GE-Hitachi Nuclear Energy Canada Inc.

January 1 to December 31

2015

The information contained in this report concerns the performance and operation of GE Hitachi Nuclear Energy Canada Inc.'s (GEH-C) Class 1B nuclear facilities located in Peterborough and Toronto, Ontario. This report is prepared to meet fuel fabrication operating licence FFOL-3620.00/2020 condition 2.4. The content shows adherence to the GE Hitachi commitment to operate a safe Class 1B nuclear facility, as well as demonstrate compliance with applicable regulations and licence conditions specified by the Canadian Nuclear Safety Commission.

Peterborough & Toronto

Revision	Description	Prepared By and Date	Approved By and Date
00	Initial Issue	S. Rheubottom, EHS Team March 31, 2016	P. Desiri March 31, 2016
01	Revised signing authority contact information Toronto effective dose revisions in Table 11 and Table 12 Section 6.5.1.6, updated terminology Toronto whole body average dose revision in section 6.5.1.7 and Figure 2	S. Rheubottom June 23, 2016	D. Snopek June 23, 2016

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1 EXECUTIVE SUMMARY

The purpose of this compliance report is to demonstrate that GE Hitachi Nuclear Energy Canada Inc. (GEH-C) has successfully met the requirements of the Nuclear Safety and Control Act and the Class 1B Nuclear Fuel Facility Operating Licence renewed by the Canadian Nuclear Safety Commission (CNSC) on January 1, 2011, and expiring December 31, 2020. The licence authorizes GEH-C to operate and modify its nuclear fuel facility for the production of natural and depleted uranium dioxide (UO_2) pellets in Toronto and produce and test fuel bundles in Peterborough. The Peterborough facility is additionally authorized to receive, repair, modify and return contaminated equipment from off-site nuclear facilities.

This report is prepared based on the Canadian Nuclear Safety Commission's *Annual Compliance Monitoring and Operational Performance Reporting Requirements for Class 1 A & B Nuclear Facilities*. It has been divided into two parts to separate worker protection from public and environmental protection. Appendices containing confidential and proprietary information are submitted to the CNSC under separate cover.

GEH-C maintains the following external registrations:

- International Standards Organization (ISO) 9001:2008 Quality Management System
- Canadian Standards Association (CSA) Z299.1-1985 Quality Management System
- ISO 14001:2004 Environmental Management System

Employee workplace exposures are measured by CNSC approved methods and systems. Overall, dose trends were favorable and consistent with an effective application of the ALARA (As Low as Reasonably Achievable - Social and Economic Factors considered) principle. All measured radiation exposures received by personnel in the reporting period were within regulatory limits and below GEH-C *Action Levels*.

Air and water emissions are routinely measured from both facilities to demonstrate compliance with the Canadian Nuclear Safety Commission's environmental protection requirements and the ALARA principle. All measurements were below GEH-C A*ction Levels* and annual releases were a very small fraction of regulatory limits.

No significant operational changes occurred at either facility. Upgrades were made to programs with the objective of achieving continuous improvement and environmental health and safety excellence. Details are provided in the main sections of this report.

Changes made to the physical facilities, equipment, processes, procedures or practices that could impact employee health and safety, the environment or the public as a result of the operation of GEH-C's facilities are assessed through the approved GEH-C Change Control program.

Each facility has established emergency response plans that describe the actions to be taken in order to minimize health and environmental hazards, which may result from fires, explosions, or the release of hazardous materials. This includes effects to the local area and members of the public. The plans are intended to reduce the risk of fires within the facility and assist emergency staff and plant personnel in understanding key emergency response issues, and assist the facilities in protecting employees, the local community and the environment through sound emergency management practices. The emergency response plans fulfil the CNSC operating licence requirements and the following standards or guides:

1. CAD/CSA-Z731-03 *Emergency Planning for Industry Standard*
2. NFPA 801, *Fire Protection for Facilities Handling Radioactive Materials*
3. CNSC Regulatory Guide G-225, *Emergency Planning at Class 1 Nuclear Facilities and Uranium Mines and Mills*
4. The Province of Ontario Nuclear Emergency Plan Part VIII
5. Canada Labour Code

A new CNSC standard for emergency response (REGDOC 2.10.1) was issued in 2015. GEH-C is in the process of updating it emergency response plans in accordance with this standard.

GEH-C has implemented and maintains a safeguards program and undertakes all required measures to ensure safeguards implementation in accordance with International Atomic Energy Agency (IAEA) commitments and CNSC regulatory document RD-336 *Accounting and Reporting of Nuclear Material*. Movement (inventory changes) of natural and depleted uranium are documented and reported to the CNSC daily and as required.

GEH-C safely transports Class 7 radioactive material shipments as defined by the *Transportation of Dangerous Goods (TDG) Act and Regulations*. Shipments occur routinely between the uranium powder supplier and the Toronto and Peterborough facilities, customers and waste vendors. A minor non-compliance occurred for a Class 7 shipment from Peterborough to Toronto with respect to classification. There was no impact to any employee, the public or the environment as a result of the miss. All other shipments occurred in accordance with TDG Regulations, CNSC Packaging and Transport of Nuclear Substances Regulations and IAEA Regulations for the Safe Transport of Radioactive Material as applicable.

GEH-C has established facility specific CNSC approved A*ction Levels* for various radiological and environmental parameters. An A*ction Level* is defined in the *Radiation Protection Regulations* "as specific dose of radiation or other parameter that, if reached, may indicate a loss of control of part of a licensee's radiation protection program, and triggers a requirement for specific action to be taken." *Action Levels* are also applied to environmental protection. *Action Levels* are set below regulatory limits; however they are CNSC reportable events. Accordingly, GEH-C has established I*nternal Control Levels* for various radiological and environmental parameters that are set even lower than *Action Levels* to act as an early warning system. *Internal Control Level* exceedances result in internal investigation and correction and are not CNSC reportable events.

GEH-C recognizes that an effective way of maintaining public trust is to maintain environmental excellence. This requires a demonstrated commitment to operating in accordance with the highest environment, health and safety standards, and keeping all environmental impacts well within applicable standards and as low as reasonably achievable.

The public information program defines the process for providing information about GEH-C operations to interested members of the public. Public interest in both facilities was low during the reporting period. Enquiries were tracked and responded to in a timely manner. The Community Liaison Committee, whose mandate is to provide a forum for a cross-section of neighbours and other community stakeholders to share information and ideas, continued to meet regularly.

This compliance report demonstrates that GEH-C has successfully met the requirements of the Nuclear Safety and Control Act, Regulations and CNSC Class 1 B nuclear facility operating licence requirements.

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2 INTRODUCTION

GE Hitachi Nuclear Energy Canada Inc. (GEH-C) operates a Class 1B nuclear facility to fabricate natural uranium fuel in two separate facilities. Ceramic grade uranium dioxide powder from Cameco Corporation is received at GEH-C's Toronto Facility where uranium dioxide pellets are fabricated. The majority of these pellets are shipped to GEH-C's Peterborough Facility and assembled into CANDU (Canadian Deuterium Uranium) reactor fuel bundles. Smaller quantities of pellets are fabricated for our parent company in Wilmington North Carolina. Finished bundles are then shipped to various customers. In addition, GEH-C's Class 1B licence approves the receipt of contaminated equipment for repair/modification in Peterborough.

As a nuclear facility, GEH-C is federally regulated for health and safety. The federal health and safety legislation is commonly referred to as Canada Labour Code (CLC) Part II and regulations. The CLC is enforced by Human Resources and Skills Development Canada (HRSDC). GEH-C facilities are also regulated federally by Transport Canada. GEH-C is additionally regulated provincially by the Ontario Ministry of the Environment (MOE). Compliance to these agency requirements is ensured through management systems, GE policies and the following external registrations:

1. International Standards Organization (ISO) 9001:2008 Quality Management System
2. Canadian Standards Association (CSA) Z299.1-1985 Quality Management System
3. ISO 14001:2004 Environmental Management System

GEH-C's Environment, Health and Safety (EHS) Mission Statement defines it as a top business priority to continuously improve our EHS systems to protect fellow employees, the environment, and our communities against known and potential environmental, health and safety hazards. The GEH-C management team reviews, prioritizes and controls workplace hazards and ensures compliance with the pertinent regulatory requirements, applicable codes and GE policies. The primary safety goals and objectives established for the reporting period and the corresponding results are in Table 1.

Goal	Peterborough Results	Toronto Results
Injury rate <0.4	Achieved	Achieved
Days away from work rate <0.2	Achieved	Achieved
Zero notice of violation, penalties, permit misses, reportable releases	Achieved	Achieved
All EHS findings tracked in Action Tracking System; 95% closed on time (30-days regulatory, non-regulatory 90 days)	Achieved	Achieved
100% completion Environment Health and Safety regulatory training	Achieved	Achieved
100% power audits complete by November 30, 2015	Achieved	Achieved

Table 1: Primary Environment, Health and Safety Goals

The primary facility potential hazard is the inhalation of airborne UO_2 particles. Measurements are performed for airborne and surface traces of uranium as an indicator of process containment efficiency. Urine samples provided by employees are used to indicate if inhalation may have occurred. A lesser potential hazard exists in the form of low-level external gamma and beta doses to employees.

Effective, skin and extremity dose measurements are conducted to demonstrate compliance with the dose limits specified in the Radiation Protection Regulations and the ALARA principle. All dose measurement results for employees were below GEH-C A*ction Levels* and regulatory limits.

Air and water emissions are routinely measured to demonstrate compliance with the Canadian Nuclear Safety Commission's environmental protection requirements and the ALARA principle. All measurements were below GEH-C A*ction Levels* and annual releases were a small fraction of regulatory limits. Because of the very low potential for releases, environmental monitoring is not required at the Peterborough facility.

Production operations continued routinely, without any significant challenges. Natural uranium dioxide pellets were shipped to GEH-C's facilities without incident. They were assembled into CANDU reactor fuel bundles in Peterborough and were then safely shipped to various customers. Radiation Safety Instructions were issued for the receipt of potentially contaminated equipment from Nuclear Reactor Sites for repair or modification at the Peterborough facility. These tasks were carried out safely and successfully with the involvement of the EHS department.

Table 2 defines the acronyms used in this report.

Acronym	Definition
ALARA	As Low as Reasonably Achievable (social and economic factors considered)
ATS	Action Tracking System
BBQ	Barbeque
CANDU	Canadian Deuterium Uranium
CCME	Canadian Council of Ministers of the Environment
CLC	Canada Labour Code
CNSC	Canadian Nuclear Safety Commission
dpm	Disintegrations per minute
EHS	Environment, Health and Safety
EMS	Environmental Management System – ISO 14001
GEH-C	General Electric Nuclear Energy Canada Inc.
IAEA	International Atomic Energy Agency
ISO	International Standards Organization
MOE	Ministry of the Environment
MP	Member of Parliament
MPP	Member of Provincial Parliament
mSv	millisievert – unit of measure for radiation dose
NFPA	National Fire Protection Association
ppm	Parts per million
QALA	Quality Assurance for Licenced Activity

Acronym	Definition
RSI	Radiation Safety Instruction
SSC	Systems, structures and components
TDG	Transportation of Dangerous Goods
TLD	Thermoluminescent Dosimeter
UO_2	Uranium Dioxide
WSC	Workplace Safety Committee

Table 2: Definition of Acronyms

PART I: WORKER PROTECTION

3 FACILITY OPERATIONS

GEH-C plant operations continued safely during the reporting period. Plant personnel followed procedures satisfactorily, as reflected in internal and external audits, radiation surveys and air sampling measurements. Details are provided in subsequent sections of this report.

GEH-C maintains five EHS related committees that review high risk activities and/or proposed changes to ensure safe plant operations. They are:

- Health and Safety Policy Committee - comprised of unionized workers and management to contribute to making the company as safe as possible by promoting health and safety awareness, making recommendations to workers and management regarding policies and procedures for safe working practices
- Workplace Safety Committee (WSC) - comprised of unionized workers and management to prevent accidents and occupational illness by promoting health and safety awareness, making recommendations to workers and management regarding safe work practices and monitoring health and safety issues until resolved
- As Low as Reasonably Achievable (ALARA) Committee - comprised of unionized workers and management to continuously improve the radiation safety program and implement ALARA practices where practical in order to ensure that radiation doses are as low as reasonably achievable.
- Beryllium Safety Committee – comprised of unionized workers and management to continuously improve the beryllium safety program and reduce potential beryllium hazards to workers.
- Ergonomics Committee - comprised of unionized workers and management to develop, monitor and administer the ergonomic procedure and recognize, reduce and where possible eliminate physical and cognitive ergonomic risk factors.

During the reporting period, the following key position change occurred:

- In March 2015, the president and Chief Executive Officer (CEO) retired. In April 2015, Mark Ward was named as president and CEO of GEH-C. Mark joined GE in 1998 as a Quality Engineer and over his 18-year career with GEH-C has held various leadership positions including quality leader, environmental health and safety leader, engineering leader and plant manager. Prior to his role as president and CEO, Mark managed all three nuclear manufacturing facilities in Canada as fuel operations manager.

During the reporting period, the following modifications were made to the company organization structure:

- In September 2015, a new role of Senior Manager Community Relations & Communications was staffed as part of the Senior Management Team. The role is responsible for the development of strategic communications programs including community relations, media relations, social media, events and internal communications.
- Between September 2015 and November 2015, the Manager of Shop Operations and Plant Manager for Toronto were replaced by an interim leader and the former Toronto Quality Assurance Leader respectively.
- In July 2015, the Plant Manager for Arnprior was promoted to Nuclear Components Manager, which now includes oversight of the Toronto Pellet Plant.

During the reporting period, there were fire safety upgrades completed in both licensed locations.

In accordance with EHS program requirements, registrations and certifications, internal audits are conducted annually to assess conformance to internal and external requirements. A total of 19 internal audits were conducted. There were 11 external agency inspections. This included the CNSC and IAEA. Details on the scope and findings are provided in subsequent sections of this report.

4 PRODUCTION

All possession and processing limits, as specified in the CNSC facility operating licence were met. Production data is proprietary and is supplied to the CNSC in Appendix C and submitted under separate cover. There was a one-week production shutdown in the 1st quarter, a two week production shutdown in the 2nd quarter, a six week production shutdown in the 3rd Quarter and a one-week production shutdown in the 4th Quarter for both sites. Production shutdowns are for engineering projects and equipment maintenance.

A small amount of uranium contaminated waste from the Peterborough facility is sent to the Toronto facility where it is combined with a larger volume and shipped together to an approved radioactive waste facility. In Toronto, only about 0.01% of the uranium that is processed ends up in waste streams. Nearly all nuclear material is used in the product or recycled back to the supplier. Waste generation details are provided in Appendix C and submitted to CNSC under separate cover.

5 FACILITY MODIFICATIONS

Changes made to the physical facilities, equipment, processes, procedures or practices that could impact product quality or employee health and safety or the environment or the public as a result of the operation of GEH-C's facilities are assessed through the Change Control program. Changes that occurred during the reporting period are summarized in section 6.4.2. No major modifications occurred that would affect the safety analysis of the facilities.

6 SAFETY AND CONTROL AREAS

6.1 Management

6.1.1 Management System

The "Management System" Safety and Control Area covers the framework which establishes the processes and programs required to ensure that the organization achieves its safety objectives and continuously monitors its performance against these objectives, as well as fostering a healthy safety culture. The management system defines the requirements of the GEH-C quality assurance program for the licenced activity, which ensures applicable buildings and facilities, process equipment, and processes used in support of licenced activities are conducted in accordance with the Nuclear Safety Control Act and Regulations, applicable CNSC Quality Assurance (QA) requirements, jurisdictional requirements and compliance best practices.

The program management system implementation and effectiveness review is scheduled for April to review the 2015 calendar year. The following elements are reviewed:

1. Follow-up actions from previous management reviews
2. Results of quality assurance for licenced activity (QALA) internal and external audits (where applicable) and findings
3. Review of Health and Safety Scorecard results (self-assessments)
4. Review of Management Self-Assessments
5. Trends in non-conformances (Gensuite Action Tracking System (ATS) items and relevant Quality Assurance Actions)
6. Review of key procurement issues

7. Trends in Incident and Measurement (Gensuite) items for root cause
8. Extent to which Workplace Safety Committee and ALARA Committee objectives and targets have been met
9. Radiation exposure results and trends
10. Evaluation of the effectiveness and continuing suitability of the EHS Mission Statement and the Health and Safety Program
11. Changing circumstances and recommendations for improvement

The implemented QALA program will be reviewed for suitability, adequacy and effective implementation throughout Toronto and Peterborough. Continuous improvement remains a priority. Opportunities for improvement will be identified in the meeting minutes and entered into ATS.

6.1.1.1 Management System Program Improvements

All management system documentation required in licence condition 2.1 is in place. Continuous improvements to the GEH-C documented management system are on-going. The EHS Policy remains unchanged since 2012. In 2015, minor continuous improvements were made to management system program elements as follows:

- The Management Self-Assessments and Annual Management Review procedure was updated to remove requirements for Fuel Project Management, Commercial Operations and Information Technology.
- The Training Program Requirements procedure was superseded by an updated Training procedure and a newly developed systematic approach to training procedure.
- The Use of Experience procedure was updated to reflect current business practice and include Fuel Operations activities and responsibilities.

6.1.1.2 Licenced Activity Related Audits

Table 3 provides a summary of internal audits conducted in the reporting period. The summary does not include internal audits that form part of the International Standards Organization (ISO) 9001/Z299 system which have a product focus but do share some overlap with safety, e.g., management system, documentation, training etc.

GEH-C did not conduct any external audits of other facilities during the review period which relate to the licenced activities at the facility.

Audit Type	Peterborough		Toronto	
	Number of Audits	Number of Non-conformances	Number of Audits	Number of Non-conformances
GEH-C Cross Business	0	0	0	0
General Electric Cross Business	0	0	0	0
Compliance (Power Audits)	5	0	5	0
Quality Assurance for Licenced Activity	3	5	4	9
Environmental (14001)	1	1	1	3
TOTAL	9	6	10	12

Table 3: Summary of Internal Audits

6.1.1.3 Licenced Activity Related Self-Assessments

The Management Self-Assessments procedure was improved with respect to scheduling and performance. Table 4 provides a summary of self-assessments conducted in the reporting period.

