

# Record of Proceedings

In the Matter of

Applicant Cameco Corporation

Subject Mid-term Performance Report on the Operation  
of the Cameco Corporation's Port Hope Uranium  
Conversion Facility

Date May 18, 2005

**RECORD OF PROCEEDINGS**

Applicant: Cameco Corporation

Address/Location: Cameco Corporation, One Eldorado Place,  
Port Hope, Ontario, L1A 3V1

Purpose: Mid-term performance report on the operation of the Cameco Corporation's Port Hope Conversion Facility

Application received: N/A

Date(s) of hearing: February 23, 2005

Location: Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario

Members present: L.J. Keen, Chair      A.R. Graham  
C.R. Barnes      M. J. McDill  
J.A. Dosman      M. Taylor

General Counsel: J. Lavoie  
Secretary: M.A. Leblanc  
Recording Secretary: C. Taylor

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<b>Intervenors</b>	<b>Document Number</b>
See appendix A	

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## 1. Introduction

Cameco Corporation (Cameco) is licensed by the Canadian Nuclear Safety Commission (CNSC<sup>1</sup>) to operate a uranium conversion facility in the Municipality of Port Hope, Ontario. The Port Hope Uranium Conversion Facility (the facility) forms an intermediate step in the nuclear reactor fuel cycle. The facility is designed to convert uranium trioxide (UO<sub>3</sub>) supplied by Cameco's uranium refinery in Blind River, Ontario into either natural uranium dioxide (UO<sub>2</sub>) or uranium hexafluoride (UF<sub>6</sub>). UO<sub>2</sub> is used in the manufacture of natural uranium fuels (used in CANDU reactors in Canada). UF<sub>6</sub> is used in the manufacture of enriched uranium fuels. The facility has a licensed annual production capacity of 12,500 tonnes of uranium as UF<sub>6</sub>, 2,800 tonnes of uranium as UO<sub>2</sub>, and 2,000 tonnes of uranium as metal.

Following a public hearing held on November 15, 2001 and January 17, 2002, the Commission issued Nuclear Fuel Facility Operating Licence FFOL-3631.0/2007 to Cameco for the operation of the facility for a five-year period. In its *Record of Proceedings, Including Reasons for Decision*<sup>2</sup>, the Commission requested that CNSC staff prepare a report on the performance of the facility at the approximate mid-point in the five-year licence term. The Commission required that the mid-term report address the overall performance of the licensee and the facility with respect to the protection of the health and safety of persons, the environment and the maintenance of national security and measures required to implement international obligations to which Canada has agreed. The Commission further required that the mid-term report be presented at a public proceeding of the Commission and that it be made available in advance of that proceeding so that the licensee and the public would have an opportunity to provide the Commission with comments on the report.

The Commission did not consider at this public hearing any information presented on Cameco's proposal to install a Slightly Enriched Uranium (SEU) blending unit to the facility. SEU is not part of the current operation evaluated for the mid-term report. If Cameco proceeds with its application for SEU, the matter will come before the Commission at future proceedings.

## 2. The Public Hearing Process

The public hearing on the mid-term report was held on February 23, 2005 in Ottawa, Ontario and was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*. While the hearing was held in the CNSC Hearing Room in Ottawa, a number of intervenors and observers were able to participate from Port Hope, Ontario via teleconference and videoconference.

This *Record of Proceedings* contains a summary of issues and information presented by the participants during the course of the hearing, as well as the views of the Commission where

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<sup>1</sup> In this *Record of Proceedings*, the *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.

<sup>2</sup> Canadian Nuclear Safety Commission, February 18, 2002, *Record of Proceedings, Including Reasons for Decision, in the matter of Cameco Corporation, Application for a Licence to Operate the Port Hope Nuclear Fuel Facility*.

appropriate. The official record of each submission to the Commission is contained in the written submissions listed in Appendix A and in the transcripts of the hearing. The mid-term report was presented for information and the Commission was not required to make, and did not make, a licensing decision following the hearing.

#### Requests for Postponement:

A number of intervenors requested that the hearing be postponed because of what they considered to be a lack of information in the mid-term report prepared by the CNSC staff (CMD 05-H5). Those intervenors were of the view that the CNSC staff report did not meet the aforementioned requirements specified by the Commission, including sufficient specific information on the performance of the facility that would allow for informed public comment. Prior to the commencement of the public hearing on February 23, 2005, a Panel of the Commission considered the above-noted requests for postponement and decided not to accede to those requests<sup>3</sup>. Furthermore, the Commission decided not to accept a request made during the course of the hearing by an intervenor to reconsider that earlier Panel decision. The Commission noted that it would consider all of the information presented during the public hearing from all participants as constituting the report to the Commission on the performance of the facility.

#### Hearing Venue:

A number of intervenors expressed concern and disappointment that the hearing was not being held in the Municipality of Port Hope and requested that the venue be changed to Port Hope. That request was also considered by the above-noted Panel of the Commission and the Panel decided that the hearing would be held in Ottawa as planned.

The Commission notes that it had earlier intended to take the opportunity to hold the mid-term report hearings in Port Hope in conjunction with a hearing on the environmental assessment of Cameco's proposed Slightly-Enriched Uranium (SEU) blending circuit. The Commission stated that it will hold the hearing on the SEU proposal in Port Hope if the matter proceeds. Due to delays in the SEU project assessment, the Commission could not further delay the hearing on the mid-term performance reports on the existing operations. Furthermore, logistical and financial considerations prevented the Commission from holding both the mid-term and SEU project hearings outside of Ottawa at different times. Presentations on mid-term reports are normally held in Ottawa, as are the majority of licensing hearings. To facilitate the involvement of Port Hope residents in the proceedings, the Commission made provisions for the people of Port Hope to intervene and observe the proceedings by videoconference.

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<sup>3</sup> Canadian Nuclear Safety Commission, January 5, 2005, *Record of Proceedings, Ruling on Requests from Intervenors for the Deferral of Hearings and the Relocation of the Hearings in Port Hope Concerning the Mid-Term Reports of Cameco's Port Hope Facility and Zircotec Precision Industries*

#### Other Relevant Proceedings:

The Commission also held on February 23, 2005, a public hearing on the mid-term performance of another nuclear fuel facility located in the Municipality of Port Hope. That facility, operated by Zircatec Industries Ltd., uses the products from the Cameco Uranium Conversion Facility to manufacture reactor fuels. The Commission renewed the operating licence for the Zircatec facility in 2002 at approximately the same time as it renewed the operating licence for the Cameco facility. In its decision on the Zircatec licence renewal in 2002<sup>4</sup>, the Commission made a similar request of CNSC staff for a mid-term performance report on Zircatec's operation.

Because the two facilities are located in the same geographic area, and recognizing the interest many of the intervenors have in both facilities, the Commission decided to hold both hearings on the mid-term reports on the same day and to consider for both hearings any relevant information presented on either hearing record.

### **3. Issues and Commission Views**

In reviewing Cameco's mid-licence performance in the operation of the Port Hope Uranium Conversion Facility, the Commission considered the information presented by CNSC staff, Cameco and all other hearing participants on a variety of issues related to Cameco's qualifications to carry out the activities permitted under the licence, and to the adequacy of the measures Cameco has in place to protect the environment, the health and safety of persons, national security and international obligations to which Canada has agreed. The Commission's views on those issues are summarized below.

#### **3.1 Radiation Protection**

##### **3.1.1 Worker Protection:**

With respect to the protection of the workers at the facility from the effects of radiation, CNSC staff stated that, in its assessment, Cameco's overall performance in the first half of the licence period has been satisfactory. CNSC staff reported that:

- worker dose rates have remained well below the regulatory limits;
- Cameco has investigated and taken appropriate and timely corrective action on each occasion that an Administrative Control Level<sup>5</sup> was exceeded;
- Cameco successfully developed and instituted a new internal dose assignment program in accordance with the requirements of the CNSC Regulatory Transition Plan; and

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<sup>4</sup> Canadian Nuclear Safety Commission, February 18, 2002, Record of Proceedings, Including Reasons for Decision, in the matter of Zircatec Precision Industries Inc., Application for a Licence to Operate the Port Hope Nuclear Fuel Facility

<sup>5</sup> Administrative Control Levels are set well below the regulatory limits and are used to help identify possible breakdowns in control measures so they may be rectified before more significant doses occur.

- Cameco has taken, or is in the process of planning, appropriate corrective actions to address deficiencies in its radiation protection program that were identified by CNSC inspectors during the review period.

In response to the Commission's questions on the above-noted deficiencies, CNSC staff reported that the issues primarily related to aspects of respiratory protection, training, and the establishment and use of dose targets. On elaboration, CNSC staff stated that Cameco has taken effective action to reduce worker exposures using engineering and process design measures, but needs to focus more on the worker awareness and behavioural aspects of the ALARA (as low as reasonably achievable) requirement. CNSC staff added that Cameco is making significant progress in addressing these issues. Cameco, in its submissions, acknowledged the deficiencies noted by CNSC staff and added that it is currently focussing its improvement efforts in areas where the highest worker doses are being recorded. Cameco also considers that it has made substantial progress in its radiation protection training and in the updating of its radiation protection documentation and manuals.

