

CROW BUTTE RESOURCES, INC.

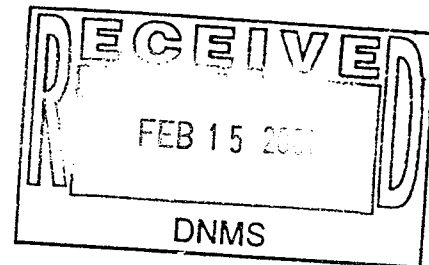
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February 10, 2000

Mr. Dwight Chamberlain, Director
Division of Nuclear Material Safety
Region IV
United States Nuclear Regulatory Commission
611 Ryan Plaza Drive
Suite 400
Arlington, Texas 76011



Subject: Docket No. 40-8943
License No. SUA-1534

Dear Mr. Chamberlain:

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. This report covers the third and fourth quarters of 2000.

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

Sincerely,
CROW BUTTE RESOURCES, INC.

Michael L. Griffin
Manager of Environmental and Regulatory Affairs

Enclosures – As Stated

c: Mr. Philip Ting, Chief
Fuel Cycle Licensing Branch, FCSS
c/o Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555



CROW BUTTE URANIUM PROJECT
RADIOLOGICAL EFFLUENT
AND
ENVIRONMENTAL MONITORING
REPORT

for

THIRD AND FOURTH QUARTERS, 2000

USNRC Source Materials License SUA 1534

CROW BUTTE RESOURCES, INC.

Second Half 2000 Semiannual Radiological Effluent and Environmental Monitoring Report



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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 1 through 7 during the third and fourth quarters of 2000. Complete excursion monitoring results are available on site for inspection.

One shallow monitor well (SM6-12) was placed on excursion status during the period. This well was subsequently removed when monitoring results were below the criteria. One other shallow monitor well (SM6-13) was also removed from excursion status. Two shallow monitor wells (SM6-18 and SM7-23) remain on excursion status. Excursion reports for these shallow monitor wells have been submitted as required in License Condition 12.2.

1.2 Water Supply Wells and Surface Water

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

- Surface Water collection point S-5 (Squaw Creek downstream) was dry during the third quarter of 2000, so no sample could be obtained.
- Well No. 28 is a windmill providing water for livestock. During the fourth quarter of 2000, the windmill was inoperable, so no sample was obtained from the well.
- Surface water collection point E-2 (English Creek upstream), which is usually composited with E-1, was dry during the fourth quarter of 2000 sampling event. A sample was obtained from E-1 and was analyzed.

2 OPERATIONAL

2.1 Production Data Summary

Mining operations continued through the third and fourth quarters of 2000. The average operating production flow rate was 4393 gpm for the third quarter and 4531 gpm for the fourth quarter. The annual average production flow for the second half of 2000 was 4462 gpm. Injection and production totals from the totalizers and the calculated bleed totals for the reporting period are included in Appendix B.

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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 1,854,800 gallons during the third quarter and 2,330,945 gallons during the fourth quarter. Included in these totals are 266,675 gallons of water generated from well workovers, well development, and well maintenance activities were discharged to the ponds during the second half of 2000. 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 continuous basis and 15,363,599 gallons of wastewater was injected into the well during the second half of 2000. A summary of the total volume of wastewater injected and the average radionuclide content is contained in Appendix D.

On October 30, 2000, the NDEQ modified the Class I UIC permit for the DDW. The modification removed flow rate and total flow limitations. Monitoring requirements and limitations were also modified. By letter dated September 12, 2000, CBR requested NRC amend License Condition 10.7. to reference the modification. Amendment 7 approving the change was received in January 2001.

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 7.04×10^{-4} Curies/m³ radon release from leaching operations and are the basis for the radon release calculations for the second half of 2000.

During the third quarter production occurred at an average flow rate of 4393 gpm (16,629 lpm). During the fourth quarter production occurred at an average flow rate of 4531 gpm (17,150 lpm). Production was maintained continuously for 92 days for the third quarter. This represents a third quarter operating factor of 100%. Production was maintained continuously for 92 days for the fourth quarter. This represents a fourth quarter operating factor of 100%. The production flow for the third quarter would result in a calculated radon release of 1,117 Curies. The production flow for the fourth quarter would result in a calculated radon release of 1,152 Curies. Calculations for radon release from production operations are shown in Appendix E.

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Additional wells were brought on line during the second half of 2000. Calculations for the start-up of 23 acres of a new wellfield are shown in Appendix E. The calculated radon released from start-up of 23 acres is 29 Curies.

The total radon emission due to leaching operations from the Crow Butte plant for the second half of 2000 was 2,298 Curies. This calculated annual 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 2000, a total of 124,564,970 gallons (471,478,412 l) of restoration water was produced from Mine Units 2 and 3. 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 329 Curies as shown in Appendix E. The estimated release of radon through wellfield loss at 25% of this total was 82 Curies. The plant loss for ion exchange treatment of the restoration water is estimated at 10% of the remaining radon, or 25 Curies.

Of the total amount of restoration water produced in the second half of 2000, 18,573,087 gallons (70,299,134 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 33 Curies. An additional 5.1 acres of wellfields were placed in restoration during the second half of 2000. The calculated radon released from start-up of 5.1 acres is 6 Curies. Calculations for the start-up of 5.1 acres of a wellfield placed in restoration are shown in Appendix E.

Based upon the calculations shown in Appendix E, the total estimated semiannual radon emission for the second half of 2000 from restoration activities was 146 Curies. This resulted in a total estimated radon release from the Crow Butte project during the second half of 2000 of 2,444 Curies.

