CROW BUTTE RESOURCES, INC.

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August 15, 2001

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 first and second quarters of 2001.

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 Health, Safety, and Environmental Affairs

Enclosures – As Stated

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

CROW BUTTE RESOURCES, INC.

CROW BUTTE URANIUM PROJECT

RADIOLOGICAL EFFLUENT AND ENVIRONMENTAL MONITORING REPORT

for

FIRST AND SECOND QUARTERS, 2001

USNRC Source Materials License SUA 1534

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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 first and second quarters of 2001. Complete excursion monitoring results are available on site for inspection.

One shallow monitor well (SM6-18) was removed from excursion status when the UCLs were adjusted following approval of alternate UCL calculational methods in Amendment 8 to SUA-1534. SM7-23 remains on excursion status due to exceedance of the sulfate UCL. Excursion reports for these 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 with the exception of the results for Well No. 24. In the second quarter 2001, Well No. 24 had elevated radium-226 at 3.4 pCi/l. A reanalysis by the lab yielded similar results. CBR believes that the results may have been caused by sampling error. The sample was potentially filtered with a filter housing that is used for sampling wellfield wells that have elevated radium-226 level, causing cross-contamination of the sample. The sample was obtained late in the second quarter, so there was no time available for resampling. A sample taken from Well No. 24 early in the third quarter 2001 had radium-226 at <0.2 pCi/l.

Samples were obtained from all sample locations with the following exceptions:

- Well No. 24 was frozen during the first quarter 2001 and could not be sampled.
- Well BOW 96-1 had no pump during the first quarter 2001, so no sample was obtained.
- Surface water collection point E-2 (English Creek upstream), which is usually composited with E-1, was dry during the second quarter of 2001 sampling event. A sample was obtained from E-1 and was analyzed.
- Surface Water collection point E-4 (English Creek downstream sample point) was frozen during the first quarter of 2001, so no sample was obtained.

2 OPERATIONAL

2.1 Production Data Summary

Mining operations continued through the first and second quarters of 2001. The average operating production flow rate was 4460 gpm for the first quarter and 4344 gpm for the second quarter. The annual average production flow for the first half of 2001 was 4402 gpm. 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 1,672,215 gallons during the first quarter and 1,041,325 gallons during the second 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 continuous basis and 11,367,829 gallons of wastewater was injected into the well during the first half of 2001. 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 7.04×10^{-4} Curies/m^3 radon release from leaching operations and are the basis for the radon release calculations for the first half of 2001.

During the first quarter production occurred at an average flow rate of 4460 gpm (16,881 lpm). During the second quarter production occurred at an average flow rate of 4344 gpm (16,442 lpm). Production was maintained continuously for 90 days for the first quarter. This represents a first quarter operating factor of 100%. Production was maintained continuously for 91 days for the second quarter with the exception of a total of 12 hours of downtime. This represents a second

quarter operating factor of 99.4%. The production flow for the first quarter would result in a calculated radon release of 1,109 Curies. The production flow for the second quarter would result in a calculated radon release of 1,086 Curies. Calculations for radon release from production operations are shown in Appendix E.

Additional wells were brought on line during the first half of 2001. Calculations for the start-up of 15.6 acres of a new wellfield are shown in Appendix E. The calculated radon released from start-up of 15.6 acres is 20 Curies.

The total radon emission due to leaching operations from the Crow Butte plant for the first half of 2001 was 2,215 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 μCi/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 μCi/l after adjusting for wellfield loss and ion exchange loss.

During the first half of 2001, a total of 115,588,233 gallons (437,501,462 l) of restoration water was produced from Mine Units 2 and 3. Based upon an estimated radon concentration of 0.697 μCi/l, the total amount of radon in the restoration solution was calculated to be 305 Curies as shown in Appendix E. The estimated release of radon through wellfield loss at 25% of this total was 76 Curies. The plant loss for ion exchange treatment of the restoration water is estimated at 10% of the remaining radon, or 23 Curies.

Of the total amount of restoration water produced in the first half of 2001, 15,736,723 gallons (59,563,497 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 μCi/l. The total estimated radon release from reverse osmosis treatment was 28 Curies. An additional 1.9 acres of wellfields were placed in restoration during the first half of 2001. The calculated radon released from start-up of 1.9 acres is 2 Curies. Calculations for the start-up of 1.9 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 first half of 2001 from restoration activities was 129 Curies. This resulted in a total estimated radon release from the Crow Butte project during the first half of 2001 of 2,344 Curies.

