



**2023 Fourth Quarter Compliance Monitoring  
&  
Operational Performance Report**

**Reporting Period October 1 – December 31, 2023**

**Cameco Fuel Manufacturing Inc.  
Fuel Facility Operating Licence  
FFL-3641.00/2043**

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

In the fourth quarter there was a planned shutdown of the facility between Christmas and New Year. 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 Fourth 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 2023, CFM was granted a twenty-year licence by the Commission (FFL-3641.00/2043) effective March 1, 2023 until February 28, 2043. A new Licence Conditions Handbook (LCH) was released on August 31<sup>st</sup>, 2023 (LCH-FFL-3641.00/2043, prior to the LCH in effect was issued in March of 2022 (LCH-FFL-3641.00/2023).

There were no significant changes to Structure, Systems and Components (SSC) or processes in the fourth quarter. The LCH for the facility references core CFM documents that form the licensing basis in each safety and control area.

There were five documents that were submitted to the CNSC in the fourth quarter of 2023.

- Fire Safety Plan procedure (MSP 30-03), version #7 - Updated information along with responsibilities and references.
- Preventative Maintenance procedure (AP 018), version #10 - Updated to provide clarification on the final step for signing off work tasks along with updated references and titles.
- Facility Licensing Manual (FLM), version #12 – Updated to incorporate items discussed in the Record of Decision for CFM’s licence FFL-3641.00/2043. The changes include: an update to reflect the current licence, documents from the licence application, new text regarding dose to the lens of the eye from the Radiation Protection Regulation, new environmental licence limits and changes to the public dose calculations. Other updates were made in the Financial Guarantee, Public Information Program and Radiation Protection to reflect changes from the licence renewal and licence format.
- Management Systems manual (CFM-MS), version #6 – Updated to include the addition of the method to promote safety culture, clarification with implementation and commissioning, documenting the MOC process with commissioning activities, and including references to the Preliminary Decommissioning plan and Financial Guarantee. A section was also added to document the approach for identification and management of business risks.

- Environmental Protection manual (CFM-EP), version #6 – Updated to replace Derived Release Limits with Exposure Based Release Limits (EBRL) as referenced in the operating licence (FFL-3641.00/2043), remove reference to Health Physics database, update to reflect continuous monitoring of stacks, update aquatic monitoring program, update references, and update some of the figures in the document. This document requires revisions and will be resubmitted as version #7 in 2024.

In the fourth quarter there was a planned shutdown of the facility between Christmas and New Year. 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 was one reportable event that required notification of the duty officer as detailed in the *Nuclear Safety and Control Act* during the fourth quarter.

On October 17, 2023 CFM became aware of an oil leak from a fork truck to the paved area. The CNSC Duty Officer was notified of the incident along with the municipality of Port Hope. The leak occurred while moving empty fuel pallets to the fuel storage warehouse. The operator noticed an oil leak from the rear of the lift truck and upon retracing the route, hydraulic fluid was noted outdoors on the pavement for the driving path including over a storm drain grate. There was no impact to the environment resulting from this event, the health and safety of persons was maintained as was the maintenance of national and international security.

During the fourth quarter there were no exceedances of the radiation protection or environmental protection action levels.

## 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 fourth quarter of 2023, 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. There were no changes to the equipment in which third party reviews were required in the fourth 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 fourth quarter there was no exceedance in the Radiation Protection program.

### Whole Body Dose

Table 1 shows the fourth 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 fourth quarter, the majority of NEWs received a whole body dose below 1 mSv (99%).

**Table 1**

<b>Fourth Quarter 2023 Whole Body Dose Results</b>				
<b>Work Group</b>	<b>Number of Individuals</b>	<b>Average (mSv)</b>	<b>Minimum (mSv)</b>	<b>Maximum (mSv)</b>
Operations	109	0.20	0.00	1.07
Administration / Support	89	0.01	0.00	0.27
Contractors/Visitors	10	0.00	0.00	0.00
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 fourth quarter of 2022 to the fourth quarter of 2023 (five monitoring periods). The average whole body dose in the fourth quarter for all NEWs was 0.11 mSv. The average whole body dose is lower than previous quarters with the exception of the fourth of 2022. The maximum dose is lower than previous quarters. It is most accurate to compare the fourth quarter results in 2023 to the previous fourth quarter results in 2022 when normalized with production rates. When these two quarters are compared, the average dose and maximum dose was lower in 2023. The individual

with the highest exposure in the fourth quarter was an operator who works in the Pelleting Area

**Table 2**

<b>Whole Body Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Employees</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q4 2022	200	0.11	0.00	1.20
Q1 2023	198	0.15	0.00	1.54
Q2 2023	195	0.17	0.00	1.37
Q3 2023	202	0.13	0.00	1.24
Q4 2023	208	0.11	0.00	1.07

Skin Dose

Table 3 shows the fourth 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 11.87 mSv in the fourth quarter and the average skin dose for all NEWs was 0.77 mSv. The action levels for skin dose were not exceeded in the quarter. The majority of NEWs received a skin dose in the fourth quarter below 10 mSv (99%).