2.4 Restoration

Restoration activities continued in Mine Unit #2 and Mine Unit #3 during the second half of 2000. Mine Unit 1 is shut-in following completion of the stabilization period and subsequent approval of restoration by the NDEQ. The Mine Unit #1 Restoration Report was submitted to NRC with a related amendment request on January 14, 2000. NRC continues their review of these submittals.



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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 of the data for both quarters are within the expected 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 two locations on Squaw Creek and two locations on English Creek on an annual basis. The sample locations are immediately upstream and downstream of the point where the creeks cross the site boundary. Sediment samples for 2000 were collected during the second half of 2000. The results of the sediment sampling fall within the expected ranges and are listed in Appendix H.

Appendix A

Private Well and Surface Water Radiological Monitoring Results

Third and Fourth Quarter, 2000

Sample ID:
Laboratory ID:
Sample Matrix:
Sample Date:
Date Received:
Report Date:

Sample #1E - Well Drinking Water	Sample #2E - Well #19	Sample #3E - Well #27
35516-1	35516-2	35516-3
Water	Water	Water
08-10-00	08-10-00	08-10-00
08-25-00	08-25-00	08-25-00
September 25, 2000	September 25, 2000	September 25, 2000

Radiometric	Results	Results	Results
Uranium	0.0078	0.0075	0.010
Uranium	5.28E-09	5.08E-09	6.77E-09
Radium-226	<0.2	<0.2	<0.2
Radium Precision \pm	-	-	-

Sample #4E - Well #125	Sample #5E - Well #129	Sample #6E - Well #8	Sample #7E - Well #12
35516-4	35516-5	35516-6	35516-7
Water	Water	Water	Water
08-10-00	08-10-00	08-10-00	08-11-00
08-25-00	08-25-00	08-25-00	08-25-00
September 25, 2000	September 25, 2000	September 25, 2000	September 25, 2000

Results	Results	Results	Results
0.0067	0.010	0.017	0.0047
4.54E-09	6.77E-09	1.14E-08	3.18E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-

Sample #8E - Well #11	Sample #9E - Well #16	Sample #10E - Well #24	Sample #11E - Stream S1
35516-8	35516-9	35516-10	35516-11
Water	Water	Water	Water
08-11-00	08-11-00	08-11-00	08-11-00
08-25-00	08-25-00	08-25-00	08-25-00
September 25, 2000	September 25, 2000	September 25, 2000	September 25, 2000

Results	Results	Results	Results
0.0097	0.0080	0.0054	0.0041
6.57E-09	5.42E-09	3.66E-09	2.78E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-

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Sample #12E - Well #25	Sample #13E - Stream S2	Sample #14E - Well #17	Sample #15E - Well #26
35516-12	35516-13	35516-14	35516-15
Water	Water	Water	Water
08-11-00	08-11-00	08-11-00	08-11-00
08-25-00	08-25-00	08-25-00	08-25-00
September 25, 2000	September 25, 2000	September 25, 2000	September 25, 2000

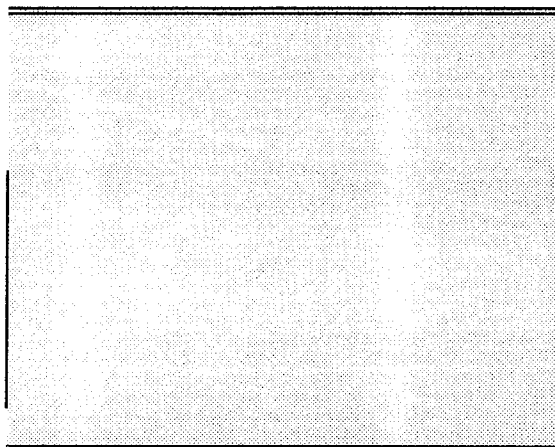
Results	Results	Results	Results
0.0057	0.0041	0.0043	0.0079
3.86E-09	2.78E-09	2.91E-09	5.35E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-

Sample #16E - Well #28	Sample #17E - Stream E1	Sample #18E - Stream E4	Sample #19E - BOW 96-1
35516-16	35516-17	35516-18	35516-19
Water	Water	Water	Water
08-11-00	08-11-00	08-11-00	08-11-00
08-25-00	08-25-00	08-25-00	08-25-00
September 25, 2000	September 25, 2000	September 25, 2000	September 25, 2000

Results	Results	Results	Results
0.0066	0.013	0.032	0.012
4.47E-09	8.87E-09	2.16E-08	7.79E-09
<0.2	<0.2	<0.2	0.4
-	-	-	0.2

Sample #20E - Well #63	Sample #21E - Well #41	Sample #22E - Well #57	Sample #23E - Well #130
35516-20	35516-21	35516-22	35516-23
Water	Water	Water	Water
08-11-00	08-11-00	08-11-00	08-11-00
08-25-00	08-25-00	08-25-00	08-25-00
September 25, 2000	September 25, 2000	September 25, 2000	September 25, 2000

Results	Results	Results	Results
0.014	0.0079	0.011	0.0084
9.41E-09	5.35E-09	7.31E-09	5.69E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-



Units	Reporting Limit
mg/L	0.0003
μCi/mL	2.03E-10
pCi/L	0.2

Sample ID:
Laboratory ID:
Sample Matrix:
Sample DateTime:
Date Received:
Report Date:

Sample #E1 - Well #19	Sample #E2 - Well #27	Sample #E3 - Stream S-1
00-37744-1	00-37744-2	00-37744-3
Liquid, water	Liquid, water	Liquid, water
11/09/2000 NST	11/09/2000 NST	11/09/2000 NST
11/21/2000	11/21/2000	11/21/2000
December 22, 2000	December 22, 2000	December 22, 2000

