	72	57	64	34	38	44	49
AVERAGE	0	0	68	75	58	75	33	39	44	50
	WF HOUSE #33		WF HOUSE #34		WF HOUSE #35		WF HOUSE #36		WF HOUSE #37	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	44	48	95	99	98	99	95	99	96	99
August	46	50	95	99	97	99	97	99	96	99
September	45	56	92	99	94	99	94	99	94	99
AVERAGE	45	56	94	99	96	99	95	99	95	99
	WF HOUSE #38		WF HOUSE #39		WF HOUSE #40		WF HOUSE #41		WF HOUSE #42	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	97	99	89	96	95	99	96	99	91	95
August	96	99	94	99	95	99	97	99	95	99
September	95	99	95	99	94	99	93	99	92	98
AVERAGE	96	99	93	99	95	99	96	99	93	99
	WF HOUSE #43		WF HOUSE #44		WF HOUSE #45		WF HOUSE #46		WF HOUSE #46A	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	90	98	91	95	82	89	95	99	95	99
August	93	97	95	98	85	90	94	99	96	99
September	92	97	94	98	83	88	98	99	97	99
AVERAGE	92	98	93	98	84	90	96	99	96	99
	WF HOUSE #47		WF HOUSE #47A		WF HOUSE #48					
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM				
July	60	92		0		0				
August	61	68		0		0				
September	62	68	15	67	94	97				
AVERAGE	61	92	15	67	94	97				



WELLFIELD INJECTION PRESSURE - PSI  
Fourth Quarter 2007

WF HOUSE #3		WF HOUSE #4		WF HOUSE #5		WF HOUSE #6		WF HOUSE #7	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	5	12	0	0	0	0	0	8	15
November	2	12	0	0	0	0	0	6	15
December	4	12	0	0	0	0	0	12	72
AVERAGE	4	12	0	0	0	0	0	9	72
WF HOUSE #8		WF HOUSE #9		WF HOUSE #10		WF HOUSE #11		WF HOUSE #12	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	0	0	49	0	0	0	0	50	77
November	8	22	19	0	5	0	0	23	83
December	19	22	1	0	0	0	0	2	7
AVERAGE	9	22	23	0	5	0	0	25	83
WF HOUSE #13		WF HOUSE #14		WF HOUSE #15		WF HOUSE #16		WF HOUSE #17	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	45	70	0	0	0	0	0	12	61
November	20	76	0	1	32	9	99	26	74
December	0	1	0	1	9	15	98	37	83
AVERAGE	22	76	0	1	32	8	99	25	83
WF HOUSE #18		WF HOUSE #19		WF HOUSE #20		WF HOUSE #21		WF HOUSE #22	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	0	0	3	88	95	42	85	96	99
November	0	0	0	89	99	47	96	95	99
December	0	0	0	80	94	60	98	98	99
AVERAGE	0	0	1	86	99	50	98	96	99
WF HOUSE #23		WF HOUSE #24		WF HOUSE #25		WF HOUSE #26		WF HOUSE #27	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	0	0	0	9	24	92	99	0	0
November	2	64	0	12	99	93	99	0	0
December	2	63	1	2	48	97	99	0	0
AVERAGE	1	64	0	8	99	94	99	0	0
WF HOUSE #28		WF HOUSE #29		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	0	0	69	59	65	35	47	46	50
November	0	0	68	59	64	35	48	41	49
December	2	71	71	61	64	36	48	0	11
AVERAGE	1	71	69	60	65	35	48	29	50
WF HOUSE #33		WF HOUSE #34		WF HOUSE #35		WF HOUSE #36		WF HOUSE #37	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	47	50	84	85	99	83	99	98	99
November	46	50	94	95	99	95	99	94	99
December	49	50	97	99	99	98	99	98	99
AVERAGE	47	50	92	93	99	92	99	96	99
WF HOUSE #38		WF HOUSE #39		WF HOUSE #40		WF HOUSE #41		WF HOUSE #42	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	97	99	96	97	99	98	99	94	98
November	95	99	95	94	99	95	99	91	99
December	97	99	97	98	99	97	99	97	99
AVERAGE	96	99	96	96	99	97	99	94	99
WF HOUSE #43		WF HOUSE #44		WF HOUSE #45		WF HOUSE #46		WF HOUSE #46A	
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	91	99	93	83	92	96	99	96	99
November	91	98	92	83	98	95	99	95	99
December	96	99	96	86	91	99	99	98	99
AVERAGE	93	99	94	84	98	97	99	97	99
WF HOUSE #47		WF HOUSE #47A		WF HOUSE #48					
AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM				
October	61	67	16	84	99				
November	62	68	40	95	99				
December	66	70	32	98	99				
AVERAGE	63	70	29	92	99				

