

CROW BUTTE RESOURCES, INC.

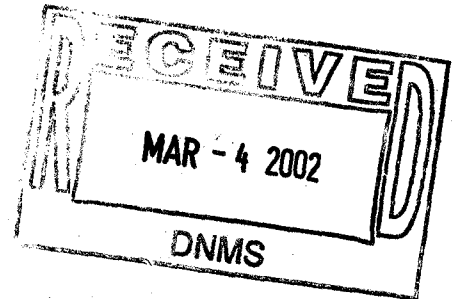
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February 28, 2002

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 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

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CROW BUTTE URANIUM PROJECT
RADIOLOGICAL EFFLUENT
AND
ENVIRONMENTAL MONITORING
REPORT

for

THIRD AND FOURTH 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 third and fourth quarters of 2001. Complete excursion monitoring results are available on site for inspection.

SM7-23 was removed from excursion status due to decreasing sulfate concentrations in November 2001. However, sulfate concentrations increased above the UCL shortly afterwards, requiring that the well be returned to excursion status. Excursion reports for SM7-23 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 exception:

- Well No. 57 was not sampled during the fourth quarter of 2001 because it was out of service and will be abandoned.

2 OPERATIONAL

2.1 Production Data Summary

Mining operations continued through the third and fourth quarters of 2001. The average operating production flow rate was 4276 gpm for the third quarter and 4302 gpm for the fourth quarter. The average production flow for the second half of 2001 was 4289 gpm, with an annual average for 2001 of 4345 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.

**Second Half 2001 Semiannual Radiological Effluent
and Environmental Monitoring Report**

2.2 Wastewater Summary

The total volume of wastewater discharged to the ponds was 1,657,560 gallons during the third quarter and 2,105,070 gallons during the fourth quarter, with an annual total for 2001 of 6,479,917 gallons. 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 11,214,922 gallons of wastewater was injected into the well during the second half of 2001. The annual total injected in the deep disposal well for 2001 was 22,582,751. 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/m³ radon release from leaching operations and are the basis for the radon release calculations for the second half of 2001.

During the third quarter production occurred at an average flow rate of 4276 gpm (16,186 lpm). During the fourth quarter production occurred at an average flow rate of 4302 gpm (16,285 lpm). Production was maintained continuously for 92 days with the exception of 19 hours during the third quarter. This represents a third quarter operating factor of 99.1%. Production was maintained continuously for 92 days for the fourth quarter with the exception of a total of 29 hours of downtime. This represents a fourth quarter operating factor of 98.7%. The production flow for the third quarter would result in a calculated radon release of 1,076 Curies. The production flow for the fourth quarter would result in a calculated radon release of 1,082 Curies. Calculations for radon release from production operations are shown in Appendix E.

Additional wells were brought on line during the second half of 2001. Calculations for the start-up of 6 acres of a new wellfield are shown in Appendix E. The calculated radon released from start-up of 6 acres is 7.6 Curies.

The total radon emission due to leaching operations from the Crow Butte plant for the second half of 2001 was 2,166 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 μ 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

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and Environmental Monitoring Report**

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 2001, a total of 110,405,988 gallons (417,932,041 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 291 Curies as shown in Appendix E. The estimated release of radon through wellfield loss at 25% of this total was 73 Curies. The plant loss for ion exchange treatment of the restoration water is estimated at 10% of the remaining radon, or 22 Curies.

Of the total amount of restoration water produced in the second half of 2001, 14,897,566 gallons (56,393,410 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 27 Curies. An additional 0.4 acres of wellfields were placed in restoration during the second half of 2001. The calculated radon released from start-up of 0.4 acres is 0.5 Curies. Calculations for the start-up of 0.4 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 2001 from restoration activities was 123 Curies. This resulted in a total estimated radon release from the Crow Butte project during the second half of 2001 of 2,289 Curies, with a total radon release for 2001 of 4,633 Curies.

2.4 Restoration

Restoration activities continued in Mine Unit #2 and Mine Unit #3 during the second 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). CBR has provided additional information requested by NRC concerning Mine Unit 1 restoration and is awaiting NRC 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. Note that the radon detector for Station AM-4 was missing from the detector cup when collected, so there is no radon monitoring data available for the period from this location. Station AM-4 is located south of the permit area.

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 are provided in Appendix H.

Appendix A

Private Well and Surface Water Radiological Monitoring Results

Third and Fourth Quarter, 2001

CROW BUTTE RESOURCES, INC.

PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS

THIRD QUARTER, 2001

SAMPLE ID	DATE SAMPLED	URANIUM mg/l	URANIUM μCi/ml	RADIUM-226 pCi/l	RADIUM-226 precision \pm
Well #8	7/12/01	0.0166	1.10E-08	0.5	0.2
Well #11	7/13/01	0.0099	6.70E-09	<0.2	-
Well #12	7/12/01	0.0029	2.00E-09	<0.2	-
Well #16	7/13/01	0.0078	5.30E-09	<0.2	-
Well #17	7/13/01	0.0045	3.00E-09	<0.2	-
Well #19	7/13/01	0.0072	4.90E-09	<0.2	-
Well #24	7/13/01	0.0049	3.30E-09	<0.2	-
Well #25	7/13/01	0.0058	3.90E-09	<0.2	-
Well #26	7/13/01	0.0075	5.10E-09	<0.2	-
Well #27	7/13/01	0.0082	5.60E-09	<0.2	-
Well #28	7/12/01	0.0068	4.60E-09	<0.2	-
Well #41	7/13/01	0.0080	5.40E-09	<0.2	-
Well #57	7/13/01	0.0106	7.20E-09	<0.2	-
Well #63	7/13/01	0.0155	1.00E-08	<0.2	-
Well #125	7/13/01	0.0061	4.10E-09	<0.2	-
Well #129	7/13/01	0.0081	5.50E-09	<0.2	-
Well #130	7/13/01	0.0106	7.20E-09	<0.2	-
Well #BOW 96-1	7/13/01	0.0130	8.80E-09	<0.2	-
Drinking Water Well	7/13/01	0.0073	4.90E-09	<0.2	-
Stream S-1	7/12/01	0.0042	2.80E-09	<0.2	-
Stream S-2	7/13/01	0.0044	3.00E-09	<0.2	-
Stream S-5	7/13/01	0.0056	3.80E-09	<0.2	-
Stream E-1	7/13/01	0.0132	8.90E-09	0.6	0.2
Stream E-4	7/13/01	0.0178	1.20E-08	<0.2	-
Reporting Limit		0.0003	2.00E-10	0.2	-

CROW BUTTE RESOURCES, INC.

PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS

FOURTH QUARTER, 2001

SAMPLE ID	DATE SAMPLED	URANIUM mg/l	URANIUM μCi/ml	RADIUM-226 pCi/l	RADIUM-226 precision \pm
Well #8	10/4/01	0.0162	1.18E-08	0.5	0.2
Well #11	10/5/01	0.0095	6.49E-09	ND	-
Well #12	10/5/01	0.0047	3.29E-09	ND	-
Well #16	10/5/01	0.0084	5.79E-09	0.3	0.2
Well #17	10/5/01	0.0047	3.29E-09	ND	-
Well #19	10/5/01	0.0082	5.60E-09	0.3	0.2
Well #24	10/5/01	0.0053	3.60E-09	ND	-
Well #25	10/5/01	0.0058	3.90E-09	ND	-
Well #26	10/5/01	0.0092	6.20E-09	ND	-
Well #27	10/5/01	0.0083	5.60E-09	ND	-
Well #28	10/4/01	0.0073	4.90E-09	ND	-
Well #41	10/5/01	0.0081	5.50E-09	ND	-
Well #57	No Sample Taken- Well to be abandoned				
Well #63	10/5/01	0.0154	1.00E-08	ND	-
Well #125	10/5/01	0.0070	4.70E-09	ND	-
Well #129	10/4/01	0.0090	6.10E-09	ND	-
Well #130	10/5/01	0.0080	5.40E-09	0.4	0.2
Well #BOW 96-1	10/5/01	0.0136	9.20E-09	0.3	0.2
Drinking Water Well	10/5/01	0.0079	5.30E-09	ND	-
Stream S-1	10/4/01	0.0042	2.80E-09	ND	-
Stream S-2	10/4/01	0.0044	3.00E-09	ND	-
Stream S-5	10/4/01	0.0054	3.60E-09	ND	-
Stream E-1	10/4/01	0.0185	1.30E-08	0.4	0.3
Stream E-4	10/4/01	0.0234	1.60E-08	0.5	0.3
Reporting Limit		0.0003	2.00E-10	0.2	-

ND-Not detected at the reporting limit

Appendix B

Plant Production and Waste Totals

Third and Fourth Quarter, 2001

WASTE VOLUME
Third Quarter 2001

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	TRUCKS TO POND
July	398740	951703	970157	334410	
August	548650	899777	890019	282725	
September	258670	690505	1025065	232753	
TOTAL GAL. EOQ	1206060	2541985	2885241	849888	451500

TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS =	1657560 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO DEEP WELL=	5427226 GALLONS
TOTAL 3rd QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	7084786 GALLONS
TOTAL 3rd QTR VOLUME WF BLEED FROM WELLFIELDS=	6234898 GALLONS

WELLFIELD BLEED

Third Quarter 2001

MONTH	October	November	December
BLEED	1.1%	1.0%	0.8%

PLANT FLOW

Third Quarter 2001

AVERAGE OPERATING FLOW RATE=	4276 GPM EOQ
TOTAL GALLONS PRODUCED=	566466920 GALLONS EOQ
TOTAL GALLONS INJECTED=	545262247 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	1147274866	1109156767	4344	4343				12
July	188948524	182426213	744	725	4233	4087	395	19
August	190887122	184493240	744	744	4276	4133	366	0
September	186631274	178342794	720	720	4320	4128	391	0
EOQ TOTAL	566466920	545262247	2208	2189	4276	4116	384	19
YTD TOTAL	1713741786	1654419014	6552	6532	4359	4208	410	31

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	PLANT BLEED	MUIII BLEED TO DDW
Prev. YTD	24048561	177885761	9990316	20157182	9425259	5021750
July	4359996	14211160	572918	3903920	1792857	397239
August	3510786	14395465	536250	3175523	1790935	353769
September	4144844	14016845	862632	3697004	1488533	162433
EOQ TOTAL	12015626	42623470	1971800	10776447	5072325	913441
YTD TOTAL	36064187	220509231	11962116	30933629	14497584	5935191

WASTE VOLUME
Fourth Quarter 2001

TOTALIZER	PLANT TO PONDS	PLANT TO DDW	RESTORATION TO DDW	CLEAN WATER INTO PLANT	TRUCKS TO POND
October	274960	736748	1076115	282633	
November	497470	755441	1044040	352427	
December	1143240	1124352	1051000	549533	
TOTAL GAL. EOQ	1915670	2616541	3171155	1184593	189400

TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS =	2105070 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO DEEP WELL=	5787696 GALLONS
TOTAL 4th QTR VOLUME DISCHARGED TO WASTE PONDS + DPWELL =	7892766 GALLONS
TOTAL 4th QTR VOLUME WF BLEED FROM WELLFIELDS=	6708173 GALLONS

WELLFIELD BLEED
Fourth Quarter 2001

MONTH	October	November	December
BLEED	0.8%	0.9%	1.3%

PLANT FLOW
Fourth Quarter 2001

AVERAGE OPERATING FLOW RATE=	4302 GPM EOQ
TOTAL GALLONS PRODUCED=	569958100 GALLONS EOQ
TOTAL GALLONS INJECTED=	545636561 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	1713741786	1654419014	6552	6532				31
October	192610369	184225809	744	746	4315	4127	397	2
November	185946102	178986502	720	706	4304	4143	405	14
December	191401629	182424250	744	731	4288	4087	409	13
EOQ TOTAL	569958100	545636561	2208	2183	4302	4119	404	29
YTD TOTAL	2283699886	2200055575	8760	8715	4345	4186	408	60

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	PLANT BLEED	MUIII BLEED TO DDW
Prev. YTD	36064187	22059231	11962116	30933629	14520938	5935191
October	4039643	14356766	678876	3598998	1497825	397239
November	3931353	14396960	690271	3504354	1631177	353769
December	3978032	15064138	885086	3557391	2469434	165914
EOQ TOTAL	11949028	43817864	2254233	10660743	5598436	916922
YTD TOTAL	48013215	65877095	14216349	41594372	20119374	6852113

Appendix C

Wellfield Injection Pressures

Third and Fourth Quarter, 2001

WELLFIELD INJECTION PRESSURE

Third 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
July	0	0	0	4	28	49	35	49	22	40
August	0	5	0	5	24	37	31	44	20	31
September	0	0	0	5	29	40	35	42	21	31
AVERAGE	0	0	0	5	26	49	34	49	21	40
	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	23	26	0	0	16	20	18	70	58	76
August	22	25	0	12	13	15	21	82	62	72
September	20	26	0	0	11	15	12	82	56	78
AVERAGE	22	26	0	12	13	20	17	82	58	78
	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	54	74	0	1	77	94	91	96	0	0
August	62	69	3	89	78	82	91	95	0	0
September	53	74	0	5	60	80	89	96	0	0
AVERAGE	56	74	1	89	72	94	90	96	0	0
	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	0	15	76	86	92	96	92	96	84	90
August	0	1	76	80	93	96	94	96	84	90
September	3	98	76	84	90	98	90	96	83	95
AVERAGE	1	98	76	86	92	98	92	96	84	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	94	99	93	95	0	0	94	95	94	96
August	94	96	91	95	0	0	94	97	95	98
September	92	99	90	98	1	15	91	98	92	95
AVERAGE	93	99	91	98	0	15	93	98	94	98
	WF HOUSE #26		WF HOUSE #28		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
July	93	96	60	65	58	62	67	80	0	0
August	95	98	62	67	60	65	76	83	0	0
September	91	98	59	67	57	66	68	83	19	41
AVERAGE	93	98	60	67	58	66	70	83	19	41

