



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

Reporting Period July 1– September 30, 2021

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

200 Dorset Street East
Port Hope, Ontario
L1A 3V4

Submitted to:
The Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
280 Slater Street
Ottawa, Ontario
K1P 5S9

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 third quarter, there were no exceedances of the action levels in the radiation protection or environmental protection program.

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. In June 2021, a staged approach was initiated by the government to open the province from restrictions. During the third quarter employees were encouraged to return to the facility with flexibility granted for employees who requested to work from home on a part time basis.

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1.0 Third 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. During the third quarter of 2021, 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. In June 2021, a staged approach was initiated by the government to open the province from restrictions. During the third quarter, employees were encouraged to return to the facility with flexibility granted for employees who requested to work from home on a part time basis.

There were no significant changes to Structure, Systems and Components (SSC) or processes in the third 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 two documents that were submitted to the CNSC in the third quarter of 2021.

- Environmental Protection Program (EPP) – The EPP was updated to reflect changes in the derived release limits, action levels and to align with the current practice for terrestrial and aquatic sampling.
- Exposure Based Release Limits (EBRLs) – Cameco implemented EBRLs to support the licence renewal application for CFM's Fuel Facility Operating Licence (FFOL-3641.0/2022).

In the third quarter there was a planned shutdown of the facility for three weeks in July. The planned shutdown provides an opportunity to complete maintenance activities, complete any scheduled facility and equipment upgrades as well as allows operators an opportunity to use vacation time.

There were no reportable events as detailed in the *Nuclear Safety and Control Act* during the quarter. There were no exceedances of the action levels in the radiation protection or 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 third 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 third quarter there was no exceedance in the Radiation Protection program.

Whole Body Dose

Table 1 shows the third 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 third quarter, 99% of external whole body exposures for NEWs were 1 mSv or less.

Table 1

Third Quarter 2021 Whole Body Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	104	0.21	0.00	1.28
Administration / Support	81	0.01	0.00	0.23
Contractors/Visitors	9	0.02	0.00	0.06
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 third quarter of 2020 to the third quarter of 2021 (five monitoring periods). The average whole body dose in the third quarter for all NEWs was 0.12 mSv. The average and maximum dose are lower when compared to previous quarters (with the exception of the maximum dose in the third quarter of 2020). It is most accurate to compare the third quarter results in 2021 to the previous third 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 third 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)
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
Q3 2021	194	0.12	0.00	1.28

Skin Dose

Table 3 shows the third 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 8.81 mSv in the third quarter and the average skin dose for all NEWs was 0.73 mSv. The action levels for skin dose were not exceeded in the quarter. All NEWs received a skin dose below 10 mSv (100%).

Table 3

Third Quarter 2021 Skin Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	104	1.35	0.00	8.81
Administration / Support	81	0.02	0.00	0.61
Contractors/Visitors	9	0.02	0.00	0.06
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 third quarter of 2020 to the third quarter of 2021. It is most accurate to compare the third quarter results in 2021 to the previous third quarter results in 2020 due to production rates. When these two quarters are compared the average and maximum dose was the same. 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)
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
Q3 2021	194	0.73	0.00	8.81

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 third quarter the extremity action level was not exceeded. It should be that starting in the second quarter, CFM began an assessment for the extremity dose to align with the Radiation Protection Regulations issued in 2020. Instead of employees 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. The third quarter results were also calculated by summing the monthly dose for July, August, and September. Until the assessment was completed employees continued to wear extremity rings each month. The assessment identified the majority of employees are not required to be assigned dose from a licensed dosimetry service provider. There is one group that will continue to wear extremity rings until the end of the year to complete the assessment to determine if this group must continue to wear rings or not.

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

Table 5

Third Quarter 2021 Extremity Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	79	1.25	0.00	7.87
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 third quarter of 2020 to the third quarter of 2021. As noted above the second and third quarter data for 2021 was calculated using a different method than previous quarter. The second and third quarter results for 2021 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. 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)
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
Q3 2021	79	1.25	0.00	7.87

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 third quarter are provided in Table 7 below.

Table 7

Third Quarter 2021 Routine Urine Analysis Results				
Work Group	Number of Samples	Average (µg/L)	Minimum* (µg/L)	Maximum (µg/L)
Operations	360	0.25	<0.20	1.30
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 third quarter, there were no routine urine sample results that were above the internal administrative level of 4.0 µgU/L.

