CAMECO RESOURCES
CROW BUTTE OPERATION

86 Crow Butte Road
P.O. Box 169 **(308) 665-2215**
Crawford, Nebraska 69339-0169 **(308) 665-2341 – FAX**

August 18, 2022

ATTN: Document Control Desk Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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

Dear Document Control:

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 11.1(B) of Source Materials License SUA-1534 and 10 CFR Part 40. This report covers the first and second quarters of 2022.

If you have any questions concerning the report, please feel free to call me at (308) 665-2215 Ext 117.

Sincerely,
CAMECO RESOURCES
CROW BUTTE OPERATION

Casey Yada
SHEQ Coordinator

cc: Ron Burrows – NRC
CBO – File
ec: Amanda Osborn – NDEE Program Coordinator
CR – Electronic File

CROW BUTTE URANIUM PROJECT

RADIOLOGICAL EFFLUENT AND ENVIRONMENTAL MONITORING REPORT

for

FIRST AND SECOND QUARTERS, 2022

USNRC Source Materials License SUA 1534

Table of Contents

1 WATER QUALITY MONITORING DATA

1.1 Excursion Monitoring

Biweekly excursion monitoring in the shallow aquifer and perimeter monitor wells was continued in Mine Units 2 through 11 during the first and second quarters of 2022. There were no wells placed on excursion status during the reporting period.

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 and surface water sampling points. Samples were obtained from all sample locations with the exceptions noted in Appendix A.

1.3 Mine Units 8-11 Semi-annual Trunk-line Sampling Data

In response to a request for additional information related to the alternate decommissioning request, CBO proposed adding a table to the Semi-annual report that includes trunk-line sampling data for Mine Unites 8-11. One sample will be collected each reporting period (half-year), and the table will be updated with this information.

Date	U3O8 ppm	V ppm	CO3 ppm	Alk ppm	pH	Ca ppm	Na ppm	Cl ppm	SO4 ppm	COND.
May-18	5.7	0.3	1111	926	7.4	74	974	414	880	4607
Nov-18	8.4	0.3	1157	964	7.4	77	975	404	893	4511
May-19	7.2	0.3	1201	1001	7.4	108	1007	427	932	4853
Nov-19	6.5	0.3	1119	933	7.3	75	926	365	839	4403
May-20	11.7	0.8	1238	1032	7.4	90	1039	381	982	4850
Nov-20	11.4	.2	1247	1039	7.3	108	1033	353	1088	4854
May-21	5.2	.12	1050	875	7.38	85	895	301	964	4240
Nov-21	5.2	0.1	1145	954	7.40	96	993	329	1030	4550
May-22	5.4	0.21	1140	950	7.25	94	913	319	946	4380

2 OPERATIONAL

2.1 Production Data Summary

Mining operations continued through the first and second quarters of 2022. The average operating production flow rate was 68 gpm for the first quarter and 67 gpm for the second quarter. Injection and production totals from the totalizers and the calculated bleed totals for the reporting period are included in Appendix B. Production injection pressures are included in Appendix C.

2.2 Restoration

Restoration activities continued in Mine Units 2, 3, 4, 5, 6, 7, and 8 during the first half of 2022. Permeate continued to be injected into Mine Units 2, 4, 6, 7 and 8. Stability monitoring was initiated in Mine Units 3 and 5 during the third quarter of 2018. Stability monitoring was initiated in Mine Units 2 and 4 during the first quarter of 2022. Stability monitoring continued in these mine units during the reporting period. Permeate injection began in April 2021 in Mine Unit 8. Restoration injection and production totals are included in Appendix B. Restoration injection pressures are included in Appendix C.

2.3 Wastewater Summary

The total volume of wastewater discharged to the ponds was 897,050 gallons during the first quarter and 1,495,700 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 two Deep Disposal Wells (DDWs). Currently, the wells are operated on a nearly continuous basis and 64,099,434 gallons of wastewater was injected into the wells during the first half of 2022. A summary of the total volume of wastewater injected and the average radionuclide content is contained in Appendix D.

2.4 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 the radon release calculations for the first half of 2022 use this release rate estimate.

During the first quarter, production occurred at an average flow rate of 68 gpm (257 lpm). Production was maintained continuously for 90 days during the first quarter with an operating factor of 100%. The production flow for the first quarter results in a calculated radon release of 17 Curies. During the second quarter, production occurred at an average flow rate of 67 gpm (254 lpm). Production was maintained continuously for 91 days during the second quarter with an operating factor of 100%. The production flow for the second quarter results in a calculated radon release of 17 Curies. Calculations for radon release from production operations are shown in Appendix E.

There were no additional wells brought online during the first half of 2022.

The total radon emission due to leaching operations from the Crow Butte plant for the first half of 2022 was 34 Curies. This calculated release rate is comparable with the releases estimated in CBO'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 2022 a total of 196,235,493 gallons (742,832,148 liters) of restoration water was produced from Mine Units 2, 3, 4, 5, 6, 7, and 8. Based upon an estimated radon concentration of 0.697 µCi/l, the total amount of radon in the restoration solution was calculated to be 518 Curies as shown in Appendix E. The estimated release of radon through wellfield loss at 25% of this total was 129 Curies. The plant loss for ion exchange treatment of the restoration water is estimated at 10% of the remaining radon, or 39 Curies. 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.

Of the total amount of restoration water produced in the first half of 2022, 116,138,623 gallons (439,632,512 liters) of the water was treated by reverse osmosis. The total estimated radon release from reverse osmosis treatment was 207 Curies.

No additional acres of wellfields were placed into restoration during the first half of 2022.

Based upon the calculations shown in Appendix E, the total estimated semiannual radon emission for the first half of 2022 from restoration activities was 451 Curies. This resulted in a total estimated radon release from the leaching operation during the first half of 2022 of 485 Curies.

This information is included for historical purposes as a comparison for the requirements in License Condition 11.11.

2.5 License Condition 11.11

By letter dated January 6, 2016, the NRC staff indicated that it had completed the technical review of the licensee's January 2, 2015 submittal describing the site's operational airborne effluent and environmental monitoring program.

The licensee identified three primary sources of airborne effluents at the Crow Butte Project. These sources included the main plant, wellfield, and the wellhouses.

Main Plant

Radon and radon progeny

The licensee will measure ambient radon gas concentrations using track etch detectors and working level measurements at six different locations.

The licensee will use scintillation cell measurements quarterly at each tank vent for radon gas measurements.

Particulates

The licensee shall conduct isotopic analyses for alpha- and beta-emitting radionuclides on airborne samples at each in-plant air particulate sampling location at a frequency of once every six months for the first two years after the license renewal (November 2014) and annually thereafter to ensure compliance with 10 CFR 20.1204(g). For any changes to operations, the licensee shall conduct an evaluation to determine if more frequent isotopic analyses are required for compliance with 10 CFR 20.1204(g).

There were no changes made to the operation during the first half of 2022. Samples were collected from each of the in-plant air particulate sampling locations.

The summary of the Main Plant samples are shown in Appendix F.

Wellfield

The licensee identified two potential sources of radon in the wellfield. The first potential source of radon is when wellheads are opened to the atmosphere to depressurize a wellhead that has become pressurized. When these wellheads are depressurized, the licensee will obtain a grab sample using a scintillation cell. Wellhead pressurization occurs as a result of adding oxygen to the injection stream. Since CBO did not add oxygen to the injection stream during the reporting period, no wells became pressurized during the first half of 2022, so no scintillation cell grab samples were collected from pressurized wellheads during the period.

The other potential sources of radon in the wellfield include unplanned releases of process fluids from spills. The amount of radon released will be estimated based on the amount of fluid released and an estimate of the concentration of radon in the process fluid. The licensee will assume that all radon in the fluid is released to the atmosphere.

The summary of the Wellfield samples are shown in Appendix G.

Wellhouses

Radon and radon progeny

The licensee will measure radon in the wellhouses using track etch detectors with a six-month exposure time. The licensee will use the average radon concentration (collected quarterly) along with the flow rate of the wellhouse exhaust fans to determine the total radon released from the wellhouses. Four production and four restoration wellhouses will be monitored annually in this manner.

Radon daughters will be measured semi-annually in the wellhouses where radon gas is being measured. The licensee will determine the total radon daughters released in the same manner as the radon gas using the flow rate of the wellhouse exhaust fan.

Particulates

The licensee will estimate the emission of particulate releases based on isotopic analyses of semiannual air particulate samples performed in each of the wellhouses that are monitored for radon. The exhaust rate of the wellhouses will be the same as described above for the radon emissions.

The summary of the Wellhouse samples are shown in Appendix H.

Estimated emissions for the first half of the year are summarized in the following table. The estimated emissions are 478.98 curies.

First Half of Year

Emissions in Ci for First 6 Months by Source

Source	Radon Progeny (Ci)	Radon Gas (Ci)	Particulate (Ci)	Total by Source	% by Source
Plant Floor Vents	0.18	2.24	2.78E-05	**2.42**	**0.5%**
Wellhouses (64)	0.10	0.94	2.86E-05	**1.04**	**0.2%**
Plant Tanks/vents	18.8	456.7	N/A	**475.5**	**99.3%**
Spills	N/A	1.39E-04	N/A	**1.39E-04**	**0.0%**
Deepwells	N/A	N/A	7.14E-07	**7.14E-07**	**0.0%**
Total by Type	**19.07**	**459.92**	**5.71E-05**		

Estimated Emissions for First Half of the Year = 478.98 Curies (Ci)

3 ENVIRONMENTAL MONITORING

3.1 Air Monitor Stations

Eight 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 I. Six track etch cups were deployed at the background monitoring station and the nearest residence to check for potential variability in data using only one track etch cup. All air monitoring results were within expected historical ranges.

3.2 TLD Monitors

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

The site is provided with both a deployment and a transient dosimeter by the provider. The process used by the dosimeter provider, Landauer, is to subtract the deployment badge result from the badges used for environmental monitoring. If the deployment badge is lost, damaged, etc. the transient badge result is subtracted instead. If neither is available to be read, the average of a set number of previous quarter's background results is subtracted. Only one of the badge results is subtracted, not multiple. The purpose of these deployment and transient badges is to subtract off any radiation that was accumulated on the environmental badges during times when they were not deployed to ensure that only dose accumulated while in the prescribed monitoring location is returned to the site as a final result.

3.3 Mechanical Integrity Testing (MIT)

Mechanical integrity tests shall be performed on each injection and production well before the wells are utilized and on wells that have been serviced with equipment or procedures that could damage the well casing. Additionally, each well shall be retested at least once each five (5) years it is in use. The following table summarizes the MIT's performed during the first half of 2022.

Five (5) Year Retesting			
Required Testing	**Number Tested**	**Number Passed**	**Number Failed**
622	658	658	0

Wells Serviced			
Required Testing	**Number Tested**	**Number Passed**	**Number Failed**
0	0	0	0

Appendix A

Private Well and Surface Water Radiological Monitoring Results

First and Second Quarters, 2022

CROW BUTTE RESOURCES, INC.

PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS

First Quarter, 2022

SAMPLE ID	DATE SAMPLED	URANIUM mg/l	URANIUM µCi/ml	RADIUM-226 pCi/l	RADIUM-226 precision ±
Well #8	03-01-22	0.0152	1.03E-08	0.6	0.1
Well #11	02-28-22	0.0090	6.10E-09	0.3	0.1
Well #12	02-28-22	0.0036	2.40E-09	0.2	0.1
Well #26	02-28-22	0.0063	4.30E-09	0.3	0.1
Well #28	02-28-22	The well was off			
Well #38	02-28-22	The well was off			
Well #41	02-28-22	0.0081	5.50E-09	0.3	0.1
Well #61	02-28-22	<0.0003	2.00E-10	3.2	0.2
Well #63	02-28-22	0.0197	1.33E-08	0.4	0.1
Well #66	02-28-22	0.0251	1.70E-08	0.4	0.1
Well #125	03-01-22	0.0064	4.30E-09	0.2	0.1
Well #129	03-01-22	0.0087	5.90E-09	<0.2	0.05
Well #131	02-28-22	0.0062	4.20E-09	<0.2	0.1
Well #133	03-01-22	0.0097	6.60E-09	0.4	0.1
Well #134	03-01-22	0.0119	8.10E-09	0.3	0.1
Well #135	03-01-22	0.0194	1.31E-08	0.2	0.1
Well #138	02-28-22	0.0141	9.60E-09	0.3	0.1
Well #140	02-28-22	The well was off			
Well #435	02-28-22	0.0076	5.20E-09	0.2	0.1
Well #445	02-28-22	0.0126	8.50E-09	<0.2	0.05
Drinking Water Well	03-01-22	0.0073	4.90E-09	<0.2	0.05
Stream S-1	02-28-22	0.0045	3.00E-09	<0.2	0.04
Stream S-2	03-01-22	0.0044	3.00E-09	<0.2	0.04
Stream S-5	03-14-22	0.0039	2.60E-09	18.7	0.5
Stream E-1	03-14-22	0.0111	7.50E-09	1.1	0.1
Stream E-2	03-01-22	0.0131	8.90E-09	0.3	0.1
Stream E-5	02-28-22	0.0146	9.90E-09	<0.2	0.1
					0
Impoundment I-3	03-01-22	0.077	5.23E-08	<0.2	0.04
Impoundment I-4	03-01-22	0.0695	4.71E-08	0.2	0.1
Impoundment I-5	03-01-22	0.0165	1.12E-08	0.2	0.1
Reporting Limit		**0.0003**	**2.00E-10**	0.2	-

CROW BUTTE RESOURCES, INC.

PRIVATE WELL AND SURFACE WATER RADIOLOGICAL MONITORING RESULTS

Second Quarter, 2022

SAMPLE ID	DATE SAMPLED	URANIUM mg/l	URANIUM µCi/ml	RADIUM-226 pCi/l	RADIUM-226 precision ±
Well #8	06-07-22	0.0146	9.90E-09	0.6	0.1
Well #11	The well was off during sampling.				
Well #12	06-03-22	0.0033	2.20E-09	0.2	0.1
Well #26	06-03-22	0.0051	3.50E-09	0.4	0.1
Well #28	06-03-22	0.0050	3.40E-09	0.3	0.1
Well #38	06-03-22	0.0035	2.40E-09	0.2	0.1
Well #41	06-03-22	0.0064	4.30E-09	0.3	0.1
Well #61	06-02-22	<0.0003	<2.00E-10	3.2	0.2
Well #63	06-02-22	0.0176	1.19E-08	0.4	0.1
Well #66	06-03-22	0.0209	1.41E-08	0.5	0.1
Well #125	06-02-22	0.0054	3.70E-09	0.2	0.1
Well #129	06-02-22	0.0085	5.80E-09	0.3	0.1
Well #131	06-06-22	0.0049	3.30E-09	0.3	0.1
Well #133	06-02-22	0.0082	5.60E-09	0.4	0.1
Well #134	06-02-22	0.0078	5.30E-09	0.4	0.1
Well #135	06-02-22	0.0167	1.13E-08	0.6	0.1
Well #138	06-03-22	0.0150	1.02E-08	0.4	0.1
Well #140	06-06-22	0.0087	5.90E-09	0.3	0.1
Well #435	06-03-22	0.0063	4.30E-09	0.3	0.1
Well #445	06-06-22	0.0101	6.80E-09	0.2	0.1
Drinking Water Well	06-07-22	0.0070	4.70E-09	0.2	0.1
Stream S-1	06-03-22	0.0032	2.20E-09	<0.2	0.1
Stream S-2	06-07-22	0.0040	2.70E-09	<0.2	0.1
Stream S-5	06-03-22	0.0038	2.60E-09	0.2	0.1
Stream E-1 & E-2(Composite)	06-06-22	0.0168	1.14E-08	0.4	0.1
Stream E-5	06-03-22	0.0054	3.70E-09	0.4	0.1
					0
Impoundment I-3	06-03-22	0.018	1.20E-08	0.3	0.1
Impoundment I-4	06-06-22	0.0131	8.90E-09	0.3	0.1
Impoundment I-5	06-06-22	0.0087	5.90E-09	<0.2	0.1
Reporting Limit		**0.0003**	**2.00E-10**	0.2	-

Appendix B

Plant Production and Waste Totals

First and Second Quarters, 2022

WASTE VOLUME
First Quarter 2022

TOTALIZER	PLANT TO PONDS	PLANT TO DDW 1 & 2	RESTORATION TO DDW	CLEAN WATER INTO PLANT	DDW TOTAL INJECTED	TRUCKS TO POND	POND WATER TREATMENT
January	293,640	2,719,005	9,028,214	6,216	11,747,219		0
February	255,390	2,469,959	8,138,771	8,534	10,608,730		0
March	348,020	2,668,134	8,812,758	6,630	11,480,892		0
TOTAL GAL. EOQ	897,050	7,857,098	25,979,743	21,380	33,836,841	0	0

First Quarter 2022	Volume
DISCHARGED TO WASTE PONDS LESS POND WATER TREATMENT GALLONS =	897,050 GALLONS
DISCHARGED TO DEEP WELL=	33,836,841 GALLONS
DISCHARGED TO WASTE PONDS + DPWELL =	34,733,891 GALLONS
WF BLEED FROM WELLFIELDS=	34,712,511 GALLONS

COMMERCIAL WELLFIELD BLEED
First Quarter 2022

MONTH	January	February	March
BLEED	100.0%	100.0%	100.0%

RESTORATION WELLFIELD BLEED
First Quarter 2022

MONTH	January	February	March
BLEED	47.2%	63.5%	64.3%

PLANT FLOW
First Quarter 2022

AVERAGE OPERATING FLOW RATE=	68 GPM EOQ
TOTAL GALLONS PRODUCED=	8,754,148 GALLONS EOQ
TOTAL GALLONS INJECTED=	0 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	0	0	0
January	3,012,645	0	744	744	67	0	756	0
February	2,725,349	0	672	672	68	0	639	0
March	3,016,154	0	744	744	68	0	618	0
EOQ TOTAL	8,754,148	0	2,160	2,160	68	0	672	0
YTD TOTAL	8,754,148	0	2,160	2,160	68	0	672	0

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL MUIV GALS PRODUCED	TOTAL MUV GALS PRODUCED	TOTAL MUVI GALS PRODUCED	TOTAL MUVII GALS PRODUCED	TOTAL MUVIII GALS PRODUCED
Prev. YTD	0	0	0	0	0	0	0
January	10,392	1	47,281	13	4,049	19,087,548	21,089,614
February	30,127	20,473	82,871	88,060	2,503	12,645,529	18,587,204
March	0	0	6	1	628,661	13,067,077	20,051,454
EOQ TOTAL	40,519	20,474	130,158	88,074	635,213	44,800,154	59,728,272
YTD TOTAL	40,519	20,474	130,158	88,074	635,213	44,800,154	59,728,272

	MUII BLEED TO WASTE	MUIII BLEED TO WASTE	MUIV BLEED TO WASTE	MUV BLEED TO WASTE	MUVI BLEED TO WASTE	MUVII BLEED TO WASTE	MUVIII BLEED TO WASTE
Prev. YTD	0	0	0	0	0	0	0
January	10,392	1	55,494	13	4,753	3,222,979	4,335,152
February	30,127	20,473	100,445	88,060	3,034	2,250,938	4,394,616
March	0	0	7	0	421,578	2,654,783	4,578,256
EOQ TOTAL	40,519	20,474	155,946	88,073	429,365	8,128,700	13,308,024
YTD TOTAL	40,519	20,474	155,946	88,073	429,365	8,128,700	13,308,024

	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	COMM BLEED TO RO FEED
Prev. YTD	0	0	0
January	9,028,214	27,542,880	1,703,462
February	8,138,771	23,227,200	1,536,595
March	8,812,758	20,406,240	1,506,154
EOQ TOTAL	25,979,743	71,176,320	4,746,211
YTD TOTAL	25,979,743	71,176,320	4,746,211

WASTE VOLUME
Second Quarter 2022

TOTALIZER	PLANT TO PONDS	PLANT TO DDW 1 & 2	RESTORATION TO DDW	CLEAN WATER INTO PLANT	DDW TOTAL INJECTED	TRUCKS TO POND	POND WATER TREATMENT
April	598,290	2,288,608	8,430,175	7,622	10,718,783		0
May	365,360	2,638,199	7,879,649	10,478	10,517,848		0
June	532,050	2,366,666	6,659,296	16,995	9,025,962		0
TOTAL GAL. EOQ	1,495,700	7,293,473	22,969,120	35,095	30,262,593	0	0

TOTAL 2nd QTR VOLUME

DISCHARGED TO WASTE PONDS LESS POND WATER TREATMENT GALLONS =	1,495,700 GALLONS
DISCHARGED TO DEEP WELL=	30,262,593 GALLONS
DISCHARGED TO WASTE PONDS + DPWELL =	31,758,293 GALLONS
WF BLEED FROM WELLFIELDS=	31,723,198 GALLONS

COMMERCIAL WELLFIELD BLEED
Second Quarter 2022

MONTH	April	May	June
BLEED	100.0%	100.0%	100.0%

RESTORATION WELLFIELD BLEED
Second Quarter 2022

MONTH	April	May	June
BLEED	60.4%	53.3%	46.1%

PLANT FLOW
Second Quarter 2022

AVERAGE OPERATING FLOW RATE=	67 GPM EOQ
TOTAL GALLONS PRODUCED=	8,789,173 GALLONS EOQ
TOTAL GALLONS INJECTED=	0 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	8,754,148	0	2,160	2,160	68	0	672	0
April	2,886,898	0	720	720	67	0	626	0
May	3,003,559	0	744	744	67	0	599	0
June	2,898,716	0	720	720	67	0	533	0
EOQ TOTAL	8,789,173	0	2,184	2,184	67	0	586	0
YTD TOTAL	17,543,321	0	4,344	4,344	67	0	629	0