**Appendix D**

**Deep Disposal Well Injection Radiological Data**

**Third and Fourth Quarter, 2007**

**Crow Butte Uranium Mine**  
**Deep Disposal Well Injection Radiological Data**

Month	Total Gallons Injected	Average Natural Uranium (mg/l)	Total Natural Uranium Injected (mg)	Total Natural Uranium Injected (uCi)	Average Radium- 226 (pCi/l)	Total Radium- 226 Injected (uCi)
July-07	4,091,768	7	1.08E+08	7.34E+04	856	1.33E+04
August-07	3,068,058	6	6.97E+07	4.72E+04	782	9.08E+03
September-07	2,295,585	5	4.34E+07	2.94E+04	974	8.46E+03
October-07	3,442,085	5	6.51E+07	4.41E+04	788	1.03E+04
November-07	2,708,273	4	4.10E+07	2.78E+04	820	8.41E+03
December-07	4,527,076	3	5.14E+07	3.48E+04	1,230	2.11E+04
Totals	20,132,845		3.79E+08	2.57E+05		7.06E+04

## **Appendix E**

### **Radon Release Calculations**

**Third and Fourth Quarter, 2007**

### Radon Effluent Release Calculation (Production and Startup)

#### Third Quarter 2007 Radon Release from Leaching Operations:

<i>Curies/M3</i>	<i>Production Flow (liters)</i>	<i>Radon-222 Decay Constant</i>	<i>Operating Days</i>	<i>Operating Factor</i>	<i>M3/liter conversion</i>	<i>Hours/Day Conversion</i>	<i>Minutes/Hour Conversion</i>	<i>Total Radon Release from Leaching</i>
7.04E-04	15,520	0.72	92	99.8%	0.001	24	60	1,040

#### Fourth Quarter 2007 Radon Release from Leaching Operations:

<i>Curies/M3</i>	<i>Production Flow (liters)</i>	<i>Radon-222 Decay Constant</i>	<i>Operating Days</i>	<i>Operating Factor</i>	<i>M3/liter conversion</i>	<i>Hours/Day Conversion</i>	<i>Minutes/Hour Conversion</i>	<i>Total Radon Release from Leaching</i>
7.04E-04	16,197	0.72	92	99.9%	0.001	24	60	1,087

#### Second Half 2007 Radon Release From Startup:

<i>Curies/M3</i>	<i>Total Acres of New Wellfield</i>	<i>Meter3/Acre Conversion</i>	<i>Orebody Thickness (meters)</i>	<i>Porosity</i>	<i>Total Radon Release from Startup</i>
7.04E-04	9.6	4,074	1.52	0.29	12

**Total Estimated Radon Release from Production:**

**2,139**

### Radon Effluent Release Calculation (Restoration)

#### Second Half 2007 Radon Release From Restoration:

<i>Total Restoration Flow (liters)</i>	<i>Microcuries/liter</i>	<i>Curies/Microcurie</i>	<i>Production Potential</i>
136,858,946	0.697	1.00E-06	95

Wellfield Loss (25% of Production Potential):

24

Ion Exchange Loss (10% of Production Potential minus Wellfield Loss):

7

Reverse Osmosis Loss (100% of remaining activity at 0.470 microcuries/liter)

16

<i>Total Reverse Osmosis Flow (liters)</i>	<i>Microcuries/liter</i>	<i>Curies/Microcurie</i>
34,096,177	0.470	1.00E-06