During the third quarter there were no routine lung counts conducted. The next planned campaign is scheduled for November and December of 2021.

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 third quarter. Of the 653 samples taken none exceeded the internal administrative control limits (ACL).

Table 8

Third Quarter 2021 Alpha Contamination Monitoring Results			
Area	# of Samples Taken	Administrative Limits (Bq/cm²)	# of Samples Above Limits
Zone 1	140	0.4	0
Zone 2	191	4.0	0
Zone 3	42	4.0	0
Zone 4	280	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 third 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 third quarter.

Table 9

Third Quarter 2021 Uranium In-plant Air Sampling Results					
Plant Area	# of Samples	Average ($\mu\text{g U/m}^3$)	Maximum ($\mu\text{g U/m}^3$)	# Samples > ACL^{2000 hr}	# Samples > ACL^{80 hr}
Ceramics Lab	264	2	6	0	0
Compaction Room	89	2	6	0	0
Load Room	177	1	6	0	0
Pangborn Room	89	3	13	0	0
Pelleting Area	266	2	8	0	0
UO ₂ Grinders	178	5	23	0	0
Waste Treatment	44	2	11	0	0
PP2 Area	712	1	8	0	0
Dry Waste Treatment	445	1	5	0	0
Furnace Hall	537	2	11	0	0
TOTAL	2801	2	23	0	0
2000 hour Administrative Control Limit = 52 $\mu\text{g/m}^3$					
80 hour Administrative Control Limit = 595 $\mu\text{g/m}^3$					

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 third quarter is summarized in Table 10. The results illustrate that the Fuel Storage Area had the highest gamma fields (6.1 $\mu\text{Sv/hr}$), 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 (5.2 $\mu\text{Sv/hr}$) was in the PP2 Receiving area. This is also expected due to the amount of raw material stored in this area. Employees limit their time in this area as well.

Table 10

Third Quarter 2021 Gamma Survey Results						
Location #	Area	Result (µSv/hr)		Location #	Area	Result (µSv/hr)
13	Kitting	0.2		37	PP2 Powder Rec. N.	1.3
14	S Stacking	0.7		38	Powder Receipt	0.4
15	Stacking	0.1		39	U ₃ O ₈ Add-back	1.7
16	Pelleting Entry	0.5		40	S End Cap	0.1
17	Pelleting Lab	0.1		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	0.7		44	S End Plate	0.0
21	S Wall	0.0		45	End Plate	0.0
22	S Furnace	0.8		46	N End Plate	0.0
23	Furnace	0.8		47	W Offices	0.0
24	N Furnace	0.1		48	S Inspection	0.1
25	SE Wall	0.5		49	Inspection	0.1
26	E Wall Furnace	0.9		50	N Inspection	0.3
27	NE Wall	0.5		51	W Inspection	0.0
28	N Corridor	0.4		52	Strapping Bay	0.3
29	Ceramics Lab	0.1		53	Packing	0.2
30	R7#1 East Wall	1.7		54	Fuel Storage Area	6.1
31	PP2 West Wall	0.2		55	Graphite East	0.2
32	S Pressing	0.5		56	BMS Loading	0.7
33	N Pressing	0.5		57	PP2 Receiving	5.2
34	Pangborn	0.7		58	PP2 Press R53-1	1.1
35	S. Waste Treat	1.8		59	PP2 East Wall	0.4
36	N. Waste Treat	0.5				

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	4		13
Medical Diagnostic Injuries	0	1	0		1
Medical Treatment Injuries	0	0	0		0
Lost Time Injuries	0	0	0		0
Lost Time Injury Frequency	0.0	0.0	0.0		0.0
Lost Time Injury Severity	0.0	0.0	0.0		0.0

There were no lost time incidents that occurred in the third quarter. The Total Recordable Injury Rate (TRIR) for August to October was 3.4 for the Port Hope facility and was 1.8 for both facilities (Port Hope and Cobourg). The year to date TRIR for both facilities is 0.5.

Health and Safety Activities

- **Communications:** The third quarter safety meetings were held each month with a different topic each month including return to work (including a review of changes in the facility over shutdown, heat stress risks after being away for shutdown, and the importance of stretching after the holidays), mental health, as well as school bus safety, emergency preparedness at home, social media safety and knowing your limits. 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 third quarter of 2021, the CFM Training group began addressing the findings from a CNSC inspection conducted in June by updating the training manual. This included creating new supporting second tier documents to address in and out of scope positions. Subsequently, a risk ranking exercise was started and completed during the third quarter, where all

positions were analyzed. Additional work during the third quarter included updating SAT templates. Work continued on developing training for operators in the PP2 area, which included finalizing the training design, developing work instructions, and developing a process overview video.

