



**2020 Third Quarter Compliance Monitoring
&
Operational Performance Report**

Reporting Period July 1 – September 30, 2020

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

**One Eldorado Place
Port Hope, Ontario
L1A 3A1**

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

Submitted On: November 24, 2020

I Executive Summary

Cameco Corporation (Cameco) is committed to the safe, clean and reliable operation of all of 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.



II	Table of Contents	
1.0	Second Quarter Overview	5
1.1	Facility Operation	5
1.2	Physical Design / Facility Modification	5
2.0	Radiation Protection	7
3.0	Conventional Health and Safety	14
4.0	Environmental Protection	16
5.0	Public Information Program	25
6.0	Other Matters of Regulatory Interest	29
6.1	Vision in Motion	29
7.0	Concluding Remarks	31

1.0 Third Quarter Overview

1.1 Facility Operation

Cameco continues to strive for operational excellence at all of its facilities through consistent application of management systems to ensure that they operate in a safe, clean and reliable manner. Corporate policies and programs, including that for Safety, Health, Environment and Quality (SHEQ) provide guidance and direction for all site-based programs and procedures that define the PHCF Quality Management System.

There were no significant changes to Structure, Systems and Components (SSC) or processes in the third quarter of 2020.

On July 13, 2020, a burnout of a fluorine inlet valve in the UF₆ plant resulted in a fluoride emission as HF of 273 gHF/h. This was above the action limit of 230 gHF/h. An investigation was performed and appropriate corrective actions are tracked through the Cameco Incident Reporting System (CIRS).

On July 22, 2020, a fluorine leak resulted in a UF₆ plant stack peak of 1,600 g/h fluorides. All safety systems performed as designed and the investigation and corrective actions were documented in CIRS.

On August 27, 2020, UF₆ plant cooling water pumps were shut down due to algae on the intake screens. As a result, chlorinated town water was discharged to the harbour without dilution from surface water also used for cooling.

On September 30, 2020, an ambient station high volume air sampler (hi-vol) exceedance of 261 µg/m³ for total suspended particulate (TSP) was reported for the period of September 28 to 29. The measurement is above the 120 µg/m³ TSP dust criteria for visibility. The elevated result was due to construction activity adjacent to Cameco property.

The UO₂ plant was shut down for annual maintenance and vacation from July 9, 2020 to September 1, 2020.

The UF₆ plant shut down July 24, 2020 to August 20, 2020 for annual maintenance and was safely restarted on August 21, 2020. The plant was also shut down from September 4, 2020 to September 15, 2020 due to issues with the cooling water system.

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.

There were no significant changes to the physical design of equipment, processes and the facility in the third quarter of 2020.

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 exceedances in the third quarter of 2020.

Whole Body Dose

Table 1 shows the whole body dose summary results from the third quarter of 2020 for six work groups: UF₆ Plant; UO₂ Plant, Maintenance; Technical Support (including Nuclear Energy Worker (NEW) contractors), Corporate Technical Services (formerly named Major Projects); and Administration.

There were no results above the monthly action level of 2 mSv during the quarter.

Table 1

Third Quarter 2020 Whole Body Dose Results				
Work Group	Number of Individuals	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
UF ₆ Plant	92	0.10	0.00	0.72
UO ₂ Plant	23	0.07	0.00	0.26
Maintenance	66	0.10	0.00	0.77
Technical Support ¹	349	0.03	0.00	0.87
Corporate Technical Services	40	0.00	0.00	0.05
Administration	72	0.00	0.00	0.05
Total (Max)	642	0.04	0.00	0.87
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 third quarter of 2019 through to the third quarter of 2020. The average whole body dose is consistent with previous quarters when production was reduced due to maintenance shut downs. The maximum whole body dose received by a Materials Handling Operator was related to work in the warehouse storage area.

Table 2

Whole Body Dose Results by Quarter				
Monitoring Period	Number of Individuals	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q3 2019	827	0.04	0.00	0.69
Q4 2019	806	0.05	0.00	1.52
Q1 2020	729	0.07	0.00	1.37
Q2 2020	553	0.05	0.00	1.15
Q3 2020	642	0.04	0.00	0.87
Quarterly Action Level 2.0 mSv (NEWs)				

Skin Dose

Table 3 shows the quarterly skin dose summary results for six work groups: UF₆ Plant; UO₂ Plant; Maintenance; Technical Support (including NEW contractors), Corporate Technical Services (formerly named Major Projects); and Administration. The highest exposures are from the UF₆ group related to work in the flame reactor areas.

