2022 First Quarter Compliance Monitoring
&
Operational Performance Report

Reporting Period January 1 – March 31, 2022

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.

II Table of Contents

1.0 First 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 first quarter of 2022.

On March 17, 2022, the daily composite sample uranium result from the combined facility discharge was reported above the daily action level of 100 µg U/L at a concentration of 120 µg/L. Additionally, the daily composite sample uranium result was reported at or above the action level on March 18, 21, 22, 24, 25, 26, 27, 28, 29 and April 2. These results were investigated as one event and were attributed to groundwater infiltration.

Elevated dust loading results (greater than MECP total suspended particulate criteria of 120 µg TSP/m^3) were recorded at two hi-vol locations for the March 22-23, 2022, period. Both samplers are close to roadways, and it is likely residual winter sand was resuspended due to vehicle traffic.

The UF_6 plant ran uninterrupted for the first quarter of 2022.

The UO_2 plant restarted after the holiday break on January 4, 2022. The first two weeks of operation in 2022 was to blend the depleted UO_2 lots. The UO_2 plant operated the remainder of the quarter without interruption.

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.

As part of the Vision in Motion (VIM) project, the site's liquid Hydrogen tank is being replaced by a new installation located at the south end of the facility. Commissioning of the new tank is planned for some time in 2022. A section of the PHCF Safety Analysis Report was updated to reflect this change 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.

There were no radiation dose action level exceedances in the first quarter of 2022.

Whole Body Dose

Table 1 shows the whole-body dose summary results from the first quarter of 2022 for six work groups: UF_6 Plant; UO_2 Plant, Maintenance; Technical Support (including Nuclear Energy Worker (NEW) contractors), Corporate Technical Services (formerly named Major Projects); and Administration.

Table 1

First Quarter 2022 Whole Body Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	92	0.21	0.00	1.68
UO_2 Plant	24	0.12	0.00	0.30
Maintenance	67	0.09	0.00	0.51
Technical Support [1]	356	0.03	0.00	1.27
Corporate Technical Services	36	0.00	0.00	0.04
Administration	76	0.00	0.00	0.03
Total (Max)	**615**	**0.06**	**0.00**	**1.68**
[1]Includes contractors (NEWs) Quarterly Action Level 2.0 mSv (NEWs)				

Table 2 shows the employee average, minimum and maximum quarterly individual external whole-body exposures for the first quarter of 2021 through to the first quarter of 2022. The average whole-body dose is consistent with previous quarters when production was operational. The maximum whole-body dose received by a UF_6 operator was related to work in the flame reactor area.

Table 2

Whole Body Dose Results by Quarter				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q1 2021	533	0.12	0.00	2.34
Q2 2021	571	0.06	0.00	1.69
Q3 2021	686	0.05	0.00	0.82
Q4 2021	652	0.08	0.00	2.32
Q1 2022	615	0.06	0.00	1.68
Quarterly Action Level 2.0 mSv (NEWs)				

Skin Dose

Table 3 shows the quarterly skin dose summary results for six work groups: UF_6 Plant; UO_2 Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services (formerly named Major Projects); and Administration. The highest exposures are from the Maintenance group related to work in the flame reactor and effluent areas.

Table 3

First Quarter 2022 Skin Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	92	0.66	0.00	4.24
UO_2 Plant	24	0.39	0.00	1.26
Maintenance	67	0.67	0.00	5.88
Technical Support[1]	356	0.10	0.00	2.03
Corporate Technical Services	36	0.01	0.00	0.12
Administration	76	0.01	0.00	0.36
Total (Max)	**615**	**0.25**	**0.00**	**5.88**
[1]Includes contractors (NEWs) Quarterly Action Level 15.0 mSv (NEWs)				

Table 4 shows the employee average and maximum quarterly individual skin exposure for the first quarter of 2021 through to the first quarter of 2022. The average skin dose is consistent with previous quarters when production was operational.

Table 4

Skin Dose Results by Quarter				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q1 2021	533	0.28	0.00	5.70
Q2 2021	571	0.22	0.00	4.76
Q3 2021	686	0.21	0.00	5.39
Q4 2021	652	0.29	0.00	10.44
Q1 2022	615	0.25	0.00	5.88
Quarterly Action Level 15.0 mSv (NEWs)				

Eye Dose

Table 5 shows the quarterly eye dose summary results for six work groups: UF_6 Plant; UO_2 Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services (formerly named Major Projects); and Administration. The highest exposure is from the UF_6 group related to work in the flame reactor and effluent areas.

