



**2022 Third Quarter Compliance Monitoring
&
Operational Performance Report**

Reporting Period July 1 – September 30, 2022

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

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Submitted to:
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Executive Summary

Cameco Corporation (Cameco) is committed to the safe, clean, and reliable operations 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.

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.

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1.0 Third Quarter Overview

1.1 Facility Operation

Cameco continues to strive for operational excellence at 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. During the third quarter Cameco relaxed most of the precautionary actions that were taken with respect to the Covid-19 pandemic and removed the requirement for employees to complete entry assessments. Employees are requested to self-monitor for symptoms and isolate after consulting with CFM's Occupational Health Nurse. Individuals were still required to provide proof of vaccinations to gain entry to the site.

In the first quarter, CFM was granted a one-year licence by the Commission (FFL-3641.00/2023) effective March 1, 2022 until February 28, 2023. There was a new Licence Conditions Handbook (LCH) also released effective March 1, 2022 (LCH-FFL-3641.00/2023). There were no significant changes to Structure, Systems and Components (SSC) or processes in the second quarter. The LCH for the facility references core CFM documents that form the licensing basis in each safety and control area.

There were two documents that were submitted to the CNSC in the third quarter of 2022.

- Fire Protection Program (MSP 30-07, version #5) – Removed reference to NFPA 801 as CFM now complies with CSA N393 and updated references throughout the document,
- Sealed Source (HSI 048, version #8) – Update document to reflect change to electronic form for Radioisotope location tracking, remove reference to obsolete paper forms.

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 two reportable events that required notification of the duty officer as detailed in the *Nuclear Safety and Control Act* during the quarter. The first occurred in early July when a fire alarm was automatically activated at the CFM Port Hope facility after fumes

from tar work that was occurring on the roof entered through a door and triggered the smoke detector. This resulted in a fire alarm within the facility as well as activation of the Port Hope Fire Emergency Services (PHFES). The second occurred later in July after a CO₂ fire suppression alarm point was triggered. After a review of the area, it was determined that there was no fire, and that the panel indication was a false alarm. 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 2022, 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, only one NEW had an external whole body exposures greater than 1.0 mSv.

Table 1

Third Quarter 2022 Whole Body Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	105	0.17	0.00	1.33
Administration / Support	83	0.01	0.00	0.44
Contractors/Visitors	11	0.00	0.00	0.01
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 2021 to the third quarter of 2022 (five monitoring periods). The average whole body dose in the third quarter for all NEWs was 0.10 mSv. The average whole body dose is slightly lower than previous quarters; however this can be attributed to the higher number of support staff as well as contractors in the third quarter. The lower dose assigned to these NEWs would bring the average dose result lower than previous quarters. The maximum dose is higher than most of the previous quarters except for the first quarter in 2022. It is most accurate to compare the third quarter results in 2022 to the previous third quarter results in 2021 when

normalized with production rates. When these two quarters are compared, the average dose was lower and the maximum dose was higher in 2022. The individual with the highest exposure in the third quarter was an operator who works in the Pelleting Area.

Table 2

Whole Body Dose Results by Quarter				
Monitoring Period	Number of Employees	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q3 2021	194	0.12	0.00	1.28
Q4 2021	194	0.13	0.00	1.23
Q1 2022	198	0.13	0.00	1.71
Q2 2022	192	0.12	0.00	1.16
Q3 2022	199	0.10	0.00	1.33

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 8.65 mSv in the third quarter and the average skin dose for all NEWs was 0.60 mSv. The action levels for skin dose were not exceeded in the quarter. All NEWs received a skin dose in the third quarter below 10 mSv (100%).

Table 3

Third Quarter 2022 Skin Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	105	1.13	0.00	8.65
Administration / Support	83	0.02	0.00	0.44
Contractors/Visitors	11	0.00	0.00	0.02
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 2021 to the third quarter of 2022. It is most accurate to compare the third quarter results in 2022 to the previous third quarter results in 2021 due to production rates. When these two quarters are compared the average dose is lower in the third quarter of 2022. This would be for the same reason as whole body dose (i.e. more

NEWs on site during the third quarter in the support staff and contractor groups which typically receive a lower dose). The individual who received the maximum skin dose was a Pelleting area employee and was 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 2021	194	0.73	0.00	8.81
Q4 2021	194	0.96	0.00	10.18
Q1 2022	198	1.03	0.00	14.06
Q2 2022	192	1.00	0.00	11.91
Q3 2022	199	0.60	0.00	8.65

Eye Dose

Table 5 shows the third quarter eye 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 eye dose for all NEWs was 4.31 mSv in the second quarter and the average eye dose for all NEWs was 0.32 mSv. The interim action levels for eye dose were not exceeded in the quarter. The majority of NEWs received an eye dose below 2 mSv (98%).

