2021 Third Quarter Compliance Monitoring
&
Operational Performance Report

Reporting Period July 1 – September 30, 2021

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 Third 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 third quarter of 2021.

On July 29, 2021, the ambient station high volume air sampler (hi-vol) at Hayward Street exceeded the 120 µg/m^3 dust criteria for total suspended particulate (TSP) at 126 µg/m^3. Rail line replacement work adjacent to the hi-vol station caused the elevated TSP in the localized area.

On August 19, 2021, a contractor had a fluoride in urine result of 8.3 mgF/L which is above the action level of 7.0 mgF/L. An investigation was completed, and the cause was determined to be related to respirator usage while welding in an enclosed area.

Both the UF_6 and the UO_2 plants completed their annual summer maintenance outage and restarted in late August. Both plants experienced intermittent downtime in September due to Hydrogen supply shortages.

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 early 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 exceedances in the third quarter of 2021.

Whole Body Dose

Table 1 shows the whole-body dose summary results from the third quarter of 2021 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.

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

Table 1

Third Quarter 2021 Whole Body Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	95	0.10	0.00	0.63
UO_2 Plant	23	0.08	0.00	0.36
Maintenance	67	0.19	0.00	0.82
Technical Support [1]	418	0.03	0.00	0.58
Corporate Technical Services	35	0.01	0.00	0.08
Administration	83	0.00	0.00	0.06
Total (Max)	**686**	**0.05**	**0.00**	**0.82**
[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 2020 through to the third quarter of 2021. The average whole-body dose is consistent with previous quarters when production was shut down for scheduled maintenance. The maximum whole-body dose received by a maintenance employee was related to work in the flame reactor areas during scheduled plant maintenance.

Table 2

Whole Body Dose Results by Quarter				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q3 2020	642	0.04	0.00	0.87
Q4 2020	657	0.05	0.00	1.58
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
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 areas during scheduled plant maintenance.

Table 3

Third Quarter 2021 Skin Dose Results				
Work Group	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
UF_6 Plant	95	0.5	0.00	3.03
UO_2 Plant	23	0.21	0.00	0.73
Maintenance	67	0.91	0.00	5.39
Technical Support[1]	418	0.08	0.00	1.69
Corporate Technical Services	35	0.02	0.00	0.24
Administration	83	0.00	0.00	0.07
Total (Max)	**686**	**0.21**	**0.00**	**5.39**
[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 2020 through to the third quarter of 2021. The average skin dose is consistent with previous quarters. The maximum skin dose received by a maintenance

employee was related to work in the flame reactor areas during scheduled plant maintenance.

Table 4

Skin Dose Results by Quarter				
Monitoring Period	**Number of Individuals**	**Average Dose (mSv)**	**Minimum Dose (mSv)**	**Maximum Dose (mSv)**
Q3 2020	642	0.14	0.00	2.53
Q4 2020	657	0.15	0.00	7.13
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**
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

One fluoride in urine result of 8.3 mgF/L exceeded the action level of 7.0 mgF/L in the third quarter of 2021. This was related to respirator usage while welding in an enclosed area. An investigation was completed, and corrective actions were implemented.

Table 6 shows the distribution of urine results for the third quarter of 2021. A total of 8,860 urine samples were collected and analyzed for uranium during the third quarter of 2021. The majority of routine urine analysis results (98.5%) 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 third quarter of 2021.

Table 6

Third Quarter 2021 Routine Urine Analysis Results	
Distribution of Results	**Q3 2021**
Number of Samples < 5 µg U/L	8,730
Number of Samples > 5 to < 25 µg U/L	124
Number of Samples > 25 to < 50 µg U/L	3
Number of Samples > 50 µg U/L	3
Number of Samples Analyzed (Uranium)	8,860

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 0.01 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 2020	501	0.00	0.28	0.02
Q4 2020	532	0.00	0.13	0.01
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

Fluoride in Urine

A total of 4,793 urine samples were analyzed for fluoride during the third quarter, with summary results provided in Table 8.