#### Second Half 2007 Radon Release From Startup of New Restoration:

<i>Curies/M3</i>	<i>Total Acres of New Wellfield</i>	<i>Meter3/Acre Conversion</i>	<i>Orebody Thickness (meters)</i>	<i>Porosity</i>	<i>Total Radon Release from Startup</i>
7.04E-04	0.0	4074	1.52	0.29	0

**Total Estimated Radon Release from Restoration:**

**47**

**Total Estimated Radon Release, Second Half 2007:**

**2,186**

**Appendix F**

**Environmental Air Monitoring Results**

**Third and Fourth Quarter, 2007**

**Crow Butte Resources, Inc.**  
Crow Butte Uranium Project

**Track Etch Cup Ambient Radon Concentrations**

*Air Monitoring Station  
No.*

*Period: July 2, 2007 to January 2, 2008*

	Gross Count	Average Radon Concentration (x 10 <sup>-9</sup> µCi/ml)	Accuracy (x 10 <sup>-9</sup> µCi/ml)	Percent Effluent Concentration
AM-1	94.4	0.5	0.05	5.0%
AM-2	133.8	0.7	0.06	7.0%
AM-3	*	*	Detector Damaged-No Data	
AM-4	112.9	0.6	0.06	6.0%
AM-5	173.3	0.9	0.07	9.0%
AM-6	72.4	0.4	0.05	4.0%
AM-8	122.2	0.7	0.06	7.0%
AB-1 (AM-1 Duplicate)	89.8	0.5	0.05	5.0%
AB-2 (AM-2 Duplicate)	123.4	0.7	0.06	7.0%
AB-6 (AM-6 Duplicate)	80.5	0.4	0.04	4.0%
LLD (x 10 <sup>-9</sup> µCi/ml)				0.2
Effluent Concentration Limit, 10 CFR 20 App B Column 2:				10



### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-1

Quarter/Date Sampled	Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-001 01/02/2007 - 04/02/2007 Air Volume in mLs 3.35E+09		$^{235}\text{U}$	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	1.83E-14	1.16E-15	2.00E-15	6.00E-13	3.04E+00
C07070204-001 04/02/2007 - 07/02/2007 Air Volume in mLs 5.21E+09		$^{235}\text{U}$	1.15E-16	N/A	1.00E-16	9.00E-14	1.28E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	1.35E-14	1.38E-15	2.00E-15	6.00E-13	2.25E+00
C07100307-002 07/02/2007 - 10/01/2007 Air Volume in mLs 5.24E+09		$^{235}\text{U}$	2.29E-16	N/A	1.00E-16	9.00E-14	2.54E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	1.64E-14	1.15E-15	2.00E-15	6.00E-13	2.73E+00
C08010210-001 10/01/2007 - 1/02/2008 Air Volume in mLs 5.71E+09		$^{235}\text{U}$	3.50E-16	N/A	1.00E-16	9.00E-14	3.89E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	6.44E-15	8.93E-16	2.00E-15	6.00E-13	1.07E+00

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210





### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-2

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-002 01/02/2007 - 04/02/2007 Air Volume in mLs 4.97E+11	$^{235}\text{U}$	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	< 2.00E-15	8.25E-18	2.00E-15	6.00E-13	< 3.33E-01
C07070204-002 04/02/2007 - 07/02/2007 Air Volume in mLs 5.15E+09	$^{235}\text{U}$	4.66E-16	N/A	1.00E-16	9.00E-14	5.18E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.52E-14	1.46E-15	2.00E-15	6.00E-13	2.53E+00
C07100307-003 07/02/2007 - 10/01/2007 Air Volume in mLs 5.06E+09	$^{235}\text{U}$	7.71E-16	N/A	1.00E-16	9.00E-14	8.56E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.71E-14	1.21E-15	2.00E-15	6.00E-13	2.85E+00
C08010210-002 10/01/2007 - 1/02/2008 Air Volume in mLs 5.30E+09	$^{235}\text{U}$	2.83E-16	N/A	1.00E-16	9.00E-14	3.14E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	3.34E-15	7.36E-16	2.00E-15	6.00E-13	5.57E-01