- **Safety Awareness Activities:** In the third quarter, CFM continued to focus on mental health with a mindfulness photography challenge. This contest has been going on monthly for the last few months. It encourages employees to get outside, and to focus on mindfulness (both healthy focuses for mental health). The JHSC also held a 2-month long STAR (Stop Think Act Review) Activity, this presented employees with 3 different sceneries to problem solve. We wanted to remind our employees to practice STAR on daily activities to ensure hazards are identified and then mitigate the hazards by implementing simple controls you can do to prevent injuries.
- **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. The last week of tests was conducted on November 10, 2021.
- **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 returned to the site. A few employees continued to work part time from home.

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 third 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 third quarter of 2020 to the third quarter of 2021.

The results in the third 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. When comparing the first three quarters in 2021 the public dose using the new method is similar for each quarter.

The total dose to the member of the public from air, liquid emissions and gamma levels for the quarter is calculated to be 0.094 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	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
Air (combined)	0.003	0.003	0.023	0.026	0.017
Air (stacks)	-	-	0.000	0.000	0.000
Air (building ventilation)	-	-	0.023	0.026	0.017
Liquid	-	-	0.001	0.001	0.001
Gamma (Location 12)	-	-	0.067	0.072	0.076
Gamma (Location 1)	0.017	0.014	0.000	0.057	0.037
Total dose to Previous Critical Receptor (location #1)*	0.020	0.018	0.024	0.084	0.055
Total dose to Critical Receptor (location #12) ⁺	-	-	0.091	0.099	0.094

*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 third 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 came into effect on July 1, 2021. Therefore, for the third quarter of 2021, the action level of 0.2 $\mu\text{Sv/hr}$ is in place. The result for location #2 in the third quarter was below the action level.

Table 13

Third Quarter 2021 Gamma Monitoring Results ($\mu\text{Sv/hr}$)		
Location	Action Level	Quarterly Dose Rate
1	0.2	0.01
2	0.2 (starting July 1)	0.05
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	0.03
10	1.0	0.00
11	1.0	0.34
12	1.0	0.41

*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 third quarter of 2021, the action level of 0.2 $\mu\text{Sv/hr}$ is in place.

The monitoring results for location 12 (closest location to the revised critical receptor) from the third quarter in 2020 to the third 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
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
Q3 2021	1.35	1.0	0.41

Stack Emissions

The total amount of uranium dioxide released to the environment during the quarter in gaseous effluent from stacks was 0.001 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 third quarter of 2020 to the third quarter of 2021. The average concentrations measured in stack emissions in the third quarter were similar to previous quarters. The maximum result in the third quarter was elevated when compared to previous quarters.

Table 15

Daily Stack Emissions by Quarter (µg/m³)							
Source	Action Level	Avg. / Max.	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
PP2 West	2.0	Avg.	0.0	0.1	0.0	0.0	0.0
		Max.	0.5	1.3	0.0	0.3	0.1
PP2 East	2.0	Avg.	0.1	0.0	0.0	0.0	0.0
		Max.	1.1	0.2	0.1	0.2	0.2
Waste Treatment Area Absolute	2.0	Avg.	0.1	0.1	0.0	0.2	0.4
		Max.	0.5	0.7	0.4	0.9	1.7
BMS Extraction	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.4	0.1	0.0	0.1	0.0
Hoffman Vacuum	2.0	Avg.	0.1	0.0	0.0	0.0	0.0
		Max.	0.3	0.1	0.1	0.1	0.1
Pangborn North Dust Collector	2.0	Avg.	0.1	0.0	0.0	0.1	0.0
		Max.	0.7	0.1	0.1	0.3	0.2
Pangborn South Dust Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.6	0.1	0.0	0.1	0.1
DeVilbiss Mist Collector	2.0	Avg.	0.0	0.0	0.1	0.1	0.0
		Max.	0.5	0.1	0.1	0.3	0.0
Furnace Burn-off	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.0	0.0	0.0	0.1	0.0
Overall	2.0	Avg.	0.1	0.0	0.0	0.0	0.1
		Max.	1.1	1.3	0.4	0.9	1.7

