2022 Annual VIM Supplementary Report

Reporting Period January 1 – December 31, 2022

Operating Licence
FFOL-3631.00/2027

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1.0 INTRODUCTION

Vision in Motion (VIM) is Cameco's plan to clean up and renew the Port Hope Conversion Facility (PHCF). The project builds on work now under way through the Port Hope Area Initiative (PHAI) to address historic low-level waste issues in the Municipality of Port Hope. It provides Cameco with an opportunity to deliver a volume of qualifying waste materials to the Long-Term Waste Management Facility (LTWMF) that was constructed by the PHAI on the site of the licensed Welcome Waste Management Facility.

This report is considered supplementary to the Annual Compliance Monitoring and Operational Performance Report for the PHCF. The intention is to provide further information regarding VIM activities, progress, and monitoring throughout the year.

In accordance with its licence, the 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. The VIM project is subject to the PHCF site programs, plans and procedures. Additional plans and procedures have been created specific to VIM processes as many of the VIM changes were new to the site. These additions are maintained for the duration of the VIM project and are subject to the same review and due diligence as all Cameco programs.

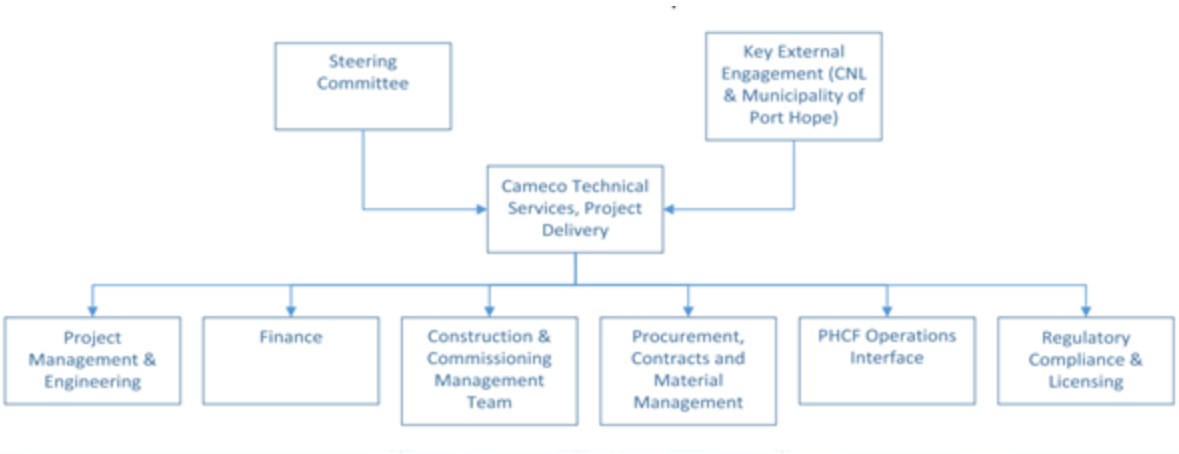
2.0 MANAGEMENT SYSTEMS

Cameco strives for operational excellence throughout all facilities and projects by way of consistent application of management systems. This ensures operations are safe, clean, and reliable.

In 2022, the VIM project continued to operate in a manner that supports safe, clean, and reliable operations and in compliance with applicable acts and regulations.

An organization chart for VIM is shown in Figure 1 below. The VIM project is managed by the Cameco Corporate Technical Services (CTS) division under the Project Delivery group. Guidance and direction for the project is provided to CTS by the VIM steering committee, which is made up of CTS and Fuel Services Divisional (FSD)/PHCF management staff and subject matter experts. Input is also considered from external stakeholders, such as Canadian Nuclear Laboratories (CNL) and the Municipality of Port Hope. The project is planned and implemented under CTS by a number of speciality teams, such as the construction management team, which is responsible for day-to-day VIM activities.

Figure 1 – VIM Organizational Chart



The annual PHCF site management review meeting was held March 1, 2023, to review the suitability, adequacy, and effectiveness of the management system in 2022. This review meeting covered the VIM project and sufficient information was provided and reviewed to demonstrate the effectiveness of the system for this project.