Radiometric	Results	Results	Results
Uranium	0.0063	0.0087	0.0048
Uranium	4.27E-09	5.89E-09	3.25E-09
Radium-226	<0.2	<0.2	<0.2
Radium Precision ±	-	-	-

Sample #E4 - Stream S-2	Sample #E5 - Stream S-5	Sample #E6 - Stream E1	Sample #E7 - Stream E4
00-37744-4	00-37744-5	00-37744-6	00-37744-7
Liquid, water	Liquid, water	Liquid, water	Liquid, water
11/09/2000 NST	11/09/2000 NST	11/09/2000 NST	11/09/2000 NST
11/21/2000	11/21/2000	11/21/2000	11/21/2000
December 22, 2000	December 22, 2000	December 22, 2000	December 22, 2000

Results	Results	Results	Results
0.0046	0.0058	0.0036	0.033
3.11E-09	3.93E-09	2.42E-09	2.20E-08
<0.2	<0.2	<0.2	<0.2
-	-	-	-

Sample #E8 - Well #11	Sample #E9 - Well #24	Sample #E10 - Well #25	Sample E11 - Well #17
00-37744-8	00-37744-9	00-37744-10	00-37744-11
Liquid, water	Liquid, water	Liquid, water	Liquid, water
11/10/2000 NST	11/10/2000 NST	11/10/2000 NST	11/10/2000 NST
11/21/2000	11/21/2000	11/21/2000	11/21/2000
December 22, 2000	December 22, 2000	December 22, 2000	December 22, 2000

Results	Results	Results	Results
0.0096	0.0053	0.0061	0.0045
6.50E-09	3.59E-09	4.13E-09	3.05E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-

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Sample E12 - Well #26	Sample E13 - Well #16	Sample E14 - Well #130	Sample E15 - Well #41
00-37744-12	00-37744-13	00-37744-14	00-37744-15
Liquid, water	Liquid, water	Liquid, water	Liquid, water
11/10/2000 NST	11/10/2000 NST	11/10/2000 NST	11/10/2000 NST
11/21/2000	11/21/2000	11/21/2000	11/21/2000
December 22, 2000	December 22, 2000	December 22, 2000	December 22, 2000

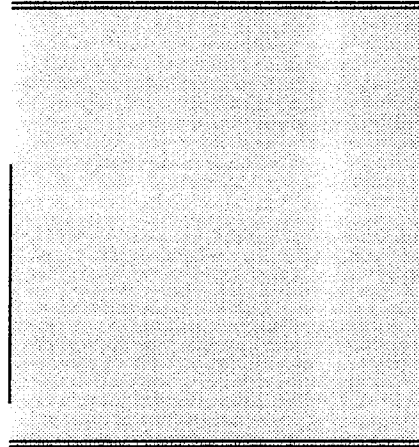
Results	Results	Results	Results
0.0081	0.0071	0.0086	0.0075
5.48E-09	4.81E-09	5.82E-09	5.08E-09
<0.2	0.4	<0.2	<0.2
-	0.2	-	-

Sample E16 - Well #63	Sample E17 - Well #57	Sample E18 - Well #125	Sample E19 - Well #129
00-37744-16	00-37744-17	00-37744-18	00-37744-19
Liquid, water	Liquid, water	Liquid, water	Liquid, water
11/10/2000 NST	11/10/2000 NST	11/10/2000 NST	11/10/2000 NST
11/21/2000	11/21/2000	11/21/2000	11/21/2000
December 22, 2000	December 22, 2000	December 22, 2000	December 22, 2000

Results	Results	Results	Results
0.013	0.0103	0.0066	0.0090
8.87E-09	6.97E-09	4.47E-09	6.09E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-

Sample E20 - Well #8	Sample E21 - Drinking Water	Sample E22 - Well #BOW 96-1	Sample E23 - Well #12
00-37744-20	00-37744-21	00-37744-22	00-37744-23
Liquid, water	Liquid, water	Liquid, water	Liquid, water
11/10/2000 NST	11/10/2000 NST	11/10/2000 NST	11/15/2000 NST
11/21/2000	11/21/2000	11/21/2000	11/21/2000
December 22, 2000	December 22, 2000	December 22, 2000	December 22, 2000

Results	Results	Results	Results
0.020	0.0082	0.012	0.0044
1.35E-08	5.55E-09	8.12E-09	2.98E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-



Units	Reporting Limit
mg/L	0.0003
μCi/mL	2.03E-10
pCi/L	0.2

Appendix B

Plant Production and Waste Totals

Third and Fourth Quarter, 2000

Appendix B

WASTE VOLUME Thrd Quarter 2000					
TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	TRUCKS TO POND
July	633000	938122	1554114	240268	
August	477840	762061	2354011	140272	
September	596710	898285	1839541	598792	
TOTAL GAL. EOQ	1707550	2598468	5747666	979332	147250

TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS =	1854800 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO DEEP WELL=	8346134 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	10200934 GALLONS
TOTAL 3rd QTR VOLUME WF BLEED FROM WELLFIELDS=	9221602 GALLONS

WELLFIELD BLEED Thrd Quarter 2000			
MONTH	July	August	September
BLEED	1.2%	1.0%	1.1%

PLANT FLOW Thrd Quarter 2000	
AVERAGE OPERATING FLOW RATE=	4393 GPM EOQ
TOTAL GALLONS PRODUCED=	582034301 GALLONS EOQ
TOTAL GALLONS INJECTED=	564709237 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	1138636346	1097233749	4368	4357				34.8
July	193366395	187160693	744	744	4332	4193	393	0
August	197748592	192152177	744	744	4430	4304	431	0
September	190919314	185396367	720	720	4419	4292	445	0
EOQ TOTAL	582034301	564709237	2208	2208	4393	4263	423	0
YTD TOTAL	1720670647	1661942986	6576	6565	4361	4212	380	34.8

