

PURPOSE

This program describes how the University of Regina meets requirements in Canadian Nuclear Safety Commission (CNSC) REGDOC 2.13.1 *Safeguards and Nuclear Material Accountancy* for the establishment and maintenance of a safeguards program. This program applies to the CNZR Location Outside Facility (LOF).

SCOPE

This program specifies the information, access, and support that the University of Regina shall provide to the CNSC and the IAEA to facilitate Canadian compliance with Canada's safeguards agreements with the IAEA, and with licensee obligations established in the *General Nuclear Safety and Control Regulations* (GNSCR), and the Practical Arrangements for the Implementation of Safeguards at Locations Outside Facilities in Canada (SG-PR-15932).

RESPONSIBILITIES

Senior Management - Vice President, Research (VPR)

The VPR is responsible to:

- Provide technically qualified personnel to advise on radiation safety and program administration.
- Provide the necessary resources to establish, implement and maintain the company's Safeguards Program.

Radiation Safety Officer (RSO) and Alternate Radiation Safety Officer (ARSO)

The RSO and ARSO are responsible for the implementation and control of the Safeguards Program.

All Employees

Every employee has a responsibility to assist in the control and accountancy of safeguarded materials.

SAFEGUARDS AND SEALS

University of Regina will be consulted prior to any request to install safeguards equipment on site and, at the request of the CNSC, allow for the installation of safeguards equipment or facilitate the IAEA's installation of such equipment.

University of Regina staff shall not interfere with or interrupt the operation of safeguards equipment at the facility, or alter, deface or break a safeguards seal, except at the CNSC's request. University of Regina will implement measures to prevent damages to, or the theft, loss, tampering with or sabotage of safeguards equipment, seals or samples. Any such events are to be reported.

As per section 30 of the GNSCR, University of Regina shall immediately make a preliminary report to the Commission in the event of interference with or an interruption to the operation of safeguards equipment, or the alternation, defacement or breakage of a safeguards seal, among other events.

IAEA ACCESS

The University of Regina will provide access to IAEA inspectors in order to enable the IAEA to verify Canada's declaration to the IAEA. At the CNSC's request, the University of Regina will report to the CNSC on the outcomes of any IAEA activities that occur on their sites.

INSPECTIONS

The IAEA has the right to carry out inspections at facilities such as the CNZR and to verify all Group 1A material on site and to verify relevant records and reports including source documents. Notification of an IAEA inspection will typically be sent between 24 hours and a week in advance.

During an inspection, the University of Regina will provide a list of inventory items (LII) covering the material subject to inspection, and then facilitate IAEA verification of that inventory.

For inspections where environmental samples of nuclear material are taken, University of Regina will provide such reasonable assistance as required to enable the shipment of the samples.

LOF INFORMATION VERIFICATION

Under section 2.1.5 of the Practical Arrangements for the Implementation of Safeguards at Locations Outside Facilities in Canada (SG-PR-15932), the IAEA has the right to verify the design information provided by University of Regina to the CNSC as part of a physical inventory verification (PIV).

During an inspection, University of Regina will also provide the IAEA with the latest design information submitted to the CNSC, and then facilitate IAEA verification of that information. The CNSC will seek to participate in all IAEA verification activities at CNZR, as a method of verifying licensees' compliance with CNSC requirements and of verifying IAEA compliance with Canada-IAEA safeguards agreements.

COMPLEMENTARY ACCESS

Under the Additional Protocol, the IAEA has the right to request complementary access (CA) to University of Regina with at least 24 hours' notice, or 2 hours notice if the IAEA is already on site, for an inspection.

A CA will only take place during regular working hours. IAEA access during a CA will be managed to prevent the dissemination of proliferation-sensitive information, to meet safety or physical protection requirements and to protect commercially sensitive information. The CNSC will seek to participate in all IAEA CA's at CNZR as a method of verifying licensee compliance with CNSC requirements and of verifying IAEA compliance with the Canada-IAEA safeguards agreements.

NUCLEAR MATERIAL ACCOUNTANCY

Nuclear material accountancy is the program of nuclear material accounting and reporting implemented by the licensee and the CNSC to satisfy the requirements of the *Safeguards Agreement*. It covers licensee activities carried out to establish the quantities of nuclear material present within defined areas, and the changes in those quantities within a defined time period. This includes nuclear material measurement, record keeping, preparing and submission of accounting reports, and verification of accounting information.

For University of Regina, who possess Group 1A material, this further includes the establishment of material balance areas (MBAs), where flows and inventory of nuclear material can be determined, and key measurement points (KMPs) within those MBAs, where flows and inventories of nuclear material can be measured.

Accountancy for safeguarded materials starts with the purchasing program. The program tracks the person making the purchase, the supplier of the material, verifies licences, obtains approvals from the RSO/ARSO, and records when the material is received at the University of Regina.