In 2022, VIM created 3 new documents (2 job aids and 1 work form). All three new documents were related to building ventilation. Two job aids, 1 procedure and 1 plan were updated in 2022. These job aid and procedure updates were related to radiation monitoring. The duties were updated, and additional field leadership and waste items were added to the VIM Safety Health Environment (SHE) Plan.

The Supplementary Environmental Monitoring Plan for VIM and Other Clean-Up Program Projects was implemented to monitor environmental impacts for these VIM activities, primarily during demolition/excavation.

VIM is often involved in audits in conjunction with the PHCF site. In 2022, Canadian Nuclear Safety Commission (CNSC) staff conducted Environmental Protection, Waste Management, and Packaging and Transport inspections at the PHCF that included VIM activities in the scope.

Seven layered audits were completed in 2022 by Cameco leadership as part of the Field Leadership Program.

There were no significant issues identified during audits and inspections in 2022 related to VIM. Audits will not be discussed elsewhere in this report. Details and findings related

to the audit program are submitted under separate cover due to the confidential nature of the information.

VIM personnel at the PHCF follow the standard PHCF training program, including site orientations and computer-based training requirements in addition to CTS required training. In 2022, VIM staff was 97.4% compliant with the prescribed training program, with 39 deficiencies. 180 VIM specific orientations, 60 Building 27 specific orientations and 49 return to work reviews were completed.

3.0 OPERATING PERFORMANCE

The VIM project is a significant undertaking at the PHCF with the key objective of transferring Cameco decommissioning waste to the LTWMF in Port Hope operated by the PHAI. The materials being transferred include buildings, equipment, contaminated soils, and stored wastes. The project is also implementing building and infrastructure modifications needed to support the remediation effort.

In 2022, the VIM project adjusted its medium and long-term schedule in line with the new closure dates of the LTWMF. Cameco took the opportunity to re-sequence the plan in line with the post pandemic closure date of the LTWMF. Site-wide storm sewer infrastructure, parking lot improvements, and the yard area north of Building 27 were pushed into future years. Engineering continued with preparation of the construction work package and bid documentation for Building 72 (new warehouse), existing warehouse building demolition, and deep excavations. The following on-site remediation and construction activities also took place:

- LTWMF was closed to all waste for more than half of 2022; however, 61 dump trucks of eligible wastes, 477 super sacks, 857 drums and 546 other items were transferred to the LTWMF from the PHCF, including the Dorset Street warehouse.
- Building 27 equipment removal continued with the east and west baghouses safely size reduced and beginning interior blockwork wall removal.
- Began Building 27 tower hoarding in preparation for full demolition in 2023.
- The new liquid hydrogen station was fully commissioned, and the old hydrogen station removed from site.
- The package for the deep excavation west of the harbour turning basin was returned to development. A new excavation methodology will be proposed at the start of 2023.

Safety, health, and environment (SHE) matters for VIM are managed by the CTS safety, health, environment, and quality (SHEQ) Group with support from Occupational Health and Safety (OH&S), Radiation Protection and Environmental programs, personnel and activities at the PHCF.

Field level safety is conducted at the PHCF by VIM team members to ensure compliance to Cameco's policies and procedures by means of the CTS Field Leadership Program that includes four levels of safety involvement: Safety Chats, Job Task Observations (JTO), Risk Control Observations (RCO) and Layered Audits. Results of the CTS Field Leadership Program are outlined below in Table 1. These results are reviewed annually by the SHEQ group, and findings from RCOs and Layered Audits can result in action workflows to improve job task safety performance.

Table 2 below outlines the safety statistics for VIM in 2022.

Table 1

2022 Field Leadership Activity	
Activity	**Number Completed**
Safety Chats	1,214
Job Task Observations	221
Risk Control Observations	83
Layered Audits	7

Table 2

2022 Safety Statistics	
Safety Parameter	**Number in 2022**
Hours Worked	117,583
First Aid Injuries	4
Medical Diagnostic Procedures	1
Medical Treatment Injuries	0
Lost Time Injuries	0
Lost Time Frequency	0.0
Lost Time Injury Severity	0.0
Total Recordable Injury Rate	1.7

All reported OH&S incidents are registered in CIRS for tracking and management.

