



**2021 Second Quarter Compliance Monitoring
&
Operational Performance Report**

Reporting Period April 1– June 30, 2021

**Cameco Fuel Manufacturing Inc.
Fuel Facility Operating Licence
FFOL-3641.00/2022**

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Executive Summary

Cameco Corporation (Cameco) is committed to the safe, clean, and reliable operations of all of its facilities and continually strives to improve safety performance and processes to ensure the safety of both its employees, local residents, and the environment. CFM maintains the required programs, plans and procedures as required by the applicable regulations including but not limited to the areas of health and safety, radiation protection, environment, emergency response, fire protection, waste management, and training.

As a result of the programs, plans and procedures, CFM's operations have maintained radiation exposures to workers and the public well below the regulatory dose limits. Environmental emissions are also being controlled to levels that are a fraction of the regulatory limits. During the second quarter, there was one exceedance of the radiation protection action levels in which an employee's lung dose exceeded the annual lung dose action level. The incident was reported to the CNSC, entered into CIRS and a follow investigation completed. There were no exceedances of the action levels in the environmental protection program in the second quarter.

Cameco continued to implement precautionary actions that were taken with respect to the Covid-19 pandemic with entry assessments and weekly inhouse Covid-19 testing for all employees. During the second quarter another stay at home order was issued by the provincial government on April 17, 2021. Employees who were able to work at home during the provincial orders were encouraged to do so. In June, a staged approach was initiated by the government to open the province from restrictions. As during the stay at home order, employees continued to work from home if able to and were also able to enter the facility following completion of the entry assessments.

Table of Contents

EXECUTIVE SUMMARY2

1.0 SECOND QUARTER OVERVIEW.....4

1.1 Facility Operation4

1.2 Physical Design / Facility Modification.....6

2.0 RADIATION PROTECTION.....7

3.0 CONVENTIONAL HEALTH AND SAFETY14

4.0 ENVIRONMENTAL PROTECTION.....16

5.0 PUBLIC INFORMATION PROGRAM23

6.0 OTHER MATTERS OF REGULATORY INTEREST27

7.0 CONCLUDING REMARKS.....28

1.0 Second Quarter Overview

1.1 Facility Operation

Cameco continues to strive for operational excellence at all of its facilities through consistent application of management systems to ensure that they operate in a safe, clean, and reliable manner. Corporate policies and programs, including that for Safety, Health, Environment and Quality (SHEQ) provide guidance and direction for all site-based programs and procedures that define the CFM Management System.

In the first quarter of 2020, in accordance with Section 29 (1)(d) of the General Nuclear Safety Control Regulations, Cameco provided notification to the CNSC of some precautionary actions that were taken with respect to the Covid-19 pandemic and that Cameco activated their Local Business Continuity Plans. Cameco continued to implement precautionary actions that were taken with respect to the Covid-19 pandemic with entry assessments and weekly inhouse Covid-19 testing for all employees. During the stay at home order issued by the Provincial Government salary employees who were able to work from home were asked to stay home until the order was lifted in June; however, any employee who needed to go into the facility were permitted. Staffing levels continued to be monitored closely to maintain the minimum compliment for Emergency Response.

There were no significant changes to Structure, Systems and Components (SSC) or processes in the second quarter. CFM's Licence Conditions Handbook (LCH) references core CFM documents that form the licensing basis of the facility in each safety and control area. There were three documents that were submitted to the CNSC in the second quarter of 2021.

- Pressure Retaining Components (MSP 27-16), version 3 – The procedure was updated to reflect the current responsibilities as well as added the inspection and servicing requirements for Pressure Relief Devices as required by CSA B51-19, Boiler, Pressure Vessel, and Pressure Piping Code. The procedure is a notification document for submission requirements to the CNSC.
- Preliminary Decommissioning Plan (PDP) – The PDP was reviewed and updated to meet the requirements in the CNSC guidance documents *G-219, Decommissioning Planning for Licensed Activities* and *G-206, Financial Guarantees for the Decommissioning of Licensed Activities* as well as *CSA N294-19 Decommissioning of facilities containing nuclear substances*.
- Facility Licensing Manual (FLM), version 11 – The FLM was updated to address the CNSC staff comments related to version 10.
- Review of Environmental Risk Assessment (ERA) – a review of the November 2016 ERA was conducted to meet the 5 year review requirement under Clause 11 of N288.6-12 *Environmental risk assessment at class I nuclear facilities and*

uranium mines and mills with the review results required to be submitted to the CNSC. This review concluded that there are no identified risks that have emerged since the last ERA review and there were no changes identified in the review which required a full update of the ERA before the 5-year timeframe.

