



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

**Reporting Period April 1 – June 30, 2023**

**Port Hope Conversion Facility  
Operating Licence  
FFOL-3631.00/2027**

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## **I Executive Summary**

Cameco Corporation (Cameco) is committed to the safe, clean, and reliable operation of all its facilities and continually strives to improve its performance and processes to ensure the safety of both its employees and local residents. The Port Hope Conversion Facility (PHCF) maintains the required programs, plans and procedures in the areas of health and safety, radiation protection, environment, emergency response, fire protection, waste management, and training.

As a result of these programs, plans and procedures, PHCF'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.

Cameco utilizes administrative levels and action levels to provide early detection of issues and ensure levels remain well below regulatory limits. A variety of control measures and practices are employed as part of site programs to ensure the protection of the public, site employees and the environment. A robust ALARA program is in place to ensure continual improvement and to ensure exposures and emissions remain well below action levels.

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## 1.0 Second Quarter Overview

### 1.1 Facility Operation

Cameco continues to strive for operational excellence at all 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 PHCF Quality Management System.

There were no significant changes to Structure, Systems and Components (SSC) or processes in the second quarter.

The April 5 and 6, 2023 daily sanitary sewer discharge composite sample uranium values were reported at the daily action level. Facility discharge quality otherwise remained well below the monthly average limit during the quarter.

On June 5, 6, and 7, 2023, ambient station high volume air sampler (hi-vol) results for total suspended particulate (TSP) were above the dust criteria for visibility (at six sampling locations). Poor air quality (smoky conditions) in the area due to wildfires in Ontario and Quebec are the likely cause.

The UO<sub>2</sub> plant experienced a brief production interruption due to lack of hydrogen feed supply in the second quarter. The UF<sub>6</sub> plant operated without interruption.

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## 1.2 Physical Design / Facility Modification

There were no modifications affecting the safety analysis of the licensed facility made in the quarter that required written approval of the Commission or a person authorized by the Commission.

A project to replace the current cooling water systems for both the UF<sub>6</sub> and UO<sub>2</sub> plants with closed loop cooling water systems began in 2022. The UO<sub>2</sub> plant ceased discharging once-through cooling water to the harbour in late-July 2022. Commissioning for the UO<sub>2</sub> plant closed loop cooling system was completed in Q4 2022. Commissioning for the UF<sub>6</sub> plant is scheduled for Q3 2023. The Safety Analysis Report was updated to reflect these changes and has been approved by CNSC staff.

At the PHCF, changes to the physical design of equipment, processes, and the facility with the potential to impact safety are evaluated using the internal design change process described in *Process and Design Change Control, CQP-113*. Changes are reviewed through Cameco's management of change workflow, which ensures all potential impacts to the environment as well as to the health and safety of personnel are evaluated prior to implementation.

## 2.0 Radiation Protection

This safety and control area covers the implementation of a radiation protection program, in accordance with the *Radiation Protection Regulations*. This program must ensure that contamination and radiation doses are monitored and controlled. Cameco manages the radiation protection program using ALARA principles in order to ensure doses are maintained well below regulatory limits.

There were no radiation dose action level exceedances in the second quarter of 2023.

### Whole Body Dose

Table 1 shows the whole-body dose summary results from the second quarter of 2023 for six work groups: UF<sub>6</sub> Plant; UO<sub>2</sub> Plant, Maintenance; Technical Support (including Nuclear Energy Worker (NEW) contractors), Corporate Technical Services; and Administration.

**Table 1**

<b>Second Quarter 2023 Whole Body Dose Results</b>				
<b>Work Group</b>	<b>Number of Individuals</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
UF <sub>6</sub> Plant	99	0.27	0.00	1.73
UO <sub>2</sub> Plant	26	0.12	0.00	0.37
Maintenance	73	0.19	0.00	0.88
Technical Support <sup>1</sup>	535	0.03	0.00	1.07
Corporate Technical Services	37	0.01	0.00	0.10
Administration	83	0.00	0.00	0.03
<b>Total (Max)</b>	<b>816</b>	<b>0.07</b>	<b>0.00</b>	<b>1.73</b>
<sup>1</sup> Includes contractors (NEWs)				

Table 2 shows the average, minimum and maximum quarterly individual external whole-body exposures for the second quarter of 2022 through to the second quarter of 2023. The average whole-body dose is slightly elevated compared to the previous quarters when production was operational. The maximum whole-body dose received by a UF<sub>6</sub> employee was related to work in the flame reactor and effluent areas.

**Table 2**

<b>Whole Body Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Individuals</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q2 2022	700	0.03	0.00	1.10
Q3 2022	825	0.05	0.00	1.40
Q4 2022	736	0.07	0.00	1.97
Q1 2023	684	0.10	0.00	2.08
Q2 2023	816	0.07	0.00	1.73

Skin Dose

Table 3 shows the quarterly skin dose summary results for six work groups: UF<sub>6</sub> Plant; UO<sub>2</sub> Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services; and Administration. The highest exposures are from the UF<sub>6</sub> work group related to work in the ashcan and effluent areas.

**Table 3**

<b>Second Quarter 2023 Skin Dose Results</b>				
<b>Work Group</b>	<b>Number of Individuals</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
UF <sub>6</sub> Plant	99	0.90	0.00	7.36
UO <sub>2</sub> Plant	26	0.30	0.00	0.97
Maintenance	73	0.94	0.00	6.75
Technical Support <sup>1</sup>	535	0.06	0.00	1.09
Corporate Technical Services	37	0.02	0.00	0.18
Administration	83	0.00	0.00	0.03
<b>Total (Max)</b>	<b>816</b>	<b>0.24</b>	<b>0.00</b>	<b>7.36</b>
<sup>1</sup> Includes contractors (NEWs)				



Table 4 shows the average and maximum quarterly individual skin exposure for the second quarter of 2022 through to the second quarter of 2023. The average skin dose has increased compared to previous quarters (Q1 2023 excluded) when production was operational due to operator time in the flame reactor and effluent areas.