In 2022, one VIM contractor (restricted medical diagnostic injury) strain to left elbow/bicep was reported to ESDC. There were no other reportable events recorded related to VIM. All events that require reporting are completed through the PHCF compliance group and are investigated with corrective actions identified and tracked to completion in accordance with Cameco's non-conformance and corrective action process. Cameco is confident that through a robust management system, the VIM project will continue to operate in a safe, clean, and reliable manner.

Table 3 below summarizes the environmental exceedances in 2022 related to VIM. These environmental VIM monitoring exceedances were investigated, and corrective actions implemented in accordance with with Cameco's non-conformance and corrective action process. Specific exceedance details were provided in the 2022 quarterly reports.

Table 3

VIM 2022 Environmental Air and Noise Monitoring Exceedances						
Date	**Monitoring Parameter**	**Averaging Period**	**Location**	**Results (μg TSP/m^3)**	**Criteria (μg TSP/m^3)**	**Level**
21-Oct-22	DustTrak	1 hour	East of B27	270	200	Admin
25-Oct-22	DustTrak	1 hour	East of B27	310	300	Action
27-Oct-22	HiVol	24 hours	Yacht Club	214	120	Action
6-Dec-22	DustTrak	1 hour	East of B27	396	300	Action
6-Dec-22	DustTrak	1 hour	East of B27	251	200	Admin
8-Dec-22	HiVol	24 hours	Yacht Club	111	100	Admin
14-Dec-22	DustTrak	1 hour	East of B27	338	300	Action

Note: TSP = Total Suspended Particulate

VIM activities continued to be impacted by the COVID-19 pandemic. Mobilization of field crews and on-site activities were limited to smaller crew sizes. However, crews size began to increase during the summer months. The focus was on completion of the interior deconstruction of the former UF_6 plant (Building 27).

VIM was also affected by LTWMF waste receipt restrictions. Receipt of materials in roll-off bins was suspended by CNL in Q3 of 2021 while a CNL review of unloading these containers was undertaken. The date CNL plans to accept roll-off bins continues to slip and is now expected to resume in Spring 2023.

Cameco and CNL continued to coordinate regularly. There was some progression of cost and technical information needed to support legal agreements for shared work at the Centre Pier and harbour. This work will continue into 2023.

Coordination with the Municipality of Port Hope (MPH) continued. An agreement on remediation approaches at the waterfront was finalized. Collaboration on storm sewer infrastructure work at Eldorado Place was also initiated, with plans to begin to jointly implement improvements in 2023.

No notification of physical works undertaken in 2022 was provided to CNSC as none were triggered by the requirements of WMP-02. Due to the start date of the various activities and delays from the COVID-19 pandemic, these notifications were provided in March 2018, June 2018, March 2019, December 2019, and January 2020 and throughout 2021.

In May 2022, the VIM project had achieved 80% of its previously approved scope of work. Later in the year, additional scope and scheduled adjustment approvals were completed. New items were added to the scope, including new warehouse design build, warehouse demolition and development of the plan for Area 5 subsurface remedial work. In addition to these new scope items, the project schedule was extended to align with the new closure date of the LTWMF. Therefore, at the end of December 2022, following addition of new scope items listed above and a 4-year project extension, the new project scope was 52% complete.

4.0 PROJECT CHANGES AND CHANGE CONTROL

There were no modifications made in 2022 that negatively affected safety analysis in relation to the VIM project.

The safety-significant systems at the PHCF have been identified and a preventive maintenance program is in place to ensure that the equipment associated with these systems is properly maintained. The VIM project is evaluated on a continual basis to ensure the site safety case remains intact.

During 2022, it was decided full demolition of Building 27 would be delayed until 2023. The proposed new warehouse (Building 72) is scheduled to be completed in 2024. Area 9 (parking lot) storm sewer improvements with the Municipality of Port Hope (MPH) was deferred to 2024 due to MPH funding strategies. VIM is currently evaluating bringing other projects forward in the schedule in place of Area 9, including demolition of Building 14/15 and Building 2 interior equipment demo.