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 proposed lowering the PP2 area action level to 0.4 g/hr which has been accepted by the CNSC which was implemented on July 1, 2021. There were no exceedances of either action level in the third quarter. The estimated release of uranium dioxide in exhaust ventilation from both areas during the quarter was 0.17 kg (0.15 kg from the Pelleting Area and 0.02 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 third quarter of 2020 to the third 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 third 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	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
Uranium Emissions from Pelleting Area	1.0	Average	0.15	0.14	0.15	0.16	0.14
		Maximum	0.37	0.47	0.24	0.26	0.21
		Minimum	0.08	0.06	0.08	0.09	0.05
Uranium Emissions from PP2 Area	0.5 0.4*	Average	0.01	0.01	0.01	0.01	0.01
		Maximum	0.05	0.10	0.02	0.05	0.04
		Minimum	0.00	0.00	0.00	0.00	0.00

* CFM proposed lowering the PP2 area action level to 0.4 g/hr and was implemented on July 1, 2021

Liquid Emissions

The action level for liquid effluent released to the sewer is 0.1 mg/L. In the third 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 third quarter of 2020 to the third quarter of 2021. The average and maximum concentration in the third 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	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
Uranium (mg/L)	0.1	Average	0.01	0.01	0.01	0.01	0.01
		Maximum	0.03	0.02	0.02	0.02	0.03
pH (pH units)	6.5	Minimum	7.3	7.3	7.5	7.4	7.3
	9.0	Maximum	8.9	8.4	8.4	8.9	8.4
Volume of water	-	(m ³)	5485	5069	5070	5225	5229
Estimated Discharge	-	(kg)	0.07	0.07	0.07	0.07	0.08

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 third quarter of 2020 to the third quarter of 2021.

Table 18

Overall Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg/m³)					
Parameter	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021
Average	0.0004	0.0002	0.0002	0.0007	0.0002
Maximum	0.0024	0.0006	0.0003	0.0056	0.0006

Table 19 provides the quarterly average and maximum uranium-in-air concentrations for all locations from the third quarter of 2020 to the third quarter of 2021. The average and maximum result for the third quarter is back within typical results.

Table 19

Uranium-in-Air Concentration at Hi-Vol Stations by Quarter ($\mu\text{g}/\text{m}^3$)					
Quarter	Result	East	North	Northwest	Southwest
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
Q3 2021	Average	0.0002	0.0002	0.0002	0.0002
	Maximum	0.0003	0.0006	0.0004	0.0004

Legacy Waste Management

The focus for legacy waste in 2021 has been the examination of approximately 200 drums that did not meet the screening criteria for disposal in the United States at an appropriately permitted landfill. Beginning in the second quarter, this has involved systematically opening each drum to visually identify the contents, sort, and segregate like materials. Marginally contaminated material was repackaged, rescanned, and prepped for disposal in the United States. Materials which contained recoverable uranium will be processed as Class 3 scrap. A third set of drums has been designated as requiring further characterization to determine a disposal pathway – these activities will likely occur in 2022. In the third quarter CFM sent one shipment of drums and bags to the United States.

In the fourth quarter, in addition to the continuation of drum processing, characterization of select large surface contaminated items will be completed in anticipation of shipment to the United States for disposal in early 2022.

5.0 Public Information Program

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

Public Engagement

In July, Cameco announced its Cameco Charity Golf Package in partnership with Dalewood Golf and Country Club. The non-traditional golf tournament raises funds for the Cameco Fund for Mental Health. \$40 from individual golfers and 100 per cent of sponsorships are matched by Cameco.

The summer issue of Energize was mailed to all addresses in Port Hope, posted on camecofuel.com and promoted on Cameco Ontario social media channels. The summer issue featured stories on Cameco's Step Up for Mental Health activities, a Vision in Motion update, and the nuclear fuel cycle.

In July, Cameco sponsored the Northumberland 89.7FM Summer Music Series.

In August, Cameco sponsored the United Way Backpacks for Kids program, the Cobourg Highland Games and the Northumberland Rocks Back fundraising event for the United Way.

KBI Inspire Magazine featured Cameco Chief Corporate Officer, Alice Wong in the August/September issue. Alice shared her insights on approaching gender bias.