Table 3

Third Quarter 2020 Skin Dose Results				
Work Group	Number of Individuals	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
UF ₆ Plant	92	0.43	0.00	2.53
UO ₂ Plant	23	0.22	0.00	1.18
Maintenance	66	0.44	0.00	1.93
Technical Support ¹	349	0.05	0.00	0.94
Corporate Technical Services	40	0.02	0.00	0.16
Administration	72	0.00	0.00	0.06
Total (Max)	642	0.14	0.00	2.53
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 third quarter of 2019 through to the third quarter of 2020. The average skin dose is consistent with previous quarters in which production was reduced due to maintenance shut-downs. The maximum skin dose received by a UF₆ operator was related to flame reactor activities.

Table 4

Skin Dose Results by Quarter				
Monitoring Period	Number of Individuals	Average Dose (mSv)	Minimum Dose (mSv)	Maximum Dose (mSv)
Q3 2019	827	0.15	0.00	6.00
Q4 2019	806	0.16	0.00	5.03
Q1 2020	729	0.30	0.00	6.73
Q2 2020	553	0.16	0.00	3.06
Q3 2020	642	0.14	0.00	2.53
Quarterly Action Level 15.0 mSv (NEWs)				

Urine Analysis

The urine analysis action levels are presented in Table 5 below.

Table 5

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

No urine analysis action levels were exceeded in the third quarter of 2020.

Table 6 shows the distribution of urine results for the third quarter. A total of 6,608 urine samples were collected and analyzed for uranium during the third quarter of 2020. The majority of routine urine analysis results (99.0%) 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 analysis during the third quarter of 2020.

Table 6

Third Quarter 2020 Routine Urine Analysis Results	
Distribution of Results	Q3 2020
Number of Samples < 5 µg U/L	6,545
Number of Samples > 5 to < 25 µg U/L	56
Number of Samples > 25 to < 50 µg U/L	2
Number of Samples > 50 µg U/L	5
Number of Samples Analyzed (Uranium)	6,608

Table 7 presents the internal urine analysis doses for the last five quarters. The average and maximum internal urine analysis doses in the quarter were 0.02 mSv and 0.28 mSv, respectively, which was consistent with previous quarters.

Table 7

Internal Dose (Urine) by Quarter				
Quarter	Number of Individuals	Minimum Dose (mSv)	Maximum Dose (mSv)	Average Dose (mSv)
Q3 2019	684	0.00	0.40	0.02
Q4 2019	681	0.00	0.18	0.01
Q1 2020	618	0.00	0.26	0.02
Q2 2020	410	0.00	0.22	0.02
Q3 2020	501	0.00	0.28	0.02

Fluoride in Urine

A total of 2,714 urine samples were analyzed for fluoride during the third quarter, with summary results provided in Table 8.

There were six samples above the internal administrative investigation level of 4 mg F/L during the third quarter. All six samples were investigated and determined to be non-occupational (related to tea drinking).

Table 8

Third Quarter 2020 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	2,714	0.1	5.3
Routine post-shift fluoride samples >= 7 mg F/L	0	-	-
Routine pre-shift fluoride samples >= 4 mg F/L	0	-	-
Non-routine fluoride samples	303	0.1	5.1
Samples analyzed for U, insufficient volume (< 30mL) for F analysis	134	-	-

Lung Counting

Lung counting was routine throughout the third quarter. The lung count trailer travelled to the Blind River Refinery at the end of September to begin the counting campaign there.

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 and 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 9.

Table 9

Third Quarter 2020 Alpha Contamination Monitoring Results			
Area	Number of Samples Taken	Zone Contamination Criteria (Bq/cm²)	Number of Samples Above Criteria
Zone 1	1,465	0.4	0
Zone 2	14,812	0.4	16

The contamination in Zone 2 areas was primarily detected in the office areas and lunch rooms 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 third quarter results are presented in Table 10.

The site administrative level and derived air concentration (DAC), based on slow moving (low solubility) material, is 100 µg U/m³ 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 UF₆ and UO₂ 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 10

Third Quarter 2020 In-Plant Air Uranium Concentration by Operations Group				
Operations Group	Number of Samples Taken	Average (µg U/m³)	Maximum (µg U/m³)	Number of Samples Taken Above Administrative Level
UF ₆ Plant	5,041	10	607	71
UO ₂ Plant	1,647	3	185	2
Waste Recovery	792	1	19	0
CUP	454	1	9	0

The maximum in-plant air sample of 607 µg U/m³ was recorded on August 14, 2020. This result was due to scheduled maintenance in the UF₆ plant. The entire area was posted as respirator required.