5.0 RADIATION PROTECTION

The VIM project follows the extensive Radiation Safety Program in place at the PHCF. The program meets the requirements of the *Nuclear and Safety Control Act* and the *Radiation Protection Regulations* to ensure exposures are kept as low as reasonably achievable (ALARA). The same targets and limits noted in the PHCF program apply to the VIM project.

The radiation program includes the following aspects:

- External dosimetry – personal monitoring
- Internal dosimetry – urine analysis and lung counting program
- Workplace air sampling program
- Respirator program
- Radiation and contamination surveys

VIM personnel take care of certain aspects of radiation protection monitoring specific to the VIM project. Monitoring completed by VIM Radiation & Environment Technicians includes the following:

- Air sampling using portable RADeCO samplers
- Air sampling using iCams (Continuous air sampling for uranium)
- Worker personal air sampling
- Point of entry/exit monitoring
- Gamma surveys
- Routine room monitoring
- Pre-scanning vehicles and equipment
- Monitoring of supersacs and drums before shipment
- Monitoring of shipments leaving site
- Heat Stress monitoring
- Radon testing
- Direct Reading Dosimeters
- Collecting surface water samples for CNL
- Calibration and source checks of radiation monitoring equipment

External and Internal Dosimetry

Table 4 summarizes the external and internal dosimetry results for VIM workers in 2022. There were no CNSC licensed limits or action level exceedances with respect to radiation protection related to VIM in 2022.

Table 4

2022 VIM External and Internal Dosimetry Results				
	Number of Individuals	Average (mSv)	Minimum (mSv)	Maximum (mSv)
Whole Body Dose	39	0.02	0.00	0.44
Skin Exposure	39	0.07	0.00	0.52
Eye Dose	39	0.05	0.00	0.46
Urine Analysis Dose	30	0.00	0.00	0.01
Lung Dose	33	0.33	0.00	1.37
Total Effective Dose	39	0.30	0.00	1.37

Maximum dose was received by radiation and environment technicians in relation to lung dose assigned.

Contamination Control

PHCF is divided into three zones for contamination control purposes. Zone 1 areas are clean areas where no radioactive sources are present other than monitoring equipment. VIM currently does not monitor any Zone 1 areas. In Zone 2 areas, no visible contamination should exist, but when detected it is promptly isolated, monitored, cleaned, and monitored again to ensure all contamination has been removed. If any items are unable to be cleaned, then they are disposed of. Zone 3 areas are production areas where radioactive products and contaminated objects are expected. VIM monitors Zone 2 lunchrooms on a weekly basis and Zone 2 office areas on a quarterly basis. Additional monitoring is completed on an as needed basis when contamination is suspected, or it is requested.

There were 14 samples above the internal administrative level in 2022 in Zone 2 areas. These exceedances included 8 chairs and 6 floor locations. All areas were isolated, cleaned and re-monitored to ensure all contamination was removed.

Table 5

Summary of VIM Internal Administration Levels and Events in 2022				
Area	**Levels (Bq/cm^2)**		**Contamination Events**	
	Alpha	**Beta/Gamma**	**Number of Samples above Levels**	**Number of Samples Taken**
Zone 1	0.4	0.4	0	0
Zone 2	0.4	3.7	14	14,295

Air Sampling

Portable air sampling equipment (RADeCOs) and continuous air sampling equipment (ICams) are used in active work areas to monitor the derived air concentration (DAC) of uranium. In 2022, samplers were used in Buildings 27, 64, 65 (Dorset Street) and 5C to support VIM construction activity. Results are compiled and monitored by VIM personnel.

Table 6 below shows the average annual derived air concentration (DAC) for each work area in 2022.