WELLFIELD INJECTION PRESSURE

Fourth 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
October	0	0	0	0	32	48	39	54	26	45
November	0	0	0	0	28	40	34	50	21	36
December	0	0	0	0	31	40	38	45	24	35
AVERAGE	0	0	0	0	31	48	37	54	24	45
	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	21	24	0	0	10	13	12	78	66	71
November	21	23	0	0	13	18	0	0	63	70
December	21	22	0	0	10	14	0	0	63	78
AVERAGE	21	24	0	0	11	18	4	78	64	78
	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	56	70	0	0	0	0	92	96	0	0
November	61	70	0	0	0	0	87	98	0	0
December	60	67	0	0	0	0	93	97	0	0
AVERAGE	59	70	0	0	0	0	91	98	0	0
	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	3	97	77	80	94	99	95	99	86	95
November	0	0	76	83	88	98	89	99	84	96
December	0	0	78	82	95	99	97	99	87	90
AVERAGE	1	97	77	83	92	99	94	99	86	96
	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	91	99	96	98	4	84	96	99	95	95
November	91	98	93	99	0	0	92	98	92	98
December	95	96	96	96	0	0	95	98	95	96
AVERAGE	91	99	95	99	1	84	94	99	94	98
	WF HOUSE #26		WF HOUSE #28		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
October	95	97	61	66	59	63	73	78	38	65
November	91.9	96	58	63	55	60	70	78	50	91
December	94	98	61	76	57	64	70	78	83	92
AVERAGE	94	98	60	76	57	64	71	92	57	92

Appendix D

Deep Disposal Well Injection Radiological Data

Third and Fourth 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)
July-01	1,921,860	8	5.82E+07	3.94E+04	1,310	9.53E+03
August-01	1,789,796	14	9.48E+07	6.42E+04	1,600	1.08E+04
September-01	1,715,570	17	1.10E+08	7.47E+04	1,490	9.68E+03
October-01	1,802,863	9	6.14E+07	4.16E+04	1,360	9.28E+03
November-01	1,809,481	10	6.85E+07	4.64E+04	1,500	1.03E+04
December-01	2,175,352	12	9.88E+07	6.69E+04	931	7.67E+03
Totals	11,214,922		4.92E+08	3.33E+05		5.73E+04

Appendix E

Radon Release Calculations

Third and Fourth Quarter, 2001

Radon Effluent Release Calculation (Production and Startup)

Third Quarter 2001 Radon Release from Leaching Operations:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times \left(\frac{16,186 \text{ liters}}{\text{min}} \right) \times (0.72) \times (92 \text{ days}) \times (0.99) \times \left(\frac{\text{meter}^3}{1000 \text{ liters}} \right) \times \left(\frac{24 \text{ hours}}{\text{day}} \right) \times \left(\frac{60 \text{ min}}{\text{hour}} \right) \right] = 1,076 \text{ Curies}$$

Fourth Quarter 2001 Radon Release from Leaching Operations:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times \left(\frac{16,285 \text{ liters}}{\text{min}} \right) \times (0.72) \times (92 \text{ days}) \times (0.99) \times \left(\frac{\text{meter}^3}{1000 \text{ liters}} \right) \times \left(\frac{24 \text{ hours}}{\text{day}} \right) \times \left(\frac{60 \text{ min}}{\text{hour}} \right) \right] = 1,082 \text{ Curies}$$

Radon Release from Wellfield Startup:

$$\left[\left(\frac{7.04\text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times (6 \text{ acres}) \times \left(\frac{4074 \text{ meter}^2}{\text{acre}} \right) \times (1.52 \text{ meters}) \times (0.29) \right] = 7.6 \text{ Curies}$$

Total Estimated Radon Emissions from Leaching: 2,166 Curies

Radon Effluent Release Calculation (Restoration)