The average in-plant air concentrations were in line with the previous quarters in which production was operational.

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 11.

Table 11

2020 Safety Statistics					
Quarter / Parameter	Q1 2020	Q2 2020	Q3 2020	Q4 2020	YTD
First Aid Injuries	12*	10	11	-	33
Medical Diagnostic Procedures	1	1	0	-	2
Medical Treatment Injuries	2*	1	4	-	7
Lost Time Injuries	0	0	0	-	0
Lost Time Injury Frequency	0	0	0	-	0
Lost Time Injury Severity	0	0	0	-	0

*Correction from Q2 2020 report due to incident dated in March being reported in June and then removed as a work-related injury in July.

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

Health and Safety Activities

- **Communications:** COVID teams (PPE, Protective Measures, HR & Medical and Logistics) continued to meet and disposition changes to existing site protocols and create new ones as the COVID Interruption is updated by the Ontario Government.
- **Education and Training:** Education and training continues to be deployed remotely where possible, utilizes social distancing and maximum room occupancy levels where executed on site; or has been temporarily suspended.
- **Safety Awareness Activities:** The ‘Caught Working Safely’ promotion was communicated for reactivation for the beginning of Q4 2020. Site safety meetings continued in the quarter and transitioned from a Hand Safety theme to an Ergonomic focus.

-
- **CSSC and Safety Subcommittees:** The CSSC (CLC regulatory meetings) resumed as planned and continue to be executed for remainder of year. Safety subcommittees are occurring at discretion of each committee.
 - **Safety & Industrial Hygiene:** New personal F₂ monitors education package was completed and launched. Discussions continue, netting in additional performance requirements, with the vendor and the manufacturer. Personal HF monitors were identified as a priority in lieu of ambient monitoring devices facing supply and demand issues with spare parts.
 - **COVID Interruption:** Contractor and visitor approval to access the site continues to be managed on a priority basis. Vision in Motion work (Area 1) recommenced. Some PHCF employees continue to work from home with some transitioning to Flexible work plans.
 - **Total Recordable Injury Rate (TRIR):** YTD is 2.69. Site recordables and First Aids increased through Q3 predominantly associated to strains and cuts.

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.

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

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 12.

Table 12

Quarterly Dose (mSv/quarter)					
ORL Component	Q1 2020	Q2 2020	Q3 2020	Q4 2020	YTD 2020
Air	<0.001	<0.001	<0.001	-	<0.001
Water	<0.001	<0.001	<0.001	-	<0.001
Gamma – Site 1	0.033	0.037	0.036	-	0.107
Gamma – Site 2	0.037	0.027	0.027	-	0.092
Quarterly Dose – Site 1	0.033	0.038	0.037	-	0.108
Quarterly Dose – Site 2	0.037	0.028	0.028	-	0.093

Gamma Monitoring

As per the 2016 ORL, dose to the public is calculated for both sites 1 and 2 using specific gamma fence line monitoring locations. The results at stations 2 and 10 (as of July 1, 2019) are used for Site 1 public dose calculations and the results at stations 2 and 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 13.

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

Table 13

Third Quarter 2020 Public Dose Gamma Monitoring Results					
Station Number	July	August	September	Action Level (µSv/h)	Licence Limit (µSv/h)
2	0.20	0.18	0.15	0.400	0.570
10	0.11	0.08	0.02	0.400	0.610
21	0.04	0.00	0.00	0.250	0.260

Air Emissions

The quarterly average and maximum stack emissions from the UF₆ plant main stack and the UO₂ plant main stack are presented in Table 14.

A stack monitoring program is used to determine the airborne uranium emission rates on a daily basis from the main stacks of the UF₆ and UO₂ plants.

No licensed action levels were exceeded for uranium emissions from the UF₆ plant main stack in the quarter. The UF₆ main stack average uranium emission rate is slightly below previous quarters due to the annual maintenance shut down period.

No licensed action levels were exceeded for uranium emissions from the UO₂ plant main stack in the quarter. The UO₂ main stack average uranium emission rate is slightly below previous quarters due to the annual maintenance shut down period.

