

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

| Record of Revisions |                |                                                                                                                                                                                              |                     |
|---------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Version No.         | Date           | Description of Revision                                                                                                                                                                      | Prepared/Revised by |
| 19                  | May 2011       | Updated Section 5 to include proposed new environmental action levels and changes to incinerator operation. Also updated workforce table in Section 2.2 and Figure 4 – Organizational Chart. | J. DeGraw           |
| 20                  | August 2011    | Updated section 2 to remove reference to staffing levels during non-operating periods. Also updated Table 12.2 re pH limits and Appendix C re organizational changes.                        | J. DeGraw           |
| 21                  | April 2012     | Updated sections 4.4.7, 5.2, 5.3 and Tables 12.1 & 12.2 to reflect new CNSC action levels. Updated section 2.1.3 to reflect new annual production capacity.                                  | J. DeGraw           |
| 22                  | September 2013 | Updated to reflect recent organizational changes. Other minor changes in sections 4.4.8, 5.2, 5.4 and 12.1.                                                                                  | J. DeGraw           |
| 23                  | February 2014  | Updated section 5.6 to indicate receipt of material for incineration from both the PHCF and CFM.                                                                                             | J. DeGraw           |
| 24                  | September 2014 | Minor changes to sections 1.3, 2.2, 8.1 & Appendix C                                                                                                                                         | J. DeGraw           |
| 25                  | August 2020    | Total rewrite for better linkage and alignment to safety and control areas referenced in LCH.                                                                                                | J. DeGraw/R. Peters |

| Reviewers / Approvers |                                                   |                  |                                                                |
|-----------------------|---------------------------------------------------|------------------|----------------------------------------------------------------|
|                       | Title                                             | Name             |                                                                |
| Reviewer              | Superintendent, Special Projects                  | Rebecca Peters   | <i>Electronic signature through document management system</i> |
| Reviewer              | Senior Specialist, Regulatory Compliance          | Kristine MacIver | <i>Electronic signature through document management system</i> |
| Reviewer              | Superintendent, Quality, Compliance and Licensing | Joe DeGraw       | <i>Electronic signature through document management system</i> |
| Signatory Reviewer    | Director, Regulatory Compliance and Licensing     | Tom Smith        | <i>Electronic signature through document management system</i> |
| Signatory Approver    | General Manager, Blind River Refinery             | Chris Astles     | <i>Electronic signature through document management system</i> |

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

## TABLE OF CONTENTS

|            |                                               |           |
|------------|-----------------------------------------------|-----------|
| <b>1.0</b> | <b>INTRODUCTION</b>                           | <b>6</b>  |
| <b>1.1</b> | <b>Scope</b>                                  | <b>6</b>  |
| <b>1.2</b> | <b>BRR Overview</b>                           | <b>6</b>  |
| 1.2.1      | Description of the Site                       | 7         |
| 1.2.2      | Location and Layout of the Facility           | 7         |
| 1.2.3      | UO <sub>3</sub> Operations                    | 12        |
| 1.2.4      | Analytical Laboratories                       | 13        |
| 1.2.5      | Utilities                                     | 13        |
| <b>1.3</b> | <b>Fuel Facility Operating Licence</b>        | <b>13</b> |
| 1.3.1      | Licensing Basis and General Conditions        | 13        |
| 1.3.2      | Notification of Changes                       | 14        |
| <b>2.0</b> | <b>SAFETY AND CONTROL AREAS</b>               | <b>15</b> |
| <b>2.1</b> | <b>SCA – Management System</b>                | <b>15</b> |
| 2.1.1      | Safety, Health Environment and Quality Policy | 15        |
| 2.1.2      | Organizational Structure                      | 16        |
| 2.1.3      | Management System Program                     | 19        |
| 2.1.4      | Safety Culture                                | 20        |
| 2.1.5      | Public Information and Disclosure             | 20        |
| <b>3.1</b> | <b>SCA – Human Performance Management</b>     | <b>21</b> |
| 3.1.1      | Human Performance Management                  | 22        |
| 3.1.2      | Training                                      | 22        |
| <b>4.1</b> | <b>SCA- Operating Performance</b>             | <b>24</b> |
| 4.1.1      | Regulated Activities                          | 24        |
| 4.1.2      | Corporate Oversight                           | 25        |
| 4.1.3      | Operating Limits                              | 25        |
| 4.1.4      | Nuclear Substances and Radiation Devices      | 26        |
| 4.1.5      | Reporting Requirements                        | 26        |
| <b>5.1</b> | <b>SCA – Safety Analysis</b>                  | <b>26</b> |
| 5.1.1      | Safety Report                                 | 27        |
| 5.1.2      | Fire Hazard Analysis                          | 28        |
| 5.1.3      | Environmental Risk Assessment                 | 28        |
| 5.1.4      | Derived Release Limit                         | 28        |
| 5.1.5      | Chemical Hazard Assessment                    | 28        |
| 5.1.6      | Environmental Aspects Registry                | 29        |
| <b>6.1</b> | <b>SCA – Physical Design</b>                  | <b>29</b> |
| 6.1.1      | Current Facilities                            | 30        |

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

|             |                                                                   |           |
|-------------|-------------------------------------------------------------------|-----------|
| 6.1.2       | Current Plant Equipment .....                                     | 30        |
| 6.1.3       | Facility and Process Changes .....                                | 30        |
| 6.1.4       | Design Governance for Safety Significant Systems.....             | 30        |
| 6.1.5       | Third Party Review for Fire Protection.....                       | 30        |
| 6.1.6       | Pressure Boundary Program .....                                   | 31        |
| <b>7.1</b>  | <b>SCA – Fitness for Service .....</b>                            | <b>31</b> |
| 7.1.1       | Preventative Maintenance.....                                     | 32        |
| 7.1.2       | In-service Inspection Program .....                               | 32        |
| 7.1.3       | Periodic Inspection and Testing for Fire Protection Systems ..... | 32        |
| <b>8.1</b>  | <b>SCA – Radiation Protection .....</b>                           | <b>32</b> |
| 8.1.1       | Potential Radiological Hazards.....                               | 33        |
| 8.1.2       | Nuclear Energy Workers .....                                      | 33        |
| 8.1.3       | ALARA.....                                                        | 34        |
| 8.1.4       | Personal Dosimetry.....                                           | 34        |
| 8.1.5       | Zone Control – Contamination Control.....                         | 36        |
| 8.1.6       | Radioisotope Control .....                                        | 36        |
| 8.1.7       | Worker Dose Control .....                                         | 36        |
| <b>9.1</b>  | <b>SCA – Conventional Health and Safety.....</b>                  | <b>37</b> |
| 9.1.1       | Conventional Safety Program .....                                 | 38        |
| 9.1.2       | Hazards .....                                                     | 38        |
| 9.1.3       | Work Controls.....                                                | 39        |
| 9.1.4       | Health and Safety Committee.....                                  | 39        |
| <b>10.1</b> | <b>SCA – Environmental Protection .....</b>                       | <b>40</b> |
| 10.1.1      | Environmental Management Program (EMP).....                       | 40        |
| 10.1.2      | Environment and Public Assessments .....                          | 41        |
| 10.1.3      | Environmental Regulation .....                                    | 41        |
| 10.1.4      | Airborne Emission Program .....                                   | 41        |
| 10.1.5      | Liquid Emission Program.....                                      | 42        |
| 10.1.6      | Ambient Water Quality.....                                        | 43        |
| 10.1.7      | Derived Release Limit - Estimated Dose to Public .....            | 43        |
| 10.1.8      | Reported Dose to Public.....                                      | 44        |
| <b>11.1</b> | <b>SCA – Emergency Management and Fire Protection .....</b>       | <b>45</b> |
| 11.1.1      | Emergency Planning.....                                           | 45        |
| 11.1.2      | Emergency Preparedness and Response Organizations .....           | 45        |
| 11.1.3      | Fire Protection Program.....                                      | 46        |
| 11.1.4      | Recovery Program.....                                             | 46        |
| <b>12.1</b> | <b>SCA – Waste Management .....</b>                               | <b>46</b> |
| 12.1.1      | Waste Management .....                                            | 47        |
| 12.1.2      | Preliminary Decommissioning Plan.....                             | 47        |
| <b>13.1</b> | <b>SCA – Security.....</b>                                        | <b>47</b> |

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

|                                                                          |           |
|--------------------------------------------------------------------------|-----------|
| <b>14.1 SCA – Safeguards .....</b>                                       | <b>48</b> |
| <b>15.1 SCA – Packaging and Transport.....</b>                           | <b>48</b> |
| <b>3.0 NUCLEAR FACILITY SPECIFIC.....</b>                                | <b>49</b> |
| <b>16.1 Financial Guarantee.....</b>                                     | <b>49</b> |
| <b>Appendix A: Legal Description of Cameco Blind River Refinery.....</b> | <b>50</b> |

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

### TABLE OF FIGURES

|                                                                                 |    |
|---------------------------------------------------------------------------------|----|
| Figure 1: Location of Blind River Refinery.....                                 | 8  |
| Figure 2: Cameco Property Boundaries.....                                       | 9  |
| Figure 3: BRR Facility Licensed Area.....                                       | 10 |
| Figure 4: Refining Operations at BRR.....                                       | 11 |
| Figure 5: Organizational Structure – Fuel Services Division and Corporate ..... | 17 |
| Figure 6: Blind River Organizational Chart – Internal Organization .....        | 18 |

### TABLE OF TABLES

|                                                                                    |    |
|------------------------------------------------------------------------------------|----|
| Table 1: BRR Documents Relevant to the Licensing Basis .....                       | 14 |
| Table 2: BRR Documents Relevant to Management System .....                         | 15 |
| Table 3: BRR Documents Relevant to Public Information .....                        | 21 |
| Table 4: BRR Documents Relevant to Human Performance Management.....               | 21 |
| Table 5: BRR Documents Relevant to Operating Performance .....                     | 24 |
| Table 6: Other Regulatory Agencies Governing BRR Operations.....                   | 25 |
| Table 7: BRR Documents Relevant to Safety Analysis.....                            | 27 |
| Table 8: BRR Documents Relevant to Physical Design.....                            | 29 |
| Table 9: BRR Documents Relevant to Fitness for Service.....                        | 31 |
| Table 10: BRR Documents Relevant to Radiation Protection.....                      | 33 |
| Table 11: Action Levels for External Dosimetry (NEW).....                          | 35 |
| Table 12: Action Levels for Urinalysis (NEW).....                                  | 35 |
| Table 13 BRR Documents Relevant to Conventional Health and Safety.....             | 37 |
| Table 14: BRR Documents Relevant to Environmental Protection.....                  | 40 |
| Table 15: Summary of Air Discharge Limits and Environmental Action Levels .....    | 42 |
| Table 16: Summary of CNSC Liquid Effluent Discharge Limits and Action Levels ..... | 43 |
| Table 17: DRL Values Corresponding to a 1 mSv/y Dose.....                          | 44 |
| Table 18: BRR Documents Relevant to Emergency Management & Fire Protection.....    | 45 |
| Table 19: BRR Documents Relevant to Waste Management.....                          | 46 |
| Table 20: BRR Documents Relevant to Security .....                                 | 47 |
| Table 21: BRR Documents Relevant to Safeguards .....                               | 48 |
| Table 22: BRR Documents Relevant to Packaging and Transport.....                   | 49 |
| Table 23: BRR Documents Relevant to Financial Guarantee .....                      | 49 |

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

## 1.0 INTRODUCTION

### 1.1 Scope

The Facility Licensing Manual (FLM) is a document that describes how Cameco Corporation's (Cameco) Blind River Refinery (BRR) meets the licence conditions defined in its Fuel Facility Operating Licence (FFOL) and associated Licence Conditions Handbook (LCH) issued by the Canadian Nuclear Safety Commission (CNSC). The FLM provides an overview of the Cameco documents that describe the licensing basis organized by Safety and Control Areas (SCA), in order to comply with the licensing requirements under sections 24(4)(a) and (b) of the *Nuclear Safety and Control Act* (NSCA).

### 1.2 BRR Overview

BRR was built on a green field site in the early 1980s by Eldorado Resources Ltd. (ERL) and began producing uranium trioxide (UO<sub>3</sub>) in 1983. ERL later became Eldorado Nuclear Limited (ENL). ENL subsequently merged with the Saskatchewan Mining and Development Corporation to form a Canadian Mining and Energy Corporation, later known as Cameco, in 1988.

Cameco is a fully integrated resource development company with uranium mining operations and processing facilities in Canada and abroad. Cameco's Fuel Services Division (FSD) operates a uranium refinery, BRR, in Blind River, Ontario as well as a uranium conversion facility, known as the Port Hope Conversion Facility (PHCF) and a fuel fabrication facility, known as Cameco Fuel Manufacturing (CFM), both in Port Hope, Ontario. CFM also operates a specialty metals fabrication facility in Cobourg, Ontario to facilitate the complete CANDU fuel supply cycle.

BRR is operated under a FFOL issued by the CNSC. Licence requirements are prescribed in the *NSCA*. The operations performed at BRR are also subject to supporting regulations issued by the Commission with respect to materials, transportation, security and safeguard obligations. Descriptions of the site processes and key safety systems are summarized in this manual, along with the site management system and associated programs that have been developed and implemented to meet corporate objectives and regulatory requirements. Key elements in specific programs are highlighted to demonstrate compliance to the facility licence as well as applicable federal and provincial statutes.

This document forms part of the licensing basis for the site and thus is structured in accordance with the CNSC Safety and Control Areas (SCAs), as denoted in the current version of the site Licence Conditions Handbook (LCH).