#### 3.1.1.1 Radiation Incidents:

With respect to radiation incidents that occurred at the facility during the review period, Cameco described an event in 2002 where a worker inhaled a quantity of UO<sub>2</sub> powder. As a consequence, the worker was placed on temporary restricted status to limit further exposure and corrective action was taken to prevent similar events from occurring in the future. CNSC staff expressed its satisfaction with Cameco's response to the event. The affected worker returned to work following appropriate safety and medical assessments.

An intervenor expressed concern over what he understood to be a criticality accident at the facility and sought information on the condition and treatment of the affected worker(s). In response to the Commission's questions on this intervention, Cameco and CNSC staff confirmed that no criticality accidents have occurred at the facility in its history.

#### 3.1.1.2 Availability of Dose Records:

Some intervenors expressed concern about the above-noted radiation protection deficiencies and incident and recommended that the dose records be made available to the individual workers at least on an annual basis.

In their interventions, the representatives of the worker unions at the facility noted that the workers are given full access to all studies, reports and test data related to their occupational health and exposures. The union representatives attested to the high level of attention paid by Cameco to radiation protection.

#### 3.1.1.3 Commission Views on Worker Radiation Protection:

Based on the information summarized above, the Commission is satisfied with Cameco's performance in worker radiation protection during the mid-term review period. The Commission expects Cameco will continue to resolve the remaining issues raised by CNSC staff in a timely

manner. The Commission will examine the status of those issues at the time the next application for renewal of the licence comes again before the Commission.

### **3.1.2 Public Radiation Protection:**

The Commission received information during the hearing on a wide range of topics related to existing and potential public exposures to radiation emitted from Cameco's operations.

The Commission notes that the matter of public radiation protection is closely related to environmental protection. Therefore, section 3.2 below contains an additional discussion of Cameco's performance in regard to broader human and environmental health issues, including from both radiological and non-radiological emissions and effluents.

CNSC staff reported that Cameco's performance in protecting the public from radiation has remained acceptable and within the regulatory dose limit of 1 mSv/year. CNSC staff reported that, based on conservative projections, the radiation doses to the public remain a small fraction of the regulatory public dose limit (e.g., for the year 2002, the maximum projected dose to the most exposed individual was 0.069 mSv or 6.9% of the 1 mSv/year dose limit).

In response to this assessment by CNSC staff, several intervenors expressed concerns about the adequacy of the regulatory limits and action levels, the quality and reliability of the radiological emissions and environmental monitoring data used in the calculations of personal exposures, and the methods used by the CNSC to assess the effects of exposures (modelled projections as opposed to direct measurement through health studies). These issues are discussed further in this section and in section 3.2 (Environmental Protection).

#### **3.1.2.1 Regulatory Dose Limits and Action Levels:**

A number of intervenors were critical of the risk assessments used by the International Commission on Radiation Protection (ICRP) on whose recommendations the CNSC has based its regulatory public dose limit of 1 mSv/year. Some of those intervenors cited other scientific reports and opinions that they consider support their view that the CNSC's dose limits should be lowered by a factor of ten or more. The intervenors' submissions (see Appendix A) and the transcripts of the hearing contain further details on the arguments presented and the specific reference materials cited.

In response to these submissions, CNSC staff noted it has copies of the studies cited by the intervenors and that it reviews such material in the context of the CNSC's ongoing review of the international work on radiation risk assessment and protection standards.

In explaining the regulatory dose limits, CNSC staff noted that, for added safety, nuclear facilities in Canada are not permitted to operate at or near these limits. CNSC staff explained that, through the application of various engineered and administrative controls under the ALARA principle, licensees, including Cameco in Port Hope, are required to operate at a small fraction of the dose limit. By using conservative exposure pathways analyses in translating the



dose limits into Derived Release Limits for a nuclear facility, a further margin of safety is introduced.

In a related discussion of the regulatory radiological release Action Levels, some intervenors, upon comparing the Action Levels established for the Cameco facility in Port Hope with those set for the Ontario power reactor facilities, questioned why it appears the CNSC is willing to accept higher public radiation exposures in Port Hope than elsewhere at other major nuclear facilities. Some intervenors expressed the view that the affected community should determine what levels of risk are tolerable, rather than having those risks assessed by the regulator.

In response to these questions and concerns, CNSC staff explained that Action Levels help control where within the above-note small fraction of the dose limit a licensee should reasonably be able to operate. Approaching or exceeding an Action Level provides an early indication of where control measures may be breaking down and need attention. CNSC staff noted that because the materials and processes used in different types of facilities vary, so will the specific Action Levels assigned to individual facilities. Despite that variation, the CNSC does not permit any nuclear facility to release radiation or radioactivity at levels that would pose a significant risk to persons.

In related comments, a number of intervenors expressed concern over the fact that there are no specific safety guidelines or standards for uranium in air that would help them judge the acceptability of the levels present in the air in Port Hope. In this regard, CNSC staff stated that it uses the above-described Derived Release Limits, Action Levels and ALARA practices to ensure worker and public doses are maintained as low as reasonably achievable below any standards.

Commission's Views on the Dose Limits and Action Levels:

The Commission is satisfied that regulatory public dose limits and the facility-specific Action Levels provide an acceptable basis for measuring Cameco's performance in public radiation protection.

The Commission notes that CNSC staff actively monitors the evolving science that forms the basis of the international recommendations on the assessment and regulation of radiological risk. A detailed review of the regulatory dose limits is not within the scope of the current hearing.

3.1.2.2 Adequacy of the CNSC Public Dose Assessment Method:

A number of intervenors were critical of how the CNSC estimates the actual radiation exposures that are being received by the public. In general, these intervenors are concerned that the CNSC bases its assessments too much on theoretical modelling projections and not enough on measurements of radioactivity and radiation exposures of the public in their actual environment, including the combined exposures from the historic radioactive contamination in the area from when the site was operated by Eldorado Nuclear.

Many intervenors are not satisfied that the monitoring of emissions and effluents from the facility is sufficient to characterize the source of the continuing releases to their environment.

Several intervenors also questioned the reliability of the meteorological data used by CNSC to predict how radioactivity from the current operation is dispersed in the environment, both within Port Hope and in neighbouring municipalities, and how it is combining with the historic contamination in the area. In related comments, intervenors expressed concern that electromagnetic fields near electrical transmission lines may be adversely skewing the CNSC measurement of radioactivity in the environment to which people could be exposed. Furthermore, many intervenors are of the view that systematic health studies should be conducted on the residents of Port Hope to measure and establish a baseline on the actual, rather than projected effects that all radiological and non-radiological contamination from the past and current nuclear operations in the area is having on the health of the people.

In response to these comments on the radiation risk assessment methodology, CNSC staff noted that the CNSC's primary tool for assessing public radiation risk involves the use of a conservative critical group modelling assessment (i.e., a method that is conservatively designed to overestimate, rather than underestimate what the actual public exposures would be). This is a method that assumes a theoretical group of people, including particularly sensitive types of individuals such as children, that is maximally exposed to the radiological releases through a variety of potential environmental pathways. CNSC staff also stated that the radiological risks are examined in relation to any historic radiological contamination in the area. From this assessment, the monitoring of the workers in the plant who are typically exposed to higher internal and external doses, and strategic sampling within the actual environmental pathways (e.g., ambient air quality monitoring), CNSC staff concluded that the Cameco facility does not pose a significant radiation risk to the public.

The Commission notes the role of, and requirement for, appropriate monitoring of contaminants in the environment to validate the conservatism in exposure predictions, mark trends and identify opportunities for further minimizing exposures to people and the environment. The specific issues raised by the intervenors on the release, dispersal and measurement of radioactivity in the environment are clearly linked to an understanding and validation of public radiation exposure and are discussed in section 3.2 below in the context of environmental protection. Similarly, the discussion of health studies, due to its broad environmental, radiological and non-radiological focus, is also discussed below in the context of environmental protection. Refer also to section 3.11 below (Public Information Program) for a discussion of the Commission's views on the importance of providing meaningful information to the public on the amounts, forms and distribution of radiation and radioactivity, and other types of potentially harmful contaminants being released into their environment.

#### Commission's View on the Public Dose Assessment Method:

The Commission accepts that the risk-informed assessment method described by CNSC staff is the appropriate means for assessing public radiation risk. The Commission is also satisfied that CNSC staff has properly applied that method in assessing Cameco's performance against the regulatory requirements for public radiation protection. Issues related to quality of the environmental radiological monitoring data used in that assessment method are discussed in section 3.2.