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210



### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-3

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-003 01/02/2007 - 04/02/2007 Air Volume in mLs 5.13E+09	$^{\text{nat}}\text{U}$	1.36E-16	N/A	1.00E-16	9.00E-14	1.52E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.57E-14	8.58E-16	2.00E-15	6.00E-13	2.61E+00
C07070204-003 04/02/2007 - 07/02/2007 Air Volume in mLs 5.30E+09	$^{\text{nat}}\text{U}$	1.32E-16	N/A	1.00E-16	9.00E-14	1.47E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.16E-14	1.30E-15	2.00E-15	6.00E-13	1.93E+00
C07100307-004 07/02/2007 - 10/01/2007 Air Volume in mLs 5.22E+09	$^{\text{nat}}\text{U}$	2.11E-16	N/A	1.00E-16	9.00E-14	2.34E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	2.01E-14	1.28E-15	2.00E-15	6.00E-13	3.35E+00
C08010210-003 10/01/2007 - 1/02/2008 Air Volume in mLs 5.37E+09	$^{\text{nat}}\text{U}$	1.49E-16	N/A	1.00E-16	9.00E-14	1.66E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	6.37E-15	9.12E-16	2.00E-15	6.00E-13	1.06E+00

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210



### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-004 01/02/2007 - 04/02/2007 Air Volume in mLs 3.55E+09	$^{235}\text{U}$	1.41E-16	N/A	1.00E-16	9.00E-14	1.56E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.41E-14	9.86E-16	2.00E-15	6.00E-13	2.34E+00
C07070204-004 04/02/2007 - 07/02/2007 Air Volume in mLs 5.87E+09	$^{235}\text{U}$	4.43E-16	N/A	1.00E-16	9.00E-14	4.92E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.29E-14	1.26E-15	2.00E-15	6.00E-13	2.16E+00
C07100307-005 07/02/2007 - 10/01/2007 Air Volume in mLs 5.09E+09	$^{235}\text{U}$	6.29E-16	N/A	1.00E-16	9.00E-14	6.99E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	2.04E-14	1.32E-15	2.00E-15	6.00E-13	3.41E+00
C08010210-004 10/01/2007 - 1/02/2008 Air Volume in mLs 5.98E+09	$^{235}\text{U}$	2.17E-16	N/A	1.00E-16	9.00E-14	2.42E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	8.16E-15	9.70E-16	2.00E-15	6.00E-13	1.36E+00

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210



### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-5

Quarter/Date Sampled Volume	Air	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-005 01/02/2007 - 04/02/2007 Air Volume in mLs 4.96E+09		$^{nat}\text{U}$	1.21E-16	N/A	1.00E-16	9.00E-14	1.34E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	1.22E-14	7.86E-16	2.00E-15	6.00E-13	2.03E+00
C07070204-005 04/02/2007 - 07/02/2007 Air Volume in mLs 5.12E+09		$^{nat}\text{U}$	2.34E-16	N/A	1.00E-16	9.00E-14	2.60E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	9.53E-15	1.27E-15	2.00E-15	6.00E-13	1.59E+00
C07100307-006 07/02/2007 - 10/01/2007 Air Volume in mLs 5.03E+09		$^{nat}\text{U}$	7.16E-16	N/A	1.00E-16	9.00E-14	7.95E-01
		$^{226}\text{Ra}$	1.19E-16	5.96E-17	1.00E-16	9.00E-13	1.33E-02
		$^{210}\text{Pb}$	1.72E-14	1.21E-15	2.00E-15	6.00E-13	2.87E+00
C08010210-005 10/01/2007 - 1/02/2008 Air Volume in mLs 5.25E+09		$^{nat}\text{U}$	1.71E-16	N/A	1.00E-16	9.00E-14	1.90E-01
		$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
		$^{210}\text{Pb}$	7.09E-15	9.71E-16	2.00E-15	6.00E-13	1.18E+00

