Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

CMD 15-H5.1

File / dossier : 6.01.07
Date: 2015-03-13
Edocs: 4692836

Written submission from SRB Technologies (Canada) Inc.

Mémoire de SRB Technologies (Canada) Inc.

In the Matter of

SRB Technologies (Canada) Inc.

Application to renew the Nuclear Substance Processing Facility Operating Licence for SRB Technologies (Canada) Inc.

Commission Public Hearing

May 13 and 14, 2015

À l'égard de

SRB Technologies (Canada) Inc.

Demande concernant le renouvellement du permis d'exploitation d'une installation de traitement de substances nucléaires pour SRB Technologies (Canada) Inc.

Audience publique de la Commission

Les 13 et 14 mai 2015

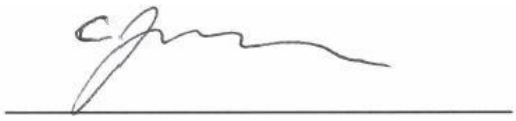
Canada

SRB TECHNOLOGIES (CANADA) INC.
320-140 Boundary Road
Pembroke, Ontario, Canada, K8A 6W5
Tel.: (613) 732-0055
Fax: (613) 732-0056
E-Mail: sales@betalight.com
Web: www.betalight.com

SRB TECHNOLOGIES (CANADA) INC.

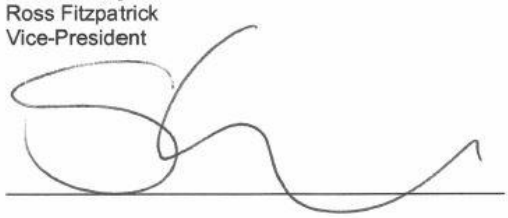
Written Submission
For
Hearing

In Support Of Application To Renew
Nuclear Substance Processing Facility Operating Licence
For A Period Of Ten Years



Prepared by:
Jamie MacDonald
Manager – Health Physics and Regulatory Affairs

Reviewed by:
Ross Fitzpatrick
Vice-President



Approved by:
Stephane Levesque
President

EXECUTIVE SUMMARY

SRB Technologies (Canada) Inc. is licensed by the Canadian Nuclear Safety Commission (CNSC) under Nuclear Substance Processing Facility Operating Licence number NSPFOL-13.00/2015 for the purpose of manufacturing gaseous tritium light sources.

The current licence expires on June 30, 2015, and SRBT has applied for this licence to be renewed. The requested licence term covers a ten-year period from July 1, 2015 through to July 1, 2025.

Throughout the current licence term, SRBT has continuously demonstrated that we are qualified to carry on all activities authorized by our licence, and that in carrying out these activities, we continue to make adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

We have a committed responsibility to ensure that information relating to our operations is provided to interested members of the local community, and the public in general. Our Public Information Program has been revised and renewed to ensure that the public continues to have every opportunity to become engaged and informed about our company, and the products that we design and manufacture.

Our company is comprised of a dedicated workforce of 43 employees. Our record of safety is something that we are extremely proud of; however, we continually strive to increase the effectiveness of all of our licensed activities and safety programs.

In each Safety and Control Area, SRBT has been evaluated as satisfactorily meeting or exceeding the requirements and expectations of CNSC staff throughout the current licence term.

Our organization continues to grow and evolve, and we have increased our available in-house expertise in several key areas. Our management system is also changing in step with industry best practices and the expectations of the CNSC and its staff, and our training methods are coming into alignment with newly published requirements.

The facility remains within the documented design basis and safety case. The structures, systems and components that ensure safe operations continue to be maintained in conditions fit for reliable service. We continue to manage change in an effective fashion.

Exposures to ionizing radiation are extremely low when compared to the regulatory limits for nuclear energy workers and members of the public, and we continue to explore ways of driving these exposures even lower, in line with the ALARA concept. Lost-time injuries and conventional safety events continue to be low in number, with zero occurrences of this type of event in the last three years. This is a credit to the safety programs that we employ, and to the safety culture of each and every worker in our facility.

We continue to reduce our environmental impacts; emission reducing initiatives has proven to successfully lower the amount of tritium being released to the environment for every unit of tritium processed. SRBT will continue to challenge ourselves to make further gains in this area. Ownership is committing to provide financial and human resources correlated with annual company profits, solely intended for the research and development of ways to drive our tritium emissions even lower.

EXECUTIVE SUMMARY (continued)

Our fire protection and emergency preparedness programs have continued to be improved in response to regulatory changes and nuclear-safety related events worldwide. Waste materials of all types are safely and effectively managed, and strategies for minimizing volumes of waste continue to pay dividends.