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

### 1.2.1 Description of the Site

The Blind River Refinery is located about 5 km to the west of the Town of Blind River and south of the Mississauga First Nation, as shown in Figure 1. The property owned by Cameco Corporation extends north to the railway line and is bounded on the west by the Mississagi River and south by the North Channel of Lake Huron. The property is 257.6 hectares in total, which includes a secured area of 11.3 hectares, where the facility is located and where the CNSC licensed activities are carried out. Cameco has a lease arrangement for an additional 194.8 hectares to the east of the existing property boundary. The Cameco property boundaries and leased lands are shown in more detail in Figure 2.

The nearest residence is located approximately 1 km NE of the operating facility.

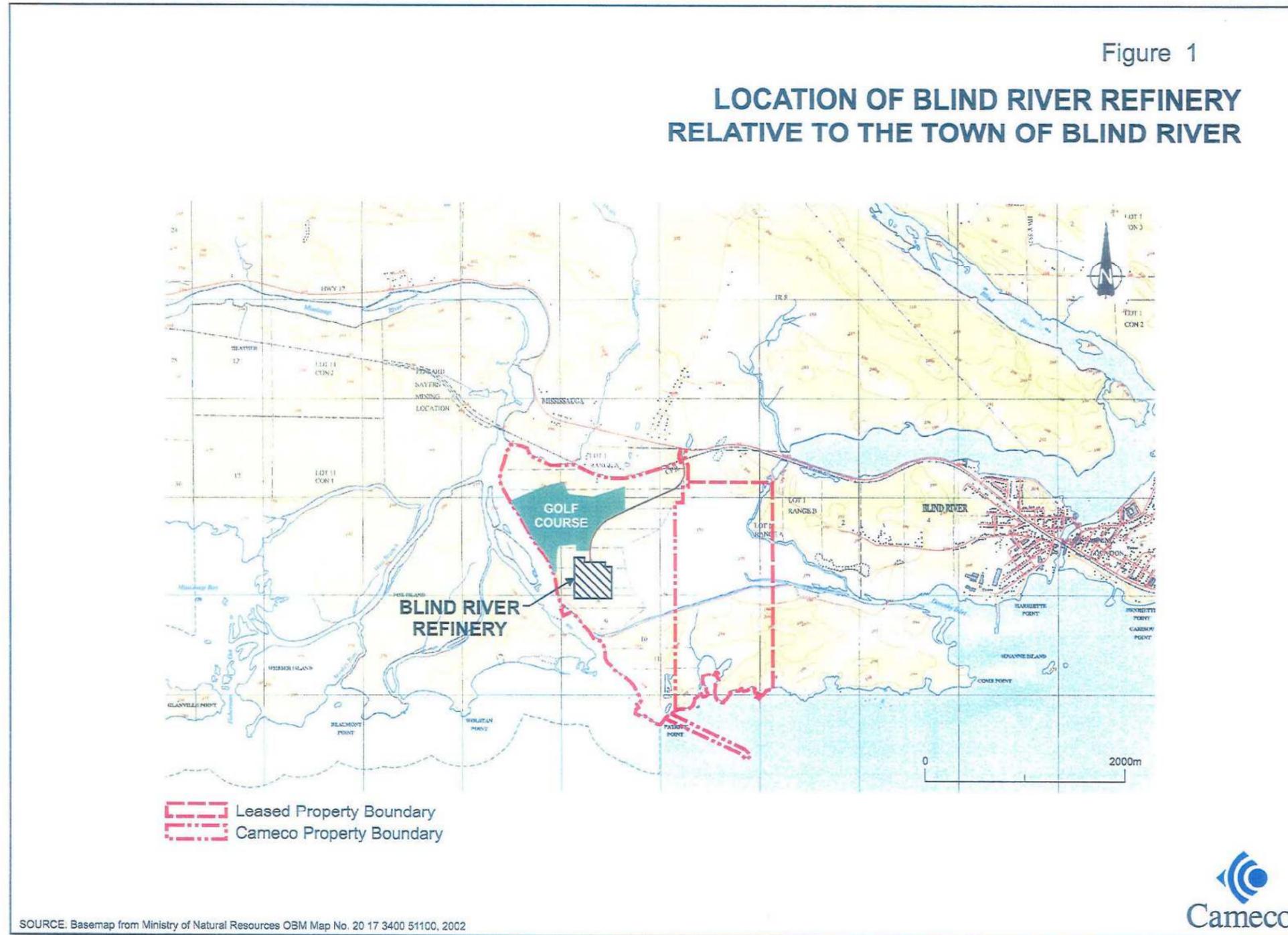
### 1.2.2 Location and Layout of the Facility

The refinery is situated on a portion of the lands owned by Cameco in the Town of Blind River, District of Algoma. The legal description of the facility is provided in Appendix A.

The licensed area of the facility is shown in more detail in Figure 3. The UO<sub>3</sub> refinery, plant services and administration are located in a central building. There are also three separate buildings that can be used to store uranium-bearing products. A number of outside storage areas are used for storing chemicals and uranium-bearing materials. These materials are properly identified and stored in a safe manner.

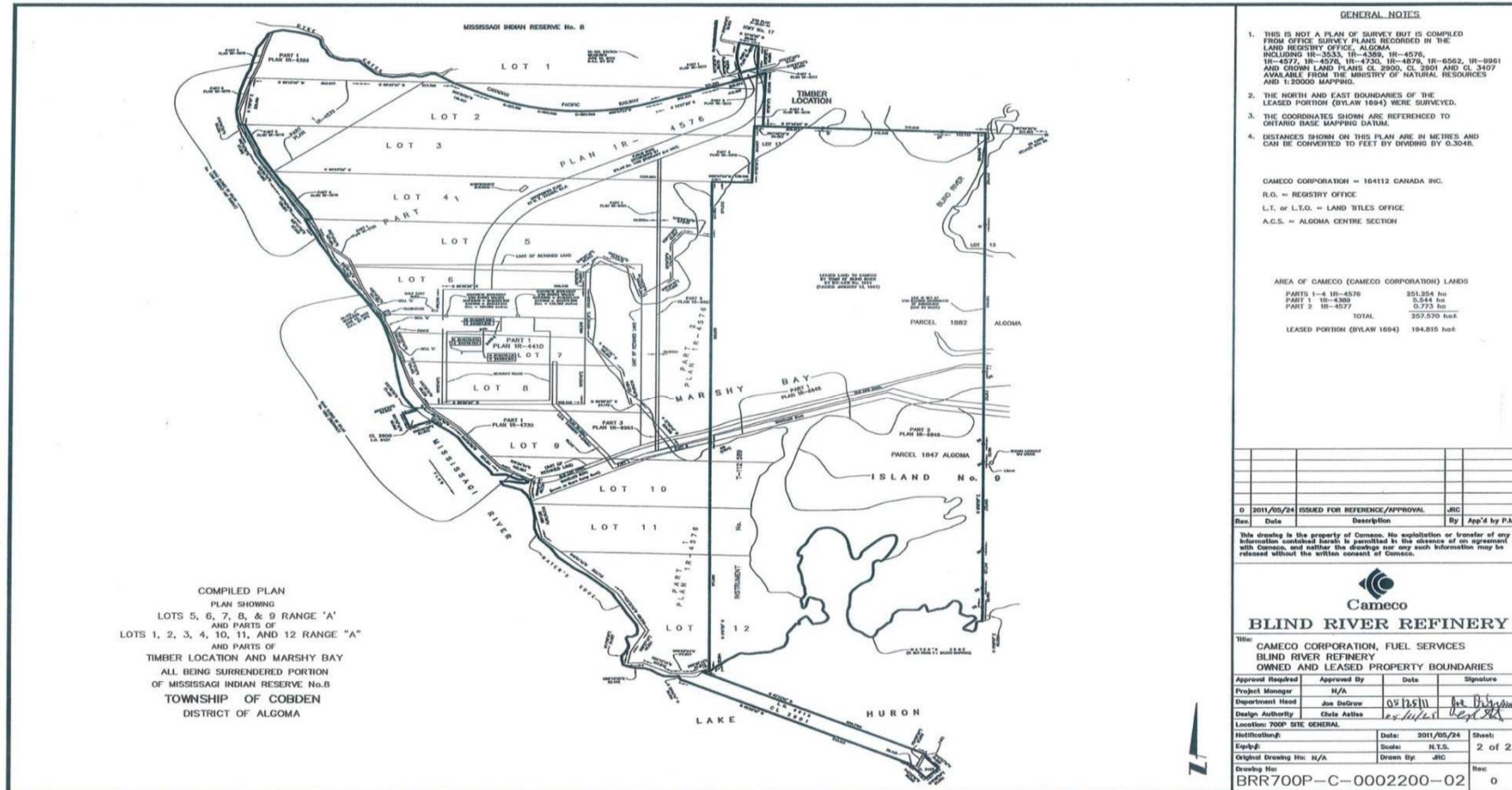
|              |                                                   |               |             |          |    |
|--------------|---------------------------------------------------|---------------|-------------|----------|----|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100   |    |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25 |

Figure 1: Location of Blind River Refinery



|              |                                                   |               |             |          |    |
|--------------|---------------------------------------------------|---------------|-------------|----------|----|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100   |    |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25 |

Figure 2: Cameco Property Boundaries



GENERAL NOTES

1. THIS IS NOT A PLAN OF SURVEY BUT IS COMPILED FROM OFFICE SURVEY PLANS RECORDED IN THE LAND REGISTRY OFFICE, ALGOMA INCLUDING 1R-3553, 1R-4359, 1R-4576, 1R-4577, 1R-4578, 1R-4730, 1R-4879, 1R-6562, 1R-0961 AND CROWN LAND PLANS CL 2900, CL 2901 AND CL 3407 AVAILABLE FROM THE MINISTRY OF NATURAL RESOURCES AND 1:20000 MAPPING.
2. THE NORTH AND EAST BOUNDARIES OF THE LEASED PORTION (BYLAW 1694) WERE SURVEYED.
3. THE COORDINATES SHOWN ARE REFERENCED TO ONTARIO BASE MAPPING DATUM.
4. DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

CAMECO CORPORATION = 164112 CANADA INC.  
 R.O. = REGISTRY OFFICE  
 L.T. or L.T.O. = LAND TITLES OFFICE  
 A.C.S. = ALGOMA CENTRE SECTION

AREA OF CAMECO (CAMECO CORPORATION) LANDS

|                             |                   |
|-----------------------------|-------------------|
| PARTS 1-4 1R-4576           | 251,254 ha        |
| PART 1 1R-4359              | 0,544 ha          |
| PART 2 1R-4577              | 0,773 ha          |
| <b>TOTAL</b>                | <b>252,571 ha</b> |
| LEASED PORTION (BYLAW 1694) | 194,815 ha        |

| Rev. | Date       | Description                   | By  | App'd by P.M. |
|------|------------|-------------------------------|-----|---------------|
| 0    | 2011/05/24 | ISSUED FOR REFERENCE/APPROVAL | JRC |               |

This drawing is the property of Cameco. No exploitation or transfer of any information contained herein is permitted in the absence of an agreement with Cameco, and neither the drawings nor any such information may be released without the written consent of Cameco.



**BLIND RIVER REFINERY**

Title: CAMECO CORPORATION, FUEL SERVICES  
 BLIND RIVER REFINERY  
 OWNED AND LEASED PROPERTY BOUNDARIES

| Approval Required | Approved By  | Date     | Signature           |
|-------------------|--------------|----------|---------------------|
| Project Manager   | N/A          |          |                     |
| Department Head   | Joe DeGraw   | 05/28/11 | <i>Joe DeGraw</i>   |
| Design Authority  | Chris Astles | 05/28/11 | <i>Chris Astles</i> |

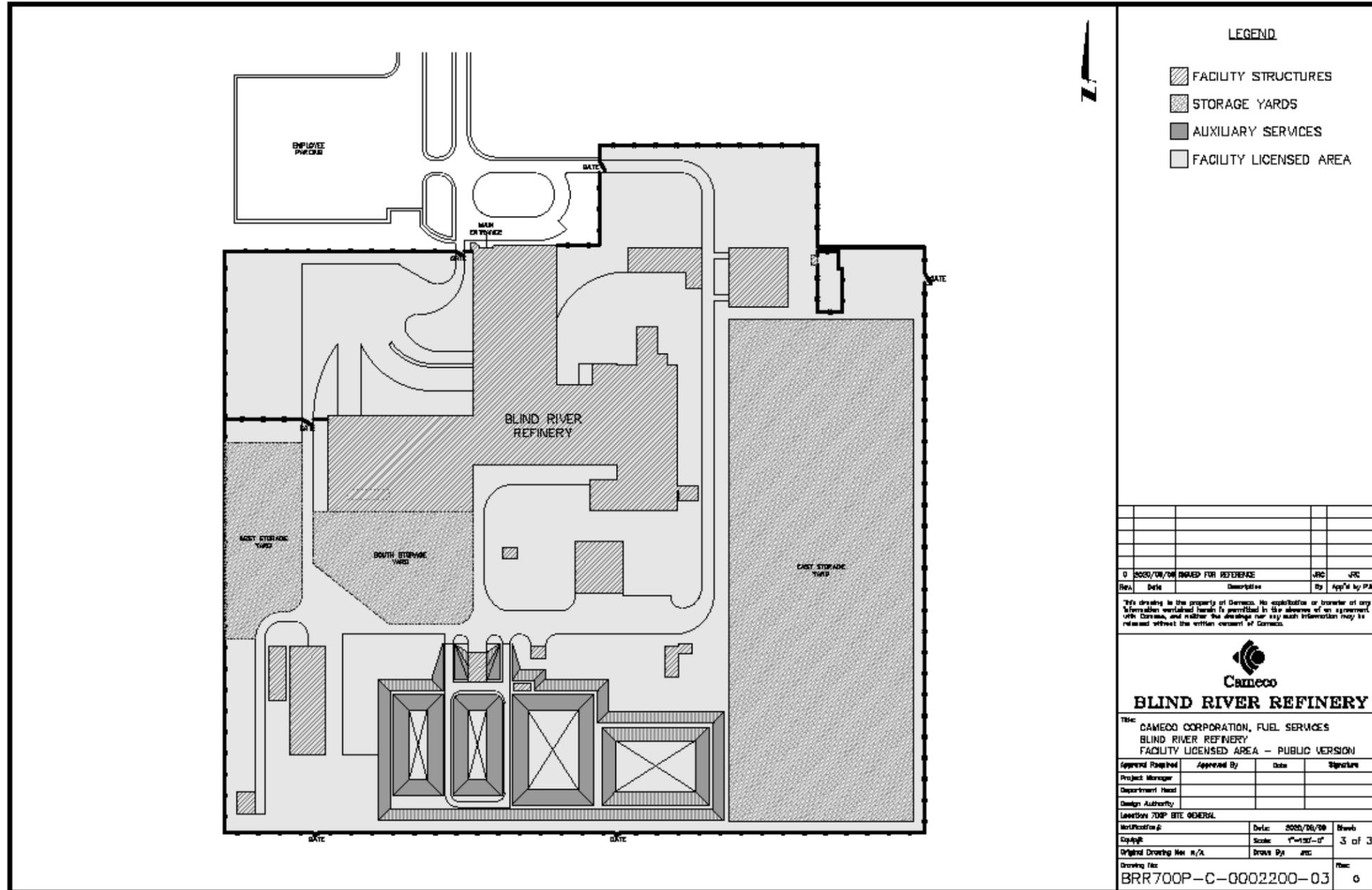
|                             |                  |               |
|-----------------------------|------------------|---------------|
| Location: 700P SITE GENERAL | Date: 2011/05/24 | Sheet: 2 of 2 |
| Notification#:              | Scale: N.T.S.    |               |
| Equip#:                     | Drawn By: JRC    |               |
| Original Drawing No: N/A    |                  |               |