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210



### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-6

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-006 01/02/2007 - 04/02/2007 Air Volume in mLs 5.13E+09	<sup>nat</sup> U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	<sup>226</sup> Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	<sup>210</sup> Pb	1.22E-14	7.60E-16	2.00E-15	6.00E-13	2.03E+00
C07070204-006 04/02/2007 - 07/02/2007 Air Volume in mLs 5.20E+09	<sup>nat</sup> U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	<sup>226</sup> Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	<sup>210</sup> Pb	8.29E-15	1.19E-15	2.00E-15	6.00E-13	1.38E+00
C07100307-007 07/02/2007 - 10/01/2007 Air Volume in mLs 5.18E+09	<sup>nat</sup> U	1.54E-16	N/A	1.00E-16	9.00E-14	1.72E-01
	<sup>226</sup> Ra	< 1.00E-16	5.79E-17	1.00E-16	9.00E-13	< 1.11E-02
	<sup>210</sup> Pb	1.70E-14	1.18E-15	2.00E-15	6.00E-13	2.83E+00
C08010210-006 10/01/2007 - 1/02/2008 Air Volume in mLs 5.62E+09	<sup>nat</sup> U	8.01E-16	N/A	1.00E-16	9.00E-14	8.90E-01
	<sup>226</sup> Ra	3.02E-16	2.31E-16	1.00E-16	9.00E-13	3.36E-02
	<sup>210</sup> Pb	7.60E-15	9.61E-16	2.00E-15	6.00E-13	1.27E+00

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210



### HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2008

SAMPLE ID: AM-8

Quarter/Date Sampled Air Volume	Radionuclide	Concentration $\mu\text{Ci/mL}$	Error Estimate $\mu\text{Ci/mL}$	L.L.D. $\mu\text{Ci/mL}$	Effluent Conc.* $\mu\text{Ci/mL}$	% Effluent Concentration
C07040233-007 01/02/2007 - 04/02/2007 Air Volume in mLs 4.68E+09	$^{235}\text{U}$	4.06E-16	N/A	1.00E-16	9.00E-14	4.51E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.64E-14	9.19E-16	2.00E-15	6.00E-13	2.73E+00
C07070204-007 04/02/2007 - 07/02/2007 Air Volume in mLs 4.46E+09	$^{235}\text{U}$	3.81E-16	N/A	1.00E-16	9.00E-14	4.24E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	7.24E-15	1.30E-15	2.00E-15	6.00E-13	1.21E+00
C07100307-008 07/02/2007 - 10/01/2007 Air Volume in mLs 4.63E+09	$^{235}\text{U}$	9.50E-16	N/A	1.00E-16	9.00E-14	1.06E+00
	$^{226}\text{Ra}$	1.30E-16	6.48E-17	1.00E-16	9.00E-13	1.44E-02
	$^{210}\text{Pb}$	1.88E-14	1.32E-15	2.00E-15	6.00E-13	3.14E+00
C08010210-007 10/01/2007 - 1/02/2008 Air Volume in mLs 5.42E+09	$^{235}\text{U}$	4.24E-16	N/A	1.00E-16	9.00E-14	4.72E-01
	$^{226}\text{Ra}$	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	$^{210}\text{Pb}$	1.14E-14	1.18E-15	2.00E-15	6.00E-13	1.90E+00

LLD's are from Reg. Guide 4.14

\*Effluent Concentration from the NEW 10 CFR Part 20 - Appendix B - Table 2

Year for Natural Uranium

Week for Radium-226

Day for Lead-210

**Appendix G**

**Environmental TLD Monitoring Results**

**Third and Fourth Quarter, 2007**

Crow Butte Resources  
 Attn: Rhonda Grantham  
 PO Box 169  
 Crawford, NE 69339