Program Element	Peterborough		Toronto	
	Number of Self-Assessments	Number of Findings	Number of Self-Assessments	Number of Findings
Radiation Protection	1	0	1	2
EHS Audits	1	2	1	1
Self-Assessments (both sites within scope)	1	5	1	5
Annual Management Reviews (both sites within scope)	1	1	1	1
Environmental Protection	1	3	1	3
Waste	1	2	1	2
Emergency Preparedness and Fire Protection	1	4	1	2
Preventive Maintenance	1	2	0	-
TOTAL	8	19	7	16

Table 4: Summary of Self-Assessments

6.2 Human Performance Management

The "Human Performance Management" Safety and Control Area covers activities that enable effective human performance, through the development and implementation of processes that ensure that GEH-C staff members are sufficient in numbers in all relevant job areas, and have the necessary knowledge, skills and tools in place to safely carry out their duties.

The training program is described in the license application document section 3.2 and outlined in the Licenced Activity Quality Assurance Manual, the Radiation Protection Manual and the Health and Safety Manual. Qualifications and training requirements are identified and personnel are given the appropriate training to ensure they are competent at the work they do. This training includes on-the-job training, radiation protection and job safety analysis training. Both facilities achieved 100% regulatory training completion in the reporting period. The Training Tracker Tool in Gensuite® tracks EHS-related training. Gensuite is a suite of award-winning, integrated Web applications enabling compliance and EHS excellence. Specific course completion details are in subsequent sections of this report.

The Systematic Approach to Training (SAT) has been implemented at GEH-C and supporting procedures, forms and templates have been published to our Business Management System. The project team that previously met on a biweekly basis during implementation has migrated into a SAT Review Committee that meets quarterly to review the new training system and related activities.

The facilities are staffed with a sufficient number of qualified workers as well as the minimum number of responsible people to carry on the licenced activities safely and in accordance with the Nuclear Safety and Control Act and its Regulations. EHS and other staff are available after business hours as needed.

6.3 Operating Performance

The "Operating Performance" Safety and Control Area covers an overall review of the operations licenced activities. Management conducts routine meetings to review operations at each facility including a discussion of health and safety concerns. Health and safety related employee concerns and actions are assigned and tracked in the Gensuite software system.

In accordance with EHS program requirements, registrations and certifications, internal audits are conducted annually to assess conformance to internal and external requirements. A total of 19 internal audits were conducted. Related licenced activity audits are summarized in Table 3 and section 6.1.1.2 above. There were 11 external agency inspections. This included the CNSC and IAEA.

6.4 Facility and Equipment

6.4.1 Safety Analysis

The "Safety Analysis" Safety and Control Area covers the maintenance of the safety analysis which supports the overall safety case for the facility. The safety analysis is a systematic evaluation of the potential hazards associated with the conduct of a proposed activity or facility, and considers the effectiveness of preventive measures and strategies in reducing the effects of such hazards.

The safety analyses utilized a combination of What-if Analysis, Hazards and Operability and Quantitative Risk Analysis and documents a systematic evaluation of hazards associated with the licenced facility.

Modifications to the facility are made in accordance with BMS-P-008 *Change Control*, and Health and Safety Manual Procedure 14.0 *Management of Change and Preventive Maintenance* which requires review of environment, health and safety for new or modified facilities, processes, and new or relocated machinery, apparatus and equipment. Under this process, a proposed modification is screened for potential impact on the

facility safety analysis. Where screening identifies a potential impact, a more detailed review of the proposed modification is done to identify if the change impacts a safety system, or the basis of the safety assessment (e.g. materials, quantities, locations, etc.). In this way, impacts on the safety analysis are identified and the safety analysis is validated and updated, where necessary, as part of the change process.

There were no updates to the facility safety analysis reports at either site.

6.4.2 Physical Design

The "Physical Design" Safety and Control Area relates to activities that impact on the ability of systems, structures and components (SSC) to meet and maintain their design basis, given new information arising over time and taking into account changes in the external environment.

Changes made to the physical facilities, equipment, processes, procedures or practices that could adversely affect product quality or employee health and safety or the environment or the public as a result of the operation of GEH-C's facilities are assessed through the Change Control program and *Management of Change and Preventive Maintenance* procedures. Any changes to the design basis are identified and assessed through this program, including third-party reviews as required. Adequate mitigations can then be applied including modification of the proposed change, up to rejection of the modification.

The following significant improvements to the physical plants have been implemented during the reporting period:

- The tractor-trailer dock was surrounded by a 6 inch think and 10 foot high drywall. A rollup door was installed at the interior load/unload end. This was to reduce fluctuations in temperature as a result of the outside temperature when the exterior door is open. (Building 21 Peterborough)
- Natural gas supply upgrade, including header replacement and piping (Building 7 Toronto)
- Passenger elevator hydraulic cylinder replacement (Building 7 Toronto)
- South fire escape door was moved from the current ground level location, up to the next landing level in the south stairwell to facilitate a grade change to prevent rain water leaks into the building (Building 7 Toronto)
- Uncertified fire doors were replaced with certified fire doors (Building 7 Toronto)

6.4.3 Fitness for Service

The "Fitness for Service" Safety and Control Area covers activities that impact on the physical condition of SSCs to ensure that they remain effective over time. This includes programs that ensure all equipment is available to perform its intended function when called upon to do so.

Both facilities are using a maintenance software system. Maintenance Connections is a Web-Based Maintenance Management Software (or Web-Based CMMS Software) for Equipment Maintenance, Work Order Software, Building Maintenance Software, Facility Maintenance Software, Facility Management Software, Asset Management Software and Manufacturing Maintenance Software. Maintenance Connection connects maintenance personnel to extend asset lifecycle, track maintenance costs, prevent and predict equipment failures, improve labor productivity, reduce costly equipment downtimes, minimize investments in inventory, and lower the total cost of maintenance. This software allows GEH-C to efficiently perform all the above mentioned tasks as well as help to control and identify Critical –to-Safety and Critical-to-Quality assets and parts. Preventive maintenance tasks deemed Critical-to-Safety are designated in this system as described in Health and Safety Manual Procedures 14.0 *Management of Change and Preventive Maintenance*.

In the event of an incident, the preventive maintenance program for that equipment is reviewed if necessary.

In Peterborough, the following reviews/changes to preventive maintenance tasks were completed:

- An employee slipped in water, which resulted in a review of the preventive maintenance for the automatic floor washer. It was concluded that the maintenance schedule was effective and not the root cause of the incident.
- A small oil leak from a computer numerical control milling machine resulted in the creation of a preventive maintenance task.
- A radiation protection internal audit resulted in the creation of a cleaning task as a contamination control improvement.
- A beryllium safety program internal control level exceedance resulted in a review and update of the preventive maintenance task for the exhaust damper on the beryllium coater units to prevent sticking and ensure that the damper opens/closes as designed.

In Toronto, the following reviews/changes to preventive maintenance tasks were completed:

- A minor powder spill in the Bipel feed room resulted when the coupling for the boot disengaged from the cad cone. The preventive maintenance task was reviewed and verified to contain have the clamp on the checklist.
- A Critical-to-Safety review resulted in a new preventive maintenance task to conduct an inspection of the nitrogen emergency back-fill system.
- A Self-Assessment resulted in a new preventive maintenance task to conduct a verification of the quarterly filter inventory.

In Peterborough, 99% of tasks deemed Critical-to-Safety issued in 2015 were completed without the need for follow-up. In Toronto, the transition to the maintenance software system continued. Changes in supervision and maintenance personnel resulted in a back log in both the issuance and closure of preventive maintenance tasks. Currently there are two tasks that are outstanding from 2015.

Independent verification is done on the 6H68, 4H48, rotoclone, and furnace ventilation systems in Toronto during filter changes (maintenance). Following rotoclone ductwork maintenance, smoke testing is performed to confirm that flow in the lines has not been blocked by the maintenance activity. The Critical-to-Safety project continues into 2016 and will include a review of tasks flagged as Critical-to-Safety as well as identification whether other activities require post-maintenance verification and/or testing.

The preventive maintenance program is considered to be adequate and effective. However, as stated, the critical-to-safety project continues into 2016.

6.5 Core Control Processes

6.5.1 Radiation Protection

The "Radiation Protection" Safety and Control Area covers the implementation of the radiation protection program, in accordance with the *Radiation Protection Regulations*. This program ensures that contamination and radiation doses received are monitored and controlled.

GEH-C has an established radiation protection program to address the hazards from UO_2 and keep employee doses ALARA. The major potential hazard is inhalation of airborne UO_2 particles. A respiratory protection

program is in place. Measurements are performed of airborne and surface traces of uranium as an indicator of process containment efficiency. Urine samples provided by employees are used to indicate if inhalation may have occurred and to monitor clearance of uranium from the body. A lesser potential hazard exists in the form of low-level external gamma and beta doses to employees. The GEH-C program ensures that surface and airborne contamination and radiation doses to employees are monitored and controlled.

GEH-C has established facility specific CNSC approved *Action Levels* for various radiological and environmental parameters. An *Action Level* is defined in the *Radiation Protection Regulations* "a specific dose of radiation or other parameter that, if reached, may indicate a loss of control of part of a licensee's radiation protection program, and triggers a requirement for specific action to be taken." *Action Levels* are set below regulatory limits; however they are CNSC reportable events. Accordingly, GEH-C has established I*nternal Control Levels* for various radiological and environmental parameters that are set even lower than *Action Levels* to act as an early warning system. An *Internal Control Level* exceedance results in internal investigation and corrective action.

A component of the radiation protection program is area classification. Areas of each facility are classified into four different areas for the purpose of controlling the spread of radioactive contamination. These classifications are defined in the Radiation Protection Manual as follows:

- Unclassified Area - these areas do not involve nuclear substances and in which incidental contamination does not exceed the unclassified *Internal Control Levels* for surface or airborne contamination.
- Active Area - these areas are designed for handling materials with loose contamination that is potentially above *Internal Control Levels* for surface or airborne contamination. External radiation hazards are not of significant concern.
- R1 Area - these areas are designed for operations where only external radiation is of concern, and loose contamination is below R1 *Internal Control Levels* for surface or airborne contamination.
- R2 Area - these areas are designed for operations involving exposed non-dispersible nuclear substances, where external radiation is of concern and loose contamination may be above R1 *Internal Control Levels*.
- R3 Areas - these areas are designed for operations involving exposed solid dispersible nuclear substances, where external radiation may be of concern and where the hazard of contaminant inhalation or ingestion is identified. Loose contamination may be above R2 *Internal Control Levels* and below R3 *Internal Control Levels* for surface or airborne contamination.

Whole body, skin and extremity dose measurements are performed using thermoluminescent dosimeters (TLDs) to ensure compliance with the Canadian Nuclear Safety Commission's radiation dose limits and the ALARA principle. One 2014 dose measurement exceeded a quarterly *Action Level* in Peterborough. Details are provided in section 6.5.1.4. All 2014 dose measurements were below regulatory limits.

6.5.1.1 Contamination Control Data

Surface contamination measurements (swipes) are conducted in manufacturing areas of each facility. The potential for surface contamination is greater in the Toronto facility since UO_2 powder is received and handled. Contamination by itself is not necessarily an indicator of exposure potential but can be used as an indicator of housekeeping conditions; however loose surface uranium has the potential to become airborne. If this occurs, the air monitoring results will reflect the increased airborne concentration and appropriate corrective action is then taken. In the event a swipe measurement exceeds an *Internal Control Level*, the area is cleaned and re-swiped to verify cleanliness.

Surface contamination measurement results are summarized in Table 5.

	Classification and Area Description	Internal Control Level	2014		2015	
			Total Number of Samples	Total Number Samples Exceeding Internal Control Level (%)	Total Number of Samples	Total Number Samples Exceeding Internal Control Level (%)
Peterborough	R2 - Pellet Loading, Element Welding and Pellet Storage	2200 dpm/100 cm^2	591	2 (<1%)	479	1(<1%)
	R1 - Bundle Assembly, Inspection, Receiving, Building 24	220 dpm/100 cm^2	197	1 (<1%)	169	0 (0%)
	Active - Met Lab	220 dpm/100 cm^2	111	1 (<1%)	120	1(<1%)
	Unclassified - Items, Main Hallway	220 dpm/100 cm^2	463	2 (<1%)	368	0 (0%)
Toronto	R3-Powder Preparation, Pressing, Grinding, Laboratory	22,000 dpm/100 cm^2	444	2 (<1%)	444	1 (<1%)
	R2-Sintering, Sorting & Stacking, Laboratory	2,200 dpm/100 cm^2	504	23 (5%)	510	15 (3%)
	Active - Plant Washrooms, Laundry Room	2,200 dpm/100 cm^2	144	0 (0%)	144	0 (0%)
	Unclassified	220 dpm/100 cm^2	284	19 (7%)	297	16 (5%)

Table 5: Surface Contamination Result Summary

Peterborough surface contamination remains very low. Surface contamination results are reviewed by EHS staff. During the reporting period, there were only two exceedances of an *Internal Control Level*. The areas were cleaned and re-swiped to confirm verify cleaning effectiveness.

Toronto surface contamination has seen a significant reduction in the number of samples exceeding the Internal Control Level in 2015 over 2014. Surface contamination results are reviewed by EHS staff and

discussed at Workplace Safety Committee Meetings. The Toronto ALARA committee is continuing its goal to reduce the number of sample results above the *Internal Control Levels* in 2016.

One personnel contamination event occurred in Toronto during the reporting period. An Operator removed his work boots in the change room, placed his left foot onto the floor and felt a prick in his toe. Upon removal of his sock, the Operator noticed a small piece of sintered pellet sticking into has toe. The foreign object was removed with tweezers and his foot scanned to verify that the object was completely removed. One corrective action related to house-keeping was logged in ATS and tracked to closure.

6.5.1.2 Air Monitoring Data

In Peterborough, each process workstation where open uranium dioxide pellets are handled is periodically monitored during routine operations for airborne uranium dioxide. Filter papers are counted in-house and verified periodically by an independent external laboratory using delayed neutron activation analysis. In Toronto, each process workstation is monitored continuously during standard operating conditions for airborne uranium dioxide and counted in-house. Internal dose to workers in Toronto is estimated based on these air monitoring results.

Non-routine work functions, such as machine maintenance, modifications, etc. are controlled by Radiation Safety Instructions (RSI). The RSI specifies protective measures, including those to reduce exposure to airborne UO_2. This may or may not include air monitoring and/or respirator use.

Workstation air sampling results (excluding Toronto's lunchroom) are summarized in Table 6.

	Peterborough			Toronto		
	2013	2014	2015	2013	2014	2015
Number of Workstations Sampled	3	3	4	19	22	22
Total Number of Samples Collected	48	46	44	4979	5313	5229
Total Number of Samples Exceeding *Internal Control Level* (facility and area specific)	0	0	0	2	7	9
Total Number of Samples Exceeding *Action Level* (facility and area specific)	0	0	0	0	0	0
Average Concentration (dpm/m^3)	0.57	0.67	0.15	10.0	11.0	8.9
Maximum Value Recorded (dpm/m^3)	2.0	1.86	1.04	212	753*	294

Table 6: Workstation Air Monitoring Summary

*The maximum result in 2014 occurred during the execution of a radiation safety instruction for the change-out of the torit filters in the BWR Grinding Room.

In Peterborough, average and maximum workstation air monitoring results continue to remain negligible. No trends are discernible.

In Toronto, all *Internal Control Level* exceedances were investigated internally and corrective and preventive actions logged in ATS and tracked to closure. Three of the nine ICL exceedances were part of one instance, which was completed under the control of a Radiation Safety Instruction. All corrective and preventative actions are closed.

6.5.1.3 Facility Radiological Conditions

Routine gamma surveys are conducted at each facility. Peterborough conducts the survey on a monthly basis and Toronto on a quarterly basis. Dose rates are compared to targets for areas based on area classification and occupancy. When necessary, items are moved to alternative storage locations. Areas that appear routinely higher than target dose rates are investigated for improvements, such as shielding.

Dose rate results are summarized in Table 7.

	Peterborough			Toronto		
	2013	2014	2015	2013	2014	2015
Total Number of Locations Surveyed	314	417	394	100	102	160
Average Dose Rate (µSv/h) on Shop Floor	2.0	3.1	2.9	3.4	3.8	2.8
Average Dose Rate (µSv/h) in Storage Areas	2.6	4.9	5.7	8.2	6.7	7.0

Table 7: Routine Dose Rate Survey Result Summary

In Peterborough, dose rates remain steady. The Peterborough facility survey focuses on radioactive material handling areas and adjacent occupied locations. Storage areas are showing a slight increase in average dose rate. This may be the result of the inclusion of an additional shielded bundle storage area into the average. In addition, the timing of the monthly survey is a factor in the results, as production levels vary over the year.

In Toronto, dose rates are fairly consistent in shop and storage areas. Minor variability is due to the inventory at the time of this spot-check survey and an increase in the number of locations surveyed.

6.5.1.4 Urinalysis Results

All Peterborough employees working greater than thirty hours in an R2 classified area, where exposed UO_2 material is processed, or working as a roving inspector during the quarter, submit urine samples for uranyl ion analysis. All Toronto employees working where exposed UO_2 material is processed submit urine samples for uranyl ion analysis during the week/month (depending on the work area). The presence of uranium in the urine is an indication of recent inhalation of UO_2 dust or the systemic clearance of an established Thorax Burden. Urinalysis at GEH-C is used as a screening tool to initiate further review of internal dose control measures and practices but is not used to estimate internal dose. Internal dose is estimated based on air monitoring.

Urinalysis results are summarized in Table 8.

	Peterborough			Toronto		
	2013	2014	2015	2013	2014	2015
Number of urine samples analyzed	105	108	112	1961	2021	2065
Number of samples above *Internal Control Level* (5 µg U/L)	0	0	0	2	3	6
Number of samples above *Action Level* (10 µg U/L)	0	0	0	1	0	0
Maximum result (µg U/L)	0.3	0.5	<0.1	13.5	6.8	6.8

Table 8: Urinalysis Results Summary

Of all urinalysis samples from Peterborough processed between 2005 and 2015, only 0.3% of samples (5/1474) have measured above 0.1 µg U/L (less than 0.5 µg U/L). These occurrences were well below the *Internal Control Level* of 5 µg U/L. This demonstrates that the inhalation hazards at this facility are minimal and that current engineered and administrative controls, where applicable, are adequately controlling the risk.