2.4 Restoration

Restoration activities continued in Mine Unit #2 and Mine Unit #3 during the first half of 2001. 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 completed their review of the Mine Unit 1 restoration Report and amended SUA-1534 on June 26, 2001 to adjust the restoration parameter list (License Condition 10.3B) and to recognize NDEQ Permit standards as the secondary restoration standards (License Condition 10.3C). NRC has requested additional information concerning Mine Unit 1 restoration before final approval.

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 in October. The results of the sediment sampling will be provided in the second Semiannual Report for 2001.

Appendix A

Private Well and Surface Water Radiological Monitoring Results

First and Second Quarter, 2001

Sample ID:	**Sample #1E - Drinking Water**	**Sample #2E - Well #19**	**Sample #3E - Well #27**
Laboratory ID:	**01-30562-1**	**01-30562-2**	**01-30562-3**
Sample Matrix:	**Liquid, water**	**Liquid, water**	**Liquid, water**
Sample DateTime:	**01/18/2001 NST**	**01/18/2001 NST**	**01/18/2001 NST**
Date Received:	**01/26/2001**	**01/26/2001**	**01/26/2001**
Report Date:	**February 22, 2001**	**February 22, 2001**	**February 22, 2001**

Radiometric	**Results**	**Results**	**Results**
Uranium	0.011	0.0071	0.0095
Uranium	7.18E-09	4.81E-09	6.43E-09
Radium-226	<0.2	0.4	<0.2
Radium Precision ±	-	0.2	-

Sample #4E - Well #8	Sample #5E - Well #12	Sample #6E - Stream S-1	Sample #7E - Stream S-2
01-30562-4	01-30562-5	01-30562-6	01-30562-7
Liquid, water	Liquid, water	Liquid, water	Liquid, water
01/18/2001 NST	01/18/2001 NST	01/18/2001 NST	01/18/2001 NST
01/26/2001	01/26/2001	01/26/2001	01/26/2001
February 22, 2001	February 22, 2001	February 22, 2001	February 22, 2001

Results	Results	Results	Results
0.019	0.0042	0.0055	0.0054
1.31E-08	2.84E-09	3.72E-09	3.66E-09
0.4	<0.2	<0.2	<0.2
0.2	-	-	-

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Sample #8E - Stream S-5	Sample #9E - Well #28	Sample #10E - Stream E1	Sample #11E - Well #57
01-30562-8	01-30562-9	01-30562-10	01-30562-11
Liquid, water	Liquid, water	Liquid, water	Liquid, water
01/18/2001 NST	01/18/2001 NST	01/18/2001 NST	01/19/2001 NST
01/26/2001	01/26/2001	01/26/2001	01/26/2001
February 22, 2001	February 22, 2001	February 22, 2001	February 22, 2001

Results	Results	Results	Results
0.0064	0.0082	0.015	0.011
4.33E-09	5.55E-09	1.03E-08	7.58E-09
<0.2	<0.2	<0.2	0.3
-	-	-	0.2

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Sample #12E - Well #26	Sample #13E - Well #11	Sample #14E - Well #41	Sample #15E - Well #16
01-30562-12	01-30562-13	01-30562-14	01-30562-15
Liquid, water	Liquid, water	Liquid, water	Liquid, water
01/19/2001 NST	01/19/2001 NST	01/19/2001 NST	01/19/2001 NST
01/26/2001	01/26/2001	01/26/2001	01/26/2001
February 22, 2001	February 22, 2001	February 22, 2001	February 22, 2001

Results	Results	Results	Results
0.0084	0.010	0.010	0.0079
5.69E-09	6.97E-09	6.77E-09	5.35E-09
<0.2	<0.2	<0.2	<0.2
-	-	-	-

Sample #16E - Well #130	Sample #17E - Well #25	Sample #18E - Well #63	Sample #19E - Well #125
01-30562-16	01-30562-17	01-30562-18	01-30562-19
Liquid, water	Liquid, water	Liquid, water	Liquid, water
01/19/2001 NST	01/19/2001 NST	01/19/2001 NST	01/19/2001 NST
01/26/2001	01/26/2001	01/26/2001	01/26/2001
February 22, 2001	February 22, 2001	February 22, 2001	February 22, 2001