- Safety Analysis Report (SAR) - The Safety Analysis Report was updated to was submitted by Cameco in part to support the licence renewal application for CFM's Fuel Facility Operating Licence (FFOL-3641.0/2022). This version of the SAR was updated to include the recommendations from CNSC staff provided in 2015 and 2020 as well as requirements in the draft REGDOC 2.4.4 *Safety Analysis for Class 1B Nuclear facilities*.
- Exposure Based Release Limits (EBRLs) – Cameco submitted proposed EBRLs to support the licence renewal application for CFM's Fuel Facility Operating Licence (FFOL-3641.0/2022).
- Review of Environmental Action Levels – CFM completed a comprehensive review of its environmental action levels in accordance with the guidance in CSA standard N288.8-17 *Establishing and implementing action levels for releases to the environment from nuclear facilities*. This review was undertaken to support the licence renewal application for Fuel Facility Operating Licence (FFOL-3641.0/2022). The proposed action levels were submitted to the CNSC for approval and will be implemented in the third quarter.

There was no planned shutdown of the facility in the second quarter.

There were no reportable events as detailed in the *Nuclear Safety and Control Act* during the quarter. There was one exceedance of the radiation protection action levels in which an employee's lung dose exceeded the annual lung dose action level. The incident was reported to the CNSC, entered into CIRS and an investigation completed. There were no exceedances of the action levels in the environmental protection program.

1.2 Physical Design / Facility Modification

Modifications to facility buildings, processes, equipment, procedures, programs, or organizational structure with the potential to impact safety are evaluated through the internal change and design control process from planning through to completion. This process is used to help identify impacts and potential impacts to the licensing basis, the environment as well as to the health and safety of employees and local residents.

In the second quarter of 2021, there were no modifications undertaken that required written approval from the Commission or a person authorized by the Commission.

There were also no significant changes to the physical design of equipment, processes, or the facility in the quarter.

2.0 Radiation Protection

This safety and control area covers the implementation of a radiation protection program, in accordance with the *Radiation Protection Regulations*. The program must ensure that contamination and radiation doses are monitored and controlled.

CFM has established action levels pertaining to radiation protection, which are listed in CFM’s LCH. A result above an action level is investigated and remedial actions taken if necessary. During the second quarter there was one exceedance of the annual lung count action level. This was discovered during the routine lung count campaign conducted in the second quarter. The exceedance was entered into CIRS and was reported to the CNSC with a follow up investigation completed to identify the cause and implement corrective actions.

Whole Body Dose

Table 1 shows the second quarter whole body dose for three work groups: employees in the operations group, employees in administration/support roles, and outside contractors/visitors. The highest exposures are from the operations work group, consisting of production, inspection, and maintenance personnel. There were no action level exceedances for whole body dose in the radiation protection program during the quarter. In the second quarter, 94% of external whole body exposures for NEWs were 1 mSv or less.

Table 1

Second Quarter 2021 Whole Body Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	101	0.33	0.00	1.69
Administration / Support	74	0.01	0.00	0.33
Contractors/Visitors	12	0.02	0.00	0.10
Monthly action level is 1.6 mSv (for NEWs such as production employees). Quarterly action level is 1.0 mSv (for NEWs such as support staff and contractors).				

Table 2 shows the quarterly average, minimum and maximum individual external whole body exposure for all NEWs from the second quarter of 2020 to the second quarter of 2021 (five monitoring periods). The average whole body dose in the second quarter for all NEWs was 0.18 mSv. The average and maximum dose was elevated when compared to previous quarters. It is most accurate to compare the second quarter results in 2021 to the previous second quarter results in 2020 due to production rates. When these two

quarters are compared, taking into account the amount of uranium produced, the average dose was similar, and the maximum dose was higher in 2021. The individual with the highest exposure in the second quarter was a Pelleting Area employee.

Table 2

Whole Body Dose Results by Quarter				
Monitoring Period	Number of Employees	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q2 2020	179	0.16	0.00	1.58
Q3 2020	202	0.12	0.00	1.07
Q4 2020	186	0.14	0.00	1.16
Q1 2021	177	0.15	0.00	1.29
Q2 2021	187	0.18	0.00	1.69

Skin Dose

Table 3 shows the second quarter skin dose results for three work groups, employees in operations (monitored monthly), employees in administration and/or support roles and outside contractors/visitors (both monitored on a quarterly basis). The highest exposures are from the operations work group, consisting of production and maintenance personnel. The maximum skin dose for all NEWs was 14.87 mSv in the second quarter and the average skin dose for all NEWs was 1.32 mSv. The action levels for skin dose were not exceeded in the quarter. The majority of NEWs received a skin dose below 10 mSv (95.7%).

Table 3

Second Quarter 2021 Skin Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	101	2.43	0.00	14.87
Administration / Support	74	0.02	0.00	0.36
Contractors/Visitors	12	0.02	0.00	0.10
Monthly action level is 20.0 mSv (for NEWs such as production employees). Quarterly action level is 5.0 mSv (for NEWs such as support staff and contractors).				

Table 4 shows the employee quarterly average and maximum individual skin exposure from the second quarter of 2020 to the second quarter of 2021. It is most accurate to compare the second quarter results in 2021 to the previous second quarter results in 2020 due to production rates. When these two quarters are compared the average dose was

higher and the maximum dose was lower in the second quarter of 2021. The individual who received the maximum skin dose was a Pelleting area employee who was not the same individual with the maximum whole body dose.