# LANDAUER

## SPHERICAL X9 ENVIRONMENTAL REPORT

Account Number: 306192

Process Number: X9SP ES026

Received Date: 4-Oct-07

Report Date: 8-Oct-07

Released by: LCC

Net Values  
 after control  
 subtraction

Participant No.	Name/Description	Mean Ambient					Dose		Standard Deviation (mrem)	95% Confidence Interval (mrem)	
		Mean Ambient					Dose	Equivalent			
		Reading 1 (mrem)	Reading 2 (mrem)	Reading 3 (mrem)	Reading 4 (mrem)	Reading 5 (mrem)	Equivalent (mrem)	Equivalent (mrem)			
Quarterly Monitoring Period starting: July 1, 2007											
Control											
1001	AM-1	22	21	23	25	20	22		1.9	2.4	
1002	AM-2	27	26	26	27	27	27	5	0.5	0.7	
1003	AM-6	28	27	28	29	30	28	6	1.1	1.4	
		31	29	29	27	29	29	7	1.4	1.8	
1008	AM-8	30	30	32	33	29	31	9	1.6	2.0	
1009	AM-3	29	32	36	29	29	31	9	3.1	3.8	
1010	AM-4	30	31	32	27	29	30	8	1.9	2.4	
1011	AM-5	31	33	31	31	31	31	9	0.9	1.1	

95% Confidence Interval is based on the standard error of the mean



Crow Butte Resources  
 Attn: Rhonda Grantham  
 PO Box 169  
 Crawford, NE 69339

# LANDAUER

## SPHERICAL X9 ENVIRONMENTAL REPORT

Account Number: 306192

Process Number:	X9SP ES034
Received Date:	9-Jan-08
Report Date:	10-Jan-08
Released by:	LCC

Net Values  
 after control  
 subtraction

Participant No.	Name/Description	Mean Ambient					Dose Equivalent (mrem)	Standard Deviation (mrem)	95% Confidence Interval (mrem)		
		Dose									
		Reading 1 (mrem)	Reading 2 (mrem)	Reading 3 (mrem)	Reading 4 (mrem)	Reading 5 (mrem)					
Quarterly Monitoring Period starting: October 1, 2007											
	Control	25	25	24	22	25	24	1.3	1.6		
1001	AM-1	30	28	29	28	29	29	5	1.0		
1002	AM-2	33	28	31	30	29	30	6	2.4		
1003	AM-6	29	28	30	30	29	29	5	1.0		
1008	AM-8	30	30	32	33	32	31	7	1.7		
1009	AM-3		31	30	31	32	31	7	1.3		
1010	AM-4	29	29	28	31	30	29	5	1.4		
1011	AM-5	30	30	29	31	29	30	6	1.0		

95% Confidence Interval is based on the standard error of the mean

## **Appendix H**

### **Sediment Monitoring Results**

**Third and Fourth Quarter, 2007**



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-001  
Client Sample ID: E12 Stream S1

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	10.7	mg/kg-dry	D	0.03		SW6020	02/11/08 14:16 / ts
Uranium, Activity	7.21	pCi/g-dry	D	0.02		SW6020	02/11/08 14:16 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	2.0	pCi/g-dry		0.1		E909.0M	01/03/08 09:05 / dm
Lead 210 precision (±)	0.2	pCi/g-dry				E909.0M	01/03/08 09:05 / dm
Radium 226	2.8	pCi/g-dry		0.1		E903.0	01/15/08 12:23 / trs
Radium 226 precision (±)	0.3	pCi/g-dry				E903.0	01/15/08 12:23 / trs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-002  
Client Sample ID: E13 Stream S2

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	2.63	mg/kg-dry	D	0.03		SW6020	01/09/08 19:17 / ts
Uranium, Activity	1.78	pCi/g-dry	D	0.02		SW6020	01/09/08 19:17 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	0.7	pCi/g-dry		0.1		E909.0M	01/03/08 09:05 / dm
Lead 210 precision (±)	0.1	pCi/g-dry				E909.0M	01/03/08 09:05 / dm
Radium 226	0.6	pCi/g-dry		0.1		E903.0	01/15/08 12:23 / trs
Radium 226 precision (±)	0.1	pCi/g-dry				E903.0	01/15/08 12:23 / trs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-003  
Client Sample ID: E14 Stream S5

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	2.31	mg/kg-dry	D	0.03		SW6020	01/09/08 19:21 / ts
Uranium, Activity	1.56	pCi/g-dry	D	0.02		SW6020	01/09/08 19:21 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	0.6	pCi/g-dry		0.1		E909.0M	01/03/08 09:05 / dm
Lead 210 precision (±)	0.1	pCi/g-dry				E909.0M	01/03/08 09:05 / dm
Radium 226	0.4	pCi/g-dry		0.1		E903.0	01/15/08 12:23 / trs
Radium 226 precision (±)	0.1	pCi/g-dry				E903.0	01/15/08 12:23 / trs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-004  
Client Sample ID: E15 Stream E1 & E2

