



**CAMECO CORPORATION
FUEL SERVICES DIVISION**

**2017 LICENCE RENEWAL APPLICATION
FOR THE
PORT HOPE CONVERSION FACILITY**

Supplemental VIM Submission

February 1, 2016

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	VISION IN MOTION PROJECT.....	1
1.2	APPLICATION FOR LICENCE RENEWAL RELATED TO VIM.....	5
2.0	VIM PROJECT DESCRIPTION.....	6
2.1	HISTORY.....	6
2.2	FACILITY LOCATION AND LAYOUT.....	8
2.3	VIM PROJECT SCOPE.....	12
2.4	DEMOLITION, EXCAVATION, CONSTRUCTION AND WASTE MANAGEMENT ACTIVITIES CARRIED OUT THROUGH THE CLEAN-UP PROGRAM	16
2.5	PAST REMEDIATION ACTIVITIES AT PORT HOPE CONVERSION FACILITY	16
2.6	COMMUNITY SUPPORT	17
2.7	ABORIGINAL CONSULTATION.....	17
3.0	PROJECT SCHEDULE.....	19
4.0	PROJECT RESOURCES	22
5.0	REGULATORY FRAMEWORK.....	23
5.1	VIM PROJECT REGULATORY OVERSIGHT	23
5.2	PHCF ENVIRONMENTAL RISK ASSESSMENT	23
5.3	ENVIRONMENTAL ASSESSMENT REVIEWS	24
6.0	PROJECT HAZARDS AND CONTROLS	26
6.1	VIM PROJECT - MANAGEMENT SYSTEMS.....	27
6.2	PHCF PROGRAMS, PLANS AND PROCEDURES.....	27
6.3	VIM HAZARDS AND MITIGATION.....	31
7.0	CONCLUSION	37
8.0	REFERENCES	38

Table of Tables

Table 1: Summary of PHCF Environmental and Health and Safety Programs, Plans and Procedures	28
Table 2: Summary of Potential Environmental Hazards and Mitigation for the VIM Project	32

Table of Figures

Figure 1 – Port Hope Conversion Facility Existing Site Layout	3
Figure 2 – Port Hope Conversion Facility Site Layout Post VIM.....	4
Figure 3 – Port Hope Conversion Facility Site Study Area – PHCF Main Site and Centre Pier.....	9
Figure 4 – Port Hope Conversion Facility Site Study Area – Dorset Street East Site	10
Figure 5 – VIM Transportation Route to LTWMF.....	11
Figure 6 – Demolition and Construction Plan – PHCF Main Site.....	14
Figure 7 – VIM Remediation Plan.....	15
Figure 8 – Preliminary VIM Project Schedule	20
Figure 9 – VIM PHCF Site Changes	21

Table of Appendices

Appendix 1 – List of Acronyms Used in the Supplemental VIM Submission	39
Appendix 2 – Supplementary Environmental Monitoring Plan for Vision in Motion.....	41

1.0 INTRODUCTION

1.1 Vision in Motion Project

In the upcoming licence term, Cameco Corporation (Cameco) is proposing to undertake a major site cleanup and renewal of its Port Hope conversion facility (PHCF), which is located in the Municipality of Port Hope (MPH), Ontario. This undertaking is known as the Vision in Motion (VIM) project. The VIM project will be implemented during the applied-for licence period. A 10-year licence term will provide sufficient flexibility to address potential delays to the project due to internal or external factors.

This project is a unique and timely opportunity that has been made possible because of the Port Hope Area Initiative (PHAI). The PHAI Port Hope project is being undertaken by Canadian Nuclear Laboratories (CNL) and includes the construction of a long-term waste management facility (LTWMF) in the Municipality of Port Hope. VIM will require effective co-ordination with the PHAI to ensure the success of both projects. Remediation activities in the Port Hope Harbour area as well as the transfer of drummed waste and soil that meet the waste acceptance criteria (WAC) to the LTWMF are among the activities where effective coordination is paramount. A framework for coordination of activities between PHAI and Cameco is in place to link the teams in each organization working on similar aspects of the project such as Centre Pier remediation, regulatory activities, public outreach and communication and environmental monitoring. A senior management coordination team regularly reviews the progress of the project teams at a joint meeting.

VIM entails an extensive remediation and redevelopment of much of the PHCF and includes:

- the clean-up and demolition of a number of old or underutilized buildings;
- the removal of contaminated soils, building materials and stored wastes; and
- the proposed construction of new replacement buildings, additions or modifications to existing buildings at the PHCF with associated landscaping and infrastructure.

Proposed changes at the PHCF will result in modifications in the ongoing management of the site related to uranium trioxide (UO₃), uranium dioxide (UO₂) and uranium hexafluoride (UF₆) storage as well as wastewater treatment. Overall, VIM will allow for environmental remediation, improved site operations, enhancement of site safety and security through site design, and improved aesthetics.

1.1.1 Current Licensing Basis

The PHCF Clean-Up Program (CUP) (also referred to as Waste Management Program - 02 or WMP-02) has been in place for many years. WMP-02 describes how Cameco will manage CUP activities within the existing licensing basis. CUP was established to remove obsolete buildings, equipment and materials for the purpose of reducing

environmental obligations, addressing health and safety hazards in underutilized buildings, creating useable space and improving the appearance of the PHCF. CUP may involve undertaking these activities at any of the three properties that make up the PHCF.

CUP activities are ongoing and consist of routine work and clean-up projects. Planning for CUP activities incorporates an assessment of the relevant safety and control areas from a demolition, decontamination and waste management perspective. This assessment determines whether project-specific programs or procedures are required to supplement existing site programs to ensure the objectives of the licensing basis are maintained.

1.1.2 Project Overview

VIM is a specific project to carry out clean-up and renewal activities at the PHCF and will be completed in accordance with WMP-02. The original project description was submitted to the Canadian Nuclear Safety Commission (CNSC) in 2006 under the name Vision 2010 Project. The project was rebranded as Vision in Motion when it became clear that work would not begin until well after the original project timelines anticipated for both completion of the environmental assessment for Vision 2010 and the PHAI.

VIM will facilitate environmental remediation at the PHCF site, improve the operational efficiency and environmental performance of the PHCF and enhance site safety and security through site design. VIM also presents an opportunity for Cameco to make the PHCF more visually appealing, return the Centre Pier to the MPH and improve public access to the waterfront. The project consists of removing several old or underutilized buildings; removing contaminated soils, building materials and stored wastes; transporting those soils and wastes to the LTWMF; and constructing associated new infrastructure and building modifications. The layout of the current PHCF Main Site and the site post VIM are provided in Figures 1 and 2, respectively.

1.1.3 Project Timeline

VIM is progressing with design activity based on the defined scope. The resulting plans will cover aspects such as engineering, procurement, project execution (including environmental monitoring, risk management, site-project interactions) and the construction strategy and schedule. It is anticipated that the current planning phase of the project will be completed in the summer of 2016.

The implementation of most VIM activities is dependent on when the LTWMF is able to accept wastes from Cameco. It is anticipated that most aspects of VIM, particularly building demolition, soil remediation, groundwater treatment program expansion, and transfer of wastes will occur over a four to five year period after the LTWMF is open to receipt of wastes.