There were 5 samples above the internal administrative investigation level of 4 mg F/L during the third quarter. The samples were investigated with two determined to be non-occupational and three determined to be related to respirator usage while welding in an enclosed area.

Table 8

Third Quarter 2021 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	4793	0.1	8.3
Routine post-shift fluoride samples >= 7 mg F/L	0	-	-
Routine post-shift fluoride samples >= 4 mg F/L	1	-	-
Non-routine fluoride samples	459	0.1	3.8
Samples analyzed for U, insufficient volume (< 30mL) for F analysis	45	-	-

Lung Counting

PHCF production and maintenance employees were lung counted during the third quarter. The lung count trailer was transported to the Blind River Refinery the last week of September for the lung counting campaign at that site.

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 9.

Table 9

Third Quarter 2021 Alpha Contamination Monitoring Results			
Area	**Number of Samples Taken**	**Zone Contamination Criteria (Bq/cm²)**	**Number of Samples Above Criteria**
Zone 1	1,087	0.4	0
Zone 2	13,847	0.4	49
Zone 3 (Yard)*	1	0.4	0

*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 employee 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 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/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 10

Third Quarter 2021 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	4,860	9	585	54
UO_2 Plant	1,639	3	83	0
Waste Recovery	643	2	37	0
CUP	462	1	10	0

The maximum in-plant air sample of 585 µg U/m^3 was recorded on September 3, 2021, in the UF_6 plant. This result was due 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 when production was shut down for scheduled maintenance.

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

2021 Safety Statistics					
Quarter / Parameter	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**YTD**
First Aid Injuries	11	11	6	-	28
Medical Diagnostic Procedures	0	1	0	-	1
Medical Treatment Injuries	1	0	0	-	1
Other Recordable Injuries	0	0	0	-	0
Lost Time Injuries	0	0	0	-	0
Lost Time Injury Frequency	0	0	0	-	0
Lost Time Injury Severity	0	0	0	-	0

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

Health and Safety Activities

- **Communications**: COVID Protective Measures continued to be issued as information and status changes evolved. As well, site issued COVID updates remained a weekly communication, advising all personnel of municipal, provincial, and federal data and updates. OHS issued 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. Offsite ERT training was approved to resume in Q4 2021.
- **Safety Awareness Activities**: Activities executed for this period included a campaign focus on ergonomic awareness (site survey) and the site celebratory recognition of attaining 3 years LTI free.

- **CSSC and Safety Subcommittees:** The CSSC committee held all required regulatory meetings and resumed regular committee meetings. Safety subcommittees remained on hold, pending a refresher activity with Milliken. However, a new committee – Knife Safety – was approved for deployment this year (Q4 2021) to focus on the reduction of hand injuries.
- **Safety & Industrial Hygiene**: Fluorine exposure prevention management remains ongoing with the use of personal monitors and administrative controls. Communication with manufacturers and suppliers of personal monitors received approval for a site visit (Q4 2021). Facility noise, light and mould assessments were all conducted in accordance with corporate IH requirements.
- **COVID Interruption**: Site implemented a COVID vaccine form for completion by all employees, contractors, and visitors. As well, the corporation communicated mandatory vaccination requirements, to be met in Q4 2021. Weekly testing remained in place and will end in Q4 2021 as well. Screening and site mask use remained in effect.
- **Total Recordable Injury Rate (TRIR)** - YTD = 0.35 (28 First Aids, 1 Medical Diagnostic & 1 Medical Treatment)

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 12.

Table 12

Quarterly Dose (mSv/quarter)					
ORL Component	**Q1 2021**	**Q2 2021**	**Q3 2021**	**Q4 2021**	**YTD 2021**
Air	<0.001	<0.001	<0.001	-	0.001
Water	<0.001	<0.001	<0.001	-	<0.001
Gamma – Site 1	0.008	0.024	0.018	-	0.050
Gamma – Site 2	0.010	0.028	0.024	-	0.063
Quarterly Dose – Site 1	0.008	0.025	0.018	-	0.051
Quarterly Dose – Site 2	0.010	0.029	0.025	-	0.064

Gamma Monitoring

As per the 2016 ORL, dose to the public is calculated for both sites 1 and 2 using specific gamma fenceline 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 2021 Public Dose Gamma Monitoring Results					
Station Number	**July**	**August**	**September**	**Action Level (µSv/h)**	**Licence Limit (µSv/h)**
2	0.29	0.26	0.24	0.480	0.570
10	0.03	0.07	0.04	0.480	0.610
21	0.07	0.11	0.07	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 14.