**Table 3**

<b>Fourth Quarter 2023 Skin Dose Results</b>				
<b>Work Group</b>	<b>Number of Individuals</b>	<b>Average (mSv)</b>	<b>Minimum (mSv)</b>	<b>Maximum (mSv)</b>
Operations	109	1.46	0.00	11.87
Administration / Support	89	0.01	0.00	0.27
Contractors/Visitors	10	0.00	0.00	0.01
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 fourth quarter of 2022 to the fourth quarter of 2023. The average and maximum dose was lower in the fourth quarter than previous quarters. It is most accurate to compare the fourth quarter results in 2023 to the previous fourth quarter results in 2022 due to production rates. When these two quarters are compared the average dose was



higher and the maximum dose was higher in 2023. The individual who received the maximum skin dose was a Pelleting area employee and was not the same individual with the maximum whole-body dose.

**Table 4**

<b>Skin Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Employees</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q4 2022	200	0.82	0.00	12.95
Q1 2023	198	0.97	0.00	12.95
Q2 2023	195	1.14	0.00	12.37
Q3 2023	202	0.89	0.00	11.44
Q4 2023	208	0.77	0.00	11.87

Eye Dose

Table 5 shows the fourth 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 5.38 mSv in the fourth quarter and the average eye dose for all NEWs was 0.40 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 (92%).

**Table 5**

<b>Fourth Quarter 2023 Eye Dose Results</b>				
<b>Work Group</b>	<b>Number of Individuals</b>	<b>Average (mSv)</b>	<b>Minimum (mSv)</b>	<b>Maximum (mSv)</b>
Operations	109	0.75	0.00	5.38
Administration / Support	89	0.01	0.00	0.27
Contractors/Visitors	10	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 from the fourth quarter of 2022 to the fourth quarter of 2023. The average dose in the fourth quarter of 2023 was lower than the previous quarters. The maximum eye dose in the fourth quarter was lower than the previous quarters with the exception of the third

quarter of 2023. When production quantity is considered for the quarters, the average and maximum eye dose in 2023 was the higher than 2022. The individual who received the maximum eye dose was a Pelleting area employee and was the same individual with the maximum skin dose.

**Table 6**

<b>Eye Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Employees</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q4 2022	200	0.42	0.00	5.92
Q1 2022	198	0.51	0.00	6.05
Q2 2023	195	0.59	0.00	5.55
Q3 2023	202	0.47	0.00	5.36
Q4 2023	208	0.40	0.00	5.38

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 fourth quarter of 2023, the bundle inspection, washing and repack project continued. Each employee assigned to the project underwent an ALARA assessment to determine the impact to the individual's extremity dose. Employees who worked in job tasks that were in higher extremity dose areas were limited time to work on the bundle wash project. Employees were also provided ring dosimeters to wear during the project to assess the potential dose accrued. In October and November, a total of nineteen employees had assessments performed to determine the time the employee was able to work on the project. All employees received similar extremity dose from their normal work activities. Therefore, the extremity dose does not

need to be adjusted for the fourth quarter. The project was completed in the fourth quarter.

Table 7 shows the average, minimum, and maximum extremity dose for NEWs over the period from the fourth quarter of 2022 to the fourth quarter of 2023. The dose for the fourth quarter of 2023 would be similar to the second quarter of 2021 as the most representative. If the second quarter dose from 2021 was used as the basis for the fourth quarter of 2023 the average dose is estimated at 1.90 mSv and the maximum dose is estimated to be 10.50 mSv.

**Table 7**

<b>Extremity Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Employees</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q4 2022	-	1.90*	0.00	10.50*
Q1 2023	-	1.90*	0.00	10.50*
Q2 2023	-	1.90*	0.00	10.50*
Q3 2023	-	1.25 <sup>+</sup>	0.00	7.87 <sup>+</sup>
Q4 2023	-	1.90*	0.00	10.50*

\*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 fourth quarter are provided in Table 8 below.

**Table 8**

<b>Fourth Quarter Routine Urine Analysis Results</b>				
<b>Work Group</b>	<b>Number of Samples</b>	<b>Average (µg/L)</b>	<b>Minimum* (µg/L)</b>	<b>Maximum (µg/L)</b>
Operations	401	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 fourth quarter of 2023, there were no routine urine sample results that were above the internal administrative level of 4.0 µgU/L.

During the fourth quarter there was routine lung counts conducted. In total 56 employees attended a lung count in the fourth quarter. The next campaign is scheduled for June of 2024.

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 fourth quarter. Of the 713 samples taken none exceeded the internal administrative control limits (ACL).