Table 5

Third Quarter 2022 Eye Dose Results				
Work Group	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Operations	105	0.60	0.00	4.31
Administration / Support	83	0.02	0.00	0.44
Contractors/Visitors	11	0.00	0.00	0.01
*Monthly interim action level is 6.0 mSv				
*Quarterly interim action level is 12.0 mSv.				

*Interim action levels approved by CNSC July 11, 2022

Table 6 shows the employee quarterly average and maximum individual eye exposure for the first three quarters of 2022. The average and maximum dose in the third quarter of 2022 was lower than the dose in the first and second quarter. Similar to whole body and

skin dose the average would be lower due to the increased NEWs on site in the third quarter who typically receive a lower dose. The individual who received the maximum eye dose was a Pelleting area employee who was the same individual with the maximum whole body dose and skin dose.

Table 6

Eye Dose Results by Quarter				
Monitoring Period	Number of Employees	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q1 2022	198	0.53	0.00	6.40
Q2 2022	192	0.50	0.00	5.42
Q3 2022	199	0.32	0.00	4.31

*Note – Tracking eye dose results was implemented as a requirement in the first quarter; therefore, additional quarters will be added to this table in future reports until 5 monitoring periods is acquired.

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 2021, CFM completed an assessment for extremity dose to align with the Radiation Protection Regulations (RPR) issued in 2020. Specifically, section 8 of the RPR adds the requirement to use a licensed dosimetry service for equivalent doses to the skin, hands, and feet if the annual dose would be over 50 mSv. It was determined that the extremity dose for NEWs at CFM do not exceed 50 mSv/yr and therefore are not required to wear dosimeters from a licensed dosimetry service provider. Extremity dose can be estimated using historic data.

If there is a change in processing techniques or work configurations that would impact extremity dose, then an assessment is required to determine if the 50 mSv/yr criteria would be exceeded. Changes to equipment or processes are captured through CFM's Management of Change (MoC) process. In the third quarter of 2022, there were no changes implemented that would have required an assessment of the impact to extremity dose; therefore, the third quarter extremity dose is equivalent to previous quarters.

Table 7 shows the average, minimum, and maximum extremity dose for NEWs over the period from the third quarter of 2021 to the third quarter of 2022. As noted above the dose for the third quarter of 2022 would be similar to previous quarters with the third quarter of 2021 most representative as NEWs wore their rings for the entire quarter. If the third quarter dose from 2021 was used as the basis for the third quarter of 2022 the average dose is estimated at 1.25 mSv and the maximum dose is estimated to be 7.87 mSv.

Table 7

Extremity Dose Results by Quarter				
Monitoring Period	Number of Employees	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q3 2021	79	1.25	0.00	7.87
Q4 2021	78	1.76	0.00	9.03
Q1 2022	-	1.90*	0.00	10.50*
Q2 2022	-	1.90*	0.00	10.50*
Q3 2022	-	1.25	0.00	7.87 ⁺

*estimation based on Q2 2021 data

+ estimation based on Q3 2021 data

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 8 below.

Table 8

Third Quarter Routine Urine Analysis Results				
Work Group	Number of Samples	Average (µg/L)	Minimum* (µg/L)	Maximum (µg/L)
Operations	389	0.23	<0.20	1.40
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 was no routine lung counts conducted. The next campaign is scheduled for November/December 2022.

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 9 as well as the routine contamination monitoring results for the third quarter. Of the 590 samples taken none exceeded the internal administrative control limits (ACL).

Table 9

Third Quarter Alpha Contamination Monitoring Results			
Area	# of Samples Taken	Administrative Limits (Bq/cm²)	# of Samples Above Limits
Zone 1	115	0.4	0
Zone 2	160	4.0	0
Zone 3	35	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 second quarter of 2022 taken in each area, including the CAM heads in the PP2 area, dry Waste Treatment area and the furnace hall are shown in Table 10 below. There were no results above the 80 hour ACL or the 2000 hour ACL in the third quarter.