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 is slightly lower than previous quarters due to production shutdowns.

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 is consistent with previous quarters during which production was shut down for some time for maintenance.

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 is consistent with previous quarters.

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 is slightly lower than previous quarters due to production shutdowns.

The depleted circuit was not operated in the third quarter 2021.

Table 14

Daily Main Stack Emissions by Quarter									
Plant	**Parameter**	**Licence Limit**	**Action Level**	**Value**	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
UF_6	Uranium g U/h	280	40	Quarterly Daily Average	2.1	2.9	2.8	2.6	1.4
				Quarterly Daily Maximum	7.0	8.2	6.0	4.7	6.3
	Hydrogen Fluoride g HF/h	650	230	Quarterly Daily Average	29	34	29	27	27
				Quarterly Daily Maximum	273	137	155	88	155
UO_2	Uranium g U/h	240	10	Quarterly Daily Average	0.4	0.6	0.6	0.4	0.3
				Quarterly Daily Maximum	1.5	2.5	1.6	2.3	0.6
	Ammonia kg NH_3/h	58	10	Quarterly Daily Average	1.7	2.2	2.3	2.2	1.0
				Quarterly Daily Maximum	4.4	4.9	4.4	5.1	2.9

Liquid Discharges

Production facility cooling water return quality data is summarized in Table 15 and Table 16. The production facility returns both had periods of inactivity for portions of the third quarter primarily in association with planned utility outage and production outage periods.

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.

Increases in third quarter 2021 baseline and maximum uranium concentrations at the production facility cooling water returns relative to the prior quarterly periods have been recorded. Several daily results within the quarterly period were reported above the

CCME short-term and long-term water quality guidelines of 33 and 15 µg/L, respectively. Uranium trending significantly increased as of late-September and further increases have been recorded in the fourth quarter. Similar trending patterns have been recorded at the PHCF harbour water intake. Overall, the trending is interpreted as relating to the on-going Canadian Nuclear Laboratories (CNL) remedial work within the inner Port Hope harbour, namely mechanical dredge activities.

Due to sample matrix interferences, ammonia+ammonium sample analyses included a revised method detection limit of 0.014 mg/L as of the first quarter of 2020. Ammonia results recorded since that time have been influenced by the revised detection limit.

Table 15

UO_2N Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Uranium	µg U/L	Average	3.2	6.6	5.8	5.4	21
		Maximum	9.1	10	12	12	89
Fluoride	mg F/L	Average	0.090	0.077	0.064	0.069	0.070
		Maximum	0.21	0.13	0.085	0.10	0.10
Ammonia & Ammonium	mg N/L	Average	0.021	0.015	0.014	0.014	0.023
		Maximum	0.30	0.077	0.014	0.014	0.32
Nitrate	mg N/L	Average	0.49	0.91	1.2	0.80	0.52
		Maximum	1.5	1.6	1.6	1.6	1.2
pH	-	Minimum	7.98	7.87	8.14	8.14	8.04
		Maximum	8.33	8.38	8.36	8.40	8.39

Table 16

UO_2S Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Uranium	µg U/L	Average	3.1	7.0	6.1	5.8	24
		Maximum	7.1	11	13	14	94
Ammonia & Ammonium	mg N/L	Average	0.017	0.020	0.014	0.014	0.014
		Maximum	0.17	0.30	0.014	0.014	0.014
Nitrate	mg N/L	Average	0.50	0.94	1.3	0.84	0.60
		Maximum	0.66	1.6	1.8	1.6	1.3
pH	-	Minimum	8.03	7.89	8.20	8.21	8.14
		Maximum	8.37	8.47	8.42	8.44	8.48

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 17 and 18 summarize uranium concentrations and pH values recorded for the third quarter of 2021. No action level exceedances were recorded, and discharges remained well below the facility monthly mean release limit throughout the quarter.