	TOTAL MUII GALS PRODUCED	TOTAL MUIII GALS PRODUCED	TOTAL MUIV GALS PRODUCED	TOTAL MUV GALS PRODUCED	TOTAL MUVI GALS PRODUCED	TOTAL MUVII GALS PRODUCED	TOTAL MUVIII GALS PRODUCED
Prev. YTD	40,519	20,474	130,158	88,074	635,213	44,800,154	59,728,272
April	0	0	0	1,950	1,800,052	12,163,808	18,569,118
May	21,314	19,420	48,116	89,326	2,966,950	11,677,332	16,467,121
June	0	0	0	458,484	4,051,365	9,935,459	12,522,814
EOQ TOTAL	21,314	19,420	48,116	549,760	8,818,367	33,776,599	47,559,053
YTD TOTAL	61,833	39,894	178,274	637,834	9,453,580	78,576,753	107,287,325

	MUII BLEED TO WASTE	MUIII BLEED TO WASTE	MUIV BLEED TO WASTE	MUV BLEED TO WASTE	MUVI BLEED TO WASTE	MUVII BLEED TO WASTE	MUVIII BLEED TO WASTE
Prev. YTD	40,519	20,474	155,946	88,073	429,365	8,128,700	13,308,024
April	0	0	0	1,950	1,130,494	1,639,675	4,784,522
May	21,314	19,420	72,384	89,326	2,769,426	1,400,441	2,431,159
June	-1	0	0	458,484	4,010,054	2,364,531	-1,101,883
EOQ TOTAL	21,313	19,420	72,384	549,760	7,909,974	5,404,647	6,113,798
YTD TOTAL	61,832	39,894	228,330	637,833	8,339,339	13,533,347	19,421,822

	TOTAL BRINE GALS PRODUCED	TOTAL PERM GALS PRODUCED	COMM BLEED TO RO FEED
Prev. YTD	25,979,743	71,176,320	4,746,211
April	8,430,175	22,033,440	1,471,824
May	7,879,649	20,672,640	1,462,853
June	6,659,296	17,307,360	1,460,160
EOQ TOTAL	22,969,120	60,013,440	4,394,837
YTD TOTAL	48,948,863	131,189,760	9,141,048

Appendix C

Wellfield Injection Pressures

First and Second Quarter, 2022

WELLFIELD INJECTION PRESSURE - PSI
First Quarter 2022

	WF HOUSE #3		WF HOUSE #4		WF HOUSE #5		WF HOUSE #6		WF HOUSE #7	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	0	0	19	22	20	21	2	10	0	0
February	0	4	19	26	19	22	3	11	0	0
March	0	0	19	22	19	23	3	10	0	0
AVERAGE	0	4	19	26	19	23	2	11	0	0
	WF HOUSE #8		WF HOUSE #9		WF HOUSE #10		WF HOUSE #11		WF HOUSE #12	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	0	0	50	60	35	45	2	38	51	60
February	0	0	43	51	33	50	0	2	46	52
March	0	0	47	51	37	40	0	0	47	51
AVERAGE	0	0	47	60	35	50	1	38	48	60
	WF HOUSE #13		WF HOUSE #14		WF HOUSE #15		WF HOUSE #16		WF HOUSE #17	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	50	62	9	10	0	0	0	0	0	0
February	48	53	9	10	0	2	0	0	0	0
March	48	53	9	10	0	0	0	0	0	0
AVERAGE	49	62	9	10	0	2	0	0	0	0
	WF HOUSE #18		WF HOUSE #19		WF HOUSE #20		WF HOUSE #21		WF HOUSE #22	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	6	40	0	0	0	0	11	12	0	3
February	7	38	0	0	0	0	12	14	0	2
March	3	12	0	0	0	0	12	12	0	0
AVERAGE	5	40	0	0	0	0	12	14	0	3
	WF HOUSE #23		WF HOUSE #24		WF HOUSE #25		WF HOUSE #26		WF HOUSE #27	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	0	0	22	34	0	0	0	0	36	47
February	0	2	11	13	0	0	0	0	36	58
March	0	2	14	36	0	0	5	30	30	44
AVERAGE	0	2	16	36	0	0	2	30	34	58
	WF HOUSE #28		WF HOUSE #29		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	36	46	40	50	33	44	8	16	14	20
February	35	45	38	48	33	44	6	15	13	20
March	34	38	38	40	31	35	7	11	12	14
AVERAGE	35	46	39	50	32	44	7	16	13	20
	WF HOUSE #33		WF HOUSE #34		WF HOUSE #35		WF HOUSE #36		WF HOUSE #37	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	18	24	15	23	22	36	28	38	17	29
February	17	24	8	10	12	14	20	22	9	12
March	16	18	11	28	13	31	20	21	10	21
AVERAGE	17	24	11	28	16	36	23	38	12	29
	WF HOUSE #38		WF HOUSE #39		WF HOUSE #40		WF HOUSE #41		WF HOUSE #42	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	22	34	14	26	1	5	1	4	0	0
February	12	14	4	6	2	40	1	4	0	2
March	15	35	6	28	1	4	1	4	0	0
AVERAGE	16	35	8	28	1	40	1	4	0	2
	WF HOUSE #43		WF HOUSE #44		WF HOUSE #45		WF HOUSE #46		WF HOUSE #46A	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	0	0	0	0	0	0	27	41	24	26
February	0	0	0	0	0	0	18	23	24	26
March	0	0	0	0	0	0	21	40	22	32
AVERAGE	0	0	0	0	0	0	22	41	23	32
	WF HOUSE #47		WF HOUSE #47A/65		WF HOUSE #48		WF HOUSE #49		WF HOUSE #50	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	0	0	0	0	25	26	0	2	0	0
February	0	0	0	0	25	26	0	3	0	0
March	0	0	0	0	25	26	0	2	0	0
AVERAGE	0	0	0	0	25	26	0	3	0	0
	WF HOUSE #51		WF HOUSE #52		WF HOUSE #53		WF HOUSE #54		WF HOUSE #55	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	0	2	1	20	0	0	14	21	20	38
February	0	2	0	0	0	0	8	10	14	16
March	0	3	0	0	0	0	9	22	15	30
AVERAGE	0	3	0	20	0	0	10	22	17	38
	WF HOUSE #56		WF HOUSE #57							
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM						
January	0	0	0	0						
February	0	0	0	0						
March	0	0	0	2						
AVERAGE	0	0	0	2						
	WF HOUSE #60		WF HOUSE #61		WF HOUSE #62		WF HOUSE #63		WF HOUSE #64	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
January	1	3	1	3	0	0	0	0	0	0
February	1	4	1	3	0	0	0	0	0	0
March	1	4	1	4	0	0	0	0	0	0
AVERAGE	1	4	1	4	0	0	0	0	0	0

WELLFIELD INJECTION PRESSURE - PSI
Second Quarter 2022

	WF HOUSE #3		WF HOUSE #4		WF HOUSE #5		WF HOUSE #6		WF HOUSE #7	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	0	0	19	20	20	30	2	10	0	0
May	0	0	20	24	19	22	2	11	0	0
June	0	0	27	36	24	34	2	11	1	19
AVERAGE	0	0	22	36	21	34	2	11	0	19
	WF HOUSE #8		WF HOUSE #9		WF HOUSE #10		WF HOUSE #11		WF HOUSE #12	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	0	0	57	65	47	55	0	0	59	66
May	0	0	61	74	53	72	0	0	61	78
June	2	58	64	73	56	69	0	0	65	73
AVERAGE	1	58	61	74	52	72	0	0	62	78
	WF HOUSE #13		WF HOUSE #14		WF HOUSE #15		WF HOUSE #16		WF HOUSE #17	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	60	66	9	10	0	0	0	0	0	1
May	64	85	9	10	0	0	0	0	0	0
June	67	79	9	13	0	0	0	0	0	0
AVERAGE	64	85	9	13	0	0	0	0	0	1
	WF HOUSE #18		WF HOUSE #19		WF HOUSE #20		WF HOUSE #21		WF HOUSE #22	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	2	10	0	0	0	0	11	21	0	0
May	2	26	0	0	0	0	12	12	0	0
June	0	0	0	0	0	0	12	13	0	0
AVERAGE	1	26	0	0	0	0	11	21	0	0
	WF HOUSE #23		WF HOUSE #24		WF HOUSE #25		WF HOUSE #26		WF HOUSE #27	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	1	12	19	22	0	0	12	16	24	28
May	0	0	27	45	0	0	21	38	33	50
June	0	0	52	73	0	0	44	53	55	64
AVERAGE	0	12	33	73	0	0	26	53	37	64
	WF HOUSE #28		WF HOUSE #29		WF HOUSE #30		WF HOUSE #31		WF HOUSE #32	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	46	53	46	54	40	47	17	24	19	24
May	50	56	52	56	43	50	23	42	25	38
June	55	72	55	72	48	66	29	54	30	40
AVERAGE	50	72	51	72	44	66	23	54	25	40
	WF HOUSE #33		WF HOUSE #34		WF HOUSE #35		WF HOUSE #36		WF HOUSE #37	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	25	30	16	25	20	28	20	20	14	16
May	31	50	26	43	29	48	19	21	22	37
June	36	47	52	62	51	57	17	51	45	56
AVERAGE	31	50	32	62	34	57	19	51	27	56
	WF HOUSE #38		WF HOUSE #39		WF HOUSE #40		WF HOUSE #41		WF HOUSE #42	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	19	22	12	16	0	3	1	4	1	17
May	28	46	21	38	0	3	0	4	0	0
June	53	62	45	53	1	43	0	0	0	8
AVERAGE	33	62	26	53	1	43	0	4	0	17
	WF HOUSE #43		WF HOUSE #44		WF HOUSE #45		WF HOUSE #46		WF HOUSE #46A	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	0	0	0	0	0	0	26	58	23	60
May	0	0	0	0	0	0	34	54	32	55
June	0	0	0	0	0	0	59	66	48	73
AVERAGE	0	0	0	0	0	0	40	66	34	73
	WF HOUSE #47		WF HOUSE #47A/65		WF HOUSE #48		WF HOUSE #49		WF HOUSE #50	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	0	0	0	0	26	26	0	2	0	0
May	0	0	0	0	25	26	0	0	0	0
June	0	0	0	0	26	26	0	0	0	0
AVERAGE	0	0	0	0	25	26	0	2	0	0
	WF HOUSE #51		WF HOUSE #52		WF HOUSE #53		WF HOUSE #54		WF HOUSE #55	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	0	0	0	0	0	0	11	12	16	20
May	0	0	0	0	1	10	18	34	24	41
June	0	0	0	0	0	0	41	48	49	57
AVERAGE	0	0	0	0	0	10	23	48	30	57
	WF HOUSE #56		WF HOUSE #57							
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM						
April	0	0	0	0						
May	0	0	0	0						
June	0	0	0	0						
AVERAGE	0	0	0	0						
	WF HOUSE #60		WF HOUSE #61		WF HOUSE #62		WF HOUSE #63		WF HOUSE #64	
	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM	AVERAGE	MAXIMUM
April	1	4	1	3	0	0	0	0	0	0
May	1	18	0	3	0	0	0	5	0	0
June	0	0	0	2	0	0	0	0	0	0
AVERAGE	1	18	1	3	0	0	0	5	0	0