**Table 4**

<b>Skin Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Individuals</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q2 2022	700	0.15	0.00	5.89
Q3 2022	825	0.18	0.00	4.85
Q4 2022	736	0.19	0.00	4.73
Q1 2023	684	0.33	0.00	7.82
Q2 2023	816	0.24	0.00	7.36

Eye Dose

Table 5 shows the quarterly eye dose summary results for six work groups: UF<sub>6</sub> Plant; UO<sub>2</sub> Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services; and Administration. The highest exposure is from the UF<sub>6</sub> group related to time in the flame reactor and effluent areas.

**Table 5**

<b>Second Quarter 2023 Eye Dose Results</b>				
<b>Work Group</b>	<b>Number of Individuals</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
UF <sub>6</sub> Plant	99	0.58	0.00	4.08
UO <sub>2</sub> Plant	26	0.22	0.00	0.72
Maintenance	73	0.54	0.00	3.38
Technical Support <sup>1</sup>	535	0.04	0.00	1.09
Corporate Technical Services	37	0.01	0.00	0.11
Administration	83	0.00	0.00	0.03
<b>Total (Max)</b>	<b>816</b>	<b>0.15</b>	<b>0.00</b>	<b>4.08</b>

<sup>1</sup>Includes contractors (NEWs)

Table 6 shows the average, minimum and maximum quarterly individual external eye exposures for the second quarter of 2023.

**Table 6**

<b>Eye Dose Results by Quarter</b>				
<b>Monitoring Period</b>	<b>Number of Individuals</b>	<b>Average Dose (mSv)</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>
Q2 2022	700	0.09	0.00	3.16
Q3 2022	825	0.11	0.00	3.09
Q4 2022	736	0.13	0.00	2.42
Q1 2023	684	0.21	0.00	4.14
Q2 2023	816	0.15	0.00	4.08

Urine Analysis

The urine analysis action levels are presented in Table 7 below.

**Table 7**

<b>Urine Analysis Action Levels</b>		
	<b>Parameter</b>	<b>Action Level</b>
Urinalysis (NEW)	Weekly - UO <sub>2</sub> /UF <sub>6</sub> Operators, Maintenance, Technical Support	65 µg U/L
	Monthly - Administrative Support	25 µg U/L
	Long-term Contractors	65 µg U/L
	Short-term Contractors	80 µg U/L
	Chemical toxicity – post shift sample	500 µg U/L
	Fluoride toxicity – all samples	7 mg F/L
Urinalysis (Non-NEW)	Daily - Routine Sample	40 µg U/L
	Monthly - Routine Sample	25 µg U/L
	Chemical Toxicity - Post Shift Sample	500 µg U/L
	Fluoride Toxicity – All Samples	4 mg F/L

There were no fluoride in urine results above the action level of 7 mg F/L in the second quarter of 2023.

Table 8 shows the distribution of urine results for the second quarter of 2023. A total of 14,613 urine samples were collected and analyzed for uranium during the second quarter of 2023. The majority of routine urine analysis results (99.2%) were less than 5 µg U/L in the quarter.

All results above 13 µg U/L were screened by radiation protection staff. There were no official investigations for uranium in urine during the second quarter of 2023.

**Table 8**

<b>Second Quarter 2023 Routine Urine Analysis Results</b>	
<b>Distribution of Results</b>	<b>Q2 2023</b>
Number of Samples < 5 µg U/L	14,500
Number of Samples > 5 to < 25 µg U/L	108
Number of Samples > 25 to < 50 µg U/L	5
Number of Samples > 50 µg U/L	0
Number of Samples Analyzed (Uranium)	14,613

Table 9 presents the internal urine analysis doses for the last five quarters. The average and maximum internal urine analysis doses in the quarter were 0.01 mSv and 0.10 mSv, respectively, which was consistent with previous quarters.

**Table 9**

<b>Internal Dose (Urine) by Quarter</b>				
<b>Quarter</b>	<b>Number of Individuals</b>	<b>Minimum Dose (mSv)</b>	<b>Maximum Dose (mSv)</b>	<b>Average Dose (mSv)</b>
Q2 2022	586	0.00	0.16	0.01
Q3 2022	676	0.00	0.20	0.01
Q4 2022	633	0.00	0.16	0.01
Q1 2023	586	0.00	0.21	0.01
Q2 2023	662	0.00	0.10	0.01

Fluoride in Urine

A total of 10,259 urine samples were analyzed for fluoride during the second quarter with summary results provided in Table 10.

There were 11 routine and non-routine samples above the internal administrative investigation level of 4 mg F/L during the second quarter. The samples were investigated and entered into CIRS. All results were non-occupational.

**Table 10**

<b>Second Quarter 2023 Fluoride in Urine Analysis Results</b>			
<b>Type of Fluoride Samples</b>	<b>Number of Samples</b>	<b>Minimum Concentration (mg F/L)</b>	<b>Maximum Concentration (mg F/L)</b>
All fluoride samples	10,259	0.1	5.5
Routine post-shift fluoride samples >= 7 mg F/L	0	-	-
Routine post-shift fluoride samples >= 4 mg F/L	0	-	-
Non-routine fluoride samples	410	0.1	4.2
Samples analyzed for U, insufficient volume (< 30mL) for F analysis	12	-	-

Lung Counting

The lung count trailer was at the BRR site in the second quarter of 2023. The PHCF technical support group as well as the CFM site were also lung counted.