Table 10

Third Quarter 2022 Uranium In-plant Air Sampling Results					
Plant Area	# of Samples	Average ($\mu\text{g U}/\text{m}^3$)	Maximum ($\mu\text{g U}/\text{m}^3$)	# Samples > ACL^{2000 hr}	# Samples > ACL^{80 hr}
Ceramics Lab	80	1	5	0	0
Compaction Room	92	2	5	0	0
Load Room	184	1	6	0	0
Pangborn Room	92	3	10	0	0
Pelleting Area	276	2	10	0	0
UO ₂ Grinders	184	3	16	0	0
Waste Treatment	46	3	16	0	0
PP2 Area	736	3	30	0	0
Dry Waste Treatment	460	2	16	0	0
Furnace Hall	548	1	6	0	0
TOTAL	2698	2	30	0	0
2000 hour Administrative Control Limit = 52 $\mu\text{g}/\text{m}^3$					
80 hour Administrative Control Limit = 595 $\mu\text{g}/\text{m}^3$					

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 (7.2 $\mu\text{Sv}/\text{hr}$), 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 $\mu\text{Sv}/\text{hr}$) 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. The dose rate results for these areas are in line with the previous quarter for the fuel storage area (6.7 $\mu\text{Sv}/\text{hr}$) and was slightly higher than the previous quarter in the PP2 area (5.9 $\mu\text{Sv}/\text{hr}$). The dose rate in the PP2 receiving area fluctuates according to production requirements.

Table 11

Third Quarter 2022 Gamma Survey Results						
Location #	Area	Result (μSv/hr)		Location #	Area	Result (μSv/hr)
13	Kitting	0.1		37	PP2 Powder Rec. N.	1.0
14	S Stacking	0.9		38	Powder Receipt	1.2
15	Stacking	0.3		39	U ₃ O ₈ Add-back	1.4
16	Pelleting Entry	0.5		40	S End Cap	0.1
17	Pelleting Lab	0.1		41	End Cap	0.1
18	S Grinding	1.1		42	N End Cap	0.0
19	Grinding	0.8		43	E Offices	0.0
20	N Grinding	0.8		44	S End Plate	0.0
21	S Wall	0.0		45	End Plate	0.0
22	S Furnace	0.3		46	N End Plate	0.0
23	Furnace	0.7		47	W Offices	0.0
24	N Furnace	0.0		48	S Inspection	0.0
25	SE Wall	0.5		49	Inspection	0.1
26	E Wall Furnace	0.5		50	N Inspection	0.2
27	NE Wall	0.5		51	W Inspection	0.0
28	N Corridor	0.3		52	Strapping Bay	0.1
29	Ceramics Lab	2.4		53	Packing	0.1
30	R7#1 East Wall	1.2		54	Fuel Storage Area	7.2
31	PP2 West Wall	0.1		55	Graphite East	0.1
32	S Pressing	0.8		56	BMS Loading	0.6
33	N Pressing	0.6		57	PP2 Receiving	4.6
34	Pangborn	0.8		58	PP2 Press R53-1	1.2
35	S. Waste Treat	1.3		59	PP2 East Wall	0.5
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 12 shows the safety statistics for the Port Hope facility.

Table 12

2022 Safety Statistics					
Year / Parameter	Q1	Q2	Q3	Q4	YTD
First Aid Injuries	0	2	3		5
Medical Diagnostic Injuries	3	4	1		8
Medical Treatment Injuries	1	0	1		2
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

Updates from previous compliance reports:

In the first quarter, added medical diagnostic. This was determined in June and misreported in the second quarter of a standard threshold shift for a hearing diagnosis occurred in February.

In the second quarter a medical treatment was evaluated and reclassified as a medical diagnostic injury due to the designation of no restriction was determined. A medical diagnostic was reclassified as a first aid; the event originally reported that the employee sought medical diagnosis (X-ray) but was later determined that this did not occur.

There were no lost time incidents that occurred in the third quarter. The Total Recordable Injury Rate (TRIR) for July 1st to September 30th, 2022 was 3.46 with a year to date TRIR of 2.98.