Appendix D

Deep Disposal Wells Injection Radiological Data

First and Second Quarter, 2022

Crow Butte Uranium Mine
Deep Disposal Well #1 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-22	10,777,832	0.65	2.65E+07	1.79E+04	416	1.70E+04
February-22	9,742,455	1.35	4.98E+07	3.37E+04	410	1.51E+04
March-22	10,522,821	1.33	5.30E+07	3.59E+04	355	1.41E+04
April-22	9,886,101	1.04	3.89E+07	2.63E+04	220	8.23E+03
May-22	9,441,905	1.51	5.40E+07	3.65E+04	154	5.50E+03
June-22	8,052,874	1.25	3.81E+07	2.58E+04	297	9.05E+03
Totals	58,423,988		2.60E+08	1.76E+05		6.90E+04

Crow Butte Uranium Mine
Deep Disposal Well #2 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-22	969,387	0.65	2.38E+06	1.61E+03	416	1.53E+03
February-22	866,275	1.35	4.43E+06	3.00E+03	410	1.34E+03
March-22	958,071	1.33	4.82E+06	3.27E+03	355	1.29E+03
April-22	832,682	1.04	3.28E+06	2.22E+03	220	6.93E+02
May-22	1,075,943	1.51	6.15E+06	4.16E+03	154	6.27E+02
June-22	973,088	1.25	4.60E+06	3.12E+03	297	1.09E+03
Totals	5,675,446		2.57E+07	1.74E+04		6.57E+03

Appendix E

Radon Release Calculations

First and Second Quarter, 2022

Radon Effluent Release Calculation (Production and Startup)

First Quarter 2022 Radon Release from Leaching Operations:

Curies/M3	*Production Flow (liters)*	*Radon-222 Decay Constant*	*Operating Days*	*Operating Factor*	*M3/liter conversion*	*Hours/Day Conversion*	*Minutes/Hour Conversion*	*Total Radon Release from Leaching*
7.04E-04	257	0.72	90	100.0%	0.001	24	60	17

Second Quarter 2022 Radon Release from Leaching Operations:

Curies/M3	*Production Flow (liters)*	*Radon-222 Decay Constant*	*Operating Days*	*Operating Factor*	*M3/liter conversion*	*Hours/Day Conversion*	*Minutes/Hour Conversion*	*Total Radon Release from Leaching*
7.04E-04	254	0.72	91	100.0%	0.001	24	60	17

First Half 2022 Radon Release From Startup:

Curies/M3	*Total Acres of New Wellfield*	*Meter2/Acre Conversion*	*Orebody Thickness (meters)*	*Porosity*	*Total Radon Release from Startup*
7.04E-04	0.0	4,074	1.52	0.29	0

Total Estimated Radon Release from Production: **34**

Radon Effluent Release Calculation (Restoration)

First Half 2022 Radon Release From Restoration:

Total Restoration Flow (liters)	*Microcuries/liter*	*Curies/Microcurie*	*Production Potential*
742,832,148	0.697	1.00E-06	518

Wellfield Loss (25% of Production Potential):	129

Ion Exchange Loss (10% of Production Potential minus Wellfield Loss):	39

Reverse Osmosis Loss (100% of remaining activity at 0.470 microcuries/liter) 207

Total Reverse Osmosis Flow (liters)	*Microcuries/liter*	*Curies/Microcurie*
439,632,512	0.470	1.00E-06

First Half 2022 Radon Release From Startup of New Restoration:

Curies/M3	*Total Acres of New Wellfield*	*Meter2/Acre Conversion*	*Orebody Thickness (meters)*	*Porosity*	*Total Radon Release from Startup*
7.04E-04	60.00	4074	1.52	0.29	76

Total Estimated Radon Release from Restoration: **451**

Total Estimated Radon Release, First Half 2022: **485**

Appendix F

Main Plant

Track Etch Detectors

Working Level Measurements

Scintillation Cell Measurements

Isotopic Analyses

First Half, 2022

Calculation of Radon Gas Emissions from the Main Plant

First Half of Year

Locations	RnG Concentration (x 10-9 µCi/ml)
01 Blower Pipe (Injection Filters)	5.1
02 Blower Pipe (Between Injection Tanks)	5.1
03 Boxed Fan (PWT West)	4.9
04 Boxed Fan (PWT East)	15.7
05 Pipe Duct (PWT)	4.9
09 Boxed Fan (Behind Acid Scrubber)	1.5
12 Shaker Room Blower/Exhaust	5.2

	Average RnG Concentration (µCi/ml)	Plant Vent Rate (CFM)	Plant Vent Rate (ml/6 months)	RnG Emissions (Ci/6 Months)
Plant Average	**6.1E-09**	**49748**	**3.7E+14**	**2.24**

Formula Ci/yr = average (µCi/ml) * ventilation (ml/yr) / (1e6 µCi/Ci)

Calculation of Radon Progeny Emissions from the Plant

First Half of 2022

Exhaust Rate for Building (CFM)	49748
Total Flow from Building (ml/ 6 months)	3.7E+14

Total In Plant Radon Progeny Emissions (Ci/yr) 0.18

Formula Ci/yr = WL * (3e-8 µCi/ml/0.33 WL) * ventilation (ml/6 months) / (1e6 µCi/Ci)

Start Date	2022-01-01	Average	0.0053
End Date	2022-06-30		

SITE_CODE	LOCATION_NAME	START_DATE	RNP_VALUE	AREA_SAMPLE_CLASS_COI	AREA_SAMPLE_TYPE_CODE
CB	R6 Between IX Column Trains	2022-06-15 7:29	0.00177413	Dosimetry	R
CB	R5 Between IX Columns and Column Drain Tank	2022-06-15 7:23	0.00130811	Dosimetry	R
CB	R4 Between IX Columns and Resin Transfer Tanks	2022-06-15 7:17	0.00108137	Dosimetry	R
CB	R3 Between IX Columns and Injection Tanks	2022-06-15 7:11	0.00475431	Dosimetry	R
CB	R13-E Pond Water Treatment Room East	2022-06-15 7:05	0.00405515	Dosimetry	R
CB	R13-M Pond Water Treatment Room Middle	2022-06-15 6:58	0.00489678	Dosimetry	R
CB	R13-W Pond WaterTreatment Room West	2022-06-15 6:52	0.00477076	Dosimetry	R
CB	R12 Down Flow Column Area	2022-06-15 6:46	0.00430342	Dosimetry	R
CB	R2 Between Precip Cells and Eluent Tanks	2022-06-15 6:40	0.00241583	Dosimetry	R
CB	R1 Between IX Columns and Precip Cells	2022-06-15 6:34	0.00036046	Dosimetry	R
CB	R7 Between Precip Cells and Raw Water Tank	2022-06-15 6:28	0.00223732	Dosimetry	R
CB	R8 Motor Control Room	2022-06-15 6:21	0.00078172	Dosimetry	R
CB	R6 Between IX Column Trains	2022-05-18 9:06	0.00362398	Dosimetry	R
CB	R5 Between IX Columns and Column Drain Tank	2022-05-18 9:00	0.00299424	Dosimetry	R
CB	R4 Between IX Columns and Resin Transfer Tanks	2022-05-18 8:54	0.00438563	Dosimetry	R
CB	R3 Between IX Columns and Injection Tanks	2022-05-18 8:48	0.00534060	Dosimetry	R
CB	R13-E Pond Water Treatment Room East	2022-05-18 8:42	0.00249066	Dosimetry	R

CB	R13-M Pond Water Treatment Room Middle	2022-05-18 8:36	0.00229746	Dosimetry	R
CB	R13-W Pond WaterTreatment Room West	2022-05-18 8:29	0.00152207	Dosimetry	R
CB	R12 Down Flow Column Area	2022-05-18 8:23	0.00570776	Dosimetry	R
CB	R2 Between Precip Cells and Eluent Tanks	2022-05-18 8:17	0.00545219	Dosimetry	R
CB	R1 Between IX Columns and Precip Cells	2022-05-18 8:11	0.00608828	Dosimetry	R
CB	R7 Between Precip Cells and Raw Water Tank	2022-05-18 8:05	0.00349901	Dosimetry	R
CB	R8 Motor Control Room	2022-05-18 7:59	0.00072480	Dosimetry	R
CB	R6 Between IX Column Trains	2022-04-20 12:54	0.01470764	Dosimetry	R
CB	R5 Between IX Columns and Column Drain Tank	2022-04-20 12:48	0.00680455	Dosimetry	R
CB	R4 Between IX Columns and Resin Transfer Tanks	2022-04-20 12:42	0.00843557	Dosimetry	R
CB	R3 Between IX Columns and Injection Tanks	2022-04-20 12:36	0.00751640	Dosimetry	R
CB	R13-E Pond Water Treatment Room East	2022-04-20 12:30	0.01550256	Dosimetry	R
CB	R13-M Pond Water Treatment Room Middle	2022-04-20 12:24	0.00965929	Dosimetry	R
CB	R13-W Pond WaterTreatment Room West	2022-04-20 12:18	0.00669711	Dosimetry	R
CB	R12 Down Flow Column Area	2022-04-20 12:12	0.00273973	Dosimetry	R
CB	R2 Between Precip Cells and Eluent Tanks	2022-04-20 12:06	0.00317098	Dosimetry	R
CB	R1 Between IX Columns and Precip Cells	2022-04-20 12:00	0.00397062	Dosimetry	R
CB	R7 Between Precip Cells and Raw Water Tank	2022-04-20 11:54	0.00444650	Dosimetry	R
CB	R8 Motor Control Room	2022-04-20 11:47	0.00091324	Dosimetry	R
CB	R6 Between IX Column Trains	2022-03-23 7:20	0.01112282	Dosimetry	R
CB	R5 Between IX Columns and Column Drain Tank	2022-03-23 7:14	0.01065449	Dosimetry	R
CB	R4 Between IX Columns and Resin Transfer Tanks	2022-03-23 7:08	0.01078133	Dosimetry	R
CB	R3 Between IX Columns and Injection Tanks	2022-03-23 7:02	0.00562504	Dosimetry	R
CB	R13-E Pond Water Treatment Room East	2022-03-23 6:56	0.00819576	Dosimetry	R
CB	R13-M Pond Water Treatment Room Middle	2022-03-23 6:50	0.01033859	Dosimetry	R
CB	R13-W Pond WaterTreatment Room West	2022-03-23 6:44	0.01104247	Dosimetry	R
CB	R12 Down Flow Column Area	2022-03-23 6:38	0.00528065	Dosimetry	R
CB	R2 Between Precip Cells and Eluent Tanks	2022-03-23 6:32	0.00453383	Dosimetry	R
CB	R1 Between IX Columns and Precip Cells	2022-03-23 6:26	0.00541180	Dosimetry	R
CB	R7 Between Precip Cells and Raw Water Tank	2022-03-23 6:20	0.00489862	Dosimetry	R
CB	R8 Motor Control Room	2022-03-23 6:14	0.00036240	Dosimetry	R
CB	R6 Between IX Column Trains	2022-02-16 8:42	0.00511448	Dosimetry	R
CB	R5 Between IX Columns and Column Drain Tank	2022-02-16 8:36	0.00503457	Dosimetry	R
CB	R4 Between IX Columns and Resin Transfer Tanks	2022-02-16 8:30	0.00560158	Dosimetry	R
CB	R3 Between IX Columns and Injection Tanks	2022-02-16 8:24	0.00276685	Dosimetry	R
CB	R13-E Pond Water Treatment Room East	2022-02-16 8:18	0.03380760	Dosimetry	R
CB	R13-M Pond Water Treatment Room Middle	2022-02-16 8:12	0.01292080	Dosimetry	R
CB	R13-W Pond WaterTreatment Room West	2022-02-16 8:06	0.00446355	Dosimetry	R
CB	R12 Down Flow Column Area	2022-02-16 8:00	0.00289499	Dosimetry	R
CB	R2 Between Precip Cells and Eluent Tanks	2022-02-16 7:54	0.00240682	Dosimetry	R
CB	R1 Between IX Columns and Precip Cells	2022-02-16 7:48	0.00250505	Dosimetry	R
CB	R7 Between Precip Cells and Raw Water Tank	2022-02-16 7:42	0.00261165	Dosimetry	R
CB	R8 Motor Control Room	2022-02-16 7:36	0.00167819	Dosimetry	R
CB	R6 Between IX Column Trains	2022-01-26 7:11	0.00241598	Dosimetry	R