Figure 1 – Port Hope Conversion Facility Existing Site Layout

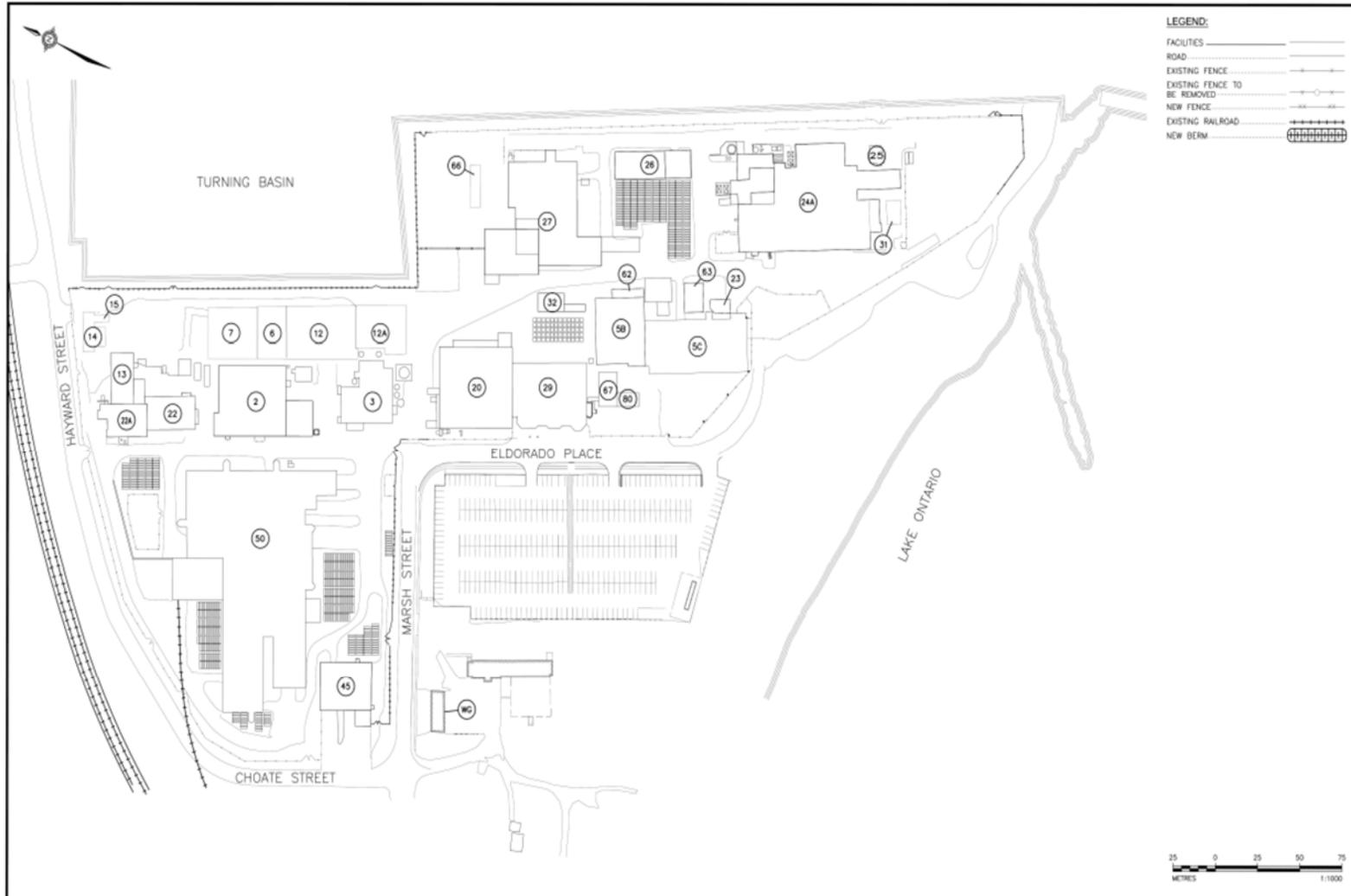
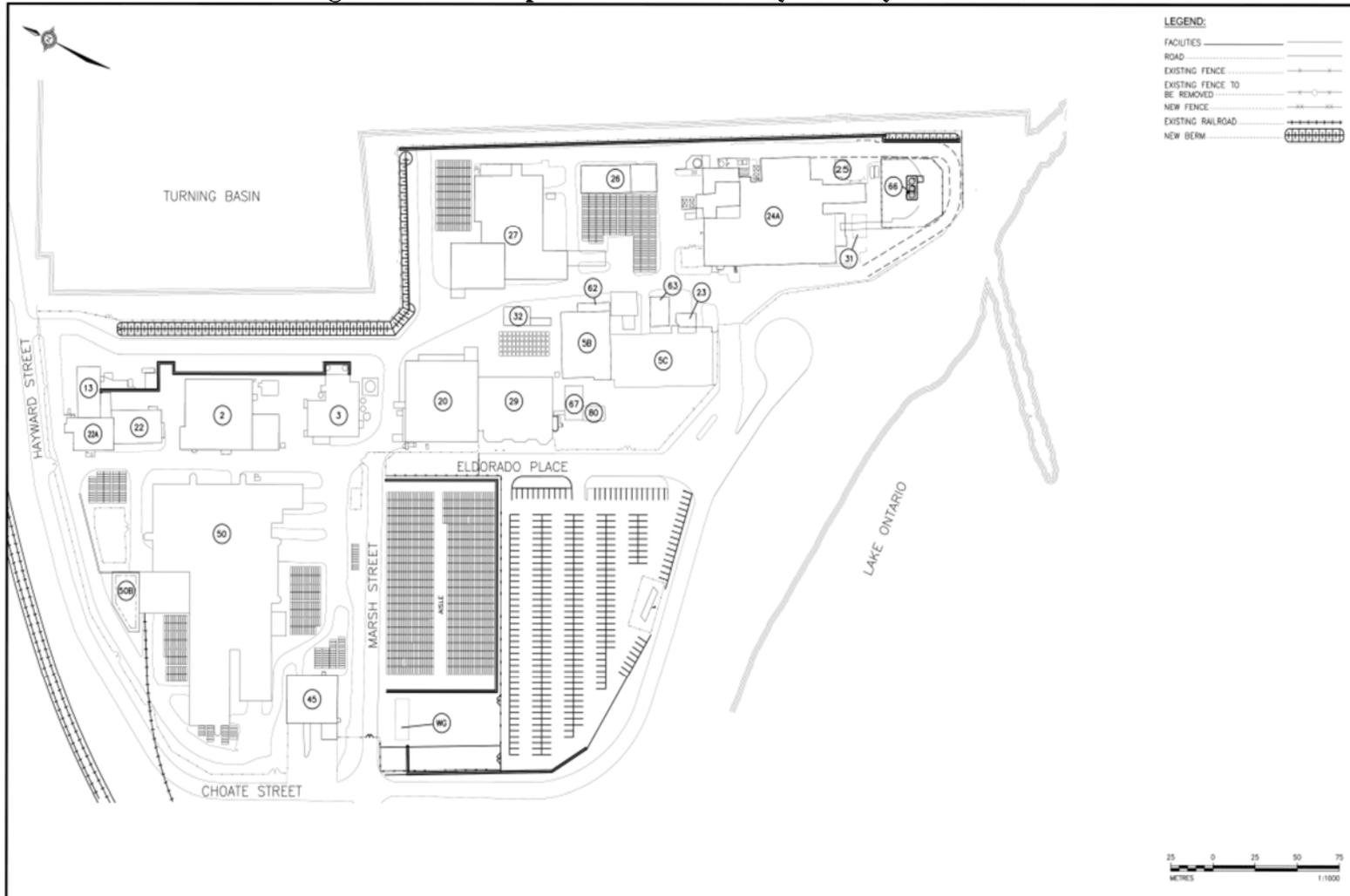


Figure 2 – Port Hope Conversion Facility Site Layout Post VIM



1.2 Application for Licence Renewal Related to VIM

Within the requested licence period of 10 years, the PHCF expects to continue with current licensed operations including carrying out its VIM project to clean up and renew the facility. A licence renewal application was submitted to the CNSC on November 20, 2015 and this follow-up document outlines the objective of the licensing basis for the ongoing CUP operations including the VIM project.

As part of licence renewal activities occurring in 2016, Cameco requests that the operating licence for the PHCF specifically provide the authorization for PHCF to engage in clean-up, decontamination, demolition and remediation activities (including VIM) that are currently part of the licensing basis.

In support of increased clean-up, decontamination, demolition and remediation activities, including discharge of treated groundwater at the PHCF, Cameco completed a federal environmental assessment (EA) pursuant to section 5(1)(d) of the *Canadian Environmental Assessment Act (CEAA)*. Cameco prepared an Environmental Impact Statement (EIS) for Vision 2010 (Cameco 2010) (now VIM) in accordance with the EA requirements under *CEAA* and the project specific EA Guidelines developed by the CNSC in 2009.

The EIS was submitted to the CNSC in December 2010 and the Comprehensive Study Report (CSR) (CNSC 2012) was accepted by the Commission in May 2012. In December 2012, Canada's Environment Minister announced that this proposed project for PHCF is not likely to cause significant adverse environmental effects and the project was referred back to the CNSC for appropriate action.

Acronyms and abbreviations used throughout this document are found in Appendix 1.

2.0 VIM PROJECT DESCRIPTION

The VIM project provides Cameco with an opportunity to deliver an allowance of qualifying waste materials to the LTMWF and to remediate and redevelop the PHCF. The VIM project is a large CUP project under WMP-02 and is expected to be implemented within the next 10 years in conjunction with the PHAI Port Hope project being implemented by Canadian Nuclear Laboratories (CNL).

2.1 History

The 2001 federal/municipal agreement establishing the PHAI specifies that approximately 150,000 m³ of Cameco decommissioning waste materials arising at the PHCF and other specified locations are to be accommodated in the LTMWF, which is to be located in the MPH. This agreement provides Cameco with a limited window of opportunity, during the time that the LTMWF is receiving wastes, in which to transport waste for long term management at the LTMWF.

Since 2001, the scope of the VIM project has been evolving and, during this period, Cameco has promoted the project through various forums and with a variety of stakeholders (including local government, regulatory agencies, Aboriginal and community groups and the general public). In late 2005/early 2006, prior to completion of the Project Description, Cameco engaged in an extensive public consultation involving more than 600 local residents and other stakeholders, including the Municipality of Port Hope and non-governmental organizations. The results of these consultations provided direction to Cameco as it explored options for site redevelopment that considered the input received.

Cameco continued to both formally (public meetings, workshops) and informally (phone calls, one-on-one conversations) consult with the public throughout the EA process. The community was also informed about project developments through its community forums, newsletters, website and other public information activities. This dialog with the community has been ongoing since that time.

Cameco has worked very closely with the Municipality of Port Hope to ensure that VIM is as consistent with community planning objectives for waterfront redevelopment as possible.

One of the areas in which the direction from both the community and MPH was clear from both early and ongoing consultations was a desire to see the facility move away from the harbour, wherever possible. With the Centre Pier becoming publically accessible following completion of VIM and the PHAI, there was a desire to open up that area of the waterfront for increased public use.

The CSR was the subject of a CNSC public hearing in May 2012, and as noted above, the EA's conclusions for Vision 2010 were accepted by the Federal Minister of the

Environment in December 2012. The project was subsequently rebranded Vision in Motion (VIM). Work was then undertaken to refine the scope of the project. In January 2014, Cameco engaged in consultation with its three primary regulators, the CNSC, Environment Canada (EC) and the Ontario provincial Ministry of the Environment (now Ministry of the Environment and Climate Change (MOECC)) and provided an overview of the scope for VIM at a joint regulatory meeting in Port Hope. In February 2014, the three regulatory agencies provided Cameco with letters supporting the further development of the VIM project as outlined at the January meeting.