Drawing No: BRR700P-C-0002200-02  
 Rev: 0



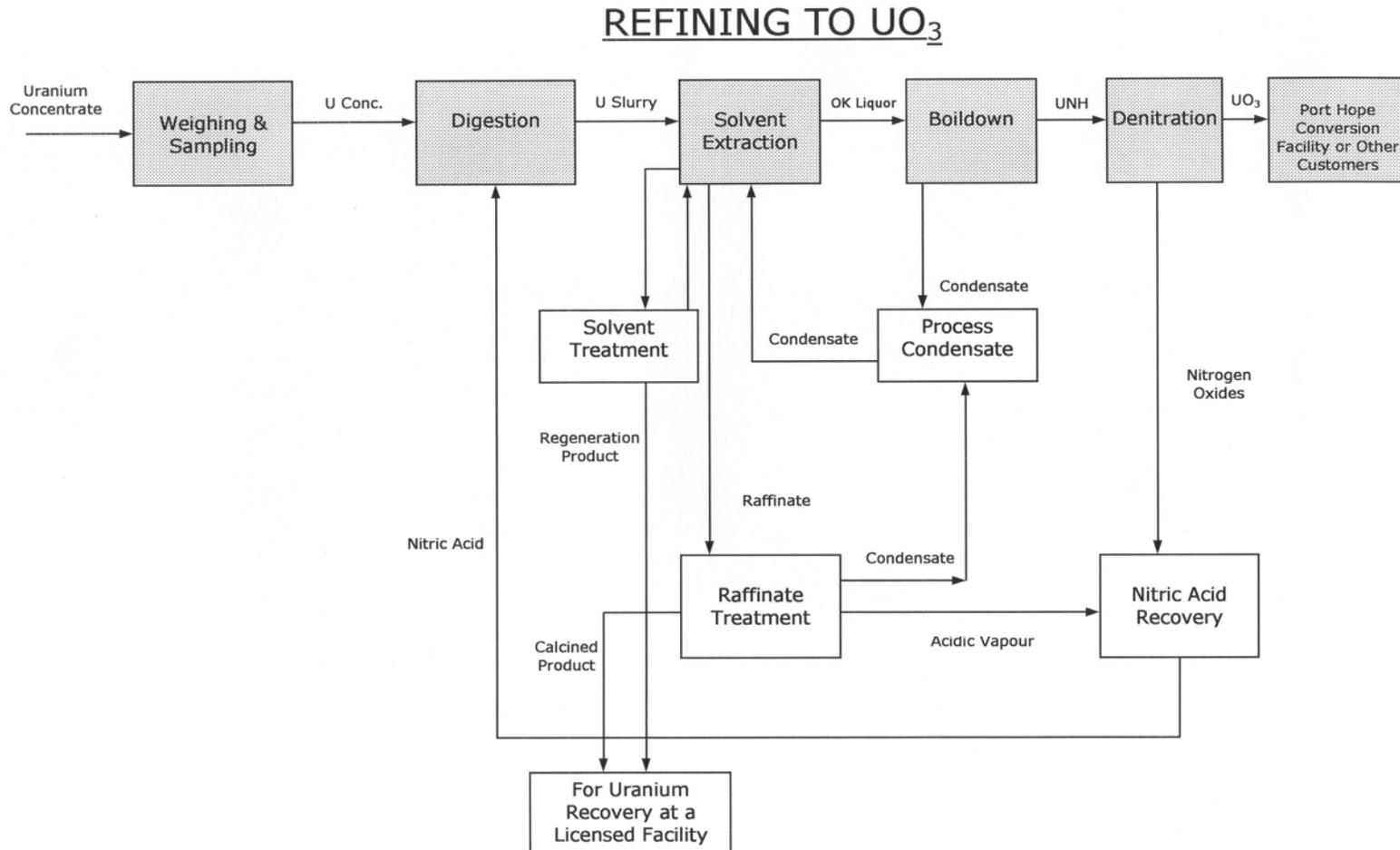
|              |                                                   |               |             |          |    |
|--------------|---------------------------------------------------|---------------|-------------|----------|----|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100   |    |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25 |

Figure 3: BRR Facility Licensed Area



|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

Figure 4: Refining Operations at BRR



|              |                                                   |               |             |          |        |
|--------------|---------------------------------------------------|---------------|-------------|----------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               |             | Doc. No. | AM 100 |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25     |

### 1.2.3 UO<sub>3</sub> Operations

A diagram of the refining process is shown in Figure 4. The refinery has a licensed capacity of 18,000 tonnes U/year as UO<sub>3</sub> with an approval to modify the plan to increase the annual production rate to 24,000 tonnes U as UO<sub>3</sub> subject to conditions and hold points approved by the Commission.

Cameco receives uranium concentrates from uranium mines worldwide. Cameco also receives and processes small quantities of scrap natural uranium-bearing materials such as uranium dioxide (UO<sub>2</sub>) and natural uranium metal. All concentrates and scrap uranium products are received in steel drums. Other material such as natural uranium metal scrap and natural uranium-bearing scraps such as wet filter cake are processed periodically and are packaged in a manner appropriate to the type and quantity of material. The facility does not have a licence for and does not possess enriched uranium or other fissile materials. In the refining process, nitric acid is added to uranium concentrate to produce a uranyl nitrate solution. Impurities are removed from the uranyl nitrate solution using a solvent extraction process. The purified uranyl nitrate is then heated and concentrated, producing a nuclear-grade uranyl nitrate hexahydrate (UNH) liquid. This UNH is then thermally decomposed to form UO<sub>3</sub> powder. The UO<sub>3</sub> can be stored and shipped in specially designed bulk containers called tote bins, which contain approximately 9.6 tonnes of uranium each, to Cameco's Port Hope Conversion Facility, or the UO<sub>3</sub> can be stored in steel drums for shipment to other customers. The facility recovers oxides of nitrogen generated in the various processes in a nitric acid recovery circuit. In addition, the solvent, tributyl phosphate (TBP) in a kerosene diluent, is recovered and recycled.

Two recyclable products of the refining process are: the formation of regeneration product produced in the solvent treatment circuit; and calcined product, produced in the raffinate treatment circuit. Both of these products contain recoverable uranium. The calcined product is stored in steel drums and the regeneration product is stored in plastic drums, which are in turn placed in over pack containers. Both products are recycled via re-milling for uranium recovery at a licensed facility, though regeneration product could also be processed through the BRR incinerator, if required. The majority of the UO<sub>3</sub> produced at the facility is shipped to the Cameco Port Hope Conversion Facility, where it is converted to either uranium dioxide (UO<sub>2</sub>) or uranium hexafluoride (UF<sub>6</sub>). The Blind River refinery also periodically prepares and ships UO<sub>3</sub> to other customers, who are licensed either by the CNSC or by the equivalent authority in another country. The UO<sub>3</sub> is packaged in conventional steel drums for these shipments. Cameco also ships small quantities of UNH to other customers from time to time. In addition, the facility can also periodically receive, store and then re-package and ship uranium concentrate without processing the material on site.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

Piloting work for various Cameco projects may also be done at this facility on an as required basis and may involve Cameco employees from other operations.

#### 1.2.4 Analytical Laboratories

The analytical laboratory provides analysis of quality control, environmental and radiation protection samples for BRR.

#### 1.2.5 Utilities

The powerhouse is responsible for the operation and maintenance of heating, ventilation and air conditioning (HVAC) systems and refrigeration units, as well as for the operation of the sewage treatment plant and cooling water system.

### 1.3 Fuel Facility Operating Licence

The Fuel Facility Operating Licence (FFOL-3641/current version) authorizes BRR to:

- (i) Operate its nuclear fuel facility for the production of uranium trioxide from uranium ore concentrates, (hereinafter “the facility”) at a site located in Blind River, Ontario
- (ii) Possess, transfer, use, process, import, package, transport, manage store and dispose of the nuclear substances that are required for, associated with, or arise from the activities described in (i); and
- (iii) Possess and use prescribed equipment and prescribed information that are required for, associated with, or arise from the activities described in (i).

There have been no licence amendments within the current licence term.

#### 1.3.1 Licensing Basis and General Conditions

The licensing basis is the boundary conditions for acceptable performance at the facility and is defined as the information upon which the Commission rendered their decision. It includes information provided in the licence application, its attachments and the documents referenced within, as well as commission member documents and transcripts from the relicensing hearings. The conditions and safety control measures of this Facility Licensing Manual (FLM) and the CNSC Licence Conditions Handbook, and the documents referenced within provide an overview of the licensing basis, and also provide a framework under which facility changes may be made, documents supporting the licensing basis may be updated, and other requirements such as standards and REGDOCs may be implemented, within the licence term.

|              |                                                   |                  |             |             |
|--------------|---------------------------------------------------|------------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100      |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version: 25 |

**Table 1: BRR Documents Relevant to the Licensing Basis**

| Document Title                                                                                                    | Site/Division/Corporate |
|-------------------------------------------------------------------------------------------------------------------|-------------------------|
| Application for Renewal of Fuel Facility Operating Licence (FFOL-3631.0/2012) for a 10-year term (April 15, 2011) | Site                    |
| Facility Licensing Manual                                                                                         | Site                    |

### 1.3.2 Notification of Changes

BRR may make continuous improvements to facility design, operating conditions, policies, programs, methods, studies and third-party reports referred to in the licensing basis that are directly relevant to safety and control measures during the licence term if they remain within the licensing basis.

The following questions are initial screening criteria which would trigger further evaluation of impact to the licensing basis and potential notification to CNSC.

- 1- Is this a new or different activity than what the licence specifies?
- 2- Will it require a change to any of the site documents listed in the LCH or licence?
- 3- Will this change the site layout?
- 4- Does this change have the potential to negatively impact the safety case for the facility?

In accordance with the operating licence, BRR will give CNSC written notification in advance of proposed changes with the potential to change designs, operating conditions, documentation or other elements that are integral to the licensing basis outside of the licensing basis approved by the Commission. notification will include BRR's assessment of the change to confirm it remains within the licensing basis. Additional information and/or lead time may be required for CNSC staff to complete their assessment of the proposed change. If a change is determined to be outside of the licensing basis, it will be referred to the Commission before it can proceed.

|              |                                                   |                  |             |             |
|--------------|---------------------------------------------------|------------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100      |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version: 25 |

## 2.0 SAFETY AND CONTROL AREAS

### 2.1 SCA – Management System

**Legislative Requirement:** The *General Nuclear Safety Control Regulations* require a licence application to contain the organizational structure, including the internal allocation of functions, responsibilities and authority. The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the proposed quality assurance program for the activity to be licensed, including the measures to promote and support safety culture.

**Table 2: BRR Documents Relevant to Management System**

| Document                                       | Site/Division/Corporate |
|------------------------------------------------|-------------------------|
| Management System Program Manual, AM 400       | Site                    |
| Safety, Health, Environment and Quality Policy | Corporate               |

BRR is in the operational phase of its nuclear life cycle. This facility processes natural uranium concentrates into natural UO<sub>3</sub>. The management system program at BRR is the framework that currently guides the processes and programs required to ensure safety objectives are achieved, performance is monitored and a healthy safety culture is maintained. The Management System Program Manual meets the requirements of CSA N286-12 (R2017): *Management System Requirements for Nuclear Facilities* and REGDOC 2.1.1: *Management System*.

#### 2.1.1 Safety, Health Environment and Quality Policy

Consistent with our vision, values and measures of success, Cameco recognizes the safety and health of our workers and the public, protection of the environment, and quality of our processes as the highest corporate priorities during all stages of our activities, which include exploration, development, operations, restoration, decommissioning and reclamation. As such, we are striving to be a world class performer in all aspects of our business through a strong safety culture, environmental leadership, operational excellence and our commitment to the following:

- Preventing injury, ill health, and pollution;
- Fulfilling compliance obligations;
- Keeping risks at levels as low as reasonably achievable, taking into account economic and societal factors;
- Ensuring quality of processes, products and services; and

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

- Continually improving our overall performance.