Second Half 2001 Radon Release from Restoration:

$$(417,932,041 \text{ liters}) \times \left(\frac{0.697 \text{ } \mu\text{Ci}}{\text{liter}} \right) = 291 \text{ Curies (production potential)}$$

$$291 \text{ Curies} \times 0.25 = 73 \text{ Curies (25\% Wellfield Loss)}$$

$$(291 \text{ Curies} - 73 \text{ Curies}) \times 0.10 = 22 \text{ Curies (10\% Ion Exchange Loss)}$$

$$(56,393,410 \text{ liters}) \times \left(\frac{0.470 \text{ } \mu\text{Ci}}{\text{liter}} \right) = 27 \text{ Curies (100\% Reverse Osmosis Loss)}$$

Startup of additional restoration patterns:

$$\left[\left(\frac{7.04 \text{E}^{-4} \text{ Curies}}{\text{meter}^3} \right) \times (0.4 \text{ acres}) \times \left(\frac{4074 \text{ meter}^2}{\text{acre}} \right) \times (1.52 \text{ meters}) \times (0.29) \right] = 0.5 \text{ Curies}$$

Total Estimated Radon Emissions from Restoration: 123 Curies

Total Estimated Radon Emissions from Crow Butte Operations, 2nd Half 2001: 2,289 Curies

Total Estimated Radon Emissions from Crow Butte Operations, 2001: 4,633 Curies

Appendix F
Environmental Air Monitoring Results
Third and Fourth Quarter, 2001

Crow Butte Resources, Inc.
Crow Butte Uranium Project

Track Etch Cup Ambient Radon Concentrations

***Air Monitoring Station
No.***

Period: July 2, 2001 to January 2, 2002

	Gross Count	Average Radon Concentration (x 10 ⁻⁹ uCi/ml)	Accuracy (x 10 ⁻⁹ uCi/ml)	Percent Effluent Concentration
AM-1	47	0.6	0.09	6.0%
AM-2	72	1	0.12	10.0%
AM-3	64	0.9	0.11	9.0%
AM-4		Detector missing from Cup		
AM-5	111	1.7	0.16	17.0%
AM-6	113	1.7	0.16	17.0%
AM-8	79	1.2	0.14	12.0%
AB-3 (AM-3 Duplicate)	45	0.5	0.07	5.0%
AB-6 (AM-6 Duplicate)	28	0.2	0.04	2.0%
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: February 6, 2002

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
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 4.16E+09	²¹⁰ Pb	1.40E-14	1.28E-15	2.00E-15	6.00E-13	2.34E+00
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 4.62E+09	²¹⁰ Pb	1.24E-14	1.15E-15	2.00E-15	6.00E-13	2.07E+00
C01100255-001A	^{nat} U	1.47E-16	N/A	1.00E-16	9.00E-14	1.64E-01
07/02/2001-10/01/2001	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
Air Volume in mLs 4.39E+09	²¹⁰ Pb	1.72E-14	1.43E-15	2.00E-15	6.00E-13	2.86E+00
C02010449-001A	^{nat} U	1.66E-16	N/A	1.00E-16	9.00E-14	1.85E-01
10/01/2001-01/02/2002	²²⁶ Ra	1.99E-16	3.98E-17	1.00E-16	9.00E-13	2.21E-02
Air Volume in mLs 4.77E+09	²¹⁰ Pb	1.37E-14	1.19E-15	2.00E-15	6.00E-13	2.29E+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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10449R00002



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: February 6, 2002

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
01-32012-2 01/02/2001-04/02/2001 Air Volume in mLs 4.18E+09	^{nat} U	2.93E-16	N/A	1.00E-16	9.00E-14	3.26E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.59E-14	1.30E-15	2.00E-15	6.00E-13	2.66E+00
01-34267-2 04/02/2001-07/02/2001 Air Volume in mLs 4.67E+09	^{nat} U	1.51E-16	N/A	1.00E-16	9.00E-14	1.67E-01
	²²⁶ Ra	4.48E-16	8.14E-17	1.00E-16	9.00E-13	4.97E-02
	²¹⁰ Pb	1.45E-14	1.16E-15	2.00E-15	6.00E-13	2.41E+00
C01100255-002A 07/02/2001-10/01/2001 Air Volume in mLs 4.44E+09	^{nat} U	4.64E-16	N/A	1.00E-16	9.00E-14	5.16E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	2.06E-14	1.45E-15	2.00E-15	6.00E-13	3.44E+00
C02010449-002A 10/01/2001-01/02/2002 Air Volume in mLs 4.81E+09	^{nat} U	1.62E-16	N/A	1.00E-16	9.00E-14	1.80E-01
	²²⁶ Ra	2.17E-16	3.95E-17	1.00E-16	9.00E-13	2.41E-02
	²¹⁰ Pb	1.67E-14	1.22E-15	2.00E-15	6.00E-13	2.78E+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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10449R000003