In Toronto, a total of 6 samples were above the *Internal Control Level* of 5 µg U/L during the reporting period. No samples exceeded the *Action Level* of 10 µg U/L. Investigations are conducted for all *Internal Control Level* exceedances. Seven corrective actions have been identified from the 6 investigations. Identified corrective actions were logged in ATS and tracked to closure.

6.5.1.5 Dose Control Data

All employees are classified as either Nuclear Energy Workers (NEWs) or Non-Nuclear Energy Workers (Non-NEWs). All contractors are classified non-NEWs. All NEWs are deemed to have a reasonable probability of receiving a dose of radiation that is greater than the prescribed limit for the general public (1 mSv/year) in the course of the person's work with nuclear substances or at our nuclear facilities. All NEWs at GEH-C are assigned personal passive dosimeters known as TLDs (thermoluminescent dosimeter). These passive dosimeters record the Whole Body and Skin Doses received in each monitoring period. TLD rings are worn on certain employee's hands for a one-week period each quarter to monitor extremity dose. The test results and the weekly hours of contact are used to estimate the extremity dose. TLDs are exchanged routinely, monthly (Toronto) or quarterly (Peterborough), and analyzed by a CNSC licenced external dosimetry service provider. On receipt, knowledgeable staff reviews the monitoring results, and compares them to associated *Internal Control Levels*, *Action Levels* and regulatory limits.

All radiation exposures received by personnel in the reporting period were within *Internal Control Levels*, *Action Levels* and regulatory limits. Regulatory limits are specified in the *Radiation Protection Regulations* with exception during the control of an emergency and the consequent immediate and urgent remedial work. Regulatory limits are listed in Table 9 and Table 10. GEH-C dosimetry results are summarized in the following sub-sections. Table 11 provides a summary of dosimetry data with employees and one customer grouped in various ranges of exposure.

Employees are divided into workgroups based on job function for dosimetry analysis and trending. Operators are employees who manufacture product and includes the Customer Site Representative. Technicians are employees who support the licenced activities, (Fuel Shop or Services Manufacturing Shop) e.g. electrical, mechanical, quality control, laboratory, etc. Staff includes management and professional employees who support the Operators and Technicians with the licenced activities.

Effective Dose Limits		
Person	**Period**	**Effective Dose (mSv)**
Nuclear energy worker, including a pregnant nuclear energy worker	(a) One-year dosimetry period (b) Five-year dosimetry period	50 100
Pregnant nuclear energy worker	Balance of the pregnancy	4

Effective Dose Limits		
Person	**Period**	**Effective Dose (mSv)**
A person who is not a nuclear energy worker	One calendar year	1

Table 9: Regulatory Effective Dose Limits

Equivalent Dose Limits			
Organ or Tissue	**Person**	**Period**	**Effective Dose (mSv)**
Lens of an eye	(a) Nuclear energy worker (b) Any other person	One-year dosimetry period One calendar year	150 15
Skin	(a) Nuclear energy worker (b) Any other person	One-year dosimetry period One calendar year	500 50
Hands and feet	(a) Nuclear energy worker (b) Any other person	One-year dosimetry period One calendar year	500 50

Table 10: Regulatory Equivalent Dose Limits

		Total # Individuals Monitored	Total # of Individuals in Dose Range (mSv)							
			0 - 1	1 - 5	5 - 10	10 - 20	20 - 50	50 - 100	100 - 200	200 - 500
Peterborough	Effective	75	44	29	2	0	0	0	0	0
	Skin	75	38	15	10	11	1	0	0	0
	Extremity	34	3	10	5	8	8	0	0	0
Toronto	Effective	69	22	42	5	0	0	0	0	0
	Skin	69	20	9	14	16	9	1	0	0
	Extremity	52	4	4	6	12	15	10	1	0

Table 11: Radiation Dose Distribution

6.5.1.6 Effective Dose

Effective dose is summarized in Table 12. Toronto dose shows effective dose, which is monitored external and calculated internal dose. The contribution from internal dose is indicated. As Peterborough does not have any measurable internal dose, the effective dose is the TLD whole body dose. Peterborough doses presented and trended are for the fuel shop only; fifteen TLDs assigned to NEWs working for the Services division are excluded as doses are minimal with the average dose at 0.02 mSv and the maximum at 0.12 mSv.

	Year	Peterborough			Toronto	
		Operators	Technicians	Staff	Operators (Internal)	Staff
Maximum (mSv)	2015	5.77	1.29	1.69	8.38 (2.50)	3.25
	2014	7.55	1.35	1.40	7.80 (2.56)	1.84
	2013	7.96	1.99	1.77	8.03 (1.39)	1.71
Average (mSv/person)	2015	2.03	0.27	0.84	2.67 (0.95)	0.30
	2014	2.75	0.35	0.71	3.06 (1.13)	0.27
	2013	2.70	0.43	0.66	2.60 (0.84)	0.29
Minimum (mSv)	2015	0.00	0.00	0.14	0.10 (0.10)	0.00
	2014	0.00	0.00	0.00	0.13 (0.01)	0.00
	2013	0.00	0.00	0.00	0.07 (0.07)	0.00

Table 12: Effective Dose Summary

6.5.1.6.1 Peterborough Trending

Average annual effective dose trend for all monitored employees is shown in Figure 1. Effective dose by workgroup is listed in Table 12. Overall, the average dose trend is flat. Maximum and average Operator doses are trending down from 2012 to 2015. Maximum Technician and Staff doses are trending down, while averages are showing steady from 2012 to 2015.

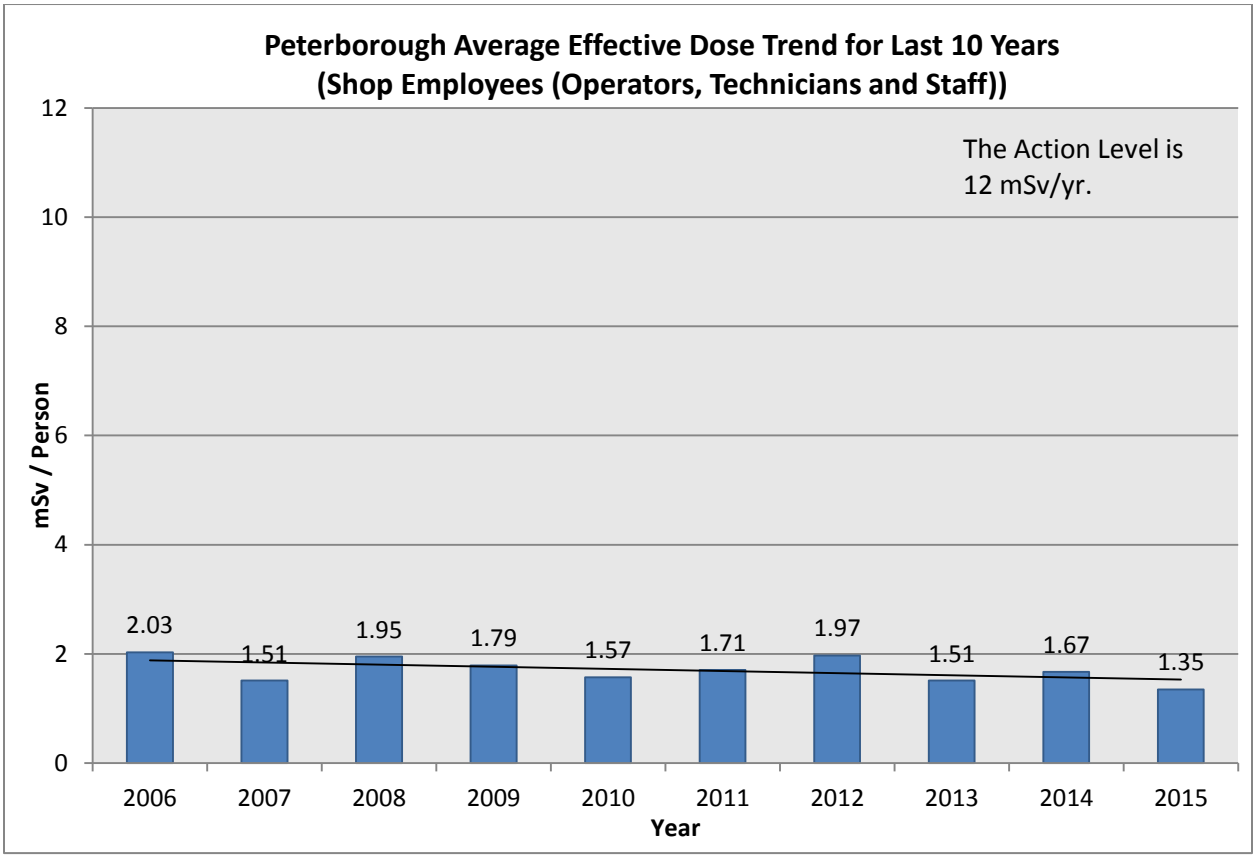

Figure 1: Peterborough 10-year Average Annual Effective Dose

6.5.1.7 Toronto Trending

Average annual whole body dose trend for all monitored employees is shown in Figure 2. Note: This is whole body dose only, and excludes internal dose. Effective dose by workgroup is listed in Table 12. Trends are showing that Toronto average whole body dose has decreased year over year from 2008 to 2011. The year over year decrease in whole body dose is considered to be a combination of shielding improvements made in the Sort Stack, Grinding and Sintering areas and an improvement in ALARA awareness and operator experience. 2012 shows a slight increase in average, which is in line with the increased overtime hours for shop floor employees. 2013 hours have returned to typical levels. As a result, average Operator doses are reduced slightly from 2012 to 2013. Average Operator dose has increased slightly for 2014 over 2013 and is most likely due to increased inspection. Average Staff doses continue to decrease in 2014 over 2013. 2015 whole body dose has decreased slightly over 2014.

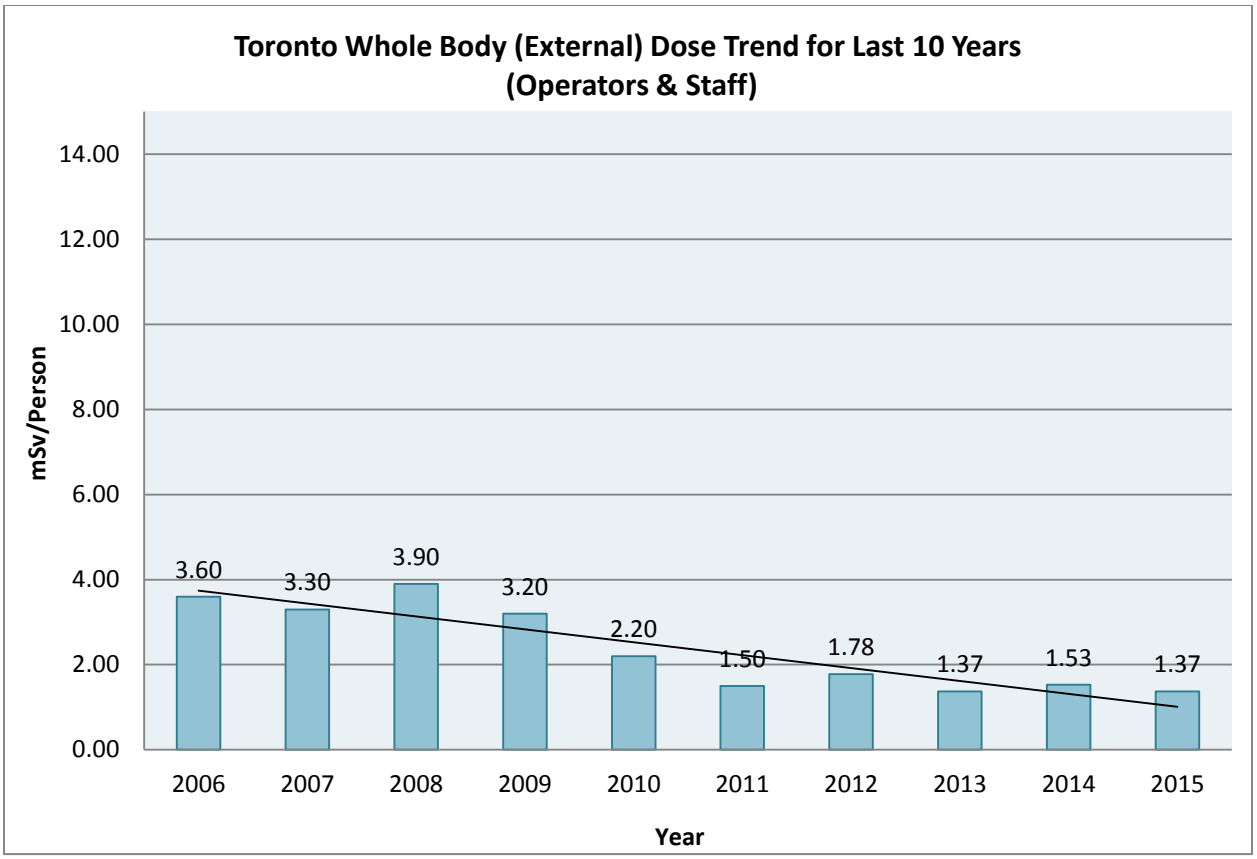

Figure 2: Toronto 10-Year Average Annual Whole Body (External) Dose

6.5.1.8 Equivalent Skin Dose

Equivalent skin dose is summarized in Table 13. Peterborough doses presented and trended are for the fuel shop only; fifteen TLDs assigned to NEWs working for the Services division are excluded as doses are minimal with the average dose at 0.03 mSv and the maximum at 0.21 mSv.

	Year	Peterborough			Toronto	
		Operators	Technicians	Staff	Operators	Staff
Maximum (mSv)	2015	22.47	2.57	3.69	54.99	3.86
	2014	29.91	2.30	2.06	51.67	1.99
	2013	31.20	3.59	1.97	52.84	5.40
Average (mSv/person)	2015	7.11	0.59	0.98	13.16	0.47
	2014	8.65	0.56	0.85	14.43	0.41
	2013	7.57	0.60	0.71	13.81	0.71
Minimum (mSv)	2015	0.00	0.00	0.14	0.00	0.00
	2014	0.00	0.00	0.00	0.00	0.00
	2013	0.00	0.00	0.00	0.00	0.00

Table 13: Equivalent Skin Dose Summary

6.5.1.8.1 Peterborough Trending

Average annual skin dose trend for all monitored employees is shown in

Figure 3. Skin dose by workgroup is listed in Table 13. Skin doses across all workgroups remain a fraction of the regulatory limit and the GEH-C *Action Level*. Maximum Operator and Technician skin dose is trending down from 2012 to 2015. Average Operator, Technician and Staff doses are showing steady from 2012 to 2015.

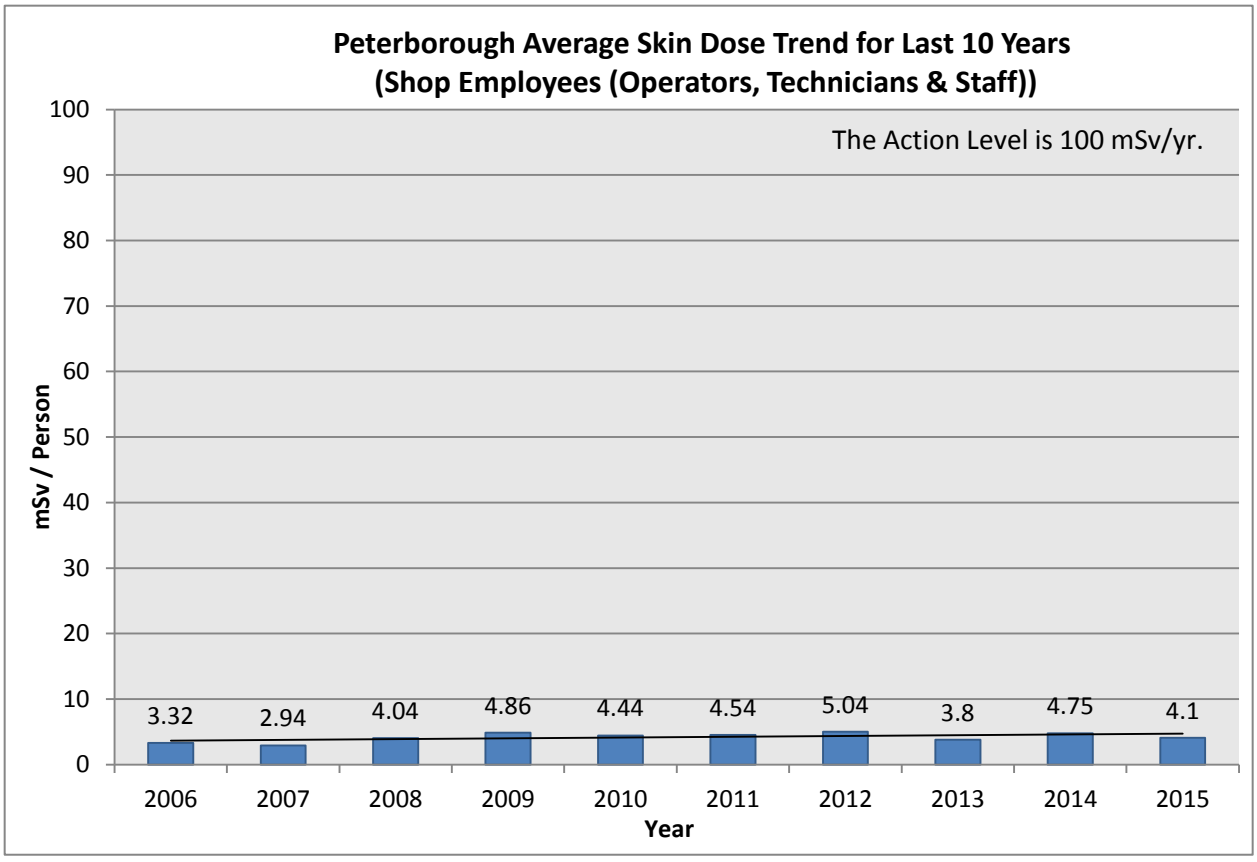

Figure 3: Peterborough 10-year Average Annual Skin Dose

6.5.1.8.2 Toronto Trending

Average annual skin dose trend for all monitored employees is shown in Figure 4. Skin dose by workgroup is listed in Table 12. Skin doses remain a small fraction of the applicable limit and the GEH-C *Action Level.* Trends are showing that average skin dose has decreased year over year from 2008 to 2011. The year over year decrease in skin dose is considered to be a combination of shielding improvements made in the Sort Stack, Grinding and Sintering areas and an improvement in ALARA awareness and operator experience. While the primary objective of shielding improvements was reduction in gamma exposures, there will also be a reduction in overall beta fields in the work area from the shielding. Average Operator dose has increased slightly for 2014 over 2013 and is most likely due to increased inspection. Average Staff doses are reduced in 2014 over 2013. 2015 skin dose continues to decrease over 2014.