Contamination Control

The PHCF is divided into three zones for contamination control purposes. Zone 1 areas (clean areas - no radioactive sources other than monitoring equipment) are clearly delineated. Whole body monitors are located at the Zone 1 boundary in the main lobby, men’s, and women’s change rooms. There is also a monitor located at the gate 12 vehicle port. In Zone 2 areas and the yard Zone 3 areas (transition areas – may contain limited amounts of uranium compounds), no visible contamination should exist and, when detected, loose contamination is promptly isolated, monitored, cleaned, and monitored again to ensure the contamination has been removed. Zone 3 production areas are production areas where uranium compounds are expected. Incidents of zone contamination are presented in Table 11.

**Table 11**

<b>Second Quarter 2023 Alpha Contamination Monitoring Results</b>			
<b>Area</b>	<b>Number of Samples Taken</b>	<b>Zone Contamination Criteria (Bq/cm<sup>2</sup>)</b>	<b>Number of Samples Above Criteria</b>
Zone 1	932	0.4	0
Zone 2	12,748	0.4	57
Zone 3 (Yard)*	4	0.4	1

\*Note – Samples are not routinely required in the yard area. Samples are taken as required if contamination is suspected.

The contamination in Zone 2 areas was primarily detected in the office areas and lunchrooms of production buildings. Contamination measurements are taken upon request in Zone 3 areas when contamination is suspected and only documented when above the applicable levels.

**In-Plant Air**

Routine air sampling is performed by collecting airborne particulate on air sampling filters and quantifying the airborne concentration of uranium. The second quarter results are presented in Table 12.

The site administrative level and derived air concentration (DAC), based on slow moving (low solubility) material, is 100 µg U/m<sup>3</sup> but protective measures, such as investigation and respiratory protection, are normally required as a precaution at lower DAC levels. Continuous air monitoring equipment (iCAMs) in the UF<sub>6</sub> and UO<sub>2</sub> plants are also used to provide early warning and to prompt response to elevated airborne uranium concentrations. Local alarms and direct communication with the control rooms provide early warning to plant personnel.

**Table 12**

<b>Second Quarter 2023 In-Plant Air Uranium Concentration by Operations Group</b>				
<b>Operations Group</b>	<b>Number of Samples Taken</b>	<b>Average (µg U/m<sup>3</sup>)</b>	<b>Maximum (µg U/m<sup>3</sup>)</b>	<b>Number of Samples Taken Above Administrative Level</b>
UF <sub>6</sub> Plant	4,549	11	455	109
UO <sub>2</sub> Plant	1,350	2	54	0
Waste Recovery	695	2	41	0
CUP	398	2	12	0

The maximum in-plant air sample of  $455 \mu\text{g U/m}^3$  was recorded on May 24, 2023, in the  $\text{UF}_6$  plant. This result was due to work in the flame reactor area.

The average in-plant air concentrations are consistent with previous quarters.

### 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.

Conventional safety statistics are presented in Table 13.

**Table 13**

2023 Safety Statistics					
Quarter / Parameter	Q1 2023	Q2 2023	Q3 2023	Q4 2023	YTD
First Aid Injuries	12	15	-	-	27
Medical Diagnostic Procedures	1	4	-	-	5
Medical Treatment Injuries	5	3	-	-	8
Other Recordable Injuries	1	0	-	-	1
Lost Time Injuries	0	0	-	-	0
Lost Time Injury Frequency	0	0	-	-	0
Lost Time Injury Severity	0	0	-	-	0

There were no lost time incidents that occurred in the second quarter.

#### Health and Safety Activities

- **Communications:** OHS and CSSC continued to issue safety bulletins to promote a focus on continuing safety awareness.
- **Education and Training:** Training continued routinely using both in person methods and computer-based learning.
- **Safety Awareness Activities:** The CSSC held a breakfast in June with a focus on ergonomics. PPE was given out and a third-party was onsite to demonstrate wearable ergonomic devices.
- **CSSC:** The CSSC committee continues to meet for regulatory meetings.
- **Safety & Industrial Hygiene:** The safety group has placed a focus on completing HIRAC assessments and ergonomic assessments in 2023. These assessments were well underway in the second quarter.

- **Total Recordable Injury Rate (TRIR)** – Q2 Ending = 2.67 (15 First Aids, 4 Medical Diagnostics, 3 Medical Treatments). Site has more than 4.2 million hours without a Lost Time Injury. Contractor TRIR YTD is 1.40.



#### 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

ORL equations for Site 1 and Site 2 have been derived and are expressed in the form shown below.

$$\text{Public Dose} = \text{Dose}_{\text{Air}} + \text{Dose}_{\text{Water}} + \text{Dose}_{\text{Gamma}} < 0.3 \text{ mSv/y}$$

The monthly dose from Site 1 and Site 2 are based on monitoring results for each dose component as shown in Table 14.

**Table 14**

<b>Quarterly Dose (mSv/quarter)</b>					
<b>ORL Component</b>	<b>Q1 2023</b>	<b>Q2 2023</b>	<b>Q3 2023</b>	<b>Q4 2023</b>	<b>YTD 2023</b>
Air	<0.001	<0.001	-	-	<0.001
Water	<0.001	<0.001	-	-	<0.001
Gamma – Site 1	0.026	0.031	-	-	0.057
Gamma – Site 2	0.036	0.039	-	-	0.075
Quarterly Dose – Site 1	0.027	0.031	-	-	0.058
Quarterly Dose – Site 2	0.037	0.039	-	-	0.076

##### Gamma Monitoring

Dose to the public is calculated for both site 1 and 2 using specific gamma fenceline monitoring locations. The results at station 2 are used for site 1 public dose calculations and the results at station 21 are used for site 2 public dose calculations. The results at these locations for this quarter are summarized and compared with regulatory action levels in Table 15.

There were no monthly gamma radiation action levels exceeded during the second quarter.