Table 4

Skin Dose Results by Quarter				
Monitoring Period	Number of Employees	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q2 2020	179	1.16	0.00	19.10
Q3 2020	202	0.76	0.00	9.39
Q4 2020	186	0.95	0.00	11.92
Q1 2021	177	1.00	0.00	14.58
Q2 2021	187	1.32	0.00	14.87

Extremity Dose

The action level for extremity dose at CFM is 55 mSv per quarter. The quarterly action level applies to production NEWs who regularly handle product as part of their daily task. In the second quarter the extremity action level was not exceeded. It should be noted in the second quarter, CFM adjusted the method used to determine extremity dose to align with the Radiation Protection Regulations issued in 2020. Instead of employee’s wearing extremity rings for one week per quarter, employees were asked to wear extremity rings continuously for the entire month while onsite. This started in April, with the second quarter results calculated by summing April, May, and June data.

Table 5 displays the second quarter extremity results for the operation work group. In the second quarter all NEWs received an extremity dose below 20 mSv for both the left and right hand extremity.

Table 5

Second Quarter 2021 Extremity Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	79	1.93	0.00	10.58
Quarterly action level is 55.0 mSv (for NEWs such as production employees).				

Table 6 shows the average, minimum, and maximum extremity dose for NEWs over the period from the second quarter of 2020 to the second quarter of 2021. As noted above the second quarter data was calculated using a different method than previous quarter.

The second quarter results are lower than previous quarters which indicates the method of employee's wearing rings for one week per quarter was an overestimate of actual dose. This information will be used to determine a path forward on how extremity dose will be assigned. The individual with the highest exposure was a Pelleting Area employee and was not the same individual with the highest whole body or the highest skin dose.

Table 6

Extremity Dose Results by Quarter				
Monitoring Period	Number of Employees	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q2 2020	77	5.87	2.45	31.57
Q3 2020	76	4.14	0.02	21.04
Q4 2020	73	4.43	1.54	18.51
Q1 2021	74	4.17	1.85	16.41
Q2 2021	79	1.93	0.00	10.58

Urine Analysis

The action level for a single routine urine sample is 10 µg/L of uranium concentration. During the quarter there was no exceedance of the urine analysis action level. Routine urine samples results analyzed during the second quarter are provided in Table 7 below.

Table 7

Second Quarter 2021 Routine Urine Analysis Results				
Work Group	Number of Samples	Average (µg/L)	Minimum* (µg/L)	Maximum (µg/L)
Operations	383	0.25	<0.20	1.50
Routine urine sample action level is 10 µg/L				

*detection limit of equipment is 0.2 µg/L therefore reported as <0.20 µg/L

Internal Dose

Routine urine analysis samples are collected on a biweekly basis for trending purposes; if an acute uptake is noted it is verified using lung counting and dose assigned if required.

In the second quarter, there were no routine urine sample results that were above the internal administrative level of 4.0 µgU/L.

During the second quarter there was lung counts conducted as part of the campaign conducted every six months. There were 52 employees that were counted during the campaign. The next planned campaign is scheduled for November of 2021.

During the second quarter there was one exceedance of the annual lung count action level. This was discovered during a routine lung count in which an operator's results indicated the presence of surface contamination. This prompted follow up activities including several additional lung counts. The lung counts continued to show results above the Decision Level (DL) and the presence of surface contamination. An internal dose was assigned to the employee for the period between December 18, 2020 (last lung count) and June 17 (midpoint of the combined lung counts) of 5.5 mSv, which is in excess of CFM's annual lung count action level of 5.0 mSv. This is not the final dose that will be assigned to the employee for 2021, as this is calculated annually; and therefore, the results obtained later this year will be incorporated with this result to determine the final value. The exceedance was entered into CIRS and was reported to the CNSC with a follow up investigation completed to identify the cause and implement corrective actions.

Contamination Control

CFM has other programs to ensure radiation exposure levels remain low. An extensive contamination control program at CFM is zone control. The facility is divided into four zones for contamination control purposes. Zone 1 areas are designated as clean areas with no contamination permitted. Food and drink can be consumed in these areas and include the lunchroom and office areas. Zone 2 areas contain no open sources of radioactivity but have the potential for contamination. These areas include the assembly area, change rooms and the machine shop. Zone 3 areas are the access points to Zone 4. Zone 4 areas contain open sources of radioactivity and include the Pelleting Area. Consumption of food and drink are restricted in Zones 2, 3, and 4.

The administrative limits are provided in Table 8 as well as the routine contamination monitoring results for the second quarter. Of the 712 samples taken none exceeded the internal administrative control limits (ACL).

Table 8

Second Quarter 2021 Alpha Contamination Monitoring Results			
Area	# of Samples Taken	Administrative Limits (Bq/cm ²)	# of Samples Above Limits
Zone 1	140	0.4	0
Zone 2	192	4.0	0
Zone 3	42	4.0	0
Zone 4	338	40	0

In-Plant Air

Routine air sampling is conducted at workstations throughout the plant continuously during operations to monitor airborne uranium dioxide in the work environment. The results for the second quarter of 2021 taken in each area, including the CAM heads in the PP2 area, dry Waste Treatment area and the furnace hall (which was added in the second quarter), are shown in Table 9 below.