Results	Results	Results	Results
0.0090	0.0067	0.016	0.0074
6.09E-09	4.54E-09	1.07E-08	5.01E-09
0.3	<0.2	0.6	<0.2
0.2	-	0.3	-

Sample #20E - Well #129	Sample E#21 - Well #17
01-30562-20	01-30562-21
Liquid, water	Liquid, water
01/19/2001 NST	01/31/2001 NST
01/26/2001	02/01/2001
February 22, 2001	February 22, 2001

Results	Results	Units	Reporting Limit
0.010	0.0053	mg/L	0.0003
6.77E-09	3.59E-09	µCi/mL	2.03E-10
<0.2	<0.2	pCi/L	0.2
-			

Sample ID:	**Sample #E1 Bow 96-1**	**Sample #E2 Stream E1**	**Sample #E3 Stream S5**
Laboratory ID:	**01-32571-1**	**01-32571-2**	**01-32571-3**
Sample Matrix:	**Liquid, water**	**Liquid, water**	**Liquid, water**
Sample Date/Time:	**04/26/2001 NST**	**04/26/2001 NST**	**04/26/2001 NST**
Date Received:	**05/03/2001**	**05/03/2001**	**05/03/2001**
Report Date:	**May 25, 2001**	**May 25, 2001**	**May 25, 2001**

Radiometric	**Results**	**Results**	**Results**
Uranium	0.013	0.041	0.0055
Uranium	8.87E-09	2.80E-08	3.72E-09
Radium-226	<0.2	<0.2	<0.2
Radium Precision ±	N/A	N/A	N/A

Sample #E4 Stream S2	Sample #E5 Stream S1	Sample #E6 Well #8	Sample #E7 Well #28
01-32571-4	01-32571-5	01-32571-6	01-32571-7
Liquid, water	Liquid, water	Liquid, water	Liquid, water
04/26/2001 NST	04/26/2001 NST	04/27/2001 NST	04/27/2001 NST
05/03/2001	05/03/2001	05/03/2001	05/03/2001
May 25, 2001	May 25, 2001	May 25, 2001	May 25, 2001

Results	Results	Results	Results
0.0049	0.0052	0.017	0.0068
3.32E-09	3.52E-09	1.14E-08	4.60E-09
<0.2	<0.2	<0.2	<0.2
N/A	N/A	N/A	N/A

Sample #E8 Well #12	Sample #E9 Well #19	Sample #E10 Well #27	Sample #E11 Well #129
01-32571-8	01-32571-9	01-32571-10	01-32571-11
Liquid, water	Liquid, water	Liquid, water	Liquid, water
04/27/2001 NST	04/27/2001 NST	04/27/2001 NST	04/27/2001 NST
05/03/2001	05/03/2001	05/03/2001	05/03/2001
May 25, 2001	May 25, 2001	May 25, 2001	May 25, 2001

Results	Results	Results	Results
0.0033	0.0062	0.0082	0.0076
2.23E-09	4.20E-09	5.55E-09	5.15E-09
<0.2	<0.2	<0.2	<0.2
N/A	N/A	N/A	N/A

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Sample #E12 Well #Stream E4	Sample #E13 Well #63	Sample #E14 Well #41	Sample #E15 Well #57
01-32571-12	01-32571-13	01-32571-14	01-32571-15
Liquid, water	Liquid, water	Liquid, water	Liquid, water
04/27/2001 NST	04/27/2001 NST	04/27/2001 NST	04/27/2001 NST
05/03/2001	05/03/2001	05/03/2001	05/03/2001
May 25, 2001	May 25, 2001	May 25, 2001	May 25, 2001

Results	Results	Results	Results
0.036	0.019	0.0097	0.0098
2.44E-08	1.25E-08	6.57E-09	6.63E-09
<0.2	<0.2	<0.2	0.4
N/A	N/A	N/A	0.2

Sample #E16 Well #26	Sample #E17 Well #17	Sample #E18 Well #25	Sample #E19 Well #11
01-32571-16	01-32571-17	01-32571-18	01-32571-19
Liquid, water	Liquid, water	Liquid, water	Liquid, water
04/27/2001 NST	04/27/2001 NST	04/27/2001 NST	04/27/2001 NST
05/03/2001	05/03/2001	05/03/2001	05/03/2001
May 25, 2001	May 25, 2001	May 25, 2001	May 25, 2001