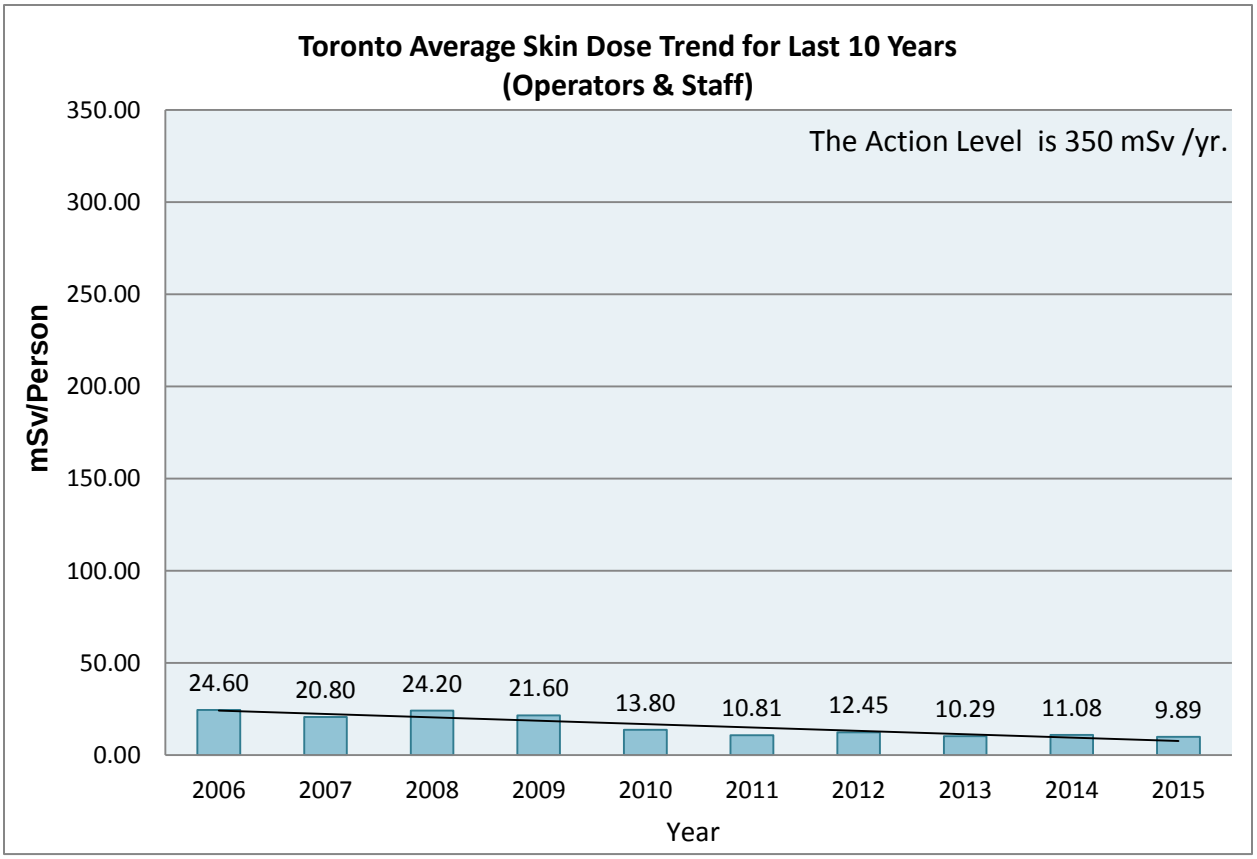

Figure 4: Toronto 10-Year Average Annual Skin Dose

6.5.1.9 Equivalent Extremity Dose

Equivalent extremity dose is summarized in Table 14. Only one staff employee participated in the program in 2012 to 2015. Services employees do not participate in the extremity monitoring program.

	Year	Peterborough			Toronto	
		Operators	Technicians	Staff	Operators	Staff
Maximum (mSv)	2015	39.34	4.98	4.82	109.62	N/A
	2014	98.98	12.01	2.57	102.44	N/A
	2013	76.03	13.57	4.78	143.59	N/A
Average (mSv/person)	2015	14.34	2.03	4.82	30.30	N/A
	2014	20.88	4.62	2.57	31.96	N/A
	2013	16.40	1.39	4.78	32.92	N/A
Minimum (mSv)	2015	0.00	0.32	4.82	0.00	N/A
	2014	0.00	0.49	2.57	0.00	N/A
	2013	0.00	0.00	4.78	1.21	N/A

Table 14: Equivalent Extremity Dose Summary

6.5.1.9.1 Peterborough Trending

Average annual extremity dose trend for all monitored employees is shown in Figure 5. Extremity dose by workgroup is listed in Table 14. Extremity doses across all workgroups remain a fraction of the regulatory limit and the GEH-C *Action Level* and show a decreasing average dose from 2006 through 2013. This is primarily due to changes in how extremity doses are calculated. Ring testing, which was previously done for a two week period on an annual basis, is now performed for a one week period on a quarterly basis and the current measurements are considered more representative of actual doses. Maximum and average Operator dose is showing steady from 2012 to 2015. Maximum Technician dose is showing a slight reduction while average Technician dose is showing steady from 2012 to 2015. Staff dose is a single monitored employee with a steady trend from 2013 to 2015.

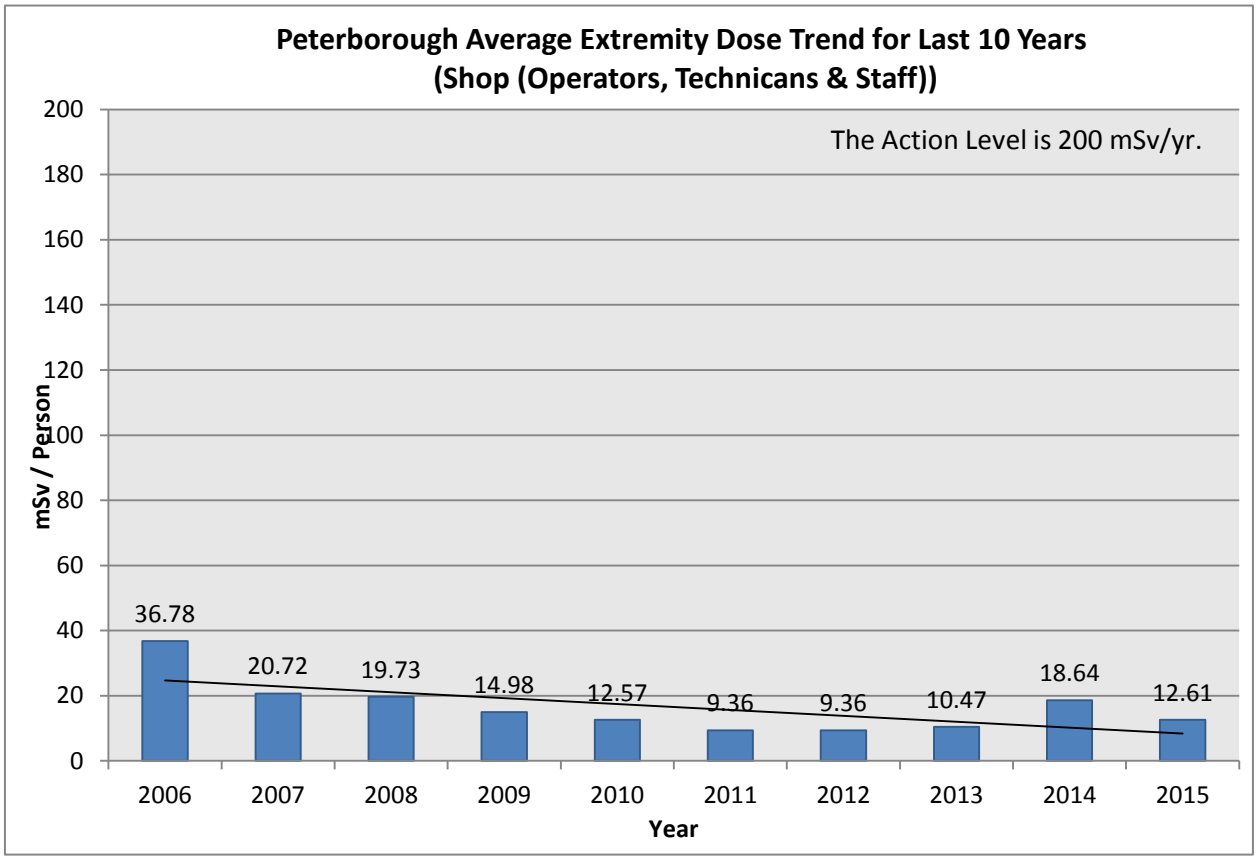

Figure 5: Peterborough 10-year Average Annual Extremity Dose

6.5.1.9.2 Toronto Trending

Average annual extremity dose trend for all monitored employees (Operators only; Staff are not monitored) is shown in Figure 6. Extremity dose by workgroup is listed in Table 12. Extremity doses continue to show a decreasing trend to average dose since 2008. This is primarily due to changes in how extremity doses are calculated. Ring testing, which was done for two weeks on a quarterly basis prior to 2009, is now performed for one week on a quarterly basis and the new measurements are considered more representative of actual doses. Also, while the primary objective of shielding improvements was reduction in gamma exposures, there will also be a reduction in overall beta fields in the work area from the shielding. The slight increase in 2012 extremity dose is likely due to increased overtime hours for operators. Average Operator doses are reduced slightly from 2013 to 2014. 2015 extremity dose continues to decrease over 2014.

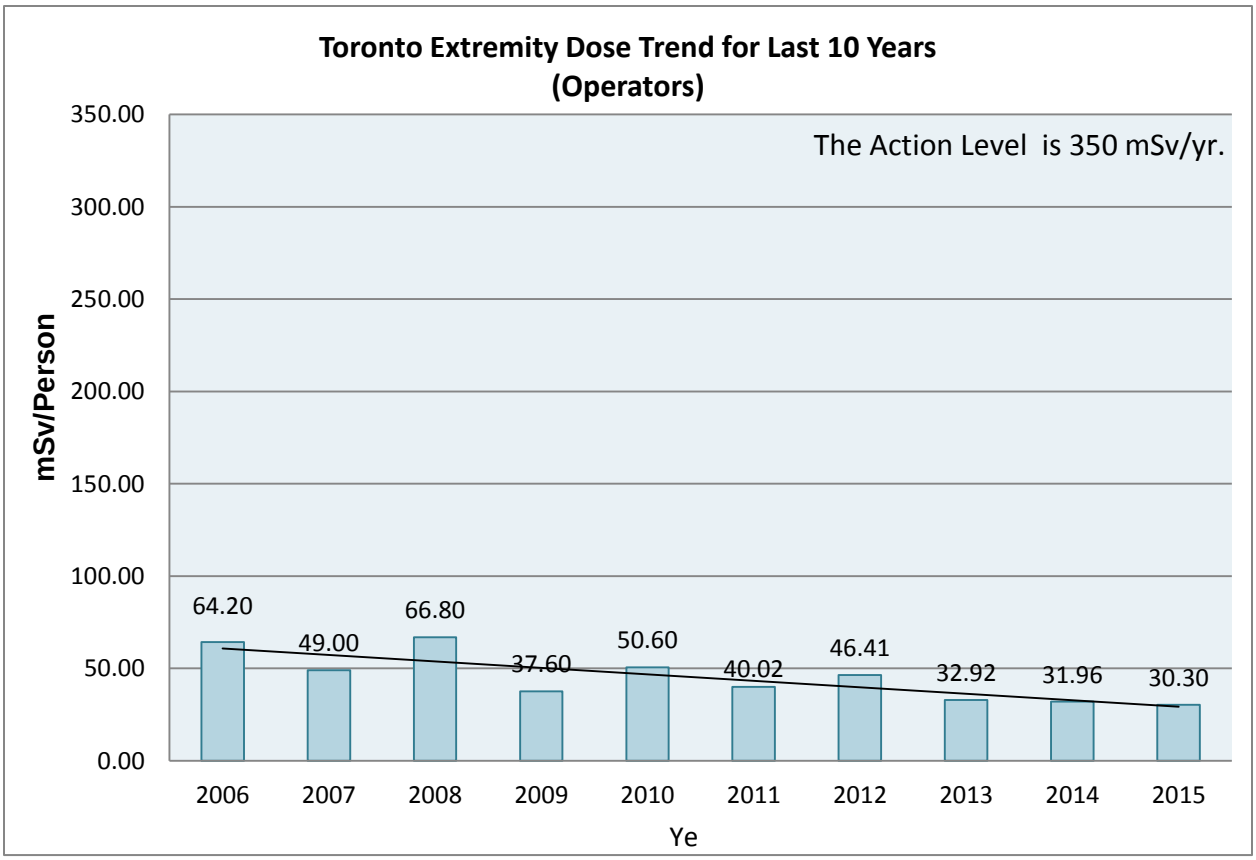

Figure 6: Toronto 10-Year Average Annual Extremity Dose

6.5.1.10 Exceedances of Regulatory Limits or Action Levels

All measured radiation exposures received by personnel in the reporting period were within *Internal Control Levels*, *Action Levels* and regulatory limits.

6.5.1.11 Radiation Protection Program Effectiveness

The radiation protection program is effectively implemented. Elements of the Radiation Protection Program such as dose monitoring, contamination monitoring, radiation field surveys, etc. are reviewed internally by

EHS staff and the ALARA Committee on a regular basis. Details of the reviews are recorded in meeting minutes.

An internal audit of the radiation protection program, with a focus on radiation protection program effectiveness and compliance, is conducted annually at each site. A copy of these reports is provided to the CNSC separately.

6.5.1.12 Radiation Protection Program Improvements

Several minor continuous improvements to the Radiation Protection Manual were instituted during the reporting period:

- Four Peterborough radiation protection work instructions were updated to reflect the use of an Air Sample and Contamination Monitoring database for calculating and distributing sample results.
- Peterborough's Liquid Effluent Monitoring work instruction was updated to include grab samples at the bundle washer and beryllium area settling tank and provide additional packaging instructions.
- Peterborough's TLD work instruction was updated to clarify the use of TLDs in the Nuclear Services division.
- Peterborough's Radiation Instrumentation Calibration work instruction was updated to include calibration of select instruments internally.
- Peterborough's Uranium Analysis Efficiency Determination and Delayed Neutron Activation Analysis work instruction calculation factors were updated.
- Peterborough's Breathing Air Monitoring work instruction was updated to add a fourth sampling location.
- Peterborough's Radiation Protection Training work instruction was updated to require Radiation Safety training at least biennially.
- The Urinalysis Sampling work instructions were updated to provide sample shipment preparation steps at both sites. In addition, Peterborough's work instruction was updated to include the R2 Area Manufacturing Engineer to the program.
- Toronto's TLD work instruction's dose report distribution was updated.
- Toronto's Exhaust Air Sampling work instruction was updated to include sample preparation steps.
- A new work instruction was developed for in duct air sampling and calibration of the sampling train in Toronto.
- Toronto's Calibration Source Verification work instruction was made obsolete.
- Minor administrative edits and continuous improvements were made to 7 other work instructions across both sites.

6.5.1.13 Summary of Radiation Protection Program Performance

Radiation protection program goals are monitored through the ALARA Committees as summarized in section 6.5.1.14 below.

6.5.1.14 Summary of ALARA Committee Performance

The ALARA Committees meet quarterly at a minimum. The Peterborough committee met four times and the Toronto committee met five times during the reporting period. Dose results, radiation protection related audits and radiation protection related employee concerns were reviewed and discussed. Actions are assigned and tracked as part of the meeting minutes.

ALARA Committee goals and results for the reporting period are provided in Table 15. Goals that are not achieved are informally reviewed by the ALARA Committee to discuss probable causes. The feasibility of achievement is discussed and implementation plans revised as needed. These are considered during future goal setting.

Peterborough's 5% dose reduction was not achieved and has not been achieved for the past two years. Dose reduction is occurring as ongoing efforts to improve ALARA awareness and TLD storage compliance improves; however, a 5% reduction is proving difficult for doses that are already very low. The Peterborough shielding project goal was not met due to a potential rearrangement of the Final Inspection area layout. The potential rearrangement would not require the shielding to be in place. Investigation into the feasibility of this rearrangement project continues into 2016.

Toronto's goal of having a downward trend for employee dose results was not achieved. Employee dose results were found to have increased by 8% from last year. The main cause of this increase can be attributed to additional rework of material, an increase in operator's overtime, and more product being present within the plant than anticipated. The ALARA Committee is working on developing new engineering and administrative controls and developing a more robust program for dose reduction. In 2015 new permanent and temporary shielding was installed in various areas throughout the plant. These areas saw a decrease in dose to the operators. As well, the ALARA committee was more forthcoming in providing prudent information to the operators via posting of ALARA practices on the shop floor monitors and safety boards. The Toronto surface contamination goal for 2015 was not achieved. Although GEH-Toronto did not achieve a 10% reduction from 2014, even with the increase in the number of samples, Toronto's total number over the ICL remained the same at 2% of the total swipes collected. Toronto's ALARA Committee remains focused on the commitment to improving swipe results each year through the installation of engineering controls and best practice techniques.