We have revised our decommissioning plans and have made provisions to ensure that these activities will be adequately and fully funded. Our facility and the nuclear substances that we use and store remain safe and secure, and will remain as such throughout our facility life cycle.

We respectfully request that the Commission grant a renewed operating licence for a period of ten years.

Note: This Commission Member Document was developed in close consultation with CNSC guidance document GD-379, Guide for Applicants and Intervenors Writing CNSC Commission Member Documents, published in March 2012.

TABLE OF CONTENTS

DESCRIPTION **PAGE**

DESCRIPTION **PAGE**

DESCRIPTION **PAGE**

LIST OF FIGURES

NUMBER TITLE PAGE

LIST OF TABLES

NUMBER TITLE PAGE

1. INTRODUCTION

1.1 Background

SRB Technologies (Canada) Inc. (SRBT) is a small company that has been in Pembroke since 1990. The company currently employs 43 people and is located in an industrial park on the outskirts of Pembroke, Ontario. The closest residence is located approximately 250 meters from the facility. The company leases 12,000 square feet of a building that also houses a manufacturer of personal protective clothing systems and a supplier of gases, welding equipment and safety products.

FIGURE 1: AERIAL PHOTOGRAPH OF THE FRONT LEFT OF SRBT'S FACILITY

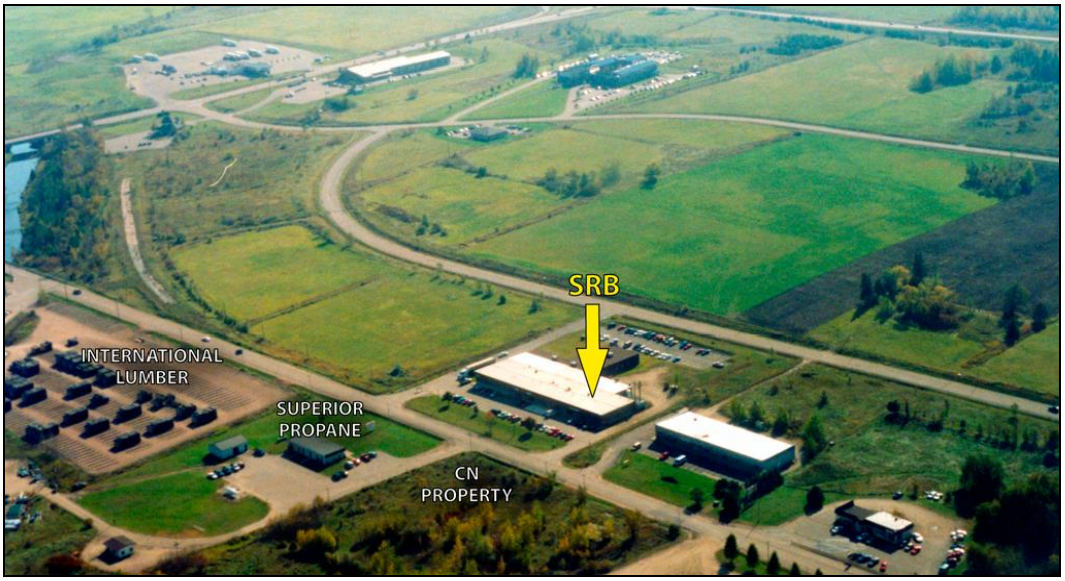
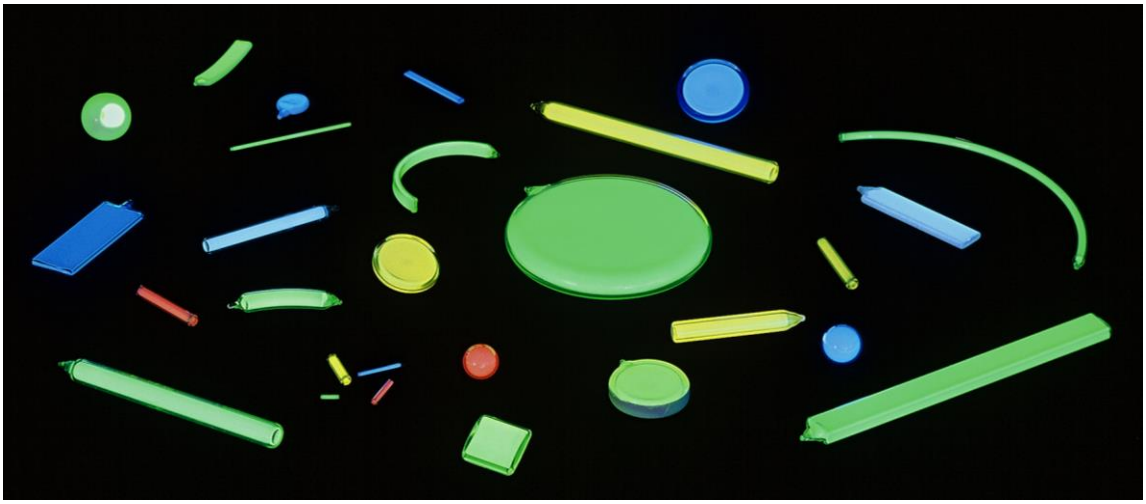