Results	Results	Results	Results
0.0071	0.0042	0.0056	0.0087
4.81E-09	2.84E-09	3.79E-09	5.89E-09
<0.2	<0.2	<0.2	<0.2
N/A	N/A	N/A	N/A

Sample #E20 Well #16	Sample #E21 Well #130	Sample #E22 Well #125	Sample #E23 Drinking Water
01-32571-20	01-32571-21	01-32571-22	01-32571-23
Liquid, water	Liquid, water	Liquid, water	Liquid, water
04/27/2001 NST	04/27/2001 NST	04/27/2001 NST	04/27/2001 NST
05/03/2001	05/03/2001	05/03/2001	05/03/2001
May 25, 2001	May 25, 2001	May 25, 2001	May 25, 2001

Results	Results	Results	Results
0.0071	0.0072	0.0065	0.0076
4.81E-09	4.87E-09	4.40E-09	5.15E-09
<0.2	<0.2	<0.2	<0.2
N/A	N/A	N/A	N/A

Sample #E24 Well #24
01-32571-24
Liquid, water
05/03/2001 NST
05/03/2001
May 25, 2001

Results	Units	Reporting Limit
0.0051	mg/L	0.0003
3.45E-09	µCi/mL	2.03E-10

3.4	pCi/L	0.2
0.3		

Appendix B

Plant Production and Waste Totals

First and Second Quarter, 2001

WASTE VOLUME
First Quarter 2001

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	TRUCKS TO POND
January	611260	857531	1375212	226278	
February	529580	837006	1226016	220132	
March	479900	814154	1290029	258154	
TOTAL GAL. EOQ	1620740	2508691	3891257	704564	51475

TOTAL 1st QTR VOLUME DISCHARGED TO WASTE PONDS =	1672215 GALLONS
TOTAL 1st QTR VOLUME DISCHARGED TO DEEP WELL=	6399948 GALLONS
TOTAL 1st QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	8072163 GALLONS
TOTAL 1st QTR VOLUME WF BLEED FROM WELLFIELDS=	7367599 GALLONS

WELLFIELD BLEED
First Quarter 2001

MONTH	January	February	March
BLEED	1.0%	0.9%	0.9%

PLANT FLOW
First Quarter 2001

AVERAGE OPERATING FLOW RATE=	4460 GPM EOQ
TOTAL GALLONS PRODUCED=	577984299 GALLONS EOQ
TOTAL GALLONS INJECTED=	560099433 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	0	0	0	0				0
January	199890557	193621090	744	744	4478	4337	472	0
February	180180996	174023312	672	672	4469	4316	451	0
March	197912746	192455031	744	744	4434	4311	432	0
EOQ TOTAL	577984299	560099433	2160	2160	4460	4322	452	0
YTD TOTAL	577984299	560099433	2160	2160	4460	4322	452	0

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	PLANT BLEED	MUIII BLEED TO DDW
Prev. YTD	0	0	0	0	0	0
January	4908268	17198143	977973	4031943	1984160	397239
February	4249993	14728817	872247	3347785	1657350	353769
March	3948192	16422064	1012558	3330252	1771060	277471
EOQ TOTAL	13106453	48349024	2862778	10709980	5412570	1028479
YTD TOTAL	13106453	48349024	2862778	10709980	5412570	1028479

WASTE VOLUME
Second Quarter 2001

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	TRUCKS TO POND
April	327640	739633	1205723	272096	
May	229880	650806	932086	283365	
June	367880	638178	801455	337745	
TOTAL GAL. EOQ	925400	2028617	2939264	893206	115925

TOTAL 2nd QTR VOLUME DISCHARGED TO WASTE PONDS =	1041325	GALLONS
TOTAL 2nd QTR VOLUME DISCHARGED TO DEEP WELL=	4967881	GALLONS
TOTAL 2nd QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	6009206	GALLONS
TOTAL 2nd QTR VOLUME WF BLEED FROM WELLFIELDS=	5116000	GALLONS

WELLFIELD BLEED
Second Quarter 2001

MONTH	April	May	June
BLEED	0.8%	0.6%	0.7%

PLANT FLOW
Second Quarter 2000

AVERAGE OPERATING FLOW RATE=	4344	GPM EOQ
TOTAL GALLONS PRODUCED=	569290567	GALLONS EOQ
TOTAL GALLONS INJECTED=	549057334	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	577984299	560099433	2160	2160	4460	4322	452	0
April	188783920	182337473	720	719	4370	4221	404	1
May	194348994	187406612	744	720	4354	4198	410	6
June	186157653	179313249	720	744	4309	4151	370	5
EOQ TOTAL	569290567	549057334	2184	2183	4344	4190	395	12
YTD TOTAL	1147274866	1109156767	4344	4343	4402	4256	423	12