	Goal	Actual	Result
Peterborough	5% reduction in collective whole body dose for the fuel shop (corrected for production)	4% Reduction	Not Achieved
	Complete previous shielding project (1)	Not Completed	Not Achieved
	>95% Compliance in TLD Audits	99.4% Compliance (23 Audits)	Achieved
	>95% Swipes below the Internal Control Levels (area specific)	99.8% < ICL	Achieved
Toronto	Downward trend of employee dose results	8% Increase	Not Achieved
	Average annual concentration of workstation air monitoring results <10 dpm/m^3	8.9 dpm/m^3	Achieved
	10% reduction in surface contamination monitoring results that exceed the Internal Control Level compared to 2014	0% reduction from 2014	Not Achieved
	Conduct four employee shop floor demonstrations of the ALARA principles	Four Demos Completed	Achieved

Table 15: ALARA Committee Goals and Results

2016 goals for Peterborough are established as follows:

1. 2% reduction in collective whole body dose (corrected for production)
2. >97% compliance in TLD audits
3. Investigate the possibility of upgrading to electronic data entry to the Radiation Database
4. Conduct four shop floor demonstrations of the ALARA principles

2016 goals for Toronto are established as follows:

1. Downward employee dose trend (shielding projects, education)
2. Ventilation Improvements: Average annual concentration of workstation air monitoring results <10 dpm/m^3
3. 5% reduction in surface contamination monitoring results that exceed the *Internal Control Level* compared to 2015
4. Conduct four employee shop floor meetings/demonstrations/communications of the ALARA principles

6.5.1.15 Summary of Radiation Protection Training Program and Effectiveness

An internal or external specialist in radiation protection periodically provides classroom training to new and continuing NEWs or those working in areas with radioactive materials. Online training is also made available to employees with computer access. Testing is performed on completion of the training to demonstrate employee understanding. Training Tracker is updated with these results.

	Course Name	Number Completed	% Required Completed
Peterborough	Radiation Safety (Initial and Refresher)	73	100%
Toronto	Radiation Safety (Initial and Refresher)	32	100%

Table 16: Radiation Protection Training Summary

6.5.1.16 Summary of Radiation Device and Instrumentation Performance

All radiation devices and instruments were maintained in a state of safe operation. Radiation calibrations are conducted within 12 months of the previous calibration as required by regulation. Where calibration is expired or where detectors fail calibration, they are removed from service until they are repaired and meet radiation calibration expectations.

6.5.1.17 Summary of Inventory Control Measures

A current inventory of non-production radioactive sources is maintained by each facility. The inventory for each facility is provided in Appendix A and B, submitted to CNSC under separate cover.

6.6 Conventional Health and Safety

The "Conventional Health and Safety" Safety and Control Area covers the implementation of a program to manage non-radiological workplace safety hazards and to protect personnel and equipment.

GEH-C has implemented the GE Framework for environmental, health and safety program excellence. This is ensured through the implementation of program elements including training, contractor safety, fall protection, electrical safety, hot work, cranes and hoists, chemical management and others. Routine self-assessments and program evaluations are conducted to ensure compliance. These programs also demonstrate compliance to the CLC part II.

6.6.1 Health and Safety Program Effectiveness

The GE business is in transition to a new environment health and safety framework (Framework 2.0) which covers all worker safety and environmental protection elements including the following:

1. Leadership and Accountability
2. Regulatory Applicability
3. EHS Processes and Systems
4. Emergency Preparedness and Response
5. Risk Assessment
6. Highly Hazardous Processes
7. Safety Defenses
8. Exposure Defenses

9. Environmental Defenses
10. Dangerous Goods
11. Contractor Management
12. Preventive Maintenance
13. Distributed Workforce Defenses

Both sites have completed initial scorings and are implementing new framework requirements through 2016.

6.6.1.1 Peterborough

In 2015, Peterborough conducted a total of 66 investigations and inspections. This includes WSC inspections, Manager Inspections, Near Miss and Incident Investigations. These investigations and inspections led to a total of 265 actions logged into ATS and tracked to closure. One action remains open from actions initiated in December. The top 5 finding categories were equipment safety, emergency response/preparedness, housekeeping, documents/procedures and fall protection.

6.6.1.2 Toronto

In 2015, Toronto conducted a total of 31 investigations and inspections. This includes WSC inspections, and incident investigations. These investigations and inspections led to a total of 188 health and safety hazards being identified. The Toronto WSC targets one inspection every four weeks. WSC investigation findings are logged and tracked to closure outside of the ATS system. The top 5 finding categories from WSC inspections were housekeeping, personal protective equipment, facilities, emergency and unsafe condition. The top five categories of findings in ATS from incident investigations were radiation/nuclear safety, industrial hygiene, emergency response, industrial hygiene/medical, and air.

6.6.2 Workplace Safety Committee Performance

Elements of the Health and Safety Program are implemented and reviewed by the WSC. Regulatory findings resulting from these inspections are closed within 30 days.

Each facility committee meets on a monthly basis. In Peterborough, ten meetings were held and quorum was met at all ten meetings. In Toronto, ten regular meetings were held; quorum was met at all meetings.

Established goals for each facility's reporting period are summarized in Table 17.

	Goal	Actual	Result
Peterborough	Zero recordable injuries	0	Achieved
	Zero lost time injuries	0	Achieved
	Meet at least 9 x per year	9	Achieved
	Every area inspected at least quarterly	4/4	Achieved
	100% regulatory training completed by Dec. 31st	100%	Achieved
	Review and validate WSC Charter	Completed	Achieved
	Accident/incident investigation exercise	Completed	Achieved

	Goal	Actual	Result
	Joint meeting with EHS teams (Ergonomics, ALARA, Emergency Response)	Completed	Achieved
	Review a section of the CLC part II at meetings	9/9 Completed	Achieved
	Each member to participate in one non-WSC inspection related health and safety item	Completed	Achieved
Toronto	Reoccurring shop floor inspection with whole committee	Completed	Achieved
	Participation in root cause review	Not completed	Not Achieved
	Shop floor involvement/communication - increase by 10%	Completed	Achieved
	Canada Labour Code training	Completed	Achieved
	Conduct 3 program reviews	Completed	Achieved

Table 17: Workplace Safety Committee Goals and Results

2016 goals for Peterborough are established as follows:

1. Zero Recordable Injuries
2. Zero Lost Time Injuries
3. Meet at least 9 times/year
4. Every Area inspected at least quarterly
5. 100% regulatory training completed by Dec 31
6. Review and validate WSC Charter
7. Review 2 EHS programs

2016 goals for Toronto are established as follows:

1. Committee member roles and responsibilities refresher training
2. Program Review (Risk Assessments or EHS procedures) (3)
3. Shop floor involvement/communication – increase by 10% over 2015
4. Joint meeting with EHS teams

6.6.3 Health and Safety Program Improvements

6.6.3.1 Peterborough

A multiyear strategy to identify and reduce ergonomic risks for employees was initiated in Peterborough. A standard template is used to identify ergonomic risk factors which are then reviewed by the workplace ergonomics team. The exercise was completed for Fuel Assembly and continues for Nuclear Services into 2016. In addition, a physical demands analysis was developed for Fuel Assembly processes, excluding End Cap Welding due to ongoing equipment changes during that time period. The analysis ensures workers with limited physical abilities are assigned to appropriate workstations.

6.6.3.2 Toronto

In 2015, there was a focus on emergency response. Training sessions were held with over 150 individuals including area police, fire, ambulance and hazardous materials crews. In addition, the Toronto team worked with Toronto fire to develop an on-line material, and is in the process of developing a video to be used by emergency medical services.

The health and safety committee was involved in the testing and procurement of new styles of personal protective equipment including respirators and hearing protection. ALARA projects for the year included shielding for the scrap drum storage area, and scrap pail storage.

In 2013, GEH-C began the engineering and design work to bring the legacy furnaces into compliance with the NFPA-86 (2011) code for furnaces. The first furnace was finished in spring 2014, and was completely upgraded to meet NFPA 86. In addition, supporting systems were brought into compliance with applicable technical standards (TSSA) and electrical codes (ESA). The second furnace was upgraded and work completed December 2014. Two additional furnaces were updated in 2015.

6.6.4 Hazardous Occurrences

In Peterborough, there were no hazardous occurrences. There were a total of sixteen first aids and one medical aid. Of the sixteen first aids, ten occurred in fuel, four in services and two in the office. Six of the injuries were classed as laceration/cut or abrasion/scratch. Seven of the injuries were classed as struck against or struck by. There were thirteen near miss events. The top three event categories were industrial hygiene, water and safety.

In Toronto, there were no hazardous occurrences. There were eight first aids. Five out of the eight first aids in Toronto involved an injury to the arm or hand as a result of an employee being cut or struck by an object. Sharp edge on part, workstation, or equipment was identified as the unsafe condition that contributed to the first aid in the majority of cases. There were fourteen reported near miss events including one spill that were investigated. The top three event categories were air, industrial hygiene, and radiation protection. Airborne and urine results at Internal Control Levels were the trigger in most cases for the investigations.

PART II: PUBLIC AND ENVIRONMENTAL PROTECTION

6.7 Environmental Protection

The "Environmental Protection" Safety and Control Area covers programs that monitor and control all releases of nuclear and hazardous substances into the environment, as well as their effects on the environment as a result of licenced activities.

GEH-C facilities are ISO 14001 registered to ensure effective environmental management systems are in place to achieve environmental goals and objectives. The environmental management system takes into account all relevant legal requirements. These programs demonstrate compliance to relevant federal and provincial legislation.

GEH-C has established facility specific CNSC approved *Action Levels* for various environmental parameters. An *Action Level* is defined in the *Radiation Protection Regulations* "as specific dose of radiation or other parameter that, if reached, may indicate a loss of control of part of a licensee's radiation protection program, and triggers a requirement for specific action to be taken." *Action Levels* are also applied to environmental protection. *Action Levels* are set below regulatory limits; however they are CNSC reportable events. Accordingly, GEH-C has established *Internal Control Levels* for various environmental parameters that are set even lower than *Action Levels* to act as an early warning system. *Internal Control Level* exceedances trigger an internal investigation and corrective actions; however they are not CNSC reportable events.

The Peterborough facility also uses beryllium as part of the fuel bundle manufacturing process. Beryllium use in a federally regulated facility is governed by the *Canada Labour Code Part II* and the *Canada Occupational Health and Safety Regulations*. The Environmental Protection Act of Ontario (R.S.O. 1990, c. E. 19) and Ontario Regulation 419/05 *Air Pollution – Local Air Quality Regulation* determine the permitted concentration of contaminant release. The release limit at the Point of Impingement (POI) for Beryllium is currently set at 0.01 µg per cubic meter of air. The POI is the plant/public boundary. GEH-C has established an *Internal Control Level* of 0.01 µg/m^3 air at the stack exit. Dilution between the stack and the plant boundary will also reduce the concentrations at the POI to below legislated limits. At the request of the CNSC, beryllium emission monitoring results are summarized where applicable in the following sub-sections.

6.7.1 Air Effluent Monitoring

6.7.1.1 Peterborough

A single process uranium air emission point exists in the Peterborough facility. The R2 Area Decan Station exhausts through a High Efficiency Particulate Air and absolute filter. The GEH-C Peterborough Facility performs weekly in-stack monitoring by removal of a filter capable of trapping uranium dust in the exhaust system. Filter papers are analyzed in-house and verified externally by an independent laboratory for testing by delayed neutron activation analysis. The minimum detection limit is 0.01 µg uranium. Results are compared to the previous results, and to relevant *Internal Control Levels* and *Action Levels*.

Three beryllium exhaust vents are measured by inserting a probe into the duct centerline and withdrawing a sample of air. The air is passed through a filter capable of trapping beryllium. The filter is analyzed for beryllium using the Atomic Absorption method or the Inductively Coupled Plasma - Atomic Emission Spectrometer method at an external independent laboratory. The result is related to the air volume passed through the filter. The minimum detection level is 0.002 µg beryllium. A calculation of the concentration is then made. The Peterborough site is implementing monitoring at each of the three stacks on a weekly basis, rather than one 24 hour sample per week.

A summary of air effluent sampling results are in Table 18.

6.7.1.2 Toronto

The Toronto facility performs continuous in-stack sampling and boundary air monitoring for uranium. The in-house filter papers are analyzed in-house daily and verified externally. Boundary samples are high volume air samples drawn at five positions around the facility perimeter. Boundary samples are analyzed externally only. The external independent laboratory tests the filter papers by delayed neutron activation analysis. The minimum detection limit is 0.01 µg uranium. Results are compared to the previous results, and to relevant *Internal Control Levels* and *Action Levels*.

A summary of air effluent sampling results are in Table 18 and Table 19. Sampling from the furnace stacks in Toronto is being implemented in 2016 and results will be included in next year's report.

	Stack Description	Emission Description	Total Number of Samples	Regulatory Release Limit (# Samples Exceeding Limit)	Highest Value Recorded (µg/m³)	Average Value Recorded (µg/m³)	Total Discharge (g)
Peterborough	R2 Decan	Uranium	43	*Action Level:* 1 µg/m³ (0)	0.016	0.001	0.003
	North	Beryllium	44	Ministry of Environment Limit: 0.01 µg Be/m³ (0)	0.002	≤0.000	N/A
	South	Beryllium	43	Ministry of Environment Limit: 0.01 µg Be/m³ (0)	0.002	≤0.000	N/A
	Acid	Beryllium	43	Ministry of Environment Limit: 0.01 µg Be/m³ (0)	0.009	≤0.001	N/A
Toronto	Rotoclone	Uranium	249	*Action Level:* 1 µg/m³ (0)	0.197	0.005	2.06
	6H-68	Uranium	249	*Action Level:* 1 µg/m³ (0)	0.375	0.006	2.92
	4H-48	Uranium	249	*Action Level:* 1 µg/m³ (0)	0.217	0.006	1.25

Table 18: Summary of Hazardous Substance Releases to Air at Exhaust Stack

	Peterborough	Toronto		
		2013	2014	2015
Number of Boundary Samples Taken	N/A	260	260	265
Number of Samples > *Action Level* (0.08 µg/m³)	N/A	0	0	0
Average Concentration (µg U/m³)	N/A	0.001	0.001	0.001
Highest Value Recorded (µg U/m3)	N/A	0.003	0.003	0.002

Table 19: Summary of Boundary Air Quality Monitoring

Air monitoring results are trended over 5 years as shown in the Figure 7 and Figure 8. Toronto's boundary monitor results are trended over 5 years as shown in Figure 9.

6.7.1.2.1 Peterborough Trending

Air release results continue to remain low and well below the Action Level of 1 µg/m³. The five year trend graph of annual air releases, presented in Figure 7, shows a stable five year performance consisting of very low air releases. The increase in 2011 may be due to an increase in the production amount over prior years. The increase in 2013 is attributed to two higher than usual sample results in the year. Investigations into the two samples results were inconclusive. The total release of 0.003 g in the reporting period is well below the discharge limit of 550 g.

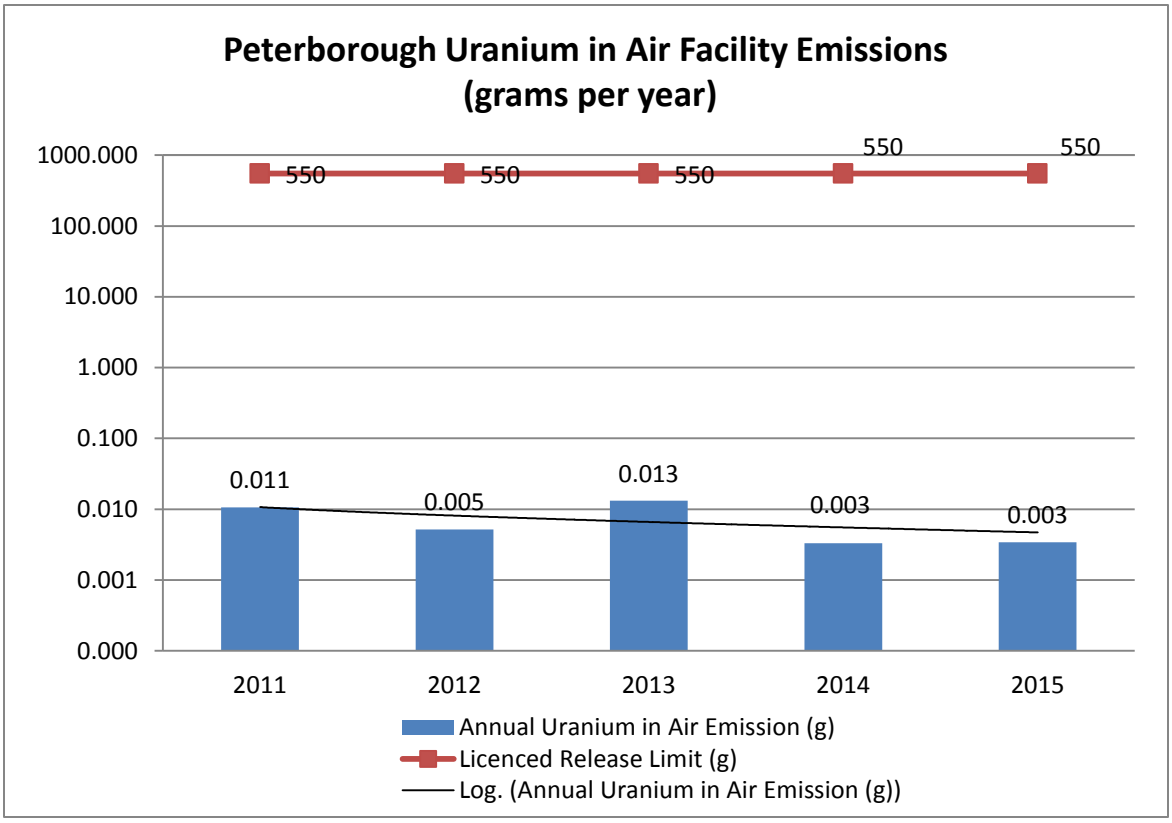

Figure 7: Peterborough Stack Air Emission Trending

Note: the above graph has a logarithmic scale

6.7.1.2.2 Toronto Trending

The Toronto stack air emission trend is decreasing. 2012 stack air emissions were slightly higher than the previous year due to a 6H68 exhaust system filter change. During filter change outs, higher concentrations are expected because of the potential for disturbance of trapped material in the existing filters while the filters are removed from the housing. In addition, new filters require a break-in period with initial loading for filter performance to reach its optimum level. The total release of 6.24 g during the reporting period is well below the discharge limit of 760 g.