Health and Safety Activities

- **Communications:** The third quarter safety meetings were held each month with a different topic including Ergonomics, WHMIS, and Fall Arrest/Hoist/Incident Reporting. 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 2022, CFM Training continued to develop work instructions for the PP2 area. The Emergency Response Program roll-out was completed. Also, SAT analysis for the Millwright position was completed and the PSOD process is being updated to a digital format. Training development work has started on LH2 Compound Entry.
- **Safety Awareness Activities:** In the third quarter the JHSC promoted the Continuous Improvement Teams and conducted a “Green Card” draw for safety improvement ideas. Employees were encouraged to submit ideas to improve safety and their names were entered into a draw for prizes.
- **JH&SC and Safety Subcommittees:** The JHSC has returned to in person meetings with the option of attending virtually if people are not comfortable in group settings. Continuous Improvement Teams were launched in September and replace Safety Subcommittees. Employees are assigned to teams and focus on specific areas of the facility to look for improvements in safety, equipment and employee tasks.
- **Safety & Industrial Hygiene:** CFM’s new ergonomic procedure and contractor management program are in the process of being updated. Noise dosimetry is to be conducted in the 4th quarter for employees who work in hearing protection mandatory areas based on sound level assessments. Welding fume sampling and silica in air sampling are scheduled to be done in Q4.
- **Covid-19 Interruption:** During the third quarter Cameco continued to relax some of the precautionary actions that were taken with respect to the Covid-19 pandemic and removed the requirement for employees to complete entry assessments. Employees are requested to self-monitor for symptoms and isolate in consultation with CFM’s Occupational Health Nurse. Individuals were still required to provide proof of vaccinations to gain entry to the site.
- **Emergency Preparedness:** During the third quarter, CFM planned its full scale emergency exercise which was planned to occur early in the fourth quarter.

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 was 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 to the third quarter of 2022, 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 13.

The total dose to the member of the public from air, liquid emissions and gamma levels for the quarter is calculated to be 0.089 mSv. This is in line with previous quarters and lower than the second quarter.

Table 13

Public Dose by Quarter (mSv/quarter)					
DRL Component	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022
Air (stacks)	0.000	0.000	0.000	0.000	0.000
Air (building ventilation)	0.017	0.020	0.025	0.028	0.021
Liquid	0.001	0.001	0.001	0.001	0.001
Gamma (Location 12)	0.076	0.067	0.059	0.071	0.067
Total dose to Critical Receptor (location #12)	0.094	0.088	0.085	0.100	0.089

Gamma Monitoring

The perimeter gamma for the critical receptor at location #12 is 1.35 $\mu\text{Sv/hr}$ and the action level is 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 with the action level of 0.2 $\mu\text{Sv/hr}$ for both locations. There were no exceedances of the DRL's or the action levels during the third quarter.

Table 14 provides the quarterly gamma levels in $\mu\text{Sv/hr}$ for all fence line monitoring locations (i.e., 1-12) for the quarter.

Table 14

Third Quarter 2022 Gamma Monitoring Results ($\mu\text{Sv/hr}$)		
Location	Action Level	Quarterly Dose Rate
1	0.2	0.02
2	0.2	0.07
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	0.28
12	1.0	0.36

The monitoring results for location 12 (closest location to the critical receptor) from the third quarter in 2021 to the third quarter of 2022 are provided in Table 15. Results have been corrected to take into account background gamma levels by subtracting 0.08 $\mu\text{Sv/hr}$. The dose rate for the third quarter of 2022 is lower than or equal to previous quarters with the exception of the first quarter of 2022.

Table 15

Gamma Monitoring Results at Critical Receptor by Quarter ($\mu\text{Sv/hr}$)			
Period	Regulatory Limit (DRL)	Action Level	DRL Contribution
Q3 2021	1.35	1.0	0.41
Q4 2021	1.35	1.0	0.36
Q1 2022	1.35	1.0	0.32
Q2 2022	1.35	1.0	0.38
Q3 2022	1.35	1.0	0.36

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 action levels with respect to air emissions during the quarter.

Table 16 provide the average and maximum uranium concentration for all stacks in µg/m³ from the third quarter of 2021 to the third quarter of 2022. The average and maximum concentrations measured in stack emissions in the third quarter were lower than previous quarters.

Table 16

Daily Stack Emissions by Quarter (µg/m³)							
Source	Action Level	Avg. / Max.	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022
PP2 West	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.1	0.1	0.1	0.1
PP2 East	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.2	0.1	0.2	0.1	0.1
Waste Treatment Area Absolute	2.0	Avg.	0.4	0.2	0.2	0.3	0.2
		Max.	1.7	0.5	0.7	0.7	0.3
BMS Extraction	2.0	Avg.	0.0	0.0	0.0	0.0	0.1
		Max.	0.0	0.0	0.0	0.2	0.3
Hoffman Vacuum	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.1	0.1	0.1	0.0
Pangborn North Dust Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.1
		Max.	0.2	0.3	0.1	0.2	0.2
Pangborn South Dust Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.1	0.1	0.1	0.1
DeVilbiss Mist Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.0	0.0	0.0	0.1	0.1
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	0.1
Overall	2.0	Avg.	0.1	0.0	0.0	0.1	0.0
		Max.	1.7	0.5	0.7	0.7	0.3

Building Ventilation Emissions

The action level for building ventilation is 1.0 g/hr and is monitored daily for the Pelleting Area and 0.4 g/hr for the PP2 area. 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 0.22 kg (0.17 kg from the Pelleting Area and 0.05 kg from the PP2 area).