### 3.1.2.3 Site Perimeter Gamma Dose Rates:

With respect to direct external radiation exposure of the public, CNSC staff and Cameco reported that radiation dose rates at certain monitoring stations near the perimeter of the facility property were discovered during the reporting period to be in excess of the Action Levels established for those locations. As a result, Cameco and CNSC staff reported that additional shielding in the form of a concrete wall was being installed between the warehouse area (the radiation source) and the facility boundary. An intervenor expressed concern about these elevated radiation levels, particularly since they are occurring in areas that have been frequented by him and several other members of the public over a long period of time while engaged in recreational fishing. This intervenor questioned whether some of the illnesses experienced by people in Port Hope could have been caused by the time spent in those areas.

In response to the Commission's examination of these concerns, Cameco reported that initial measurements have shown that the concrete wall under construction will reduce the measured dose rates off site by approximately 90%. While the Commission acknowledges that appropriate corrective action is now being taken to address the monitoring results, the Commission is concerned that it took until early 2004 for Cameco to recognize that such corrective action was warranted and that a preventable radiation dose to the public, albeit small, was not addressed in keeping with the ALARA principle in a timely manner. The Commission expects licensees to take timely corrective action in all circumstances where even small excess radiation doses can be reasonably mitigated. While the Commission does not request a separate report from CNSC staff on the matter, the Commission expects CNSC staff to also examine its approach to compliance verification to determine how this issue could have been addressed earlier.

### 3.1.2.4 Transportation Doses to the Public:

In addition to the potential sources of radiation exposure from the plant, some intervenors expressed concern about actual or potential public exposures to radiation during the transport of uranium products on public roadways in their community. Of particular concern were issues relating to the following:

- dose rates and type of radiation emanating from the transport trucks;
- public information on the contents of the trucks;
- parking and movement of the trucks near schools, shopping areas and public utilities (e.g., water filtration plant);
- alleged violations of the radiation hazard placard requirements; and
- radiological consequences of an accident involving a spill of material.

In response to the Commission's examination of these concerns during the hearing, CNSC staff confirmed that Cameco is transporting uranium products to and from the facility in compliance with the CNSC's *Packaging and Transport of Nuclear Substances Regulations* and the *Transportation of Dangerous Goods Act*. CNSC staff explained that the type of packaging required for those products (consisting of UO<sub>2</sub> and UO<sub>3</sub> powder) is not such that it would necessarily prevent a spill in the event of a serious traffic accident. CNSC staff noted, however, that the solid form and low radiation characteristics of the materials are such that the radiation

risks associated with a spill would be low and the clean-up would not require special measures or precautions to protect the response personnel or public.

Based on this information, the Commission is satisfied with Cameco's performance with respect to protecting the public from radiation during the transport of nuclear substances. The Commission requests that Cameco provide additional information to the public on the alleged detection of neutron radiation emanating from the transport vehicles and, if such radiation is present, on its source and the potential risk that it poses to human health. See section 3.11 below for a general discussion of Cameco's Public Information Program.

#### 3.1.2.5 Commission Views on Public Radiation Protection:

Based on the above information and considerations, and taking into account the related discussion in section 3.2 of the actual radioactive contamination in the environment, the Commission is satisfied with Cameco's overall performance in regard to the protection of the public from radiation during the licence mid-term review period.

## **3.2 Environmental Protection**

In considering Cameco's performance in protecting the environment (including the health and safety of persons in that environment), the Commission considered information presented by the hearing participants on a wide range of topics. These topics, each of which is discussed further below, include: the results of an Ecological Risk Assessment; the emission and effluent monitoring results and methods; and the impacts of emissions and effluents on air quality, surrounding soils, groundwater and surface water (including aquatic life).

In addition, a number of concerns were raised by intervenors about how the facility operations could be adversely affected by the environment itself, such as from flooding and geotechnical instability, which in turn could lead to accidental contaminant releases.

Furthermore, a number of intervenors requested support for additional studies of human health in the community to address their concerns about the combined effects of all radiological and non-radiological releases from current and past nuclear operations in Port Hope. Each of these issues is discussed further below.

### **3.2.1 Ecological Risk Assessment:**

CNSC staff reported that Cameco completed an Ecological Risk Assessment (ERA) for the facility in 2003. CNSC staff explained that one of the purposes of an ERA is to identify if there are any gaps in the information necessary for implementing a fully integrated environmental management system. CNSC staff further reported that Cameco has committed to submitting a plan to address the data gaps identified in the ERA to the CNSC by February 28, 2005<sup>6</sup>.

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<sup>6</sup> At the time of release of this Record of Proceedings, Cameco's plan for addressing the data gaps identified by the ERA had been received by the CNSC by the February 28, 2005 date and was under the review of CNSC staff.

A number of intervenors expressed concern that, despite earlier deadlines having been established, Cameco still has not closed the identified data gaps in their environmental programs that were identified by the ERA two years earlier. The intervenors did not consider such delays to be acceptable.

In response to questions from the Commission on the gaps identified by the ERA, CNSC staff stated that the ERA identified areas where Cameco needs to employ less conservative assessment methods. It also identified where more information on contaminants in the harbour was needed to better delineate the effects of historic operations from current operations. CNSC staff noted that this gap on harbour contamination was subsequently addressed by studies conducted by the Low Level Radioactive Waste Management Office (LLRWMO) as part of the separate Port Hope Area Initiative. The ERA also identified the need to gather better information with respect to the parameters and modelling of uranium in soil (see section 3.2.2.2 below for a further discussion of uranium in soil).

In its responses to the Commission's questions on the identified data gaps, Cameco acknowledged the findings of the ERA, but noted that the ERA did not identify a need to expand the routine monitoring programs. Cameco stated that, in response to the ERA findings, one ambient air monitoring station will be relocated and Cameco will continue to participate in special studies of the harbour and soil-related contaminant pathways.

The Commission accepts that the ERA did not identify fundamental problems in Cameco's environmental program. The Commission also accepts that some time was needed to redesign and site the uranium-in-soil study (see section 3.2.2.2 below). Nevertheless, the Commission is concerned with the length of time being taken to close all of the remaining gaps identified by the ERA. The Commission is concerned that, at the time of this hearing, only a plan for addressing the remaining gaps was in preparation. Commission expects that the remaining gaps identified in the ERA will be closed in a timely manner and that the public will receive, through Cameco's Public Information Program, explanations of, and regular updates on, the status of the related activities. The Commission expects that CNSC staff will report to the Commission in the event that there are any undue delays in the closing of the remaining gaps identified by the ERA. The Commission will, in any event, examine the status of the issues related to the ERA findings at the time the next application for renewal of the licence comes again before the Commission.

### **3.2.2 Emissions to the Atmosphere**

With respect to emissions from the facility to the atmosphere, CNSC staff reported that those emissions, consisting of natural uranium particulate, gaseous and particulate forms of fluorides, and gaseous ammonia and nitrogen oxides, have remained well below the limits specified in the licence during the review period. CNSC staff noted that, while natural uranium is the contaminant which poses the greatest potential hazard to health and the environment, the emission levels are not such that harmful effects or toxic accumulations in the environment will occur.

Cameco reported that its emissions to the atmosphere have been generally stable or decreasing through the reporting period. Of particular note, Cameco reported that it was able in 2003 to reduce its emissions of hydrogen fluoride to the environment by approximately 50%.

CNSC staff and Cameco noted that the stack monitoring is continuous, thus providing real-time data that assists in continual optimization of the operation. CNSC staff also stated that the emission monitoring at the facility is consistent with the Ontario Ministry of the Environment Stack Sampling Code.

#### 3.2.2.1 Particulate in Air:

Intervenors, while acknowledging Cameco's improved particulate filtration in its emission control system, expressed concern about what they believe may be a greater hazard posed by the very fine particulate remaining or created from this process (i.e., particles in the order of 5 microns or less in size). The intervenors are concerned that very small particles may pass deeper into a person's lung and become lodged.

In response to the Commission questions on the particulate size, CNSC staff confirmed that the improved filtration system removes an additional fraction of the particulates to a certain size and does not create a larger quantity of finer particulates. CNSC staff also stated that the amount of particulate released from the facility is in the order of 100 to 200 times lower than the standards set by the Canadian Council of Ministers. CNSC staff explained that the risk assessments for particulate are based on conservative exposure pathway and metabolic models, including the assumption that there would be no dissolution of particles in the lung. Such assumptions will tend to overestimate, rather than underestimate the impacts on the lung tissues. In response to related concerns of the intervenors about how the more sensitive members of the population, such as children, are taken into account, CNSC staff confirmed that these sensitive groups are considered in the assessment of the risk.

Some intervenors also questioned whether the CNSC's practice of using meteorological data from weather stations located in other municipalities on the shore of Lake Ontario to calculate the dispersion and concentrations of radioactive particles in the environment in Port Hope is reliable. In related comments, intervenors expressed the view that the location of some of the environmental monitors on or near electrical transmission lines will not provide accurate readings due to the effect that the electromagnetic fields from the transmission lines could have on the behaviour of the charged particles of contamination in the air.