When the safeguarded material arrives on site, receiving staff will receive and inspect the package for any damage. They will then proceed to verify the sender and the purchase order number that tracks this activity.

The receiver acknowledges receipt of the material in the University of Regina's Radioactive Materials Inventory database which links it to the purchase order and the user who ordered the material. The user is contacted and notified of the arrival of the material. A document trail is generated when purchasing radioactive or process materials. The material is then measured by weight and placed into the appropriate space.

Inventory Tracking

The University of Regina will be capable, at the CNSC's request, of providing an up-to-date LII, covering all of the Group 1 material in their possession. All items in inventory will be uniquely identified, such that a CNSC or IAEA inspector can easily relate the LII to the physical inventory.

Receipt of Safeguarded Materials

The receiving system generates receipts of nuclear material arriving at University of Regina. The corresponding **inventory change document** (ICD) will accompany the received material. Receipts and shipments of nuclear materials are reported by the RSO or ARSO via CNSC's **Nuclear Materials Accountancy Reporting System** (NMAR).

Quantity of nuclear material is verified through a weight measurement using a calibrated scale.

Method of Recording and Reporting

The CNSC's NMAR system will be used to submit nuclear accountancy reports (e.g. ICDs) by the RSO/ARSO. New users of the NMAR system will submit a request and the CNSC will provide an NMAR access code. For files that cannot be submitted via NMAR (due to file size, for example), the University of Regina will contact the CNSC to make alternate arrangements. As a Location Outside Facility, the CNSC will maintain general ledgers for the CNZR. The CNSC will generate a general ledger for IAEA inspections. The system that shall be implemented is governed by the CNSC's regulatory document REGDOC-2.13.1.

Measured Discards and Retained Waste

Solid and liquid waste is tracked and verified using mass weights or other methods prior to shipment through a licenced waste service provider. To reduce the burden of reporting measured discards every time, the cumulative measured discard (LDs) for a material balance period (MBP) will be reported once prior to the PIT (e.g. one day before PIT). The LDs must be included in Material Balance Report for that particular MBP.

The NMAR system will be used to submit the nuclear accountancy report by the RSO or ARSO.

Physical Inventory Taking

University of Regina is required to carry out a physical inventory taking (PIT) each calendar year, and not more than 14 months after their previous PIT. The PIT date shall be September 30th of each calendar year.

The PIT shall:

- Confirm the presence of all Group 1 material on the LII;
- Verify that an item's unique identifier matches the information on the LII; and
- Verify that there is no Group 1 material present which is not included on the LII.

The CNSC and/or the IAEA may choose to verify the results of the University of Regina PIT. Verification by the CNSC is termed a PIT-E (physical inventory taking evaluation) while verification by the IAEA is termed a PIV (physical inventory verification). The PIT-E and/or PIV may occur after the PIT or coincide with it.

A PIV and a PIT-E will involve the verification of some or all Group 1A material onsite at the time of the PIT. The University of Regina will support an IAEA PIV and/or a CNSC PIT-E following each PIT, as necessary.

PITs should be scheduled when nuclear material movements and inventory are at a minimum where possible, and when equipment used to process nuclear material can be emptied and cleaned out to the extent reasonably possible.

Any Group 1B material can be accounted for using source documents that indicate the location of such material.

On an annual basis all nuclear material is accounted for during a planned audit. The inventory verification will match quantities with the University of Regina's Radioactive Materials Inventory database and NMAR. These particular steps will still take place along with those in the above-mentioned PIT process.

Operational Records and Accounting Records

- Nuclear material accounting will be performed in accordance with the requirements of CNSC REGDOC 2.13.1.
- Corrections will be reported on ICDs as required.
- Users keep records on the amount and location of nuclear material processed and signed out to them. If the record of inventory does not match and the nuclear material has been lost an investigation will be performed followed by an adjustment.

Key Measurement Points

Health and Safety maintains a list that includes identification categories, locations and activities of the Key Measurement Points used at University of Regina. This data can be used to complete the P-KMPIS.

Measurement Equipment

The balances used to verify the quantity of material received or transferred shall be calibrated a minimum of once per year. Prior to use for the verification of safeguarded material weights an NIST traceable check weight is used to test the balances accuracy and stability. Check weights are also calibrated once per year.

PROVISION OF INFORMATION TO THE CNSC

All information supplied to the CNSC shall be provided through the Nuclear Materials Accountancy Reporting (NMAR) e-business system to the CNSC. This system provides information security during transmission. If information cannot be transmitted in this fashion, the CNSC should be contacted for alternatives.

The **reconciliation statement (RS)**, **list of inventory items (LII)**, and the **physical key measurement points inventory summary (P-KMPIS)**, if applicable) is to be submitted to the CNSC within seven business days following the PIT.