2.1.1 EA for Vision 2010 as it Applies to VIM

The EA for Vision 2010 that was the subject of the CSR issued in May 2012, evaluated four different alternative means to carrying out the project. Although a preferred alternative was identified at the time, the effects assessment evaluated the activities that would potentially lead to the maximum environmental effects associated with all of the alternatives.

In general, the scope of the VIM project has refined the original Vision 2010 activities to include a greater re-purposing of existing buildings. Consequently there will be fewer demolition and construction activities than were considered in the original assessment. Ultimately this reduced level of activity will ensure that the effects associated with VIM remain within the bounds of the assessment in the 2012 CSR.

Similarly, for activities associated with remediation, a more targeted approach to remediation will be undertaken, focusing on removing the most contaminated material. This remediation will significantly reduce the source of groundwater contaminants at the PHCF site, and thereby greatly reduce the potential for groundwater contamination. Despite the fact that environmental risk assessments (SENES, 2009a; SENES 2009b; SENES 2010; Arcadis, 2015) completed for the current facility conclude that no additional groundwater management is required to remain protective of the environment, the VIM project involves the installation of additional groundwater collection wells. These wells are intended to further reduce the flux of contaminated groundwater discharging to the Port Hope Harbour and will be operated under the existing permit from the MOECC. This activity will more than offset the groundwater loading due to PHCF soil contamination evaluated in the CSR.

Further, because of this refinement in remediation activities, less soil excavation and backfill will be involved, reducing the potential environmental effects (airborne dust, etc.) evaluated in the Vision 2010 EA (and CSR). Consequently, the effects evaluated as part of the CSR will bound the potential effects associated with the VIM project.

Overall, the VIM project will not increase the radiological, human health or environmental hazards that were evaluated in the CSR and does not change the decision that the project is not likely to result in significant adverse environmental effects.

2.2 Facility Location and Layout

Detailed descriptions of the PHCF site are provided in the 2017 License Renewal Application and are not repeated herein. The VIM Project will take place within the three PHCF sites, including the PHCF Main Site, the Centre Pier and the Dorset Street East site. The Site Study Area illustrations in Figures 3 and 4 from the original EIS for the Vision 2010 project illustrate the area assessed in the EA, which includes property within the PHCF fenceline, as well as adjacent land that is accessible to the public. An element of the project involves relocating drums and low level radioactive waste (LLRW) from all three PHCF properties to the PHAI LTWMF. The transportation route is illustrated in Figure 5.

Figure 3 – Port Hope Conversion Facility Site Study Area – PHCF Main Site and Centre Pier

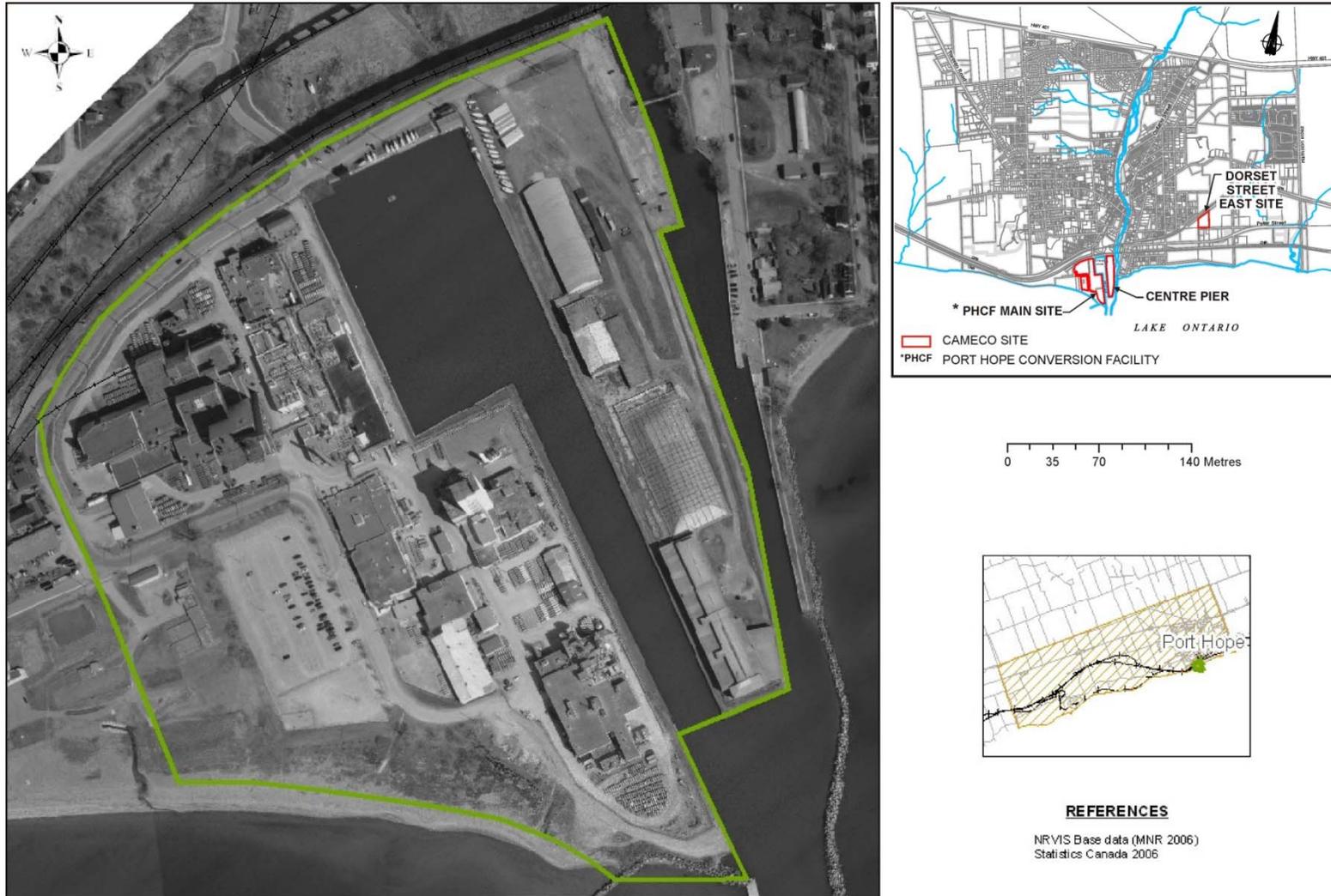


Figure 4 – Port Hope Conversion Facility Site Study Area – Dorset Street East Site