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	PLANT BLEED	MUIII BLEED TO DDW
Prev. YTD	13106453	48349024	2862778	10709980	5412570	1028479
April	3545257	14830980	808484	3079778	1557156	397239
May	3781362	15246618	578317	3092522	1180510	353769
June	3615489	13113050	755221	3274902	1275023	46234
EOQ TOTAL	10942108	43190648	2142022	9447202	4012689	797242
YTD TOTAL	24048561	91539672	5004800	20157182	9425259	1825721

Appendix C

Wellfield Injection Pressures

First and Second Quarter, 2001

WELLFIELD INJECTION PRESSURE First Quarter 2001										
	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
January	0	0	0	0	45	58	50	63	37	51
February	0	0	0	0	35	54	40	72	28	45
March	0	0	0	0	42	60	47	65	34	53
AVERAGE	0	0	0	0	40	60	45	72	33	53
	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
January	22	24	0	0	15	18	80	86	67	70
February	19	23	0	0	12	15	72	85	60	71
March	20	22	0	2	11	15	35	85	67	72
AVERAGE	20	24	0	2	13	18	62	86	65	72
	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
January	66	70	0	0	77	80	62	92	82	87
February	59	71	0	0	69	80	80	97	75	90
March	66	72	0	0	77	81	89	94	83	90
AVERAGE	64	72	0	0	74	81	76	97	80	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
January	95	99	73	78	90	95	93	98	82	88
February	84	98	68	80	81	97	85	99	74	88
March	94	98	75	80	91	95	95	99	84	92
AVERAGE	91	99	72	80	88	97	91	99	80	92
	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
January	94	98	93	96	89	90	93	95	94	96
February	85	99	83	97	80	92	85	97	85	97
March	95	99	93	96	89	92	95	98	95	96
AVERAGE	91	99	90	97	86	92	91	98	92	97
	WF HOUSE #26		WF HOUSE #28		WF HOUSE #30		WF HOUSE #31			
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM		
January	91	99	62	66	60	65	0	0		
February	83	95	55	66	54	64	0	0		
March	94	95	62	65	59	65	0	0		
AVERAGE	90	99	60	66	57	65	0	0		

WELLFIELD INJECTION PRESSURE Second Quarter 2001										
	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
April	0	0	0	0	42	54	49	60	34	48
May	0	0	0	0	41	66	48	72	36	51
June	0	0	0	0	38	76	43	82	31	70
AVERAGE	0	0	0	0	40	76	47	82	34	70
	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
April	21	28	0	0	11	15	2	73	68	76
May	21	26	0	0	13	15	3	77	57	70
June	21	28	0	0	13	21	5	70	52	70
AVERAGE	21	28	0	0	13	21	3	77	59	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
April	66	70	0	0	77	80	91	96	85	90
May	56	70	0	0	63	85	90	94	80	90
June	53	70	0	0	74	81	87	97	0	0
AVERAGE	58	70	0	0	71	85	89	97	55	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
April	94	98	77	80	93	97	96	99	84	95
May	94	98	75	80	91	95	95	99	84	90
June	14	99	74	82	89	98	90	99	81	90
AVERAGE	67	99	75	82	91	98	94	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
April	95	99	91	95	89	94	91	98	95	96
May	96	99	92	95	67	90	93	95	95	97
June	91	99	91	98	0	0	91	96	92	97
AVERAGE	94	99	91	98	52	94	92	98	94	97
	WF HOUSE #26		WF HOUSE #28		WF HOUSE #30		WF HOUSE #31			
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM		
April	94	95	62	67	59	64	9.4	29		
May	91	95	60	65	56	61	23	30		
June	91	98	57	68	55	64	45	85		
AVERAGE	92	98	60	68	57	64	26	85		