**Table 9**

<b>Fourth Quarter Alpha Contamination Monitoring Results</b>			
<b>Area</b>	<b># of Samples Taken</b>	<b>Administrative Limits (Bq/cm<sup>2</sup>)</b>	<b># of Samples Above Limits</b>
Zone 1	150	0.4	0
Zone 2	186	4.0	0
Zone 3	40	4.0	0
Zone 4	337	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 fourth quarter of 2023 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 fourth quarter.

**Table 10**

<b>Fourth Quarter 2023 Uranium In-plant Air Sampling Results</b>					
<b>Plant Area</b>	<b># of Samples</b>	<b>Average (<math>\mu\text{g U}/\text{m}^3</math>)</b>	<b>Maximum (<math>\mu\text{g U}/\text{m}^3</math>)</b>	<b># Samples &gt; ACL<sup>2000 hr</sup></b>	<b># Samples &gt; ACL<sup>80 hr</sup></b>
Ceramics Lab	56	1	3	0	0
Compaction Room	115	2	11	0	0
Load Room	227	2	15	0	0
Pangborn Room	115	3	15	0	0
Pelleting Area	342	2	15	0	0
UO <sub>2</sub> Grinders	230	3	24	0	0
Waste Treatment	56	5	14	0	0
PP2 Area	736	1	10	0	0
Dry Waste Treatment	460	2	10	0	0
Furnace Hall	552	1	9	0	0
<b>TOTAL</b>	<b>2889</b>	<b>2</b>	<b>24</b>	<b>0</b>	<b>0</b>
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 OSLD's around the facility to determine areas of elevated gamma radiation. The result for each location in the fourth quarter is summarized in Table 10. The results illustrate that the Fuel Storage Area had the highest gamma fields (5.6  $\mu\text{Sv}/\text{hr}$ ), 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. This is lower than the previous quarter (7.0  $\mu\text{Sv}/\text{hr}$ ), which is interesting to note. The bundle inspection/washing project did not impact the gamma dose rate in the area they were being processed. The next highest reading (5.1  $\mu\text{Sv}/\text{hr}$ ) 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.

**Table 11**

<b>Fourth Quarter 2023 Gamma Survey Results</b>						
<b>Location #</b>	<b>Area</b>	<b>Result (µSv/hr)</b>		<b>Location #</b>	<b>Area</b>	<b>Result (µSv/hr)</b>
13	Kitting	0.2		37	PP2 Powder Rec. N.	1.3
14	S Stacking	1.0		38	Powder Receipt	0.2
15	Stacking	0.2		39	U <sub>3</sub> O <sub>8</sub> Add-back	1.1
16	Pelleting Entry	0.5		40	S End Cap	0.2
17	Pelleting Lab	0.1		41	End Cap	0.4
18	S Grinding	1.2		42	N End Cap	0.1
19	Grinding	0.9		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	0.4		46	N End Plate	0.1
23	Furnace	0.4		47	W Offices	0.0
24	N Furnace	0.0		48	S Inspection	0.2
25	SE Wall	0.3		49	Inspection	0.2
26	E Wall Furnace	0.4		50	N Inspection	1.3
27	NE Wall	0.4		51	W Inspection	0.0
28	N Corridor	0.2		52	Strapping Bay	0.2
29	Ceramics Lab	0.2		53	Packing	0.2
30	R7#1 East Wall	1.5		54	Fuel Storage Area	5.6
31	PP2 West Wall	0.5		55	Graphite East	0.4
32	S Pressing	0.9		56	BMS Loading	0.8
33	N Pressing	0.7		57	PP2 Receiving	5.1
34	Pangborn	0.8		58	PP2 Press R53-1	1.6
35	S. Waste Treat	1.4		59	PP2 East Wall	0.6
36	N. Waste Treat	0.8				

### 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**

2023 Safety Statistics					
Year / Parameter	Q1	Q2	Q3	Q4	YTD
First Aid Injuries	1	5	8	3	17
Medical Diagnostic Injuries	0	0	0	0	0
Medical Treatment Injuries	0	0	0	0	0
Lost Time Injuries	0	0	0	0	0
Lost Time Injury Frequency	0.0	0.0	0.0	0.0	0.0
Lost Time Injury Severity	0.0	0.0	0.0	0.0	0.0

There were no lost time incidents that occurred in the fourth quarter. The Total Recordable Injury Rate (TRIR) for October through December 2023 is 0.0 for the Port Hope facility.