There were no results above the 2000 hour ACL in the second quarter.

Table 9

Second Quarter 2021 Uranium In-plant Air Sampling Results					
Plant Area	# of Samples	Average (µg U/m ³)	Maximum (µg U/m ³)	# Samples > ACL ^{2000 hr}	# Samples > ACL ^{80 hr}
Ceramics Lab	353	2	8	0	0
Compaction Room	126	2	7	0	0
Load Room	252	1	7	0	0
Pangborn Room	126	6	48	0	0
Pelleting Area	378	2	7	0	0
UO ₂ Grinders	252	4	48	0	0
Waste Treatment	63	3	10	0	0
PP2 Area	712	2	8	0	0
Dry Waste Treatment	390	2	7	0	0
Furnace Hall	534	2	7	0	0
TOTAL	3186	3	48	0	0
2000 hour Administrative Control Limit = 52 µg/m ³					
80 hour Administrative Control Limit = 595 µg/m ³					

Gamma Surveys

An ongoing ALARA initiative involves posting OSL's around the facility to determine areas of elevated gamma radiation. The result for each location in the second quarter is summarized in Table 10. The results illustrate that the Fuel Storage Area had the highest gamma fields (5.8 $\mu\text{Sv/hr}$), which is expected due to the amount of product stored in the area. The area is posted instructing workers to limit the time spent in this area. The next highest reading (4.6 $\mu\text{Sv/hr}$) was in the PP2 Receiving area. This is expected due to the amount of raw material stored in this area. Employees limit their time in this area as well.

Table 10

Second Quarter 2021 Gamma Survey Results						
Location #	Area	Result ($\mu\text{Sv/hr}$)		Location #	Area	Result ($\mu\text{Sv/hr}$)
13	Kitting	0.2		37	PP2 Powder Rec. N.	1.2
14	S Stacking	0.9		38	Powder Receipt	0.1
15	Stacking	0.1		39	U ₃ O ₈ Add-back	1.1
16	Pelleting Entry	0.5		40	S End Cap	0.2
17	Pelleting Lab	0.3		41	End Cap	0.3
18	S Grinding	1.1		42	N End Cap	0.1
19	Grinding	1.0		43	E Offices	0.0
20	N Grinding	0.9		44	S End Plate	0.0
21	S Wall	0.0		45	End Plate	0.0
22	S Furnace	0.7		46	N End Plate	0.0
23	Furnace	0.9		47	W Offices	0.0
24	N Furnace	0.1		48	S Inspection	0.1
25	SE Wall	0.2		49	Inspection	0.1
26	E Wall Furnace	0.9		50	N Inspection	1.2
27	NE Wall	0.5		51	W Inspection	0.0
28	N Corridor	0.3		52	Strapping Bay	0.3
29	Ceramics Lab	0.1		53	Packing	0.3
30	R7#1 East Wall	1.5		54	Fuel Storage Area	5.8
31	PP2 West Wall	0.2		55	Graphite East	0.1
32	S Pressing	0.5		56	BMS Loading	0.9
33	N Pressing	0.6		57	PP2 Receiving	4.6
34	Pangborn	0.9		58	PP2 Press R53-1	1.3
35	S. Waste Treat	2.6		59	PP2 East Wall	0.6
36	N. Waste Treat	0.6				

3.0 Conventional Health and Safety

This safety and control area covers the implementation of a program to manage non-radiological workplace safety hazards and to protect personnel and equipment. Table 11 shows the safety statistics for the Port Hope facility.

Table 11

2021 Safety Statistics					
Year / Parameter	Q1	Q2	Q3	Q4	YTD
First Aid Injuries	4	5			9
Medical Diagnostic Injuries	0	1			1
Medical Treatment Injuries	0	0			0
Lost Time Injuries	0	0			0
Lost Time Injury Frequency	0.0	0.0			0.0
Lost Time Injury Severity	0.0	0.0			0.0

There were no lost time incidents that occurred in the second quarter. The second quarter Total Recordable Injury Rate (TRIR) was 0.0 for the Port Hope facility and was 0.0 for both facilities (Port Hope and Cobourg). The year to date TRIR for both facility is also 0.0.

Health and Safety Activities

- **Communications:** The second quarter safety meetings were held each month with a different topic each month including heat stress awareness, workplace violence prevention and summer safety. Each month an update is included for the previous month on 4 topics: Safe, healthy, and rewarding workplace, clean environment, supportive communities, and outstanding financial performance. Safety statistics as well as the status on quality and production targets are also included in the update on these topics.
- **Education and Training:** During the second quarter of 2021, the Emergency Response Program training was rolled out for emergency responders. This involved conducting two table-top simulations. Also, in the second quarter the SAT work for the PP2 Operator continued. The analysis and the design were both completed and signed-off with the development of the training material starting. During the second quarter another stay at home order was issued by the provincial government on April 17, 2021. As a result, only safety critical training could continue onsite. With all COVID-19 protocols in place, training and

requalification for lift truck and elevated work platform operators were able to continue face-to-face. Toward the end of the second quarter, the CNSC completed a virtual compliance inspection focused on training.