CB	R5 Between IX Columns and Column Drain Tank	2022-01-26 7:05	0.00598847	Dosimetry	R
CB	R4 Between IX Columns and Resin Transfer Tanks	2022-01-26 6:59	0.00567552	Dosimetry	R
CB	R3 Between IX Columns and Injection Tanks	2022-01-26 6:53	0.00320436	Dosimetry	R
CB	R13-W Pond WaterTreatment Room West	2022-01-26 6:47	0.00387436	Dosimetry	R
CB	R13-M Pond Water Treatment Room Middle	2022-01-26 6:41	0.00516929	Dosimetry	R
CB	R13-E Pond Water Treatment Room East	2022-01-26 6:35	0.00716268	Dosimetry	R
CB	R12 Down Flow Column Area	2022-01-26 6:29	0.00465940	Dosimetry	R
CB	R2 Between Precip Cells and Eluent Tanks	2022-01-26 6:23	0.00485767	Dosimetry	R
CB	R1 Between IX Columns and Precip Cells	2022-01-26 6:16	0.00342038	Dosimetry	R
CB	R7 Between Precip Cells and Raw Water Tank	2022-01-26 6:09	0.00253678	Dosimetry	R
CB	R8 Motor Control Room	2022-01-26 6:03	0.00074247	Dosimetry	R

Tank Vent Effluent (RnP and RnG Emissions from Tank Vents)

First Half Data

				First Quarter Results						Second Quarter Results					
Location	Ventalation Blower Flow Rates (cfm)	Ventalation Blower Flow Rates (m^3/min)	Ventalation Blower Flow Rates (L/min)	RnG Filling pCi/l	RnP Filling WL	RnG Draining pCi/l	RnP Draining WL	RnG Steady pCi/l	RnP Steady WL	RnG Filling pCi/l	RnP Filling WL	RnG Draining pCi/l	RnP Draining WL	RnG Steady pCi/l	RnP Steady WL
6 - Pond Water Treat. Fan	4700	133.1	133089.0					23.31	0.042					0	0.072
8 - Waste Tank Blower	1500	42.5	42475.2					535.75	0.031					257.26	0.074
10 - Precip Demister Fan	1500	42.5	42475.2					0.15	0.003					4.56	0.001
11 - Shaker Deck Blower	800	22.7	22653.4					0.3	0.004					1.38	0.005
13 - Eluent Tank Blower	1500	42.5	42475.2					221.09	0.006					32.66	0.005
14 - Precip A Blower	185	5.2	5238.6					2.63	0.005					1.04	0.009
15 - East Train/West Train/Backwash Tank Blower	6000	169.9	169900.8					12221.1	4.927					7955.99	4.209

Footnote: Locations numbered per HPC Air Ventilation Study - August 2013 (LRA SUA 1534 November 2014 Appendix C) ML15310A373

First Half Results

				Average for First Half of Year													
Location	Ventalation Blower Flow Rates (cfm)	Ventalation Blower Flow Rates (m^3/min)	Ventalation Blower Flow Rates (L/min)	RnG Filling pCi/l	RnP Filling WL	RnG Draining pCi/l	RnP Draining WL	RnG Steady pCi/l	RnP Steady WL	Average RnG (pCi/l)	Average RnG (pCi/min)	Average RnG Emissions (Ci/6months)	Average RnP Emissions (Ci/6 months)	Max RnG (pCi/l)	Max RnG (pCi/min)	Maximum RnG Emissions (Ci/6 months)	Maximum RnP Emissions (Ci/6 months)
6 - Pond Water Treat. Fan	4700	133.1	133089.0					11.7	0.1	11.7	1.55E+06	0.41	0.2	11.7	1.55E+06	0.41	0.18
8 - Waste Tank Blower	1500	42.5	42475.2					396.5	0.1	396.5	1.68E+07	4.43	0.1	396.5	1.68E+07	4.43	0.05
10 - Precip Demister Fan	1500	42.5	42475.2					2.4	0.0	2.4	1.00E+05	0.03	0.0	2.4	1.00E+05	0.03	0.00
11 - Shaker Deck Blower	800	22.7	22653.4					0.8	0.0	0.8	1.90E+04	0.01	0.0	0.8	1.90E+04	0.01	0.00
13 - Eluent Tank Blower	1500	42.5	42475.2					126.9	0.0	126.9	5.39E+06	1.4	0.0	126.9	5.39E+06	1.42	0.01
14 - Precip A Blower	185	5.2	5238.6					1.8	0.0	1.8	9.61E+03	0.0	0.0	1.8	9.61E+03	0.00	0.00
15 - East Train/West Train/Backwash Tank Blower	6000	169.9	169900.8					10088.5	4.6	10088.5	1.71E+09	450.5	18.5	10088.5	1.71E+09	450.45	18.54

Footnote: Locations numbered per HPC Air Ventilation Study - August 2013 (LRA SUA 1534 November 2014 Appendix C) ML15310A373

Sum	456.7	18.8	456.74	18.79
First Half 2022 Tank RnP and RnG			475.52	

Calculation of Particulate Emissions from the Plant

2022

	Run Time (min)	Flow Rate (LPM)	Total Volume (L)	Lab Result (µCi/ml) Lead 210	Radium 226	Thorium 230	Uranium	Calculated Result (µCi/ml) Th234	Po-210
Between IX Train	16826	49.77	837411.0	4.30E-14	2.40E-16	4.40E-16	7.30E-16	3.58E-16	4.30E-14
Below Thickener Tank	16860	49.68	837656.0	1.00E-14	6.30E-16	5.00E-17	2.40E-15	1.18E-15	1.00E-14
Top of Precip B	16823	49.75	837012.0	1.20E-14	2.20E-16	5.00E-17	8.10E-16	3.97E-16	1.20E-14
Belt Filter Room	16858	49.66	837233.0	1.80E-14	3.60E-16	2.70E-16	1.60E-15	7.84E-16	1.80E-14
Top of Tall White Tanks	16860	49.67	837412.0	8.70E-14	2.90E-16	5.50E-16	5.30E-14	2.60E-14	8.70E-14
Dryer Change Room	16856	45.28	763239.7	1.90E-14	2.70E-16	3.90E-16	2.50E-15	1.23E-15	1.90E-14
R.O. Building	16867	49.30	831543.1	2.60E-14	3.40E-16	5.50E-16	1.90E-16	9.31E-17	2.60E-14
10 CFR 20 Effluent Limit				**1.00E-10**	**3.00E-10**	**6.00E-12**	**2.00E-11**	**3.00E-10**	**9.00E-13**
RL				**2.00E-15**	**1.00E-16**	**1.00E-16**	**1.00E-16**		

Note: if result was non-detect, 1/2 RL was used

Exhaust Rate for Building (CFM)	49748
Total Flow from Building (ml/ 6 months)	3.70E+14

Total Emissions of Each Radionuclide for First Half of 2022

	Emission (Ci/yr)
Lead 210	1.14E-05
Radium 226	1.24E-07
Thorium 230	1.22E-07
Uranium	3.24E-06
Th234	1.59E-06
Po-210	1.14E-05
Sum	**2.78E-05**

Appendix G

Wellfield

Scintillation Cell Measurements

Spill Radon Calculation

First and Second Quarter, 2022

Calculation of Radon Gas Emissions from Venting Wellheads

First Half of Year

	RnG (pCi/L)
Average RnG vented from Wellheads - Q1	N/A
Average RnG vented from Wellheads - Q2	N/A

Total Emissions for First Half

Average RnG (pCi/L)	0	
Casing volume (L)	1563.75	(4.5 in diameter, 500 ft depth)
Wellheads bled/Month	0	
Wellheads bled/6 Months	0	
Ci/6 Months	**0.00E+00**	

SPILL CALCULATION

Quarter	Volume in Liters	Ci Radon per cubic meter	Total Curies
Q1-Q2	196.841	7.04E-04	1.39E-04
Q3-Q4		7.04E-04	0.00E+00

Appendix H

Wellhouses

Track Etch Detectors

Working Level Measurements

Isotopic Analyses

First and Second Quarter, 2022

Calculation of Radon Gas Emissions from Wellhouses

First Half of Year

Wellhouses	RnG Concentration (x 10-9 µCi/ml)
Wellhouse 3 (Restoration)	1.4
Wellhouse 6 (Restoration)	3.9
Wellhouse 16 (Restoration)	2.6
Wellhouse 22 (Production)	5.2
Wellhouse 40 (Production)	0.24
Wellhouse 47A (Production)	0.62
Wellhouse 54 (Production)	1.4
Wellhouse 60 (Production)	0.7
Wellhouse 9 (Restoration)*	35

Total Emissions for First Half of Year

	Average RnG Concentration (µCi/ml)	WH Vent Rate (CFM)	WH Vent Rate (ml/6 months)	# WH	RnG Emissions (Ci/6 Months)
WH Avg Concentration (Restoration)	3.90E-09	800	6.0E+12	24	0.56
WH Avg Concentration (Production)	7.40E-10	800	6.0E+12	39	0.17
*WH Not part of Average	0.000000035	800	6.0E+12	1	0.21
		Total Radon Gas Emissions from WH's			**0.94**

Formula Ci/yr = average (µCi/ml) * ventilation (ml/yr) * # WH / (1e6 µCi/Ci)