#### Health and Safety Activities

- Communications:** The fourth quarter safety meetings were held each month with a different topic including Fire Safety, Hearing Protection, and Mental Health. Each month an update is also 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 fourth quarter, the analysis and design for the Bundle Manufacturing System (BMS) was completed, and the work instructions were drafted and feedback from stakeholders was collected. The updated analysis and design for PP2 were drafted and are waiting on final approval. The work instructions are being reviewed for changes from subject matter experts. The instructor guide and participant guide for the Millwright SAT package was finalized. The SAT package for fire safety was also completed. The analysis included three elements, each with their own design package: fire safety, fire extinguisher and emergency evacuation. The design for each of those were completed. The development of the emergency evacuation eLearning started in the fourth quarter. The SAT package for Incident Commander training also began in

the fourth quarter with the analysis and design completed and approved. Finally, a new automated form to manage on-the-job training, initial qualification and re-qualifications, and job task observation was under development. The form was completed with rules and workflows still needing to be developed. Once completed, this form will automate and track positional training and create consistency across CFM. The end of the fourth quarter resulted in a strong compliance results. The overall compliance score for CFM was 97.5%, which was ahead of the 95% corporate target. Safety critical training ended 2023 with a score of 97.9%.

- **Safety Awareness Activities:** The STAR safety awareness was the focus in the fourth quarter with a joint STAR Search Contest with Cobourg. The purpose of the contest was to highlight the STAR methodology and for employees to grow the habit of conducting regular self checks. Completed STAR self check sheets were validated by the JHSC and entered in a draw. Employees seemed to be engaged and the contest had good participation.
- **JH&SC:** The JHSC continues to meet twice per month with guests providing updates on radiation protection, engineering projects, and training. Committee members are still actively participating in workplace inspections as well as incident investigations and corrective action follow-ups. The fourth quarter included an initiative to encourage employees to mentally prepare themselves for the task they are going to perform. This STAR initiative directs employees to Stop, Think, Act, and Review for each task to assess what potentially could go wrong and then act in a way to prevent injury. In Q1 of 2024, the committee will be evaluating their 2023 performance and setting new objectives for 2024.
- **Safety & Industrial Hygiene:** In the fourth quarter CFM completed a lockdown drill in Port Hope. There were 7 Ergonomic Risk Assessments completed in the fourth quarter. Fourth quarter saw some initial draft completed and starting the review process.



#### 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. Public dose is calculated by summing the total amount of uranium dioxide released to air in process stacks, building ventilation as well as liquid emissions, and was 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 fourth quarter of 2022 to the fourth quarter of 2023 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 0.087 mSv, which is higher than last quarter but lower than the other previous quarters. The third quarter result was very low due to the removal of fuel bundles from the Fuel Storage Building after fire suppression material was inadvertently discharged and a clean up of the building was required. The project to move the material back into the Fuel Storage Building started in September therefore the fourth quarter was higher but still less than typical levels.

**Table 13**

<b>Public Dose by Quarter (mSv/quarter)</b>					
<b>DRL Component</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>	<b>Q3 2023</b>	<b>Q4 2023</b>
Air (stacks)	0.000	0.000	0.000	0.000	0.000
Air (building ventilation)	0.028	0.026	0.027	0.021	0.027
Liquid	0.001	0.001	0.002	0.001	0.001
Gamma (Location 12)	0.069	0.067	0.061	0.030	0.059
Total dose to Critical Receptor (location #12)	0.098	0.093	0.089	0.052	0.087

### Gamma Monitoring

The perimeter gamma derived release limit for the critical receptor at location #12 is 1.35  $\mu\text{Sv/hr}$  and the action level is 1.0  $\mu\text{Sv/hr}$ . 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 fourth 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**

<b>Fourth Quarter 2023 Gamma Monitoring Results (<math>\mu\text{Sv/hr}</math>)</b>		
<b>Location</b>	<b>Action Level</b>	<b>Quarterly Dose Rate</b>
1	0.2	0.00
2	0.2	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	0.00
10	1.0	0.00
11	1.0	0.25
12	1.0	0.32

The monitoring results for location 12 (closest location to the critical receptor) from the fourth quarter in 2022 to the fourth quarter of 2023 are provided in Table 15. Results have been corrected to consider background gamma levels by subtracting 0.08  $\mu\text{Sv/hr}$ . The dose rate for the fourth quarter of 2023 at location 12 is higher than last quarter but lower than the dose rates in previous quarters. This is due to the relocation of bundles in the third and fourth quarters to facilitate cleaning of the Fuel Storage Building.

**Table 15**

<b>Gamma Monitoring Results at Critical Receptor by Quarter (µSv/hr)</b>			
<b>Period</b>	<b>Regulatory Limit (DRL)</b>	<b>Action Level</b>	<b>DRL Contribution</b>
Q4 2022	1.35	1.0	0.37
Q1 2023	1.35	1.0	0.36
Q2 2023	1.35	1.0	0.33
Q3 2023	1.32	1.0	0.16
Q4 2023	1.32	1.0	0.32

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/m<sup>3</sup> 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/m<sup>3</sup> from the fourth quarter of 2022 to the fourth quarter of 2023. The average and maximum concentrations measured in stack emissions in the fourth quarter were lower than or equal to the concentrations in previous quarters.