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: February 6, 2002

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
01-32012-3 01/02/2001-04/02/2001 Air Volume in mLs 4.15E+09	^{nat} U	2.01E-16	N/A	1.00E-16	9.00E-14	2.24E-01
	²²⁶ Ra	2.06E-16	9.16E-17	1.00E-16	9.00E-13	2.29E-02
	²¹⁰ Pb	1.38E-14	1.26E-15	2.00E-15	6.00E-13	2.31E+00
01-34267-3 04/02/2001-07/02/2001 Air Volume in mLs 4.63E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	1.44E-16	6.16E-17	1.00E-16	9.00E-13	1.60E-02
	²¹⁰ Pb	1.09E-14	1.13E-15	2.00E-15	6.00E-13	1.82E+00
C01100255-003A 07/02/2001-10/01/2001 Air Volume in mLs 4.41E+09	^{nat} U	1.29E-16	N/A	1.00E-16	9.00E-14	1.44E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.74E-14	1.42E-15	2.00E-15	6.00E-13	2.91E+00
C02010449-003A 10/01/2001-01/02/2002 Air Volume in mLs 4.81E+09	^{nat} U	< 1.00E-16	N/A	1.00E-16	9.00E-14	< 1.11E-01
	²²⁶ Ra	1.58E-16	3.95E-17	1.00E-16	9.00E-13	1.76E-02
	²¹⁰ Pb	1.28E-14	1.17E-15	2.00E-15	6.00E-13	2.13E+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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10449R00004

HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: February 6, 2002

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
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 4.23E+09	²¹⁰ Pb	1.25E-14	1.24E-15	2.00E-15	6.00E-13	2.09E+00
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 4.65E+09	²¹⁰ Pb	1.23E-14	1.14E-15	2.00E-15	6.00E-13	2.06E+00
C01100255-004A	^{nat} U	2.80E-16	N/A	1.00E-16	9.00E-14	3.11E-01
07/02/2001-10/01/2001	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
Air Volume in mLs 3.66E+09	²¹⁰ Pb	1.73E-14	1.66E-15	2.00E-15	6.00E-13	2.89E+00
C02010449-004A	^{nat} U	1.58E-16	N/A	1.00E-16	9.00E-14	1.76E-01
10/01/2001-01/02/2002	²²⁶ Ra	3.36E-16	3.95E-17	1.00E-16	9.00E-13	3.73E-02
Air Volume in mLs 4.81E+09	²¹⁰ Pb	1.52E-14	1.20E-15	2.00E-15	6.00E-13	2.53E+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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10449R00005



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: February 6, 2002

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
01-32012-5 01/02/2001-04/02/2001 Air Volume in mLs 4.11E+09	^{nat} U	3.28E-16	N/A	1.00E-16	9.00E-14	3.65E-01
	²²⁶ Ra	2.08E-16	9.25E-17	1.00E-16	9.00E-13	2.31E-02
	²¹⁰ Pb	1.59E-14	1.32E-15	2.00E-15	6.00E-13	2.65E+00
01-34267-5 04/02/2001-07/02/2001 Air Volume in mLs 4.54E+09	^{nat} U	3.26E-16	N/A	1.00E-16	9.00E-14	3.63E-01
	²²⁶ Ra	1.88E-16	6.28E-17	1.00E-16	9.00E-13	2.09E-02
	²¹⁰ Pb	1.28E-14	1.17E-15	2.00E-15	6.00E-13	2.13E+00
C01100255-005A 07/02/2001-10/01/2001 Air Volume in mLs 4.34E+09	^{nat} U	7.55E-16	N/A	1.00E-16	9.00E-14	8.39E-01
	²²⁶ Ra	2.19E-16	8.76E-17	1.00E-16	9.00E-13	2.43E-02
	²¹⁰ Pb	1.84E-14	1.47E-15	2.00E-15	6.00E-13	3.06E+00
C02010449-005A 10/01/2001-01/02/2002 Air Volume in mLs 4.84E+09	^{nat} U	2.07E-16	N/A	1.00E-16	9.00E-14	2.31E-01
	²²⁶ Ra	5.69E-16	5.89E-17	1.00E-16	9.00E-13	6.32E-02
	²¹⁰ Pb	1.56E-14	1.20E-15	2.00E-15	6.00E-13	2.61E+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: February 6, 2002