Calculation of Particulate Emissions from the Wellhouses

First Half of Year

	Run Time (min)	Flow Rate (LPM)	Total Volume (L)	Lab Result (µCi/ml) Lead 210	Radium 226	Thorium 230	Uranium	Calculated Result (µCi/ml) Th234	Po-210
Wellhouse 3 (Restoration)	13013	49.7579	647499.0	7.30E-14	1.20E-15	4.40E-15	1.60E-16	7.84E-17	7.30E-14
Wellhouse 6 (Restoration)	13019	49.6555	646465.0	5.50E-14	7.90E-16	4.60E-16	3.00E-16	1.47E-16	5.50E-14
Wellhouse 16 (Restoration)	13015	49.7809	647898.0	1.90E-14	4.20E-16	4.10E-16	1.70E-16	8.33E-17	1.90E-14
Wellhouse 22 (Production)	12954	49.9465	647007.0	1.70E-14	4.20E-16	5.00E-17	1.00E-16	4.90E-17	1.70E-14
Wellhouse 40 (Production)	18626	49.7497	926637.0	4.60E-14	6.40E-16	5.00E-17	2.00E-16	9.80E-17	4.60E-14
Wellhouse 47A (Production)	18616	49.6900	925029.0	2.00E-14	2.00E-16	5.00E-17	1.20E-16	5.88E-17	2.00E-14
Wellhouse 54 (Production)	18593	49.7856	925663.0	4.00E-14	2.30E-16	5.00E-17	1.40E-16	6.86E-17	4.00E-14
Wellhouse 60 (Production)	18581	49.7456	924323.0	2.40E-14	3.50E-16	3.00E-16	1.70E-16	8.33E-17	2.40E-14
10 CFR 20 Effluent Limit				**1.00E-10**	**3.00E-10**	**6.00E-12**	**2.00E 11**	**3.00E 10**	**9.00E 13**
RL				**2.00E-15**	**1.00E-16**	**1.00E-16**	**1.00E-16**		

Note: if result was non-detect, 1/2 RL was used

Exhaust Rate for Wellhouse (CFM)	800	
Total Flow from Building (ml/ 6 months)	6.0E+12	(1 ft3 = 28316.84659 ml)
# Wellhouses	64	

Total Emissions of Each Radionuclide for First Half of Year

	Emission (Ci/6 Months)
Lead 210	1.40E-05
Radium 226	2.02E-07
Thorium 230	2.75E-07
Uranium	6.48E-08
Th234	3.17E-08
Po-210	1.40E-05
Sum	**2.86E-05**

Calculation of Particulate Emissions from DeepWell Buildings

First Half of Year

	Run Time (min)	Flow Rate (LPM)	Total Volume (L)	Lab Result (µCi/ml) Lead 210	Radium 226	Thorium 230	Uranium	Calculated Result (µCi/ml) Th234	Po-210
DeepWell Building #1	11521	49.59908	571431.0	2.30E-14	1.50E-15	4.70E-16	7.20E-16	3.53E-16	2.30E-14
DeepWell Building #2	11520	49.57691	571126.0	3.50E-14	1.90E-16	4.30E-16	1.40E-16	6.86E-17	3.50E-14
10 CFR 20 Effluent Limit				**1.00E-10**	**3.00E-10**	**6.00E-12**	**2.00E-11**	**3.00E-10**	**9.00E-13**
RL				**2.00E-15**	**1.00E-16**	**1.00E-16**	**1.00E-16**		

Note: if result was non-detect, 1/2 RL was used

	Building 1	Building 2	
Exhaust Rate for Wellhouse (CFM)	800	800	
Total Flow from Building (ml/ 6 months)	6.0E+12	6.0E+12	(1 ft3 = 28316.84659 ml)

Total Emissions of Each Radionuclide for First Half of Year

	Emission (Ci/6 Months) Building 1	Building 2
Lead 210	1.37E-07	2.08E-07
Radium 226	8.93E-09	1.13E-09
Thorium 230	2.80E-09	2.56E-09
Uranium	4.29E-09	8.33E-10
Th234	2.10E-09	4.08E-10
Po-210	1.37E-07	2.08E-07
By Building	**2.92E-07**	**4.22E-07**
Total	**7.14E-07**	

Crow Butte Resources

Wellhouse Radon Daughters Summary **C.Yada**

WH#	2022 2nd Qtr. Working Level Concentration	Date	2022 1st Qtr. Working Level Concentration	Date
3	0.000	2022-04-13	0.003	2022-01-20
4	0.001	2022-04-13	0.002	2022-01-20
5	0.001	2022-04-13	0.002	2022-01-20
6	0.002	2022-04-13	0.003	2022-01-20
7	0.001	2022-04-13	0.002	2022-01-20
8	0.002	2022-04-13	0.002	2022-01-20
9	0.008	2022-04-13	0.024	2022-01-20
10	0.006	2022-04-13	0.011	2022-01-20
11	0.000	2022-04-13	0.017	2022-01-20
12	0.000	2022-04-13	0.003	2022-01-20
13	0.000	2022-04-13	0.003	2022-01-20
14	0.002	2022-04-13	0.008	2022-01-20
15	0.001	2022-04-13	0.005	2022-01-20
16	0.002	2022-04-13	0.002	2022-01-20
17	0.002	2022-04-13	0.006	2022-01-20
18	0.000	2022-04-13	0.005	2022-01-20
19	0.001	2022-04-13	0.002	2022-01-20
20	0.002	2022-04-13	0.011	2022-01-20
21	0.001	2022-04-13	0.003	2022-01-20
22	0.002	2022-04-13	0.015	2022-01-20
23	0.000	2022-04-13	0.003	2022-01-20
24	0.002	2022-04-13	0.011	2022-01-20
25	0.000	2022-04-13	0.004	2022-01-20
26	0.003	2022-04-13	0.006	2022-01-20
27	0.003	2022-04-13	0.004	2022-01-20
28	0.001	2022-05-11	0.002	2022-02-11
29	0.004	2022-05-11	0.000	2022-02-11
30	0.001	2022-05-11	0.001	2022-02-11
31	0.000	2022-05-11	0.001	2022-02-11
32	0.000	2022-05-11	0.000	2022-02-11
33	0.002	2022-05-11	0.000	2022-02-11
34	0.004	2022-05-11	0.001	2022-02-11
35	0.001	2022-05-11	0.002	2022-02-11
36	0.001	2022-05-11	0.001	2022-02-11
37	0.010	2022-05-11	0.008	2022-02-11

Crow Butte Resources

Wellhouse Radon Daughters Summary **C.Yada**

WH#	2022 2nd Qtr. Working Level Concentration	Date	2022 1st Qtr. Working Level Concentration	Date
38	0.015	2022-05-11	0.007	2022-02-11
39	0.004	2022-05-11	0.003	2022-02-11
40	0.004	2022-05-11	0.004	2022-02-11
41	0.002	2022-05-11	0.001	2022-02-11
42	0.004	2022-05-11	0.004	2022-02-11
43	0.001	2022-05-11	0.002	2022-02-11
44	0.001	2022-05-11	0.001	2022-02-11
45	0.001	2022-05-11	0.000	2022-02-11
46	0.000	2022-05-11	0.001	2022-02-11
46A	0.000	2022-05-11	0.001	2022-02-11
47	0.001	2022-05-11	0.001	2022-02-11
47A	0.001	2022-05-11	0.001	2022-02-11
48	0.006	2022-05-11	0.001	2022-02-10
49	0.049	2022-05-11	0.022	2022-02-10
50	0.002	2022-05-11	0.005	2022-02-10
51	0.004	2022-06-22	0.002	2022-03-15
52	0.002	2022-06-22	0.002	2022-03-15
53	0.002	2022-06-22	0.001	2022-03-15
54	0.001	2022-06-22	0.002	2022-03-15
55	0.001	2022-06-22	0.003	2022-03-15
56	0.002	2022-06-22	0.004	2022-03-15
57	0.001	2022-06-22	0.002	2022-03-15
60	0.001	2022-06-22	0.001	2022-03-15
61	0.002	2022-06-22	0.002	2022-03-15
62	0.001	2022-06-22	0.001	2022-03-15
63	0.001	2022-06-22	0.001	2022-03-15
64	0.000	2022-06-22	0.002	2022-03-15
DDW-1	0.003	2022-06-22	0.001	2022-03-15
DDW-2	0.001	2022-06-22	0.001	2022-03-15

Appendix I

Environmental Air Monitoring Results

First and Second Quarter, 2022

Track Etch Cup Ambient Radon Concentrations

Air Monitoring Station No.

Period: December 31,2021 to July 1,2022

	Gross Count	Average Radon Concentration ($\times 10^{-9}$ µCi/ml)	Accuracy ($\times 10^{-9}$ µCi/ml)	Percent Effluent Concentration
AM-1	46.0	0.24	0.04	2.4%
AM-2	<21	<.11	-	-
AM-3	24.0	0.14	0.03	1.4%
AM-4	41.0	0.22	0.03	2.2%
AM-5	23.0	0.14	0.03	1.4%
AM-6A	20.0	0.11	0.02	1.1%
AM-6B	23.0	0.14	0.03	1.4%
AM-6C	<21	<.11	-	-
AM-6D	20.0	0.11	0.02	1.1%
AM-6E	23.0	0.14	0.03	1.4%
AM-6F	43.0	0.24	0.04	2.4%
AM-8	28.0	0.16	0.03	1.6%
AM-9A	28.0	0.16	0.03	1.6%
AM-9B	21.0	0.11	0.02	1.1%
AM-9C	37.0	0.22	0.04	2.2%
AM-9D	28.0	0.16	0.03	1.6%
AM-9E	<21	-	-	-
AM-9F	26.0	0.14	0.03	1.4%

LLD ($\times 10^{-9}$ µCi/ml)	0.2
Effluent Concentration Limit, 10 CFR 20 App B Column 2:	10

Pace Analytical
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sampler ID: AM-1

Lab ID: S2204204-001 **Sample Air Volume: 6506250 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	88.4	6.5	1.4E-14	1.0E-15	2E-15	6 E-13	Day	2.3
Radium 226	0.3	0.1	5.3E-17	1.5E-17	1E-16	9 E-13	Week	0.0059
Thorium 230	0.16	0.1	0.0E+0	1.5E-17	1E-16	3 E-14	Year	0
Uranium	0.2		2.9E-17		1E-16	9 E-14	Year	0.032

Client Sampler ID: AM-2

Lab ID: S2204204-002 **Sample Air Volume: 6240093 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	66.9	5.7	1.1E-14	9.1E-16	2E-15	6 E-13	Day	1.8
Radium 226	0.22	0.1	3.7E-17	1.6E-17	1E-16	9 E-13	Week	0.0041
Thorium 230	0.28	0.2	4.5E-17	3.2E-17	1E-16	3 E-14	Year	0.15
Uranium	0.3		4.2E-17		1E-16	9 E-14	Year	0.047

Client Sampler ID: AM-3

Lab ID: S2204204-003 **Sample Air Volume: 6513828 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	69.2	6.8	1.1E-14	1.0E-15	2E-15	6 E-13	Day	1.8
Radium 226	0.28	0.1	4.4E-17	1.5E-17	1E-16	9 E-13	Week	0.0049
Thorium 230	0.26	0.2	4.1E-17	3.1E-17	1E-16	3 E-14	Year	0.14
Uranium	0.3		4.9E-17		1E-16	9 E-14	Year	0.054