Table 6

Airborne Activity Concentration								
Year	Annual Average (DAC) and Number of Samples >DAC							
	Building 27		Building 64		Building 65		Building 5C	
	Average (µgU/m^3)	>DAC[1]	Average (µgU/m^3)	>DAC[1]	Average (µgU/m^3)	>DAC[1]	Average (µgU/m^3)	>DAC[1]
2020	0.22	0	0.05	0	0.01	0	N/A	N/A
2021	0.12	0	0.02	0	0.02	0	N/A	N/A
2022	0.17	17	0.04	0	0.01	0	0.03	0
[1]Number of samples greater than 1 DAC								

Gamma Surveys

Gamma surveys are completed on a monthly basis in areas where inventory changes are frequent and could impact gamma radiation levels in lunchroom/break rooms. In 2022, surveys were completed in Building 24A and a rental lunchroom trailer south of Building 27 (when in use). Table 7 below summarizes VIM gamma survey results for 2022.

Table 7

Summary of VIM Gamma Readings by Area (µSv/h)					
Building Number	Quarter	Location	Average	Minimum	Maximum
24A	1	Contractor Lunchroom	0.12	0	0.32
24A Storage Area		Storage Area	2.12	0.04	33.5
Rental Lunchroom Trailer		Building 27, south side	0.12	0	0.28
24A	2	Contractor Lunchroom	0.10	0	0.26
24A Storage Area		Storage Area	5.24	0.03	55.6
Rental Lunchroom Trailer		Building 27, south side	0.12	0	0.33
24A	3	Contractor Lunchroom	0.11	0.01	0.34
24A Storage Area		Storage Area	3.31	0.01	46.9
Rental Lunchroom Trailer		Building 27, south side	0.14	0	0.47
24A	4	Contractor Lunchroom	0.08	0	0.90
24A Storage Area		Storage Area	1.10	0.02	15.8
Rental Lunchroom Trailer		Building 27, south side	0.18	0.01	0.51

Vehicle Monitoring

All vehicles leaving a Cameco property are monitored based on their contents and their transportation paperwork. All shipments to the LTWMF are monitored by Radiation Technicians using a combination of swipes and direct monitoring analysis. Shipments do not leave the property unless they meet shipping requirements.

Once vehicles/containers are finished transporting radioactive waste, they are cleaned and monitored so that they can be free released to enable them to be used for other tasks. A combination of swipes and direct monitoring are conducted on multiple surfaces as part of clearing these vehicles or containers.

Radon Monitoring

Radon testing was not required to be completed in 2022 for the VIM Project.

6.0 ENVIRONMENTAL PROTECTION

There are both federal and provincial regulatory authorities that have legislative jurisdiction over environmental protection at the PHCF. The environmental monitoring program is comprised of the following components:

- water and air emissions
- gamma levels
- groundwater
- soil and vegetation

The PHCF program and associated plans/procedures are applicable to the VIM project and ensure that applicable provincial and federal requirements are met. Additionally, the *Supplementary Environmental Monitoring Plan for Vision in Motion and Other Clean-Up Program* Projects was created to supplement the PHCF programs. Pursuant to this plan, the key characteristics of the VIM activities that can have a significant environmental impact are monitored and measured. The applicable environmental programs have been demonstrated to be effective.

VIM personnel take care of certain aspects of environmental monitoring specific to the VIM project. Monitoring completed by VIM Radiation & Environment Technicians includes the following:

- Noise Monitoring
- Hi-Vol Air Sampling
- Dust Trak Monitoring

Noise Monitoring

Noise monitoring is regularly conducted at three residential locations during VIM construction activities on the PHCF site (N1, N2 and N3 locations). Figure 2 shows the current noise monitoring locations. In addition, the N4 location was surveyed as needed in 2022. The two residential noise monitoring locations (N5 and N6) surrounding the Dorset Street property are only surveyed during active construction activities. Table 8 below summarizes the limits related to residential noise surveys while Table 9 shows the 2022 noise monitoring average and maximum for N1, N2, N3, N4, N5 and N6.

There were no action level exceedances for noise in 2022.