These commitments are reflected in the safety, health, environment and quality (SHEQ) policy which is publicly available on the Cameco website ([www.cameco.com](http://www.cameco.com)). These commitments are approved and supported by Cameco's board of directors. The officers, senior management and all employees are accountable for the performance of their jobs in compliance with this policy and all relevant legislation.

### 2.1.2 Organizational Structure

Cameco is a fully integrated resource development company and as such maintains a divisional structure to reflect the diversity of operations within the organization. Corporate offices are maintained in Saskatoon.

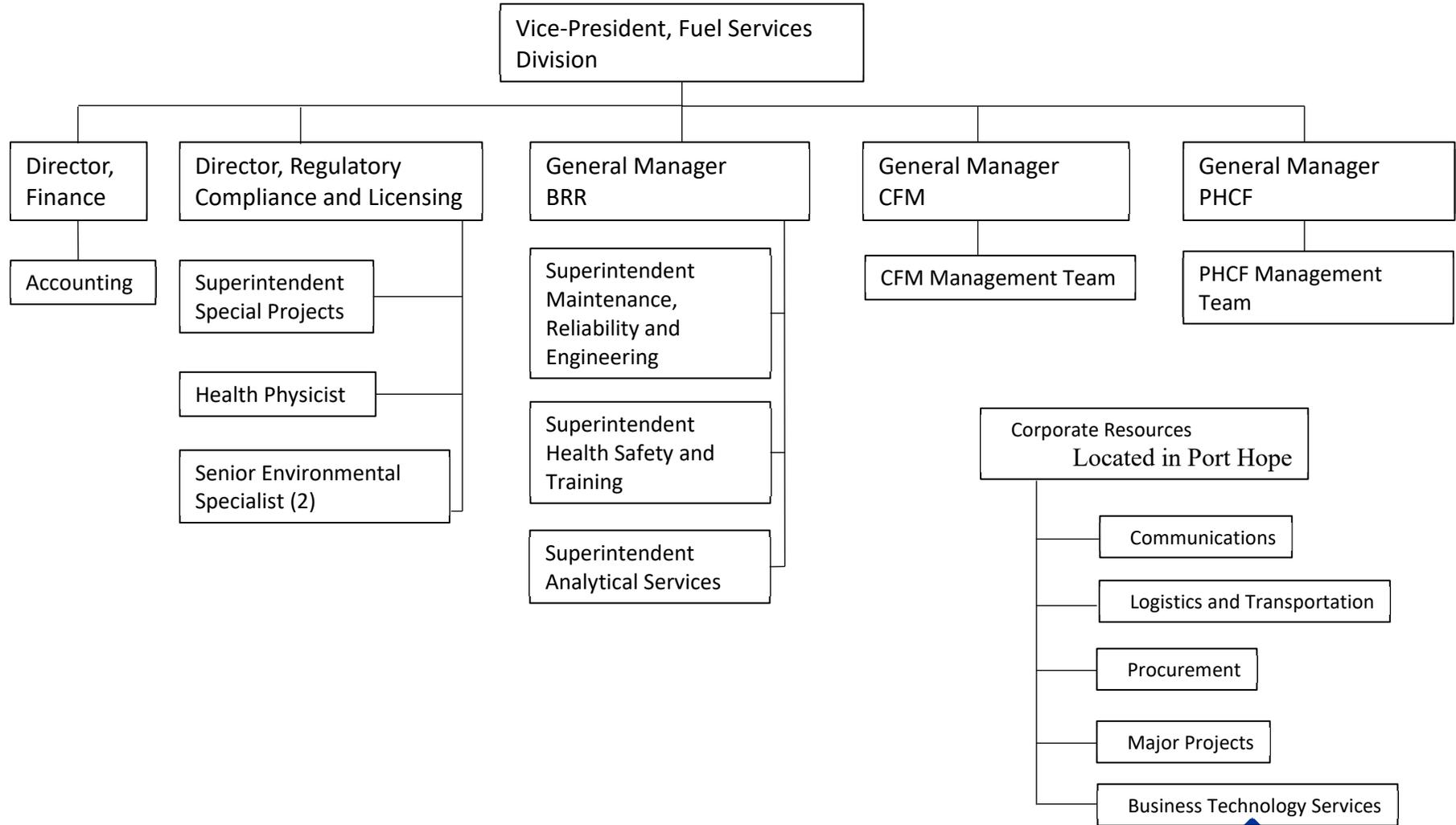
The organizational structures of FSD and BRR are shown in Figures 5 and 6. The vice-president, fuel services, directs the operation of and maintains corporate responsibility for the BRR. The general manager, Blind River operations, has the responsibility of operating the facility in accordance with the corporate policies, principles and operating budgets approved by the company's board of directors. To facilitate administrative control within the facility, employees have been organized into a number of departments. Production and service-oriented departments have been segregated, but all departments report to the general manager.

Designated personnel are responsible for all operations within their departments which must be carried out in a manner consistent with company policies, programs, plans and procedures.

In accordance with Section 15 of the *General Nuclear Safety and Control Regulations*, the persons who have authority to act for BRR in dealings with the Commission, and the name and position titles of the persons who are responsible for the management and control of the licensed activities are documented in writing and provided to CNSC staff. Any changes to these names and positions shall be reported to the CNSC using form BRR-814 within 15 days of the change.

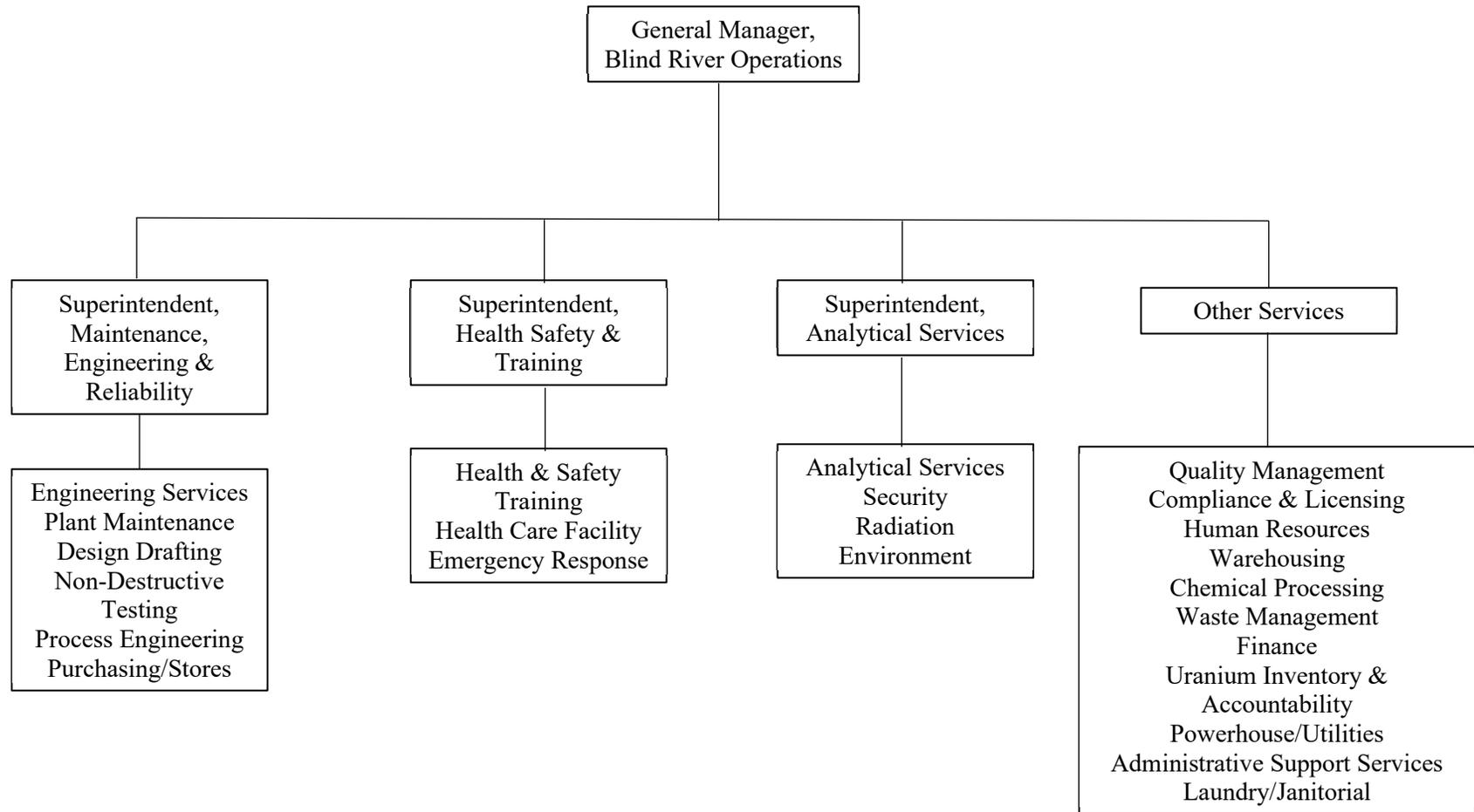
|              |                                                   |               |             |          |    |
|--------------|---------------------------------------------------|---------------|-------------|----------|----|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100   |    |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25 |

**Figure 5: Organizational Structure – Fuel Services Division and Corporate**



|              |                                                   |               |             |          |    |
|--------------|---------------------------------------------------|---------------|-------------|----------|----|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100   |    |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25 |

**Figure 6: Blind River Organizational Chart – Internal Organization**



|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

### 2.1.3 Management System Program

The Management System Program Manual (MSPM), AM 400, describes the management system program that is in effect to ensure that licensed activities are effectively controlled. This section of the FLM provides an overview of how the MSPM meets the requirements of the CNSC SCA-Management System. The MSPM is a part of the licensing basis for BRR and is a controlled document that is periodically reviewed and revised to ensure its continued effectiveness.

Many of the licensed activities are controlled by simply documenting procedures or providing qualified personnel. Additional controls are established commensurate with the safety significance of the activity or system. The equipment and systems with the highest safety significance, with respect to protection of people and the environment, are:

- Gaseous and liquid emission control systems;
- Floors, sumps, trenches and other in-ground structures; and
- The emergency diesel generator system.

The management system is based on the following principles, which are described in more detail in the MSPM, and applied in a graded manner commensurate with risk.

- Safety is the paramount consideration guiding decisions and actions;
- The business is defined, planned and controlled;
- The organization is defined and understood;
- Risks are identified and managed;
- Resources, generally captured as financial, human and infrastructure, are identified and managed;
- Communication is necessary and must be effective to achieve our business objectives;
- Information is identified and managed;
- Work is identified and managed;
- Problems are identified, assessed for significance and resolved as appropriate to the significance;
- Changes are identified and controlled;
- Assessments are performed;
- Experience is sought;
- The management system is continually improved; and
- Corporate oversight is defined and performed to ensure the management system meets the business needs of the organization.

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

### 2.1.4 Safety Culture

Cameco's corporate focus on its management system through governance, quality and safety culture drives accountability and oversight at all operations.

Divisional oversight and collaboration is enhancing the fuel services division safety culture through consistency, management system enhancements and/or divisional program development, to improve safety and environmental performance.

The following are examples of some of the tools that are in place at BRR to support a strong safety culture:

- In order to enhance and continue support of a questioning attitude in employees and to ensure that an appropriate level of investigation and/or corrective action is undertaken, both CIRS (Cameco Incident Reporting System) and the safety concerns process are used to drive continual improvement.
- BRR's leadership team has an ongoing expectation to ensure their presence in different areas of the facility and to continually improve communications between operators and the leadership team.
- Cameco has joined the CANDU Owners Group (COG) and is working through other nuclear industry affiliations to share experiences and learn from other organizations in addition to ongoing sharing of best practices across sites within Cameco.

Cameco conducts safety culture surveys (also called safety culture assessments) on a five year cycle at all sites within the FSD. These surveys gauge the perception of employees in relation to safety culture in a scientifically meaningful way. From these surveys/assessments action plans may be developed in areas where opportunities for improvement are identified. These action plans will be entered into CIRS for tracking and follow-up.

The BRR and FSD leadership teams are committed to enhancing a sustainable safety culture and will continue to work diligently to ensure that all employees remain engaged to the extent possible.

### 2.1.5 Public Information and Disclosure

**Legislative Requirement:** The *Class I Nuclear Facilities Regulations* require that an application for a licence contain the proposed program to inform persons living in the vicinity of the site of the general nature and characteristics of the anticipated effects on the environment and the health and safety of persons that may result from the activity to be licensed.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

**Table 3: BRR Documents Relevant to Public Information**

| Document Title                     | Site/Division/Corporate |
|------------------------------------|-------------------------|
| Public Information Program, AM 120 | Division                |

The objective of the public information program is to foster open dialogue between the company and persons living in the vicinity of Cameco's Ontario operations. The program has been designed to meet the requirements of REGDOC 3.2.1: *Public Information and Disclosure*. The PIP also describes Cameco's Indigenous outreach in both the Blind River and Port Hope areas.

Cameco will provide information to the community regarding how activities at BRR affect the environment and the health and safety of employees and the community. A key component of the program is a formal public information and disclosure protocol, which has been made available to local residents and other interested parties and is available on Cameco's website.

### 3.1 SCA – Human Performance Management

**Legislative Requirement:** The *General Nuclear Safety Control Regulations* require the licensee to: ensure the presence of sufficient number of qualified staff; train the workers; and ensure the workers follow procedures and safe work practices. The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the proposed human performance program, including measures to ensure workers' fitness for duty.

The *Class I Nuclear Facilities Regulations* require that licence applications include the proposed responsibilities of and qualification requirements and training programs for workers, including the procedures for the requalification of workers; and the results that have been achieved in implementing the program for recruiting, training and qualifying workers in respect of the operation and maintenance of the nuclear facility. The *Class I Nuclear Facilities Regulations* requires every licensee to keep a record of the status of each worker's qualifications, requalification and training, including the results of all tests and examinations completed in accordance with the licence.