Fluoride emissions from the UF₆ 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 action level for fluoride emissions from the UF₆ plant main stack was exceeded during the third quarter. On July 13, 2020, a burnout of a fluorine inlet valve in the UF₆ plant resulted in a fluoride emission as HF of 273 g HF/h. The UF₆ main stack average fluoride emission rate is comparable to previous quarters.

The UO₂ main stack is also continuously sampled for ammonia. No licensed action levels were exceeded for ammonia emissions from the UO₂ plant main stack in the quarter. The UO₂ main stack average ammonia emission rate is slightly below previous quarters due to the annual maintenance shut down period.

The depleted circuit was not operated in the third quarter 2020.

Table 14

Daily Main Stack Emissions by Quarter									
Plant	Parameter	Licence Limit	Action Level	Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
UF ₆	Uranium g U/h	280	40	Quarterly Daily Average	2.1	2.2	2.3	2.5	2.1
				Quarterly Daily Maximum	13.3	4.5	4.7	7.7	7.0
	Hydrogen Fluoride g HF/h	650	230	Quarterly Daily Average	15	20	24	23	29
				Quarterly Daily Maximum	266	56	97	139	273
UO ₂	Uranium g U/h	240	10	Quarterly Daily Average	0.6	0.6	0.7	0.6	0.4
				Quarterly Daily Maximum	1.1	1.0	1.5	1.1	1.5
	Ammonia kg NH ₃ /h	58	10	Quarterly Daily Average	1.9	2.2	2.0	1.9	1.7
				Quarterly Daily Maximum	4.0	4.1	3.6	3.5	4.4

Liquid Discharges

Production facility cooling water return quality data is summarized in Table 15 and Table 16.

Increases in the recorded fourth quarter 2019 uranium concentrations were noted at the UF₆ Plant/Building 2 (UO₂N) and UO₂ Plant (UO₂S) cooling water return locations as a function of elevated cooling water intake trending over the same period.

The uranium trending reflected changes in the ambient harbour quality that had been attributed to Canadian Nuclear Laboratories (CNL) harbour remedial work. Uranium concentrations at the UO₂N and UO₂S monitoring locations subsequently stabilized in the second quarter of 2020, albeit slightly above typical conditions, and trending returned to baseline conditions in the second quarter.

Maximum third quarter uranium results for both UO₂N and UO₂S monitoring locations were both recorded for the September 6 monitoring period. The facility cooling water

pump house harbour water supply was significantly impacted during the referenced monitoring period in association with the fouling of end-of-pipe cooling water intake screen panels. The pump house cooling water pumps were eventually shut down during the September 6 monitoring period and cooling water pumps remained down until September 11. During the outage period, the Municipality of Port Hope completed a mechanical dredge program in the vicinity of the PHCF cooling water intake September 8-9.

Additional cooling water system downtime was otherwise experienced in the third quarter in advance of and during the planned annual cooling water utility outage period in August.

Due to sample matrix interferences, ammonia+ammonium sample analyses included sample dilutions and a revised method detection limit of 0.014 mg/L as of late January 2020. Second and third quarter mean ammonia results were in turn primarily influenced by the revised detection limit.

Table 15

UO₂N Water Quality Data by Quarter							
Parameter	Units of Measure	Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Uranium	µg U/L	Average	2.2	11	5.6	3.3	3.2
		Maximum	5.0	44	12	5.8	9.1
Fluoride	mg F/L	Average	0.10	0.090	0.092	0.11	0.090
		Maximum	0.13	0.19	0.16	0.15	0.21
Ammonia & Ammonium	mg N/L	Average	0.016	0.066	0.011	0.014	0.021
		Maximum	0.080	0.20	0.040	0.014	0.30
Nitrate	mg N/L	Average	0.43	1.1	1.2	0.80	0.49
		Maximum	0.87	1.5	1.6	1.3	1.5
pH	-	Minimum	7.84	7.98	8.12	8.16	7.98
		Maximum	8.35	8.47	8.52	8.50	8.33

Table 16

UO₂S Water Quality Data by Quarter							
Parameter	Units of Measure	Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Uranium	µg U/L	Average	2.2	12	5.9	3.4	3.1
		Maximum	4.6	47	13	6.1	7.1
Ammonia & Ammonium	mg N/L	Average	0.016	0.076	0.011	0.014	0.017
		Maximum	0.080	1.6	0.014	0.014	0.17
Nitrate	mg N/L	Average	0.41	1.2	1.3	0.81	0.50
		Maximum	0.86	1.6	1.6	1.3	0.66
pH	-	Minimum	7.89	7.92	8.16	8.18	8.03
		Maximum	8.39	8.50	8.49	8.50	8.37