Table 8

Noise Limits		
Receptor Type	**Action Level**	**Limit Level**
	LA_{eq} (15_{min}) (dBA)	**LA_{eq} (15_{min}) (dBA)**
Residential	65 or Baseline + 5 (whichever is higher)	75 or Baseline + 5 (whichever is higher)

Table 9

Noise Monitoring Results LA_{eq} (15_{min}) (dBA)												
Year	**N1**		**N2**		**N3**		**N4**		**N5**		**N6**	
	Avg	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**	**Avg**	**Max**
2020	52	65	51	65	55	65	N/A	N/A	N/A	N/A	N/A	N/A
2021	52	64	52	64	56	65	N/A	N/A	54	59	50	64
2022	53	64	54	65	56	65	58	65	56	64	53	64.

Figure 2 – Noise Monitoring Locations

Hi-Vol Air Sampling

The high volume (hi-vol) air sampling program monitors the concentration of dust and uranium suspended in the air near the facility. VIM has three hi-vol air samplers surrounding the PHCF (DE-1, DE-2 and DE-3a). Samples are collected daily during VIM activities, and results are recorded and tracked.

Approximately 40 cubic feet per minute of air is passed through and collects on a filter over a 24-hour period. The regulatory criteria for uranium content in ambient air varies by period and particulate size. Cameco uses TSP (total suspended particulates) hi-vols at the PHCF and for VIM purposes. For particulate concentration, the administrative level is 100 µgTSP/m^3 and the MECP regulatory limit is 120 µgTSP/m^3.

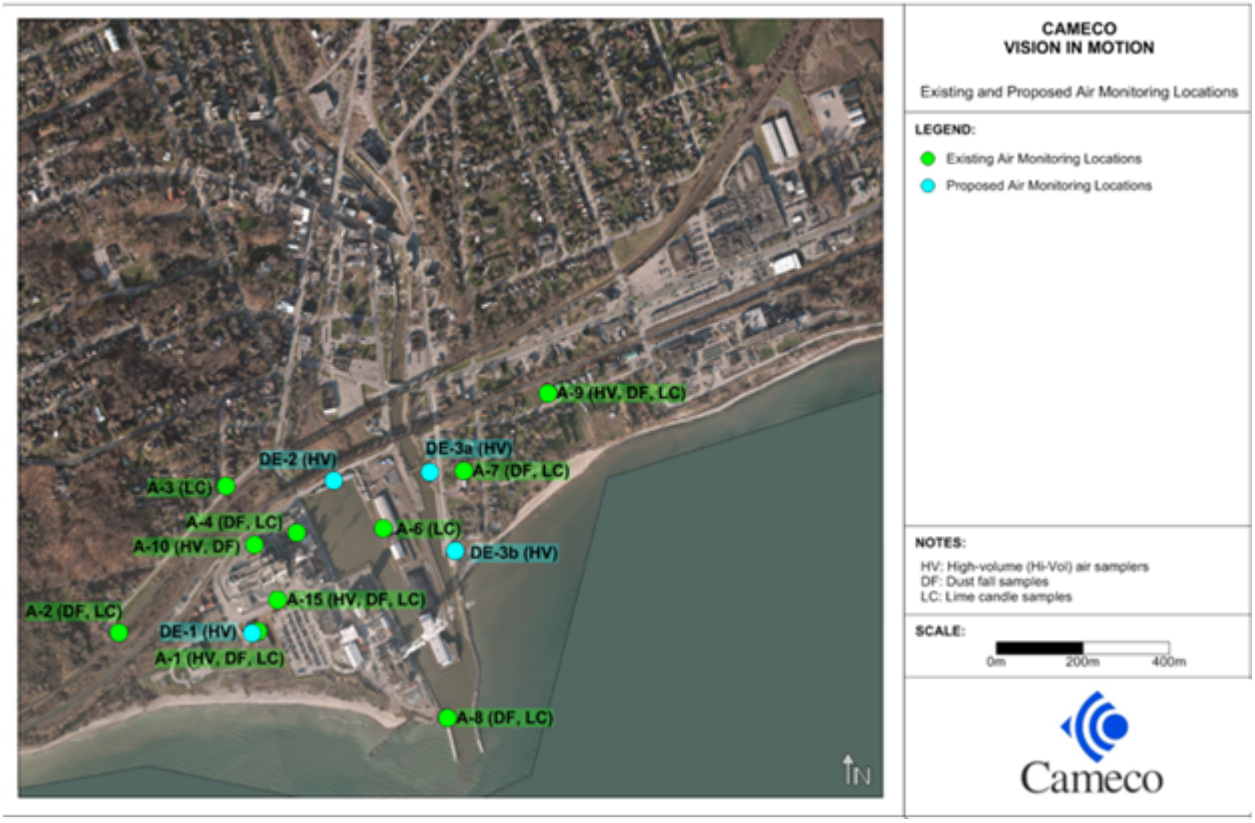
Figure 3 shows existing (site) and proposed (VIM) air monitoring locations. All VIM hivol samples that have a particulate concentration greater than the administrative level, or the action level are sent to an external lab for further analysis. Two hivol samples were sent to an external lab in 2022. HiVol exceedances were attributed to track out from CNL activities to the North of the Yacht Club hiVol location. Table 10 shows the