**Table 15**

<b>Second Quarter 2023 Public Dose Gamma Monitoring Results</b>					
<b>Station Number</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>Action Level (µSv/h)</b>	<b>Licence Limit (µSv/h)</b>
2	0.190	0.230	0.220	0.400	0.570
10	0.030	0.030	0.010	0.400	0.610
21	0.020	0.050	0.040	0.250	0.260

Air Emissions

The quarterly average and maximum stack emissions from the UF<sub>6</sub> plant main stack and the UO<sub>2</sub> plant main stack are presented in Table 16.

A stack monitoring program is used to determine the airborne uranium emission rates on a daily basis from the main stacks of the UF<sub>6</sub> and UO<sub>2</sub> plants.

No licensed action levels were exceeded for uranium emissions from the UF<sub>6</sub> plant main stack in the quarter. The UF<sub>6</sub> main stack average uranium emission rate was consistent with previous quarters during which production was operational.

No licensed action levels were exceeded for uranium emissions from the UO<sub>2</sub> plant main stack in the quarter. The UO<sub>2</sub> main stack average uranium emission rate was slightly higher than previous quarters as a result of continuous production rates and equipment parameters.

Fluoride emissions from the UF<sub>6</sub> main stack are sampled and analyzed on a continuous basis using an on-line analyzer and the data is collected on the plant computer system. The UF<sub>6</sub> main stack average fluoride emission rate was with previous quarters during which production was operational.

The UO<sub>2</sub> main stack is also continuously sampled for ammonia. No licensed action levels were exceeded for ammonia emissions from the UO<sub>2</sub> plant main stack in the quarter. The UO<sub>2</sub> main stack average ammonia emission rate was consistent with previous quarters.

**Table 16**

Daily Main Stack Emissions by Quarter									
Plant	Parameter	Licence Limit	Action Level	Value	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023
UF <sub>6</sub>	Uranium g U/h	280	40	Quarterly Daily Average	3.8	2.0	1.9	2.5	2.1
				Quarterly Daily Maximum	44.7	6.7	3.7	5.0	4.3
	Hydrogen Fluoride g HF/h	650	230	Quarterly Daily Average	25	21	12	9	16
				Quarterly Daily Maximum	124	236	201	60	197
UO <sub>2</sub>	Uranium g U/h	240	10	Quarterly Daily Average	0.6	0.4	0.5	0.8	1.1
				Quarterly Daily Maximum	1.2	1.2	1.4	1.7	2.9
	Ammonia kg NH <sub>3</sub> /h	58	10	Quarterly Daily Average	2.6	1.4	2.0	2.3	1.7
				Quarterly Daily Maximum	4.9	3.8	4.3	4.6	2.8

Liquid Discharges

The PHCF operated a once-through non-contact cooling water system in support of UF<sub>6</sub> plant operations and harbour water supply quality influences cooling water return quality under normal operating conditions. Ambient water quality can fluctuate based on near-shore Lake Ontario currents, seasonal weather patterns, harbour remedial work and outer harbour sedimentation among other items.

Cooling water return quality data for the UF<sub>6</sub> plant cooling water return (monitoring location UO2N) is summarized in Table 17. The UO<sub>2</sub> plant ceased discharging once-through cooling water to the harbour in late-July 2022 in association with a transition to a closed loop cooling system.

With the resumption of inner harbour dredge activities by Canadian Nuclear Laboratories (CNL) in March 2022 following a winter period interruption, a corresponding increase in uranium trending was observed. Elevated mean and maximum conditions were observed

at monitoring location UO2N for the balance of the 2022 calendar year as a function of on-going inner harbour remedial work. General increases in first quarter 2023 trending were recorded relative to the fourth quarter of 2022 and second quarter trending decreased to within range of third and fourth quarter 2022 recordings, albeit at concentrations well above typical background concentrations. Similar trending patterns have been recorded at the PHCF harbour water intake.

Though ammonia results generally increased in the fourth quarter 2022, decreases are noted in the first and second quarters of 2023. Ammonia is not a parameter of concern with respect to UF<sub>6</sub> plant heat exchanger operations. Periods of elevated trending are attributed to the accumulation and decomposition of surface water organic matter within the PHCF cooling water works.

**Table 17**

<b>UO2N Water Quality Data by Quarter</b>							
<b>Parameter</b>	<b>Units of Measure</b>	<b>Value</b>	<b>Q2 2022</b>	<b>Q3 2022</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>
Uranium	µg U/L	Average	80	160	140	310	160
		Maximum	280	420	320	730	440
Fluoride	mg F/L	Average	0.11	0.10	0.12	0.11	0.095
		Maximum	0.21	0.15	0.33	0.14	0.15
Ammonia & Ammonium	mg N/L	Average	0.014	0.014	0.27	0.067	0.056
		Maximum	0.014	0.028	0.84	0.25	0.46
Nitrate	mg N/L	Average	0.68	0.34	0.89	1.5	0.77
		Maximum	1.7	0.51	1.6	1.9	1.4
pH	-	Minimum	8.12	8.08	8.10	8.14	8.20
		Maximum	8.38	8.76	8.57	8.38	8.51

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A daily sanitary sewer discharge uranium action level of 100 µg U/L (0.10 mg U/L) and a monthly mean release limit of 275 µg U/L (0.275 mg U/L) are currently in place. Tables 18 and 19 summarize uranium concentrations and pH values recorded for the second quarter of 2023.

The daily sanitary sewer action level was reached on the April 5 and 6 daily monitoring periods. Facility discharge quality otherwise remained well below the monthly average limit during the quarter.