Table 17 provides the average and maximum uranium concentration emitted through the building ventilation system in g/hr from the third quarter of 2021 to the third quarter of 2022.

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 2022 the building ventilation average and maximum emission rates for the Pelleting Area were slightly elevated when compared to previous quarters.

Table 17

Building Ventilation Rates by Quarter (g/hr)							
Parameter	Action Level	Measure	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022
Uranium Emissions from Pelleting Area	1.0	Average	0.14	0.14	0.15	0.17	0.15
		Maximum	0.21	0.24	0.31	0.38	0.25
		Minimum	0.05	0.06	0.08	0.05	0.06
Uranium Emissions from PP2 Area	0.5 0.4*	Average	0.01	0.01	0.01	0.01	0.02
		Maximum	0.04	0.03	0.07	0.04	0.11
		Minimum	0.00	0.00	0.00	0.00	0.00

* action level for PP2 area was reduced to 0.4 g/hr 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 18 provides the average and maximum uranium concentration for a single composite sample from the third quarter of 2021 to the third quarter of 2022. Also provided in the table is the minimum and maximum pH measured in the samples.

Table 18

Sanitary Sewer Emissions by Quarter							
Parameter	Action Level (mg/L)	Measure	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022
Uranium (mg/L)	0.1	Average	0.01	0.01	0.02	0.02	0.01
		Maximum	0.03	0.03	0.10*	0.02	0.02
pH (pH units)	6.5	Minimum	7.3	6.8	6.8	6.6	6.8
	9.0	Maximum	8.4	8.9	7.6	7.4	7.6
Volume of water	-	(m ³)	5229	5473	3306	3928	3770
Estimated Discharge	-	(kg)	0.08	0.08	0.05	0.06	0.05

*Result was 0.095 mg/L; therefore, was not above the action level.

Ambient Air Monitoring

High volume air samples are collected in the four corners of the CFM property. Table 19 shows the quarterly average and maximum results for all four locations from the third quarter of 2021 to the third quarter of 2022.

Table 19

Overall Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg/m³)					
Parameter	Q3 2021	Q4 2021	Q1 2022	Q2 2022	Q3 2022
Average	0.0002	0.0001	0.0002	0.0005	0.0003
Maximum	0.0006	0.0004	0.0008	0.0021	0.0006

Table 20 provides the quarterly average and maximum uranium-in-air concentrations for all locations from the third quarter of 2021 to the third quarter of 2022. The average and maximum result for the third quarter of 2022 is comparable to or lower than previous quarters.

Table 20

Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg/m³)					
Quarter	Result	East	North	Northwest	Southwest
Q3 2021	Average	0.0002	0.0002	0.0002	0.0002
	Maximum	0.0003	0.0006	0.0004	0.0004
Q4 2021	Average	0.0001	0.0001	0.0001	0.0002
	Maximum	0.0002	0.0002	0.0003	0.0004
Q1 2022	Average	0.0002	0.0002	0.0002	0.0002
	Maximum	0.0005	0.0006	0.0008	0.0007
Q2 2022	Average	0.0003	0.0006	0.0005	0.0005
	Maximum	0.0009	0.0023	0.0021	0.0011
Q3 2022	Average	0.0002	0.0003	0.0002	0.0003
	Maximum	0.0003	0.0005	0.0005	0.0006

Legacy Waste Management

Limited waste management activities occurred in the second quarter due to resource constraints. CFM intends to continue the project for processing drums that did not meet the screening criteria for disposal in the United States at an appropriately permitted landfill and the characterization/processing of select large surface contaminated objects in the second half of the year. The drum project has involved systematically opening each drum to visually identify the contents, sort, and segregate like materials. From this activity, recoverable uranium material is consolidated to be verified and the uranium recovered with other scrap material. Marginally contaminated material is repackaged, rescanned, and prepped for disposal in the United States. A small percentage of these drums require additional analysis to determine the most appropriate disposal pathway. Once the remaining drums are processed, the additional analysis will commence.