Table 5

First Quarter 2022 Eye Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	92	0.44	0.00	2.58
UO_2 Plant	24	0.27	0.00	0.80
Maintenance	67	0.36	0.00	2.50
Technical Support[1]	356	0.06	0.00	1.29
Administration	76	0.01	0.00	0.18
Total (Max)	**615**	**0.15**	**0.00**	**2.58**
[1]Includes contractors (NEWs)				

Table 6 shows the employee average, minimum and maximum quarterly individual external eye exposures for the first quarter of 2022.

Table 6

Eye Dose Results by Quarter*				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q1 2022	615	0.15	0.00	2.58

*Note – Tracking eye dose results is a new requirement and additional quarters will be added to this table in future reports.

Urine Analysis

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

Table 7

Urine Analysis Action Levels		
Parameter		**Action Level**
Urinalysis (NEW)	Weekly - UO_2/UF_6 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 mgF/L in the first quarter of 2022.

Table 8 shows the distribution of urine results for the first quarter of 2022. A total of 8,075 urine samples were collected and analyzed for uranium during the first quarter of 2022. The majority of routine urine analysis results (99%) were less than 5 µg U/L in the quarter.

All results above 13 µg U/L were screened by radiation protection staff. There was one official investigation for uranium in urine during the first quarter of 2022.

Table 8

First Quarter 2022 Routine Urine Analysis Results	
Distribution of Results	**Q1 2022**
Number of Samples < 5 µg U/L	8,007
Number of Samples > 5 to < 25 µg U/L	64
Number of Samples > 25 to < 50 µg U/L	4
Number of Samples > 50 µg U/L	0
Number of Samples Analyzed (Uranium)	8,075

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 0.26 mSv, respectively, which was consistent with previous quarters.

Table 9

Internal Dose (Urine) by Quarter				
Quarter	**Number of Individuals**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**	**Average Dose (mSv)**
Q1 2021	425	0.00	0.26	0.01
Q2 2021	453	0.00	0.19	0.01
Q3 2021	527	0.00	0.28	0.01
Q4 2021	539	0.00	0.15	0.01
Q1 2022	493	0.00	0.26	0.01

Fluoride in Urine

A total of 4,379 urine samples were analyzed for fluoride during the first quarter, with summary results provided in Table 10.

There was one sample above the internal administrative investigation level of 4 mg F/L during the first quarter. The sample was investigated and determined to be non-occupational.

Table 10

First Quarter 2022 Fluoride in Urine Analysis Results			
Type of Fluoride Samples	**Number of Samples**	**Minimum Concentration (mg F/L)**	**Maximum Concentration (mg F/L)**
All fluoride samples	4,379	0.1	5.5
Routine post-shift fluoride samples >= 7 mg F/L	0	-	-
Routine post-shift fluoride samples >= 4 mg F/L	1	-	-
Non-routine fluoride samples	492	0.1	2.7
Samples analyzed for U, insufficient volume (< 30mL) for F analysis	21	-	-

Lung Counting

The lung count trailer was at the PHCF site in the first quarter. Maintenance and production groups were lung counted during this period.

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

First Quarter 2022 Alpha Contamination Monitoring Results			
Area	**Number of Samples Taken**	**Zone Contamination Criteria (Bq/cm²)**	**Number of Samples Above Criteria**
Zone 1	985	0.4	0
Zone 2	11,962	0.4	33
Zone 3 (Yard)*	3	0.4	3

*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.

Additional monitoring has been put in place due to Covid-19 protocols. Strategic conference and meeting rooms have been temporarily established as lunchrooms in response to the need of physical distancing during break times.

In-Plant Air

Routine air sampling is performed by collecting airborne particulate on air sampling filters and quantifying the airborne concentration of uranium. The first 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^3 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_6 and UO_2 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

First Quarter 2022 In-Plant Air Uranium Concentration by Operations Group				
Operations Group	**Number of Samples Taken**	**Average (µg U/m^3)**	**Maximum (µg U/m^3)**	**Number of Samples Taken Above Administrative Level**
UF_6 Plant	4,817	7	627	42
UO_2 Plant	1,548	2	72	0
Waste Recovery	630	2	31	0
CUP	427	1	12	0

The maximum in-plant air sample of 627 µg U/m^3 was recorded on March 29, 2021, in the UF_6 plant. This result was due to a small release in the first-floor flame reactor area. The area was posted as respirator required.