In 2016 and early 2017, as part of the relicensing process, a daily sanitary sewer discharge action level of 100 µg/L (0.100mg/L) and a monthly mean release limit of 275 µg/L (0.275 mg/L) were developed and accepted. Tables 17 and 18 summarize uranium concentrations and pH values observed during the third quarter. No action level exceedances were recorded for the third quarter and discharges remained well below the facility monthly mean release limit throughout the third quarter of 2020.

Table 17

Sanitary Sewer Discharge Data by Quarter							
Parameter	Units of Measure	Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Uranium	mg U/L	Average	0.039	0.012	0.023	0.016	0.0052
		Maximum	0.11	0.10	0.16	0.049	0.024
pH	-	Minimum	7.32	7.80	7.82	7.60	7.55
		Maximum	8.10	8.34	9.10	8.31	8.48

Table 18

Q3 2020 Monthly Sanitary Sewer Discharges			
Period	Sanitary Sewer Action Level/Release Limit	Monthly Average Uranium Concentration (µg/L)	Daily Maximum Uranium Concentration (µg/L)
July	Action Level of 100 µg/L – daily composite samples	2.6	6.3
August		7.0	24
September	Release Limit of 275 µg/L – monthly average of daily composite samples	5.8	22

Ambient Air Monitoring

Table 19 shows the quarterly all-station average and maximum uranium dustfall results from the third quarter of 2019 through to the third quarter of 2020.

No uranium dustfall results exceeded the internal administrative screening level in the third quarter. The average uranium in dustfall results in the third quarter of 2020 were consistent with the uranium in dustfall averages during the previous quarters.

Table 19

Uranium in Dustfall Results by Quarter (mg U/m²/30 days)					
Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Average	0.1	0.1	<0.1	0.1	0.1
Maximum	0.3	0.2	0.1	0.3	0.2
Internal Administrative Screening Level = 10 mg U/m ² /30 days					

Table 20 summarizes the average and maximum uranium hi-vol results from the third quarter of 2019 through to the third quarter of 2020.

Average and maximum results for the quarter are below regulatory criteria. The average results are comparable to levels observed in the previous quarters.

Table 20

Uranium-in-Air Concentration at Hi-Vol Stations by Quarter ($\mu\text{g U in TSP/m}^3$)					
Quarter	Result	Waterworks	Shuter Substation	Marsh Street	Hayward Street
Q3 2019	Average	0.001	0.001	0.003	0.002
	Maximum	0.011	0.007	0.013	0.033
Q4 2019	Average	0.001	0.001	0.003	0.002
	Maximum	0.007	0.003	0.015	0.010
Q1 2020	Average	0.001	0.001	0.003	0.002
	Maximum	0.005	0.009	0.019	0.010
Q2 2020	Average	0.001	0.001	0.003	0.002
	Maximum	0.007	0.008	0.018	0.010
Q3 2020	Average	0.001	0.001	0.003	0.002
	Maximum	0.004	0.008	0.076	0.005
Average $<0.06 \mu\text{g U in TSP/m}^3$ (annual) AAQC					
Maximum $<0.3 \mu\text{g U in TSP/m}^3$ (24 hr) AAQC					

Table 21 shows the quarterly all-station average and maximum fluoride dustfall results from the third quarter of 2019 through to the third quarter of 2020.

The average fluoride in dustfall results in the third quarter of 2020 is consistent with fluctuations observed in the previous quarters.

Table 21

Fluoride in Dustfall Results by Quarter ($\text{mg F/m}^2/30 \text{ days}$)					
Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Average	1.0	1.4	1.1	1.1	1.1
Maximum	9.1	12.0	7.1	9.6	6.9
Internal Administrative Screening Level = $20 \text{ mg F/m}^2/30 \text{ days}$					

Table 22 shows the average and maximum lime candle results from the third quarter of 2019 through to the third quarter of 2020. The average results are comparable to levels observed in the previous quarters.