5.0 Public Information Program

During the third quarter of 2022, CFM continued to meet the requirements of CNSC RD/GD 3.2.1, *Public Information and Disclosure programs*.

Public Engagement

Cameco entered its firetruck in the Port Hope Canada Day parade on July 1 and sponsored Movies in the Park on July 27.

Cameco conducted public polling in Port Hope during the last week of July and first week of August.

Letters regarding the intervention process for CFM's licence renewal were emailed out to dozens of local organizations, industry partners, emergency services, schools and local elected officials. The letters provided information on how to intervene in the licence renewal.

Cameco sponsored the Northumberland Rocks Back concert for the Northumberland United Way on August 6.

Cameco hosted the Canadian Nuclear Society 15th International Conference on CANDU Fuel in Ajax from August 21 to August 24.

The summer issue of Energize was posted on our website on August 30 and mailed out to residents of Port Hope. The issue featured the Port Hope Cameco Charity Golf Tournament; how to participate in the licence renewal process for CFM; medical isotopes; and the new isotope production system at Bruce Power.

The Port Hope Cameco Charity Golf Tournament was advertised on the radio and Facebook throughout the month of August. The sold-out tournament took place on September 9 at Dalewood Golf & Country Club and raised over \$35,000 for the Cameco Fund for Mental Health.

Members of the Durham chapter of North American Young Generation in Nuclear (NAYGN) toured CFM Port Hope on September 16. Members of the Canadian Forces from Canadian Forces Base Trenton toured CFM Port Hope on October 12.

Cameco sponsored an information booth at the Port Hope Fall Fair from September 16-18. The booth was staffed by Cameco leaders and subject matter experts throughout the weekend. The information boards featured Cameco's operations and activities including PHCF, Vision in Motion, CFM and more.

Cameco hosted a free community BBQ on September 28 from 4-7 p.m. in Memorial Park, Port Hope. The BBQ was advertised via postcards mailed out to approximately 2,700 addresses in Port Hope and advertised via social media. Cameco leadership and

subject matter experts were available to talk with guests and answer questions. Information boards and displays provided information about PHCF, Vision in Motion, CFM operations and activities and the licence renewal. Approximately 300 people attended the BBQ.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFMs Community Partner Program. Through the quarter, Cornerstone Family Violence Prevention Centre, Capitol Theatre, and Westben Theatre benefitted from this sponsorship by receiving advertising.

On July 9 CFM Security received a telephone call from citizen walking on Peter Street past the Port Hope facility who was concerned with their observation of workers on the roof of the facility using a leaf blower to blow debris from the roof. The citizen was concerned and wanted to know if there was asbestos or any other hazardous chemicals that may have been blown off the roof to which they may have been exposed. On July 11th, CFM called the citizen to explain that the activity was being performed to remove debris from the roof prior to application of tar. There is no asbestos, production related chemicals or any hazardous material on the roof that could have been blown into the environment for members of the public to be exposed. The MOECP was contacted to verify if this concern was reportable under CFM’s ECA; they informed CFM that this was not reportable as “the roof is not considered operation of the equipment”.

Public Disclosure

CFM made two public disclosures during the third quarter: Environment & Safety - Fuel Manufacturing: Port Hope & Cobourg - Fuel Services - Businesses - Cameco.

Posting Date	July 7, 2022
Incident Date	July 6, 2022
Incident	Emergency Response Team Activation
Details	<p>The Cameco Fuel Manufacturing (CFM) Emergency Response Team (ERT) was activated in response to fumes from roofing tar work being detected by an office area smoke detector which triggers an automatic fire alarm and notifies Port Hope Fire and Emergency Services. The fire department responded to the site and confirmed the conditions that activated the alarm.</p> <p>There was no health or safety risk posed to the public or environment.</p>
Corrective Action	<p>Port Hope Fire and Emergency Services confirmed the source of fumes was normal given the roofing work that is taking place during the CFM maintenance shutdown.</p> <p>The Canadian Nuclear Safety Commission has been notified.</p>
Cameco Environmental Effect Rating	1