In early January, sanitary sewer trending increased corresponding to a period of unreasonably warm and rainy weather. The magnitude and frequency of precipitation events has been seen to influence sanitary sewer quality as a function of an increase in groundwater infiltration potential. The mid-January action level excursion groupings were partially influenced by Powerhouse effluent discharges. Harbour water was entering the sanitary sewer system at the Powerhouse, and harbour water trending was elevated during the time period in question. The harbour water supply to the Powerhouse was ultimately isolated by January 20 and a municipal water supply displaced former harbour water uses. Uranium trending decreased following the Powerhouse remedial actions, but trending increases were subsequently observed starting in mid-March in association with warmer ambient conditions and precipitation events that exacerbated baseline groundwater infiltration conditions.

The March and April 2023 sanitary sewage uranium excursions are interpreted to have resulted from groundwater infiltration, exacerbated by precipitation events and spring thaw conditions,

As a follow-up to fourth quarter 2021 and first quarter 2022 sanitary sewer infrastructure inspections, Cameco has evaluated targeted sanitary sewer infrastructure rehabilitation, replacement and/or abandonment tasks, taking into consideration work completed to date and planned site and VIM project sanitary sewer system improvements. Several activities are targeted for the 2023 calendar year, with near term focus centered on the licensed facility. Items to note include the replacement and realignment of sewer infrastructure servicing existing facility lift stations and portions of building 20, and the abandonment of associated inactive utilities. Rehabilitation work is also being planned for the building 13 service.

**Table 18**

<b>Sanitary Sewer Discharge Data by Quarter</b>							
<b>Parameter</b>	<b>Units of Measure</b>	<b>Value</b>	<b>Q2 2022</b>	<b>Q3 2022</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>
Uranium	mg U/L	Average	0.050	0.022	0.040	0.039	0.038
		Maximum	0.28	0.18	0.094	0.22	0.10
pH	-	Minimum	7.32	7.12	7.56	7.39	7.44
		Maximum	8.20	8.21	8.22	8.84	8.28

**Table 19**

<b>Q2 2023 Monthly Sanitary Sewer Discharges</b>			
<b>Period</b>	<b>Sanitary Sewer Action Level/Release Limit</b>	<b>Monthly Average Uranium Concentration (µg U/L)</b>	<b>Daily Maximum Uranium Concentration (µg U/L)</b>
April	Action Level of 100 µg U/L – daily composite samples	57	100
May		45	80
June	Release Limit of 275 µg U/L – monthly average of daily composite samples	12	25

Ambient Air Monitoring

Table 20 shows the quarterly all-station average and maximum uranium dustfall results from the second quarter of 2022 through to the second quarter of 2023.

No uranium dustfall results exceeded the internal administrative screening level in the second quarter. The average uranium in dustfall results in the second quarter of 2023 were consistent with the uranium in dustfall averages during the previous quarters.

**Table 20**

<b>Uranium in Dustfall Results by Quarter (mg U/m<sup>2</sup>/30 days)</b>					
<b>Value</b>	<b>Q2 2022</b>	<b>Q3 2022</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>
Average	0.1	0.2	0.2	<0.1	0.1
Maximum	0.4	1.7	1.3	0.1	0.2
Internal Administrative Screening Level = 10 mg U/m <sup>2</sup> /30 days					

Table 21 summarizes the average and maximum uranium hi-vol results from the second quarter of 2022 through to the second quarter of 2023.

No uranium hi-vol results exceeded the AAQC in the second quarter. The average uranium in hi-vol results in the second quarter of 2023 were consistent with the uranium in hi-vol averages during the previous quarters.

**Table 21**

<b>Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg U in TSP/m<sup>3</sup>)</b>					
<b>Quarter</b>	<b>Result</b>	<b>Waterworks</b>	<b>Shuter Substation</b>	<b>Marsh Street</b>	<b>Hayward Street</b>
Q2 2022	Average	0.002	0.002	0.004	0.003
	Maximum	0.012	0.036	0.031	0.012
Q3 2022	Average	0.001	0.001	0.004	0.001
	Maximum	0.003	0.008	0.025	0.005
Q4 2022	Average	0.001	0.001	0.003	0.002
	Maximum	0.006	0.004	0.010	0.015
Q1 2023	Average	0.008	0.001	0.006	0.002
	Maximum	0.381	0.003	0.132	0.047
Q2 2023	Average	0.002	0.001	0.005	0.002
	Maximum	0.007	0.005	0.022	0.010
Average <0.06 µg U in TSP/m <sup>3</sup> (annual) AAQC					
Maximum <0.3 µg U in TSP/m <sup>3</sup> (24 hr) AAQC					

Table 22 shows the quarterly all-station average and maximum fluoride dustfall results from the second quarter of 2022 through to the second quarter of 2023.

The average fluoride in dustfall results in the second quarter of 2023 were consistent with previous quarters.

**Table 22**

<b>Fluoride in Dustfall Results by Quarter (mg F/m<sup>2</sup>/30 days)</b>					
<b>Value</b>	<b>Q2 2022</b>	<b>Q3 2022</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>
Average	1.5	0.4	0.8	0.6	1.1
Maximum	9.9	4.1	4.2	5.3	5.5
Internal Administrative Screening Level = 20 mg F/m <sup>2</sup> /30 days					

Table 23 shows the average and maximum lime candle results from the second quarter of 2022 through to the second quarter of 2023. The average results are comparable to levels observed in the previous quarters.