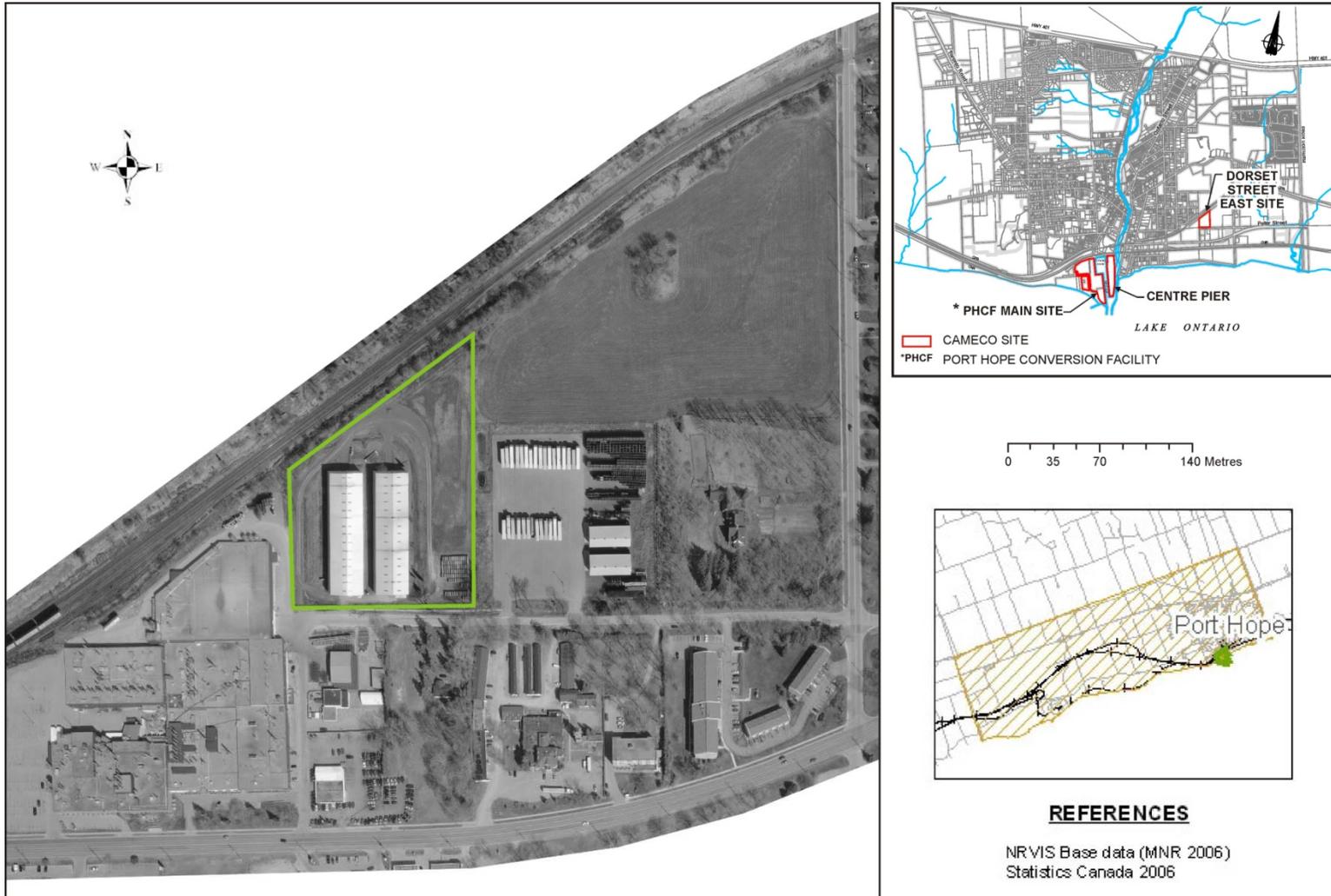
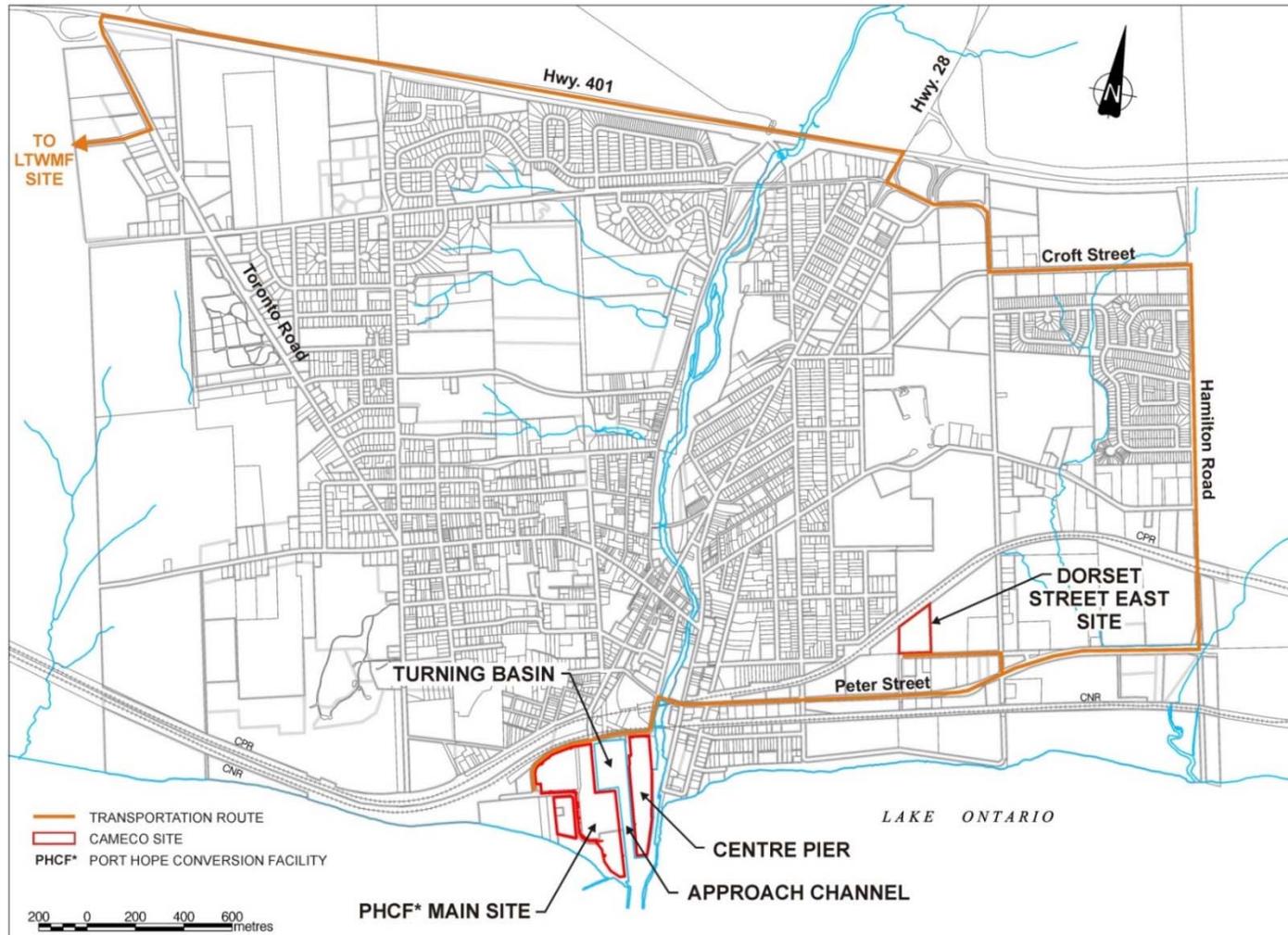


Figure 5 – VIM Transportation Route to LTWMF



2.3 VIM Project Scope

The VIM project is a relatively straight-forward project with distinct boundaries for remediation and defined activities. Specific tasks that will be undertaken as part of the VIM project at the PHCF Main Site, Centre Pier and the Dorset Street East Site include:

- Drums identified to be part of the VIM project (eligible for the LTWMF) will be sent to the LTWMF (including drums at Centre Pier, Cameco's Dorset Street East Site and the PHCF Main Site)
- Fenceline shift in accordance with land-transfer agreements (as shown in Figure 8)
- Parking lot modifications;
- Installation of flood protection barriers which will also provide gamma, noise and visual shielding as needed along the eastern fenceline;
- Improvements to stormwater management infrastructure including installation of new oil-grit separators and upgrades to existing underground piping to prevent groundwater intrusion into the stormwater system;
- Building demolition (Figure 6, illustrated on the redeveloped Main Site):
 - Main Site - Buildings 6, 7, 12, 12A, 14, 15 and 27 tower;
 - Centre Pier Buildings 40, 41, and 43;
- Equipment removal from buildings that will not be demolished:
 - Buildings 2, 5B, 5C and 31
 - Portions of Building 27 that will be repurposed
- Modifying buildings on Main Site:
 - Building 5C improved for CUP and waste management;
 - Building 26 façade improvements;
 - Building 27 repurposed for UO₂ product drum storage and shipping on the ground floor and varied storage on the second floor;
- New Building Construction on Main Site:
 - Building 50B constructed, housing the new waste water treatment facility;
 - Building 66 (Liquid Hydrogen Storage Compound) relocated to south of Building 24;
- Soil remediation for the VIM project on the Main Site is being targeted to specific areas (Figure 7, illustrated on the existing Main Site). The scope is based on modelled improvements to groundwater; and
- Five new pump and treat wells installed.

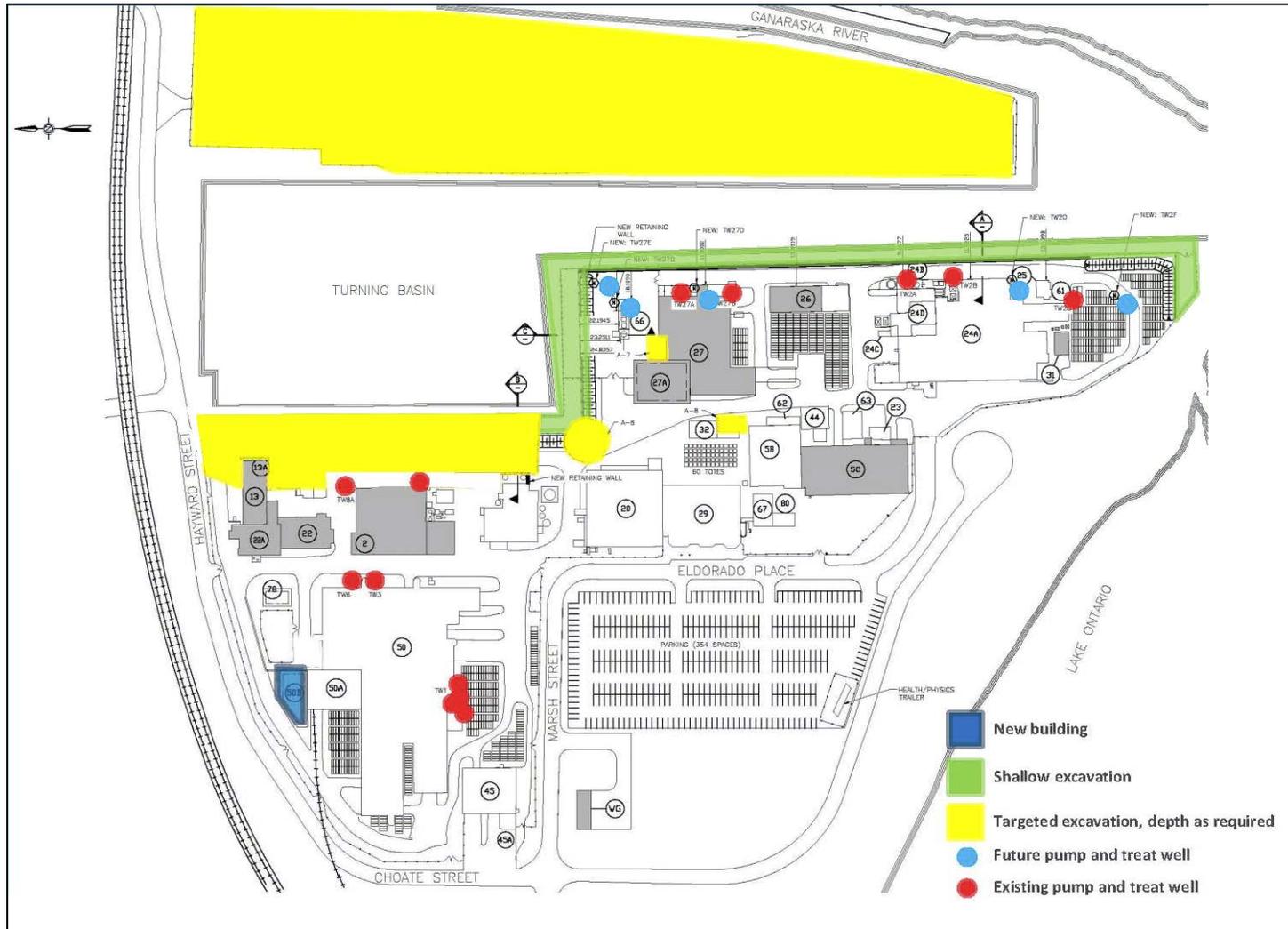
At the completion of the VIM project, Cameco will have successfully reduced the PHCF operational footprint to two licensed properties in the MPH, safely transferred wastes to the LTWMF and markedly improved the environmental performance of the site through the targeted removal of heavily contaminated soils and enhancement of the groundwater treatment system. Complete remediation of the site is not required as part of the VIM project because Cameco will continue to operate the PHCF under a CNSC licence