In response to these comments, CNSC staff stated that it relies for regulatory purposes on strict emission monitoring and controls, conservative environmental exposure pathway modelling of an assumed maximally exposed population, and selected monitoring of the ambient environmental conditions. CNSC staff considers that the available meteorological data from neighbouring communities is sufficient for this purpose.

On the matter of electromagnetic fields near electrical lines affecting the accuracy of the monitoring of particulates in the receiving environment, CNSC staff reported that there is no measurable variation in the results recorded by the air quality monitors located either near or

distant from electrical transmission lines and, therefore, the accuracy of the data appears to be uncompromised by any electromagnetic fields present. CNSC staff also noted that the monitors are not located on or near the type of high-tension transmission lines where relatively stronger electromagnetic fields are known to exist.

### 3.2.2.2 Accumulation of Uranium Air Emissions in Soil:

A number of intervenors also expressed concern about how they could be at risk from the particulate (principally uranium) once it settles and accumulates in the surrounding soils. An understanding of how uranium is accumulating and behaving in soil is of particular importance to the people of Port Hope in light of the historic soil contamination that occurred in Port Hope during previous uranium facility operations. Some intervenors were specifically concerned about internal radiation doses that could result from eating vegetables grown in the soils that may be affected by both current and historic nuclear facility operations in the area. Some of those intervenors reported that they are engaged in commercial vegetable growing operations and feel an additional responsibility to their customers.

In response to the Commission's questions on the risk associated with soil contamination, and specifically the risk from eating vegetables grown in the soils affected by current or historic operations, CNSC staff stated that rate of uranium uptake by plants from soil is very small and thus, in its view, does not constitute a significant human exposure pathway. CNSC staff also concludes that, based on current emissions, the projected accumulation of uranium in area soils will not reach levels toxic to plants or other biota.

The Commission notes that this issue of potential uranium accumulation in soil received considerable attention at the Commission's public hearing for the renewal of Cameco's operating licence in 2002. At that time, a field study led by the Ontario Ministry of Environment (OMOE), and involving a number of soil testing plots at various locations in the vicinity of the facility, was being terminated due to problems encountered in the methodology and observed variability in the results that could not be explained. Cameco, who had also been conducting an independent parallel soil sampling study, concurred with the OMOE and CNSC staff that it was not possible to draw meaningful conclusions from the study data with respect to current versus historic effects. The OMOE explained that while there appeared to be a statistically significant increase in uranium in the test plots of approximately 1 to 1.5 ppm per year, the study design was not robust enough to show where the uranium was coming from (i.e., either from the current facility operations, or from mobilized historic contamination). A redesigned study has since been in preparation to address this deficiency.

Some intervenors expressed disagreement with the above-noted conclusion of the earlier OMOE-led study and are of the view that the study provides clear and compelling scientific evidence that the facility emissions are causing significant uranium accumulations in the soils. In response to this position of the intervenors, CNSC staff stated that, until proven otherwise, the CNSC is conservatively assuming that the observed increases are the result of current operations. As noted above, CNSC staff concludes from that assessment that toxic, or otherwise hazardous accumulations of uranium in soil, are not anticipated.

In response to the Commission's questions on why it has taken more than two years to initiate a new soil study, the OMOE explained that it was necessary to find a suitably large and previously uncontaminated study area in close proximity to the facility. The removal and replacement of a large area of soil near the water filtration plant, which is expected to be completed in the summer of 2005, has since provided such an opportunity.

In response to the Commission's questions on how environmental information on groundwater flow and atmospheric dispersion patterns could be integrated into the new soil study design, the OMOE stated that the activity of micro and macro arthropods in the top 20 to 30 centimetres of the soil appears to be the most relevant mechanism involved in the potential movement of historic contamination to the surface. A significant upward movement of groundwater was not observed in the earlier studies. The OMOE is of the view that having a relatively large area of clean soil to a significant depth is the most important factor for the success of the planned study. The OMOE expressed the view that due to very localized re-entrainment rates at the surface, regional climatic data would not appear to be important. CNSC staff added that, because the current emissions and ambient air concentrations are very low, it would be difficult to design a scientifically robust study that incorporates the climatic factors. The Commission accepts these responses.

With respect to what the actual contaminant levels are in the gardens referred to by the intervenors, the Commission notes the offer made by the representative of the OMOE during the hearing to do additional soil sampling on at least one of those properties. The Commission welcomes this initiative of the OMOE. The Commission requests CNSC staff to collaborate as appropriate with the OMOE in the completion of that sampling as soon as practical in the 2005 growing season.

#### Commission's Views on Uranium in Soil:

The Commission accepts the CNSC staff's conclusions that uranium emissions from Cameco's facility do not currently pose a significant radiation or toxicity risk. The Commission is of the view, however, that a better understanding of how and where uranium may be accumulating in soils is needed, both for enhancing the CNSC's regulatory process and for addressing a clearly identified need for public information on this issue in Port Hope. The Commission is therefore supportive of the efforts being made by the OMOE, CNSC staff and Cameco to reinitiate the uranium-in-soil study as quickly as possible.

#### 3.2.2.3 Non-Radiological Air Emissions:

Some intervenors expressed concern about the quantities of nitrous oxides, ammonia and fluorides that are released by the facility. They cited scientific research linking these air contaminants to health effects such as allergies, asthma and behavioural problems in children. Refer to the written submissions of the intervenors on the record for further details and the specific referenced reports (see Appendix A). These concerns are heightened by the fact that the facility is in close proximity to populated areas of Port Hope.



CNSC staff reported that the emissions of gaseous and particulate forms of fluorides, and gaseous ammonia and nitrogen oxides, have remained well below the regulatory limits specified in the licence during the review period.

#### 3.2.2.4 Proximity of Emission Sources to Urban Areas:

The Commission notes that many of the concerns expressed by the intervenors with respect to the protection of persons and the environment relate to the location of the Cameco facility is in close proximity to the urban areas of Port Hope. Some intervenors are of the view that this proximity, or lack of “buffer zone” is unacceptable for a facility like Cameco’s Uranium Conversion Facility.

In its consideration of these views of the intervenors, the Commission notes that it is not a requirement that there be a zone of restricted land use surrounding Class IB nuclear facilities to protect the health and safety of persons. In this case, the Commission is of the view that the routine emissions and effluents from the Cameco facility are being controlled and monitored to an enhanced extent, such that they do not pose a significant or unreasonable risk to the public, despite the close proximity of the facility to populated areas.

However, the Commission notes that adequate measures must be in place to also take account of the proximity of the facility to populated areas in respect of contaminant releases that could result from emergencies at the facility, such as a major fire. As discussed further in section 3.6 on Emergency Preparedness and Response, the Commission is not fully satisfied that adequate long-term measures are in place at the Cameco facility to address such events.

#### 3.2.2.5 Commission’s Views on Routine Atmospheric Emissions:

Based on the above information and considerations, the Commission is satisfied that Cameco has performed acceptably during the mid-term review period with respect to the protection of the environment from routine emissions to the atmosphere.

### **3.2.3 Liquid Effluent Releases**

With respect to the release of liquid effluents from the facility to Lake Ontario and the sanitary sewer system, CNSC staff reported that all effluent streams are sampled daily for a wide variety of parameters and that no final release limits were exceeded during the mid-term reporting period.

#### 3.2.3.1 Toxicity Test Results:

Cameco reported that, while the cooling water and process effluent discharges failed to meet acute toxicity requirements on a few occasions during the review period, the events were isolated and CNSC staff confirmed that Cameco continues to meet the applicable regulatory requirements.

A number of intervenors expressed concerns about the above-noted failures to meet the acute toxicity requirements at all times. In this regard, an intervenor challenged the CNSC staff's conclusions that the effluent quality has been acceptable, given that the toxicity failures constitute, in its assessment, violations of the *Fisheries Act*. Another intervenor noted that 35,000 fish were stocked in the area approximately six years earlier, but that none of those fish appear to have survived.

In response to the Commission questions on these concerns raised by the intervenors, CNSC staff noted that the effluent samples that failed the toxicity tests were taken at locations in the facility effluent management systems that are upstream of the final point of discharge; no final discharge samples were found to be toxic. CNSC staff noted that it does not enforce the *Fisheries Act*, but that, through its close working relationship with Environment Canada (under the terms of a Memorandum of Understanding), compliance with the *Fisheries Act* is assured. CNSC staff explained that, in this circumstance, enforcement measures were not judged to be necessary because Cameco, upon receipt of the test results, exercised due diligence in taking the necessary and timely steps to correct the situation and prevent recurrence. CNSC staff explained that, in setting and enforcing the environmental protection requirements under the *Nuclear Safety and Control Act*, CNSC staff ensures that no releases would be deemed toxic, hazardous or deleterious under other legislation. Cameco also noted that it is not in possession of any evidence to suggest that the fish in Lake Ontario, including those from the earlier stocking operations referred to by the intervenors, have been adversely affected by the facility effluents.