Table 22

Monthly Lime Candle Results by Quarter ($\mu\text{g F}/100 \text{ cm}^2/30 \text{ days}$)					
Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Average	2	3	3	3	4
Maximum	5	6	6	8	13
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 winter $40\mu\text{g F}/100\text{cm}^3/30 \text{ days}$, changing to $80\mu\text{g F}/100\text{cm}^2/30 \text{ days}$ in winter					

Ambient Water Quality Monitoring

A summary of SCI water quality data is presented in Table 23. The fourth quarter 2019 uranium trending reflected changes in the ambient harbour quality. As noted in the UO_2N and UO_2S discussion text, the trending had been attributed to CNL harbour remedial work. Uranium concentrations stabilized in the first quarter of 2020, albeit slightly above typical conditions, and trending returned to baseline conditions in the second quarter.

Consistent with the UO_2N and UO_2S monitoring locations, the maximum third quarter uranium result was recorded for the September 6 monitoring period. The facility cooling water pump house harbour water supply was significantly impacted during the referenced monitoring period in association with the fouling of end-of-pipe cooling water intake screen panels. The pump house cooling water pumps were eventually shut down during the September 6 monitoring period and cooling water pumps remained down until September 11. During the outage period, the Municipality of Port Hope completed a mechanical dredge program in the vicinity of the PHCF cooling water intake September 8-9.

Additional cooling water system downtime was otherwise experienced in the third quarter in advance of and during the planned annual cooling water utility outage period in August.

Due to sample matrix interferences, ammonia+ammonium sample analyses included sample dilutions and a revised method detection limit of 0.014 mg/L as of late-January 2020. Second and third quarter mean ammonia results were in turn primarily influenced by the revised detection limit.

Table 23

SCI Water Quality Data by Quarter							
Parameter	Units of Measure	Value	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
Uranium	µg U/L	Average	2.2	12	6.0	3.4	3.3
		Maximum	4.4	46	12	5.9	7.3
Fluoride	mg F/L	Average	0.10	0.086	0.092	0.10	0.085
		Maximum	0.13	0.18	0.13	0.15	0.13
Ammonia & Ammonium	mg N/L	Average	0.015	0.057	0.011	0.014	0.017
		Maximum	0.090	0.17	0.030	0.014	0.14
Nitrate	mg N/L	Average	0.48	1.2	1.3	0.81	0.53
		Maximum	0.94	1.6	1.6	1.2	1.5
pH	-	Minimum	7.88	8.10	8.12	8.21	8.05
		Maximum	8.38	8.49	8.50	8.50	8.43

Cooling Water Intake – Visual Inspections

Table 24 below presents all non-conformities observed during daily visual inspections of the cooling water intake system. Overall the cooling water intake fish protection system remained effective.

Table 24

Date	Quantity of Fish Observed	Observations
September 11	5 – 10	Several small immobile fish were observed in the cooling water pump house. Divers were onsite earlier that day to inspect the cooling water end of pipe intake screens at which time the pumphouse was shut down and the intake screens were removed. Due to lake conditions at the time, immobile fish were observed outside of the intake and it is believed they drifted into the pump house while the intake screens were removed and the pumps were shutdown. The divers noted no issues or gaps in the screens during their inspection.

5.0 Public Information Program

During the third quarter of 2020, PHCF continued to meet the requirements of CNSC RD/GD 3.2.1, Public Information and Disclosure programs.

Public Engagement

In July, Cameco sponsored the 89.7 Virtual Summer Concert Series.

On August 4, 2020 Cameco announced the results of its annual Public Polling. Cameco has been polling the local community since 2004. The survey found that 90% of residents support the continuation of Cameco's operations in Port Hope. For the past decade, Cameco has maintained an approval rating above 80% and remains a trusted corporate citizen in the local community. The summary of findings was posted to the website <https://www.camecofuel.com/community/stories/port-hope-community-survey-results-2020> and promoted on social media.

On August 20, Cameco participated in a joint announcement with Bruce Power to announce a series of initiatives. The event was live-streamed and featured Cameco and Bruce Power CEOs, along with the Premiers of Ontario and Saskatchewan, Ontario Minister of Energy, Ontario Associate Minister of Energy, Ontario Minister of Government and Consumer Affairs, MPP Huron-Bruce and MPP Northumberland-Peterborough South. A news release was issued and posted to the website <https://www.camecofuel.com/library/news/cameco-and-bruce-power-announce-a-series-of-nuclear-initiatives>.