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	PLANT BLEED	MUIII BLEED TO DDW
Prev. YTD	25031418	83731111	5560796	21046743	10675859	3703604
July	5007270	15175305	1020809	4127956	2405246	533305
August	4673314	15743605	1960006	3942004	1123695	394005
September	4363942	16158415	1448705	3808242	1654064	390836
EOQ TOTAL	14044526	47077325	4429520	11878202	5183005	1318146
YTD TOTAL	39075944	130808436	9990316	32924945	15858864	5021750

Appendix B

WASTE VOLUME
 Fourth Quarter 2000

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	TRUCKS TO POND
October	584980	1024134	1446045	597857	
November	672250	958249	1326252	248169	
December	954290	934910	1327875	265796	
TOTAL GAL. EOQ	2211520	2917293	4100172	1111822	119425

TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS =	2330945 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO DEEP WELL=	7017465 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	9348410 GALLONS
TOTAL 4th QTR VOLUME WF BLEED FROM WELLFIELDS=	8236588 GALLONS

WELLFIELD BLEED
 Fourth Quarter 2000

MONTH	October	November	December
BLEED	1.1%	1.0%	1.1%

PLANT FLOW
 Fourth Quarter 2000

AVERAGE OPERATING FLOW RATE=	4531 GPM EOQ
TOTAL GALLONS PRODUCED=	600317184 GALLONS EOQ
TOTAL GALLONS INJECTED=	583178985 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	1720670647	1661942986	6576	6565				34.8
October	202656379	196755616	744	744	4540	4408	447	0
November	197471363	191895911	720	720	4571	4442	444	0
December	200189442	194527458	744	744	4485	4358	458	0
EOQ TOTAL	600317184	583178985	2208	2208	4531	4402	450	0
YTD TOTAL	2320987831	2245121971	8784	8773	4404	4260	398	34.8

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	PLANT BLEED	MUIII BLEED TO DDW
Prev. YTD	39075944	130808436	9990316	32924945	15858864	5021750
October	4324602	16929828	1048806	3831291	3185521	397239
November	4595104	16131381	972483	3745148	1979594	353769
December	5323791	16138413	1002727	4246170	2233137	325148
EOQ TOTAL	14243497	49199622	3024016	11822609	7398252	1076156
YTD TOTAL	53319441	180008058	13014332	44747554	23257116	6097906

Appendix C

Wellfield Injection Pressures

Third and Fourth Quarter, 2000

Appendix C

WELLFIELD INJECTION PRESSURE Third Quarter 2000										
	WF HOUSE #1		WF HOUSE #2		WF HOUSE #3		WF HOUSE #4		WF HOUSE #5	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	0	0	0	0	53	76	57	80	45	67
August	0	0	0	0	45	75	49	80	38	96
September	0	0	0	0	43	65	45	69	34	70
AVERAGE	0	0	0	0	46	76	51	80	39	96
	WF HOUSE #6		WF HOUSE #7		WF HOUSE #8		WF HOUSE #9		WF HOUSE #10	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	34	42	15	26	27	35	84	89	71	75
August	25	36	4	10	17	20	83	87	69	72
September	25	29	2	8	17	20	81	88	69	76
AVERAGE	28	42	7	26	20	35	83	89	70	76
	WF HOUSE #11		WF HOUSE #12		WF HOUSE #13		WF HOUSE #14		WF HOUSE #15	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	71	90	2	75	80	86	90	94	84	89
August	67	72	0	1	79	82	89	94	83	86
September	68	75	0	0	77	86	86	92	80	86
AVERAGE	69	90	1	75	79	86	88	94	82	89
	WF HOUSE #16		WF HOUSE #17		WF HOUSE #18		WF HOUSE #19		WF HOUSE #20	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	92	97	76	80	92	95	95	99	84	88
August	90	93	75	95	90	95	94	98	83	95
September	90	96	73	79	87	95	91	98	81	87
AVERAGE	90	97	74	95	90	95	93	99	83	95
	WF HOUSE #21		WF HOUSE #22		WF HOUSE #23		WF HOUSE #24		WF HOUSE #25	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	95	99	90	91	90	92	90	95	94	96
August	92	99	91	94	90	98	95	96	94	95
September	87	94	88	92	87	91	90	99	92	95
AVERAGE	91	99	90	94	89	98	92	99	93	96
	WF HOUSE #26		WF HOUSE #28		WF HOUSE #30					
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM				
July	0	0	66	70	64	67				
August	0	0	65	70	64	68				
September	90	95	65	72	64	72				
AVERAGE	90	95	65	72	64	72				