- **Safety Awareness Activities:** CFM celebrated mental health week in May by using a different safety moment each day, such as the importance of sleep, as well as activities and games. The Live Better committee also held a step challenge, encouraging employees to walk and obtain prizes for the most steps. The committee also held a mental health photography contest, which encouraged employees to be mindful and present and submit photos of various findings in nature. During the annual summer shutdown BBQ, the JHSC focused on physical health and gave away smart watches that track health related items such as heart rate, steps, etc.
- **JH&SC and Safety Subcommittees:** The JHSC continues to meet virtually through Microsoft Teams each month.
- **Safety & Industrial Hygiene:** CFM continued to offer rapid COVID-19 tests to its employees on a voluntary basis at both sites. These tests are scheduled weekly.
- **Covid-19 Interruption:** CFM continued to take all necessary precautions to prevent the spread of COVID-19. Processes continued to be adjusted to permit social distancing and precautionary protocols. Most support employees continued to return to the site for a few days and work from home the remaining days. A few employees continued to work exclusively from home. After each of the stay at home order issued in April employees returned to working from home; however, employees were able to enter the facility if required. After the order was lifted in June employees were able to continue working from home if able to and were also permitted to return the facility.

4.0 Environmental Protection

This safety and control area covers the programs that monitor and control all releases of nuclear and hazardous substances into the environment, as well as their effects on the environment, as the result of licensed activities.

Public Dose

With the update to the Derived Release Limit (DRL) report, the calculated public dose was revised to include potential dose from all pathways at the CFM facility. Beginning in the first quarter of 2021, public dose is now calculated by summing the total amount of uranium dioxide released to air in process stacks, building ventilation as well as liquid emissions, and is added to the gamma dose to the critical receptor (now represented by location #12). This is demonstrated in the following formula:

$$\text{Public Dose} = \text{Dose Air (stacks)} + \text{Dose Air (building ventilation)} + \text{Dose Water} + \text{Dose Gamma}$$

The estimated public dose, along with each component, for the second quarter of 2021 using revised DRLs, the revised formula (including liquid and breaking apart air sources), and the new location for the critical receptor is provided in Table 12. Also included in the table is the estimated dose to the public using the previous method with the updated DRL's from the second quarter of 2020 to the second quarter of 2021.

The results in the second quarter of 2021 using the updated method appear elevated when compared to previous quarters, but there has not been an actual increase in emissions/dose from the facility. The results actually represent a more conservative estimate of dose to the public, as the gamma monitoring location at the facility fence line is now closer to the operating facility than the previous location, resulting in the increase shown in the table. For this reason, how the results are calculated beginning in 2021 should be considered when comparing to previous quarters' results.

The total dose to the member of the public from air, liquid emissions and gamma levels for the quarter is calculated to be 0.099 mSv. Total dose to the critical receptor continues to be a fraction of the public dose limits.

Table 12

Public Dose by Quarter (mSv/qtr)					
DRL Component	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Air (combined)	0.004	0.003	0.003	0.023	0.026
Air (stacks)	-	-	-	0.000	0.000
Air (building ventilation)	-	-	-	0.023	0.026
Liquid	-	-	-	0.001	0.001
Gamma (Location 12)	-	-	-	0.067	0.072
Gamma (Location 1)	0.154	0.017	0.014	0.000	0.057
Total dose to Previous Critical Receptor (location #1)*	0.158	0.020	0.018	0.024	0.084
Total dose to Critical Receptor (location #12)+	-	-	-	0.091	0.099

*Data calculated using location #1 gamma dose as well as revised DRL's and including liquid dose

+Data calculated using location #12 gamma dose as well as revised DRL's and including liquid dose

Gamma Monitoring

In the first quarter of 2021, the fence line gamma location for the critical receptor was changed from location #1 to location #12. The perimeter gamma for the critical receptor at location #12, in the 2020 DRL, is 1.35 $\mu\text{Sv/hr}$ and the action level remains at 1.0 $\mu\text{Sv/hr}$ respectively. The other DRL's listed for gamma monitoring are for location #1 and location #2 at 4.96 $\mu\text{Sv/hr}$ and 0.46 $\mu\text{Sv/hr}$ respectively. There were no exceedances of the DRL's or the action levels during the second quarter.

Table 13 provides the quarterly gamma levels in $\mu\text{Sv/hr}$ for all fence line monitoring locations (i.e. 1-12) for the quarter. The DRL's for gamma monitoring on the fence line were updated in the revised 2020 DRL report. On April 1, 2021, an interim action level of 0.1 $\mu\text{Sv/hr}$ for location #2 was implemented. On April 30, 2021, CFM proposed an action level of 0.2 $\mu\text{Sv/hr}$ which has been accepted by the CNSC and is effective on July 1, 2021. Therefore, for the second quarter of 2021, the action level of 0.1 $\mu\text{Sv/hr}$ is in place. The result for location #2 in the second quarter was below the interim action level.