FIGURE 2: AERIAL PHOTOGRAPH OF THE FRONT RIGHT OF SRBT'S FACILITY

SRB Technologies (Canada) Inc. is licensed by the Canadian Nuclear Safety Commission (CNSC) under Nuclear Substance Processing Facility Operating Licence number NSPFOL-13.00/2015[1] for the purpose of manufacturing gaseous tritium light sources.

Our company is the original developer of the tritium light source which is a glass capsule internally coated with luminescent powder and filled with tritium. The interaction between the particles emitted by the tritium and the luminescent coating produces light on a continuous basis.

FIGURE 3: VARIOUS TYPES OF TRITIUM LIGHT SOURCES PRODUCED BY SRBT



The products that SRBT manufactures which use these light sources are crucial to ensure the safety and security of people all over the world, including most NATO peace keeping forces. Other lighting technologies require wiring, power or batteries which result in a lack of reliability, portability and in some cases safety. Our lighting products do not use electricity thereby reducing energy consumption and aid the environment against Global Warming.

FIGURE 4: VARIOUS TYPES OF PRODUCTS PRODUCED BY SRBT

1.2 Summary Of Application

On June 30, 2015, the Nuclear Substance Processing Facility Operating Licence NSPFOL-13.00/2015[1], issued to SRB Technologies (Canada) Inc. by the CNSC, will expire. We respectfully request that the Commission renews our licence for a period of 10 years from July 1, 2015 to July 1, 2025.

We are requesting the same licensed activities as those described in our current licence[1]. No new methods or processes are required, and we will be operating existing equipment with our present trained staff. We propose to continue to operate to the same release limit and observe the same action levels in the current licence[1] and to review the action levels as deemed appropriate.

SRBT is requesting a licence with a term of 10 years. The term of the licence is crucial to many aspects of our operations. This request is based upon our positive compliance history, our experienced staff and mature key health and safety programs, and the success of our emission-reducing initiatives.

1.2.1 Based On Our Positive Compliance History

We have operated the facility in the safe manner during the licence term of 5 years and have continued to improve our operations.

Throughout the term of the licence[1] air emissions (HTO + HT) were maintained at less than 18% of the licence limit and emissions to sewer were less than 7% of the license limit. During the licensing period, there were no significant safety-related events, and only a single action level exceedance.

The maximum annual dose received by any person employed by SRBT was less than 2 mSv and well within the regulatory limit for a nuclear energy worker of 50 mSv per calendar year.

The maximum annual dose received by any member of the public as a result of emissions from SRBT is well within the regulatory limit of 1,000 µSv per calendar year. Based on environmental monitoring results the maximum dose to a member of the public as a result of the emissions from SRBT over the term of the licence have been less than 7 µSv.

Only a single lost time injury has occurred during the current licensing term as a result of an injury that occurred during the machining process in Zone 1, where no tritium is handled or processed.

Additionally as of March 11, 2015, no CNSC-issued inspection action remains open.

1.2.2 Based On Our Stable And Experienced Workforce

Over the licence term our staff increased from 15 to 43 employees. All but one employee that was employed when the licence[1] was issued in July 2010 are working in the exact same positions.

New staff with expertise and qualifications in areas of radiation, conventional and nuclear safety were added to our organization which had a direct impact in further increasing nuclear safety at the facility, and a positive impact on ensuring that our operations continue to remain safe and compliant, that worker exposures remain as low as reasonably achievable, and that SRBT continues to ensure the protection of workers, the public and the environment.

By the end of 2014 our workforce had an average experience of just under 9 years with an average age of just over 40 years of age. The seven members of the Health Physics Team had a combined 107 years of work experience directly with the company. The company is now wholly-owned by the President Stephane Levesque and Vice President Ross Fitzpatrick who are Canadian residents, reside locally and have a full time, hands on role at the facility and together have more than 42 years of experience in the manufacture of tritium light sources and devices.