Appendix C

WELLFIELD INJECTION PRESSURE										
Fourth Quarter 2000										
	WF HOUSE #1		WF HOUSE #2		WF HOUSE #3		WF HOUSE #4		WF HOUSE #5	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	0	0	0	0	39	64	43	67	32	58
November	0	0	0	0	42	60	47	65	35	52
December	0	0	0	0	42	50	46	56	35	40
AVERAGE	0	0	0	0	41	64	45	67	34	58
	WF HOUSE #6		WF HOUSE #7		WF HOUSE #8		WF HOUSE #9		WF HOUSE #10	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	25	28	1	6	17	20	80	85	68	80
November	23	25	0	0	15	16	80	86	68	78
December	21	24	0	0	12	16	81	86	69	72
AVERAGE	23	28	0	6	15	20	81	88	68	80
	WF HOUSE #11		WF HOUSE #12		WF HOUSE #13		WF HOUSE #14		WF HOUSE #15	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	67	75	0	0	77	82	84	92	78	85
November	67	73	0	0	76	83	82	96	79	90
December	67	72	0	0	77	82	88	92	81	88
AVERAGE	67	75	0	0	77	83	85	96	79	90
	WF HOUSE #16		WF HOUSE #17		WF HOUSE #18		WF HOUSE #19		WF HOUSE #20	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	89	95	71	79	85	93	88	95	78	82
November	91	95	71	90	86	94	88	95	79	95
December	94	97	74	86	89	94	92	99	80	86
AVERAGE	91	97	72	90	87	94	90	99	79	95
	WF HOUSE #21		WF HOUSE #22		WF HOUSE #23		WF HOUSE #24		WF HOUSE #25	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	85	95	91	96	87	90	90	95	95	98
November	88	93	92	97	88	95	94	95	91	95
December	93	99	91	96	89	90	90	96	91	96
AVERAGE	89	99	91	97	88	95	92	96	93	98
	WF HOUSE #26		WF HOUSE #28		WF HOUSE #30		WF HOUSE #31			
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM		
October	91	95	65	71	61	71	0	0		
November	92	98	65	87	62	67	0	0		
December	94	98	65	70	60	67	0	0		
AVERAGE	93	98	65	87	61	71	0	0		

Appendix D

Deep Disposal Well Injection Radiological Data

Third and Fourth Quarter, 2000

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-00	2,491,097	9.7	9.15E+07	6.19E+04	954	9.00E+03
August-00	2,189,225	16.3	1.35E+08	9.14E+04	1,700	1.41E+04
September-00	2,346,990	3.8	3.38E+07	2.29E+04	1,570	1.39E+04
October-00	2,470,179	6	5.61E+07	3.80E+04	1,370	1.28E+04
November-00	2,284,501	5	4.32E+07	2.93E+04	1,480	1.28E+04
December-00	2,262,785	7	6.00E+07	4.06E+04	1,300	1.11E+04

Appendix E

Radon Release Calculations

Third and Fourth Quarter, 2000

Radon Effluent Release Calculation (Production and Startup)

Third Quarter 2000 Radon Release from Leaching Operations:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times \left(\frac{16,629 \text{ liters}}{\text{min}} \right) \times (0.72) \times (92 \text{ days}) \times (1.00) \times \left(\frac{\text{meter}^3}{1000 \text{ liters}} \right) \times \left(\frac{24 \text{ hours}}{\text{day}} \right) \times \left(\frac{60 \text{ min}}{\text{hour}} \right) \right] = 1,110 \text{ Curies}$$

Fourth Quarter 2000 Radon Release from Leaching Operations:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times \left(\frac{17,150 \text{ liters}}{\text{min}} \right) \times (0.72) \times (92 \text{ days}) \times (1.00) \times \left(\frac{\text{meter}^3}{1000 \text{ liters}} \right) \times \left(\frac{24 \text{ hours}}{\text{day}} \right) \times \left(\frac{60 \text{ min}}{\text{hour}} \right) \right] = 1,152 \text{ Curies}$$

Radon Release from Wellfield Startup:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times (23 \text{ acres}) \times \left(\frac{4074 \text{ meter}^2}{\text{acre}} \right) \times (1.52 \text{ meters}) \times (0.29) \right] = 29 \text{ Curies}$$

Total Estimated Radon Emissions from Leaching: 2,298 Curies

Radon Effluent Release Calculation (Restoration)

Second Half 2000 Radon Release from Restoration:

$$(471,478,412 \text{ liters}) \times \left(\frac{0.697 \text{ } \mu\text{Ci}}{\text{liter}} \right) = 329 \text{ Curies (production potential)}$$

$$329 \text{ Curies} \times 0.25 = 82 \text{ Curies (25\% Wellfield Loss)}$$

$$(329 \text{ Curies} - 82 \text{ Curies}) \times 0.10 = 25 \text{ Curies (10\% Ion Exchange Loss)}$$

$$(70,299,134 \text{ liters}) \times \left(\frac{0.470 \text{ } \mu\text{Ci}}{\text{liter}} \right) = 33 \text{ Curies (100\% Reverse Osmosis Loss)}$$

Startup of additional restoration patterns:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times (5.1 \text{ acres}) \times \left(\frac{4074 \text{ meter}^2}{\text{acre}} \right) \times (1.52 \text{ meters}) \times (0.29) \right] = 6 \text{ Curies}$$

Total Estimated Radon Emissions from Restoration: 146 Curies

***Total Estimated Radon Emissions from Crow Butte Operations, 2nd Half 2000:
2,444 Curies***

Appendix F

Environmental Air Monitoring Results

Third and Fourth Quarter, 2000

Crow Butte Resources, Inc.
Crow Butte Uranium Project

Track Etch Cup Ambient Radon Concentrations

*Air Monitoring Station
No.*

Period: July 5, 2000 to January 2, 2001

	Gross Count	Average Radon Concentration (x 10 ⁻⁹ uCi/ml)	Accuracy (x 10 ⁻⁹ uCi/ml)	Percent Effluent Concentration
AM-1	69	1.2	0.14	12.0%
AM-2	103	1.1	0.11	11.0%
AM-3	81	0.8	0.09	8.0%
AM-4	112	1.2	0.11	12.0%
AM-5	135	1.6	0.14	16.0%
AM-6	91	0.9	0.09	9.0%
AM-8	105	1.1	0.11	11.0%
AB-3 (AM-3 Duplicate)	97	1	0.10	10.0%
AB-6 (AM-6 Duplicate)	103	1.1	0.11	11.0%
LLD (x 10 ⁻⁹ uCi/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, 2001