The Commission accepts these statements of CNSC staff and Cameco and notes that the upstream effluent toxicity test failures, while potentially a serious issue, were promptly addressed and did not in the end constitute a violation of the CNSC's environmental protection requirements.

#### 3.2.3.2 Effluent Sampling and Data Reporting Methods:

Several intervenors objected to the CNSC staff's presentation to the Commission of what they considered to be aggregated and averaged effluent quality data on selected parameters. These intervenors suggested that this type of reporting could mask other short-term toxic discharge events. Intervenors also questioned whether the sampling methods, that do not require continuous sampling for all parameters, could miss periodic higher or illegal discharges from the facility. These intervenors are generally of the view that, in order to adequately demonstrate adequate protection of the environment, proof that the discharges are clean every hour of every day should be available. In related comments, a number of intervenors requested that the public have greater access to the effluent sampling sites and data, and that an independent third party be involved to oversee the monitoring.

In response to the Commission's question on the use of, and potential problems associated with, non-continuous sampling and data averaging, Cameco stated that it continues to fully meet the Ontario MISA (Municipal Industrial Strategy for Abatement) requirements. This includes the use of equipment that samples effluent on a full proportional or time proportional basis through 24 hours. Cameco noted that the Ontario Ministry of Environment (OMOE) inspects Cameco's sampling program on a regular basis and has not raised any concerns with it. Cameco explained

that, while some parameters, such as metals, are not required to be sampled every day, Cameco follows the sampling schedule set by the OMOE. Cameco also stated that the use of action levels and the reporting of data in value ranges further safeguards against the loss of relevant information through averaging. CNSC staff stated that the effluent sampling is designed to ensure the effluent meets the regulatory requirements and is not causing harm to fish or fish habitat.

The Commission is satisfied that the effluent monitoring protocols and procedures at the facility are appropriate and compliant with the relevant regulatory requirements. With respect to the request by some intervenors for independent auditing and reporting on the monitoring program, the Commission notes that the CNSC is Canada's independent nuclear regulator. The CNSC works closely with other regulators, such as Environment Canada and the OMOE to ensure licensees are in compliance with applicable regulatory requirements.

On the matter of public access to the detailed emissions and environmental monitoring data, the Commission heard conflicting points of view during the hearing. For example, while a number of intervenors felt that there was not enough access to the monitoring data and processes, others attested to having full access to all relevant environmental information. Cameco's performance in terms of meeting the CNSC's requirements for a public information program is discussed in general in section 3.11 below. Specific to the environmental information aspects, the Commission encourages Cameco to consider the concerns raised by many of the intervenors during the hearing and to explore ways to broaden, or better facilitate, public access to that environmental information.

#### 3.2.3.3 Sewage Discharges:

Specific to the matter of effluent discharges to the sanitary sewer system, the Municipality of Port Hope, in its intervention, reported that it has measured uranium concentrations in its sewage treatment plant sludge (approximately 50 ppm) most of which it believes can be attributed to the Cameco operation. The municipality and other intervenors sought information on the monitoring of the sewer discharges from the facility and on the safety of using the sludge in agricultural land amendment programs. In response to the Commission's follow-up questioning on this topic, CNSC staff confirmed that there are regulatory limits and Action Levels in place for the facility effluent discharges to the sewer system. CNSC staff also noted that the OMOE has specific requirements concerning the application of sludge biosolids to land. CNSC staff further stated its understanding that the sludge from the Port Hope sewage treatment plant was found acceptable for land applications in tests conducted by the OMOE.

The Commission accepts this information and, taking into account the foregoing discussion of the effluent monitoring requirements and performance, is of the view that Cameco's sewer discharges have been acceptable.

#### 3.2.3.4 Groundwater and Surface Water Releases:

With respect to non-point-source releases of potentially contaminated groundwater and storm-water runoff to the harbour and Lake Ontario, some intervenors expressed concern that

significant amounts of contamination may be escaping in an uncontrolled and unmonitored manner. In response to the Commission's questions on these modes of release, Cameco stated that groundwater quality and hydrogeological monitoring is in place at the site and that this provides contaminant detection capabilities that are adequate to ensure protection of the public and the environment. CNSC staff further confirmed that appropriate sampling of surface water runoff is in place.

Based on this and the preceding information on site effluent management, the Commission is satisfied that groundwater and surface water discharges to the environment are being adequately monitored and controlled.

#### 3.2.3.5 Commission's Views on Liquid Effluent Releases and Monitoring:

Based on the information presented, the Commission is satisfied with Cameco's performance in protecting the environment from the liquid effluent releases from the facility.

### 3.2.4 Health Studies

Taking their above-noted concerns about past and current radiological and non-radiological emissions and effluents to the environment into account, and considering the close proximity the facility to the urban areas of Port Hope, a number of intervenors expressed their long-standing request to have more health studies carried out directly on the Port Hope population. The purpose of those additional health studies would be to attempt to directly measure what the actual long-term effects of exposures to those contaminants have been on public health over the history of nuclear operations in the area. These intervenors are of the view that direct measurement of health is the only way that the long-term cumulative health effects of all types of contamination from past and present nuclear operations in the community could be understood in a holistic way. Some intervenors requested that the Commission make formal statements in support of additional comprehensive health investigations in Port Hope. Other intervenors also requested CNSC funding for those studies. The Port Hope Community Health Concerns Committee, in its intervention referred to a proposed project for testing residents that it hopes to initiate with the Uranium Medical Research Centre.

Several of the intervenors referred to the information gathered as part of a cancer and general mortality study completed in 2002<sup>7</sup>. The study was commissioned by the CNSC's predecessor, the Atomic Energy Control Board (AECB) and undertaken by Health Canada. Health Canada concluded in its report that there was no evidence of increased overall cancer mortality in Port Hope compared to the rest of Ontario, and that there was no excess mortality for cancers known to be associated with radiation exposure. In this regard, a number of intervenors cited a separate interpretation of the study data by Dr. E. Mintz. Dr. Mintz is of the opinion that significantly

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<sup>7</sup> Cancer and General Mortality in Port Hope, 1956-1997, Surveillance and Risk Assessment Division, Centre for Chronic Disease Prevention and Control, Population and Public Health Branch, Health Canada June, 2002

higher than average incidences of cancers and other diseases can be identified in the data for Port Hope.

With respect to these submissions, the Commission notes the strongly held views of many of the intervenors concerning their desire for additional health studies in their community. The Commission notes the CNSC's past participation of the in these types of health studies; however, recognizing the more prominent role of other authorities and industry in this regard, the CNSC is not planning any further general health effects studies. The CNSC will consider participation in studies initiated by others on a case-by-case basis.

The Commission further notes that the purpose of the current hearing is to present information on the performance of Cameco's existing operations at its Port Hope facility in respect of the applicable regulatory requirements and operating licence conditions, including an update on the projected risk that the facility poses to the health of Port Hope residents.

Based on the information presented at this current hearing, including CNSC staff's statements regarding how its regulatory oversight conservatively accounts for uncertainties in dose consequence and historic environmental contamination, the Commission remains of the opinion that there currently exists an adequate scientific basis and information to reasonably predict the risks that the facility operations pose to human health and safety and thereby to assess Cameco's regulatory performance in this respect.

As noted above in section 3.1.2.1, the CNSC remains engaged in, and responsive to, the ongoing examination of radiation protection standards.

### **3.2.5 Effects of the Environment on the Project:**

A number of intervenors expressed concerns about how the environment itself could adversely impact on the facility operations, thereby potentially resulting in increased risks to persons and the environment. Specifically, concerns were raised by a number of intervenors about potential flooding and ground instability.

#### **3.2.5.1 Flooding:**

Noting that the Cameco's facility is located on the shore of Lake Ontario immediately adjacent to the mouth of the Ganaraska River and Port Hope Harbour, a number of intervenors expressed concern that the site may be subject to periodic severe flooding which, in turn, could, in their view, result in major environmental damage and risk to health and safety. As part of these submissions, an intervenor provided a detailed pictorial account of flooding in the town of Port Hope during the past century, including the most recent flood that occurred in 1981. Some intervenors are of the view that the facility is located on the floodplain of the Ganaraska River and, as such, should be subjected to the prohibitions in Ontario concerning the manufacture and storage of hazardous materials on such areas. Other intervenors referred to a heavy rainfall event in September 2004 that caused some flooding on the Cameco site.

In response to the Commission's examination of these concerns, Cameco noted that, despite the history of flooding in Port Hope, no flood waters have reached its facility. It was noted that the flooding that occurred during the rainfall event in September 2004 was not caused by a rise in the river or lake levels. Cameco noted that improvements have since been made to its storm-water management system to reduce the risk of recurrence.