Posting Date	July 25, 2022
Incident Date	July 21, 2022
Incident	Emergency Response Team Activation
Details	<p>Port Hope Fire & Emergency Services responded to a fire alarm at Cameco Fuel Manufacturing (CFM) at approximately 4:10 a.m. on July 21, 2022. Port Hope Fire & Emergency Services determined that there was no fire, and it was a false alarm.</p> <p>There was no health or safety risk posed to the public or environment.</p>
Corrective Action	<p>Port Hope Fire & Emergency Services determined that there was no fire, and it was a false alarm. It was confirmed that the CO2 fire suppression system was the source of the false alarm and it had been removed several years ago. The alarm point has been removed from the monitoring system.</p> <p>The Canadian Nuclear Safety Commission has been notified.</p>
Cameco Environmental Effect Rating	1

Social Media

Cameco Ontario’s Facebook community grew by 166 new followers (1,239 total) and had a total of 1,041 page likes at the end of the quarter. Cameco Ontario’s 44 posts covered information such as:

- Cameco’s participating in the Port Hope Canada Day parade
- Job opportunities at Cameco sites in Port Hope and Cobourg
- Local events sponsored by Cameco
- Notifying residents that the annual public opinion survey in Port Hope would begin on July 28
- Cameco’s involvement in hosting the Canadian Nuclear Society 15th International Conference on CANDU Fuel at the Ajax Convention Centre on August 22
- Promoting the summer issue of Energize
- Promoting the Cameco Charity Golf Tournament in Port Hope
- Recognition of National Day for Truth and Reconciliation on September 30
- Sharing the results of the Cameco Charity Golf Tournament
- Promotion for the Cameco Community BBQ on September 28 at Memorial Park in Port Hope
- Cameco’s participation in the Port Hope Fair from September 16 to 18

Indigenous Engagement

On October 29, 2021, Cameco submitted its Indigenous Engagement Report (IER) to the CNSC which was developed in support of CFM's 20-year licence renewal request to fulfill the requirements of the CNSC's REGDOC 3.2.2 Indigenous Engagement.

The information provided in this section describes CFM's activities under the PIP and the IER.

Cameco's communications manager and director of regulatory compliance and licensing met with Scugog Island First Nation on July 26, 2022. This meeting was part of Cameco and Scugog Island's regularly scheduled update meetings. The meeting provided a refresher on CFM soil and groundwater monitoring programs and Cameco shared information about upcoming community initiatives such as the Cameco Community BBQ, Cameco Charity Golf Tournament and the Port Hope Fall Fair.

Cameco's communications manager and director of regulatory compliance and licensing projects met with Curve Lake First Nation on July 27 and September 28 as part of regularly scheduled updates. The July 27 meeting provided a refresher on CFM soil and groundwater monitoring programs. Cameco shared information about upcoming community initiatives such as the Cameco Community BBQ, Cameco Charity Golf Tournament and the Port Hope Fall Fair. At the September 28 meeting Cameco provided an update on community activities and initiatives and provided an overview of the 2022 public opinion results. Curve Lake also provided a general update.

Public disclosures are reviewed and discussed at all meetings with Curve Lake and Scugog Island.

On August 31, 2022 Cameco emailed the summer issue of the Energize newsletter and the Q2 Compliance Report to Curve Lake, Scugog Island, Alderville, Hiawatha and Rama First Nations and the Mohawks of the Bay of Quinte.

On September 14, Cameco emailed Curve Lake, Scugog Island, Alderville and Hiawatha First Nations an invitation to the community BBQ. Curve Lake First Nation attended the community BBQ on September 28, 2022.

Website

Cameco Charity Golf Tournament: Information about the Cameco Charity Golf Tournament was posted website [Step onto the Golf Course to Step Up for Mental Health - Making a Difference - Community - Cameco Fuel Services](#)

Compliance Reports: The 2022 Q2 Compliance Report was posted to the website [Media Library - Media - Cameco Fuel Services](#)

Public Disclosures: Three public disclosures were posted to the website [Environment & Safety - Fuel Manufacturing: Port Hope & Cobourg - Fuel Services - Businesses - Cameco](#)

Energize Newsletter: The summer issue of Energize was posted to the website [Energize - Summer 2022 - Making a Difference - Community - Cameco Fuel Services](#)

Community BBQ: Information about the free Cameco Community BBQ was posted to the website [Port Hope Community BBQ - Making a Difference - Community - Cameco Fuel Services](#)

Safety Analysis Report – Public Summary: An updated document was posted in August 2022 [Media Library - Media - Cameco Fuel Services](#)

Media Analysis

Cameco received media coverage regarding its charity golf tournament:

- **Hit the links with Cameco is support of mental health in Northumberland** – Northumberland News – Sept. 9, 2022
 - [Hit the links with Cameco in support of mental health in Northumberland \(northumberlandnews.com\)](#)

Communication Products

The summer 2022 issue of Energize was mailed to all addresses in Port Hope, posted to camecofuel.com and shared via social media channels. The issue featured stories on the Port Hope Cameco Charity Golf Tournament; how to participate in the licence renewal process for CFM; medical isotopes; and the new isotope production system at Bruce Power.