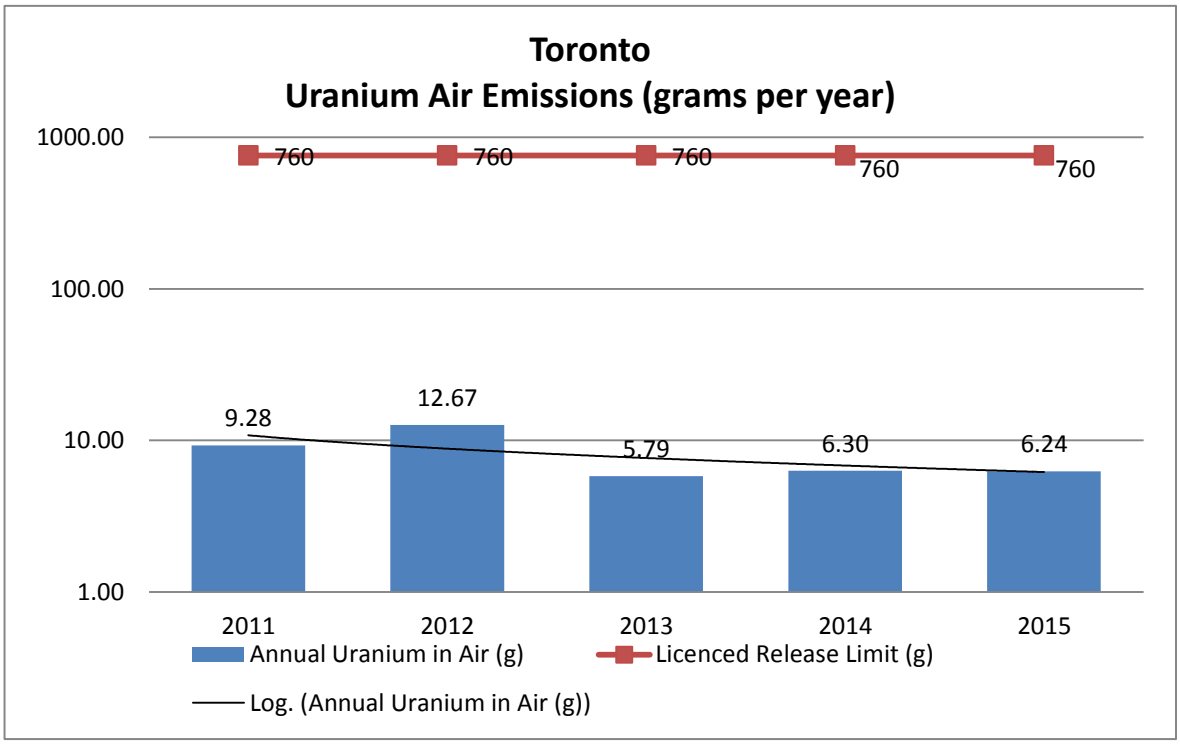

Figure 8: Toronto Stack Air Emission Trending

Note: the above graph has a logarithmic scale

The Toronto boundary air monitor maximum concentration measurements continue to remain low and well below the *Action Level* of 0.08 µg/m³. Overall, the five year trend graph of boundary air monitor concentrations shows a slightly decreasing trend consisting of very low measurements.

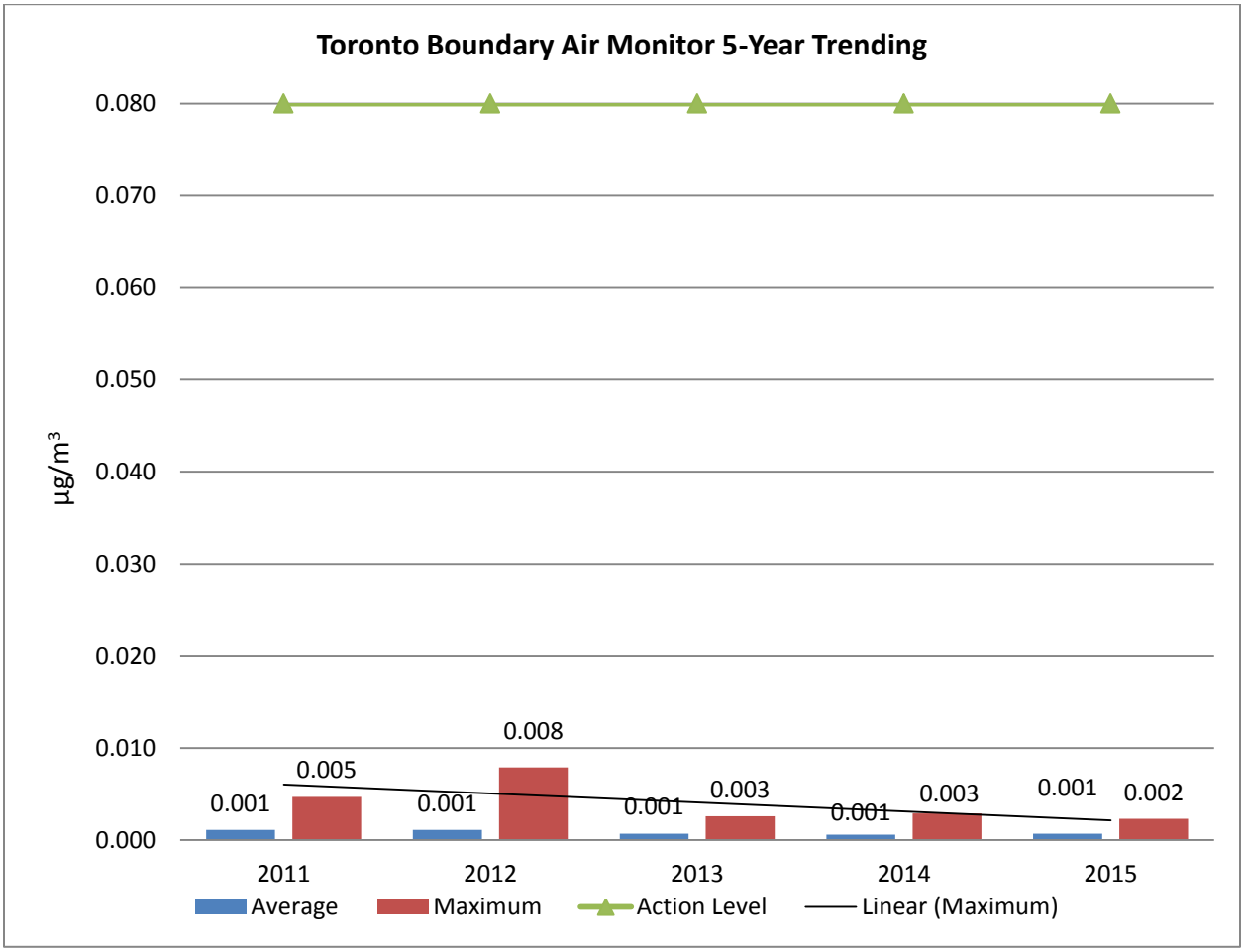

Figure 9: Toronto Boundary Monitor Air Emission Trending

6.7.2 Water Effluent Monitoring

In Peterborough, all potentially uranium contaminated waste water is held for determination of the quantity and concentration of uranium prior to disposal. Liquid waste generated from routine activities, such as washing floors, walls and equipment in the uranium pellet loading and end closure weld area, is held in a 205 Litre (45-gallon) drum stored in the maintenance area. The majority of potentially contaminated waste water originates from floor washing. The water is filtered prior to sampling, and then sent for independent analysis at an external laboratory. The minimum detectable quantity is 0.000002 mg U/L (parts per million (ppm)).

After the water sample result is verified to be below the *Internal Control Level* of 3 ppm and the *Action Level* of 6 ppm (per batch), the wash water is filtered again during discharge to the sanitary sewer. The GEH-C plant sewer also receives other wastewater from the non-nuclear fuel operations resulting in increased dilution prior to discharge to city sewers. Total grams are measured prior to additional filtering and dilution during discharge.

A second hazardous liquid effluent from the Peterborough facility is beryllium in water that is generated from equipment and washing. GEH-C has established an *Internal Control Level* of 4 µg/L, which is conservative and consistent with international drinking water guidelines for beryllium. Currently, the beryllium contaminated water passes through a weir settling system prior to release to the sanitary sewer. Regular sampling of the beryllium wastewater is conducted. The water sample consists of a 24 hour composite sample taken from the outflow lines. It is sent for analysis at an external independent laboratory. The minimum detectable level is 0.007 µg Be/L (0.000007 mg Be/L or parts per million (ppm)).

In Toronto, bulk quantities of UO_2 powder are handled. This requires frequent cleaning and washing, creating higher concentrations of uranium in wastewater to be treated. The water is used to clean protective clothing, walls, floors, equipment and in various other janitorial functions. The water is treated to remove uranium dioxide and the concentration of UO_2 in waste water leaving the treatment system is measured in-house. The concentration of UO_2 in the total waste water leaving the plant premises is calculated and compared to the *Internal Control Level* of 3 ppm and the *Action Level* of 6 ppm (per batch). A weekly composite sample is prepared and sent for independent analysis at an external laboratory. The minimum detectable quantity is 0.000001 mg U/L or parts per million (ppm).

The water effluent treatment system at the Toronto facility operates as follows:

1. Waste water is held in batches
2. Each batch is treated, then sampled
3. Each batch is only released when in-house sample results confirm the concentration is less than 3 ppm (note: the *Action Level* for a batch is 6 ppm)
4. The released water mixes with sanitary water
5. Dilution factors range from 4 to about 12; the resulting volume discharges to a combined sanitary/storm city sewer
6. Reported results do not include dilution, i.e., sample measurements are taken prior to mixing with non-process water

Results from water effluent monitoring are summarized in Table 20. Annual discharges for uranium are trended in Figure 10 and Figure 11. Beryllium average and maximum concentrations and Internal Control Level exceedances are trending up. The beryllium weir settling system was replaced in December 2015 and is showing reduced concentrations into 2016 at an average to date of 0.2 µg/L.

	Peterborough			**Toronto**		
	2013	**2014**	**2015**	**2013**	**2014**	**2015**
Total Amount of Liquid Discharged (L) from Uranium Processing Areas	820	820	820	1,649,195	1,500,470	1,487,250
Maximum Uranium Concentration in Water (ppm)	0.46	0.29	0.09	2.7	2.46	2.44
Average Uranium Concentration in Water (ppm)	0.29	0.17	0.07	0.76	0.61	0.47
Number of Samples Exceeding *Action Level* (6 ppm per batch)	0	0	0	0	0	0
Total Uranium Discharge to Sewer (g)	0.24	0.14	0.06	830	720	390

	Peterborough			Toronto		
	2013	**2014**	**2015**	**2013**	**2014**	**2015**
Minimum pH	N/A	N/A	N/A	6.9	7.0	6.6
Average pH	N/A	N/A	N/A	7.1	7.4	7.1
Maximum pH	N/A	N/A	N/A	7.6	7.8	7.7
Maximum Beryllium Concentration in Water µg/L	1.6	5.3	65.5	N/A	N/A	N/A
Average Beryllium Concentration in Water µg/L	0.4	≤1.3	4.5	N/A	N/A	N/A
Number of Samples Exceeding Internal Control Level (4 µg/L)	0	2	3	N/A	N/A	N/A

Table 20: Liquid Effluent Monitoring Results

6.7.2.1 Peterborough Trending

In Peterborough, the five year trend graph of uranium water releases shows a stable five year performance consisting of very low water releases. The sample batch number size is limited and trending is difficult due to small random fluctuations in low concentrations. Water release results continue to remain low and below the *Action Levels* of 6 ppm (per batch) and 3 ppm (annual average). The total release of 0.06 g is a very small fraction of the derived release limit and of the discharge limit of 760 kg/year.

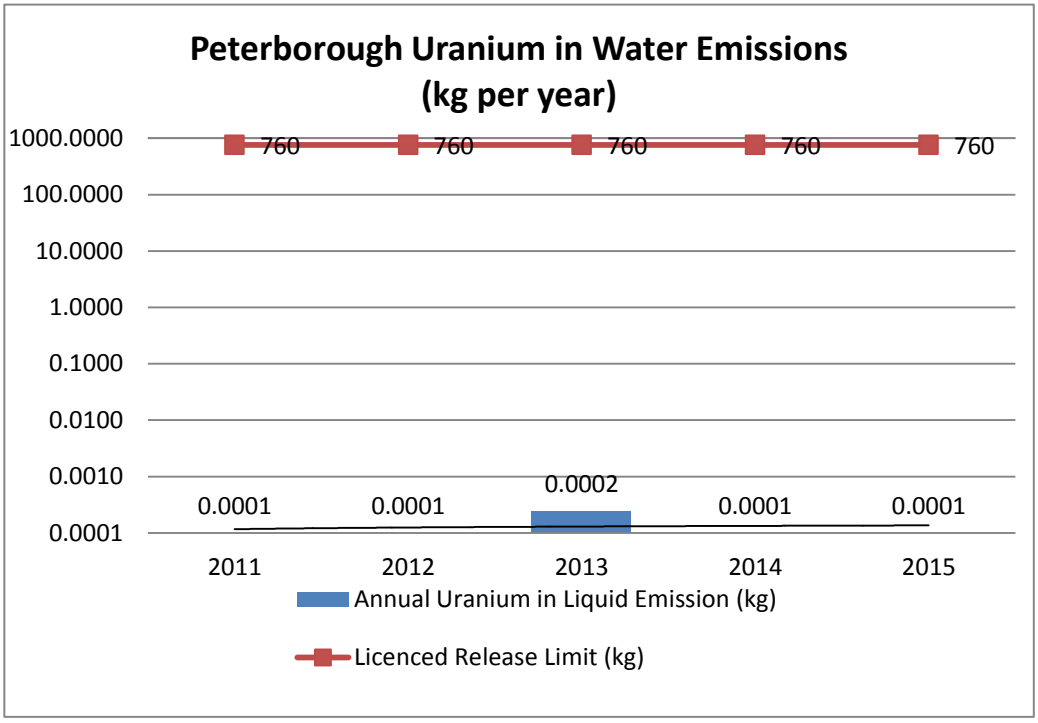

Figure 10: Peterborough Water Emission Trending

Note: the above graph has a logarithmic scale

6.7.2.2 Toronto Trending

Toronto liquid effluent releases are trending downward. In 2011, the facility saw a higher source term which was due to a higher decontamination load and grinder wash water output. Water release results continue to remain low and below the *Action Levels* of 6 ppm (per batch) and 3 ppm (annual average). The total release of 0.39 kg during the reporting period is well below the derived release limit of 9000 kg/year.

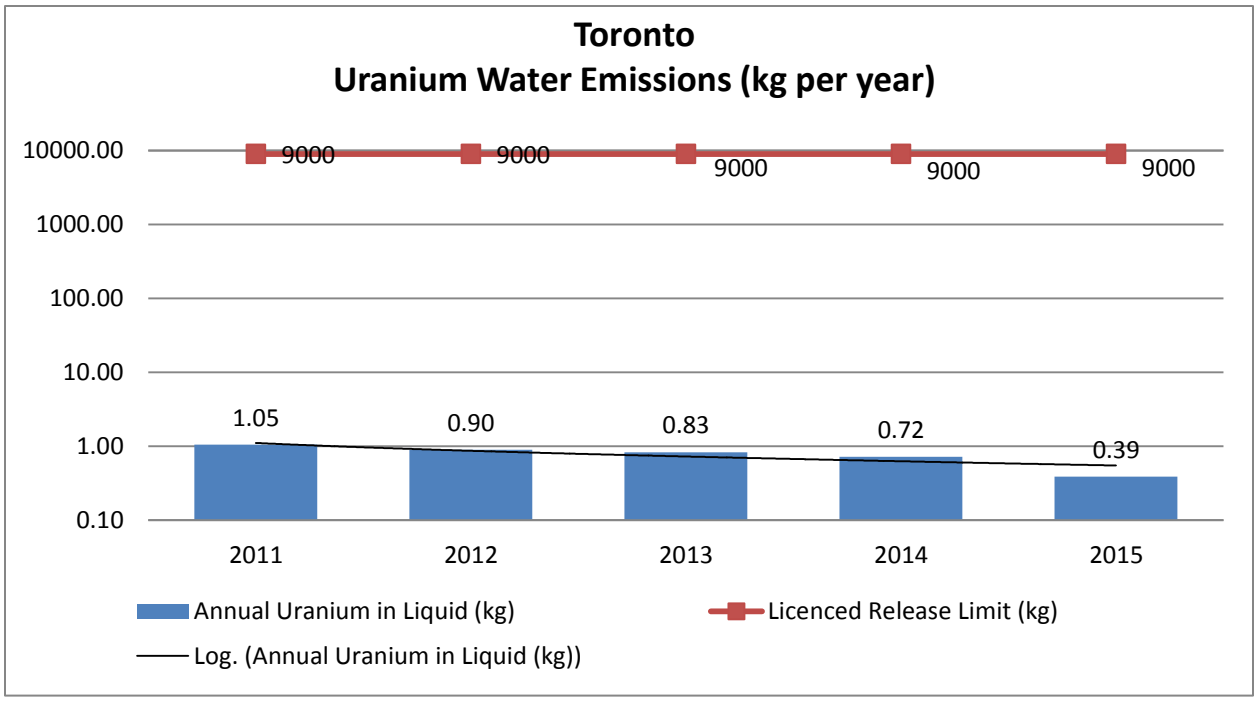

Figure 11: Toronto Water Emission Trending

Note: the above graph has a logarithmic scale

6.7.3 Well and Soil Sampling Measurements/Monitoring

Well monitoring is not required at either facility. Soil sampling is not conducted at the Peterborough facility due to the negligible air release amounts. Soil sampling is conducted annually at the Toronto facility.