following the project. This will ensure that appropriate regulatory oversight will be provided to confirm that Cameco continues to safely operate the facility and manage the subsurface contamination. This includes ongoing environmental monitoring, annual reporting of the performance of the groundwater management program, waste management, the periodic review of the ERA, and the periodic review of the facility preliminary decommissioning plan (PDP) and associated financial guarantee.

Figure 6 – Demolition and Construction Plan – PHCF Main Site



Figure 7 – VIM Remediation Plan



2.4 Demolition, Excavation, Construction and Waste Management Activities Carried Out Through the Clean-Up Program

Cameco routinely undertakes projects safely with activities similar to the VIM project. CUP permits Cameco to remove obsolete buildings, equipment and materials for the purpose of reducing environmental obligations, creating useable space and improve the appearance of the facility. Within the licensing period, Cameco progressed several CUP projects that influence the ongoing VIM project planning and include the following:

- SuperCUP 2014 – Additional employees were temporarily transferred to CUP, where they were trained and qualified to remove redundant equipment and clean-up in several buildings on the Main Site. This allowed portions of some of these buildings to be repurposed. Materials removed were processed through the outlets described in the site Waste Management Plan (WMP-01).
- VIM Trial Excavation – In 2015, Cameco carried out a trial excavation on the Main Site, which involved the excavation of two large test pits to collect information regarding subsurface condition characteristics. The information gathered is being used to help define the excavation approach for the VIM project.
- SuperCUP 2015 – Campaign of redundant equipment removal and clean-up of underutilized buildings on the Main Site. Materials removed were processed through the outlets described in WMP-01.
- Centre Pier Demolition 2015 – At the time of this application, Cameco was demolishing the above-grade portions of Buildings 42 and 43A on the Centre Pier. The work will improve the management of radiation, safety and environmental risks associated with the structures.

2.5 Past Remediation Activities at Port Hope Conversion Facility

Following the discovery of subsurface contamination beneath the UF₆ plant in July 2007 and the discovery of subsurface contamination beneath the UO₂ plant in October 2008, Cameco undertook extensive investigations, which indicated that the contamination had moved beyond the building footprints.

Environmental management plans that included soil removal, rehabilitation of the plant and groundwater management to prevent the further movement of contamination from beneath the building footprint were developed to address the subsurface contamination and were implemented in numerous phases between 2008 and 2011. All of these activities were successfully completed and similar activities are included in the VIM project. The data collected as part of an enhanced groundwater and surface water monitoring program continues to demonstrate the effectiveness of these remediation activities.

2.6 Community Support

Cameco employees are proud to be active and responsible members of the communities in which they live, work and play. As a major employer in Northumberland County and a high-profile business, Cameco plays an important role in supporting organizations and community events that contribute to the high quality of life enjoyed in Northumberland County.

Cameco has a mature Public Information Program (PIP) to provide relevant information to the community on how activities at PHCF affect the environment and the health and safety of employees and the community. The program is dynamic and utilizes traditional radio and print media, community forums and open houses, as well as web-based and social media to communicate with the public.

One of the methods Cameco uses to measure the success of its PIP is annual polling of Port Hope residents. Over the past 10 years, support for Cameco's operations has been measured at 80 percent or higher, with the community consistently indicating high levels of trust in the company and employees.

During the Vision 2010 EA, public surveys showed a high level of awareness and support of the Vision 2010 Project. The large majority of respondents who were aware of the project thought that it was "very important" or "somewhat important" for Cameco to undertake this initiative. There was a sense in the community that the Vision 2010/VIM project is needed, will benefit the community, and will help push forward other initiatives to improve the waterfront and the community as a whole.

Since the project was first announced to the public in late 2002, Cameco has recognized the importance of VIM as it relates to municipal and community plans for waterfront redevelopment after the PHAI is completed. Extensive public consultations were involved prior to and during the EA process and Cameco has attempted to accommodate community planning objectives wherever possible.

As the project has evolved, MPH and the public have been kept apprised through presentations to local groups, community forums, newsletters and the FSD website. Cameco will continue to reach out to the community during the relicensing process by making licensing documents publicly available, meeting with key stakeholders and providing additional information through its usual communication vehicles such as community forums, newsletters, the FSD website, advertisements and social media postings.

2.7 Aboriginal Consultation

Cameco is committed to provide opportunities to engage with First Nation and Métis communities regarding the PHCF's ongoing operations and Cameco's VIM project. The

five First Nations identified as potentially being interested in the PHCF licence renewal and the VIM project are:

- Alderville First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island
- Mohawks of the Bay of Quinte
- Curve Lake First Nation

These five First Nations were all identified as being potentially interested in the Vision 2010 (now VIM) project and were notified of public outreach activities and key milestones during the environmental assessment process.

Cameco includes the chiefs (or designate) of the five identified First Nations and the Métis Nation of Ontario (MNO) on our mailing list to ensure that the First Nations and MNO are aware of all community forums and other community events. No concerns were raised regarding Vision 2010 during the previous or current licence period when we reached out to the identified First Nations. Cameco will continue outreach to the local First Nations and MNO throughout the licensing process and subsequent licence period.

As part of our pre-licensing consultation, Cameco will be sending a letter to the identified Aboriginal groups outlining our request for a new licence, significant planned activities and the length of the licence term. The letter will also include an invitation for a meeting. The letter will be followed up to confirm the letter receipt and to confirm whether there is interest in a meeting. Cameco anticipates the letters will be sent during the first quarter of 2016.

3.0 PROJECT SCHEDULE

The preliminary VIM Project Schedule is provided in Figure 8. This schedule is contingent on the PHAI LTWMF being available to receive LLRW in mid-2018. This schedule shows the general timeframe expected for each of the primary tasks outlined in Section 2.3. Also provided in Figure 9 is an illustration outlining some of the the major tasks and changes to the PHCF site over time, such as relocation of cylinder storage and fenceline shifts.