**Table 23**

<b>Monthly Lime Candle Results by Quarter (µg F/100 cm<sup>2</sup>/30 days)</b>					
<b>Value</b>	<b>Q2 2022</b>	<b>Q3 2022</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>
Average	4	4	2	3	3
Maximum	12	7	4	4	7
The desirable ambient air quality criteria for lime candles are to protect forage crops consumed by livestock. During the summer growing season, the criteria is 40µg F/100cm <sup>2</sup> /30 days, changing to 80µg F/100cm <sup>2</sup> /30 days in winter					

Ambient Water Quality Monitoring

A summary of harbour water intake (SCI) water quality data is presented in Table 24. Consistent with the production facility returns trending, with the resumption of CNL inner harbour dredge activities in March 2022 following a winter period interruption, a corresponding increase in uranium trending was observed. Elevated mean and maximum conditions were observed for the balance of the 2022 calendar year as a function of the on-going inner harbour remedial work. General increases in first quarter 2023 average and maximum uranium concentrations were recorded relative to the fourth quarter of 2022 and second quarter trending decreased to within range of third and fourth quarter 2022 recordings, albeit at concentrations well above typical background concentrations.

Though ammonia results generally increased in the fourth quarter 2022, decreases are noted in the first and second quarters of 2023. Periods of elevated trending are attributed to the accumulation and decomposition of surface water organic matter within the PHCF cooling water works.



**Table 24**

<b>SCI Water Quality Data by Quarter</b>							
<b>Parameter</b>	<b>Units of Measure</b>	<b>Value</b>	<b>Q2 2022</b>	<b>Q3 2022</b>	<b>Q4 2022</b>	<b>Q1 2023</b>	<b>Q2 2023</b>
Uranium	µg U/L	Average	85	180	160	340	170
		Maximum	280	500	360	740	450
Fluoride	mg F/L	Average	0.11	0.099	0.11	0.11	0.095
		Maximum	0.22	0.19	0.16	0.14	0.14
Ammonia & Ammonium	mg N/L	Average	0.014	0.019	0.13	0.020	0.021
		Maximum	0.014	0.46	0.76	0.14	0.14
Nitrate	mg N/L	Average	0.72	0.42	1.2	1.7	0.90
		Maximum	1.4	0.65	1.9	2.1	1.6
pH	-	Minimum	8.09	8.04	7.94	8.13	8.19
		Maximum	8.46	8.74	8.60	8.34	8.47

Cooling Water Intake – Visual Inspections

Table 25 below presents all non-conformities observed during daily visual inspections of the cooling water intake system.

**Table 25**

<b>Date</b>	<b>Quantity of Fish Observed</b>	<b>Observations</b>
April	0	No fish were observed during daily checks.
May	1	One small fish approximately two inches in length was observed on May 23. It is believed that the fish was washed into the pit as a result of heavy wave action.
June	1	One small fish approximately three inches in length was observed on June 2. It is believed that this fish was the same one observed on May 23.
July	1	One small immobile fish approximately three inches in length was observed on July 17, 2023.

The harbour water pumphouse was shut down on July 13, 2023 as a function of the transition to production facility closed loop cooling water systems. Fish impingement observations are no longer required as a result of this change and will not be included in compliance reports going forward.

## 5.0 Public Information Program

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

### Public Engagement

On April 4, Cameco and Bruce Power celebrated the extension of their long-term exclusive nuclear supply agreement. A news release was issued to local media and the news release and a video were posted to the website.

On April 4, Cameco president and CEO announced a \$200,000 gift to Northumberland Hills Hospital Foundation to support the equipment needs of the Diagnostic Imaging Department. A news release was issued to local media and posted to the website.

The spring issue of Energize was mailed out to residents of Port Hope in the last week of April. A digital version was also posted on the Cameco website on April 25. Stories in this issue included: Cameco and Bruce Power's long-term agreement; Cameco supports hospital with a \$200K gift and Step Up for Mental Health events.

Cameco representatives met with the Mayor of Port Hope on May 15 to provide an overview of Cameco's operations and local community activities.

On June 13, the Cameco Emergency Response Team conducted a planned joint exercise with Port Hope Fire & Emergency Services at the Port Hope Conversion Facility. Cameco informed the community via social media.

The Step Up for Mental Health 5K run/walk took place on May 13, 2023 in Cobourg. Over 600 people registered to participate.

Over 30 Cameco employees took part in the 24th annual United Way Day of Caring on June 2, helping to complete 24 projects around the community.

The Port Hope Cameco Charity Golf Tournament took place on Friday, June 2 at Dalewood Golf Club. Over 120 people registered for the tournament with all funds raised benefitting the Cameco Fund for Mental Health.

Advertising on local radio was used to support the Step Up for Mental Health 5K and the charity golf tournament.

Cameco hosted its annual community BBQ on June 22<sup>nd</sup> from 4 – 7 p.m. at Memorial Park in Port Hope. Approximately 400 people attended including the Mayor of Port Hope

and a few councillors, and representatives from Curve Lake First Nation. Cameco mailed out information about the BBQ via postcards to approximately 2,700 addresses in Port Hope and posted information to social media channels and the website. Local Cameco leadership and subject matter experts were available to share information and answer questions. Information boards were set up to provide information to the public on various aspects of Cameco’s operations and activities such as the facilities (PHCF and CFM), Vision In Motion, community involvement and regulatory compliance.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFM’s Community Partner Program. Through the quarter, Habitat for Humanity, Rebound Child and Youth Services and the Northumberland Diversity Festival benefitted from this sponsorship by receiving advertising.