Airborne UO_2 emissions impinge on the ground surface downstream of the release point. UO_2 is insoluble in water but may be washed into the soil by rainfall, snow, etc. Surface uranium levels will indicate deposited emissions. Depositions of uranium can be measured by taking small samples of surface soil and analyzing for natural uranium. If soil analysis indicates rising natural uranium levels, emissions have increased and investigation is made into the cause(s).

At the Toronto facility, samples are taken of surface soil retrieved from 49 locations according to a documented plan. Samples are retrieved by a third party consultant and analyzed by an independent laboratory by Inductively Coupled Plasma Mass Spectrometry for the amount of natural uranium in parts per million, (1 µg U/g). The minimum detectable limit is 0.5 parts per million (0.5 µg U/g). Results are compared to previous years and the Canadian Council of Ministers of the Environment (CCME) guidelines. In Ontario, background levels of uranium in soil are generally below 2.5 µg/g. The 2015 summary of results are listed in Table 21. Each

individual soil sampling result is listed in Table 22. Locations are colour coded according to their area classification as shown in Table 21: GEH-C property is blue, industrial/commercial lands are purple, and all other locations are green. Note: location ID 39 and 40 were removed from the plan in 2013 as a result of inaccessibility due to construction activities.

	Location Description		
	On GEH-C property	**On industrial/commercial lands, i.e. south rail lands**	**All other locations, i.e. residential**
Relevant CCME Guideline (µg U/g)	**300 µg U/g**	**33 µg U/g**	**23 µg U/g**
Number of Samples Taken	1	30	18
Average concentration µg U/g	1.4	2.9	0.7
Maximum concentration µg U/g	1.4	8.7	2.1

Table 21: Toronto Soil Sampling Result Summary

Sample Location ID	Uranium Content (ppm/µg/g)	% of guideline
1	<0.5	2.2
2	0.7	3.0
3	1.4	0.5
4	<0.5	2.2
5	4.6	13.9
6	4.9	14.8
7	5.4	16.4
8	3.5	10.6
9	2.1	6.4
10	3.3	10.0
11	5.0	15.2
12	3.5	10.6
13	2.2	6.7
14	4.5	13.6
15	8.7	26.4
16	8.1	24.5
17	8.5	25.8

Sample Location ID	Uranium Content (ppm/µg/g)	% of guideline
18	1.5	4.5
19	1.2	3.6
20	1.1	3.3
21	1.1	3.3
22	1.1	3.3
23	0.9	2.7
24	0.6	1.8
25	4.5	13.6
26	1.3	3.9
27	0.8	2.4
28	0.9	2.7
29	2.1	9.1
30	0.9	2.7
31	1.8	5.5
32	1.3	3.9
33	1.0	3.0
34	1.6	4.8
35	1.6	4.8
36	<0.5	<2.2
37	1.8	7.8
38	0.6	2.6
41	<0.5	<2.2
42	0.6	2.6
43	<0.5	<2.2
44	<0.5	<2.2
45	<0.5	<2.2
46	<0.5	<2.2
47	<0.5	<2.2
48	<0.5	<2.2
49	<0.5	<2.2
50	<0.5	<2.2

Sample Location ID	Uranium Content (ppm/µg/g)	% of guideline
51	<0.5	<2.2

Table 22: Toronto Individual Soil Sampling Results

6.7.4 Exceedances of Regulatory Limits or Action Levels

No *Action Levels* or regulatory limits were exceeded during the reporting period.

6.7.5 Total Estimated Doses to Critical Group

The estimated dose to the public includes the realistic pathways occurring as a result of air emissions summarized in Table 23.

Pathway	Description
Air immersion	Airborne uranium dioxide particles (UO_2) can expose members of the public via direct radiation This is accounted for in the Peterborough and Toronto Derived Release Limits
Soil deposition gamma ground shine	Gamma ground shine dose from direct radiation This is accounted for in the Toronto Derived Release Limit
Soil deposition beta ground shine	Beta ground shine dose from direct radiation This is accounted for in the Toronto facility Derived Release Limit
Soil re-suspension and inhalation	Soil re-suspension and inhalation dose This is accounted for in the Toronto facility Derived Release Limit
Air inhalation	Airborne uranium dioxide particles (UO_2) can expose members of the public via inhalation This is accounted for in the Peterborough and Toronto Derived Release Limits

Table 23: Radiological Exposure Pathways

The facility Derived Release Limits account for the exposure pathways as described in the facilities Radiation Protection Manual to restrict dose to a member of the public to 1 mSv (1,000 µSv) per year, which is the Canadian Nuclear Safety Commission's regulatory dose limit as defined in the *Radiation Protection Regulations*. The Derived Release Limits assume that a member of the public occupies the GEH-C boundary continuously (24 hours per day, 365 days per year). Note: Liquid effluent is not included in the calculation of public dose as the effluent from both facilities is discharged directly to city sewer systems and is not used for drinking.

In Peterborough, through direct correlation with the facility Derived Release Limits, the estimated effective dose as a result of air releases during the reporting period is estimated to be 0.00 µSv. Beginning in 2016, environmental TLDs at the Peterborough plant boundary were put in place. Results will be incorporated into the 2016 annual public dose estimation. In Toronto, through direct correlation with the facility Derived Release Limits, the estimated effective dose as a result of air releases during the reporting period is 0.41 µSv.

Beginning in 2014, environmental TLDs at the Toronto plant boundary are also used to estimate a public gamma dose. The estimated effective dose as a result of gamma radiation during the reporting period is 9.4 µSv for a total estimated critical receptor dose of 9.8 µSv. In comparison to the 1 mSv (1,000 µSv) per year effective dose limit to a member of the public, doses from the operations at the Peterborough and Toronto facilities are a fraction of the public dose limit. This is presented for the current and previous reporting periods in Table 24.

Period	Peterborough		Toronto	
	Estimated Annual Public Dose (µSv)	% of Public Dose Limit (1,000 µSv = 1 mSv)	Estimated Annual Public Dose (µSv)	% of Public Dose Limit (1,000 µSv = 1 mSv)
2015	0.00	0%	9.8	1.0%
2014	0.00	0%	5.2	0.5%

Table 24: Estimated Annual Public Dose

6.7.6 Environmental Protection Program Effectiveness

GEH-C's Peterborough and Toronto facilities are registered to ISO 14001:2004. As part of the requirement for maintaining ISO 14001 registrations an Environmental Management System (EMS) is in place. Our Environmental Management System meets the requirements of ISO 14001.

Internal inspections are completed on a routine basis and focus on all areas of the plant. The purpose of these inspections is to identify environmental and safety issues. WSC members carry out routine plant safety and environmental inspections. After an inspection, the inspection findings are documented, corrective actions identified, and submitted to applicable personnel. Depending on the complexity of the finding immediate action may be required (i.e. equipment shutdown), or the action may be incorporated into meeting minutes, or tracked in GEH-C's Action Tracking System (ATS).

The following audits of the environmental protection program are conducted at each facility:

- The EMS is audited internally every year as per ISO 14001:2004
- The EMS is audited externally (by QMI-SAI Global) every year as per ISO 14001:2004
- An annual self-assessment is conducted

Following an audit or self-assessment, the findings are documented, corrective actions identified and tracked to completion in ATS.

In the reporting period, there were 30 environmentally related findings for Peterborough. These findings were identified from internal inspections, self-assessments, employee concerns and incidents. The top five finding categories were Wastewater, Hazardous Waste, Hazardous Materials Transport, Spill Prevention and Air/ISO 14001/Storm water. There were no major non-conformances. All corrective actions are closed.

In the reporting period, there were 18 environmentally related findings for Toronto. These findings were identified from incident investigations, self-assessments and other inspections. The finding categories were Air, Hazardous Material Transportation, Hazardous/Regulated Waste, Documentation/Recordkeeping and Spill Prevention. There were no major non-conformances. All corrective actions are closed.

6.7.7 Environmental Protection Program Improvements

No significant changes or improvements were made to the Peterborough or Toronto environmental protection program. Both sites are working toward program improvements to achieve compliance with the following environmental standards by year end:

- Canadian Standards Association N288.4-10, Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills
- Canadian Standards Association N288.5-11, Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills
- Canadian Standards Association N288.6-12, Environmental risk assessments at Class I nuclear facilities and uranium mines and mills

In 2015 at the Toronto plant, ceramic microfiltration (CMF) as a technology to treat wastewater was investigated and determined to meet or exceed discharge compliance criteria, potentially reducing water emissions ten-fold. Investigation into the feasibility of transitioning to this filtration system continues into 2016.

6.7.8 Environmental Protection Program Performance

2015 environmental protection goals and results are summarized in Table 25.

	Goal Description	Goal Achieved
Peterborough	Zero violations, penalties, exceedances or reportable spills/releases	Achieved
	Conduct 100% of required emergency drills	Achieved
	Implement waste reduction initiative to divert 75% of paper towel waste from landfill to organics stream by end of the third quarter	Achieved
	Complete one asbestos removal project by year end	Achieved
Toronto	Removal of historical waste	Achieved
	Reduction in soft metal drums	Achieved
	Zero reportable releases (air/water)	Achieved
	Zero ISO-14001 non-conformances	Achieved
	Average water effluent tank releases <0.9 ppm	Achieved
	>5% reduction over the 5 year average in uranium air emissions	Achieved
	Undertake a treasure hunt initiative for greenhouse gas reduction	Achieved
	Reduce on-site chemical inventory by 5%	Achieved
	Conduct a feasibility study on new water technology	Achieved

Table 25: EMS Program Goals

2016 goals for Peterborough are established as follows:

1. Reduce the quantity of beryllium hazardous waste by 25% through implementation of reusable cloth towels at the beryllium area hand washing sink

2. Develop and implement a standard methodology for chemical sweeps by year end
3. Update site-wide designated substance survey by year end
4. Implement isokinetic sampling from all three beryllium stacks by end of 2nd quarter

2016 goals for Toronto are established as follows:

1. Average water effluent tank release <0.8 ppm
2. Emissions – 5% reduction over 5 year average
3. Chemical – reduction of on-site inventory by 5%
4. Noise – completion of abatement project
5. Implement sampling from furnace stacks
6. Completion of Treasure Hunt Project

6.8 Emergency Management and Response

Each facility has established emergency response plans that describe the actions to be taken in order to minimize the health and environmental hazards, which may result from fires, explosions, or the release of hazardous materials. This includes effects to the local area and members of the public. The plan is intended to reduce the risk of fires within the facility and assist emergency staff and plant personnel in understanding key emergency response issues, and assist the facility in protecting employees, the local community and the environment through sound emergency management practices. The emergency response plans fulfil the CNSC operating licence requirements and the following standards or guides:

- CAD/CSA-Z731-03 Emergency Planning for Industry Standard
- NFPA 801, Fire Protection for Facilities Handling Radioactive Materials
- CNSC Regulatory Guide G-225, Emergency Planning at Class 1 Nuclear Facilities and Uranium Mines and Mills
- The Province of Ontario Nuclear Emergency Plan Part VIII
- Canada Labour Code

6.8.1 Review of Emergency Preparedness Program Activities

Emergency drills were performed in the following areas:

Peterborough:

1. Fire safety/Evacuation (twice)
2. Fire safety/Evacuation of GE Motors ((involved GEH-C Emergency Response Team) eight))
3. Medical Emergency Response Team (ERT) table-top exercise (once)

The drills at the Peterborough facility resulted in three actions being identified and tracked to completion in the ATS. Actions were related to facility access in the event of an emergency.

Toronto:

1. Fire/Evacuation (two)

2. Hydrogen Shut-Off System (once)
3. Hydrogen High Alarm (once)
4. Medical Emergency Response Team (ERT) table-top exercise (twice)

The drills at the Toronto facility resulted in eight actions being identified and tracked to completion in the ATS. Actions were related to training and equipment/personal protective equipment performance.

6.8.2 Emergency Preparedness Training Program and Effectiveness

The Peterborough Emergency Response Team was trained on fire extinguishers, first aid/cardio-pulmonary resuscitation/automatic external defibrillator, spill response and blood borne pathogens. Training course completion for the site is summarized in Table 26.

The Toronto Fire Warders were trained on fire extinguishers and fire warden responsibilities. The Toronto first aid team was trained in first aid/cardio-pulmonary resuscitation/automatic external defibrillator and blood-borne pathogens. Training course completion for the site is summarized in Table 26.

	Course Name	Number of Employees who Required Course	% Required Completed
Peterborough	EHS Overview for Manufacturing (includes accident prevention, emergency preparedness and fire prevention)	16	100%
	Emergency Preparedness and Fire Prevention (Initial)	14	100%
	Emergency Preparedness and Fire Prevention (Refresher)	71	100%
	Portable Fire Extinguisher Training (Practical)	13	100%
	Portable Fire Extinguishers	293	100%
	Blood borne Pathogens Awareness (Initial)	5	100%
	Blood borne Pathogens Awareness (Refresher)	11	100%
	First Aid/CPR/AED	37	100%
Toronto	EHS Overview for Manufacturing (includes accident prevention, emergency preparedness and fire prevention)	2	100%
	Emergency Preparedness and Fire Prevention (Initial)	4	100%
	Emergency Preparedness and Fire Prevention (Refresher)	38	100%
	Portable Fire Extinguisher Training (Practical)	12	100%
	Portable Fire Extinguishers	58	100%
	Blood borne Pathogens Awareness (Initial)	9	100%

	Course Name	Number of Employees who Required Course	% Required Completed
	Blood borne Pathogens Awareness (Refresher)	7	100%
	First Aid/CPR/AED	10	100%

Table 26: Emergency Preparedness and Fire Prevention Training Summary

6.8.3 Fire Protection Program Activities and Effectiveness

An internal compliance audit is conducted annually at each site, as well as a self-assessment to GE's Health and Safety Framework requirements. Internal Fire Protection Inspections are performed as per the National Fire Code, 1995.

In Peterborough, 49 Action Tracking System findings were raised related to emergency response, egress and fire protection. Findings entered into this category originated from routine site safety inspections, and third-party audits. There were no major non-conformances. All corrective actions have been implemented and the findings closed.

In Toronto, 21 Action Tracking System findings were raised related to emergency response and fire protection. Findings entered into this category originated from site safety inspections, self-assessments, internal audits, third party audits, and emergency drill lessons learned. There were no regulatory or major non-conformances. All corrective actions have been implemented and findings closed.

6.8.4 Fire Protection Program Improvements

No changes were made to the Peterborough Fire Protection Program in the reporting period.

In Toronto Building 7, a number of uncertified fire doors were replaced. In addition, the south fire escape was moved from its current location at grade to one storey above, and a fire escape leading to grade from that location was provided.

6.9 Waste and By-Product Management

The "Waste and By-product Management" Safety and Control Area covers internal waste and by-product related programs which form part of the facility's operations, up to the point where the waste is removed from the facility to a separate waste and by-product management facility. This also covers the ongoing decontamination and planning for decommissioning activities.

Waste and by-product management is described and summarized in Appendix C, submitted to the CNSC under separate cover.

6.10 Nuclear Security

The "Nuclear Security" Safety and Control Area covers the programs required to implement and support the security requirements stipulated in the regulations, in the operating licence, and in industry expectations for the facilities.

Facilities are in compliance with CNSC requirements. There were no breaches of security and no significant program improvements made at either site during the reporting period.

6.11 Safeguards and Non-Proliferation

The "Safeguards and Non-proliferation" Safety and Control Area covers the programs required for the successful implementation of the obligations arising from the Canada/IAEA Safeguards and Non-proliferation Agreement. GEH-C has implemented and maintains a safeguards program and undertakes all required measures to ensure safeguards implementation in accordance with IAEA commitments and CNSC regulatory document RD-336 *Accounting and Reporting of Nuclear Material*. Movement of natural and depleted uranium (inventory changes) are documented and reported to the CNSC daily and as required.

A Physical Inventory Taking Evaluation was conducted by the CNSC on July 13, 2015 in Peterborough. A Physical Inventory Verification involving the CNSC and the IAEA was conducted in Toronto on July 16, 2015 in Toronto. The scope concerned book examination and physical verification of nuclear material. No major non-conformances were noted.

In Toronto, a Short Notice Random Inspection was conducted by the CNSC and IAEA on February 10, 2015 in Toronto and on March 18, 2016 in Peterborough. The scope concerned verification of records for current shipments of finished product. Physical pellet samples were taken for confirmation of natural uranium. No major non-conformances were noted.

6.12 Packaging and Transport of Nuclear Substances

The "Packaging and Transport of Nuclear Substances" Safety and Control Area covers the packaging and transport of nuclear substances and other nuclear materials to and from the licenced facilities.

In October, a minor compliance miss for a Class 7 shipment from Peterborough to Toronto was reportable to the CNSC. A partial skid of uranium pellets was returned to Toronto along with a number of empty skids. The partial skid of pellets was not listed on the Bill of Lading or Shipping Memorandum. The shipment was classified as a Transportation of Dangerous Goods UN2908 shipment but it should have been classified as a UN2912 shipment. There was no impact to any employee, the public or the environment as a result of the miss. A full Tap Root investigation was conducted that identified five causal factors. Seven corrective and preventive actions were logged into ATS and tracked to closure.

All other shipments to and from both facilities were conducted safely according to regulations during the reporting period.

6.13 Other Matters of Regulatory Interest

6.13.1 Public Information Program

2015 brought changes to GEH-C that had, and will continue to have, a positive impact on how the business communicates and engages with the communities in which it operates and other important stakeholders.

GEH-C has made significant progress in its efforts to improve, build and maintain a solid communications program. In 2015, the new president and CEO solidified GEH-C's commitment to communications by hiring a communications manager – a first for GEH-C. Coming onboard in mid-September, the first few months involved transitioning existing communications programs and materials to the new manager. From September to the end of 2015, the communications manager worked to re-engage its Citizen Liaison Committee members and identified a path forward for the group; initiated GEH-C's participation in the Peterborough Santa Claus Parade, executed a successful community Barbeque (BBQ) at the Toronto facility, met with the principal at Prince of Wales Public School which is located near the Peterborough facility, and took important initial steps towards improving GEH-C's profile and relationship with government officials and media.

GEH-C continues to improve its communications efforts and its delivery of timely, transparent information to stakeholders and make progress with implementing its public information plan. GEH-C supported 33 volunteer initiatives in the Peterborough area and four in Toronto and revised and improved the content of its Toronto community newsletter, including the inclusion of a message from the president and CEO.