Public Opinion Polling results were posted to camecofuel.com and shared on Cameco Ontario social media channels in August. The survey found that 91% of residents support Cameco's continued operations in Port Hope. Consistent with previous surveys, the large majority (93%) of Port Hope respondents describe themselves as knowledgeable about Cameco, including 37% who say they are "very knowledgeable."

In September, Cameco sponsored the Cornerstone virtual Walk-A-Mile event. Cameco also sponsored the Port Hope Agriculture AG Bags in support of the Port Hope Fair, and the Port Hope & District Chamber of Commerce annual golf tournament.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFMs Community Partner Program. Through the quarter, Cobourg Highland Games, Cornerstone Family Violence Prevention Centre, and Northumberland Food for Thought. benefitted from this sponsorship by receiving advertising.

Public Disclosure

No public disclosures were made during the third quarter.

Social Media

Cameco Ontario's Facebook community grew by 10 new followers (998 total) and had a total of 966 page likes at the end of the quarter. Cameco Ontario's 31 posts covered information such as:

- Promoted the summer issue of Energize in July
- Results of the 2021 public opinion survey for Cameco's Port Hope operations
- Promotion for the Cameco Charity Golf Package, including information on registration, prizes, and sponsors
- Promotion for the virtual Step Up for Mental Health 5k event, including an eight-week video training tips series to help participants prepare
- Emergency response drills at the Port Hope Conversion Facility and the Blind River Refinery
- Recognition of the inaugural National Day for Truth and Reconciliation with a video on September 30
- Shared the August/September issue of KBI Inspire Magazine which featured an article with Alice Wong of Cameco sharing her insight on approaching gender bias.
- Promotions for community partners and sponsorships

By the end of the quarter the Instagram account had grown by 30 new followers for a total of 642 followers. Photos and information featured was similar to the Cameco Facebook page.

Indigenous Engagement

In July, Cameco emailed the 2021 Q1 Compliance Report and Summer 2021 Energize newsletter to Alderville, Hiawatha, Curve Lake, Scugog Island, Rama, and Mohawks of the Bay of Quinte First Nations.

Cameco's communications manager and the director of compliance met with Curve Lake First Nation on August 25 and September 22. Cameco provided more information on Cameco's Sustainability, Community Investment, and response to COVID-19 at the August meeting. In September, discussions focused on Cameco Fuel Manufacturing's intent to renew its licence for a 20-year period and a slight production increase.

On September 27, 2021

CFM sent letters to the seven William's Treaty First Nations, Mohawks of the Bay of Quinte, and the Métis Nation of Ontario to inform these Indigenous groups that CFM submitted a letter of intent to the CNSC to renew its operating licence for a period of 20-years. The letter of intent was also provided.

Website

The 2021 Public Opinion Polling was posted to the website:

- [Port Hope Community Survey Results 2021 - Making a Difference - Community - Cameco Fuel Services](#)

The summer issue of Energize was posted to the website:

- [Energize - Summer 2021 - Making a Difference - Community - Cameco Fuel Services](#)

Information about the Step Up for Mental Health charity golf package was posted to the website:

- [Step onto the Golf Course to Step Up for Mental Health - Making a Difference - Community - Cameco Fuel Services](#)

Media Analysis

Cameco received media coverage regarding an award nomination from the Northumberland Manufacturers Association:

- **Northumberland Manufacturers' Association unveils 2021 excellence award nominees**
Northumberland News – September 8, 2021
 - <https://www.northumberlandnews.com/news-story/10472555-northumberland-manufacturers-association-unveils-2021-excellence-award-nominees/>

Communication Products

The summer issue of Energize was mailed to all addresses in Port Hope, posted on camecofuel.com and promoted on Cameco Ontario social media channels. The summer issue featured stories on Cameco's Step Up for Mental Health activities, a Vision in Motion update, and the nuclear fuel cycle. [Energize - Summer 2021 - Making a Difference - Community - Cameco Fuel Services](#)

The 2021 Public Opinion Polling report was posted to the website and social media. [Port Hope Community Survey Results 2021 - Making a Difference - Community - Cameco Fuel Services.](#)

6.0 Other Matters of Regulatory Interest

There were no processing activities of enriched material conducted on site in the third 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 with entry assessments and weekly inhouse Covid-19 testing for all employees. In June 2021, a staged approach was initiated by the government to open the province from restrictions. During the third quarter employees were encouraged to return to the facility with flexibility granted for employees who requested to work from home on a part time basis.

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 third 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.