Appendix D

Deep Disposal Well Injection Radiological Data

First and Second Quarter, 2001

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)
January-01	2,232,743	5	4.23E+07	2.86E+04	1,800	1.52E+04
February-01	2,063,022	10	7.81E+07	5.29E+04	1,713	1.34E+04
March-01	2,104,183	8	6.37E+07	4.31E+04	1,560	1.24E+04
April-01	1,945,356	8	5.89E+07	3.99E+04	1,380	1.02E+04
May-01	1,582,892	7	4.19E+07	2.84E+04	1,610	9.65E+03
June-01	1,439,633	6	3.27E+07	2.21E+04	1,630	8.88E+03
Totals	11,367,829		3.18E+08	2.15E+05		6.97E+04

Appendix E

Radon Release Calculations

First and Second Quarter, 2001

Radon Effluent Release Calculation (Production and Startup)

First Quarter 2001 Radon Release from Leaching Operations:

$$\left[\left(\frac{7.04E^{-4}\ \text{Curies}}{\text{meter}^3}\right)\times\left(\frac{16{,}881\ \text{liters}}{\text{min}}\right)\times(0.72)\times(90\ \text{days})\times(1.00)\times\left(\frac{\text{meter}^3}{1000\ \text{liters}}\right)\times\left(\frac{24\ \text{hours}}{\text{day}}\right)\times\left(\frac{60\ \text{min}}{\text{hour}}\right)\right]=1{,}109\ \text{Curies}$$

Second Quarter 2001 Radon Release from Leaching Operations:

$$\left[\left(\frac{7.04E^{-4}\ \text{Curies}}{\text{meter}^3}\right)\times\left(\frac{16{,}442\ \text{liters}}{\text{min}}\right)\times(0.72)\times(91\ \text{days})\times(0.994)\times\left(\frac{\text{meter}^3}{1000\ \text{liters}}\right)\times\left(\frac{24\ \text{hours}}{\text{day}}\right)\times\left(\frac{60\ \text{min}}{\text{hour}}\right)\right]=1{,}086\ \text{Curies}$$

Radon Release from Wellfield Startup:

$$\left[\left(\frac{7.04E^{-4}\text{Curies}}{\text{meter}^3}\right)\times(15.6\ \text{acres})\times\left(\frac{4074\ \text{meter}^2}{\text{acre}}\right)\times(1.52\ \text{meters})\times(0.29)\right]=\ 20\ \text{Curies}$$

Total Estimated Radon Emissions from Leaching: 2,215 Curies

Radon Effluent Release Calculation (Restoration)

First Half 2001 Radon Release from Restoration:

$$(437{,}501{,}462 \text{ liters}) \times \left(\frac{0.697\ \mu\text{Ci}}{\text{liter}}\right) = 305 \text{ Curies (production potential)}$$

$$305 \text{ Curies} \times 0.25 = 76 \text{ Curies (25\% Wellfield Loss)}$$

$$(305 \text{ Curies} - 76 \text{ Curies}) \times 0.10 = 23 \text{ Curies (10\% Ion Exchange Loss)}$$

$$(59{,}563{,}497 \text{ liters}) \times \left(\frac{0.470\ \mu\text{Ci}}{\text{liter}}\right) = 28 \text{ Curies (100\% Reverse Osmosis Loss)}$$

Startup of additional restoration patterns:

$$\left[\left(\frac{7.04\text{E}^{-4}\text{Curies}}{\text{meter}^3}\right) \times (1.9 \text{ acres}) \times \left(\frac{4074 \text{ meter}^2}{\text{acre}}\right) \times (1.52 \text{ meters}) \times (0.29)\right] = 2 \text{ Curies}$$

Total Estimated Radon Emissions from Restoration: 129 Curies

Total Estimated Radon Emissions from Crow Butte Operations, 2nd Half 2001: 2,344 Curies

Appendix F

Environmental Air Monitoring Results

First and Second Quarter, 2001

Crow Butte Resources, Inc.
Crow Butte Uranium Project

Track Etch Cup Ambient Radon Concentrations

Air Monitoring Station No.