GEH-C understands the importance of building and maintaining relationships and remains committed to enhancing its communications program and its relations with the community and other key stakeholders.

6.13.1.1 Employees

Employees are GEH-C's most valued asset and are recognized for their ability to influence and educate their families and members of the public about the positive role GEH-C plays in the community and as part of Ontario's nuclear industry.

GEH-C has employees at three locations in Ontario – Arnprior, Peterborough and Toronto.

Employee Portal (Internal Intranet)

The GEH/GEH-C Employee Portal is the North American intranet for GE Hitachi employees, serving as an important tool for disseminating communication within the organization. The site houses leadership blogs, company news and initiatives, health and safety information, quick links to tools and resources and company-supported event information.

While manufacturing employees have access to a GEH-C computer in the lunchrooms, GEH-C updates that are posted on the Portal are also printed and placed in the lunch rooms for manufacturing employees. Where appropriate, some updates/news appears on the monitors (e.g. fire alarm testing, safety messages, etc.)

Monitors

Television monitors are installed on the manufacturing floors and lunch rooms at the Peterborough and Toronto facilities. The monitors are used regularly to communicate messages to employees who do not work on a computer due to the nature of their jobs. Information that is regularly communicated include:

- Safety Awareness Tips
- EHS Updates
- Site Visitors
- Schedule Updates
- Training Opportunities
- Local company-sponsored events/activities

By using the television monitors in strategic locations, GEH-C is able to communicate more effectively and more timely with its population of production and manufacturing-based employees. The monitors are updated as needed and approximately 100 messages were posted to the monitors at each location last year.

All Employee Meetings

Three All Employee Meetings are hosted each year at each of GEH-C's sites. The meetings are led by members of GEH-C's senior leadership team and focus on a range of topics including business strategies/performance, health & safety, industry updates, corporate messaging, Human Resources announcements/updates, organizational news, project updates, etc.

Environmental Health & Safety Barbeques

Annual EHS BBQs are held at each of the company's locations and are part of the All Employee meeting rhythm. The BBQs are hosted by the EHS team and include updates to staff on EHS activities, as well as business-related updates from members of the senior leadership team.

Nuclear News

Nuclear News is GEH-C's internal newsletter and was revived in late 2015. The newsletter shares business initiatives, health and safety performance, training opportunities and community initiatives from across all three of GEH-C's sites.

2016 Look Ahead

- Enhance internal communications efforts using new methods including: Employee Conversation Sessions (to include all employees across the company) and a monthly blog from the president and CEO.
- Drive employees to the Employee Portal by pushing the Portal to all employee computers and setting it as their homepage to reinforce the Portal as the primary source of internal news, updates and information. This will help to ensure employees are more effectively able to access the news and information they need to help them perform their duties safely and knowledgeably, and increase their awareness of company news and activities.
- Update the Employee Portal with improved navigation, organization of content and capabilities.
- Initiate the use of screen savers to deliver key information to employees.

Vehicle	2015 (Total)
Employee Portal	Regular updates, videos, safety tips, etc.
Monitors	Peterborough – 100 Toronto – 100
All Employee Meetings (tally includes EHS BBQ)	Peterborough – 3 Toronto – 3
Nuclear News (Internal newsletter)	1

Table 27: Employee Communication Vehicles

6.13.1.2 Government Stakeholders

All levels of government play an important role in the success and sustainability of the nuclear industry and are important relationships in the communities in which we operate, which is why GEH-C has taken a more proactive approach to engaging, educating and building relationships with government officials.

In Toronto, GEH-C senior leaders met with local Member of Parliament (MP), Andrew Cash to provide an updated on GEH-C's commitments from the Dec. 2013 public meeting. GEH-C shared the results of air and soil testing and its plans to continue improving communications with area residents. Following the meeting, GEH-C provided written follow-up correspondence to MP Cash's office.

In July, GEH-C attended the Ontario Liberal Government's GTA & Central Golf tournament which was attended by Ontario-based businesses and leaders, along with members of the Ontario Liberal Caucus and the Hon. Kathleen Wynne, MPP.

A GEH-C and Bruce Power Memorandum of Understanding (MOU) signing event was held at GEH-C's Peterborough facility on November 10th, 2015, and included representation from local governments such as Peterborough Mayor, Darryl Bennett and County Warden, J. Murray Jones. The Honourable Jeff Leal, Member of Provincial Parliament (MPP) and Minister of Agriculture, Food and Rural Affairs, was originally scheduled to attend and provide remarks but an urgent family matter prevented his attendance prompting Mayor Bennett to step in and provide the remarks. Following the event, Minister Leal was invited to meet with GEH-C president and CEO, Mark Ward and tour the Peterborough facility, which he did on December 5th, 2015.

GEH-C's commitment to improve and establish relationships with government representatives extends beyond its facilities licensed by the CNSC. In July, 2015, The Honourable Bob Chiarelli, MPP and Minister of Energy was invited to visit and tour GEH-C's tubing operation in Arnprior, ON. The invitation was accepted and arrangements are in the process of being made.

Location	Name	Title	Date	Activity
Peterborough	Hon. Jeff Leal	MPP Minister of Agriculture, Food & Rural Affairs	Nov. 2015	Visit and tour completed on Dec. 5, 2016
Peterborough	Darryl Bennett	Mayor	Nov. 2015	Participated in MOU event at Peterborough facility
Peterborough	J. Murray Jones	Peterborough County Warden	Nov. 2015	Attended MOU event at Peterborough facility
Arnprior	Hon. Bob Chiarelli	MPP Minister of Energy	July. 2015 – letter sent to his office	Arrangements for tour being coordinated

Table 28: 2015 Government Outreach at a Glance

2016 Look Ahead

GEH-C will continue to improve its government outreach including:

- Secure meetings and facility tours with local MPs and MPPs in Toronto and Peterborough.
- Invite Peterborough Mayor and councilors to GEH-C's Peterborough facility for an overview and tour.
- Invite Davenport Councilor Cesar Palacio to meet with GEH-C staff and tour the Toronto facility (previously toured in 2012).

6.13.1.3 Media

Earned Media

Media play an important role in influencing the public's perception and understanding of GEH-C's operations and the nuclear industry in general. GEH-C recognizes that media are a conduit to educating the general public and relationships with media are a valuable component of its communications program.

In November 2015, GEH-C hosted a Memorandum of Understanding signing event at its Peterborough facility which included proactively inviting area media. In collaboration with Bruce Power, a news release was issued on Canada Newswire and picked up in a number of online publications. CHEX Newswatch and the Peterborough Examiner attended the event, with each outlet conducting an interview with GEH-C's president and CEO. A post-event interview was conducted with Peterborough This Week as they were unable to attend. The resulting media coverage of the event was positive and helped GEH-C build relationships with local media.

In June 2015, GEH-C issued a news release regarding a MOU signed between the governments of Canada and the United Kingdom to explore advanced fuel cycle technology, drawing on the partnership between Candu Energy and GEH-C.

GEH-C also received media coverage as a result of its Day of Caring initiative in support of Peterborough's Camp Kawartha and, in October, the Peterborough Examiner covered GEH-C's planting of more than 300 native shrubs and plants to enhance the shoreline along the Otonabee River at James Stevenson Park.

Advertising

2015 advertising included the placement of ads in:

- University of Windsor's Engineering Students Society ESSCO AGM Delegate handbook
- Peterborough Possibilities (circulated in the Toronto Star)
- Peterborough Pete's 60th Anniversary publication

6.13.1.4 Community

Volunteerism

Volunteerism is a vibrant part of GEH-C's culture and GE Volunteers is a company-wide effort to support and encourage employees to give back to the community. Every year GEH-C employees in Toronto and Peterborough contribute to a variety of community-based initiatives with the objective to help build stronger communities where they live and work.

Last year, GEH-C Toronto employees supported the EC Drury School for the Deaf's trip to the National Technical Institute for the Deaf in Rochester, NY. And, in September, GEH-C along with other GE employees in the Toronto area, collected food donations in support of the Daily Bread Food Bank and over the course of one day, processed and sorted over 10,000 lbs. of groceries, which went on to help about 1,500 people.

During the Holiday season, GEH-C Toronto employees donated items to the GE Volunteers Holiday Helpers which provided new items for local families in need.

In Peterborough, GEH-C employees supported 33 Peterborough projects through the GE Volunteers program, contributing over 2,500 hours to the community. During GE Volunteers Day of Caring, GEH-C employees in Peterborough, together with employees at GE Energy Management spent the day at Camp Kawartha painting, raking, building and performing a range of other tasks.

Other initiatives supported by GEH-C were:

- National conference event
- Lake Scugog Camp spring cleaning
- St Vincent de Paul Society

- Junior Achievement (Company program and Economics for Success)
- Canadian Cancer Society Daffodil Days
- Greenwing Fishing Derby (with Big Brothers/Big Sisters)
- Kinsmen Park spring clean-up for Earth Day
- Ecology Park "untucking" & raised beds
- Heart & Stroke Big Bike
- Ashburnham Community Gardens
- City Wide Food Drive for Kawartha Food Share
- Prince of Wales School Fun Fair
- Habitat for Humanity (2 separate build opportunities)
- ORCA plant maintenance (in association with the Women's Network)
- Day of Empowerment (in association with Meadowvale council)
- H.O.P.E. Program (Helping Others by Providing Essentials – toiletry donations to local shelters)
- Day of Caring ORCA shoreline maintenance (2 events)
- Day of Caring Rotary Trail maintenance (2 events)
- Day of Caring Cap Kawartha (2 events)
- Day of Caring Cameron House cleaning
- Day of Caring Harold Town Conservation Area
- Day of Caring Jackson Park Trail clean-up (2 events)
- Day of Caring Peterborough Green-Up (2 events)
- Pink Ribbon campaign
- Ride for Refuge Peterborough
- Comfort for Kids/Backpacks for Kids (Senior Team event)
- Kawartha Food Share food sorting event
- United Way campaign
- Girls Power Science Day with Actua & Peterborough Girl Guides
- James Fund Walk/Run
- Angel Tree Campaign

Community Investment

Together with GE Energy Management, about $40,000 in financial support was provided to Peterborough area organizations that help improve community life in three key areas: community and cultural, charitable and health care support, education and vocational support.

GEH-C continues to be a strong supporter of the United Way. In Peterborough, GEH-C and GE Energy Management employees work together to raise funds. In 2015, employees raised $180,729, and since 2012, employees have contributed over $730,000 to Peterborough United Way.

The money is raised through payroll donations and employee-led fundraising initiatives.

Newsletters

GEH-C issued one newsletter to approximately 600 residents near the Toronto facility in September, 2015, and for the first time, it included a message to readers from the president and CEO. Content and design was improved from previous newsletters and provided residents with a range of subject matter from an invitation to the upcoming community BBQ and GEH-C volunteer efforts, to safety and the results of independent soil sampling. GEH-C seeks input from Citizen Liaison Committee (CLC) members on the content of the newsletters.

Community BBQ - Toronto

GEH-C held its first community BBQ on October 3, 2015. The BBQ was suggested by the GEH-C CLC as a means to engage neighbours and provide a forum for accurate information and answer questions about the facility.

Despite the cool and windy weather, approximately 25 community members in Toronto's Davenport neighbourhood came out to enjoy typical barbeque fare – hotdogs, hamburgers, salads and desserts – and two performances by GE Canada-sponsored local artist group Drum Artz.

Reinforcing the importance of its communications efforts, GEH-C ensured there was strong representation from its senior leadership including the president and CEO, EHS manager, communications manager and commercial operations manager. Large poster boards provided information to guests about a number of topics related to the facility including history, safety, product information, radiation facts, etc. GEH-C senior leaders and subject matter experts dialogued with guests and answered questions about the facility. Guests were also invited to sign-up for a future tour of the plant which will be arranged in 2016.

Citizen Liaison Committee – Toronto

The Toronto CLC was established in 2013 and meets four times per year. Members are neighbours and residents near the Toronto facility. The CLC is not a decision-making body but provides a forum for the exchange of information between the community and GEH-C. CLC members provide input on GEH-C activities such as newsletters, events, community initiatives, etc. which is valuable in guiding GEH-C's communications efforts with area residents.

In 2015, there were six members, all who have been members since the Committee's inception. One member resigned in 2015 due to other obligations which prevented their being able to participate. Members meet with GEH-C staff to dialogue about the facility's operations and receive updates on topics such as emergency planning and training, volunteer initiatives and environmental monitoring. The CLC suggested hosting a community BBQ, an initiative that GEH-C implemented in October, 2015.

At the November, CLC members and GEH-C staff focused on reviewing the last few years of the CLC and identifying a path forward for 2016. GEH-C and Committee members agreed on four key priorities for 2016

which are: to continue with the community BBQ, establish a terms of reference for the CLC, explore the possibility of conducting a public attitude survey and conduct tours of the facility with those that signed up at the 2015 BBQ.

2015 CLC meeting dates:

- Jan. 28, 2015
- April 1, 2015
- Sept. 16, 2015
- Nov. 25, 2015

Meeting records are posted to GEH-C's website.

Sponsorship and Special Events

GEH-C provided its support to a number of community-based activities in 2015:

- Annual Peterborough Day at Queen's Park (hosted by MPP Jeff Leal) – May 7
- Peterborough Dragon Boat Festival – June 13
- Peterborough Crime Stoppers Drug Safety awareness pamphlets to the schools – Sept.
- Peterborough Crime Stoppers Golf event – Sept. 30
- Peterborough Santa Claus Parade – Dec. 5

GEH-C also lends its support to the communities which are host to the utilities as they play an important role in Ontario's nuclear industry and some GEH-C employees live and work in these communities:

- Bruce Power charity golf tournament – Aug. 14
- Annual Bruce Power Supplier Conference and Charity Golf Tournament – Sept. 3
- Bruce Power Unity Autism charity golf tournament – Sept. 17
- Darlington Refurbishment charity golf tournament – June 24

Signage

GEH-C updated its Toronto Facility sign located on the corner of Lansdowne Avenue and Brandon Avenue to provide GEH-C's full company name: GE Hitachi Nuclear Energy Canada.

Website

The GEH-C website (http://.geh-canada.ca) is an information resource for members of the public and other stakeholders.

The website hosts information about GEH-C's operations, compliance reports, environmental monitoring, health and safety, and other areas of potential interest. In 2015, there were 8,776 total web site visits from 7,282 users. Tops pages visited were: Home page (42 per cent of all unique page views), What We Do (16 per cent) and Products & Services (13 per cent).

Over the course of 2015, GEH-C updated information on its website. The below represent some of the updates that were made to the web site:

- The CNSC's Independent Environmental Monitoring Program report for the facility was posted
- The 2014 annual compliance report was posted
- An article of a volunteer clean up event of the Toronto plant was posted
- An industry report card was posted
- Our annual soil report 2015 was posted
- A story about GEH-C's annual review with the CNSC in Ottawa was posted

Public Inquiries

Members of the public can contact GEH-C through its toll-free number at 1-855-696-9588 or via email at GEH.Canada@ge.com. The email and phone number are posted on GEH-C's website.

In 2015, 118 emails were received and 36 phone calls. Key topics were:

- Employment verification requests
- Employment inquiries/sending resumes
- Community BBQ invitation replies
- Security clearance requests

2016 Look Ahead

- Arrange for facility tours with community members who signed up at the Toronto community BBQ and other interested parties.
- Identify opportunities for tours of the Peterborough and Toronto facilities.
- Host community BBQs in Toronto and Peterborough.
- Increase frequency of newsletters in Toronto and Peterborough.
- Improve GEH-C website to improve navigation and content organization.
- Prepare a Terms of Reference for the CLC and recruit new members.

6.13.1.5 Public Disclosures Protocol

GEH-C has a Public Disclosure Protocol in place that reaffirms its commitment to providing timely information to interested members of the public and other stakeholders. Disclosures are posted to GEH-C's website and emailed to a distribution list of interested individuals and groups.

Information about the Public Disclosure Protocol is made publicly available on GEH-C's website along with any disclosures made. In 2015, the Toronto facility issued two disclosures, all of which were unusual operational events with no risk to the public, workers or environment.

The Disclosures made related to Toronto were:

- Sprinkler water leak – Feb. 17
- False alarm resulting from elevator work – Dec. 23

- No Disclosures were required in relation to Peterborough operations.

6.13.2 Site-Specific

6.13.2.1 Nuclear Criticality

This section is not applicable. GEH-C does not have an active Nuclear Criticality Program since neither facility process enriched uranium.

6.13.2.2 Financial Guarantee

In 2015, GEH-C's financial guarantee amount was updated based on the CNSC acceptance of GEH-C's revised preliminary decommissioning plans. Plan updates are required every 5 years.

6.13.3 Improvement Plans and Future Outlook

There are no significant operational changes planned for 2016.

6.13.4 Safety Performance Objectives for the Following Year

Facility operations are expected to remain fairly constant in 2016. Fuel production levels are projected to be similar to the amount processed in 2015. No significant changes are currently forecasted for either the Fuel or Services operations. The facility operating licence remains valid until 2020. As no significant changes are expected outside of continuous improvement, no licence document submissions or changes are expected.

7 CONCLUDING REMARKS

At GEH-C, it is a top business priority to continuously improve our EHS systems to protect fellow employees, the environment, and our communities against environmental, health and safety hazards. GEH-C management recognizes reviews, prioritizes and controls workplace hazards and ensures compliance with applicable regulatory requirements, applicable codes and GE policies.

There were no significant environmental issues or incidents encountered during the reporting period. All production limits were respected. Transportation of dangerous goods was conducted between suppliers and customers and waste vendors without risk to workers, the public or the environment. Conventional health and safety and radiation protection programs were well implemented. Effective, skin and extremity radiation dose measurement results for employees were below *Action Levels* and regulatory limits. Environmental protection programs were well implemented. Both facilities maintained ISO 14001:2004 Environmental Management System registrations. Facility emission results were all very low and below *Action Levels* and regulatory limits. Annual releases to the water and air were both a very small fraction of regulatory limits, resulting in minimal dose to the public.

This compliance report demonstrates that GEH-C has successfully met the requirements of the Nuclear Safety and Control Act, Regulations and CNSC Class 1B nuclear facility operating licence requirements.