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

2022 Safety Statistics					
Quarter / Parameter	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**YTD**
First Aid Injuries	9	-	-	-	9
Medical Diagnostic Procedures	0	-	-	-	0
Medical Treatment Injuries	1	-	-	-	1
Other Recordable Injuries	0	-	-	-	0
Lost Time Injuries	0	-	-	-	0
Lost Time Injury Frequency	0	-	-	-	0
Lost Time Injury Severity	0	-	-	-	0

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

Health and Safety Activities

- **Communications**: COVID Protective Measures remain in place but are continually reviewed and adjusted as regulatory health protocols evolve. Consequently, the inventory of site protocols has decreased. Weekly COVID updates continue to be issued apprising all personnel of municipal, provincial, and federal updates and statistics. OHS and CSSC continued to issue safety bulletins to promote a focus on continuing safety awareness.
- **Education and Training**: Internal training remained in place utilizing site COVID protocols, inclusive of room occupancy level restrictions. ERT training schedule adjusted for 2022 with some taking place in spring and fall this year.
- **Safety Awareness Activities**: The site cutting tool committee executed a 'collect and return' for specific knife styles to minimize risk. Safer and ergonomic friendly knives are being sourced. Prizes awarded to promote the collection campaign.

- **CSSC and Safety Subcommittees:** The CSSC committee continues to meet for regulatory meetings. Safety subcommittees continue to remain on hold, pending a refresher activity with Milliken. 2022 committee objectives were finalized.
- **Safety & Industrial Hygiene**: Fluorine monitoring improvements continue to be executed with a 2022 goal to complete a site assessment. Powered air purifying respirators (PAPR) have been sourced and are now being procured to replace the current fleet for site welders and Clean Up (CUP) crew.
- **COVID Interruption**: COVID vaccination requirements remain in effect to access PHCF in addition to public health protocol changes. As well, weekly rapid testing is still being offered. Employees are also being provided take home rapid test kits.
- **Total Recordable Injury Rate (TRIR)** – Q1 Ending = 1.02 (9 First Aids). Site has crested 3 million hours without an LTA. Contractor TRIR is 0.

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.

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

Note that as of July 1, 2019, TLD 13 has been replaced by TLD 10 in the gamma dose calculation for Site 1 due to the removal of the Centre Pier from the licensed property.

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

Quarterly Dose (mSv/quarter)					
ORL Component	**Q1 2022**	**Q2 2022**	**Q3 2022**	**Q4 2022**	**YTD 2022**
Air	<0.001	-	-	-	<0.001
Water	<0.001	-	-	-	<0.001
Gamma – Site 1	0.019	-	-	-	0.019
Gamma – Site 2	0.025	-	-	-	0.025
Quarterly Dose – Site 1	0.020	-	-	-	0.020
Quarterly Dose – Site 2	0.025	-	-	-	0.025

Gamma Monitoring

As per the 2016 ORL, 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 first quarter.

Table 15

First Quarter 2022 Public Dose Gamma Monitoring Results					
Station Number	**January**	**February**	**March**	**Action Level (µSv/h)**	**Licence Limit (µSv/h)**
2	0.24	0.26	0.25	0.480	0.570
10	0.05	0.07	0.07	0.480	0.610
21	0.06	0.09	0.12	0.330	0.260

Air Emissions

The quarterly average and maximum stack emissions from the UF_6 plant main stack and the UO_2 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_6 and UO_2 plants.

No licensed action levels were exceeded for uranium emissions from the UF_6 plant main stack in the quarter. The UF_6 main stack average uranium emission rate was consistent with previous quarters when production was operational.

No licensed action levels were exceeded for uranium emissions from the UO_2 plant main stack in the quarter. The UO_2 main stack average uranium emission rate was consistent with previous quarters during which production was operational.

Fluoride emissions from the UF_6 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. No licensed action levels were exceeded for fluoride emissions from the UF_6 plant main stack in the quarter. The UF_6 main stack average fluoride emission rate was consistent with previous quarters in which production was operational.

The UO_2 main stack is also continuously sampled for ammonia. No licensed action levels were exceeded for ammonia emissions from the UO_2 plant main stack in the quarter. The UO_2 main stack average ammonia emission rate was higher than previous quarters.