Table 17

Sanitary Sewer Discharge Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Uranium	mg U/L	Average	0.0052	0.0065	0.0094	0.016	0.016
		Maximum	0.024	0.024	0.034	0.047	0.056
pH	-	Minimum	7.55	7.36	7.63	7.38	7.14
		Maximum	8.48	8.11	8.31	8.27	8.56

Table 18

Q3 2021 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)**
July	Action Level of 100 µg U/L – daily composite samples Release Limit of 275 µg U/L – monthly average of daily composite samples	16	26
August		14	26
September		18	56

Ambient Air Monitoring

Table 19 shows the quarterly all-station average and maximum uranium dustfall results from the third quarter of 2020 through to the third quarter of 2021.

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 2021 were consistent with the uranium in dustfall averages during the previous quarters.

Table 19

Uranium in Dustfall Results by Quarter (mg U/m^2/30 days)					
Value	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Average	0.1	0.1	<0.1	<0.1	0.1
Maximum	0.2	0.2	0.1	0.1	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 2020 through to the third quarter of 2021.

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 20

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**
Q3 2020	Average	0.001	0.001	0.003	0.002
	Maximum	0.004	0.008	0.076	0.005
Q4 2020	Average	0.001	0.001	0.005	0.001
	Maximum	0.007	0.005	0.221	0.005
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
Average <0.06 µg U in TSP/m^3 (annual) AAQC Maximum <0.3 µg 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 2020 through to the third quarter of 2021.

The average fluoride in dustfall results in the third quarter of 2021 is slightly lower than previous quarters due to production shutdown periods.

Table 21

Fluoride in Dustfall Results by Quarter (mg F/m^2/30 days)					
Value	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Average	1.1	1.4	1.3	1.2	0.6
Maximum	6.9	8.1	9.4	8.3	4.7
Internal Administrative Screening Level = 20 mg F/m^2/30 days					

Table 22 shows the average and maximum lime candle results from the third quarter of 2020 through to the third quarter of 2021. The average results are comparable to levels observed in the previous quarters.

Table 22

Monthly Lime Candle Results by Quarter (µg F/100 cm^2/30 days)					
Value	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Average	4	2	3	5	3
Maximum	13	5	8	13	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 23. The intake had periods of inactivity for portions of the third quarter primarily in association with a planned utility outage period. Consistent with the production facility returns trending, increases in third quarter 2021 baseline and maximum uranium concentrations have been recorded and several daily results within the quarterly period were reported above the CCME short-term and long-term water quality guidelines of 33 and 15 µg/L, respectively. Uranium trending at the intake similarly increased well above baseline as of late-September and overall, the trending is interpreted as relating to the on-going Canadian Nuclear Laboratories (CNL) remedial work within the inner Port Hope harbour.

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

Table 23

SCI Water Quality Data by Quarter							
Parameter	**Units of Measure**	**Value**	**Q3 2020**	**Q4 2020**	**Q1 2021**	**Q2 2021**	**Q3 2021**
Uranium	µg U/L	Average	3.3	7.0	6.0	5.7	22
		Maximum	7.3	12	14	12	92
Fluoride	mg F/L	Average	0.085	0.080	0.061	0.066	0.067
		Maximum	0.13	0.14	0.074	0.11	0.11
Ammonia & Ammonium	mg N/L	Average	0.017	0.014	0.014	0.014	0.017
		Maximum	0.14	0.044	0.014	0.014	0.17
Nitrate	mg N/L	Average	0.53	0.98	1.3	0.87	0.60
		Maximum	1.5	1.7	1.8	1.7	1.4
pH	-	Minimum	8.05	7.75	8.01	7.71	8.15
		Maximum	8.43	8.36	8.39	8.44	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.