SAMPLE ID: A.M.-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
31541-1 01/04/00-03/15/00 Air Volume in mLs 2.08E+09	^{nat} U	1.24E-16	N/A	1.00E-16	9.00E-14	1.38E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.19E-14	5.48E-16	2.00E-15	6.00E-13	1.99E+00
33699-1 04/03/00-06/15/00 Air Volume in mLs 2.08E+09	^{nat} U	1.24E-16	N/A	1.00E-16	9.00E-14	1.38E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	7.72E-15	5.48E-16	2.00E-15	6.00E-13	1.29E+00
36428-1 07/05/00-09/15/00 Air Volume in mLs 2.08E+09	^{nat} U	1.85E-16	N/A	1.00E-16	9.00E-14	2.06E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.57E-14	8.22E-16	2.00E-15	6.00E-13	2.62E+00
00-38531-1 10/02/200-12/15/2000 Air Volume in mLs 2.13E+09	^{nat} U	1.52E-16	N/A	1.00E-16	9.00E-14	1.68E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.20E-14	1.92E-15	2.00E-15	6.00E-13	2.00E+00

Final prep volume is 0.95 liter

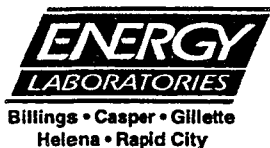
LLD's are from Reg. Guide 4.14

*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



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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2001

SAMPLE ID: A.M.-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
31541-2 01/04/00-03/15/00 Air Volume in mLs 2.08E+09	^{nat} U	1.24E-16	N/A	1.00E-16	9.00E-14	1.38E-01
	²²⁶ Ra	5.94E-16	1.83E-16	1.00E-16	9.00E-13	6.60E-02
	²¹⁰ Pb	2.06E-14	6.39E-16	2.00E-15	6.00E-13	3.43E+00
33699-2 04/03/00-06/15/00 Air Volume in mLs 2.19E+09	^{nat} U	2.06E-16	N/A	1.00E-16	9.00E-14	2.28E-01
	²²⁶ Ra	3.90E-16	1.74E-16	1.00E-16	9.00E-13	4.34E-02
	²¹⁰ Pb	1.01E-14	5.64E-16	2.00E-15	6.00E-13	1.68E+00
36428-2 07/05/00-09/15/00 Air Volume in mLs 2.19E+09	^{nat} U	5.87E-16	N/A	1.00E-16	9.00E-14	6.53E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.29E-14	7.37E-16	2.00E-15	6.00E-13	2.15E+00
00-38531-2 10/02/200-12/15/2000 Air Volume in mLs 2.14E+09	^{nat} U	1.51E-16	N/A	1.00E-16	9.00E-14	1.68E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.07E-14	1.91E-15	2.00E-15	6.00E-13	1.78E+00

Final prep volume is 0.95 liter

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



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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2001

SAMPLE ID: A.M.-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
31541-3 01/04/00-03/15/00 Air Volume in mLs 2.20E+09	^{nat} U	1.81E-15	N/A	1.00E-16	9.00E-14	2.01E+00
	²²⁶ Ra	2.03E-15	8.64E-17	1.00E-16	9.00E-13	2.26E-01
	²¹⁰ Pb	1.72E-14	5.61E-16	2.00E-15	6.00E-13	2.87E+00

33699-3 04/03/00-06/15/00 Air Volume in mLs 2.08E+09	^{nat} U	1.55E-16	N/A	1.00E-16	9.00E-14	1.72E-01
	²²⁶ Ra	1.32E-15	9.13E-17	1.00E-16	9.00E-13	1.47E-01
	²¹⁰ Pb	8.50E-15	9.13E-17	2.00E-15	6.00E-13	1.42E+00

36428-3 07/05/00-09/15/00 Air Volume in mLs 2.08E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.28E-14	7.76E-16	2.00E-15	6.00E-13	2.14E+00

00-38531-3 10/02/200-12/15/2000 Air Volume in mLs 2.12E+09	^{nat} U	2.43E-16	N/A	1.00E-16	9.00E-14	2.70E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	9.86E-15	1.88E-15	2.00E-15	6.00E-13	1.64E+00

Final prep volume is 0.95 liter

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, 2001

SAMPLE ID: A.M.-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
31541-4 01/04/00-03/15/00 Air Volume in mLs 2.15E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.54E-14	5.74E-16	2.00E-15	6.00E-13	2.57E+00
33699-4 04/03/00-06/15/00 Air Volume in mLs 2.05E+09	^{nat} U	3.76E-16	N/A	1.00E-16	9.00E-14	4.18E-01
	²²⁶ Ra	1.11E-15	9.27E-17	1.00E-16	9.00E-13	1.24E-01
	²¹⁰ Pb	1.09E-14	6.02E-16	2.00E-15	6.00E-13	1.82E+00
36428-4 07/05/00-09/19/00 Air Volume in mLs 2.06E+09	^{nat} U	5.93E-16	N/A	1.00E-16	9.00E-14	6.59E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.39E-14	7.84E-16	2.00E-15	6.00E-13	2.32E+00
00-38531-4 10/02/200-12/15/2000 Air Volume in mLs 2.17E+09	^{nat} U	1.49E-16	N/A	1.00E-16	9.00E-14	1.65E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.16E-14	1.88E-15	2.00E-15	6.00E-13	1.94E+00