On August 29, Cameco issued a news release to inform the community that Cameco has requested a collaborative review of the proposed Choate Street extension with the Municipality of Port Hope and has proposed that the Choate Street extension be eliminated from the VIM project. The release also noted that Cameco would present a delegation to Council on September 15, 2020 regarding this new proposal. The news release was issued to local media, posted on the website <https://www.camecofuel.com/library/news/cameco-proposes-changes-to-vim-project-avoiding-construction-of-choate-st>, and linked to social media channels.

Cameco sponsored a digital concert at the Westben Theatre and the annual United Way backpacks for kids program.

In September, Cameco announced its Cameco Charity Golf Package in partnership with Dalewood Golf Club. As a result of the COVID-19 pandemic, Cameco had to reimagine its annual charity golf event. The golf package runs from September 19, 2020 to October 31, 2020 and all funds raised go towards the Cameco Fund for Mental Health. These

funds will be disbursed to organizations undertaking projects that promote or support mental health in Northumberland County. More information about the golf package is posted on the website <https://www.camecofuel.com/community/stories/step-onto-the-golf-course-to-step-up-for-mental-health>. To help promote the initiative to the community, Cameco ran advertisements on local radio station 93.3 MyFM and on social media.

On September 15, 2020, Cameco's vice president, Fuel Services Division provided a virtual delegation to Council regarding the proposal to eliminate the Choate Street extension from VIM. The delegation included a presentation. The presentation was posted to the website https://www.camecofuel.com/uploads/downloads/Cameco_VIM_scope_presentation.pdf. Cameco promoted the delegation to Council on its social media channels with a link to the virtual meeting.

The summer issue of Energize was mailed to residents of Port Hope in September. The issue was posted to the website and linked through social media <https://www.camecofuel.com/community/stories/energize-summer-2020>. The issue featured information about the August 20th announcement with Bruce Power, proposed changes to VIM and public polling results.

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

No meetings were held with Indigenous groups during the third quarter.

As a result of the COVID-19 pandemic, Cameco temporarily suspended all public tours and non-essential visitors.

Public Disclosure

Cameco's PHCF made two public disclosures during the third quarter involving a small release and reportable spill.

No one was injured and there was no impact on the health or safety of the public or the environment.

The public disclosures were posted to the website:

<https://www.cameco.com/businesses/fuel-services/conversion-port-hope/environment-safety#environmental-incidents>

Social Media

Cameco Ontario's Facebook community grew by 24 new followers (894 total) and had a total of 874 page likes at the end of the quarter. Cameco Ontario's 16 posts covered information regarding the 2020 Public Opinion Survey, Cameco proposing changes to the Vision in Motion plan, promotion for the Cameco Charity Golf Package raising money for the Cameco Fund for Mental Health, and promotions for our community partners.

By the end of the quarter the Instagram account had grown by 50 new followers for a total of 500 followers. Photos and information featured was similar to the Cameco Ontario Facebook account.

Website

Two Public Disclosures were posted to the website in the third quarter:

<https://www.cameco.com/businesses/fuel-services/conversion-port-hope/environment-safety#environmental-incidents>

A dedicated page for the Cameco Charity Golf Package was established:

www.camecofuel.com/golf.

Two press releases were posted to the website:

- <https://www.camecofuel.com/library/news/cameco-and-bruce-power-announce-a-series-of-nuclear-initiatives>
- <https://www.camecofuel.com/library/news/cameco-proposes-changes-to-vim-project-avoiding-construction-of-choate-st>

The summer issue of Energize was posted to the website:

<https://www.camecofuel.com/community/stories/energize-summer-2020>.

A notice regarding Temporary Pump Installation was posted to the website on September 24, 2020 and updated on October 15, 2020.

<https://www.camecofuel.com/library/news/port-hope-conversion-facility-temporary-pump-installation-1>

Media Analysis

Cameco received media coverage regarding the Cameco and Bruce Power announcement:

World Nuclear News.org: <https://world-nuclear-news.org/Articles/Cameco-and-Bruce-Power-partner-to-support-nuclear>

Todaysnorthumberland.ca: <https://todaysnorthumberland.ca/2020/08/20/cameco-and-bruce-power-support-launch-of-centre-for-next-generation-nuclear-technologies/>

Owen Sound Sun Times.com: <https://www.owensoundsuntimes.com/news/local-news/bruce-power-cameco-announce-nuclear-technologies-centre>

Iheartradio.ca: <https://www.iheartradio.ca/92-3-the-dock/covid-19-updates/cameco-and-bruce-power-support-launch-of-centre-for-next-generation-nuclear-technologies-1.13275857>