With respect to the floodplain issue, the Commission is aware that the flood lines in the vicinity of the facility are currently in the process of being remapped by the Ganaraska Region Conservation Authority. In this regard, the Commission requests staff to take note of the findings of the Conservation Authority when available and to take any appropriate regulatory action on that information as required. The Commission understands the importance of this question and anticipates that it will be answered with the assistance of the applicable authorities in the near future. At this time, however, the Commission has no evidence on which to conclude that the probability of flooding at the facility is significant, or that it poses a significant threat to the health and safety of persons or the environment. The Commission will examine the status of this issues at the time the next application for renewal of the licence comes again before the Commission (if not sooner in the form of a Significant Development Report from CNSC staff at an earlier meeting of the Commission, should that be warranted).

With respect to the expressed desire of some intervenors to have the facility removed from the waterfront so that its natural and recreational potential could be better realized for the community, the Commission notes that this is a matter that falls under the municipal authority responsible for land use planning and control and is not within the jurisdiction of the CNSC.

#### 3.2.5.2 Geotechnical Stability:

An intervenor provided a historical summary of repairs that have been made to the Port Hope harbour concrete retaining walls and of what the intervenor believes to be current instability of the silty soils adjacent to those walls. The intervenor provided a pictorial review of past harbour wall failures and repairs, and of what the intervenor considers may be evidence of instability in the existing harbour walls bordering the Cameco site. The intervenor suggested that a ground failure could pose a risk to the safety of the facility and that the facility should therefore be relocated to a more stable site. This intervenor is of the view that the presence of geologic faults in the region and associated risk of earthquakes increase this risk.

The Commission questioned Cameco on this intervention, and specifically on the photographs provided by the intervenor which show distortion in an existing harbour wall next to the facility. Cameco was not able during the hearing to provide information on the geotechnical condition of that area and acknowledged that this matter appears to warrant further investigation.

The Commission did not have sufficient information to comment on whether the harbour walls adjacent to the Cameco site were actively moving or in some state of stable equilibrium and thus whether they pose a significant risk to the plant structures. Nevertheless, the Commission concurs that the geotechnical questions raised warrant further and timely investigation. The Commission therefore requests Cameco to assess the risk that a failure of the harbour wall could pose to the facility and to report on its findings to CNSC staff. The Commission will examine

the status of this issue at the time the next application for renewal of the licence comes again before the Commission (if not sooner in the form of a Significant Development Report from CNSC staff if warranted).

### **3.2.6 Commission's Views on Environmental Protection:**

Based on the information and considerations summarized above, the Commission is of the view that Cameco's performance in protecting the environment has been acceptable during the mid-term licensing period. Furthermore, the Commission is satisfied that the evidence on radioactivity released to, and present in, the environment supports the CNSC's projections of radiation risk to the public (as discussed in section 3.1.2 above).

While the Commission is requesting that Cameco follow-up on some questions and issues as discussed, the Commission is not of the view these matters represent significant compliance performance issues.

### **3.3 Conventional (Non-Radiological) Worker Health and Safety**

In addition to examining Cameco's mid-term performance in protecting workers from radiation, the Commission examined Cameco's performance in respect of the conventional health and safety.

In this regard, CNSC staff reported that there were 7 lost-time injuries reported during the review period. CNSC staff noted, however, that none of the accidents resulted in serious injuries and that Cameco took appropriate and timely action to prevent recurrence of similar accidents. CNSC staff expressed its general satisfaction with Cameco's occupational health and safety program. Cameco stated that the rates of all types of injuries (including those that do not result in lost time) have been relatively stable over the past few years. The recent increase in lost-time accidents were due to strains and sprains, and one hexafluoride inhalation event. Cameco went on to explain how it is actively focussing on accident prevention at the facility, including a survey and active promotion of safety culture, enhancement and expansion of the site Health and Safety Committees, improved supervisor communications on safety issues, improved ergonomics, and promotion of healthy lifestyles for workers in their off-hours.

The labour unions representing the site workers attested in their interventions to what they consider to be a strong emphasis by Cameco on safety and safety culture at the facility. Cameco's efforts in this respect were described by the union leaders as sensitive, cooperative and forward thinking.

Other intervenors expressed concern about the number of accidents that have occurred and questioned whether this pointed to a loss of control. Other intervenors questioned whether the workers may not be reporting injuries for various reasons, including for fear of retribution. In response to a question from the Commission on whether there were any such concerns in the workplace that could limit reporting, the union representatives strongly rejected the notion.

CNSC staff also stated that it had no evidence of non-reporting. The Commission also notes that the allegations by intervenors of non-reporting were not based on any evidence from the Cameco operation.

Based on this information, the Commission is of the view that Cameco's performance in the area of conventional health and safety at the facility during the mid-term review period has been satisfactory. The Commission notes, in particular, Cameco's effort to measure and promote a positive safety culture at all levels in its organization.

### **3.4 Operational Compliance and Unplanned Events**

CNSC staff reported that from its regular inspections of the facility operations, and from its review of Cameco's quarterly and annual compliance reports, CNSC staff has noted only minor deficiencies in Cameco's routine operating performance in respect of the regulatory requirements.

With respect to unplanned events, CNSC staff reported one significant event that occurred on May 31, 2004 involving a leak in a tank containing liquid uranium hexafluoride. CNSC staff noted that the leak was arrested promptly by Cameco and that there were no uncontrolled releases to the environment, injuries, or unusual chemical or radiological exposures of workers. Cameco added that the cause of the leak was traced to a plug in the tank that was incorrectly installed by the tank supplier.

In response to the Commission's questions on allegations made by some intervenors that all events may not be reported, CNSC staff confirmed that there is no evidence of events not being reported by Cameco.

Based on this information, the Commission is of the view that Cameco's performance in respect of its regulatory compliance and reporting has been satisfactory during the mid-term review period.

### **3.5 Fire Safety**

During the hearing, the Commission received and discussed a considerable amount of information on the topic of fire safety. This section contains a summary of that information and discussion as it pertains to the facilities current state of compliance with the National Building Code and National Fire Code. Comments and concerns related to the ability to combat a serious fire at the facility are discussed below in section 3.6 (Emergency Preparedness and Response).

With respect to the applicable code compliance, CNSC staff reported that Cameco has completed substantial upgrades to the building fire protection systems during the reporting period. The remaining upgrades are scheduled to be completed by mid-2005. CNSC staff noted that, while this work was originally scheduled to be completed in 2003, CNSC staff requested that the scope of work be expanded to address some additional legacy design issues. CNSC staff stated that it



considers that Cameco's rate of progress in this regard is satisfactory and that the nine remaining deficiencies do not pose an unreasonable risk. CNSC staff also noted that it engaged a third-party expert to participate in its January 2004 National Fire Code site inspections at the site.

Cameco reported that all code deficiencies identified in 2000 have been corrected. Cameco also noted that the remaining deficiencies in the physical fire protection, emergency lighting and fire alarm systems will be corrected in the current year. Cameco further noted that it has completed its updated Building Code training and currently employs two full-time fire safety inspectors. Programs and procedures for equipment maintenance and inspection, fire hazard analysis and safety plans, and engineering practices have been updated.

The Municipality of Port Hope, in its intervention, acknowledged that the facilities have been inspected against the current fire code and that the Fire Safety Plan has been approved by the Port Hope Emergency Services.

A number of intervenors expressed concern that the facility appears to still not be fully in compliance with the current building and fire codes. They consider that the time taken by Cameco to correct the identified deficiencies is unacceptable and that stronger enforcement actions are warranted.

In response to these concerns, the Commission notes that as the applicable codes continue to evolve over time, it is not unusual that building owners will need some time to make the necessary adjustments to meet the revised standards. In this regard, and taking into account the more recent decision to expand the scope of work and the safety significance of the remaining items, the Commission is generally satisfied that Cameco is giving this matter adequate attention and resources. The Commission requests that CNSC staff remain attentive to these issues to ensure they are brought to resolution in a timely manner.

### **3.6 Emergency Preparedness and Response**

In its examination of Cameco's performance in the area of emergency preparedness and response, the Commission examined not only what Cameco is required and reasonably capable of doing within the boundaries of its property, but also how those measures are supported and complemented by the emergency response capabilities within the surrounding municipality and province. By understanding how the safety of persons and the environment will be protected in the event of an emergency, through the coordinated response by all responsible parties and jurisdictions, the CNSC is able to specify and assess what licensees reasonably must maintain in terms of their own on-site emergency response capabilities. That assessment is done on a site-specific basis, taking into account the geographic setting (including the type and proximity of neighbouring land uses) and the assurances provided by the local and provincial authorities over whom the CNSC has no authority.

During the hearing, CNSC staff reported to the Commission that it became aware in October 2004 of concerns raised by the Municipality of Port Hope Fire Department. The Fire Department reportedly informed the CNSC at that time that it lacked the necessary training and

equipment to respond to fires involving hazardous materials. CNSC staff further reported that this information differs from that provided by the Fire Department at the time of the last facility relicensing in 2002. At that time, the Fire Department had signed-off on Cameco's Emergency Response Plan, clearly indicating its capability to respond to all types of fires.