Public Disclosure

PHCF made two public disclosures during the second quarter: [Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco](#)

Posting Date	April 7, 2023
Incident Date	April 5, 2023
Incident	Environmental Action Level Exceedance on April 5, 2023
Details	The daily sanitary sewer discharge recorded a value of 100 µg/L on April 5 and April 6 of which met the uranium sanitary sewer action level of 100 µg/L. Facility discharge quality remains well below the sanitary sewer uranium limit of 275 µg/L (monthly average). There was no health or safety risk posed to the public, workers or the environment.
Corrective Action	Groundwater infiltration, exacerbated by rain events, are the likely cause. Cameco notified the Canadian Nuclear Safety Commission and the Municipality of Port Hope.
Cameco Environmental Effect Rating	1

Posting Date	June 12, 2023
Incident Date	June 5, 6 and 7, 2023
Incident	Environmental Limit Exceedance on June 5, 6 and 7, 2023
Details	<p>Six ambient station high volume air samplers (hi-vol) located around the Port Hope Conversion Facility recorded exceedances with the highest result of 196 µg/m<sup>3</sup> total suspended particulate (TSP) during the period of June 5, 6 and 7, 2023. These measurements are above the dust criteria of 120 µg/m<sup>3</sup> TSP set by the Environment and Climate Change Canada and Ontario Ministry of Environment, Conservation and Parks.</p> <p>There was no health or safety risk posed to the public, workers or the environment.</p>
Corrective Action	<p>Poor air quality (smoky conditions) in the area due to wildfires in Ontario and Quebec are the likely cause. Hi-vol uranium results were within the normal range (negligible) during this period.</p> <p>Cameco notified the Canadian Nuclear Safety Commission and the Ontario Ministry of Environment, Conservation and Parks</p>
Cameco Environmental Effect Rating	1

### Social Media

Cameco Ontario’s Facebook community grew by 56 new followers (1,128 total) and had a total of 1,228 page likes at the end of the quarter. Cameco Ontario’s 76 posts covered information such as:

- Cameco and Bruce Power celebrated a 10-year extension of the fuel supply contract on April 4 with photos and video shared on social media
- Cameco CEO Tim Gitzel attended a cheque presentation at the Northumberland Hills Hospital in Cobourg on April 4 as Cameco pledged a \$200,000 gift to the hospital
- Posted photos of a tour of the Port Hope Conversion Facility for Ukrainian nuclear power company Energoatom with Cameco CEO Tim Gitzel
- Promoted the spring 2023 issue of Energize on April 25
- Recognized National Safety and Health Week on May 2

- Promotion and results of the Step Up for Mental Health 5K run / walk which took place on May 13 in Cobourg
- Cameco's participation in the Métis Nation of Ontario Nuclear Safety Open House on May 27
- Cameco recognized pride month on social media with photos of the pride flags flying at each site as well as a diversity and inclusion presentation given to all Cameco employees on June 6
- Promotion and results of the Port Hope Cameco Charity Golf Tournament that took place on June 2 at Dalewood Golf Club
- Recognition of the sponsors of the Cameco Charity Golf Tournament
- A notice about a planned emergency response exercise on June 13 at the Port Hope Conversion Facility
- Promotion for the Cameco Community BBQ on June 22 at Memorial Park in Port Hope
- Cameco recognized National Indigenous Peoples History Month throughout the month of June

By the end of the quarter the Instagram account had grown by 52 new followers for a total of 807 followers. Photos and information featured were similar to the Cameco Facebook page.

#### Website

Cameco and Bruce Power celebrated the extension of their long-term arrangements for nuclear fuel. A news release and video were posted to the website:

- [Cameco and Bruce Power Celebrate Extension of Long-Term Arrangements for Nuclear Fuel Through 2040 - News Archive - Media - Cameco Fuel Services](#)

A news release announcing a \$200,000 gift to the Northumberland Hills Hospital Foundation to support the equipment needs of the Diagnostic Imaging Department. issued to local media and posted to the website:

- [Cameco Supports Diagnostic Imaging at Northumberland Hills Hospital with \\$200,000 Gift - News Archive - Media - Cameco Fuel Services](#)

The Spring 2023 edition of Energize was posted.

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

Information about Cameco's community BBQ was posted to the website.

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

**Public Disclosures:** Two public disclosures were posted to the website:

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

The Q1 2023 Compliance Report was posted to the website:

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

### Media Analysis

Cameco receive media coverage about Cameco and Bruce Power celebrating the extension of their long-term exclusive nuclear supply agreement:

- **Bruce and Cameco partner for long-term nuclear fuel supply** – April 4, 2023  
– World Nuclear News
  - [Bruce and Cameco partner for long-term nuclear fuel supply : Corporate - World Nuclear News \(world-nuclear-news.org\)](#)
- **COMMUNITY SPOTLIGHT – Cameco has extended its relationship with Bruce Power to 2040** – Go Northumberland – April 4, 2023
  - [COMMUNITY SPOTLIGHT: Cameco has extended it's relationship with Bruce Power to 2040 | 93.3 myFM \(gonorthumberland.ca\)](#)
- **Cameco, Bruce Power extend nuclear fuel supply deal through to 2040** – Global News – April 4, 2023
  - [Cameco, Bruce Power extend nuclear fuel supply deal through to 2040 | Globalnews.ca](#)
- **Cameco, Bruce Power nuclear fuel partnership extended** – Northumberland News – April 6, 2023
  - [Cameco, Bruce Power nuclear fuel partnership extended \(northumberlandnews.com\)](#)

Cameco received media coverage on its Step Up for Mental Health initiative:

- **Step-Up for Step Up to Mental Health Fun Run/Walk Begins** – May 10, 2023 – Today’s Northumberland
  - [Set-Up for Step Up to Mental Health Fun Run/Walk Begins - Today's Northumberland - Your Source For What's Happening Locally and Beyond \(todaysnorthumberland.ca\)](https://todaysnorthumberland.ca)
- **Step Up for Mental Health this Saturday** – May 10, 2023 – Go Northumberland
  - [COMMUNITY SPOTLIGHT: Step Up for Mental Health this Saturday | 93.3 myFM \(gonorthumberland.ca\)](https://gonorthumberland.ca)
- **Cobourg road closures to accommodate fundraising run May 13** – May 12, 2023 – Northumberland News
  - [Cobourg road closures to accommodate fundraising run May 13 \(northumberlandnews.com\)](https://northumberlandnews.com)
- **Hundreds of People and Cameco Step Up for Mental Health in Cobourg** – May 14, 2023 – Today’s Northumberland
  - [Hundreds of People and Cameco Step Up for Mental Health in Cobourg - Today's Northumberland - Your Source For What's Happening Locally and Beyond \(todaysnorthumberland.ca\)](https://todaysnorthumberland.ca)