**Table 4: BRR Documents Relevant to Human Performance Management**

| Document Title                  | Site/Division/Corporate |
|---------------------------------|-------------------------|
| Training Program Manual, AM 300 | Site                    |

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

BRR maintains programs to ensure that personnel are qualified to perform tasks associated with licensed activities to ensure the protection of workers, the public and the environment.

### 3.1.1 Human Performance Management

BRR maintains processes to support human performance in its operations. Aspects of human factors have been considered in the development and continual improvement of site management system programs, work instructions, engineering and operations activities, change control and the corrective action process.

Corporately, Cameco has defined competencies for Cameco employees and which describe expectations for performance and behaviour for all levels of the organization including individual contributors, those leading others and those leading the organization. Supervisors are provided support to effectively coach their employees during performance feedback to develop the critical behaviours of accountability and respect in all employees.

Work instructions and operating documents are developed in consideration of the physical interaction of people and the production plant equipment or systems. Various risk assessment tools are used as part of continual improvement, project design and implementation and change control to identify and control error-likely situations.

Corporate requirements for self-check, personal accountability, fitness for duty, and safety and radiation protection apply to all Cameco facilities to support human performance. These are embedded into the site's operating philosophy through multiple tools and practices intended at engaging employees, promoting awareness of operational status, correcting issues and improving communication within and between crews.

BRR maintains the minimum complement of sufficient personnel to safely operate the facility and respond to emergency situations. Further detail regarding the minimum complement scenarios for production and security personnel is security-sensitive and considered commercially confidential.

### 3.1.2 Training

The BRR maintains a training program that meets the requirements of REGDOC-2.2.2: *Personnel Training* and the Corporate Training Program.

The Systematic Approach to Training (SAT) consists of five sequential phases – Analysis, Design, Development, Implementation and Evaluation. Each phase has an outcome that feeds the subsequent phase. Each phase is necessary to ensure that the training program is systematically based. By utilizing the SAT, the BRR training program follows a logical progression from the identification of qualifications required to perform a job to the

|              |                                                   |               |             |          |        |
|--------------|---------------------------------------------------|---------------|-------------|----------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               |             | Doc. No. | AM 100 |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: | 25     |

development and implementation of training to achieve these qualifications and competencies, and the subsequent evaluation of this training.

Training and development strategies at BRR strive to:

- Promote a culture of safety, health and environment;
- Apply the corporate systematic approach to training;
- Comply with and move beyond legal and regulatory requirements;
- Incorporate adult learning principles;
- Create a respectful and supportive learning environment by recognizing differences in styles;
- Develop employees at every level;
- Develop the full potential of all employees in a positive learning environment; and
- Contribute to business results and competitiveness.

Employees are required to meet specified qualification requirements prior to performing assigned task(s) in an unsupervised environment. A qualification consists of related knowledge, skills and attitudes (or behaviours) required to perform a task or set of related tasks.

Training delivery is a formal activity to provide training identified in the needs analysis utilizing various methods, (e.g., instructor based, computer based, mentoring). It may take place on or off-site.

The evaluation stage measures the effectiveness of the training program through internal/external evaluations. The evaluations validate and identify areas where improvement may be required. The employee is evaluated on how well they have learned the delivered materials and/or how well they can perform specific tasks. Training evaluation includes course and instructor evaluations, and validation assessment with knowledge assessments and/or performance evaluations.

Qualifications have been established for trainers. Trainers must have sufficient knowledge, skills and experience to fulfil these qualifications. These trainers include all training department staff and other subject matter experts who provide training at the refinery.

### 3.1.2.1 Supervisor and Management Training

In addition to the CNSC's regulatory requirements, the requirements of the *Canada Labour Code* apply to the refinery. Under Part II of the *Canada Labour Code*, management and supervisors must take every reasonable precaution for the protection of workers, including ensuring workers use prescribed protective equipment and are advised of potential and actual hazards. It is a requirement that supervisors and management are trained to fully execute

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

these responsibilities and this training is part of the required health and safety related training for supervisors.

In addition, to ensure nuclear security, supervisors and management are trained to anticipate and respond to changes in employee behaviour in accordance with both the violence prevention requirements under Part II of the *Canada Labour Code*, and the *Nuclear Security Regulations*.

### 3.1.2.2 Contractor Training

The Cameco procurement processes ensure that contractors are qualified to carry out the work they are contracted to do and would typically not require contractors to complete a SAT-compliant qualification process. Contractors and some other non-site personnel who will be performing work in designated areas of the facility are provided an orientation to the site consisting of general health and safety, radiation and environmental information. The level of orientation received is dependent on the length, location, and risks of the job.

## 4.1 SCA- Operating Performance

**Legislative Requirement:** The *Class I Nuclear Facilities Regulations* requires that a licence application contain the following information: the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility. The *Nuclear Substances and Radiation Devices Regulations* has requirements for records to be kept and retained for nuclear substances.

**Table 5: BRR Documents Relevant to Operating Performance**

| Document                                                                                             | Site/Division/Corporate |
|------------------------------------------------------------------------------------------------------|-------------------------|
| Radiation Safety Program Manual, RS 100                                                              | Site                    |
| Environmental Protection Program, ET 110                                                             | Site                    |
| Radioisotope Source Control, RP 3.2.4                                                                | Site                    |
| Cameco Responses to Third-Party Recommendations in Production Increase Engineering Assessment Report | Site                    |

This safety and control area defines how the facility ensures that it operates in a safe manner.

### 4.1.1 Regulated Activities

The BRR is federally regulated by the CNSC as a Class 1B nuclear facility. However, BRR is also regulated by other government agencies through statute, regulation, permit, approval

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

and/or licence. Table 6 provides a list of these agencies along with overview of the key activities they regulate as they pertain to the refinery.

**Table 6: Agencies with Jurisdiction over BRR Operations**

| Agency                                                             | Activities Under Jurisdiction                                                                                                          |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Environment and Climate Change Canada (ECCC)                       | National Pollutant Release Inventory, halocarbons, spills reporting, deleterious substances enforcement under the <i>Fisheries Act</i> |
| Department of Fisheries and Oceans                                 | <i>Fisheries Act</i> and regulations related to protection of fish and fish habitat                                                    |
| Ontario Ministry of the Environment, Conservation and Parks (MECP) | Discharges to air and surface water and associated approvals, monitoring wells and spills reporting                                    |
| Town of Blind River                                                | By-laws related to noise, garbage and open-air burning                                                                                 |
| Department of Employment and Social Development Canada (ESDC)      | Conventional health and safety issues through the Canada Labour Code                                                                   |
| Ontario Ministry of Labour (MOL)                                   | Contractors at the facility may fall under provincial health and safety regulation                                                     |
| Ontario Technical Standards and Safety Authority (TSSA)            | Regulate boiler and pressure vessels and associated piping                                                                             |
| Transport Canada                                                   | Transportation of dangerous goods and navigable waters regulation                                                                      |

#### 4.1.2 Corporate Oversight

The BRR licensed activities are managed and controlled by the site, which is owned and operated by Cameco Corporation. Direction and overall accountability resides with the site. The corporate office provides policies and guidance to the operating sites and these are translated into site-specific management programs. The implementation of these programs is regularly monitored and reported on to assure the site management that these programs are implemented, adequate and effective. Corporate performs audits of the site management programs on a regular basis to verify that site performance meets both corporate requirements and complies with all applicable regulatory requirements.

#### 4.1.3 Operating Limits

Operating limits are defined in the licensing basis upon which the Commission rendered their decision to renew and/or amend the facility's FFOL.

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

The current annual production limit for the refinery is:

- 18,000 tonnes of uranium (tU) as uranium trioxide

The Commission has approved an increase in the annual production to 24,000 tU as UO<sub>3</sub> with the following conditions:

- The proposed modifications of the facility as specified in Cameco's letter dated June 28, 2011, are completed and commissioned;
- A final commissioning report on the proposed modifications specified in Cameco's letter dated June 28, 2011, is submitted to the Commission or a person authorized by the Commission for review and acceptance; and
- The final commissioning report specified above is accepted in writing by the Commission or a person authorized by the Commission.

Environmental release limits and radiation protection limits are established to ensure the protection of workers, the public and the environment. These are also defined in the licensing basis and documented in the respective programs (see sections 8.1 and 10.1).

#### 4.1.4 Nuclear Substances and Radiation Devices

The refinery maintains an inventory of sealed sources and tracks and reports their transfer as required by REGDOC 2.12.3: *Security of Nuclear Substances: Sealed Sources and Category I, II, and III Nuclear Material, Version 2*.

#### 4.1.5 Reporting Requirements

The refinery reports information to the Commission as required under the *NSCA*, its regulations and the operating licence.

Routine reporting includes:

- an annual compliance and performance report covering the period January 1 to December 31 by March 31 of the following year
- quarterly compliance reports within eight weeks of the end of each quarter

Non-routine reporting includes events as defined in sections 29-32 of the *General Nuclear Safety and Control Regulations*, section 27 of the *NSCA*, and the Licence Conditions Handbook.

### 5.1 SCA – Safety Analysis

**Legislative Requirement:** The *General Nuclear Safety and Control Regulations* require that a licence application contain information that includes a description and the results of any test, analysis or calculation performed to substantiate the information included in the application. The *Class I Nuclear Facilities Regulations* require that a licence application

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

contain information that includes a final safety analysis report demonstrating the adequacy of the design of the nuclear facility, and the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.

**Table 7: BRR Documents Relevant to Safety Analysis**

| Document Title                                | Site/Division/Corporate |
|-----------------------------------------------|-------------------------|
| BRR Safety Report, EP 200                     | Site                    |
| Fire Hazard Analysis                          | Site                    |
| Environmental Risk Assessment                 | Site                    |
| Derived Release Limit                         | Site                    |
| Spill Prevention and Contingency Plan, ET 240 | Site                    |
| Environmental Aspects Registry, ET 200        | Site                    |

The protection of the environment and health and safety of persons is a fundamental principle of the *NSCA*, the associated regulations and the regulatory approval process.

The design, construction and operation of the BRR is intended to eliminate or minimize to the extent possible the potential of radiological, chemical or other physical hazard to facility personnel, the environment and the general public. This is accomplished not by a single approach but rather by a defense-in-depth approach. The hazards, preventative measures and mitigating controls associated with the licensed activities at the BRR have been systematically reviewed and documented from several perspectives, including but not limited to the following assessments.

### 5.1.1 Safety Report

In 1999 BRR elected to review the design of the refinery using the Hazards and Operability (HAZOP) study technique recommended by the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE). The HAZOP study assessed all active processing areas, identifying contributors to risk and the adequacy of the safety measures in place. Recommendations for improvements were made and implemented as appropriate. Since that time, a few additional assessments were carried out using the HAZOP technique. More recently however, a structured design control program has been established to review and assess operational changes. The BRR safety report incorporates all of the HAZOP assessments as well as more recent changes assessed through the design control process. The safety report includes an analysis of the probable worst-case release event. The Safety Report is reviewed and updated at least every five years.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

### 5.1.2 Fire Hazard Analysis

Cameco maintains a site Fire Hazards Analysis (FHA) that meets the requirements of CSA N393-13 *Fire Protection for Facilities that Process, Handle or Store Nuclear Substances* and supporting reference materials. The FHA evaluates the impact of fire on the facility and demonstrates that the fire protection objectives can be met under foreseeable fire events. To satisfy this objective, safety significant systems and equipment as well as fire hazards have been identified. An analysis has been made of the potential for a worst-case fire event to impact safety related systems and equipment. This assessment is also relevant to the Emergency Management and Fire Protection SCA.

### 5.1.3 Environmental Risk Assessment

Cameco maintains an environmental risk assessment (ERA) in accordance with the requirements of CSA N286.6: *Environment Risk Assessments at Class 1 Nuclear Facilities and Uranium Mines and Mills*. The most recent assessment found there were no undue risks to the environment or to human health as a result of refinery operations. The ERA is updated on a minimum five-year frequency. This assessment is also relevant to the Environmental Protection SCA.

### 5.1.4 Derived Release Limit

CNSC regulations require that no member of the public receive more than 1 mSv/year. In order to demonstrate that this requirement has been met, the site maintains a derived release limit (DRL) report, completed in accordance with CSA N288.1: *Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities*. The DRL is reviewed every five years to ensure that considering the most relevant scientific literature, the facility operations are maintained well below the public dose limit. This assessment is also relevant to the Environmental Protection SCA.

### 5.1.5 Chemical Hazard Assessment

The BRR has developed a site-specific Spill Prevention and Contingency Plan (SPCP) in accordance with the requirements of Ontario Regulation (O. Reg.) 224/07. The primary objective of the SPCP is to help prevent or reduce the risk of spills of hazardous chemicals, pollutants or dangerous goods to the environment and to prevent, eliminate or improve any adverse effects that may result from such spills. The SPCP provides detailed information and guidance on actions related to the prevention of spills and on procedures to detect and respond to them in a timely and effective manner if they occur. The SPCP is reviewed on an annual basis.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

### 5.1.6 Environmental Aspects Registry

In accordance with the requirements of ISO14001 – Environmental Management Systems, the BRR has documented and analysed its activities, products and services to determine the interactions of the facility with the environment. These interactions may result in environmental impacts of varying significance. Interactions are categorized into actual and potential environmental impacts. Actual environmental aspects (i.e. interactions) are those that result from the plant operation, such as emissions to the air, water and land. Potential environmental aspects are those that may result from the plant operation and for which controls are in place to prevent an event from happening or mitigating the impact if the event occurs. This information is documented in the site Environmental Aspects Registry which is reviewed and updated, as required, on an annual basis. Significant aspects identified through this process are reviewed to ensure the monitoring program is appropriate for the facility. In addition, where opportunities to improve the aspects exist, this information is considered in the annual environmental objectives and targets.