CNSC staff noted that the Fire Department has the ability to request assistance from neighbouring municipalities and the province if necessary, but that no formal mutual aid agreements for this are currently in place. CNSC staff estimated that a response time from a neighbouring force would be in the order of 30 minutes depending on its location.

When questioned by the Commission on how significant this recent information from the municipality is with respect to the health and safety of Cameco's workers and people of Port Hope, CNSC staff responded that, due to the very low probability of a major event and taking into account compensating defences currently in place at the facility, sufficient margins of safety exist in the short term.

In response to follow-up questions from the Commission on how long it will take to get a longer-term solution in place, CNSC staff stated that the initial step of getting a formal mutual aid agreement in place with an outside agency with hazardous materials capability could take a few months. The Municipality of Port Hope confirmed that this type of agreement will be initially explored. The Municipality also stated that, if it were to become fully self-sufficient, this could take more than a year to put in place.

The Commission questioned Cameco on the capabilities of its on-site force and how it would respond to a major fire in the intervening period. In response, Cameco stated that, while its Emergency Response Team (ERT) has hazardous materials training, this does not involve situations involving fire. Cameco also stated that it is not able to maintain a fully independent, stand-alone force at its site and that it must depend on off-site support for certain emergency scenarios. Cameco expressed confidence, however, that it has the ability to control a situation until additional help arrives. Further in this respect, Cameco informed the Commission that an agreement is in place whereby its trained ERT personnel would help direct the response of the local fire department to the extent possible before additional, fully trained personnel respond from elsewhere. Cameco noted that it has formally offered to provide support training to the Port Hope Fire Department and that it continues to be an active participant in the local emergency planning group known as CAER (Community Awareness and Emergency Response).

Further with respect to Cameco's on-site plans in particular, CNSC staff stated that the plans were updated in 2002 to align with the relevant CNSC guidance document (G-255). CNSC staff added that Cameco has successfully exercised its plan on five occasions during the review period and that CNSC staff has concluded that the program meets requirements. Cameco added that its emergency drills have involved off-site responders such as the municipality, local emergency medical personnel and other off-site suppliers. The Municipality of Port Hope confirmed that all unplanned events have been promptly reported to it and that communications between Cameco and the municipality are good.

Several of the intervenors at the hearing expressed concern upon hearing of the above-noted shortcomings in the combined emergency response capabilities. Some intervenors also expressed concern that the CNSC was only recently made aware of the problems. In expressing their concerns, these intervenors reiterated their concerns about the lack of a “buffer zone” which, if in place, would lessen the risk and impact on the public in the event of a major fire. Referring to a major fire that occurred at the former Eldorado Nuclear plant in 1981 on the site, the intervenors stressed that there was a possibility of such events.

Regarding the public emergency alerting system in Port Hope, Cameco explained that current issues related to the geographic coverage of the telephone-based Community Alert Network are being discussed within the CAER group and that plans are progressing to address this. Some intervenors expressed concern that the automated public alerting system in Port Hope is deficient in their view in that it does not function in certain areas (or Wards) within the municipality.

Cameco added that the municipality maintains an Emergency Response Organization with a Command Centre where any instructions for the public during an emergency would originate. Intervenors expressed concern that, in their view, there is no clear evacuation plan in place for the residents. A representative of Emergency Management Ontario (EMO) commented that, under the *Emergency Management Act*, Port Hope is not specifically required to have an evacuation plan. This is at the discretion of the municipality under the authority of the Mayor. EMO added that Port Hope is in full compliance with the *Emergency Management Act* and that EMO considers the municipality to be proactive in undertaking its responsibilities under that Act.

#### Commission’s View on Emergency Response and Preparedness

While the Commission accepts the CNSC staff assessment of Cameco on-site emergency plans and capabilities, and acknowledges the above statements of the EMO concerning the municipality’s compliance under the *Emergency Management Act*, the Commission is concerned about the current lack of combined long-term capability to respond to a major emergency at Cameco’s facility – specifically a major fire involving radioactive and/or other hazardous materials. The Commission is particularly concerned that CNSC staff was not informed of this issue in a timely manner.

While the Commission accepts CNSC staff assurance that adequate compensating defences are in place at the facility to manage the deficiency in the short term, the Commission finds the apparent lack of communication and the lack of a more permanent solution to be unacceptable. The Commission notes that its authority is limited to the licensee and the operations of the regulated nuclear facility. However, the Commission expects that there exists an effective collaboration between the various jurisdictions and authorities responsible for protecting the public and environment during emergencies at the nuclear facilities it regulates. In the event that a competent collaboration and coordination of on- and off-site planning and resources does not exist or diminishes, the Commission has the authority to, and will if necessary, require a licensee to take the necessary compensating measures within its capability to assure continued and adequate provisions for protecting the health and safety of persons and the environment, including, if appropriate, the modification or curtailment of facility operations to reduce the risks associated with credible emergencies to acceptable levels. While the Commission is not

prepared to take such action at this time at Cameco's Port Hope operation, the Commission expects that all of the responsible parties involved in this situation, including CNSC staff, will proceed forthwith to address the remaining concerns.

The Commission requests CNSC staff to report to the Commission on the progress that has been made in this regard. The report should be in the form of a Significant Development Report presented at a regular meeting of the Commission within one year, or sooner as circumstances may warrant.

### **3.7 Quality Assurance**

The CNSC requires that licensees have acceptable quality assurance programs in place. In this regard, CNSC staff reported that, with the exception of certain aspects related to the design control program, Cameco has addressed all of the deficiencies in its Quality Assurance Program that were identified at the time of facility relicensing in 2002. The remaining issues are linked to the planned alignment of Cameco's site and corporate quality plans by the end of 2005. CNSC staff indicated its satisfaction with this progress and noted that the remaining deficiencies do not pose an unreasonable risk.

A number of intervenors expressed concern that Cameco is still not fully compliant with the quality assurance requirements and that the site program is not aligned with its corporate plans.

Based on the CNSC staff's report, the Commission is of the view that Cameco has made significant progress in the area of quality assurance during the review period. The Commission asks that CNSC staff ensure Cameco remains on schedule in completing the remaining work on the program alignment.

### **3.8 Security**

With respect to Cameco's performance during the review period in the area of security, CNSC staff reported that Cameco is operating in compliance with all requirements.

A number of intervenors expressed concern about the adequacy of the security requirements and with Cameco's adherence to them.

While it would not be appropriate for the Commission to discuss security matters in detail in a public document, such as this *Record of Proceedings*, the Commission did examine the relevant information and is satisfied that Cameco's performance with respect to maintaining security at the facility has been acceptable.

### **3.9 Non-Proliferation and Safeguards**

Concerning the CNSC's requirement for non-proliferation and safeguards at the Port Hope facility, CNSC staff reported that Cameco has the appropriate uranium inventory systems in place and is reporting on this in accordance with the conditions of its licence. CNSC staff noted that the accountancy systems are being modified to reflect changes in International Atomic Energy Agency (IAEA) policy and to put an "integrated safeguards" approach in place in 2005.

Some intervenors interpreted these required modifications as an outstanding deficiency in Cameco's performance. CNSC staff clarified during the hearing, however, that Cameco is in full compliance with the current requirements. The work on integrated safeguards is to address a requirement that will apply in the future.

Other intervenors expressed concerns about the lack of detailed public information on the movements, amounts, forms and isotopic contents of all nuclear materials moving to and from the site. Concerns were also expressed about the possible use of uranium products from the site in armour piercing munitions.

Based on its consideration of CNSC staff's report and comments of the intervenors, the Commission is of the view that Cameco's performance in respect of maintaining Canada's international obligations for non-proliferation and safeguards has been satisfactory during the review period. The Commission, as noted in section 3.1.2.4 of this *Record of Proceedings*, is satisfied that the nuclear materials moving on public roadways to and from the site (UO<sub>2</sub> and UO<sub>3</sub> powders) do not pose a significant radiological risk to the public. Given this and other security reasons, the Commission was not persuaded that additional public information on the details requested by the intervenors is necessary or appropriate.

### **3.10 Decommissioning Plans and Financial Guarantees**

The CNSC requires that licensed nuclear facility operators have in place a Preliminary Decommissioning Plan (PDP) and related financial guarantee that ensures adequate funds will be available to safely decommission the facility at the end of its operating life, even in the event that the facility owner becomes financially insolvent. While a PDP is by definition a conceptual planning document, it must contain sufficient detail to allow a reasonable estimation of the costs that will be associated with the decommissioning process.

With respect to Cameco's Port Hope facility, CNSC staff reported that an acceptable PDP has been in place since December 2001. CNSC staff also reported that Cameco has an acceptable financial guarantee in place in the form of an irrevocable letter of credit valued at \$33.8 million.