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	4.36	mg/kg-dry	D	0.03		SW6020	01/09/08 19:25 / ts
Uranium, Activity	2.95	pCi/g-dry	D	0.02		SW6020	01/09/08 19:25 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	1	pCi/g-dry		0.1		E909.0M	01/03/08 09:05 / dm
Lead 210 precision (±)	0.1	pCi/g-dry				E909.0M	01/03/08 09:05 / dm
Radium 226	0.7	pCi/g-dry		0.1		E903.0	01/15/08 12:23 / trs
Radium 226 precision (±)	0.2	pCi/g-dry				E903.0	01/15/08 12:23 / trs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-005  
Client Sample ID: E16 Impoundment I3

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	7.88	mg/kg-dry	D	0.03		SW6020	01/09/08 19:30 / ts
Uranium, Activity	5.33	pCi/g-dry	D	0.02		SW6020	01/09/08 19:30 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	1.1	pCi/g-dry		0.1		E909.0M	01/09/08 09:15 / dm
Lead 210 precision (±)	0.1	pCi/g-dry				E909.0M	01/09/08 09:15 / dm
Radium 226	0.5	pCi/g-dry		0.1		E903.0	01/15/08 08:27 / trs
Radium 226 precision (±)	0.1	pCi/g-dry				E903.0	01/15/08 08:27 / trs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-006  
Client Sample ID: E17 Impoundment I4

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	25.9	mg/kg-dry	D	0.03		SW6020	02/11/08 14:12 / ts
Uranium, Activity	17.5	pCi/g-dry	D	0.02		SW6020	02/11/08 14:12 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	3.2	pCi/g-dry		0.1		E909.0M	01/09/08 09:15 / dm
Lead 210 precision (±)	0.2	pCi/g-dry				E909.0M	01/09/08 09:15 / dm
Radium 226	1.4	pCi/g-dry		0.1		E903.0	01/15/08 08:27 / trs
Radium 226 precision (±)	0.2	pCi/g-dry				E903.0	01/15/08 08:27 / trs

Report Definitions: RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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





## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-007  
Client Sample ID: E18 Impoundment 15

Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	3.12	mg/kg-dry	D	0.03		SW6020	01/09/08 19:54 / ts
Uranium, Activity	2.11	pCi/g-dry	D	0.02		SW6020	01/09/08 19:54 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	1.2	pCi/g-dry		0.1		E909.0M	01/09/08 09:15 / dm
Lead 210 precision (±)	0.1	pCi/g-dry				E909.0M	01/09/08 09:15 / dm
Radium 226	0.5	pCi/g-dry		0.1		E903.0	01/15/08 08:27 / trs
Radium 226 precision (±)	0.1	pCi/g-dry				E903.0	01/15/08 08:27 / trs

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



## LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources  
Project: Annual Sediment Samples  
Lab ID: C07121231-008  
Client Sample ID: E19 Stream E5