Figure 8 – Preliminary VIM Project Schedule

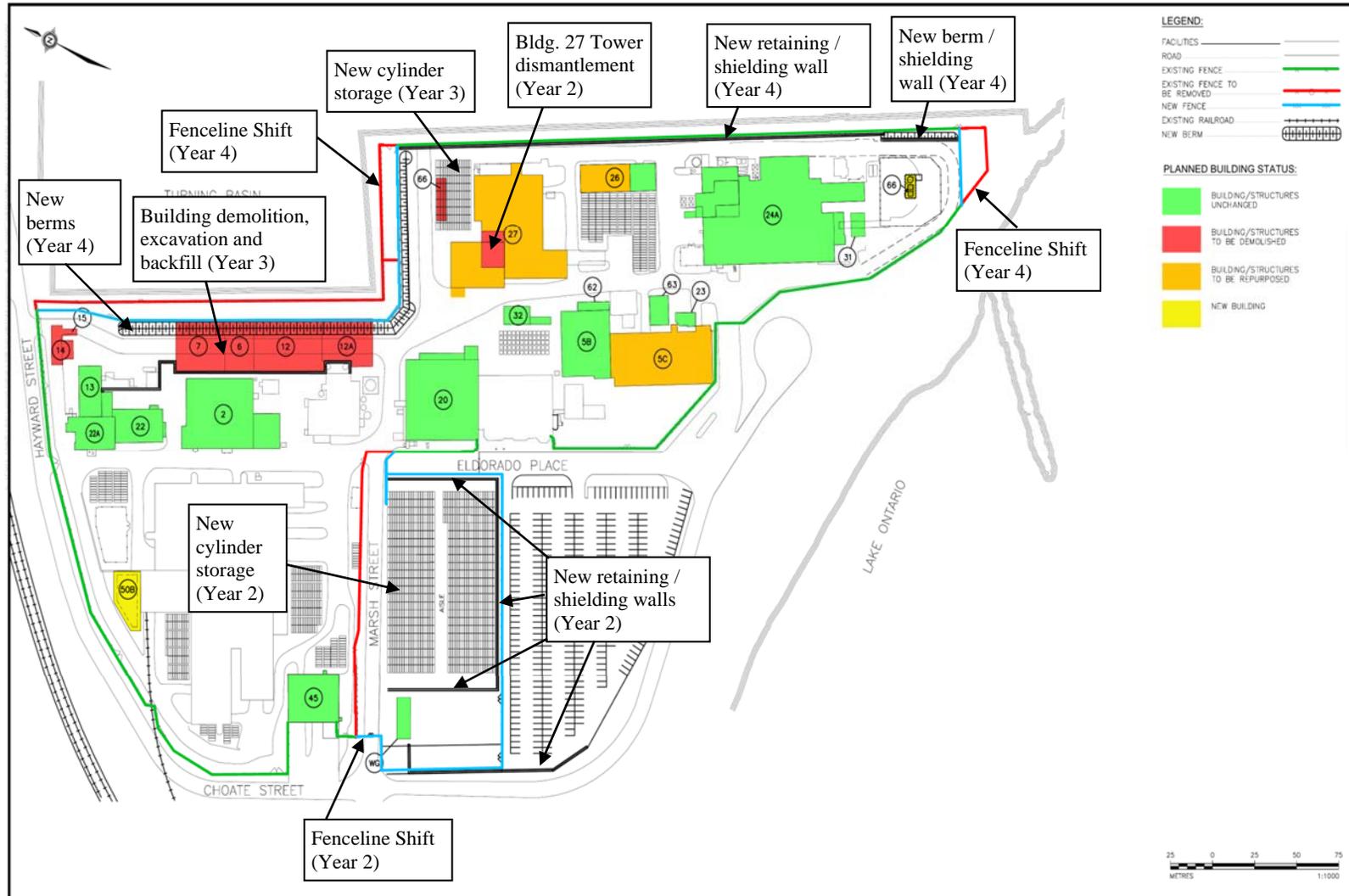
Task Name	2016	2017	2018	2019	2020	2021	Ongoing
Task Name	Year -2	Year -1	Year 1	Year 2	Year 3	Year 4	Ongoing
CNSC Licence for PHCF Renewed		◇					→
LTWMF Opens			◇				
VIM Starts			◇				
SuperCUP 2016-2017							
Main Site Building Demolition and Equipment Removal							
Centre Pier Building Demolition							
Centre Pier Site Transfer to PHAI							
Centre Pier Soil Remediation by PHAI							
Main Site Soil Remediation							
Accumulated Waste Processing							
Site Infrastructure Modifications							
Building Construction and Modifications							
Environmental Monitoring							
Reporting	○ ○	● ○ ○	● ○ ○ ○	● ○ ○ ○	● ○ ○ ○	● ○ ○ ○	● ○ ○ ○

Notes

- ◇ Milestone
- Annual Compliance Report
- Quarterly Compliance Report

- VIM Activities
- Preliminary / Follow-up VIM Activities
- Current CUP Projects
- Preliminary PHAI Activity
- PHAI Activity

Figure 9 – VIM PHCF Site Changes



4.0 PROJECT RESOURCES

Cameco has committed the resources to ensure the successful implementation of VIM. Cameco has the in-house expertise to undertake many of the specific technical tasks associated with the VIM project as well as oversight of contractors.

While resource planning is still in progress, Cameco expects that the majority of work undertaken by this project will be carried out by contractors with Cameco oversight. For example, demolition activities will be undertaken by a contractor with expertise in the demolition of industrial buildings. However, some aspects of the project, such as support services for work execution may be provided by Cameco employees or suitably qualified contractors.

All personnel involved in the project will follow existing site processes for work planning and contractor management to ensure that hazards are identified and that mitigation or controls are in place for radiation protection, health and safety including industrial hygiene, fire protection, environmental protection and quality. Wherever practicable, procedures or work instructions will be developed for frequent activities and existing non-routine work control processes (i.e. JHA, TASC and/or radiation protection work permit) will be used where appropriate to ensure that worker and public safety will be maintained at or above the standard of the current programs. Cameco will ensure that VIM is planned and executed in a safe manner with oversight consistent with the requirements of the facility QMPM.

5.0 REGULATORY FRAMEWORK

Cameco operates under Nuclear Fuel Facility Operating Licence (FFOL-3631.00/2017). Cameco's Licence Renewal Application fully demonstrates the adherence of the PHCF's operations to the *Nuclear Safety and Control Act* (NSCA) and associated regulations. Further, to meet the CNSC's stringent regulatory requirements, Cameco is responsible for implementing and maintaining environmental protection programs that identify, control and monitor all releases of radioactivity and hazardous substances and effects on the environment, including the public, from the PHCF. Cameco maintains programs, plans and procedures as described in the Facility Licensing Manual that meet the regulatory requirements for its on-going operations.

With the current request to specifically provide in the operating licence, the on-going authorization to engage in clean-up, decontamination, demolition and remediation activities (including VIM), this submission provides an overview of how existing programs, plans and procedures encompass these activities, and where project-specific documentation is required.

5.1 VIM Project Regulatory Oversight

The CNSC regulates nuclear facilities and activities in Canada to prevent unreasonable risk to the environment in a manner that is consistent with Canadian environmental policies, acts (including the NSCA) and regulations, and with Canada's international obligations.

Cameco submits quarterly and annual compliance reports to the CNSC which detail the results of the environmental protection programs related to the operations of the PHCF. VIM project specific monitoring will be reported to the CNSC through these reports.

5.2 PHCF Environmental Risk Assessment

The updated ERA to meet the requirements of Canadian Standards Association (CSA) standard N288.6-12, Environmental Risk Assessment at Class I Nuclear Facilities and Uranium Mines and Mills is the most recent ERA completed for the site and includes a screening for contaminants of potential concern, a Human Health Risk Assessment (HHRA), Ecological Risk Assessment and additional studies regarding physical stressors such as temperature and entrainment. This recently completed work has been provided to the CNSC and a summary will be made publically available. The ERA made the following recommendations, which will be taken into consideration during the planning, implementation and follow-up to the VIM project:

- Contamination in the grass patch along the harbour walls needs to be addressed, in coordination with VIM and PHAI;
- Cameco should ensure that decision-making during VIM is risk-informed where appropriate; and,

- Once remediation activities under VIM are complete, Cameco should review its soil monitoring program to ensure that it is adequate for the new conditions.

5.3 Environmental Assessment Reviews

The comprehensive study EA for the Vision 2010 project was completed in 2011 under CEAA. The CNSC was the only Responsible Authority for the project with Federal Authorities including Health Canada, Fisheries and Oceans Canada, and Natural Resources Canada with EC providing technical expertise during the review process. As previously outlined, the CSR was the subject of a CNSC public hearing in May 2012, and the EA for Vision 2010 was accepted by the Federal Minister of the Environment in December 2012.

5.3.1 EA Follow-up Monitoring Program

The preliminary scope of the EA Follow-up Monitoring Program focused on the potential environmental effects of the project, namely airborne particulate, radioactive constituents associated with the particulate (uranium and ^{226}Ra) and noise. Appendix 2 provides the EMP-VIM.

Throughout the VIM and PHAI Port Hope projects, PHCF will carry out its Environmental Monitoring Plan (EMoP) to the extent practicable. Certain aspects of the plan may require partial or full suspension to accommodate the activities of the two projects. Examples include:

- Soil monitoring results during VIM and PHAI will be inconclusive with respect to differentiating the impact of PHCF or VIM activities due to influence from other projects (i.e. PHAI). If the soil monitoring locations in the current program remain accessible, Cameco will continue to collect soil samples on an annual basis, with the caveat that interpretation of the results will not be feasible during this time.
- The surface water monitoring program will be suspended during the period of time that the PHAI has the harbour isolated and is carrying out harbour remediation activities.
- In order to facilitate different parts of VIM, some groundwater wells (monitoring and/or collection wells) may require abandonment or may be inaccessible due to adjacent activity. This may result in temporary deviation from the groundwater monitoring and/or collection programs.

All deviations from the EMoP would be documented in the quarterly compliance reports with an explanation of the rationale, expected timeframe and mitigative measures (if required) that are in place. Section 6.3 provides a summary of the Follow-up Verification or Changes to EMoP related to VIM.

Post-VIM/PHAI, Cameco will re-evaluate the site operations, potential impacts and determine what modifications may be required to the programs, following the guidance of

the applicable standards and regulatory documents listed in the PHCF Licence Conditions Handbook (LCH). These potential changes to the EMoP will require prior notification to CNSC staff.

6.0 PROJECT HAZARDS AND CONTROLS

From an environmental, radiological and health and safety perspective, the activities associated with the tasks described in section 3.0 can be grouped as follows:

- Transfer of accumulated wastes: These activities include the preparation and transfer of drummed and bagged wastes from storage to the LTWMF.
- Demolition activities: These activities include removal of hazardous materials from interiors; removal of equipment, material and building services; cleaning of building interiors; building dismantlement; and management of removed demolition waste.
- Excavation activities: These activities include the targeted removal of soil at both the Main Site and the Centre Pier. The excavation method to be used will depend on the subsurface soil and groundwater conditions, the depth of excavation, and the proximity to facilities. Excavation will include shallow excavations above the groundwater table and excavations that extend to or below the groundwater table.
- Construction activities: These activities include modifications to existing buildings, potential construction of a new building or building addition and upgrades to site infrastructure, such as pipe racks, underground utilities as well as on-site roads, parking, fencing and lighting and finished grading.
- Transportation and disposal of contaminated and non-contaminated materials: Contaminated wastes will be transported to the LTWMF. Non-contaminated waste materials may be transported to other waste outlets. Materials to be transferred to the LTWMF include drummed wastes, contaminated soils, demolition debris, and asbestos-containing material.