Table 16

Daily Main Stack Emissions by Quarter									
Plant	**Parameter**	**Licence Limit**	**Action Level**	**Value**	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
UF_6	Uranium g U/h	280	40	Quarterly Daily Average	2.8	2.6	1.4	2.1	2.3
				Quarterly Daily Maximum	6.0	4.7	6.3	6.7	6.7
	Hydrogen Fluoride g HF/h	650	230	Quarterly Daily Average	29	27	27	35	22
				Quarterly Daily Maximum	155	88	155	191	98
UO_2	Uranium g U/h	240	10	Quarterly Daily Average	0.6	0.4	0.3	0.5	0.5
				Quarterly Daily Maximum	1.6	2.3	0.6	1.1	0.9
	Ammonia kg NH_3/h	58	10	Quarterly Daily Average	2.3	2.2	1.0	2.2	2.9
				Quarterly Daily Maximum	4.4	5.1	2.9	4.2	7.7

Liquid Discharges

Production facility cooling water return quality data is summarized in Table 17 and Table 18.

As the PHCF operates a once-through non-contact cooling water system, 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.

General decreases in first quarter average and maximum uranium concentrations have been recorded relative to the fourth quarter 2021. A general decrease in uranium trending was noted from December 2021 through to February 2021 in relation to the interruption of Canadian Nuclear Laboratories (CNL) remedial work within the inner Port Hope harbour over the winter period. Following resumption of mechanical dredge activities in

March 2022, a corresponding increase in uranium trending was observed. The maximum first quarter 2022 condition was, however, much less pronounced than fourth quarter 2021 recordings. Similar trending patterns have been recorded at the PHCF harbour water intake.

An elevated first quarter maximum fluoride result is recorded for the UF_6 plant cooling water return (UO2N) relative to typical baseline concentrations and PHCF harbour water intake trending from the first quarter. The maximum daily composite sample result was recorded for the February 9 monitoring period. Harbour water supply challenges were experienced on February 9 and harbour water intake operations were subsequently shut down on February 10 to complete maintenance work on the primary harbour water supply pump. Harbour water supply operations were restored February 11 and fluoride trending at the UO2N cooling water return stabilized as of February 12. Unusual UF_6 plant process heat exchanger conductivity trending was observed in relation to February 9 cooling water supply interruptions and resumption of cooling water operations on February 11.

Ammonia results otherwise continue to be primarily influenced by the revised method detection limit implemented in the first quarter of 2020.

Table 17

UO2N Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Uranium	µg U/L	Average	5.8	5.4	21	230	48
		Maximum	12	12	89	520	140
Fluoride	mg F/L	Average	0.064	0.069	0.070	0.070	0.13
		Maximum	0.085	0.10	0.10	0.17	0.76
Ammonia & Ammonium	mg N/L	Average	0.014	0.014	0.023	0.014	0.014
		Maximum	0.014	0.014	0.32	0.014	0.014
Nitrate	mg N/L	Average	1.2	0.80	0.52	1.2	1.2
		Maximum	1.6	1.6	1.2	1.9	1.7
pH	-	Minimum	8.14	8.14	8.04	8.12	8.02
		Maximum	8.36	8.40	8.39	8.36	8.36

Table 18

UO2S Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Uranium	µg U/L	Average	6.1	5.8	24	240	53
		Maximum	13	14	94	540	160
Ammonia & Ammonium	mg N/L	Average	0.014	0.014	0.014	0.014	0.014
		Maximum	0.014	0.014	0.014	0.049	0.014
Nitrate	mg N/L	Average	1.3	0.84	0.60	1.4	1.2
		Maximum	1.8	1.6	1.3	2.0	1.8
pH	-	Minimum	8.20	8.21	8.14	8.17	8.00
		Maximum	8.42	8.44	8.48	8.38	8.40

In 2016 and early 2017, as part of the relicensing process, a daily sanitary sewer discharge 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) were developed and accepted. Tables 19 and 20 summarize uranium concentrations and pH values recorded for the first quarter of 2022.

The daily sanitary sewer action level was reached or exceeded eleven times in the first quarter. Ten excursions were recorded in March and the remaining occurrence was recorded in April. Sanitary sewer discharges otherwise remained well below the facility monthly mean release limit throughout the first quarter.

Groundwater infiltration to the underground civil works was the primal causal factor association for all occurrences. Factors that influence groundwater infiltration potential include Lake Ontario water level conditions and the significance and frequency of wet events.