Table 13

Second Quarter 2021 Gamma Monitoring Results ($\mu\text{Sv/hr}$)		
Location	Action Level	Quarterly Dose Rate
1	0.2	0.02
2	1.0 (Jan. 1 to Mar. 31) 0.1 (April 1 to June 20) 0.2 (starting July 1)	0.03
3	1.0	0.00
4	1.0	0.00
5	1.0	0.00
6	1.0	0.00
7	1.0	0.00
8	1.0	0.00
9	1.0	0.04
10	1.0	0.00
11	1.0	0.31
12	1.0	0.39

*The DRL's for gamma monitoring on the fence line were updated in the revised 2020 DRL report. On April 1, 2021, an interim action level of 0.1 $\mu\text{Sv/hr}$ for location #2 was implemented. The action level of 0.2 $\mu\text{Sv/hr}$ was accepted for use starting on July 1, 2021. Therefore, for the second quarter of 2021, the action level of 0.1 $\mu\text{Sv/hr}$ is in place.

The monitoring results for location 12 (closest location to the revised critical receptor) from the second quarter in 2020 to the second quarter of 2021 are provided in Table 14. Results have been corrected to take into account background gamma levels by subtracting 0.08 $\mu\text{Sv/hr}$.

Table 14

Gamma Monitoring Results at Critical Receptor by Quarter ($\mu\text{Sv/hr}$)			
Period	Regulatory Limit (DRL)	Action Level	DRL Contribution
Q2 2020	1.35	1.0	0.39
Q3 2020	1.35	1.0	0.35
Q4 2020	1.35	1.0	0.35
Q1 2021	1.35	1.0	0.36
Q2 2021	1.35	1.0	0.39

Stack Emissions

The total amount of uranium dioxide released to the environment during the quarter in gaseous effluent from stacks was 0.003 kg. The action level for stack emissions is 2.0 µg/m³ uranium concentration for a daily stack reading. There were no exceedances of the release limit or action levels with respect to air emissions during the quarter.

Table 15 provide the average and maximum uranium concentration for all stacks in µg/m³ from the second quarter of 2020 to the second quarter of 2021. The average concentrations measured in stack emissions in the second quarter were similar to previous quarters. The maximum result in the second quarter was less than previous quarters.

Table 15

Daily Stack Emissions by Quarter (µg/m³)							
Source	Action Level	Avg. / Max.	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
PP2 West	2.0	Avg.	0.0	0.0	0.1	0.0	0.0
		Max.	0.1	0.5	1.3	0.0	0.3
PP2 East	2.0	Avg.	0.1	0.1	0.0	0.0	0.0
		Max.	0.2	1.1	0.2	0.1	0.2
Waste Treatment Area Absolute	2.0	Avg.	0.1	0.1	0.1	0.0	0.2
		Max.	0.3	0.5	0.7	0.4	0.9
BMS Extraction	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.4	0.1	0.0	0.1
Hoffman Vacuum	2.0	Avg.	0.1	0.1	0.0	0.0	0.0
		Max.	1.5	0.3	0.1	0.1	0.1
Pangborn North Dust Collector	2.0	Avg.	0.1	0.1	0.0	0.0	0.1
		Max.	0.2	0.7	0.1	0.1	0.3
Pangborn South Dust Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.6	0.1	0.0	0.1
DeVilbiss Mist Collector	2.0	Avg.	0.0	0.0	0.0	0.1	0.1
		Max.	0.2	0.5	0.1	0.1	0.3
Furnace Burn-off	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.0	0.0	0.0	0.1
Overall	2.0	Avg.	0.0	0.1	0.0	0.0	0.0
		Max.	1.5	1.1	1.3	0.4	0.9

Building Ventilation Emissions

The action level for building ventilation is 1.0 g/hr monitored on a daily basis for the Pelleting Area and 0.5 g/hr for the PP2 area. CFM has proposed lowering the PP2 area action level to 0.4 g/hr which has been accepted by the CNSC with implementation to begin July 1, 2021. There were no exceedances of either action level in the second quarter. The estimated release of uranium dioxide in exhaust ventilation from both areas during the quarter was 0.27 kg (0.24 kg from the Pelleting Area and 0.03 kg from the PP2 area).

Table 16 provides the average and maximum uranium concentration emitted through the building ventilation system in g/hr from the second quarter of 2020 to the second quarter of 2021.

The table demonstrates that the PP2 area has much lower emissions through building ventilation than the Pelleting Area and the results are consistent between the quarters. In the second quarter of 2021 the building ventilation average and maximum emission rates for the Pelleting Area were comparable to previous quarters.