**Table 16**

Daily Stack Emissions by Quarter ( $\mu\text{g}/\text{m}^3$ )							
Source	Action Level	Avg. / Max.	Q4 2022	Q1 2023	Q2 2023	Q3 2023	Q4 2023
PP2 West	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.0	0.0	0.0	0.0
PP2 East	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.0	0.0	0.0	0.0
Waste Treatment Area Absolute	2.0	Avg.	0.1	0.1	0.1	0.1	0.1
		Max.	0.4	0.3	0.3	0.3	0.3
BMS Extraction	2.0	Avg.	0.1	0.1	0.1	0.0	0.0
		Max.	0.2	0.2	0.2	0.2	0.1
Hoffman Vacuum	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.0	0.0	0.2	0.1	0.0
Pangborn North Dust Collector	2.0	Avg.	0.1	0.0	0.1	0.0	0.0
		Max.	0.2	0.1	0.3	0.2	0.2
Pangborn South Dust Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.0	0.1	0.1	0.1
DeVilbiss Mist Collector	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.0	0.1	0.1	0.1
Furnace Burn-off	2.0	Avg.	0.0	0.0	0.0	0.0	0.0
		Max.	0.1	0.0	0.1	0.0	0.0
<b>Overall</b>	<b>2.0</b>	<b>Avg.</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
		<b>Max.</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>

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 fourth quarter. The estimated release of uranium dioxide in exhaust ventilation from both areas during the quarter was 0.28 kg (0.26 kg from the Pelleting Area and 0.03 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 fourth quarter of 2022 to the fourth quarter of 2023.

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 fourth quarter of 2023 the building ventilation average and maximum emission rates

for the PP2 area was lower than or comparable to previous quarters whereas the Pelleting Area was higher.

**Table 17**

<b>Building Ventilation Rates by Quarter (g/hr)</b>							
<b>Parameter</b>	<b>Action Level</b>	<b>Measure</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>	<b>Q3 2023</b>	<b>Q4 2023</b>
Uranium Emissions from Pelleting Area	1.0	Average	0.19	0.16	0.16	0.16	0.19
		Maximum	0.33	0.25	0.30	0.25	0.39
		Minimum	0.09	0.09	0.10	0.08	0.09
Uranium Emissions from PP2 Area	0.4	Average	0.02	0.01	0.02	0.02	0.01
		Maximum	0.08	0.05	0.07	0.07	0.06
		Minimum	0.00	0.00	0.01	0.00	0.00

Liquid Emissions

The action level for liquid effluent released to the sewer is 0.10 mg/L. In the fourth 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 fourth quarter of 2022 to the fourth quarter of 2023. Also provided in the table is the minimum and maximum pH measured in the samples. The average concentration of uranium in the fourth quarter resulted in a lower estimated discharge.

**Table 18**

<b>Sanitary Sewer Emissions by Quarter</b>							
<b>Parameter</b>	<b>Action Level (mg/L)</b>	<b>Measure</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>	<b>Q3 2023</b>	<b>Q4 2023</b>
Uranium (mg/L)	0.1	Average	0.02	0.02	0.02	0.01	0.01
		Maximum	0.06	0.03	0.03	0.02	0.02
pH (pH units)	6.5	Minimum	6.9	7.2	7.3	7.3	7.1
	9.0	Maximum	7.6	7.9	7.9	7.9	8.1
Volume of water	-	(m <sup>3</sup> )	2718	3715	6704	5547	3058
Estimated Discharge	-	(kg)	0.05	0.06	0.12	0.06	0.04

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 fourth quarter of 2022 to the fourth quarter of 2023.

**Table 19**

<b>Overall Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg/m<sup>3</sup>)</b>					
<b>Parameter</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>	<b>Q3 2023</b>	<b>Q4 2023</b>
Average	0.0002	0.0002	0.0004	0.0004	0.0004
Maximum	0.0005	0.0005	0.0010	0.0021	0.0012

Table 20 provides the quarterly average and maximum uranium-in-air concentrations for all locations from the fourth quarter of 2022 to the fourth quarter of 2023. The average result is consistent with the last 2 quarters while the maximum dose is similar to the second quarter, lower than the third quarter and higher than the fourth quarter of 2022 and the first quarter of 2023. The seasonal changes effect the hi vol results as rain and snow suppress the amount of dust generated.