Cameco completed sanitary sewer infrastructure inspections in targeted areas in the fourth quarter of 2021, both within and upstream of the licensed facility, to identify potential infiltration of areas of concern and follow-up inspections were initiated in the first quarter of 2022. Cameco continues to evaluate potential interim rehabilitation opportunities, taking into consideration sanitary sewer rehabilitation/replacement work completed to date and the planned site project and VIM project sanitary sewer system improvements that are anticipated to significantly reduce remaining groundwater infiltration conditions.

Planned site project work for 2022 is focused on sanitary sewer infrastructure between three existing site lift stations and downstream maintenance hole connections. The

current design concept includes the redirection of two lift station discharges to the third lift station by way of new gravity piping systems and the installation of a new force main from the third lift station to an existing maintenance hole.

Moreover, target areas have selected for rehabilitation or abandonment planning, additional lateral inspections or replacement gravity discharge service evaluations in 2022.

Table 19

Sanitary Sewer Discharge Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Uranium	mg U/L	Average	0.0094	0.016	0.016	0.050	0.044
		Maximum	0.034	0.047	0.056	0.25	0.14
pH	-	Minimum	7.63	7.38	7.14	6.94	7.18
		Maximum	8.31	8.27	8.56	8.31	8.31

Table 20

Q1 2022 Monthly Sanitary Sewer Discharges			
Period	**Sanitary Sewer Action Level/Release Limit**	**Monthly Average Uranium Concentration (µg U/L)**	**Daily Maximum Uranium Concentration (µg U/L)**
January	Action Level of 100 µg U/L – daily composite samples Release Limit of 275 µg U/L – monthly average of daily composite samples	23	38
February		30	48
March		77	140

Ambient Air Monitoring

Table 21 shows the quarterly all-station average and maximum uranium dustfall results from the first quarter of 2021 through to the first quarter of 2022.

No uranium dustfall results exceeded the internal administrative screening level in the first quarter. The average uranium in dustfall results in the first quarter of 2022 were consistent with the uranium in dustfall averages during the previous quarters.

Table 21

Uranium in Dustfall Results by Quarter (mg U/m^2/30 days)					
Value	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Average	<0.1	<0.1	0.1	0.1	<0.1
Maximum	0.1	0.1	0.2	0.6	0.1
Internal Administrative Screening Level = 10 mg U/m^2/30 days					

Table 22 summarizes the average and maximum uranium hi-vol results from the first quarter of 2021 through to the first quarter of 2022.

Average and maximum results for the quarter are below regulatory criteria. The average results for the Marsh Street, Waterworks, Hayward Street and Shuter Street stations are comparable to levels observed in the previous quarters.

Table 22

Uranium-in-Air Concentration at Hi-Vol Stations by Quarter (µg U in TSP/m^3)					
Quarter	**Result**	**Waterworks**	**Shuter Substation**	**Marsh Street**	**Hayward Street**
Q1 2021	Average	0.001	0.001	0.002	0.001
	Maximum	0.005	0.003	0.012	0.009
Q2 2021	Average	0.002	0.001	0.004	0.002
	Maximum	0.025	0.004	0.071	0.007
Q3 2021	Average	0.001	0.001	0.004	0.002
	Maximum	0.009	0.005	0.021	0.010
Q4 2021	Average	0.001	0.001	0.002	0.002
	Maximum	0.020	0.011	0.017	0.011
Q1 2022	Average	0.001	0.001	0.003	0.002
	Maximum	0.017	0.014	0.018	0.014
Average <0.06 µg U in TSP/m^3 (annual) AAQC Maximum <0.3 µg U in TSP/m^3 (24 hr) AAQC					

Table 23 shows the quarterly all-station average and maximum fluoride dustfall results from the first quarter of 2021 through to the first quarter of 2022.

The average fluoride in dustfall results in the first quarter of 2022 was consistent with previous quarters during which production was operational.

Table 23

Fluoride in Dustfall Results by Quarter (mg F/m^2/30 days)					
Value	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Average	1.3	1.2	0.6	1.1	0.9
Maximum	9.4	8.3	4.7	11	10
Internal Administrative Screening Level = 20 mg F/m^2/30 days					

Table 24 shows the average and maximum lime candle results from the first quarter of 2021 through to the first quarter of 2022. The average results are comparable to levels observed in the previous quarters.