average and maximum uranium in hi-vol results for 2022. Locations are subject to change as the VIM project progresses and continual evaluation of environmental needs occurs.

Table 10

Annual Particulate Concentration at Hi-Vol Stations (µg TSP/m^3)				
Year	**Result**	**DE-1 (Waterworks)**	**DE-2 (Yacht Club)**	**DE-3A (Fish Cleaning)**
2020	Average	23	20	18
	Maximum	582	115	59
2021	Average	18	19	22
	Maximum	68	45	62
2022	Average	19	29	22
	Maximum	53	214	65

Figure 3



DustTrak Monitoring

DustTrak units are placed downwind of on-site construction activities and are used to indicate when dust levels become elevated. DustTrak units are set to alarm when administrative (one hour average equal to or greater than 0.2 mg/m^3) or action (one hour average equal to or greater than 0.3 mg/m^3) levels are achieved.

Results for DustTrak units are real time and allow the VIM team to assess exceedances immediately and provide solutions immediately.

In 2022, Dust Trak monitoring was conducted at Building 27, Gate 11 Yard, Area 1 and Dorset Street.

There were 5 DustTrak exceedances in 2022. All DustTrak exceedances were attributed to CNL construction activity to the East of the sampling location.

Table 11

VIM 2022 DustTrak Exceedances						
Date	**Monitoring Parameter**	**Averaging Period**	**Location**	**Results (µg TSP/m³)**	**Criteria (µg TSP/m³)**	**Level**
21-Oct-22	DustTrak	1 hour	East of B27	270	200	Admin
25-Oct-22	DustTrak	1 hour	East of B27	310	300	Action
6-Dec-22	DustTrak	1 hour	East of B27	396	300	Action
6-Dec-22	DustTrak	1 hour	East of B27	251	200	Admin
14-Dec-22	DustTrak	1 hour	East of B27	338	300	Action

7.0 WASTE MANAGEMENT

This section covers activities under the VIM project to move accumulated waste and bulk materials to the LTWMF and other appropriately permitted facilities. The VIM project is a significant undertaking at PHCF with the key objective of transferring Cameco Decommissioning Waste to the LTWMF in Port Hope. The materials being transferred include buildings, equipment, contaminated soils, and stored wastes.

Waste acceptance and safeguards requirements are managed by Fuel Service's Divisional staff.

Waste shipments to the LTWMF for 2022 are summarized in Table 12 below.

Table 12

Summary of Waste Shipments in 2022	
Type of Package	**Number of Items**
Drums to LTWMF	857
Bags to LWTMF	477
Dump Trucks	61
Other Items	306

8.0 CONCLUSIONS

Cameco is committed to the safe, clean, and reliable operations of all our 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 2022, there were no CNSC regulatory limits exceeded as part of the VIM project activities. As well, as a result of the effective programs, plans and procedures in place, the project was able to maintain individual radiation exposures well below all regulatory dose limits.

Cameco's relationship with our neighboring communities remains strong and we are committed to maintaining these strong relationships.