Client Sampler ID: AM-4

Lab ID: S2204204-004 **Sample Air Volume: 6497791 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	49.0	5.3	7.5E-15	8.2E-16	2E-15	6 E-13	Day	1.2
Radium 226	0.3	0.1	4.9E-17	1.5E-17	1E-16	9 E-13	Week	0.0054
Thorium 230	0.3	0.2	5.3E-17	3.1E-17	1E-16	3 E-14	Year	0.18
Uranium	0.5		7.1E-17		1E-16	9 E-14	Year	0.079

Pace Analytical
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sampler ID: AM-5

Lab ID: S2204204-005 **Sample Air Volume: 6515681 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	86.2	6.4	1.3E-14	9.8E-16	2E-15	6 E-13	Day	2.2
Radium 226	0.22	0.1	3.5E-17	1.5E-17	1E-16	9 E-13	Week	0.0039
Thorium 230	0.19	0.2	0.0E+0	3.1E-17	1E-16	3 E-14	Year	0
Uranium	0.3		4.6E-17		1E-16	9 E-14	Year	0.051

Client Sampler ID: AM-6

Lab ID: S2204204-006 **Sample Air Volume: 6510733 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	91.4	7.2	1.4E-14	1.1E-15	2E-15	6 E-13	Day	2.3
Radium 226	1.6	0.3	2.4E-16	4.6E-17	1E-16	9 E-13	Week	0.027
Thorium 230	0.11	0.1	0.0E+0	1.5E-17	1E-16	3 E-14	Year	0
Uranium	0.2		3.1E-17		1E-16	9 E-14	Year	0.034

Client Sampler ID: AM-8

Lab ID: S2204204-007 **Sample Air Volume: 6511976 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	89.5	6.3	1.4E-14	9.7E-16	2E-15	6 E-13	Day	2.3
Radium 226	1.2	0.2	1.8E-16	3.1E-17	1E-16	9 E-13	Week	0.020
Thorium 230	0.24	0.2	3.8E-17	3.1E-17	1E-16	3 E-14	Year	0.13
Uranium	0.3		4.4E-17		1E-16	9 E-14	Year	0.049

Client Sampler ID: AM-9

Lab ID: S2204204-008 **Sample Air Volume: 6423229 Liters**
Sampled 12/31/21-4/1/22 (2022 1st Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	66.2	4.9	1.0E-14	7.6E-16	2E-15	6 E-13	Day	1.7
Radium 226	2.0	0.3	3.0E-16	4.7E-17	1E-16	9 E-13	Week	0.033
Thorium 230	0.06	0.1	0.0E+0	1.6E-17	1E-16	3 E-14	Year	0
Uranium	0.3		4.5E-17		1E-16	9 E-14	Year	0.050

Effluent Limits are from 10 CFR Part 20 Appendix B Table 2

ND - Not Detected at the Reporting Limit

Pace Analytical
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sampler ID: AM-1

Lab ID: S2207072-001 **Sample Air Volume: 6278631 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	67.1	4.7	1.1E-14	7.5E-16	2E-15	6 E-13	Day	1.8
Radium 226	0.4	0.1	6.4E-17	1.6E-17	1E-16	9 E-13	Week	0.0071
Thorium 230	0.22	0.2	3.6E-17	3.2E-17	1E-16	3 E-14	Year	0.12
Uranium	0.4		6.4E-17		1E-16	9 E-14	Year	0.071

Client Sampler ID: AM-2

Lab ID: S2207072-002 **Sample Air Volume: 10948574 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	67.3	4.7	6.2E-15	4.3E-16	2E-15	6 E-13	Day	1.0
Radium 226	0.4	0.1	4.0E-17	9.1E-18	1E-16	9 E-13	Week	0.0044
Thorium 230	0.22	0.2	2.1E-17	1.8E-17	1E-16	3 E-14	Year	0.070
Uranium	0.6		5.2E-17		1E-16	9 E-14	Year	0.058

Client Sampler ID: AM-3

Lab ID: S2207072-003 **Sample Air Volume: 6398237 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	64.4	5.5	1.0E-14	8.6E-16	2E-15	6 E-13	Day	1.7
Radium 226	0.4	0.1	5.7E-17	1.6E-17	1E-16	9 E-13	Week	0.0063
Thorium 230	0.08	0.1	0.0E+0	1.6E-17	1E-16	3 E-14	Year	0
Uranium	0.6		8.7E-17		1E-16	9 E-14	Year	0.097

Client Sampler ID: AM-4

Lab ID: S2207072-004 **Sample Air Volume: 6444290 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	59.6	5.2	9.3E-15	8.1E-16	2E-15	6 E-13	Day	1.6
Radium 226	0.4	0.1	5.9E-17	1.6E-17	1E-16	9 E-13	Week	0.0066
Thorium 230	0.13	0.1	0.0E+0	1.6E-17	1E-16	3 E-14	Year	0
Uranium	0.5		8.2E-17		1E-16	9 E-14	Year	0.091

Pace Analytical
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Air Filter Summary Report

Client: Cameco Resources, Crow Butte Operation

Client Sampler ID: AM-5

Lab ID: S2207072-005 **Sample Air Volume: 6394349 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	80.1	6.3	1.3E-14	9.9E-16	2E-15	6 E-13	Day	2.2
Radium 226	0.4	0.1	6.0E-17	1.6E-17	1E-16	9 E-13	Week	0.0067
Thorium 230	0.07	0.1	0.0E+0	1.6E-17	1E-16	3 E-14	Year	0
Uranium	0.6		8.7E-17		1E-16	9 E-14	Year	0.097

Client Sampler ID: AM-6

Lab ID: S2207072-006 **Sample Air Volume: 5931072 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	70.5	5.1	1.2E-14	8.6E-16	2E-15	6 E-13	Day	2.0
Radium 226	0.4	0.1	7.1E-17	1.7E-17	1E-16	9 E-13	Week	0.0079
Thorium 230	0.17	0.1	0.0E+0	1.7E-17	1E-16	3 E-14	Year	0
Uranium	0.5		7.7E-17		1E-16	9 E-14	Year	0.086

Client Sampler ID: AM-8

Lab ID: S2207072-007 **Sample Air Volume: 6492373 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

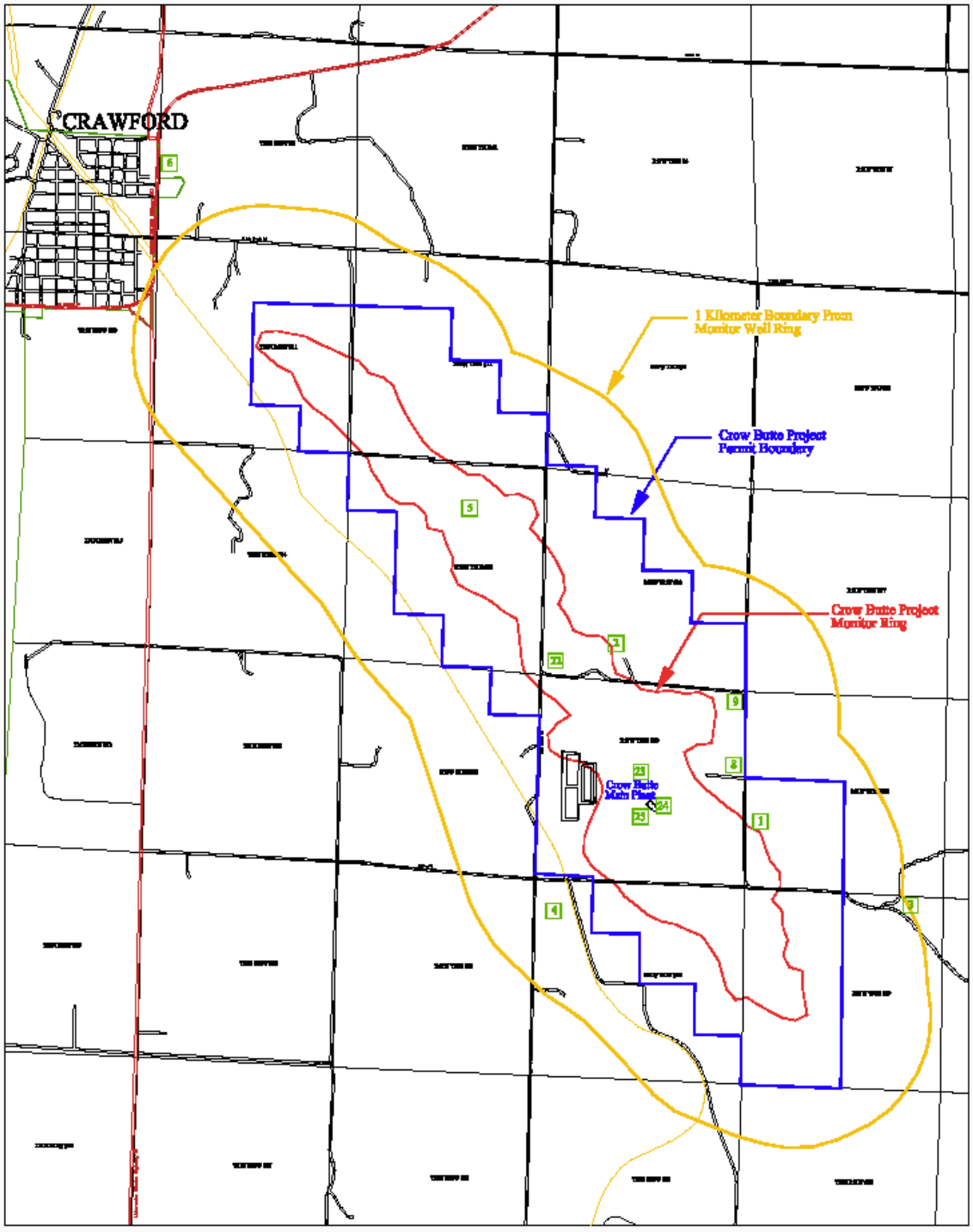
Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	63.1	4.6	9.7E-15	7.1E-16	2E-15	6 E-13	Day	1.6
Radium 226	0.4	0.1	6.7E-17	1.5E-17	1E-16	9 E-13	Week	0.0074
Thorium 230	0.21	0.2	3.4E-17	3.1E-17	1E-16	3 E-14	Year	0.11
Uranium	0.6		8.7E-17		1E-16	9 E-14	Year	0.097

Client Sampler ID: AM-9

Lab ID: S2207072-008 **Sample Air Volume: 6098336 Liters**
Sampled 4/1/22-7/1/22 (2022 2nd Qtr)

Analyte	Result pCi/filter	Precision ± pCi/filter	Result µCi/ml	Precision ± µCi/ml	RL	10 CFR Pt 20 Effluent Limit	Effluent Class	% Effluent Conc.
Lead 210	56.8	4.7	9.3E-15	7.7E-16	2E-15	6 E-13	Day	1.6
Radium 226	0.6	0.2	1.0E-16	3.3E-17	1E-16	9 E-13	Week	0.011
Thorium 230	0.3	0.2	5.7E-17	3.3E-17	1E-16	3 E-14	Year	0.19
Uranium	0.5		8.7E-17		1E-16	9 E-14	Year	0.097