**Table 20**

<b>Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg/m<sup>3</sup>)</b>					
<b>Quarter</b>	<b>Result</b>	<b>East</b>	<b>North</b>	<b>Northwest</b>	<b>Southwest</b>
Q4 2022	Average	0.0002	0.0002	0.0002	0.0002
	Maximum	0.0003	0.0005	0.0003	0.0004
Q1 2023	Average	0.0002	0.0002	0.0002	0.0003
	Maximum	0.0003	0.0004	0.0005	0.0005
Q2 2023	Average	0.0003	0.0004	0.0004	0.0004
	Maximum	0.0006	0.0010	0.0007	0.0008
Q3 2023	Average	0.0003	0.0006	0.0003	0.0004
	Maximum	0.0008	0.0021	0.0008	0.0013
Q4 2023	Average	0.0003	0.0004	0.0004	0.0004
	Maximum	0.0007	0.0012	0.0012	0.0010

### Legacy Waste Management

CFM continues the project to review drummed material that did not meet the disposal site's criteria; this requires 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. One shipment was made to the facility in the United States in the fourth quarter.

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## 5.0 Public Information Program

During the fourth quarter of 2023, CFM continued to meet the requirements of CNSC RD/GD 3.2.1, *Public Information and Disclosure programs*.

### Public Engagement

On October 5, 2023, Cameco announced the opening of the application process for the Cameco Fund for Mental Health. A news release was issued to local media, posted on the website, and promoted on social media. Recipients of the Cameco Fund for Mental Health were announced on December 12, 2023. A total of 11 organizations in the Northumberland County area received grants. A news release was issued to local media, posted on the website, and promoted on social media.

Cameco representatives attended the Queen's University Career Fair on October 3 and 4 to talk to students about the work Cameco does and the types of careers offered.

Cameco was a sponsor of the NAYGN Canadian Regional Conference on October 11, 2023. A Cameco subject matter expert presented at the conference and Cameco hosted an information booth about its operations.

Cameco sponsored and attended the Port Hope & District Business Chamber Awards on October 20, 2023. Cameco was the winner of the Healthy Workplace award which recognizes a business that demonstrates a commitment to supporting the health, safety, and well-being of employees, clients, customers, and the broader community.

Cameco participated in Loyalist College's Industry Day on October 21, 2023. Cameco's booth provided information about Cameco's local operations and the opportunity for visitors to engage with a Cameco subject matter expert.

On November 4, 2023 Cameco representatives attended the Northumberland Hills Hospital annual gala. Cameco was a sponsor of the gala which raises funds for the hospital.

The fall issue of Energize was mailed out to residents of Port Hope in November. A digital version was also posted on the Cameco website on November 9. Stories in this issue included Cameco's 35th anniversary, Vision in Motion update, closed loop cooling system at PHCF and the Cameco Fund for Mental Health.

CFM Port Hope offered family and friends' tours on November 14 and 23. A total of 24 visitors toured the facility.

Cameco entered a float in the Port Hope and Cobourg Santa Claus Parades and sponsored a tree for the Capitol Theatre Festival of Lights and Trees.



Cameco provided free advertising to local charitable organizations with its sponsorship of MyFM’s Community Partner Program. Through the quarter, Northumberland United Way, Community Care Northumberland, and Northumberland Hills Hospital Foundation benefitted from this sponsorship by receiving advertising.