Period: January 2, 2001 to July 2, 2001

	Gross Count	Average Radon Concentration (x 10^{-9} uCi/ml)	Accuracy (x 10^{-9} uCi/ml)	Percent Effluent Concentration
AM-1	39	0.4	0.06	4.0%
AM-2	75	0.9	0.10	9.0%
AM-3	32	0.3	0.05	3.0%
AM-4	42	0.5	0.08	5.0%
AM-5	57	0.4	0.05	4.0%
AM-6	56	0.4	0.05	4.0%
AM-8	50	0.6	0.08	6.0%
AB-3 (AM-3 Duplicate)	40	0.5	0.08	5.0%
AB-6 (AM-6 Duplicate)	63	0.5	0.06	5.0%
LLD (x 10^{-9} uCi/ml)				0.2
Effluent Concentration Limit, 10 CFR 20 App B Column 2:				10

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HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: August 9, 2001

SAMPLE ID: A.M.-1

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-1	^{nat}U	2.47E-16	N/A	1.00E-16	9.00E-14	2.74E-01
01/02/2001-04/02/2001	^{226}Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
Air Volume in mLs	^{210}Pb	1.40E-14	1.28E-15	2.00E-15	6.00E-13	2.34E+00
4.16E+09						
01-34267-1	^{nat}U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
04/02/2001-07/02/2001	^{226}Ra	1.03E-16	4.11E-17	1.00E-16	9.00E-13	1.14E-02
Air Volume in mLs	^{210}Pb	1.24E-14	1.15E-15	2.00E-15	6.00E-13	2.07E+00
4.62E+09						

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: August 9, 2001

SAMPLE ID: A.M.-2

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-2	^{nat}U	2.93E-16	N/A	1.00E-16	9.00E-14	3.26E-01
01/02/2001-04/02/2001	^{226}Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
Air Volume in mLs	^{210}Pb	1.59E-14	1.30E-15	2.00E-15	6.00E-13	2.66E+00
4.18E+09						
01-34267-2	^{nat}U	1.51E-16	N/A	1.00E-16	9.00E-14	1.67E-01
04/02/2001-07/02/2001	^{226}Ra	4.48E-16	8.14E-17	1.00E-16	9.00E-13	4.97E-02
Air Volume in mLs	^{210}Pb	1.45E-14	1.16E-15	2.00E-15	6.00E-13	2.41E+00
4.67E+09						

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: August 9, 2001

SAMPLE ID: A.M.-3

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-3	^{nat}U	2.01E-16	N/A	1.00E-16	9.00E-14	2.24E-01
01/02/2001-04/02/2001	^{226}Ra	2.06E-16	9.16E-17	1.00E-16	9.00E-13	2.29E-02
Air Volume in mLs	^{210}Pb	1.38E-14	1.26E-15	2.00E-15	6.00E-13	2.31E+00
4.15E+09						
01-34267-3	^{nat}U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
04/02/2001-07/02/2001	^{226}Ra	1.44E-16	6.16E-17	1.00E-16	9.00E-13	1.60E-02
Air Volume in mLs	^{210}Pb	1.09E-14	1.13E-15	2.00E-15	6.00E-13	1.82E+00
4.63E+09						

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: August 9, 2001

SAMPLE ID: A.M.-4

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-4	^{nat}U	2.74E-16	N/A	1.00E-16	9.00E-14	3.04E-01
01/02/2001-04/02/2001	^{226}Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
Air Volume in mLs	^{210}Pb	1.25E-14	1.24E-15	2.00E-15	6.00E-13	2.09E+00
4.23E+09						
01-34267-4	^{nat}U	1.25E-16	N/A	1.00E-16	9.00E-14	1.38E-01
04/02/2001-07/02/2001	^{226}Ra	1.23E-16	6.13E-17	1.00E-16	9.00E-13	1.36E-02
Air Volume in mLs	^{210}Pb	1.23E-14	1.14E-15	2.00E-15	6.00E-13	2.06E+00
4.65E+09						

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: August 9, 2001

SAMPLE ID: A.M.-5

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-5	^{nat}U	3.28E-16	N/A	1.00E-16	9.00E-14	3.65E-01
01/02/2001-04/02/2001	^{226}Ra	2.08E-16	9.25E-17	1.00E-16	9.00E-13	2.31E-02
Air Volume in mLs	^{210}Pb	1.59E-14	1.32E-15	2.00E-15	6.00E-13	2.65E+00
4.11E+09						
01-34267-5	^{nat}U	3.26E-16	N/A	1.00E-16	9.00E-14	3.63E-01
04/02/2001-07/02/2001	^{226}Ra	1.88E-16	6.28E-17	1.00E-16	9.00E-13	2.09E-02
Air Volume in mLs	^{210}Pb	1.28E-14	1.17E-15	2.00E-15	6.00E-13	2.13E+00
4.54E+09						