### 6.1 SCA – Physical Design

**Legislative Requirement:** The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed measures, policies, methods and procedures to maintain the nuclear facility. The *Class I Nuclear Facilities Regulations* require that a licence application contain a description of the structures, systems and equipment, including the relevant design information for the facility.

**Table 8: BRR Documents Relevant to Physical Design**

| Document                                                                         | Site/Division/Corporate |
|----------------------------------------------------------------------------------|-------------------------|
| Change Management Procedure, AM 37                                               | Site                    |
| Design Control Procedure, PR 33                                                  | Site                    |
| Facility Licensed Area Drawing<br>BRR700P-C-0002200-01                           | Site                    |
| Owned and Leased Property Boundaries Drawing<br>BRR700P-C0002200-02              | Site                    |
| Cameco's Response to Third Party Engineering Assessment<br>Report Correspondence | Site                    |
| Authorized Inspection Agency Services Agreement                                  | Site                    |
| Quality Control Manual for TSSA Certificates of Authorization                    | Site                    |

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

These processes assess the ability of structures, systems and components to meet and maintain their design basis given new information arising over time and manage changes to ensure that safety is maintained.

### 6.1.1 Current Facilities

Site details are provided in section 1.2. The licensed area is secured by a metal fence that encloses the entire perimeter except for the front of the main building.

### 6.1.2 Current Plant Equipment

The BRR contains numerous types of conventional industrial equipment including storage tanks, conveyors and associated piping, as well as specialized equipment for the uranium refining processes. Due to the nature of the raw materials such as nitric acid, materials of construction in the facility are specific to the service in which they are utilized. The maintenance, engineering and reliability department maintains pipe specifications to document these requirements.

### 6.1.3 Facility and Process Changes

All changes to the physical design of equipment, processes and the facility are evaluated from project planning through to the completion of the project. These changes may be physical changes completed through capital projects or maintenance work, or may be administrative through training, procedures or other controls. The design control review process involves subject matter experts and identifies potential implications with respect to operability, health and safety and the environment, including any regulatory and/or code implications.

### 6.1.4 Design Governance for Safety Significant Systems

All changes to the facility's design and equipment are reviewed and documented throughout the design control process described in site procedure PR 33. However, there are certain systems that are designated to have the highest safety significance with respect to protection of people and the environment. These systems and associated equipment are described in section 2.1.3.

### 6.1.5 Third Party Review for Fire Protection

Modifications for which the initial assessment indicates a potential impact on fire protection design basis, goals, or criteria are subject to a qualified third-party review. All third-party reviews are conducted by qualified persons from organizations whose management and financial operations are independent of the design organization. All third-party fire reviews are submitted to CNSC staff as required by the licence and LCH.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

### 6.1.6 Pressure Boundary Program

As required by the its operating licence, the BRR maintains an agreement with an Authorized Inspection Agency (AIA) for the registration, inspection and other activities related to pressure systems.

The Technical Standards and Safety Authority (TSSA) is the AIA for the BRR. The TSSA approves the quality control program which governs the shop fabrication, field installation, assembly, repairs and erection of piping systems in accordance with CSA-B51: *Boiler, pressure vessel, and pressure piping code*, CSA-B52: *Mechanical Refrigeration Code*, American Society of Mechanical Engineers (ASME) B31.1: *Power Piping*, ASME B31.3 *Process Piping* and repairs and alterations of boilers and pressure vessels, piping and fittings in accordance with CSA B51, the National Board Inspection Code and Original Codes of Construction.

The Pressure Boundary Program establishes the infrastructure and defines the activities necessary to maintain a sustainable process that allows BRR to perform activities associated with repairs, replacements, modifications and alterations to pressure retaining items, components, and systems including installation of new systems. Within this program Cameco maintains Certificates of Authorization with the TSSA to confirm that the quality program for pressure systems is in accordance with the *Ontario Technical Standards and Safety Act, 2000* and O. Reg. 220/01 *Boilers and Pressure Vessels*.

### 7.1 SCA – Fitness for Service

**Legislative Requirements:** The *Class I Nuclear Facilities Regulations* require that a licence application contain information including the proposed measures, policies, methods and procedures for operating and maintaining the nuclear facility.

**Table 9: BRR Documents Relevant to Fitness for Service**

| Document                                          | Site/Division/Corporate |
|---------------------------------------------------|-------------------------|
| Preventative Maintenance System Procedure, MA 100 | Site                    |

Critical requirements for maintaining a safe facility are effective maintenance and quality assurance programs. This is to ensure any changes to plant equipment are adequately controlled and authorized, and do not adversely affect the safety of the facility. This SCA covers activities that impact the physical condition of structures, systems and components to ensure that they remain effective over time. This area includes programs that ensure all equipment is available to perform its intended design function when called upon to do so.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

### 7.1.1 Preventative Maintenance

The BRR has an established preventative maintenance program. All preventative maintenance work is initiated and documented through the work notification system in SAP. For safety significant systems, structures and components, preventive maintenance plans are reviewed and updated periodically. The site maintenance program ensures that equipment functions as designed over its lifetime so that safety systems remain available, meet the design intent in the safety report and that equipment failures are minimized. This is accomplished by completion of corrective and preventative maintenance activities along with routine inspections on system components to ensure that they remain in good operating condition.

### 7.1.2 In-service Inspection Program

The BRR has an in-service inspection program that applies to the piping and vessels in the safety significant systems. Technicians performing the inspections are certified in accordance with the Canadian General Standards Board. Inspection methods (e.g. ultrasonic or liquid penetrant) have been selected based on the historical record of operation and inspection at the BRR and are considered the most appropriate for detecting potential problems and for revealing the type of deterioration most likely to occur as a result of the service conditions to which the equipment is subjected.

### 7.1.3 Periodic Inspection and Testing for Fire Protection Systems

Fire protection systems are tested according to an established schedule developed using the National Building Code and National Fire Code. Reviews of aspects of the fire protection systems are completed as required by CSA N393-13: *Fire protection for facilities that process, handle, or store nuclear substances*.

## 8.1 SCA – Radiation Protection

**Legislative Requirements:** The *Radiation Protection Regulations* require that the licensee implement a radiation protection program and also ascertain and record doses for each person who performs any duties in connection with any activity that is authorized by the NSCA or is present at a place where that activity is carried on. This program shall ensure that doses to workers do not exceed prescribed dose limits and are kept as low as reasonably achievable (ALARA), social and economic factors being taken into account.

|              |                                                   |                  |             |             |
|--------------|---------------------------------------------------|------------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100      |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version: 25 |

**Table 10: BRR Documents Relevant to Radiation Protection**

| Document                                                                  | Site/Division/Corporate |
|---------------------------------------------------------------------------|-------------------------|
| Radiation Safety Program Manual, RS 100                                   | Site                    |
| Radioisotope Source Control, RP 3.2.4                                     | Site                    |
| FSD's Internal Dosimetry Program Technical Basis Document, FSD-PRG-RAD-01 | Divisional              |
| Dosimetry Service Licence,                                                | Divisional              |

Radiation protection measures are in place to minimize and control the potential for radiation exposure to both employees and members of the general public arising from the operation of the BRR. This exposure is due to the alpha, beta and gamma radiation emitted from the natural uranium compounds received, processed and produced at the refinery. Exposure can be from beta or gamma radiation outside the body, or alpha, beta or gamma radiation from inside the body as a result of inhalation, ingestion or absorption through the skin of uranium bearing materials.

Uranium levels in the air, water and soil in the vicinity of the refinery are monitored to ensure that they are minimized and maintained below levels that affect the environment or the public. The following is a summary of the radiation protection program at the BRR that meets the requirements of the *Radiation Protection Regulations*. The full details of how the program ensures that contamination levels and radiation doses received by individuals are monitored, controlled and maintained ALARA are documented in the Radiation Safety Program Manual (RSPM).

### 8.1.1 Potential Radiological Hazards

Radiation hazards at BRR are associated with natural uranium and its associated daughter products and impurities. While both external and internal radiation hazards are present at the refinery, the potential risk associated with internal hazards are of more significance. Working in the presence of uranium, exposure can result from inhalation, ingestion or contamination of an open wound. The primary hazards are chemical damage to the kidney, radiation dose to the bone, and radiation dose to the lung. The RSPM provides further details on the dose implications of the uranium and thorium compounds found at the BRR.

### 8.1.2 Nuclear Energy Workers

Any individuals having a reasonable probability of receiving a radiation dose greater than 1 mSv are designated as Nuclear Energy Workers (NEWs). At the BRR all employees are designated as NEWs. Other individuals, such as contractors performing work on site, may be designated as NEWs as well. As required by the *Radiation Protection Regulations*, all

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

NEWs are notified in writing that they have been designated as such. Female NEWs are also notified in writing of their rights related to pregnancy and breast feeding, including the benefits of notifying Cameco, as soon as they are aware of their pregnancy or planning to breast feed.

All NEWs also receive training on the risks associated with radiation, in addition to other radiation protection safety training topics. As a general rule, visitors will not be made NEWs since they are on site for only a short period of time and are not involved in activities that would result in an appreciable radiation dose.

### 8.1.3 ALARA

Cameco recognizes that the responsibility for the health and safety of its employees is of the foremost importance. To meet this responsibility, Cameco acknowledges and accepts the ALARA principle that doses of ionizing radiation should be kept as low as reasonably achievable, social and economic factors taken into account. An ALARA program that meets regulatory requirements is described in the site RSPM.

### 8.1.4 Personal Dosimetry

The annual dose assignment of NEWs working at the BRR consists of both external and internal dosimetry inputs. The annual dose assignment is the sum of whole body dose as measured by dosimeter badges plus dose from uranium in urine plus dose from lung burden and is reported to all NEWs on an annual basis. Each of the three components of the personal dosimetry program is described below.

#### External Dosimetry

Individually assigned dosimeters are used to determine external dose as both deep-dose equivalent and shallow-dose equivalent exposure from external sources of radiation. The external dosimetry service for Cameco is provided through a CNSC approved external dosimetry service provider. Action levels for external dosimetry are shown in Table 11. These action levels are also referenced in the RSPM and in the appropriate radiation safety procedures. Extremity dose measurements are also utilized for some individuals who work routinely in the raffinate treatment area; using ring-type dosimeters that are processed in the same manner as the conventional dosimeters.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

**Table 11: Action Levels for External Dosimetry (NEW)**

| External Dosimetry Parameter | Frequency            | Regulatory Action Level (mSv) |
|------------------------------|----------------------|-------------------------------|
| Whole Body Exposure          | Monthly              | 2.0                           |
|                              | Quarterly            | 0.7                           |
|                              | Balance of Pregnancy | 2.0                           |
| Skin Exposure                | Monthly              | 15.0                          |
|                              | Quarterly            | 6.0                           |

### Internal Dosimetry

Cameco's Fuel Services Division holds a licence from the CNSC that authorizes Cameco to provide internal dosimetry services to the PHCF, BRR and CFM. Additional information regarding this program may be found in FSD's Internal Dosimetry Program Technical Basis Document (TBD).

Internal dose is assessed and assigned through two programs – urine analysis and lung counting. As described in the TBD, when assigning dose through the urine analysis program, it is assumed that the exposure was to a fast (soluble) uranium compound. When a dose is assigned through the lung counting program, it is assumed that a combination of medium (slightly soluble) and slow (insoluble) uranium compounds are present. When the source of the exposure to an individual is known (such as in the event of a process upset), the dose calculations are specific to that compound.

### Urine Analysis

All employees and contractor NEWs (dependent on where they are working on site) are required to submit routine urine samples for uranium analysis. Routine urine samples are used to calculate and assign dose to an individual as per the criteria specified in the TBD. The analysis at BRR is certified by the Radiation Protection Bureau annually. A computer-based system is used to generate labels for urine samples and to track the submission of urine samples for the purposes of assessing program compliance. Any urine result above a pre-defined screening level is reviewed by the Radiation Safety Officer and investigated as required. Urine analysis action levels are shown in Table 12.

**Table 12: Action Levels for Urinalysis (NEW)**

| External Dosimetry Parameter | Frequency | Regulatory Action Level ( $\mu\text{g U/L}$ ) |
|------------------------------|-----------|-----------------------------------------------|
| Routine Sample               | Bi-weekly | 65                                            |
|                              | Monthly   | 44                                            |

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

## Lung Counting

The dose assessment of uranium in lung is performed using a germanium detector-based lung counting system. A group-counting technique is used for dose assignment where all employees in a similar work group are assigned an average internal dose. This method involves creating appropriate groupings of individuals based on similar exposure potential and measuring and assessing each individual's spectrum, taking detection criteria and physical conditions (e.g. individual chest wall thickness) into account. The frequency of lung counting of NEWs is based on the work group to which the employee belongs and is described in the RSPM. Individuals who are not lung counted such as administrative support staff and contractors have internal dose based on lung exposure determined through prorating the average dose from an appropriate reference group.

Individuals with lung count results above the detection criteria are assigned an individual dose and this dose is not included in the group average. Dose from lung counting is assigned annually as part of every NEWs annual dose report. Individuals with a lung burden above the detection criteria are informed of their assigned dose as soon as possible after completion of all required lung counts. The action level for dose due to lung burden has been set at 5 mSv/year.

### 8.1.5 Zone Control – Contamination Control

The BRR maintains zone control and monitoring programs as described in the RSPM to identify areas of potential contamination and prevent the spread of radioactive contamination from these areas. The site has been divided into three zones - Zone 1, Zone 2 and Zone 3. The possibility of contamination increases with increasing zone number.

### 8.1.6 Radioisotope Control

The refinery uses a number of radioisotopes that are regulated under the CNSC *Nuclear Substances and Radiation Devices Regulation*. Cameco maintains a record of the specific radioisotope sources on site that are present above an exemption quantity, the radioisotope used and the maximum activity of the device as described in the RSPM and the associated procedures. These sources can range in type from nuclear gauges to instrument calibration sources and tracer solutions. The controls associated with sealed sources, unsealed sources and radiation devices are described in the RSPM and associated procedures and include training, certification where required, leak testing, radiation warning signs and limited access to areas where sources are stored.