Cameco received media coverage regarding the joint training exercise:

- **Cameco and Port Hope Fire and Emergency Service Hold Joint Training Exercise** – June 13, 2023 – Today’s Northumberland
  - [Cameco and Port Hope Fire and Emergency Services Hold Joint Training Exercise - Today's Northumberland - Your Source For What's Happening Locally and Beyond \(todaysnorthumberland.ca\)](https://todaysnorthumberland.ca)

Cameco received media coverage regarding its donation to the hospital:

- **Cameco supporting ‘world-class care and medical technology’ at Northumberland Hospital** – April 9, 2023 – Northumberland News
  - [Cameco supporting ‘world-class care and medical technology’ \(northumberlandnews.com\)](https://northumberlandnews.com)



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### Communication Products

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

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

Cameco and Bruce Power celebrated the extension of their long-term exclusive nuclear fuel supply arrangements for an additional 10 years through to 2040 – a news release and video were posted to the website.

- [Cameco and Bruce Power Celebrate Extension of Long-Term Arrangements for Nuclear Fuel Through 2040 - News Archive - Media - Cameco Fuel Services](#)

A news release announcing a \$200,000 gift to the Northumberland Hills Hospital Foundation to support the equipment needs of the Diagnostic Imaging Department. issued to local media and posted to the website.

- [Cameco Supports Diagnostic Imaging at Northumberland Hills Hospital with \\$200,000 Gift - News Archive - Media - Cameco Fuel Services](#)

Cameco mailed out information about the BBQ via postcards to approximately 2,700 addresses in Port Hope and posted information to social media channels and the website. Information boards were set up to provide information to the public on various aspects of Cameco's operations and activities such as the facilities (PHCF and CFM), Vision In Motion, community involvement and regulatory compliance.

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

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## 6.0 Indigenous Engagement

Cameco emailed the PHCF, VIM and CFM Annual Compliance Reports, and the spring issue of Energize on May 2 to Curve Lake, Scugog Island, Alderville, Hiawatha, and Rama First Nation and the Mohawks of the Bay of Quinte. On June 16, they were all emailed the Q1 2023 PHCF and CFM compliance reports and an email invitation to the community BBQ. Two representatives from Curve Lake First Nation attended the BBQ.

Cameco and Curve Lake participated in a routine meeting on May 3. Cameco and Curve Lake discussed recent public disclosures and a review of the PHCF Annual Compliance Report.

Alderville First Nation requested an introductory meeting with Cameco. That meeting is scheduled to take place in Q3.

On May 24, Cameco's Vice-President, Sustainability and Stakeholder Relations, and the Vice-President of Cameco Fuel Services Division met with Curve Lake First Nation's Chief, members of Council and consultation committee for the official signing of an agreement that formalizes the relationship between Curve Lake First Nation and Cameco.

Cameco representatives attended the Métis Nation of Ontario's (MNO) Nuclear Safety Open House in Blue Mountain on May 27. The objective of the Open House was to provide information and education related to the safety of the nuclear power industry to MNO citizens who are living in Region 7. Cameco's booth featured information about its operations in Ontario and representatives were available to answer questions.

Public disclosures are emailed to Curve Lake and Scugog Island and then discussed at the next available meeting.

## **7.0 Other Matters of Regulatory Interest**

### **7.1 Vision in Motion**

VIM engineering activities continued for building 72 (new warehouse), the large excavation to be completed west of the turning basin, and warehouse demolition (buildings 6, 7, 12, 12A) and work in Building 5. A scope for demolition of equipment in Building 2 was issued for bid and the contract for the demolition of buildings 14 and 15 was awarded. Collaborative engineering work with the Municipality of Port Hope was in-progress for stormwater systems in the vicinity of Eldorado Place and the Cameco parking lot.

Coordination continued with CNL regarding future remediation activities with shared responsibilities at the Centre Pier and near the Cameco fence line along the harbour, with details being discussed as construction of the new harbour wall approaches next year. A protocol was established for coordination of soil remediation at the centre pier that CNL will perform on Cameco's behalf was established.

Exterior cladding removal at the tower of building 27 was completed. The top of the tarping system was subsequently removed to prepare for dismantlement of the steel structure. In building 5B, equipment removal progressed well.

Packaged waste shipments to the LTWMF continued. The CNL hold on delivery of materials in roll-off bins was removed, but some technical requirements will need to be met for the delivery vehicles.

The Supplementary Environmental Monitoring Plan for Vision in Motion and Other Clean-Up Program Projects is in place to monitor environmental impacts for the VIM activities, primarily during demolition/excavation.

There were no environmental monitoring exceedances that occurred in the second quarter related to VIM activities; however, elevated dust trak results and high-volume air sampler total suspended particulates (TSP) were recorded in April and June 2023 as a result of CNL remediation activities and hazy/smoky conditions caused by wildfires. DustTrak units were turned off the week of June 5th, 2023, due to poor air quality impacting the accuracy of the results.

## **8.0 Concluding Remarks**

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

In the second quarter of 2023, PHCF did not exceed any CNSC regulatory limits. As a result of the effective programs, plans and procedures in place, the PHCF was able to maintain individual radiation exposures well below all regulatory dose limits. In addition, environmental emissions continued to be controlled to levels that are a fraction of the CNSC regulatory limits, and public radiation exposures are also well below the regulatory limits.

PHCF's ALARA program continued to be effective in the second quarter of 2023.

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