Table 16

Building Ventilation Rates by Quarter (g/hr)							
Parameter	Action Level	Measure	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Uranium Emissions from Pelleting Area	1.0	Average	0.15	0.15	0.14	0.15	0.16
		Maximum	0.54	0.37	0.47	0.24	0.26
		Minimum	0.06	0.08	0.06	0.08	0.09
Uranium Emissions from PP2 Area	0.5	Average	0.01	0.01	0.01	0.01	0.01
		Maximum	0.05	0.05	0.10	0.02	0.05
		Minimum	0.00	0.00	0.00	0.00	0.00

Liquid Emissions

The action level for liquid effluent released to the sewer is 0.1 mg/L. In the second quarter there was no exceedance of the action level.

Table 17 provides the average and maximum uranium concentration for a single composite sample from the second quarter of 2020 to the second quarter of 2021. The average and maximum concentration in the second quarter were comparable to previous

quarters. Also provided in the table is the minimum and maximum pH measured in the samples.

Table 17

Sanitary Sewer Emissions by Quarter							
Parameter	Action Level (mg/L)	Measure	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Uranium (mg/L)	0.1	Average	0.01	0.01	0.01	0.01	0.01
		Maximum	0.02	0.03	0.02	0.02	0.02
pH (pH units)	6.5	Minimum	7.5	7.3	7.3	7.5	7.4
	9.0	Maximum	8.3	8.9	8.4	8.4	8.9
Volume of water	-	(m ³)	6285	5485	5069	5070	5225
Estimated Discharge	-	(kg)	0.08	0.07	0.07	0.07	0.07

Ambient Air Monitoring

High volume air samples are collected in the four corners of the CFM property. Table 18 shows the quarterly average and maximum results for all four locations from the second quarter of 2020 to the second quarter of 2021.

Table 18

Overall Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg/m ³)					
Parameter	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021
Average	0.0003	0.0004	0.0002	0.0002	0.0007
Maximum	0.0010	0.0024	0.0006	0.0003	0.0056

Table 19 provides the quarterly average and maximum uranium-in-air concentrations for all locations from the second quarter of 2020 to the second quarter of 2021. The average result for the second quarter is elevated when compared to previous results. The average was affected by the maximum results after all four stations were higher during one week in June. A cause of the elevated readings was not able to be determined; therefore, the results were entered into CIRS for tracking. The results returned to typical levels the following week.

Table 19

Uranium-in-Air Concentration at Hi-Vol Stations by Quarter ($\mu\text{g}/\text{m}^3$)					
Quarter	Result	East	North	North West	South West
Q2 2020	Average	0.0003	0.0004	0.0003	0.0003
	Maximum	0.0009	0.0010	0.0008	0.0009
Q3 2020	Average	0.0004	0.0006	0.0003	0.0004
	Maximum	0.0014	0.0024	0.0009	0.0014
Q4 2020	Average	0.0003	0.0002	0.0002	0.0002
	Maximum	0.0006	0.0004	0.0004	0.0005
Q1 2021	Average	0.0002	0.0002	0.0002	0.0002
	Maximum	0.0003	0.0003	0.0003	0.0003
Q2 2021	Average	0.0006	0.0007	0.0006	0.0008
	Maximum	0.0039	0.0050	0.0042	0.0056

5.0 Public Information Program

During the second quarter of 2021, CFM continued to meet the requirements of CNSC RD/GD 3.2.1, *Public Information and Disclosure programs*.

Public Engagement

In April, two cases of COVID-19 were identified at CFM. Statements were posted online and to Cameco Ontario social media channels.

On May 6, employees from Cameco attended the Northumberland Manufacturers Association Virtual Career Day. The virtual Cameco table had 14 visitors including students, recruiters and industry members looking for more information on Cameco operations and potential job openings.

Cameco began promoting the virtual Step Up for Mental Health event during the month of May. The event will take place virtually from October 1 to 6, and all funds raised from Ontario participants will contribute to the existing Cameco Fund for Mental Health in Northumberland County. Cameco issued a news release to local media and posted the release to the website.

In late May and early June, approximately 325 Port Hope residents were contacted by Fast Consulting for the annual public opinion poll. The survey was promoted on social media to inform residents they may receive a call. The survey results will be available in Q3.

On June 1, representatives from Cameco joined Port Hope Municipal Council to make a presentation regarding CFM's request to the CNSC to renew its operating licence for one year.

In June, Cameco sponsored the Northumberland United Way Week of Caring to raise funds for Northumberland Eats. Cameco also sponsored the Ride for Rebound cycling event raising money for Rebound Child and Youth Services.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFMs Community Partner Program. Through the quarter, Sounds of the Next Generation, Rebound Child and Youth Services, and Habitat for Humanity benefitted from this sponsorship by receiving advertising.

Public Disclosure

No public disclosures were made during the second quarter.

Social Media

Cameco Ontario's Facebook community grew by 29 new followers (949 total) and had a total of 921 page likes at the end of the quarter. Cameco Ontario's 20 posts covered information such as:

- Cameco presentation to Port Hope town council regarding the licence renewal process at CFM
- Industry news from Bruce Power
- International Women's Day
- Cameco Fuel Manufacturing licence renewal application
- Job postings at Ontario facilities
- The release of the spring issue of Energize
- Sharing the results of a CNSC independent environmental monitoring reports for Blind River and Port Hope
- Promotions for community partners and sponsorships.