The VIM project will be undertaken within the general framework of the programs and plans currently in place at the PHCF, with project-specific documentation put in place where required. From the activities described above, the following Safety and Control Areas (SCAs) may be affected:

- Management System
- Human Performance Management – Training
- Safety Analysis
- Physical Design
- Radiation Protection
- Conventional Health and Safety
- Environmental Protection
- Emergency Management and Fire Protection
- Waste Management
- Security
- Safeguards
- Handling, Storing, Packaging and Transport

- Facility Specific
 - Public Information Program
 - Aboriginal Engagement

6.1 VIM Project - Management Systems

The VIM project will be executed through the existing PHCF CUP (WMP-02) framework and site management system (QMPPM). Consequently the programs and procedures defined in the QMPPM and WMP-02 are applicable to VIM. Planning for CUP projects incorporates an assessment of the relevant safety and control areas. Further discussion is provided in Table 2.

Appendix 2 of this document provides the Supplemental Environmental Monitoring Plan for VIM (EMP-VIM). This plan was developed to augment Cameco's existing EMoP, which monitors the effects of Cameco's on-going operations. The Environmental Monitoring Plan (EMP-VIM) for the VIM project is focused on monitoring for the expected demolition, construction, remediation and radiological effects that are possible as a result of VIM activities and will only be applied for the period of the VIM project.

6.2 PHCF Programs, Plans and Procedures

The following table outlines the existing site documentation that fulfil these requirements, and where applicable, what supplemental plans/assessments may be required.

Table 1: Summary of PHCF Environmental and Health and Safety Programs, Plans and Procedures

Area of Interest	Relevant Site Program/Plan/Procedure	Non-routine Process or Supplemental Plan Required
Management System	The PHCF Quality Management Program Manual (QMPPM) and all requirements therein apply to the VIM project.	N/A
Human Performance Management - Training	No change to existing training measures are needed for this project. The existing training/orientation requirements for this work are defined in WMP-02 and contractor training is managed as per the requirements of the Contractor Safety Management Plan.	Any specialized contractor requirements would be defined through the procurement process, and the appropriate documentation provided for Cameco review and acceptance prior to work commencing.
Safety Analysis	The EA provided a comprehensive assessment of the project and any potential impacts. Additional assessments have been completed as part of the project planning, including a screening-level risk assessment and gamma modelling.	All work will require a Job Hazard Analyses (JHA), procedure or other work instruction that will identify potential hazards and controls for specific tasks within the project.
Physical Design	All CUP-type projects require adherence to the Process and Design Change Control Procedure (CQP-113).	N/A
Radiation Protection	The project work areas have potential for radiation exposure. Radiation protection for employees and contractors involved in the project will follow the current practices described in the Radiation Protection Program Manual (RPPM). All workers with the potential for a dose greater than the public dose limit will be trained and designated as Nuclear Energy Workers (NEWs). All NEW workers will be monitored through the internal and external dosimetry programs described in the RPPM and associated procedures. Other measures described in the RPPM pertaining to zone control, contamination control and work planning are also applicable.	Radiation Protection Work Permits (RPWP) will be issued if specific activities have the potential for increased radiation exposure. A combination of operational controls and limited work duration may be necessary to ensure that the potential dose is kept as low as reasonably achievable.
Conventional Health and Safety	Conventional health and safety, including industrial hygiene will be managed in accordance with the Occupational Health and Safety Management Program Manual and the Contractor	The following risk mitigation tools may be used to augment the JHA and TASC assessments to ensure work is completed as safely as possible.

Area of Interest	Relevant Site Program/Plan/Procedure	Non-routine Process or Supplemental Plan Required
	Safety Management Plan. Activities under the VIM project will require the use of procedures, work instructions, JHA and/or Task Analysis Safety Card (TASC) assessments to identify and manage potential hazards.	<p>The specific risk mitigation tool requirement(s) for each will be determined during the development and approval of the JHA for each job.</p> <ul style="list-style-type: none"> - Notification and Safety Clearance - RPWP - Confined Space Entry Permit - Hot Work Permit - Safety Clearance for High Voltage Equipment and Hazardous Electrical Work - Exception to Zero Energy State Permit - Excavation Permit
Environmental Protection	The existing EMoP is primarily designed to monitor the ongoing impacts of the current production operations. While ambient monitoring programs will continue, and will provide data that may be relevant to the project, supplemental monitoring will be required that is appropriate to the project tasks. Existing operational controls such as designated processing areas with emission and noise controls, and contamination control practices will support the environmental protection aspects of the project.	A supplemental EMP for VIM will be implemented during the VIM project. This plan outlines monitoring appropriate to specific activities and is not intended to be applied in its entirety for the duration of the project, rather used to define the specific monitoring parameters (i.e. ambient air and acoustical measurements) to be applied to each work package.
Emergency Management and Fire Protection	No change to existing emergency preparedness measures are needed for this project. The existing Emergency Response Plan, Fire Safety Plan and Fire Protection Plan and associated work controls such as hot work permits will be used to prevent and/or mitigate an emergency during the project.	Project sequencing will take into consideration accessibility for the emergency response vehicles to different areas of the facility during VIM to ensure that areas of the facility are not isolated/stranded.
Waste Management	All materials removed during the VIM project will be processed in accordance with WMP01 – Waste Management Plan and WMP02 – Clean-Up Program. This will involve segregation at source (where practical) into recyclable,	Special handling is required for wastes identified to contain depleted uranium or enriched uranium; to be polychlorinated biphenyl (PCB)-contaminated; and asbestos or other hazardous



Area of Interest	Relevant Site Program/Plan/Procedure	Non-routine Process or Supplemental Plan Required
	contaminated combustible, contaminated non-combustible and uncontaminated waste. Processing of materials will occur in designated areas. The VIM project includes transfer of materials meeting the WAC to the LTWMF being constructed by the PHAI.	material (ie. hydrogen fluoride) –containing. Any of these wastes would be segregated and managed as per the WMP-01.
Security	The security of the licensed site will be maintained as per the Facility Security Plan for the duration of the project.	Temporary deviations from existing security measures (i.e. during fence line shift or licence transfer of Centre Pier) will be completed in a manner to ensure an equivalent measure of security.
Safeguards	All transfers of stored wastes and/or wastes generated during the VIM project will be managed in accordance with Cameco's existing safeguards practices, including inventory and reporting as per RD-336 Accounting and Reporting of Nuclear Material.	N/A
Handling, Storing, Packaging and Transport	Existing site procedures for handling, storing, loading, transporting and receipt of nuclear substances and other dangerous goods are sufficient to cover the aspects of this project.	N/A
Facility-Specific	The tools within the Public Information Program for the facility are sufficient to provide ongoing information to interested members of the public as well as outreach to First Nations, municipal officials and other key stakeholders.	N/A

6.3 VIM Hazards and Mitigation

The VIM specific plans that will be developed to guide VIM specific activities include:

- environmental monitoring plan (EMP-VIM) (Appendix A); and
- building-specific equipment removal and demolition plans

Table 2 provides a summary of the potential environmental effects (hazards) associated with the VIM Project and commitments to mitigate the effects as identified in the CSR for the Vision 2010 Project. A summary of any VIM monitoring will be included in Cameco's quarterly and annual compliance reports.

Table 2: Summary of Potential Environmental Hazards and Mitigation for the VIM Project

Potential Environmental Effects (Hazards)	Project Activities	Mitigation and Monitoring During VIM	Follow-up Verification or Changes to EMoP
Radiation and Radioactivity - Potential public and worker exposure to elevated dose levels	On-going site activities (totes, drums and cylinder storage)	<ul style="list-style-type: none"> a. soil berm or concrete barrier b. fenceline gamma monitoring (ongoing) c. worker dosimetry program 	1. Post-VIM follow-up fenceline gamma monitoring and final report to confirm effectiveness
Air Quality - Generation of airborne particulate and associated contaminants of concern	Demolition, soil excavation and construction activities	<ul style="list-style-type: none"> a. employing effective dust mitigation techniques b. ensuring that all mobile equipment used on site is in good repair c. air monitoring as part of EMP-VIM 	1. Soil monitoring program scope and objectives to be reviewed post-VIM and deposition during the project should be considered.
Air Quality - Generation of airborne particulate and vehicle exhaust	Transportation activities	<ul style="list-style-type: none"> a. ensuring that all dump trucks travelling to and from the PHCF site are in good repair and fitted with functioning mufflers b. dump trucks will be appropriately covered when transporting contaminated soils 	N/A – only applicable during project.
Noise - Elevated levels at sensitive receptors	Demolition activities	<ul style="list-style-type: none"> a. prohibiting the use of explosives b. limiting demolition activities to daytime hours to the greatest extent possible c. ensuring that all mobile equipment used on site is in good repair, fitted with functioning mufflers and comply with the noise emission standards outlined in MOECC guidelines d. ensuring that all dump trucks travelling to and from the PHCF site are in good repair and fitted with functioning mufflers e. complying with the time and place restrictions stipulated for construction activities in the local noise by-law f. noise monitoring as part of EMP-VIM 	N/A – only applicable during project.
	Excavation activities	<ul style="list-style-type: none"> a. limiting excavation activities to daytime hours to the greatest extent possible 	N/A – only applicable during project.