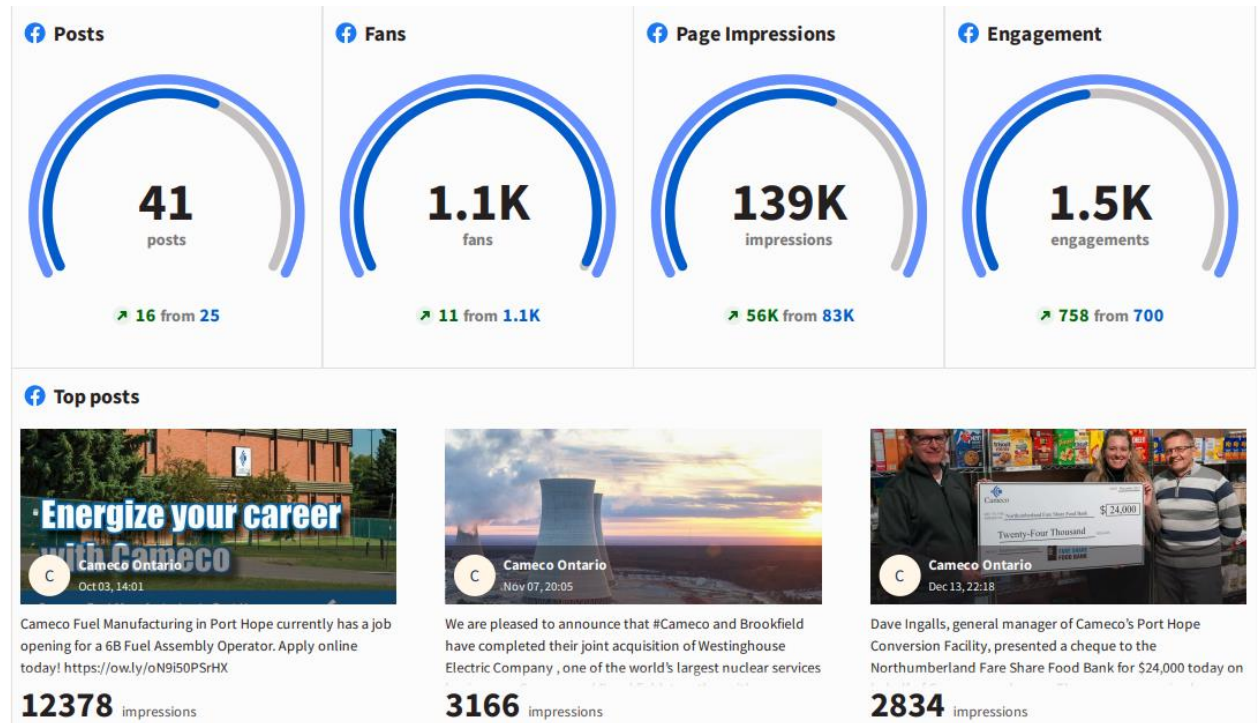
Public Disclosure

CFM made one public disclosures during the fourth quarter: [Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco](#)

Posting Date	October 19, 2023
Incident Date	October 17, 2023
Incident	Reportable Spill
Details	<p>A fork truck operator identified a hydraulic fluid leak coming from the rear of the forklift. The fluid had leaked outside on the pavement between two storage facilities including over a storm drain grate. An estimated 3-4 litres were released onto the pavement, an estimated 100ml entered the storm drain.</p> <p>There was no health or safety risk posed to the public, workers or the environment.</p>
Corrective Action	<p>Oil absorbent was spread on the oil leak on the paved areas and an oil absorbent spill pad was placed in the storm drain to absorb oil that was floating on top of the water in the catch basin.</p> <p>Cameco notified the Canadian Nuclear Safety Commission and the Municipality of Port Hope.</p>

## Social Media

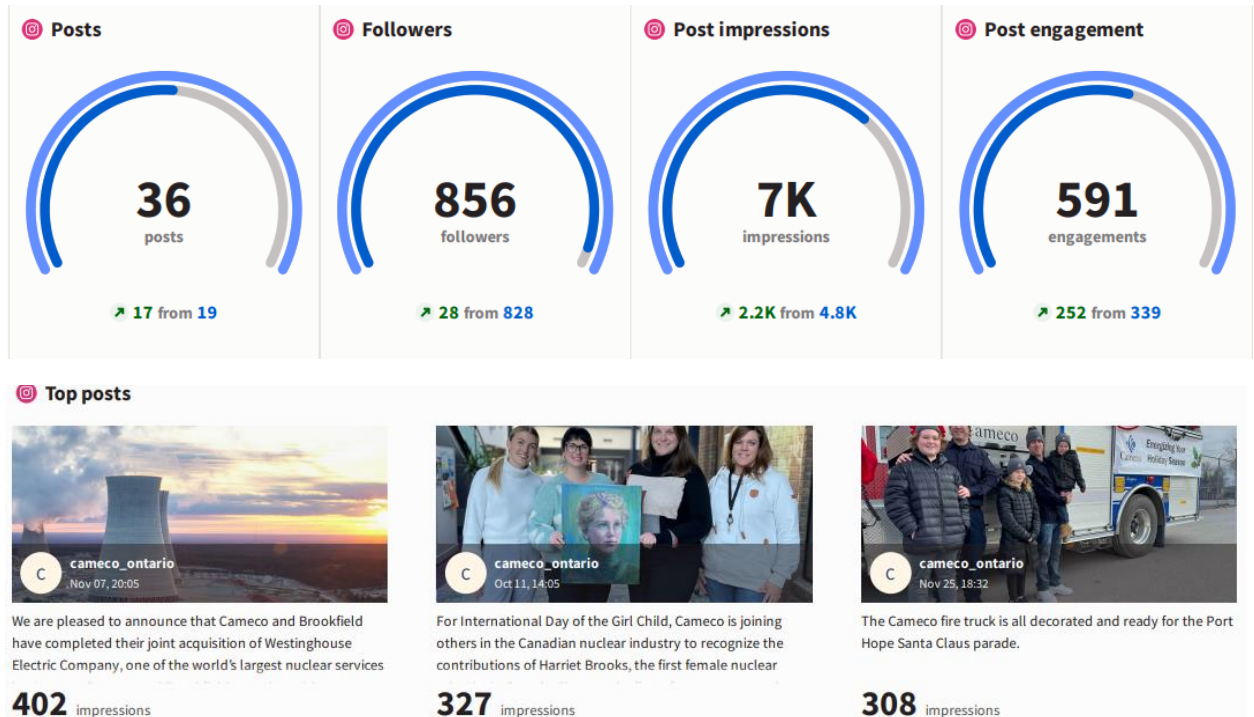
### Facebook – October 1, 2023 to December 31, 2022