### 8.1.7 Worker Dose Control

Radiation safety refresher training is done on an on-going basis through regular scheduled training sessions for all employee groups. Contractors, whether they are designated as NEWs

|              |                                                   |                  |             |             |
|--------------|---------------------------------------------------|------------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100      |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version: 25 |

or not, receive orientation training, which includes a radiation protection component, every twelve months.

The refinery has a hazard recognition procedure that serves as a safety clearance for maintenance work. Additional special clearance procedures are available for work such as confined space and hot work permits. Where applicable, these procedures have requirements for contacting the radiation safety group prior to starting work.

There are a number of permanent air sampling stations located throughout the refinery. Stations located in process areas where there is a higher likelihood of airborne uranium or thorium dust being present are operated on a continual basis, with the filter papers being collected and analyzed once a day. Other sampling stations where there is less likelihood of airborne uranium dust being present are operated on a less frequent basis. There are also continuous air monitors providing real time results installed in the auger sampling, calcination and denitration areas. The air sampling stations serve to assist in identifying process upsets, equipment breakdowns or other instances of loss of containment. Additional details on the refinery air sampling program may be found in the RSPM. Respiratory protection is required in any area where the airborne concentration of uranium exceeds a set internal level.

## 9.1 SCA – Conventional Health and Safety

**Legislative Requirement:** the *Class I Nuclear Facilities Regulations* require that a licence application contain information including the proposed worker health and safety policies and procedures. As a federally regulated site, BRR is also subject to the requirements of Part II of the *Canada Labour Code* and the *Canada Occupational Health and Safety Regulations*.

Cameco's SHEQ policy provides the direction for site programs and procedures. The Health and Safety Management System (HSMS) program manual describes how the health and safety program manages workplace safety hazards to ensure protection of personnel and equipment at the site. The manual meets the requirements of the corporate Health and Safety Program Manual and Part II of the *Canada Labour Code*.

**Table 13 BRR Documents Relevant to Conventional Health and Safety**

| Document                                                   | Site/Division/Corporate |
|------------------------------------------------------------|-------------------------|
| Health and Safety Management System Program Manual, HS 100 | Site                    |

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

### 9.1.1 Conventional Safety Program

A key element of a safe, clean and reliable operation is a comprehensive and well-established worker protection program, which is in place at BRR. The regulations made pursuant to the NSCA and Part II of the *Canada Labour Code* prescribe specific health and safety requirements that are met by BRR. In addition, Cameco's SHEQ policy and corporate Health and Safety Program provide direction for site programs and procedures. The Health and Safety Management System Program Manual describes the health and safety program at the site.

The health and safety management program fosters and promotes a strong sustainable safety culture with a safe, healthy and rewarding workplace. Cameco has five key principles in the area of safety that form the framework of how safety is managed. These are:

- safety is our first priority;
- we are all accountable for safety;
- safety is part of everything that we do;
- safety leadership is critical to Cameco Corporation; and
- we are a learning organization.

The health and safety of workers at BRR is ensured through site-specific safety and health management programs. Key components of the program include:

- compliance with all safety and health-related legal and regulatory requirements;
- the setting of site safety and health objectives;
- the implementation of corporate safety standards;
- the development and maintenance of a formal hazard recognition, risk assessment and change control processes; and
- the documentation of health and safety significant incidents from the start through to the verification of completion of corrective actions via the CIRS database.

### 9.1.2 Hazards

The BRR is a Class IB nuclear facility and a chemical processing plant. There are radiological hazards associated with the various forms of uranium present at the refinery as well as chemical hazards such as bulk quantities of nitric acid, phosphoric acid and kerosene. Other chemicals present on site include reagents used in the analytical labs, water treatment chemicals and lubricating agents. Aside from chemicals that are purchased for refinery operations, the process of producing UO<sub>3</sub> from uranium concentrate generates other chemical compounds, such as oxides of nitrogen (NO<sub>x</sub>).

There are also a variety of physical hazards that are monitored and controlled at the site such as heat, lighting, noise, vibration, traffic and extreme weather.

|              |                                                   |                  |             |             |
|--------------|---------------------------------------------------|------------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100      |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version: 25 |

### 9.1.3 Work Controls

All site personnel have a general awareness of the occupational health and safety hazards that exist at the site and the various means of minimizing these risks. All groups attend regular department safety meetings where employees are encouraged to discuss safety issues or concerns. Safety training and re-training are done through in-class sessions, safety meetings, and computer-based training depending on the topic.

Hazardous materials are labeled or identified to meet applicable regulations. The proper identification of hazardous materials decreases the likelihood of improper use, handling and disposal, which reduces potential risks and negative consequences. Purchasing procedures are in place for the procurement of chemicals. Safety Data Sheets (SDS) are requested from vendors for each type of chemical purchased. SDS information has also been developed for all of the uranic materials on site.

Work instructions, procedures, job hazard analysis (JHA), hazard recognition cards, hazard identification risk assessment and control (HIRAC), and hazard specific clearances (i.e. hazardous energy, confined space, radiation) are some of the tools used to identify and control hazards in the workplace.

Personal protective equipment (PPE) is provided as necessary and is specified in the work instruction, JHA or clearance for the job. All PPE is approved to ensure that the correct PPE is available for each job. Chemical resistant gloves, chemical goggles and/or face shields, chemical suits and disposable coveralls are available for safe chemical handling. Half mask, full-face mask and supplied air respiratory protection with appropriate respirator cartridges are available for tasks where inhalation of uranium, chemicals and/or dust is possible above the respective DAC or exposure limit. In addition to air-purifying respirators, process, maintenance, powerhouse and emergency response personnel are trained in the use of self-contained breathing air apparatus.

Personal and area monitoring is performed to assess workplace exposures. These include in-plant uranium in air levels, thorium-in-air levels in the raffinate area and urine analysis programs for uranium. Monitoring for other parameters (e.g. asbestos, lead in paint, heat, lighting, noise etc.) is performed on an “as needed” basis.

### 9.1.4 Health and Safety Committee

In accordance with Part II of the *Canada Labour Code*, the site Facility Health and Safety Committee (FHSC) fulfills the requirement for both a policy health and safety committee and a workplace health and safety committee. The FHSC has representatives from both management and the employee group. This committee participates in the implementation and monitoring of the occupational health and safety programs.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

## 10.1 SCA – Environmental Protection

**Legislative Requirement:** The *Class I Nuclear Facilities Regulations* require that a licence application contain the proposed environmental protection policies, procedures, effluent and environmental monitoring programs. The *General Nuclear Safety and Control Regulations* require that every licensee take all reasonable precautions to protect the environment and the health and safety of persons and to maintain the security of nuclear facilities and of nuclear substances. The *Radiation Protection Regulations* prescribe the radiation dose limits for the general public of 1 mSv per calendar year.

**Table 14: BRR Documents Relevant to Environmental Protection**

| Document                                                                              | Site/Division/Corporate |
|---------------------------------------------------------------------------------------|-------------------------|
| FSD Environmental Management System, FSD-PGR-EMS-001                                  | Divisional              |
| Environmental Protection Program, ET 110                                              | Site                    |
| Derived Release Limit (DRL) Report                                                    | Site                    |
| Environmental Risk Assessment for the Cameco Blind River Refinery                     | Site                    |
| Review of Environmental Action Levels to Support the Environmental Protection Program | Site                    |

The BRR maintains an Environmental Protection Program that meets the requirements of CNSC REGDOC-2.9.1: *Environmental Protection: Environmental Principles, Assessments and Protection Measures (Version 1.1)*. Cameco Corporation is registered to the ISO 14001 Standard and BRR is included in that corporate registration. The program identifies, controls and monitors releases of radioactive and hazardous substances and the effects on the environment as a result of licensed activities.

### 10.1.1 Environmental Management Program (EMP)

The FSD EMS describes the program elements that meet the requirements of the ISO 14001 standard and applicable CSA N288 series standards. The site environmental protection program (EPP) describes site-specific aspects associated with the environmental sampling that is carried out in support of the EMS and the ERA. This monitoring data is then compared to applicable action levels and limits to ensure operations remain in compliance with applicable regulations and license limits.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

### 10.1.2 Environment and Public Assessments

In addition to the ERA, the site has completed a number of other environment-related assessments, which are periodically reviewed and updated to ensure that BRR operations do not pose an unreasonable risk to employees, the public or to the environment.

The list of environment-related assessments includes:

- Environmental Risk Assessment
- Environmental Aspects Registry
- Spill Prevention and Contingency Plan
- Emission Summary and Dispersion Modelling Report
- Derived Release Limit
- BRR Safety Report

### 10.1.3 Environmental Regulation

Airborne and liquid effluent discharge quality is defined and regulated by federal and provincial regulators. For Cameco, the main federal regulatory agencies are the CNSC and ECCC. Provincial regulation is by the Ontario MECP. The acts (and associated regulations) enforced by these agencies include the *NSCA*, *Canadian Environmental Protection Act, 1999*, *Fisheries Act*, *Ontario Water Resources Act* and the *Environmental Protection Act*. BRR must also comply with applicable municipal bylaws.

### 10.1.4 Airborne Emission Program

The primary air emissions associated with the BRR are uranium and oxides of nitrogen. These contaminant emissions are measured using source monitoring and/or estimated using available monitoring data.

There are two process stacks and three utility stacks in use at the refinery. Routine sampling is carried out at the two process stacks for uranium and total particulate when operating. The incinerator stack is also sampled routinely for uranium and total particulate when operating. The other two utility stacks are the boiler stack and the calciner flue gas stack, both of which discharge combustion products from natural gas. More detailed sampling information can be found in the Environmental Protection Program manual.

The current air emissions action levels and limits for the refinery stack emissions are shown in the following table.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

**Table 15: Summary of Air Discharge Limits and Environmental Action Levels**

| Source                                               | Parameter       | CNSC Limit       | Action Level    |
|------------------------------------------------------|-----------------|------------------|-----------------|
| Dust Collection and Exhaust Ventilation Stack (DCEV) | Uranium         | 100 g/h (weekly) | 2.2 g/h (daily) |
| Absorber Stack                                       | Uranium         | 100 g/h (weekly) | 0.5 g/h (daily) |
|                                                      | NO <sub>x</sub> | 56 kg/h (weekly) | 12 kg/h (daily) |
| Incinerator                                          | Uranium         | 10 g/h (daily)   | N/A             |
| Combined Sources                                     | Particulate     | 11 kg/h (weekly) | N/A             |

Validation of Cameco's emissions from the two process stacks is completed by compliance testing conducted by an independent third party at least once every two years. Annual compliance testing is carried out at the incinerator stack as specified in the incinerator stack ECA. This source testing is completed using approved stack sampling protocols. A pre-test plan is prepared, submitted and approved by the MECP prior to each independent stack testing campaign.

Air emissions are also regulated by the MECP under O. Reg. 419/05 *Air Pollution - Local Air Quality*. Site air emissions are documented and compared against point of impingement standards in the site ESDM report. The ESDM report predicts contaminant concentrations from the refinery at the fence line, which results in a more conservative approach than using the actual Cameco property boundary. The ESDM report is updated annually to reflect the most recent air emissions data.

In support of the source sampling program, an ambient air sampling program has been established to measure the concentration of uranium in the air in the vicinity of the refinery. Five high-volume (hi-vol) sampling stations are located in the vicinity of the refinery; two inside the perimeter fence line and three outside perimeter fence line. Soil sampling for uranium in the vicinity of the refinery is also done for uranium on a periodic basis. Additional information on ambient monitoring can be found in the EPP.

### 10.1.5 Liquid Emission Program

There is one point of liquid effluent discharge from the property. Liquid effluent from the process and utilities (including the sewage treatment plant) is pumped to one of three holding lagoons where it is sampled to ensure it meets all regulatory requirements prior to discharge. The facility also has a storm water lagoon to collect surface water run-off from the site. All liquid effluent is combined prior to being discharged into the North Channel of Lake Huron via an outfall pipe diffuser. A flow proportional sampler is located on the discharge line and collects a composite sample of effluent as it is being discharged.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

CNSC liquid effluent discharge limits and action levels are shown in Table 15 below. There are also separate provincial discharge limits for liquid effluent discharges as defined in the Environmental Compliance Approval from MECP. Additional information on liquid effluent monitoring can be found in the environmental protection program.

**Table 16:** Summary of CNSC Liquid Effluent Discharge Limits and Action Levels

| Parameter                                        | CNSC Limit              | Action Level          |
|--------------------------------------------------|-------------------------|-----------------------|
| Uranium                                          | 2.0 mg/L (see Note 1)   | 0.2 mg/L (see Note 2) |
| Nitrate (as N)                                   | 1,000 mg/L (see Note 1) | 120 mg/L (see Note 2) |
| Radium-226                                       | 1.0 Bq/L (see Note 1)   | 0.1 Bq/L (see Note 2) |
| Acid Balance (as H <sub>3</sub> O <sup>+</sup> ) | ≤6.0 and ≥9.5 (daily)   | N/A                   |

Note 1 – Monthly average of weekly composite samples.

Note 2 – Based on the weekly composite sample.

The refinery also has two provincial permits to take water. One permit limits the amount of groundwater that can be taken from the three groundwater wells along the Mississagi River, while the other permit specifies water taking requirements from the River for site irrigation purposes.

### 10.1.6 Ambient Water Quality

Lastly, surface and groundwater samples are taken in the vicinity of the refinery. Water samples are collected from the North Channel of Lake Huron, where liquid effluent is discharged, and from the Mississagi River, which is located downstream of the refinery with respect to groundwater movement. Surface water samples are also collected from a number of groundwater monitoring wells located both upstream and downstream from the refinery.