An intervenor raised a concern with respect to how the value of the financial guarantee is currently calculated. The intervenor pointed out that decommissioning is proposed to take place in two phases. The first phase involves the removal and remediation of buildings and areas on the site that are currently redundant, or which are scheduled for decommissioning in the next several years (as part of Cameco's "Vision 2010" project). An agreement is in place with the

federal government and the municipality that will allow the low-level radioactive waste arising from that first decommissioning phase to be placed in the low-level radioactive waste management facility that is planned to be constructed nearby as part of the Port Hope Area Initiative led by AECL's Low Level Radioactive Waste Management Office (LLRWMO). The intervenor further noted that the Low Level Waste (LLW) area, if approved, is scheduled to be filled and closed in the year 2013 and, as per the terms of the agreement, will not be reopened or used for storing any radioactive waste generated elsewhere. The intervenor's concern stems from what appears to be an assumption in Cameco's PDP that the waste from the later phases of decommissioning, scheduled to occur at some time after 2013, will also go to the LLW facility – an assumption which the intervenor considers to be unrealistic, a violation of the aforementioned agreement and an underestimate of the cost of waste disposal associated with the future decommissioning activity. Based on other estimates considered at the time the PDP was being reviewed in 2001, the intervenor recommends that the value of the financial guarantee be increased to \$60 million to account for this discrepancy.

In response to the Commission's questioning on this issue, Cameco explained that, in accordance with the CNSC guidance on the matter, Cameco has prepared its PDP on the assumption that it may need to shutdown and decommission the facility at any time. Should this occur between now and when the LLW area is to be closed, Cameco has assumed that it would be able to negotiate the use of that site for disposing all of its decommissioning waste. Cameco stated that when the Vision 2010 project is complete and the LLW area is closed, it will need to reassess its decommissioning plans, including the waste disposal aspects, and revise its cost estimates and financial guarantee accordingly.

In its response to the Commissions questions, CNSC staff acknowledged that there appears to be ambiguity on this aspect of the plans and financial guarantee that will need to be addressed in a timely manner. CNSC staff pointed out that the agreement for the LLW area is limited to 150,000 cubic metres of materials related to historic operations at the site (i.e., from the former Eldorado Nuclear operation) and that the federal government has agreed to pay for the disposal of all waste from the former Eldorado Nuclear operation, regardless of the disposal location. In this respect, CNSC staff acknowledged that there appears to be a lack of clarity or alignment of the definitions of what is Cameco's waste and what material on the site is the responsibility of the federal government.

The Commission expressed its concern on this issue. The Commission requires that Cameco address this matter and report to CNSC staff. Furthermore, the Commission will expect an update on this issue at, or prior to the next licensing hearing for this facility.

#### Liability Insurance:

A number of intervenors expressed concern about what they consider to be a lack of sufficient liability insurance carried by Cameco. These intervenors are concerned that, under the *Nuclear Liability Act* (NLA), any liability for damages from an accident at this site in excess of \$4 million would fall to the government of Canada.

The Commission notes that it has limited responsibilities under the NLA and that the Government of Canada is responsible for the policy framework on which it is based. The Commission is aware, however, that a review of the NLA is in process.

### **3.11 Public Information Program**

With respect to Cameco's performance in regard to the public information program requirements, Cameco stated that it has been placing a high priority on public consultation and outreach activities. Cameco referred in particular to its quarterly environmental status reports that it provides to the municipality through the municipality's Protection of Persons and Property Committee. Those reports are open and available to the public. Cameco also referred to an open house that it held in May of 2004 and to various presentations that it has made to high schools on their process and issues related to safety in the workplace.

While some intervenors attested to what they consider to be the high quality of Cameco's public information activities, others expressed a contrary point of view. Some consider that Cameco's efforts have been well received by the public and helpful in reducing concerns about the safety of the facility. Others expressed frustration over their inability to get thorough and timely responses from Cameco on their specific technical questions.

From these statements, and from its consideration of the overall nature and tone of the interventions made at this hearing, it is apparent to the Commission that, while Cameco is making an effort to inform the citizens of Port Hope, there appears to be a need to review and enhance the public information program. The physical, historical and social setting in which this facility is located is unique. As such, Cameco must place a higher level of attention on public information than would otherwise be necessary. The Commission is satisfied that Cameco understands this situation, but it has not provided the evidence that it has a more detailed plan in development.

Specifically, and as noted in this *Record of Proceeding*, the Commission has identified where Cameco should review its public information on facility emissions and effluents, and environmental conditions. A more concerted effort to provide the public with information on the status of information gaps identified in the 2003 Ecological Risk Assessment is another example. Follow-up public information on a number of other topics, such as, the uranium-in-soil study, emergency preparedness and response, transportation vehicle radiation, decommissioning financial guarantees, flooding potential and geotechnical stability also appears warranted. The Commission encourages Cameco to carefully review this *Record of Proceedings*, the transcripts of the hearing, and the other documents on the hearing record to identify other opportunities for enhancing its public information program.

The Commission looks forward to improvement in this area during the balance of the licensing period.

#### 4.0 Conclusion

The Commission has considered the CNSC staff's report on the performance of Cameco Corporation in the operation of its uranium conversion facility located in the Municipality of Port Hope. The Commission also considered, as part of that mid-term performance report, the written and oral submissions of Cameco and thirty intervenors who participated in a public hearing held by the Commission on the matter on February 23, 2005.

Based on the information available for reference on the record of the hearing, the Commission is of the view that Cameco's performance has been acceptable in respect of its compliance with the regulatory requirements and conditions of its licence during the approximate first half of the current licence period.

A great many issues and concerns were raised and discussed during the course of this hearing. The Commission wishes to thank all of the hearing participants for bringing these matters to the Commission's attention in such detail and with such conviction of purpose. The totality of the evidence has contributed to the Commission's understanding of Cameco's operation, its performance, its challenges, and the breadth of views held by the public and other stakeholders involved and affected.

Through this *Record of Proceedings*, the Commission has identified a number of areas and issues which it expects will be given attention by Cameco, CNSC staff and the Municipality of Port Hope during the balance of the current licensing period, or sooner as indicated. However, the Commission does not consider that those issues warrant compliance or enforcement action at this time.

The purpose of the mid-term performance report, including this public hearing, was to inform the Commission, rather than to support an application for licensing. As such, the Commission did not make any decisions with respect to the licensing of the facility pursuant to section 24 of the *Nuclear Safety and Control Act*.

Marc A. Leblanc  
Secretary,  
Canadian Nuclear Safety Commission

Date of hearing: February 23, 2005  
Date of release of Record of Proceedings: May 18, 2005



Appendix A – Intervenors

Intervenors	Document Number
Lake Ontario Waterkeeper, represented by M. Mattson	CMD 05-H5.2
A. Johncox	CMD 05-H5.3
Families Against Radiation Exposure (FARE), represented by J. Miller	CMD 05-H5.4 CMD 05-H5.4A
A. Levtov	CMD 05-H5.5
J. D. Morand	CMD 05-H5.6 CMD 05-H5.6A
Port Hope and District Chamber of Commerce	CMD 05-H5.7
J. Fishlock	CMD 05-H5.8
United Steelworkers of America, Local 13173, represented by C. Leavitt	CMD 05-H5.9
Canadian Nuclear Workers Council, represented by B. Walker and K. Clarke	CMD 05-H5.10
J. Shaw-Rimington	CMD 05-H5.11
Municipality of Port Hope, represented by R. Austin and M. Stevenson	CMD 05-H5.12
I. R. McDonald	CMD 05-H5.13
R. Wilcock	CMD 05-H5.14 CMD 05-H5.14A CMD 05-H5.14B
P. McNamara	CMD 05-H5.15
A. McKee-Bennett	CMD 05-H5.16
I. W.M. Angus, B. Eng., LL.B., P. Eng., Barrister & Solicitor	CMD 05-H5.17 CMD 05-H5.17A
Port Hope Community Health Concerns Committee, represented by F. More	CMD 05-H5.18 CMD 05-H5.18A CMD 05-H5.18B CMD 05-H5.18C
Great Lakes United, represented by F. More	CMD 05-H5.19
S. and M. Parcher	CMD 05-H5.20
M. Mutton	CMD 05-H5.21
D. J. Kelly	CMD 05-H5.22
R. Cowan	CMD 05-H23
T. Lawson	CMD 05-H24
A. Groves	CMD 05-H25
P. Lawson	CMD 05-H26 CMD 05-H26.A CMD 05-H26.B
Port Hope Nuclear Environmental Watchdogs, represented by C. Conti	CMD 05-H5.27

S. and H.A. Haskill	CMD 05-H5.28 CMD 05-H5.28A
W. J. Crowley	CMD 05-H5.29
M. Birkett	CMD 05-H5.30 CMD 05-H5.30A
D. Taylor	CMD 05-H5.31