Table 24

Date	Quantity of Fish Observed	Observations
Sept 20 – 26	8	1 perch and 7 immobile salmon were observed during these dates. Site production was shut down on Sept 24th. A Dive team was mobilized and discovered a breach on the north wall of the intake of approximately 37 inches tall x 26 inches wide as well as a much smaller breach on the south side of approx. 3 feet tall x 4 – 5 inches wide. Both breached areas were repaired, and production resumed Sept 26th. Due to the observable condition of the immobile salmon, it is believed that they were washed down the Ganaraska river, then drifted into the intake area where they were drawn into the intake via the breached area and wave forces. The additional wave forces/dynamics resulting from the position of the CNL wave attenuators are believed to have contributed to the cause of the breach.
Sept 27 – 30	7	7 immobile salmon were observed during these dates at travelling screen sump. These fish are believed to have been drawn into the intake area prior to the Sept 26th intake repair and subsequently became observable days later after operation resumed.

5.0 Public Information Program

During the third quarter of 2021, PHCF continued to meet the requirements of CNSC RD/GD 3.2.1, Public Information and Disclosure programs.

Public Engagement

In July, Cameco announced its Cameco Charity Golf Package in partnership with Dalewood Golf and Country Club. The non-traditional golf tournament raises funds for the Cameco Fund for Mental Health. $40 from individual golfers and 100 per cent of sponsorships are matched by Cameco.

The summer issue of Energize was mailed to all addresses in Port Hope, posted on camecofuel.com and promoted on Cameco Ontario social media channels. The summer issue featured stories on Cameco's Step Up for Mental Health activities, a Vision in Motion update, and the nuclear fuel cycle.

In July, Cameco sponsored the Northumberland 89.7FM Summer Music Series.

In August, Cameco sponsored the United Way Backpacks for Kids program, the Cobourg Highland Games and the Northumberland Rocks Back fundraising event for the United Way.

KBI Inspire Magazine featured Cameco Chief Corporate Officer, Alice Wong in the August/September issue. Alice shared her insights on approaching gender bias.

Public Opinion Polling results were posted to camecofuel.com and shared on Cameco Ontario social media channels in August. The survey found that 91% of residents support Cameco's continued operations in Port Hope. Consistent with previous surveys, the large majority (93%) of Port Hope respondents describe themselves as knowledgeable about Cameco, including 37% who say they are "very knowledgeable."

In September, Cameco sponsored the Cornerstone virtual Walk-A-Mile event. Cameco also sponsored the Port Hope Agriculture AG Bags in support of the Port Hope Fair, and the Port Hope & District Chamber of Commerce annual golf tournament.

Cameco provided free advertising to local charitable organizations with its sponsorship of MyFMs Community Partner Program. Through the quarter, Cobourg Highland Games, Cornerstone Family Violence Prevention Centre, and Northumberland Food for Thought. benefitted from this sponsorship by receiving advertising.

Public Disclosure

Cameco's PHCF made one public disclosure during the third quarter: Environment & Safety - Conversion: Port Hope - Fuel Services - Businesses - Cameco

Posting Date	July 30, 2021
Incident Date	July 29, 2021
Incident	Environmental Limit Exceedance
Details	The Hayward Street high volume air sampler (along the north fence line of the Port Hope Conversion Facility) recorded a result of 126 µg/m3 total suspended particulate (TSP) for the period of July 26 to July 27. This result is 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	The elevated TSP was a result of rail line replacement work occurring on site near the affected high-volume air sampler. The Canadian Nuclear Safety Commission and the Ministry of Environment, Conservation and Parks have been notified.
Cameco Environmental Effect Rating	1

Social Media

Cameco Ontario's Facebook community grew by 10 new followers (998 total) and had a total of 966 page likes at the end of the quarter. Cameco Ontario's 31 posts covered information such as:

- Promoted the summer issue of Energize in July
- Results of the 2021 public opinion survey for Cameco's Port Hope operations
- Promotion for the Cameco Charity Golf Package, including information on registration, prizes and sponsors
- Promotion for the virtual Step Up for Mental Health 5k event, including an eight-week video training tips series to help participants prepare
- Emergency response drills at the Port Hope Conversion Facility and the Blind River Refinery
- Recognition of the inaugural National Day for Truth and Reconciliation with a video on September 30

- Shared the August/September issue of KBI Inspire Magazine which featured an article with Alice Wong of Cameco sharing her insight on approaching gender bias.
- Promotions for community partners and sponsorships

By the end of the quarter the Instagram account had grown by 30 new followers for a total of 642 followers. Photos and information featured was similar to the Cameco Facebook page.