Regional Sampling Locations



CROW BUTTE RESOURCES

Air Monitoring Station, Radon, Soil, Direct Radiation

0 500 1000 2000 meters

0 1000 3000 5000 feet

Appendix J

Environmental OSL Monitoring Results

First and Second Quarter, 2022

Crow Butte Resources

Crow Butte Uranium Project

Perimeter Air Monitoring Stations

Gamma Exposure Results

Location	Exposure of Dosimeter (mrems ambient dose equivalent)		Net Cumulative Totals		
	Gross	Net	Calendar Quarter	Year to Date	Permanent
1/1/2022 to 3/31/2022					
Transient Control	--	0.0	Q1	2022	--
Deploy Control	15	0.0	--	--	--
AM-1	31.1	16.1	16.1	16.1	517.4
AM-2	31.4	16.5	16.5	16.5	545.8
AM-3	33.3	18.3	18.3	18.4	608.1
AM-4	29.0	14.0	14.0	14.0	474.9
AM-5	30.3	15.3	15.3	15.3	594.9
AM-6	29.1	14.1	14.1	14.1	541.5
AM-8	31.6	16.6	16.6	16.6	671.8
AM-9	31.7	16.7	-	-	--

mrem – millirems

AM-1 air sampling locations

Minimum Detectable Dose = 0.1 mrems ambient dose equivalent

Crow Butte Resources

Crow Butte Uranium Project

Perimeter Air Monitoring Stations

Gamma Exposure Results

Location	Exposure of Dosimeter (mrems ambient dose equivalent)		Net Cumulative Totals		
	Gross	Net	Calendar Quarter	Year to Date	Permanent
4/1/2022 - 6/30/2022					
Transient Control	--	0.0	Q2	2022	--
Deploy Control	25.3	0.0	--	--	--
AM-1	35.9	10.6	10.6	26.7	528.0
AM-2	38.9	13.6	13.6	30.1	559.4
AM-3	38.6	13.3	13.3	31.6	621.5
AM-4	36.8	11.6	11.6	25.6	486.4
AM-5	39.5	14.2	14.2	29.5	609.0
AM-6	37.5	12.2	12.2	26.3	553.7
AM-8	40.0	14.7	14.7	31.3	686.5
AM-9	40.1	14.9	-	--	--

mrem – millirems

AM-1 air sampling locations

Minimum Detectable Dose = 0.1 mrems ambient dose equivalent

Appendix K

Radonova Radon Monitoring Results, Raw Data

First and Second Quarter, 2022

radonova
The global leader in radon measurement

REPORT NUMBER
6069737:1

REPORT PAGE
1 of 6

REPORT DATE
07/20/2022

PRINT DATE
07/20/2022

OWN ID
N/A

BY
Crow Butte Resources

REPORT RECEIVER(S)
tami_dyer@cameco.com

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories **07/13/2022**.
They were measured **07/18/2022**.

Test data have been given by Tami

Property data and address

MEASURE SITE ADDRESS
Crow Butte Resources
86 Crow Butte Rd
Crawford NE 69339

BUILDING ID

TRANSIT DETECTOR 1:
*495190 (14 ± 16 pCi*days/l)*

TRANSIT DETECTOR 2:
*192493 (15 ± 16 pCi*days/l)*

TRANSIT DETECTOR 3:
*593335 (12 ± 16 pCi*days/l)*

Test results

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	LOCATION TYPE	RADON RESULT
414032-3 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 3 Inside*	*In-door*	1.4 ± 0.25 pCi/L
732082-3 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 3 Outside*	*Out-door*	0.14 ± 0.09 pCi/L
769013-4 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 6 Inside*	*In-door*	3.9 ± 0.60 pCi/L
561456-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 6 Outside*	*Out-door*	0.22 ± 0.09 pCi/L
954828-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 9 Inside*	*In-door*	**35.0 ± 6.3 pCi/L**
150965-2 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 9 Outside*	*Out-door*	0.38 ± 0.11 pCi/L
193451-2 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 16 Inside*	*In-door*	2.6 ± 0.41 pCi/L
805797-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 16 Outside*	*Out-door*	0.19 ± 0.09 pCi/L
471256-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 22 Inside*	*In-door*	**5.2 ± 0.79 pCi/L**

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

SWEDAC ACKREDITERING
Accred. no. 1089
Testing
ISO/IEC 17025

RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com

radonova
The global leader in radon measurement

REPORT DATE
07/20/2022

PRINT DATE
07/20/2022

OWN ID
N/A

BY
Crow Butte Resources

REPORT RECEIVER(S)
tami_dyer@cameco.com

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories **07/13/2022**.
They were measured **07/18/2022**.

Test data have been given by Tami

Property data and address

MEASURE SITE ADDRESS
Crow Butte Resources
86 Crow Butte Rd
Crawford NE 69339

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	LOCATION TYPE	RADON RESULT
288326-2 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 22 Outside*	*Out-door*	0.22 ± 0.09 pCi/L
367047-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 40 Inside*	*In-door*	**6.1 ± 0.92 pCi/L**
187470-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 40 Outside*	*In-door*	0.24 ± 0.09 pCi/L
689242-6 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 47A Inside*	*In-door*	0.62 ± 0.14 pCi/L
554124-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 47A Outside*	*Out-door*	0.14 ± 0.09 pCi/L
109620-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 54 Inside*	*In-door*	1.4 ± 0.25 pCi/L
904032-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 54 Outside*	*Out-door*	0.16 ± 0.09 pCi/L
389265-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 60 Inside*	*In-door*	0.70 ± 0.14 pCi/L
138456-9 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Wellhouse 60 Outside*	*Out-door*	< 0.11 pCi/L
657890-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-1*	*Out-door*	0.24 ± 0.09 pCi/L
351470-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-2*	*Out-door*	< 0.11 pCi/L

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

SWEDAC ACKREDITERING
Accred. no. 1489
Testing
ISO/IEC 17025

RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com

radonova
The global leader in radon measurement

OWN ID N/A

BY Crow Butte Resources

REPORT RECEIVER(S) tami_dyer@cameco.com

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories **07/13/2022**.
They were measured **07/18/2022**.

Test data have been given by Tami

Property data and address

MEASURE SITE ADDRESS
Crow Butte Resources
86 Crow Butte Rd
Crawford NE 69339

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	LOCATION TYPE	RADON RESULT
838619-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-3*	*Out-door*	0.14 ± 0.06 pCi/L
228590-6 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-4*	*Out-door*	0.22 ± 0.09 pCi/L
767443-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-5*	*Out-door*	0.14 ± 0.09 pCi/L
136172-4 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-6a*	*Out-door*	0.11 ± 0.09 pCi/L
160315-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-6b*	*Out-door*	0.14 ± 0.09 pCi/L
505752-6 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-6c*	*Out-door*	< 0.11 pCi/L
955939-4 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-6d*	*Out-door*	0.11 ± 0.09 pCi/L
155739-6 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-6e*	*Out-door*	0.14 ± 0.09 pCi/L
977090-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-6f*	*Out-door*	0.24 ± 0.09 pCi/L
542744-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-8*	*Out-door*	0.16 ± 0.09 pCi/L
677984-7 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-9a*	*Out-door*	0.16 ± 0.09 pCi/L

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

SWEDAC ACCREDITERING
Accred. no. 1899
Testing
ISO/IEC 17025

RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com

radonova
The global leader in radon measurement

REPORT DATE
07/20/2022

PRINT DATE
07/20/2022

OWN ID
N/A

BY
Crow Butte Resources

REPORT RECEIVER(S)
tami_dyer@cameco.com

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories **07/13/2022**.
They were measured **07/18/2022**.

Test data have been given by Tami

Property data and address

MEASURE SITE ADDRESS
Crow Butte Resources
86 Crow Butte Rd
Crawford NE 69339

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	LOCATION TYPE	RADON RESULT
970122-8 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-9b*	*Out-door*	0.11 ± 0.09 pCi/L
311072-3 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-9c*	*Out-door*	0.22 ± 0.09 pCi/L
529488-9 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-9d*	*Out-door*	0.16 ± 0.09 pCi/L
290566-9 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-9e*	*Out-door*	< 0.11 pCi/L
994348-1 [Rapidos®]	*12/31/2021 – 07/01/2022*	*AM-9f*	*Out-door*	0.14 ± 0.09 pCi/L
409305-0 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Hallway by Office 8*	*In-door*	0.43 ± 0.11 pCi/L
197114-2 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Lunchroom*	*In-door*	0.46 ± 0.11 pCi/L
621578-4 [Rapidos®]	*12/31/2021 – 07/01/2022*	*HPT- Lab*	*In-door*	0.51 ± 0.11 pCi/L
651349-3 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Lab*	*In-door*	0.43 ± 0.14 pCi/L
958947-4 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Shaker Room Blower*	*In-door*	**5.2 ± 0.76 pCi/L**
283092-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Box Fan Behind Acid Scrubber*	*In-door*	1.5 ± 0.25 pCi/L

Comment to the results

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

SWEDAC ACKREDITERING
Accred. no. 1689
Testing
ISO/IEC 17025

RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com

radonova
The global leader in radon measurement

REPORT DATE
07/20/2022

PRINT DATE
07/20/2022

OWN ID
N/A

BY
Crow Butte Resources

REPORT RECEIVER(S)
tami_dyer@cameco.com

RADON MONITORING REPORT

Description of the measurement

The measurement was performed with a closed high-sensitivity alpha-track detector.

The detector(s) arrived to Radonova Laboratories **07/13/2022**.
They were measured **07/18/2022**.

Test data have been given by Tami

Property data and address

MEASURE SITE ADDRESS
Crow Butte Resources
86 Crow Butte Rd
Crawford NE 69339

BUILDING ID

DETECTOR	MEASUREMENT PERIOD	DESCRIPTION / LOCATION	LOCATION TYPE	RADON RESULT
244345-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*PWT (east) Box Fan*	*In-door*	**15.7 ± 2.9 pCi/L**
158663-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*PWT (west) Box Fan*	*In-door*	**4.9 ± 0.73 pCi/L**
388819-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*PWT Stack*	*In-door*	**4.9 ± 0.73 pCi/L**
284404-1 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Injection Filters (plant)*	*In-door*	**5.1 ± 0.68 pCi/L**
824088-9 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Blower Pipe Between Inj*	*In-door*	**5.1 ± 0.76 pCi/L**
661818-5 [Rapidos®]	*12/31/2021 – 07/01/2022*	*Control Room*	*In-door*	**DNR**
742195-1 [Rapidos®]	*12/31/2021 – 07/01/2022*	*R.O. Building North*	*In-door*	0.95 ± 0.14 pCi/L
274531-3 [Rapidos®]	*12/31/2021 – 07/01/2022*	*R.O. Building South*	*In-door*	1.6 ± 0.25 pCi/L

Comment to the results

US_EN_004_REPORT_v220628:1.ppcd

Tryggve Rönnqvist (Electronically signed)

Signature Radonova Laboratories Laboratory Measurement Specialist

SWEDAC ACKREDITERING
Accred. no. 1089
Testing
ISO/IEC 17025

RADONOVA INC.
1 EAST 22nd STREET, SUITE 200
LOMBARD, IL 60148
331.814.2200, help@radonova.com