- [Energize - Summer 2022 - Making a Difference - Community - Cameco Fuel Services](#)

An invitation to the free Cameco Community BBQ was mailed out to about 2,700 addresses in Port Hope, posted to the website and promoted on social media.

- [Port Hope Community BBQ - Making a Difference - Community - Cameco Fuel Services](#)

An updated public summary for the Safety Analysis Report was posted to the website

- [Media Library - Media - Cameco Fuel Services](#)

The free Cameco Community BBQ and the Cameco booth at the Port Hope Fall Fair, featured information boards about Cameco’s operations and activities.



Cameco Fuel Manufacturing.

Cameco’s fuel manufacturing consists of two facilities:

Uranium dioxide UO₂
Uranium dioxide (UO₂) is used in the fuel for CANDU reactors.

This process involves pressing UO₂ powder into cylinders and baking them at high temperature.

The pellets of natural uranium are loaded into half-metre long tubes made of zirconium alloy, which are then formed into a fuel bundle.

A 790-megawatt CANDU reactor will require 5240 fuel bundles - over five million fuel pellets in total.

These bundles are loaded into fuel channels which become part of the core, or calandria, of a CANDU reactor.

A metal fabrication facility in Cobourg, which produces fuel bundle and reactor components.

A fuel manufacturing facility in Port Hope, where natural uranium dioxide (UO₂) powder is pressed into pellets, fitted into zirconium tubes and assembled into CANDU reactor fuel bundles.

Cameco has safely manufactured over 1.5 million fuel bundles.

Cameco Fuel Manufacturing Licence Renewal

What is Different in This Application?

- 1 We are looking to increase the length of the licence term to 20 years instead of 10
- 2 We also seek to increase the amount of UO₂ which may be processed in a single year

What is the Same in This Application?

- CFM will produce uranium pellets and fuel bundles from UO₂
- There are no new activities being requested
- There are no changes to existing production lines/equipment
- There are no changes to management systems, training, radiation protection, safety, environmental, emergency and fire protection, waste management, security, safeguards, or packaging and transport program
- Reporting requirements remain the same
- Release limits and action levels remain the same

Why a 20-year Licence Renewal?



A 20-year licence has many benefits for the nuclear supply chain, our customers, the local economy and our community.

A 20-year licence is a commitment to the clean-air energy we need to help combat climate change – which benefits everyone. It also provides added workforce stability for our employees and certainty for our customers.

Our customers have made long-term commitments to provide clean-air nuclear energy. A 20-year licence term allows those customers to rely on Cameco Fuel Manufacturing as a stable and secure supplier of fuel. This commitment also means continued local jobs for our highly skilled workforce, and the many benefits that provides to the local economy and community.

Why a Production Limit Increase?

CFM is requesting a production limit increase from 1,500 tonnes per year to 1,650 tonnes per year

CFM is currently licensed to produce 125 tonnes of uranium dioxide (UO₂) as pellets during any calendar month, which is 1,500 tonnes per year.

CFM is requesting a change to the annual limit, increasing it to 1650 tonnes of uranium which will reflect the actual production capacity of the current facility.



What are the Benefits of being licensed to use 100% of our facility's production capacity?

- More energy security and demand
- Greater security of supply for global economy
- More effective use of the current facility
- Improve resilience for other stages of the supply chain

For more information on the CFM licence renewal process, please scan the QR code or visit www.camecofuel.com/cfmlicence



6.0 Other Matters of Regulatory Interest

There were no processing activities of enriched material conducted on site in the third quarter of 2022 and CFM met all site-specific reporting requirements.

During the third quarter Cameco relaxed most of the precautionary actions that were taken with respect to the Covid-19 pandemic and removed the requirement for employees to complete entry assessments. Employees are requested to self-monitor for symptoms and isolate in consultation with CFM's Occupational Health Nurse. Individuals were still required to provide proof of vaccinations to gain entry to the site.

7.0 CONCLUDING REMARKS

Cameco is committed to the safe, clean, and reliable operations 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 2022, 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 residents remains strong and we are committed to maintaining the strong support and trust we have developed over the past several years.