Indigenous Engagement

In July, Cameco emailed the 2021 Q1 Compliance Report and Summer 2021 Energize newsletter to Alderville, Hiawatha, Curve Lake, Scugog Island, Rama and Mohawks of the Bay of Quinte First Nations.

Cameco's communications manager and the director of regulatory compliance met with Curve Lake First Nation on August 25 and September 22. Cameco provided more information on Cameco's Sustainability, Community Investment, and response to COVID-19 at the August meeting. In September, discussions focused on Cameco Fuel Manufacturing. Cameco emailed Curve Lake First Nation a copy of the July 30 public disclosure.

Website

The 2021 Public Opinion Polling was posted to the website:

- Port Hope Community Survey Results 2021 - Making a Difference - Community - Cameco Fuel Services

The summer issue of Energize was posted to the website:

- Energize - Summer 2021 - Making a Difference - Community - Cameco Fuel Services

Information about the Step Up for Mental Health charity golf package was posted to the website:

- Step onto the Golf Course to Step Up for Mental Health - Making a Difference - Community - Cameco Fuel Services

A notice regarding the installation and operation of a floating barrier net and air bubble curtain system in the vicinity of the PHCF harbour water intake structure and adjacent CNL wave attenuator installation was posted to the website:

- PHCF- Integrated Barrier Net/Air Bubble Curtain System Installation & Operation - News Archive - Media - Cameco Fuel Services

Media Analysis

Cameco received media coverage regarding an emergency response exercise and an award nomination from the Northumberland Manufacturers Association:

- **Cameco Conducts Emergency Exercise at the Port Hope Conversion Facility**
  Todays Northumberland – September 23, 2021
  - https://todaysnorthumberland.ca/2021/09/23/cameco-conducts-emergency-exercise-at-the-port-hope-conversion-facility/
- **Northumberland Manufacturers' Association unveils 2021 excellence award nominees**
  Northumberland News – September 8, 2021
  - https://www.northumberlandnews.com/news-story/10472555-northumberland-manufacturers-association-unveils-2021-excellence-award-nominees/

Communication Products

The summer issue of Energize was mailed to all addresses in Port Hope, posted on camecofuel.com and promoted on Cameco Ontario social media channels. The summer issue featured stories on Cameco's Step Up for Mental Health activities, a Vision in Motion update, and the nuclear fuel cycle. Energize - Summer 2021 - Making a Difference - Community - Cameco Fuel Services

The 2021 Public Opinion Polling report was posted to the website and social media. Port Hope Community Survey Results 2021 - Making a Difference - Community - 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, and demolition of Building 27. On-site project activities continued to be substantially curtailed throughout this quarter as COVD-19 management measures limited the number of contractors on-site. Late in the quarter remobilization of the project team and some contractors began in preparation for a gradual ramp-up of activities – including resumption of demolition activities at Building 27.

The hold on CNL acceptance of packaged wastes at the LTWMF was still in place pending completion of a new waste cell later in the year. Late in the quarter a CNL safety stand-down stopped receipt of all waste materials for several weeks. CNL acceptance of bulk spoils shipments resumed September 16.

CNL completed site restoration of the former waterworks property. Return of care and control to Cameco is expected in the next quarter.

Regular monthly coordination meetings with the MPH and Cameco in relation to VIM activities continued. A proposed agreement for remediation of municipal properties remained on hold while the MPH addressed questions and issues related to post-remediation regulatory requirements at the Centre Pier property with CNL and AECL.

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 continued to be under review by the MPH through the quarter.

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. There were no environmental monitoring exceedances/reportable events occurred in the third 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 third quarter of 2021, 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 third quarter of 2021. There was one action level exceeded in the quarter for fluoride in urine, which was investigated, and corrective actions put in place. Emissions were well below PHCF site 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.