Table 24

Monthly Lime Candle Results by Quarter (µg F/100 cm^2/30 days)					
Value	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Average	3	5	3	3	4
Maximum	8	13	11	7	11
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^2/30 days, changing to 80µg F/100cm^2/30 days in winter					

Ambient Water Quality Monitoring

A summary of harbour water intake (SCI) water quality data is presented in Table 25. Consistent with the production facility returns trending, general decreases in first quarter average and maximum uranium concentrations have been recorded relative to the fourth quarter 2021. A general decrease in uranium trending was noted from December 2021 through to February 2021 in relation to the interruption of CNL remedial work within the inner Port Hope harbour over the winter period. Following resumption of mechanical dredge activities in March 2022, a corresponding increase in uranium trending was observed. The maximum first quarter 2022 condition was, however, much less pronounced than fourth quarter 2021 recordings.

Ammonia results otherwise continue to be primarily influenced by the revised method detection limit implemented in the first quarter of 2020.

Table 25

SCI Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**Q1 2022**
Uranium	µg U/L	Average	6.0	5.7	22	240	52
		Maximum	14	12	92	540	160
Fluoride	mg F/L	Average	0.061	0.066	0.067	0.070	0.11
		Maximum	0.074	0.11	0.11	0.17	0.17
Ammonia & Ammonium	mg N/L	Average	0.014	0.014	0.017	0.014	0.014
		Maximum	0.014	0.014	0.17	0.014	0.014
Nitrate	mg N/L	Average	1.3	0.87	0.60	1.3	1.2
		Maximum	1.8	1.7	1.4	1.9	1.8
pH	-	Minimum	8.01	7.71	8.15	8.14	8.02
		Maximum	8.39	8.44	8.43	8.42	8.36

Cooling Water Intake – Visual Inspections

Table 26 below presents all non-conformities observed during daily visual inspections of the cooling water intake system.

Table 26

Date	Quantity of Fish Observed	Observations
January 10 – 26	1	1 small fish approximately two to three inches in length was observed 8 days during this time period at the travelling screen sump. Based on the common description, these observations are believed to be the same fish. Because there were no breaches at the intake, it is believed that the small fish was washed into the pit during heavy wave action.
February 2 - 17	1	1 small fish approximately two to three inches in length, was observed 7 days during this time period at the travelling screen sump. Based on the common description, these observations are believed to be the same fish and the same fish observed in January.

5.0 Public Information Program

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

Public Engagement

The application process for the Cameco Fund for Mental Health was promoted on the radio and social media until January 6. The applications for the Fund were adjudicated by representatives from Cameco and local mental health experts. Recipients were announced on January 31 with a total of $43,000 awarded to nine community organization in Northumberland County. The recipients were notified directly and announced via a news release on January 31 – the release was posted on camecofuel.com and promoted via Cameco Ontario social media channels.

On February 3, Cameco participated in the Durham College and Ontario Tech University Virtual Job Fair. Cameco sponsored the Life Outside the Box podcast from KBI Inspire Magazine for youth mental health. At the end of the month, the winter 2022 issue of Energize was mailed to all addresses in Port Hope, posted to camecofuel.com and promoted on social media. The winter issue featured stories on the Vision in Motion project update at Port Hope Conversion Facility, Cameco facilities in Port Hope and Blind River granted licence renewals from the CNSC and the mental health grants awarded to nine groups.

On March 8, Cameco recognized International Women's Day with social media content featuring Cameco employees. During the month, Cameco also sponsored the Move for Kids Sake virtual fundraiser for Northumberland Big Brothers Big Sisters.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFMs Community Partner Program. Through the quarter, Five Counties Children's Centre, Northumberland Elder Abuse Network and Northumberland Big Brothers Big Sisters benefitted from this sponsorship by receiving advertising.

Public Disclosure

Cameco's PHCF made four public disclosures during the first quarter: Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco

Posting Date	March 22, 2022
Incident Date	March 17 & 18, 2022
Incident	Environmental Action Level Exceedance
Details	The daily sanitary sewer discharge recorded a value of 120 µg/L on March 17, 2022, and a value of 130 µg/L on March 18, 2022 which exceed the uranium sanitary sewer action level of 100 µg/L. There was no health or safety risk posed to the public, workers or the environment.
Corrective Action	Groundwater infiltration, influenced by recent warmer temperatures creating a snow and ground thaw are the likely cause. Cameco notified the Canadian Nuclear Safety Commission and the Municipality of Port Hope.
Cameco Environmental Effect Rating	1