Potential Environmental Effects (Hazards)	Project Activities	Mitigation and Monitoring During VIM	Follow-up Verification or Changes to EMoP
		<ul style="list-style-type: none"> b. ensuring that all mobile equipment used on site is in good repair, fitted with functioning mufflers and comply with the noise emission standards outlined in MOECC guidelines c. complying with the time and place restrictions stipulated for construction activities in the local noise by-law d. noise monitoring as part of EMP-VIM 	
	Construction activities	<ul style="list-style-type: none"> a. ensuring that all mobile equipment used on site is in good repair, fitted with functioning mufflers and comply with the noise emission standards outlined in MOECC guidelines b. limiting construction activities to daytime hours, to the greatest extent possible c. maximizing the separation distance between the construction staging areas and nearby receptors to the greatest extent possible d. maintaining on-site construction haul roads to prevent pot holes and ruts thereby avoiding the loud noises caused by construction vehicles travelling over uneven road surfaces e. complying with the time and place restrictions stipulated for construction activities in the local noise by-law f. noise monitoring as part of EMP-VIM 	N/A – only applicable during project.
	Transportation of waste	<ul style="list-style-type: none"> a. ensuring that all dump trucks travelling to and from the PHCF site are in good repair and fitted with functioning mufflers b. limiting on-site truck traffic to daytime hours to the greatest extent possible 	N/A – only applicable during project.
Surface Water Quality - Runoff during storm events - also protects aquatic habitat	Demolition and excavation activities	<ul style="list-style-type: none"> a. construction of diversion dykes to channel runoff around the excavation areas b. covering of stockpiles and excavated soil with secured tarps or plastic sheeting during significant storm events c. placing sand bags, water-filled bags or equivalent to prevent surface water escape 	1. Stormwater and surface water monitoring programs to be re-evaluated post-VIM.

Potential Environmental Effects (Hazards)	Project Activities	Mitigation and Monitoring During VIM	Follow-up Verification or Changes to EMoP
		<ul style="list-style-type: none"> d. allowing surface water inside disturbed work areas to drain to open excavations to be collected for treatment, as required e. protecting catch basin inlets using filter fences, geotextiles or an excavated sediment trap f. implementing of velocity controls and temporary water holding areas g. flood diversion capability through emergency response plan 	
Sediment Quality - Runoff during storm events - also protects aquatic habitat	Demolition, excavation and construction activities	During severe precipitation events, the following may be implemented to restrict work: <ul style="list-style-type: none"> a. evaluating the safety of haulage to the LTWMF b. evaluating the excavation along the harbour wall and securing equipment and materials, if necessary c. covering stockpiles to minimize runoff d. covering all bins and roll-off containers e. filling excavations in advance, if possible, when flood warnings are given f. flood diversion capability through emergency response plan 	N/A – only applicable during project.
Groundwater	On-going operation	<ul style="list-style-type: none"> a. contaminated soil remediation; b. installation of five new groundwater treatment wells c. groundwater monitoring program d. water treatment through waste recovery e. potential treatment and release of treated groundwater 	<ol style="list-style-type: none"> 1. Groundwater treatment system risk-based performance objectives to be developed and implemented. 2. Groundwater monitoring program to be reviewed and revised where appropriate to assess (annually) objectives from 1.
Severe Precipitation and Climate Change	Excavation activities	<ul style="list-style-type: none"> a. improvements to storm water management, (i.e. grit separators) 	<ol style="list-style-type: none"> 1. Storm water control study to be completed post-VIM to establish a new baseline.

Potential Environmental Effects (Hazards)	Project Activities	Mitigation and Monitoring During VIM	Follow-up Verification or Changes to EMoP
		b. adaptive mangement (review stormwater management capacity if severe storm intensity have increased in severity due to climate change) c. flood diversion capability through emergency response plan	2. Stormwater monitoring program to be reviewed and revised where appropriate based on 1.
Malfunctions and Accidents	Contaminant spill resulting in harbour contamination	a. existing plans and proceedures for safe operations b. spill containment practices c. emergency response plan d. event-specific sample collection and analysis	N/A – only applicable during project.
	Release of anhydrous HF (AHF), UF ₆ or other hazardous material during removal of piping and equipment	a. existing plans and procedures for safe handling of hazardous materials b. project specific plans including: <ul style="list-style-type: none"> i. dismantlement, decontamination and demolition plan ii. safety clearances for hot work iii. adequate training and use of personal protective equipment (PPE) iv. sequencing of demolition and equipment removal activities v. portable fume collection c. spill containment practices d. emergency response plan e. event-specific sample collection and analysis	N/A – only applicable during project.
	Transportation accident involving release of uranium into the Ganaraska River	a. existing plans and procedures for the safe handling of these materials b. spill containment c. emergency response plan d. event-specific sample collection and analysis	N/A – only applicable during project.

Following VIM, the following facility assessments will need to be updated to reflect the changes to the facility:

1. Safety Report
2. Environmental Risk Assessment
3. Preliminary Decommissioning Plan
4. Emission Summary Dispersion Model Report
5. Derived Release Limit and Operating Release Levels

The results of this work will then need to be incorporated into the Environmental Management Program and the EMoP modified as necessary. It is anticipated that the following aspects of the EMoP may require changes post-VIM:

1. Ambient air monitoring
2. Soil monitoring
3. Groundwater monitoring
4. Surface water monitoring
5. Stormwater monitoring
6. Fenceline gamma monitoring

7.0 CONCLUSION

Upon completion of the project scope, the following will be accomplished:

- Waste materials at the PHCF within the defined remediation scope will have been transferred to the LTWMF (or other waste outlets as appropriate).
- New or modified infrastructure will have been commissioned as needed to support the project objectives for building modifications and new infrastructure.
- The environmental objectives of the project will have been achieved.
- Improvements to the PHCF, which are consistent with the community planning objectives for development of the lands around the Port Hope harbour will have been completed, including the transfer of the Centre Pier property back to the MPH.

The VIM project will be executed within the CUP program framework which permits Cameco to remove obsolete buildings, equipment and materials for the purpose of reducing environmental obligations, creating useable space and improve the appearance of the facility. As described in sections 2.4 and 2.5 Cameco has demonstrated the robustness of this program in recent years through the safe completion of CUP projects with activities similar to the VIM project.

As part of licence renewal activities occurring in 2016, Cameco requests that the operating licence for the PHCF specifically provide the authorization through a site-specific licence condition for PHCF to engage in clean-up, decontamination, demolition and remediation activities (including VIM) that are currently part of the licensing basis through the Facility Licensing Manual, Waste Management Plan and Clean-Up Program.

8.0 REFERENCES

Canadian Nuclear Safety Commission. 2012. *Proposed Comprehensive Study Report for Cameco Corporation's Proposed Redevelopment of the Port Hope Conversion Facility (Vision 2010)*; CEAR 06-03-22672. May.

Cameco Corporation. 2010. *Cameco Vision 2010 Environmental Impact Statement – December 2010*

ERA Documents

SENES Consultants Limited. 2009a. *Port Hope Conversion Facility Site-Wide Risk Assessment: Human Health and Ecological Risk Assessment*. Prepared for Cameco Corporation.

SENES Consultants Limited. 2009b. *UPDATE - Port Hope Conversion Facility Site-Wide Risk Assessment: Human Health and Ecological Risk Assessment*, Prepared for Cameco Corporation.

SENES Consultants Limited. 2010. *Follow Up – Port Hope Conversion Facility Site-Wide Risk Assessment: Human Health and Ecological Risk Assessment*. Prepared for Cameco Corporation.

Arcadis Canada Inc. 2015. *Environmental Risk Assessment for the Cameco Port Hope Conversion Facility*. Prepared for Cameco Corporation.

Appendix 1 – List of Acronyms Used in the Supplemental VIM Submission

Cameco	Cameco Corporation
CEAA	<i>Canadian Environmental Assessment Act</i>
CNL	Canadian Nuclear Laboratories
CNSC	Canadian Nuclear Safety Commission
CSA	CSA Group - internationally-accredited standards development and testing & certification organization
CSR	Comprehensive Study Report
CUP	Clean-Up Program
EA	Environmental Assessment
EC	Environment Canada
ECA	Environmental Compliance Approval
EIS	Environmental Impact Statement
EMoP	Environmental Monitoring Plan
ERA	Environmental Risk Assessment
FFOL	Fuel Facility Operating Licence
HF	Hydrogen fluoride
HHRA	Human Health Risk Assessment
JHA	Job Hazard Analysis
LCH	Licence Conditions Handbook
LTWMF	Long-term waste management facility
MOECC	Ontario Ministry of the Environment and Climate Change
NEW	Nuclear Energy Worker
NSCA	<i>Nuclear Safety and Control Act</i>
PCB	Polychlorinated biphenyl
PHAI	Port Hope Area Initiative
PHCF	Port Hope Conversion Facility
PIP	Public Information Program
QMPM	Quality Management Program Manual
RPPM	Radiation Protection Program Manual
SCA	Safety and Control Area
Centre Pier	Property at 1 Hayward Street used for storage
PHCF Main Site	Property at 1 Eldorado Place used for operations and storage

Dorset Street East	Property at 158 Dorset Street East used for storage
UO ₃	uranium trioxide
UO ₂	uranium dioxide
UF ₆	uranium hexafluoride
VIM	Vision in Motion Project
VIM EMP	Vision in Motion Environmental Monitoring Plan
WAC	Waste Acceptance Criteria
WMP-01	Waste Management Plan
WMP-02	Clean-Up Program