Final prep volume is 0.95 liter

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, 2001

SAMPLE ID: A.M.-5

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
31541-5 01/04/00-03/15/00 Air Volume in mLs 2.06E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	4.15E-16	1.38E-16	1.00E-16	9.00E-13	4.61E-02
	²¹⁰ Pb	1.32E-14	5.53E-16	2.00E-15	6.00E-13	2.20E+00
33699-5 04/03/00-06/15/00 Air Volume in mLs 2.07E+09	^{nat} U	1.86E-16	N/A	1.00E-16	9.00E-14	2.07E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.34E-14	5.97E-16	2.00E-15	6.00E-13	2.23E+00
36428-5 07/05/00-09/15/00 Air Volume in mLs 2.11E+09	^{nat} U	3.66E-16	N/A	1.00E-16	9.00E-14	4.06E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.54E-14	7.65E-16	2.00E-15	6.00E-13	2.56E+00
00-38531-5 10/02/200-12/15/2000 Air Volume in mLs 2.10E+09	^{nat} U	2.76E-16	N/A	1.00E-16	9.00E-14	3.07E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.43E-14	1.99E-15	2.00E-15	6.00E-13	2.38E+00

Final prep volume is 0.95 liter

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



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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2001

SAMPLE ID: A.M.-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
31541-6 01/04/00-03/15/00 Air Volume in mLs 2.09E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	4.55E-16	1.36E-16	1.00E-16	9.00E-13	5.05E-02
	²¹⁰ Pb	1.47E-14	5.91E-16	2.00E-15	6.00E-13	2.45E+00
33699-6 04/03/00-06/15/00 Air Volume in mLs 2.11E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	6.48E-15	5.40E-16	2.00E-15	6.00E-13	1.08E+00
36428-6 07/05/00-09/15/00 Air Volume in mLs 2.07E+09	^{nat} U	3.40E-16	N/A	1.00E-16	9.00E-14	3.77E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.40E-14	2.02E-15	2.00E-15	6.00E-13	2.33E+00
00-38531-6 10/02/200-12/15/2000 Air Volume in mLs 2.08E+09	^{nat} U	2.78E-16	N/A	1.00E-16	9.00E-14	3.09E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.39E-14	2.01E-15	2.00E-15	6.00E-13	2.31E+00

Final prep volume is 0.95 liter

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



ENERGY LABORATORIES, INC.

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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: January 26, 2001

SAMPLE ID: A.M.-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
31541-7 01/04/00-03/15/00 Air Volume in mLs 2.05E+09	^{238}U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	^{226}Ra	4.17E-16	1.39E-16	1.00E-16	9.00E-13	4.63E-02
	^{210}Pb	1.19E-14	5.56E-16	2.00E-15	6.00E-13	1.98E+00
33699-7 04/03/00-06/15/00 Air Volume in mLs 2.06E+09	^{238}U	8.12E-16	N/A	1.00E-16	9.00E-14	9.02E-01
	^{226}Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	^{210}Pb	8.21E-15	5.53E-16	2.00E-15	6.00E-13	1.37E+00
36428-7 07/05/00-09/15/00 Air Volume in mLs 2.06E+09	^{238}U	8.43E-16	N/A	1.00E-16	9.00E-14	9.37E-01
	^{226}Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	^{210}Pb	1.05E-14	7.38E-16	2.00E-15	6.00E-13	1.74E+00
00-38531-7 10/09/200-12/15/2000 Air Volume in mLs 2.13E+09	^{238}U	2.51E-15	N/A	1.00E-16	9.00E-14	2.79E+00
	^{226}Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	^{210}Pb	1.38E-14	1.96E-15	2.00E-15	6.00E-13	2.30E+00

Final prep volume is 0.95 liter

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



**RADIOCHEMICAL QUALITY ASSURANCE REPORT
CROW BUTTE RESOURCES**

Laboratory ID Range:

00-38531-1-7

Sample Matrix:

Air Filter

Sample Date / Time:

4th Quarter 2000

Date Received:

12/28/2000

Report Date:

January 26, 2001

	<u>Method</u>	<u>Relative Percent Difference¹</u>	<u>Spike Recovery (Percent)²</u>	<u>Method Blank μCi/mL</u>	<u>Date Analyzed</u>	<u>Analyst</u>
Laboratory #:		00-38467-1	00-38467-3			
Uranium:	200.8	0.5	116	<1.00E-16	01/08/2001	ts
Laboratory #:		01-30058-5	01-30058-6	RA-8		
Radium-226:	903.0	9.2	80	<1.00E-16	01/15/2001	rs
Laboratory #:		61016-10	61016-11	PB-1		
Lead-210:	NERHL-65-4	0.0	97	<2.00E-15	01/22/2001	lmh
Digestion:		<u>Volume</u>	<u>Units</u>			
	SW3050	0.95	Liter		12/29/2000	rcb

- (1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.
- (2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.