Posting Date	March 25, 2022
Incident Date	March 21-22, 2022
Incident	Environmental Action Level Exceedance
Details	The daily sanitary sewer discharge recorded a value of 140 µg/L on March 21, 2022, and a value of 120 µg/L on March 22, 2022, which exceed 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, influenced by recent warmer temperatures creating a snow and ground thaw along with 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	March 25, 2022
Incident Date	March 22-23, 2022
Incident	Update to Environmental Action Level Exceedance on March 17 & 18, 2022
Details	The Hayward Street (along the north fence line of the Port Hope Conversion Facility) and the Marsh Street high volume air sampler recorded a result of 142 µg/m3 and 139 µg/m3 respectively for the period of March 22 to March 23, 2022. These results are above the regulatory dust criteria of 120 µg/m3 set by Environment and Climate Change Canada and the Ministry of Environment, Conservation and Parks. There was no health or safety risk posed to the public, workers or the environment.
Corrective Action	Both high-volume air samplers are close to roadways, and it is believed the cause is a result of residual winter sand being suspended due to vehicle traffic. The Canadian Nuclear Safety Commission and the Ministry of Environment, Conservation and Parks have been notified.
Cameco Environmental Effect Rating	1

Posting Date	March 29, 2022
Incident Date	March 24-27, 2022
Incident	Update to Environmental Action Level Exceedance on March 17 & 18, 2022
Details	The daily sanitary sewer discharge recorded a value of 140 µg/L on March 24, 2022, a value of 130 µg/L on March 25, 2022, a value of 140 µg/L on March 26, 2022, 140 µg/L on March 27, 2022, 140 µg/L, on March 28, 2022, and 140 µg/L on March 29, 2022, which exceed 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). Cameco is considering this event to be a continuance of the March 17 & 18 event (posted below). There was no health or safety risk posed to the public, workers or the environment.
Corrective Action	Groundwater infiltration, influenced by recent warmer temperatures creating a snow and ground thaw along with rain events are the likely cause. Cameco notified the Canadian Nuclear Safety Commission and the Municipality of Port Hope.

Social Media

Cameco Ontario's Facebook community grew by 31 new followers (1,051 total) and had a total of 997 page likes at the end of the quarter. Cameco Ontario's 18 posts covered information such as:

- Promoted the application period for the Cameco Fund for Mental Health grants
- Shared videos from Bruce Power about their refurbishment project which featured Cameco and other suppliers
- Shared a highlight video of Cameco's year end announcement about donations to the Northumberland Fare Share Food Bank and Green Wood Coalition
- Recognized Bell Let's Talk Day
- Announced the recipients of the Cameco Fund for Mental Health grants
- Cameco's participation in a virtual job fair hosted by Durham College and Ontario Tech University
- Various Cameco job opportunities
- Community sponsorships, including the Life Outside the Box youth mental health podcast and the Northumberland Big Brothers Big Sisters Move for Kids Sake virtual event
- The successful licence applications for Cameco Fuel Manufacturing and the Blind River Refinery
- Promoted the winter issue of Energize
- Recognized International Women's Day on March 8

By the end of the quarter the Instagram account had grown by 35 new followers for a total of 680 followers. Photos and information featured were similar to the Cameco Facebook page.

Indigenous Engagement

Cameco's communications manager, director of regulatory compliance and licensing and the superintendent, special projects met with Scugog Island First Nation on January 10, February 28, and March 24, 2022. These meetings continued the introductions to Cameco operations and covered topics such as sustainability, community investment and specifically the CFM licence renewal. Public Disclosures that are made between meetings are emailed in real-time and then discussed at the meeting.

Cameco's communications manager, director of regulatory compliance and licensing and the superintendent, special projects met with Curve Lake First Nation on January 26, February 23 and April 1, 2022. The January 26 meeting reviewed discussions in 2021 and established key focus areas for 2022 which includes the CFM licence renewal as a priority. In February, the discussion focused on next steps in the CFM licence renewal and the development of the briefing guide. The April 1 meeting was supposed to be in

March but was pushed to April 1 for scheduling. Cameco provided more explanation on the licence renewal for CFM (what is different, what is the same). CLFN asked Cameco to provide further details on why the ask for 20-years and the benefit. CLFN also asked about the CNSC's comments on the application – Cameco will follow-up with further discussion on these topics. The recent public disclosures regarding sanitary sewer prompted discussion about infrastructure replacement/repairs. Cameco noted that this work is approximately two to three years out – but repairs are made where possible.