Shorelinetoday.ca: <https://shorelinetoday.ca/2020/08/21/19258/>

Thelondoner.ca: <https://www.thelondoner.ca/news/local-news/bruce-power-cameco-announce-nuclear-technologies-centre-2/wcm/e221cffb-020d-41e2-bfff-ead426e664e6>

Cameco received media coverage regarding the proposed changes to VIM:

NorthumberlandNews.com: <https://www.northumberlandnews.com/news-story/10148861-cameco-proposing-not-moving-ahead-with-port-hope-s-choate-street-extension/>

TodaysNorthumberland.ca: <https://todaysnorthumberland.ca/2020/08/28/cameco-proposes-changes-that-would-avoid-construction-of-choate-street-extension/>

Cameco was also mentioned in media coverage regarding the performance of the nuclear industry during the pandemic. The coverage mentioned the temporary suspension of Cameco operations in Port Hope (UF₆) and Blind River Refinery.

<https://globalnews.ca/news/7317812/canada-nuclear-industry-covid-19/>

Communication Products

Two news releases were posted to the website.

The summer issue of Energize was posted to the website and mailed to all addresses in Port Hope, Ward 1, and Ward 2.

<https://www.camecofuel.com/community/stories/energize-summer-2020>.

6.0 Other Matters of Regulatory Interest

6.1 Vision in Motion

Vision in Motion (VIM) engineering activities continued for site-wide infrastructure, accumulated waste removal from the Dorset Street warehouses, renovation of Building 27, the deep excavation and future demolition of buildings and equipment.

The Environmental Compliance Approval (ECA) amendment application for improvements to site storm water management remained under review by the Ontario Ministry of Environment, Conservation and Parks (MECP).

After COVID-19 work suspensions were lifted, allowing some work to proceed with limited crew sizes, work resumed at the south end of the facility (area of the new hydrogen station), with this work area now setup to be able to operate independently from the rest of the site. Stormwater system installation was completed. Backfilling, compaction and final grading was started. Construction of the flood protection wall was in progress. The hydrogen tank and vaporizer were successfully-setup and the remaining activities to complete the installation were ongoing.

Transfer of waste materials to the LTWMF from the PHCF main site resumed in July after the LTWMF lifted COVID-19 work suspensions. Transport of waste materials from the Dorset St. site resumed in September.

CNL remediation activities resumed on Cameco property at the former water treatment plant and were in progress throughout the quarter.

Regular monthly coordination meetings between the Municipality of Port Hope (MPH) and Cameco in relation to VIM activities continued. The MPH and Cameco agreement for remediation of municipal properties was substantially progressed towards the end of the quarter.

The Environmental Assessment (EA) for the Choate Street extension was completed when MECP advised that the Part II Order requests were terminated and therefore MPH could proceed with the work. However, Cameco presented a proposed change to the VIM scope that would eliminate the need for the Choate St. extension. This change is possible because of new planned location of the new harbour wall on the west side of the Port Hope turning basin. Following a Cameco delegation to Port Hope council in September

and council direction to staff, collaborative discussions about the proposed change progressed positively.

The Supplementary Environmental Monitoring Plan for Vision in Motion and Other Clean-Up Program Projects was developed to monitor environmental impacts for the VIM activities, primarily during demolition/excavation. The following environmental monitoring exceedances/reportable events occurred in the third quarter.

PHCF-2020-001022, created to capture a 1-hour dust track exceedances of dust in VIM Area 1 on August 26, 2020. A result of $279 \mu\text{g}/\text{m}^3$ TSP from 11 am to 12 pm exceeded the VIM 1-hour administration level of $200 \mu\text{g}/\text{m}^3$ TSP. VIM corrective actions were implemented immediately.

PHCF-2020-001194, Cameco reported to the MECP ambient station high volume air sampler (hi-vol) exceedances of 261 and $150 \mu\text{g}/\text{m}^3$ total suspended particulate (TSP) for September 28, 2020 at the Waterworks hi-vol stations. These results are above the ECCC and MECP $120 \mu\text{g}/\text{m}^3$ TSP dust criteria for visibility. The TSP exceedances at the two Cameco Waterworks hi-vol stations were the result of activity carried out under the Port Hope Area Initiative by CNL and their contractor with insufficient dust suppression. In addition, the CNSC Project Officer was notified of the exceedance.

7.0 Concluding Remarks

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

In the third quarter of 2020, 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.

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.