Nuclear Material Accountancy Reports

The frequency of reporting will follow the guidance provided in REGDOC-2.13.1, Safeguards and Nuclear Material Accountancy, Appendix D. The reports stipulated are as follows:

- **Inventory Change Document (ICD)**

ICDs are submitted to the CNSC to capture changes in the inventory. The submission happens on the next business day following any changes in inventory. Guidance can be found in Appendix D of REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*.

For all transfers or shipments of safeguarded material, the University of Regina employee involved shall provide a copy of the ICD to the receiver.

- **General Ledger**

This is a monthly listing of all inventory changes occurring during that month. Guidance for this task can be found in REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy, Section 8*. The CNSC will maintain and submit General Ledgers to the IAEA on behalf of CNZR.

- **List of inventory items**

The LII consists of a listing of Group 1 material and covers all Group 1 material on site at a given time, as needed to support a specific CNSC and/or IAEA inspection activity. A separate LII will be maintained for each element/isotope category present onsite. Group 1A and Group 1B materials shall be recorded on separate sets of LIIs.

- **Physical Key Measurement Point Inventory Summary (P-KMPIS)**

The P-KMPIS will summarize the LII by grouping items with the same material description codes into batches.

- **Reconciliation Statement**

A reconciliation statement is a report that calculates inventory difference (ID) (see section 7.4 in REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy*) which is, the difference between the book ending inventory, derived from the most recent general ledger, and the physical ending inventory, derived from the P-KMPIS or LII for all group 1A material.

When requested by the CNSC, the University of Regina will investigate any instances of a non-zero ID for nuclear material in item form, and will communicate the results of its review into the cause to the CNSC. The results will be submitted within 30 days of the PIT.

- **Obligated Material Inventory Summary**

The obligated material inventory summary (OMIS) is a list of opening and ending balance weights, by country of obligation, for any nuclear material that has foreign obligations at CNZR of possessed foreign obligated materials. This report covers a calendar year; the opening balance shall be as of January 1 of the reporting year, and the closing balance shall be as of December 31 of that same year. Unless requested by the CNSC, an OMIS report is not required for any year in which foreign-obligated material was not possessed.

DESIGN INFORMATION

The University of Regina will ensure that the CNSC is in possession of an up-to-date design information questionnaire (DIQ) for CNZR. The structure of MBAs and KMPs will be accurately described in the design information submitted to the CNSC. Once the CNSC has reviewed and accepted the design information, the CNSC will submit it to the IAEA.

Design information will be updated and submitted to the CNSC as soon as the decision is taken to make changes that would render the information previously provided incomplete or inaccurate. Design information is to be provided on the appropriate IAEA design information questionnaire, available from the CNSC. The CNSC may require updates to design information be provided on a specific timeline and may request supplemental information.

Refer to DIQ for CNZR.

INFORMATION REQUIRED BY THE ADDITIONAL PROTOCOL

University of Regina will submit the following information to the CNSC by **March 15** each year, so that the CNSC may submit Canada's annual update under the Additional Protocol to the IAEA:

- A general description of, and information specifying, the location of nuclear fuel cycle related research and development activities, as defined in Appendix B: List of Nuclear Fuel Cycle-Related Research and Development Activities of CNSC REGDOC 2.13.1 *Safeguards and Nuclear Material Accountancy*;
- For licensees categorized as facilities or locations outside facilities, current drawings of the site, a general description of each building on the site, including its use and, if not apparent from that description, its contents. Note that current site drawings need only be submitted if previously submitted site drawings are no longer accurate;
- Information regarding Group 1B material, as follows:
 - For materials exempted from safeguards pursuant to Article 37 of the Safeguards Agreement, the quantities, uses and locations of such material
 - For materials exempted from safeguards pursuant to Article 36 of the Safeguards Agreement, but where the material is not yet in a non-nuclear end-use form, information regarding the quantities and uses at each location
- General plans for the succeeding 10-year period relevant to the development of the nuclear fuel cycle (including planned nuclear fuel cycle-related research and development activities) when approved by the appropriate authorities in Canada.

The information provided shall cover the previous calendar year. The IAEA's Protocol Reporter software will be used to submit the above information to the CNSC. The CNSC will provide University of Regina with a copy of the software upon request.

The University of Regina will provide the above information to the CNSC via NMAR or another secure transmission method.

RETENTION OF RECORDS

Regulatory documents pertaining to the CNSC are maintained for a minimum of 5 years after the stipulations outlined in Section 9 of REGDOC-2.13.1, *Safeguards and Nuclear Material Accountancy* have been met. In addition, the University of Regina will verify with the regulator that records can be destroyed prior to doing so.