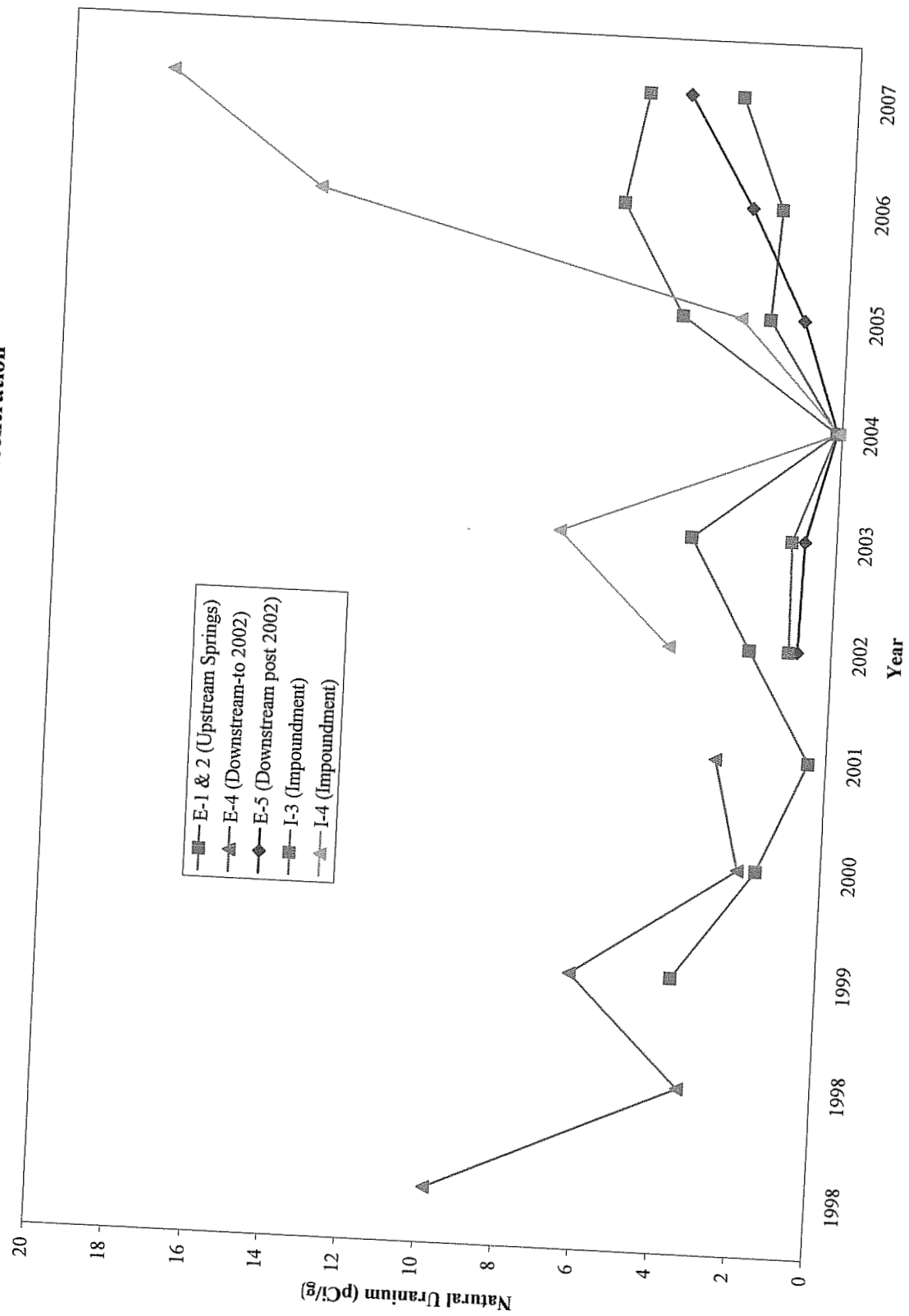
Revised Date: 02/14/08  
Report Date: 01/21/08  
Collection Date: 11/30/07  
Date Received: 12/28/07  
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Uranium	6.34	mg/kg-dry	D	0.03		SW6020	02/11/08 14:08 / ts
Uranium, Activity	4.29	pCi/g-dry	D	0.02		SW6020	02/11/08 14:08 / ts
<b>RADIONUCLIDES - TOTAL</b>							
Lead 210	0.8	pCi/g-dry		0.1		E909.0M	01/09/08 09:15 / dm
Lead 210 precision (±)	0.1	pCi/g-dry				E909.0M	01/09/08 09:15 / dm
Radium 226	0.4	pCi/g-dry		0.1		E903.0	01/15/08 08:27 / trs
Radium 226 precision (±)	0.1	pCi/g-dry				E903.0	01/15/08 08:27 / trs

Report RL - Analyte reporting limit.  
Definitions: QCL - Quality control limit.  
D - RL increased due to sample matrix interference.

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

English Creek Sediment Uranium Concentration



# Squaw Creek Sediment Uranium Concentration