Cameco Ontario's 41 posts covered information such as:

- Cameco's participation at Loyalist College Industry Day and the NAYGN conference
- Recognition of the International Day of the Girl Child
- Cameco Fund for Mental Health application process and grants announcement
- A message from Cameco's president and CEO
- Celebrating Cameco's 35<sup>th</sup> Anniversary
- Career openings
- PHCF's employee donation to Northumberland Fare Share Food Bank
- A message from Cameco's chief operating officer
- Cameco's participation at COP28
- Cameco's sponsorship of Net Zero Nuclear
- Cameco's participation in the Cobourg and Port Hope Santa Claus Parades
- The fall issue of Energize

### Instagram – October 1, 2023 to December 31, 2023



Photos and information featured on Instagram were similar to the Cameco Facebook Page.

#### Website

News release announcing the opening of the application process for the Cameco Fund for mental health:

- [Cameco’s Fund for Mental Health Opens 2023 Application Process - News Archive - Media - Cameco Fuel Services](#)

News release announcing the Cameco Fund for Mental Health 2023 grant recipients:

- [Cameco Fund for Mental Health 2023 Awards Grants to 11 Northumberland County Organizations - News Archive - Media - Cameco Fuel Services](#)

The fall issue of Energize:

- [Energize - Fall 2023 - Making a Difference - Community - Cameco Fuel Services](#)

The third quarter compliance report was posted to the website:

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

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One public disclosure was posted to the website:

- [Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco](#)

#### Media Analysis

Cameco received media coverage about the Cameco Fund for Mental Health

- **Cameco Fund for Mental Health 2023 Awards Grants to 11 Northumberland County Organizations** – December 13, 2023 – Today's Northumberland
  - [Cameco Fund for Mental Health 2023 Awards Grants to 11 Northumberland County Organizations - Today's Northumberland - Your Source For What's Happening Locally and Beyond \(todaysnorthumberland.ca\)](#)

#### Communication Products

The Summer 2023 edition of Energize was mailed to all addresses in Port Hope and posted online and social media.

- [Energize - Summer 2023 - Making a Difference - Community - Cameco Fuel Services](#)

A news release announcing a \$100,000 gift to Habitat for Humanity was posted to the website:

- [Cameco Celebrates 35th Anniversary with \\$100,000 Gift for Habitat for Humanity Northumberland - News Archive - Media - Cameco Fuel Services](#)

The Fall 2023 edition of Energize was mailed to all addresses in Port Hope and posted online and social media.

- [Energize - Fall 2023 - Making a Difference - Community - Cameco Fuel Services](#)

News releases regarding the Cameco Fund for Mental Health were posted on the website and issued to local media.

- [Cameco's Fund for Mental Health Opens 2023 Application Process - News Archive - Media - Cameco Fuel Services](#)
- [Cameco Fund for Mental Health 2023 Awards Grants to 11 Northumberland County Organizations - News Archive - Media - Cameco Fuel Services](#)

## 6.0 Indigenous Engagement

On November 1, 2023, the leaders and select employees from Fuel Services Division attended Trent University's First People's House of Learning for an interactive training session, 'Just Get Over it'.

Cameco and Curve Lake First Nation's Oversight Committee met in-person on November 2, 2023. The Oversight Committee members discussed Cameco's operations with a focus on Fuel Services Division. A roadmap was determined for the next six months, confirming meeting dates and making preliminary plans for site visits in 2024. On December 13, 2023, Cameco and Curve Lake First Nation's Environmental Working Group met in-person. The Environmental Working Group members discussed deliverables for the year ahead, roles and responsibilities and set future meeting dates. The Oversight Committee and Environmental Working Group are made up of designated members of both Cameco and Curve Lake First Nation.

The Cameco Fund for Mental Health news release with information on how to apply was sent via email to Hiawatha, Alderville, Curve Lake, Mississaugas of Scugog Island and Mississauga First Nation on October 5, 2023. A second email was sent on October 17, 2023, as a follow-up reminder that the Fund was open for applications.

Alderville First Nation's Mino-Bemaadiziwin (A Good Life) Dinner Series was a Cameco Fund for Mental Health recipient. This project will bring together mainstream health professionals and Indigenous Elders and Knowledge Keepers.

Cameco provided funding to Curve Lake's Recreation Committee to build and expand parks on the reservation.

Public disclosures are emailed to Curve Lake and Scugog Island First Nations as they occur, and they are then discussed at the next scheduled meeting. The one disclosure was emailed on October 19, 2023.

## **7.0 OTHER MATTERS OF REGULATORY INTEREST**

There were no processing activities of enriched material conducted on site in the fourth quarter of 2023 and CFM met all site-specific reporting requirements.

## **8.0 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 fourth quarter of 2023, 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.