Cameco emailed Curve Lake First Nation and Scugog Island First Nation a copy of all the public disclosures as they occurred and discussed them further during the meetings.

On March 23, Cameco hosted the Indigenous Advisory Council for the Small Modular Reactor Action Plan. The Council brings together Indigenous leaders from Ontario, Alberta, Nunavut, Saskatchewan, and New Brunswick. Tours of PHCF and CFM Port Hope were provided by Cameco leadership and included overview presentations and opportunities for questions and dialogue.

Website

The winter issue of Energize was posted to the website.

- Energize - Winter 2022 - Making a Difference - Community - Cameco Fuel Services
- Stories featured in the issue included:
    - Cameco announces $100,000 donation to Fare Share Food Bank and Green Wood Coalition
    - Vision in Motion project update at Port Hope Conversion Facility
    - Cameco facilities in Port Hope and Blind River granted licence renewals from the CNSC
    - Mental health grants awarded to nine groups

A news release announcing the recipients of the Cameco Fund for Mental Health was posted to the website:

- Cameco Fund for Mental Health 2021 Awards Grants to Nine Northumberland County Organizations - News Archive - Media - Cameco Fuel Services

The 2021 Q4 Compliance Report and the 2021 Annual Compliance Report were posted to the website:

- Media Library - Media - Cameco Fuel Services

Media Analysis

Cameco received media coverage regarding Step Up for Mental Health and other community initiatives and COVID-19 cases at its facilities:

- **Cameco Fund for Mental Health 2021 Awards Benefit Nine Northumberland Organizations** – Today's Northumberland – January 31, 2022
  - https://todaysnorthumberland.ca/2022/01/31/cameco-fund-for-mental-health-2021-awards-benefit-nine-northumberland-organizations/

- **Northumberland organizations benefit from Cameco Fund for Mental Health Fund** Northumberland 89.7 – Feb 1, 2022
  - Northumberland organizations benefit from Cameco Fund for Mental Health Fund — Northumberland 89.7 FM (northumberland897.ca)

- **'It's like being held by a caring person': New art program in Port Hope to support mental health** – Northumberland News – March 16, 2022
  - https://www.northumberlandnews.com/community-story/10588795--it-s-like-being-held-by-a-caring-person-new-art-program-in-port-hope-to-support-mental-health/

Communication Products

The winter 2022 issue of Energize was mailed to all addresses in Port Hope, posted to camecofuel.com and shared via social media channels. The winter issue featured stories on the Vision in Motion project update at Port Hope Conversion Facility, Cameco facilities in Port Hope and Blind River granted licence renewals from the CNSC and the mental health grants awarded to nine groups.

- Energize - Winter 2022 - Making a Difference - Community - Cameco Fuel Services

A news release announcing the recipients of the Cameco Fund for Mental Health was posted to the website and shared on social media:

- Cameco Fund for Mental Health 2021 Awards Grants to Nine Northumberland County Organizations - News Archive - Media - Cameco Fuel Services

6.0 Other Matters of Regulatory Interest

6.1 Vision in Motion

Vision in Motion (VIM) engineering activities continued for site-wide infrastructure, building 72 (new warehouse), as well as planning for the demolition of the building 27 structure and removal of equipment from building 5B. On-site project activities continued from the previous quarter, including interior demolition activities at Building 27. Equipment removal from the 7th to the 4th floors was complete at the end of the quarter and removals on the 3rd floor were well progressed. Commissioning of the new hydrogen station continued to be in-progress.

Packaged waste shipments (lift bags and drums) were ongoing throughout the quarter. Delivery of materials in roll-off bins is still not permitted while the LTWMF evaluates safety measures for unloading these containers.

Final inspection of the former waterworks property site restoration work was completed. Care and control of the property was returned to Cameco. MPH and Cameco are working towards a transfer of a portion of the property to MPH.

A proposed agreement with MPH for Cameco remediation of municipal properties was revised and is pending final approval. Agreements between Cameco and the MPH needed to support the proposed change to the VIM scope that would eliminate the need for the Choate St. extension were progressed—including an agreement to terminate the Choate St. construction agreement.

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/reportable events that occurred in the first quarter related to VIM activities.

7.0 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 first quarter of 2022, 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 first quarter of 2022.

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.