Appendix G

Environmental TLD Monitoring Results

Third and Fourth Quarter, 2000

Eberline Dosimetry Services

7021 Pan American Fwy NE

Albuquerque, NM 87109

(505) 345-9931 Voice (505) 761-5410 Fax

(888) 343-8537 Toll-Free

TLD ENVIRONMENTAL MONITOR REPORT

Page 1

Customer No. 06192

Report Date October 23, 2000

Exposure Period 7/5/00-10/13/00

Badge No		Dosimeter Readings (mrem)					Date Issued	Date Annealed
Type	Freq	Chip 1 Identification	Chip 2	Chip 3 Average	Chip 4 $\pm 2\sigma$	Chip 5 mrem Per Week	Date Returned	Date Read
01000		74	73	70	76	83	7/1/00	6/21/00
S	Q	CONTROL		75.2	9.7	4.42	10/18/00	10/18/00
01001		31	31	30	33	29	7/1/00	6/21/00
S	Q	AM-1		30.8	3.0	1.81	10/18/00	10/18/00
01002		33	36	29	21	34	7/1/00	6/21/00
S	Q	AM-2		30.6	11.9	1.80	10/18/00	10/18/00
01003		31	30	28	29	33	7/1/00	6/21/00
S	Q	AM-6		30.2	3.8	1.78	10/18/00	10/18/00
01008		28	34	36	34	33	7/1/00	6/21/00
S	Q	AM-8		33.0	6.0	1.94	10/18/00	10/18/00
01009		30	23	35	32	34	7/1/00	6/21/00
S	Q	AM-3		30.8	9.5	1.81	10/18/00	10/18/00
01010		30	32	30	33	29	7/1/00	6/21/00
S	Q	AM-4		30.8	3.3	1.81	10/18/00	10/18/00
01011		34	29	30	34	33	7/1/00	6/21/00
S	Q	AM-5		32.0	4.7	1.88	10/18/00	10/18/00

Frequency Code

W - Weekly
B - BiWeekly
M - Monthly
P - BiMonthly
Q - Quarterly
S - SemiAnnual
A - Annual
I - Irregular

Company CROW BUTTE RESOURCES

Attention RHONDA GRANTHAM

Address P.O. BOX 169

CRAWFORD, NE 69339

Crow Butte Resources
PO Box 169
Crawford, NE 69339

SPHERICAL X9 ENVIRONMENTAL REPORT

Prepared by Landauer, Inc.

Attn: Rhonda Grantham

Account Number: 306192

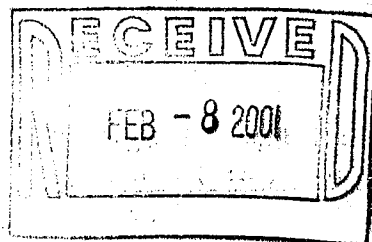
Process Number: X9SP FZ709

Received Date: 18-Jan-01

Report Date: 30-Jan-01

Released by: CJO

Participant No.	Name/Description	Reading 1 (mrem)	Reading 2 (mrem)	Reading 3 (mrem)	Reading 4 (mrem)	Reading 5 (mrem)	Mean Ambient	Standard Deviation (mrem)	95%
							Dose Equivalent (mrem)		Confidence Interval (mrem)
Quarterly Monitoring Period starting:		15-Oct-00							
	Control	46	57	51	68	49	54	8.7	10.8
1009	AM-3	27	27	27	27	26	27	0.4	0.6
1001	AM-1	26	30	26	51	30	33	10.5	13.0
1002	AM-2	30	28	30	14	28	26	6.8	8.4
1003	AM-6	26	27	27	30	27	27	1.5	1.9
1008	AM-8	31	28	26	29	29	29	1.8	2.3
1010	AM-4	27	28	31	24	27	27	2.5	3.1
1011	AM-5	28	29	31	29	30	29	1.1	1.4



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

Appendix H

Environmental Sediment Monitoring Results

Third and Fourth Quarter, 2000



Billings • Casper • Gillette
Helena • Rapid City

ENERGY LABORATORIES, INC.

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E-mail: casper@energylab.com • FAX: (307) 234-1639

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LABORATORY ANALYSIS REPORT

Client: CROW BUTTE RESOURCES

Project: Annual Stream Sediments

Contact: Rhonda Grantham

Sample Matrix: Solid, soil

Report Date: December 20, 2000

Laboratory ID	Sample Date/Time	Sample ID	Lead-210, pCi/g	Lead Precision ±	Radium-226, pCi/g	Radium Precision ±	Uranium, pCi/g
00-37232-1	10/30/2000 NST	Sample #1 - Stream Sed S-1	<0.05	N/A	0.31	0.05	0.38
00-37232-2	10/30/2000 NST	Sample #2 - Stream Sed S-2	<0.05	N/A	0.35	0.06	0.33
00-37232-3	10/30/2000 NST	Sample #3 - Stream Sed S-5	<0.05	N/A	0.37	0.06	0.31
00-37232-4	10/30/2000 NST	Stream #4 - Stream Sed E-1 & E-2 Composite	<0.05	N/A	0.63	0.07	1.66
00-37232-5	10/30/2000 NST	Sample #5 - Stream Sed E-4	<0.05	N/A	0.35	0.06	2.13

Quality Assurance Data			
Method	NERHL-65-4	903.0	200.8
Reporting Limit	0.05	0.01	0.01
Duplicate ¹	0.0	15.9	0.2
Spike ²	93	85	81
Batch ID	PB-52	RA-278	-
Analyst	lmh	rs	smd
Date Analyzed	12/13/2000	11/20/2000	11/08-09/2000

*see note (3).

NOTES:

- (1) These values are an assessment of analytical precision. The acceptance range is 0-20% for sample results above 10 times the reporting limit. This range is not applicable to samples with results below 10 times the reporting limit.
- (2) These values are an assessment of analytical accuracy. They are a percent recovery of the spike addition. ELI performs a matrix spike on 10 percent of all samples for each analytical method.
- (3) These values are an assessment of analytical precision. The acceptance range is 0-2 for sample results below 10 times the reporting limit. This range is not applicable to samples with results above 10 times the reporting limit.

Samples digested by method SW3050 on 11/02/2000 by analyst reb.

lmh: r:\reports\clients\3000\crow_butte(e)\soil\rc37232-1.xls

COMPLETE ANALYTICAL SERVICES

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