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
01-32012-6 01/02/2001-04/02/2001 Air Volume in mLs 4.06E+09	^{nat} U	3.65E-16	N/A	1.00E-16	9.00E-14	4.06E-01
	²²⁶ Ra	2.57E-16	9.36E-17	1.00E-16	9.00E-13	2.86E-02
	²¹⁰ Pb	1.23E-14	1.24E-15	2.00E-15	6.00E-13	2.05E+00
01-34267-6 04/02/2001-07/02/2001 Air Volume in mLs 4.53E+09	^{nat} U	2.41E-16	N/A	1.00E-16	9.00E-14	2.68E-01
	²²⁶ Ra	1.26E-16	6.29E-17	1.00E-16	9.00E-13	1.40E-02
	²¹⁰ Pb	8.33E-15	1.09E-15	2.00E-15	6.00E-13	1.39E+00
C01100255-006A 07/02/2001-10/01/2001 Air Volume in mLs 4.32E+09	^{nat} U	2.84E-16	N/A	1.00E-16	9.00E-14	3.15E-01
	²²⁶ Ra	< 1.00E-16	N/A	1.00E-16	9.00E-13	< 1.11E-02
	²¹⁰ Pb	1.93E-14	1.47E-15	2.00E-15	6.00E-13	3.21E+00
C02010449-006A 10/01/2001-01/02/2002 Air Volume in mLs 4.78E+09	^{nat} U	1.53E-16	N/A	1.00E-16	9.00E-14	1.70E-01
	²²⁶ Ra	1.19E-16	5.96E-17	1.00E-16	9.00E-13	1.32E-02
	²¹⁰ Pb	1.41E-14	1.19E-15	2.00E-15	6.00E-13	2.35E+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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10449R00007



HIGH VOLUME AIR SAMPLING REPORT

CLIENT: CROW BUTTE RESOURCES

REPORT DATE: February 6, 2002

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
01-32012-7 01/02/2001-04/02/2001 Air Volume in mLs 4.14E+09	^{nat} U	3.88E-16	N/A	1.00E-16	9.00E-14	4.31E-01
	²²⁶ Ra	1.61E-16	6.88E-17	1.00E-16	9.00E-13	1.78E-02
	²¹⁰ Pb	1.16E-14	1.24E-15	2.00E-15	6.00E-13	1.94E+00
01-34267-7 04/02/2001-07/02/2001 Air Volume in mLs 4.62E+09	^{nat} U	3.33E-16	N/A	1.00E-16	9.00E-14	3.70E-01
	²²⁶ Ra	1.85E-16	6.17E-17	1.00E-16	9.00E-13	2.06E-02
	²¹⁰ Pb	1.10E-14	1.13E-15	2.00E-15	6.00E-13	1.84E+00
C01100255-007A 07/02/2001-10/01/2001 Air Volume in mLs 4.40E+09	^{nat} U	5.27E-16	N/A	1.00E-16	9.00E-14	5.85E-01
	²²⁶ Ra	3.45E-16	1.08E-16	1.00E-16	9.00E-13	3.84E-02
	²¹⁰ Pb	1.22E-14	7.13E-16	2.00E-15	6.00E-13	2.04E+00
C02010449-007A 10/01/2001-01/02/2002 Air Volume in mLs 4.77E+09	^{nat} U	2.37E-16	N/A	1.00E-16	9.00E-14	2.63E-01
	²²⁶ Ra	1.79E-16	3.98E-17	1.00E-16	9.00E-13	1.99E-02
	²¹⁰ Pb	1.23E-14	1.18E-15	2.00E-15	6.00E-13	2.05E+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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Appendix G
Environmental TLD Monitoring Results
Third and Fourth Quarter, 2001

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 GB127

Received Date: 4-Oct-01

Report Date: 8-Oct-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:		July 1, 2001							
	Control	73	71	72	72	70	72	1.1	1.4
1001	AM-1	43	43	43	36	44	42	3.3	4.1
1002	AM-2	42	39	42	44	47	43	2.9	3.7
1003	AM-6	42	46	43	44	45	44	1.6	2.0
1008	AM-8	45	45	43	45	43	44	1.1	1.4
1009	AM-3	48	47	43	44	47	46	2.2	2.7
1010	AM-4	44	44	42	43	43	43	0.8	1.0
1011	AM-5	46	46	47	45	45	46	0.8	1.0