### 10.1.7 Derived Release Limit – Estimated Dose to the Public

The Derived Release Limit (DRL), in simplified terms, is the amount of radioactivity released by a nuclear facility that results in a radiation dose of 1 mSv/year to a representative member of the public. For the BRR, there are four components to the DRL: dose to the public arising from discharges of radioactivity in water, dose to the public arising from discharges of radioactivity from the refining process in air, dose to the public arising from discharges of radioactivity from the incinerator in air and dose to the public arising from gamma radiation emitted from the refinery.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

Each of the components has a different critical receptor, or most exposed member of the public. The following table summarizes the most restrictive DRL values for each component; corresponding to a 1 mSv/y dose.

**Table 17: DRL Values Corresponding to a 1 mSv/y Dose**

|     | Refinery Air Emissions (g/h U) | Incinerator Air Emissions (g/h U) | Water Discharges (g/h U) | Gamma Radiation ( $\mu\text{Sv/h}$ ) |
|-----|--------------------------------|-----------------------------------|--------------------------|--------------------------------------|
| DRL | 1000                           | 1300                              | 9500                     | 1.1                                  |

The total dose to a member of the public can be controlled through the use of the following sum rule:

$$1 \geq \frac{r_{\text{refinery}}}{\text{DRL}_{\text{refinery}}} + \frac{r_{\text{incinerator}}}{\text{DRL}_{\text{incinerator}}} + \frac{r_{\text{water}}}{\text{DRL}_{\text{water}}} + \frac{\gamma_{\text{gamma}}}{\text{DRL}_{\text{gamma}}}$$

where,  $r_{\text{refinery}}$  = the release rate of uranium from the refinery air sources (g U/h);  
 $r_{\text{incinerator}}$  = the release rate of uranium from the incinerator air sources (g U/h);  
 $r_{\text{water}}$  = the release rate of uranium from the water sources (g U/h);  
 $\gamma_{\text{gamma}}$  = the gamma exposure rate (above background) ( $\mu\text{Sv/h}$ ).

The DRL values in the equation will vary based on which receptor is being used to calculate the public dose. However, as long as the total of the four ratios in the above equation is less than one, the public dose at that particular receptor will remain below 1 mSv/year. The DRL calculates a dose to the public that is higher than the actual public exposure during normal facility operations.

### 10.1.8 Reported Dose to the Public

Dose to the public from air and water emissions is a very small fraction of the calculated public dose. Gamma emissions from the radioactive material stored and processed at the facility dominate the reported dose to the public. Therefore, it is essential to monitor gamma emissions at the fence line and at the off-site hi-vol stations to ensure that the dose to the public is maintained as low as reasonably achievable and well below the public dose limit of 1 mSv/year. The gamma emissions are measured at key locations using environmental dosimeters supplied by a licensed dosimeter service. The action level for the North Fence Gamma Radiation Monitor is 1.0  $\mu\text{Sv/h}$  on a monthly average.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

## 11.1 SCA – Emergency Management and Fire Protection

**Legislative Requirement:** The *Class I Nuclear Facilities Regulations* require measures to prevent or mitigate the effects of accidental releases of nuclear substances and hazardous substances on the environment, the health and safety of persons and the maintenance of national security, including measures to assist, notify, report to off-site authorities including the testing of the implementation of these measures.

**Table 18: BRR Documents Relevant to Emergency Management & Fire Protection**

| Document                        | Site/Division/Corporate |
|---------------------------------|-------------------------|
| Emergency Response Plan, EP 100 | Site                    |
| Fire Protection Program, FS 200 | Site                    |
| Fire Safety Plan, FS 100        | Site                    |

BRR maintains emergency preparedness and fire protection programs to ensure that licensed activities do not result in an unreasonable risk to the health and safety of persons and the environment.

### 11.1.1 Emergency Planning

Emergency planning for nuclear facilities is a requirement of the *NSCA* (Section 24 (4)) and the *Class I Nuclear Facilities Regulations* (Section 6(k)). The BRR Emergency Response Plan (ERP) is compliant with the requirements of REGDOC 2.10.1: *Nuclear Emergency Preparedness and Response*. In addition to the ERP, there are a number of other site documents that provide additional emergency response information, including information specific to emergency response related training.

### 11.1.2 Emergency Preparedness and Response Organizations

Depending on type and magnitude of an incident, the site may activate any or all of the following response organizations for the protection of human health, the environment and property: Emergency Response Team (ERT), Emergency Response Organization, Local Crisis Management Team, and the Corporate Crisis Management Team.

The ERT consists of approximately 40 employees, and includes employees trained in firefighting, industrial rescue and first aid. There are ERT members on each process crew, as well as on day shift. There are a minimum of four ERT members on site at all times when the UO<sub>3</sub> plant is operating. This allows for a two-person entry team and a two-person rapid intervention team to respond to incidents at the facility within 10 minutes, 24 hours a day when the UO<sub>3</sub> plant is operating. Additional ERT members will be called in depending on the scenario.

|              |                                                   |                  |             |             |
|--------------|---------------------------------------------------|------------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100      |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version: 25 |

### 11.1.3 Fire Protection Program

The Fire Protection Program (FPP) has been developed and implemented to comply with the requirements of the National Fire Code, National Building Code, and with CSA N393-13: *Fire Protection for facilities that process, handle, or store nuclear substances*.

The FPP consists of the following main elements: the Fire Hazard Analysis (FHA), the Fire Safety Plan (FSP), Pre-incident Plans and related fire safety procedures. These documents are reviewed and updated on a periodic basis by qualified personnel, as required.

Routine inspections and testing of the fire protection system are conducted by or under the direction of Cameco personnel. A system is in place to enable detection and notification of fire. Emergency pull stations are located strategically throughout the facility. Areas with potential fire hazards are equipped with appropriate fire detection and/or suppression systems. Fire safety equipment is maintained with the use of preventive maintenance and periodic inspections.

### 11.1.4 Recovery Program

The recovery plan will depend on the nature of the emergency situation, i.e., whether the emergency is local (within the plant), external (off-site) or a transportation event. Depending on the situation, the recovery plan may require regulatory review and approval. Recovery plans would be developed to minimize the impact to personnel involved in the clean-up, the environment and the general public. Additional information on recovery plans is provided in the ERP.

## 12.1 SCA – Waste Management

The waste management program defines waste generated as part of licensed activities, how it is managed onsite and removed from the facility. This area also covers the planning for decommissioning.

**Table 19: BRR Documents Relevant to Waste Management**

| Document                                    | Site/Division/Corporate |
|---------------------------------------------|-------------------------|
| Waste Management Program, PR 300            | Site                    |
| FSD Waste Management Program, FSD-PGR-WM-01 | Divisional              |
| Waste Management Procedure, PR 110          | Site                    |
| Preliminary Decommissioning Plan, PDP       | Site                    |

|              |                                                   |                  |             |             |        |
|--------------|---------------------------------------------------|------------------|-------------|-------------|--------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  |             | Doc.<br>No. | AM 100 |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:    | 25     |

### 12.1.1 Waste Management

The waste management activities are conducted with the following objectives:

- To manage and dispose of wastes in accordance with applicable laws and generally accepted industry practices so as to minimize the potential adverse impact to personnel and to the environment;
- To minimize and reduce the quantity of stored onsite waste through recycle, re-use and recovery to the extent possible;
- To segregate radioactively contaminated and non-contaminated waste materials;
- To maintain an inventory of waste materials produced, received, disposed of and stored, including quantities and location on site;
- To store waste materials only when re-use, recycle or recovery is not possible and then to do so with proper management systems and controls in place; until an acceptable method has been identified for their eventual disposal; and
- To continually evaluate disposal alternatives and new technologies for waste reductions.

### 12.1.2 Preliminary Decommissioning Plan

Cameco maintains a Preliminary Decommissioning Plan (PDP) and financial guarantee for the BRR. The PDP is reviewed and approved as appropriate every five years. The financial guarantee is updated as required after every PDP update has been reviewed and accepted by the CNSC.

## 13.1 SCA – Security

**Legislative Requirement:** The *General Nuclear Safety and Control Regulations* require that a licence application contain information including the proposed measures to control access to the site of the activity to be licensed and the nuclear substance, prescribed equipment or prescribed information. The *Class I Nuclear Facilities Regulations* require that a licence application contain information including the proposed measures to prevent acts of sabotage or attempted sabotage at the nuclear facility, including measures to alert the licensee to such acts. In addition, Part 2 of the *Nuclear Security Regulations* apply to BRR.

**Table 20: BRR Documents Relevant to Security**

| Document              | Site/Division/Corporate |
|-----------------------|-------------------------|
| Security Plan, ST 100 | Site                    |

The site security plan outlines how the security requirements stipulated in the regulations and the licence are met.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

Cameco maintains a security program to comply with the requirements of the *General Nuclear Safety and Control Regulations*, the *Nuclear Security Regulations* and any additional requirements such as designated officer orders.

Cameco's security plan presents an overview of the security operations at the BRR and identifies systems and processes in place to meet security program objectives. Accordingly, this document is considered prescribed information.

#### 14.1 SCA – Safeguards

**Legislative Requirement:** The *General Nuclear Safety and Control Regulations* require the licensee to take all necessary measures to facilitate Canada's compliance with any applicable safeguards agreement and defines reporting requirements for safeguards events. The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the licensee's proposed measures to facilitate Canada's compliance with any applicable safeguards agreement.

**Table 21: BRR Documents Relevant to Safeguards**

| Document                              | Site/Division/Corporate |
|---------------------------------------|-------------------------|
| FSD Safeguards Program, FSD-PGR-SG-01 | Divisional              |

BRR complies with the obligations arising from the Canada/International Atomic Energy Agency (IAEA) safeguards agreements, as well as all other measures arising from the *Treaty on the Non-Proliferation of Nuclear Weapons*. Cameco complies with REGDOC 2.13.1 *Safeguards and Nuclear Material Accountancy*.

The site maintains inventories for natural uranium where receipts and shipments are recorded. Monthly inventory reports are distributed to the CNSC that include safeguarded natural uranium as well as the inventory of non-safeguarded material.

Periodic audits of the inventory system are conducted by the IAEA, the CNSC and by Cameco internal auditors. Uranium accountability controls and practices are in place through the accountability system in order to comply with the applicable requirement for nuclear materials safeguards of the CNSC.

#### 15.1 SCA – Packaging and Transport

**Legislative Requirement:** The *Class I Nuclear Facilities Regulations* require that a licence application contain information on the proposed procedures for handling, storing, loading and transporting nuclear substances.

|              |                                                   |               |             |             |
|--------------|---------------------------------------------------|---------------|-------------|-------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |               | Doc. No.    | AM 100      |
| Date Issued: | N/A                                               | Date Revised: | August 2020 | Version: 25 |

**Table 22: BRR Documents Relevant to Packaging and Transport**

| Document                                         | Site/Division/Corporate |
|--------------------------------------------------|-------------------------|
| FSD Packaging and Transportation, FSD-PGR-TRN-01 | Divisional              |

Cameco maintains corporate standards and site procedures that cover the safe packaging and transport of nuclear substances to and from the licensed facility.

Radioactive materials are packaged and transported on public roadways in accordance with Transport Canada regulations and specifically, the CNSC *Packaging and Transport of Nuclear Substances Regulations, 2015*. Employees are trained in the safe handling, packaging and shipping of dangerous goods commensurate with their responsibilities.

Monitoring of packages being sent off-site is covered in various site procedures.

### 3.0 NUCLEAR FACILITY SPECIFIC

#### 16.1 Financial Guarantee

**Legislative Requirement:** The *General Nuclear Safety and Control Regulations* requires that a licence application contain a description of any proposed financial guarantee relating to the activity being licensed.

**Table 23: BRR Documents Relevant to Financial Guarantee**

| Document Title                                             | Site/Division/Corporate |
|------------------------------------------------------------|-------------------------|
| Blind River Refinery Preliminary Decommissioning Plan, PDP | Site                    |

BRR maintains a financial guarantee in the form of irrevocable letters of credit in the amount of \$48,000,000. Each time the PDP is reviewed, the financial guarantee is revised as applicable and approved by the Commission.

|              |                                                   |                  |             |                |
|--------------|---------------------------------------------------|------------------|-------------|----------------|
| Title:       | Facility Licensing Manual<br>Blind River Refinery |                  | Doc.<br>No. | AM 100         |
| Date Issued: | N/A                                               | Date<br>Revised: | August 2020 | Version:<br>25 |

### Appendix A: Legal Description of Cameco Blind River Refinery

ALL AND SINGULAR, that certain Parcel or Tract of land, situate, lying and being in the Province of Ontario, in the district of Algoma, and in the Town of Blind River; being more particularly described as follows:

PREMISING that a poured-in-place concrete survey control monument is located at 344123.343mE, 5116322.588mN, (Zone T-17, UTM NAD 83)

BEGINNING at said monument;

THENCE; S 2° 19' 24" E a distance of 68.334m;

THENCE: N 89° 49' 6" E a distance of 127.904m;

THUS terminating at a controlled gate at the security entrance.

RESUMING at 344297.546mE, 5116257.105mN;

THENCE: S 89° 38' 51" E a distance of 18.305m;

THENCE: N 0° 18' 57" E a distance of 58.928 m;

THENCE: S 89° 57' 51" E a distance of 116.514m;

THENCE: S 0° 28' 37" W a distance of 59.378m;

THENCE: S 89° 51' 52" E a distance of 55.431m;

THENCE: S 0° 0' 24" E a distance of 301.606m;

THENCE: S89° 58' 1" W a distance of 361.215m;

THENCE N 0° 5' 29" W a distance of 299.829m to the Point of Commencement of the lands herein described;

THE SAID lands being the site of an industrial facility and the aforesaid courses being the limits of the perimeter security fence.