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: August 9, 2001

SAMPLE ID: A.M.-6

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-6	^{nat}U	3.65E-16	N/A	1.00E-16	9.00E-14	4.06E-01
01/02/2001-04/02/2001	^{226}Ra	2.57E-16	9.36E-17	1.00E-16	9.00E-13	2.86E-02
Air Volume in mLs	^{210}Pb	1.23E-14	1.24E-15	2.00E-15	6.00E-13	2.05E+00
4.06E+09						
01-34267-6	^{nat}U	2.41E-16	N/A	1.00E-16	9.00E-14	2.68E-01
04/02/2001-07/02/2001	^{226}Ra	1.26E-16	6.29E-17	1.00E-16	9.00E-13	1.40E-02
Air Volume in mLs	^{210}Pb	8.33E-15	1.09E-15	2.00E-15	6.00E-13	1.39E+00
4.53E+09						

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: August 9, 2001

SAMPLE ID: A.M.-8

Quarter/Date Sampled Air Volume	Radionuclide	Concentration µCi/mL	Error Estimate µCi/mL	L.L.D. µCi/mL	Effluent Conc.* µCi/mL	% Effluent Concentration
01-32012-7	^{nat}U	3.88E-16	N/A	1.00E-16	9.00E-14	4.31E-01
01/02/2001-04/02/2001	^{226}Ra	1.61E-16	6.88E-17	1.00E-16	9.00E-13	1.78E-02
Air Volume in mLs	^{210}Pb	1.16E-14	1.24E-15	2.00E-15	6.00E-13	1.94E+00
4.14E+09						
01-34267-7	^{nat}U	3.33E-16	N/A	1.00E-16	9.00E-14	3.70E-01
04/02/2001-07/02/2001	^{226}Ra	1.85E-16	6.17E-17	1.00E-16	9.00E-13	2.06E-02
Air Volume in mLs	^{210}Pb	1.10E-14	1.13E-15	2.00E-15	6.00E-13	1.84E+00
4.62E+09						

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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Appendix G

Environmental TLD Monitoring Results

First and Second Quarter, 2001

Crow Butte Resources
PO Box 169
Crawford, NE 69339

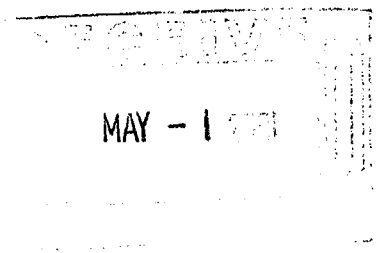
Attn: Rhonda Grantham

SPHERICAL X9 ENVIRONMENTAL REPORT
Prepared by Landauer, Inc.

Account Number: **306192**

Process Number:	X9SP GA170
Received Date:	16-Apr-01
Report Date:	18-Apr-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 Dose Equivalent (mrem)	Standard Deviation (mrem)	95% Confidence Interval (mrem)
Quarterly Monitoring Period starting:				15-Jan-01					
Control		53	52	56	54	54	54	1.5	1.8
1001	AM-1	36	31	34	32	35	34	2.1	2.6
1002	AM-2	33	35	35	35	35	35	0.9	1.1
1003	AM-6	36	37	33	35	34	35	1.6	2.0
1008	AM-8	35	36	35	36	36	36	0.5	0.7
1009	AM-3	35	36	36	37	33	35	1.5	1.9
1010	AM-4	35	35	36	37	36	36	0.8	1.0
1011	AM-5	38	39	41	38	38	39	1.3	1.6



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

Crow Butte Resources
PO Box 169
Crawford, NE 69339

Attn: Rhonda Grantham

SPHERICAL X9 ENVIRONMENTAL REPORT
Prepared by Landauer, Inc.

Account Number:	**306192**
Process Number:	X9SP GA683
Received Date:	9-Jul-01
Report Date:	19-Jul-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 Dose Equivalent (mrem)	Standard Deviation (mrem)	95% Confidence Interval (mrem)
Quarterly Monitoring Period starting:				April 1, 2001					
Control		78	77	78	77	78	78	0.5	0.7
1001	AM-1	54	58	58	50	57	55	3.4	4.3
1002	AM-2	57	58	56	56	46	55	4.9	6.0
1003	AM-6	58	50	51	59	57	55	4.2	5.2
1008	AM-8	60	57	60	58	62	59	1.9	2.4
1009	AM-3	59	59	57	56	55	57	1.8	2.2
1010	AM-4	58	56	54	53	57	56	2.1	2.6
1011	AM-5	57	61	58	60	54	58	2.7	3.4

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