OCT 15 2001

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

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 GB594

Received Date: 9-Jan-02

Report Date: 22-Jan-02

Released by: CJO

							after control			
							Mean Ambient	Mean Ambient	Standard	95%
							Dose	Dose	Deviation	Confidence
Participant No.	Name/Description	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Equivalent	Equivalent	(mrem)	Interval
		(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)	(mrem)
Quarterly Monitoring Period starting:		October 1, 2001								
	Control	73	74	84	91	84	81		7.6	9.4
1001	AM-1	48	47	45	50	47	47	0	1.8	2.3
1002	AM-2	43	45	50	50	50	48	0	3.4	4.2
1003	AM-6	45	51	42	43	44	45	0	3.5	4.4
1008	AM-8	45	48	50	47	52	48	0	2.7	3.3
1009	AM-3	46	45	45	44	46	45	0	0.8	1.0
1010	AM-4	47	45	43	45	46	45	0	1.5	1.8
1011	AM-5	50	48	45	45	47	47	0	2.1	2.6

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

Appendix H
Stream Sediment Monitoring Results
Third and Fourth Quarter, 2001



LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Not Indicated

Lab Order: C01100632
Report Date: 11/28/01

Lab ID: C01100632-001
Client Sample ID: Stream E-4 Sed

Collection Date: 10/17/01
Date Received: 10/22/01
Matrix: SEDIMENT

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, DISSOLVED							
Uranium	2.83	pCi/g	B	0.01		SW6020	11/05/01 11:00 / ts
RADIONUCLIDES							
Lead 210	0.45	pCi/g		0.20		NERHL-65-4	11/06/01 22:25 / ph
Lead 210 precision	0.16	±				NERHL-65-4	11/06/01 22:25 / ph
Radium 226	0.53	pCi/g		0.10		E903.0	11/05/01 11:56 / rs
Radium 226 precision	0.050	±				E903.0	11/05/01 11:56 / rs

Lab ID: C01100632-002
Client Sample ID: Stream E-1 Sed

Collection Date: 10/17/01
Date Received: 10/22/01
Matrix: SEDIMENT

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, DISSOLVED							
Uranium	0.45	pCi/g	B	0.01		SW6020	11/05/01 11:03 / ts
RADIONUCLIDES							
Lead 210	0.44	pCi/g		0.20		NERHL-65-4	11/06/01 22:25 / ph
Lead 210 precision	0.16	±				NERHL-65-4	11/06/01 22:25 / ph
Radium 226	0.62	pCi/g		0.10		E903.0	11/05/01 13:01 / rs
Radium 226 precision	0.050	±				E903.0	11/05/01 13:01 / rs

Lab ID: C01100632-003
Client Sample ID: Stream S-5 Sed

Collection Date: 10/17/01
Date Received: 10/22/01
Matrix: SEDIMENT

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, DISSOLVED							
Uranium	0.45	pCi/g	B	0.01		SW6020	11/05/01 11:06 / ts
RADIONUCLIDES							
Lead 210	0.48	pCi/g		0.20		NERHL-65-4	11/06/01 22:25 / ph
Lead 210 precision	0.16	±				NERHL-65-4	11/06/01 22:25 / ph
Radium 226	0.51	pCi/g		0.10		E903.0	11/05/01 13:01 / rs
Radium 226 precision	0.050	±				E903.0	11/05/01 13:01 / rs

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

RL - Analyte reporting level
QCL - Quality control limit

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LABORATORY ANALYTICAL REPORT

Client: Crow Butte Resources
Project: Not Indicated

Lab Order: C01100632
Report Date: 11/28/01

Lab ID: C01100632-004
Client Sample ID: Stream S-2 Sed

Collection Date: 10/17/01
Date Received: 10/22/01
Matrix: SEDIMENT

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, DISSOLVED							
Uranium	0.49	pCi/g	B	0.01		SW6020	11/05/01 11:08 / ts
RADIONUCLIDES							
Lead 210	ND	pCi/g		0.20		NERHL-65-4	11/06/01 22:25 / ph
Radium 226	0.44	pCi/g		0.10		E903.0	11/05/01 13:01 / rs
Radium 226 precision	0.040	±				E903.0	11/05/01 13:01 / rs

Lab ID: C01100632-005
Client Sample ID: Stream S-1 Sed

Collection Date: 10/17/01
Date Received: 10/22/01
Matrix: SEDIMENT

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, DISSOLVED							
Uranium	0.44	pCi/g	B	0.01		SW6020	11/05/01 11:11 / ts
RADIONUCLIDES							
Lead 210	0.87	pCi/g		0.20		NERHL-65-4	11/06/01 22:25 / ph
Lead 210 precision	0.17	±				NERHL-65-4	11/06/01 22:25 / ph
Radium 226	0.61	pCi/g		0.10		E903.0	11/05/01 00:00 / rs
Radium 226 precision	0.10	±				E903.0	11/05/01 00:00 / rs

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

RL - Analyte reporting level
QCL - Quality control limit

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