By the end of the quarter the Instagram account had grown by 35 new followers for a total of 546 followers. Photos and information featured was similar to the Cameco Ontario Facebook account.

Indigenous Engagement

In April, Cameco emailed the 2020 Annual Compliance Report and Spring 2021 Energize newsletter to Alderville, Hiawatha, Curve Lake, Scugog Island and Rama First Nations.

Cameco's communications manager and the director of compliance met with Curve Lake First Nation on April 28, May 26, and June 30. Cameco provided information about its operational activities. Cameco and Curve Lake First Nation continue to meet regularly and discuss areas of interest. Cameco emailed Curve Lake First Nation a copy of the public disclosure on June 3.

Website

Three statements regarding positive COVID-19 cases were posted to the website:

- [Port Hope Conversion Facility Assumed Positive Case - News Archive - Media - Cameco Fuel Services](#)
- [Port Hope Conversion Facility Positive Case - News Archive - Media - Cameco Fuel Services](#)

- [Positive Case at Port Hope Conversion Facility - News Archive - Media - Cameco Fuel Services](#)

One news release was posted to the website:

- [Step Up for Mental Health Run Goes Virtual - News Archive - Media - Cameco Fuel Services](#)

A recording of the presentation to the Municipality of Port Hope was posted to the website:

- [CFM Presentation to Port Hope Municipal Council – June 1, 2021 - News Archive - Media - Cameco Fuel Services](#)
- [Licence Renewal - Cameco Fuel Manufacturing - Business - Cameco Fuel Services](#)

Media Analysis

Cameco received media coverage regarding COVID-19, Step Up for Mental Health run, Week of Caring and the Mission to Mars Competition:

- **COVID-19 case at Cameco Fuel Manufacturing in Cobourg, out of caution some workers sent home**
Northumberland News – April 9, 2021
 - <https://www.northumberlandnews.com/news-story/10370422-covid-19-case-at-cameco-fuel-manufacturing-in-cobourg-out-of-caution-some-workers-sent-home/>
- **Positive COVID-19 Case at Cameco Fuel Manufacturing Cobourg**
News Now – April 9, 2021
 - <http://www.cobourgnow.com/?p=18493>
- **Positive COVID-19 Case at Cameco Fuel Manufacturing Cobourg**
Todays Northumberland – April 9, 2021
 - <https://todaysnorthumberland.ca/2021/04/09/positive-covid-19-case-at-cameco-fuel-manufacturing-cobourg/>
- **Cameco – Step Up for Mental Health Run Goes Virtual**
Todays Northumberland – May 13, 2021
 - <https://todaysnorthumberland.ca/2021/05/13/cameco-step-up-for-mental-health-run-goes-virtual/>
- **Cobourg students part of winning virtual 'Mission to Mars Competition'**
Northumberland News – May 19, 2021

- [https://www.northumberlandnews.com/community-story/10394009-cobourg-students-part-of-winning-virtual-mission-to-mars-competition-/](https://www.northumberlandnews.com/community-story/10394009-cobourg-students-part-of-winning-virtual-mission-to-mars-competition/)
- **‘Week of Caring for Northumberland Eats’ supports food voucher program amid COVID-19**
Northumberland News – June 3, 2021
 - <https://www.northumberlandnews.com/news-story/10408381--week-of-caring-for-northumberland-eats-supports-food-voucher-program-amid-covid-19/>
- **Northumberland raises \$19,250 for Northumberland Eats through Week of Caring**
Northumberland News – June 16, 2021
 - <https://www.northumberlandnews.com/news-story/10416964-northumberland-raises-19-250-for-northumberland-eats-through-week-of-caring/>

Communication Products

One news release was issued to local media and posted to the website: [Step Up for Mental Health Run Goes Virtual - News Archive - Media - Cameco Fuel Services](#)

A recording of the presentation to the Municipality of Port Hope was posted to the website: [CFM Presentation to Port Hope Municipal Council – June 1, 2021 - News Archive - Media - Cameco Fuel Services.](#)

6.0 Other Matters of Regulatory Interest

There were no processing activities of enriched material conducted on site in the second quarter of 2021 and CFM met all site-specific reporting requirements.

Cameco continued to implement precautionary actions that were taken with respect to the Covid-19 pandemic.

7.0 CONCLUDING REMARKS

Cameco is committed to the safe, clean, and reliable operations of all of its facilities and continually strives to improve safety performance and processes to ensure the safety of both its employees and the local residents.

During the second quarter of 2021, CFM did not exceed any CNSC regulatory limits. CFM maintained environmental emissions and public radiation exposures to levels that are a fraction of the regulatory limits.

Cameco's relationship with local residents remains strong and we are committed to maintaining the strong support and trust we have developed over the past several years.