1.2.3 Based On Our Mature Key Health And Safety Programs

Since the last licence renewal application was submitted, most programs and subordinate processes have undergone some form of review, improvement or revision which have been submitted and approved by CNSC Staff.

Numerous and significant changes have been made in the set of documented requirements and guidance that are to be applied to SRBT's operations, such as revised CSA standards and new CNSC Regulatory Documents.

Our programs continue to evolve in response to these changes, including:

- Our Management System is evolving in a planned and controlled fashion in order to meet the latest CSA standard N286-12, *Management system requirements for nuclear facilities*.
- Our Waste Management Program[2] has been revised to align with the latest related CSA standards, and was recently deemed acceptable by CNSC staff.
- Our Fire Protection Program[3] and Fire Hazards Analysis[4] have undergone detailed review and revision to reflect the new CSA standard N393-13, *Fire protection for facilities that process, handle or store nuclear substances*, published in 2013.
- A new Training Program Manual[5] has been developed and implemented as a result of the publication of CNSC Regulatory Document 2.2.2, *Personnel Training*, in 2014.
- Proactively, the Maintenance Program[6] was revised to incorporate several useful aspects of programs aimed at nuclear power plants, as described in CNSC Regulatory Document RD/GD- 210, *Maintenance Programs for Nuclear Power Plants*, including such concepts as critical spare parts and master equipment lists.
- Our Emergency Plan[7] is being revised to reflect the new Regulatory Document 2.10.1, *Nuclear Emergency Preparedness and Response* published by CNSC in October 2014.
- Our Public Information Program[8] was revised to address the requirements of RD/GD-99.3, *Public Information and Disclosure* issued in March 2012.

The programs and processes that govern the operation of our facility have continued to ensure that safety is the paramount consideration guiding our actions and decisions.

1.2.4 Based On The Success Of Our Emission-Reducing Initiatives

Despite having increased tritium processed by approximately 4.5 times between 2010 and 2014, atmospheric emissions have risen at less than half of that rate.

Emission reduction initiatives have been successful in reducing the ratio of tritium released to atmosphere versus processed from 0.55% in 2010 to 0.23% in 2014. For the first 8 weeks in 2015, this ratio is less than 0.12%. This ratio was as high as 1.70% in 2008.

Significant, dedicated resources will be directed in the coming years specifically focused on finding ways to further minimize our environmental impact.

1.2.5 Based On Public Perception

An appreciable amount of information has been disseminated to the public over the licence term, and information is routinely updated and available on our web site. There has been very little concern expressed by the public over the licence period.

Despite these results to date, SRBT is fully committed to increase its public information initiatives with a 10 year licence period.

As part of our revised Public Information Program[8], we will ensure that regular public input is facilitated and considered in lieu of hearings by having regular meetings with all stakeholders as required and by continuing to allow a flow of information between parties.

A 10 year term would also give the general public more confidence in SRBT's ability to continue to protect our workers, the public and the environment.

2. BUSINESS PLAN

2.1 Value Of Licensed Activities

The value of the proposed licence and associated activities cannot be understated. The sale of tritium light sources and products that use this technology are the sole source of revenue for our company. The Commission's approval of the licence will ensure an ongoing revenue stream to help fund the facility's financial guarantee, as well as SRBT's commitment to further environmental studies and enhanced safety programs and development of new emission reduction initiatives.

2.2 Value of Products

The products SRBT manufactures are crucial to ensure the safety and security of people all over the world.

Without our products some companies would be forced to completely redesign their products at considerable cost or completely adopt inferior lighting technologies which require wiring, power or batteries which result in a lack of reliability, portability and in some cases safety.

Any lighting system which does not use electricity is a benefit. This is the reason why the military, aerospace and some commercial entities have chosen to rely on our products for safe and effective operation. Many industries are converting to our products to reduce energy consumption and aid the environment against Global Warming.

We have a contract and are the sole supplier of tritium aircraft signs for many large aerospace manufacturers (Augusta Westlands, Beechcraft, Boeing, Bombardier, GKN Aerospace, Gulfstream, Learjet, Sikorsky, Westlands, etc.) to ensure the safety of passengers and crews. Without our products, airlines and aeroplane manufacturers could have planes grounded without an immediate "flight qualified and certified" alternative.

NATO peacekeeping troops worldwide use our products in the field. We are the sole supplier of many vital products used by NATO peacekeeping troops worldwide (Canada, United Stated, United Kingdom, etc.) The applications range from illumination of:

- In-flight refueling equipment
- Mine clearing devices used by our Canadian military and allied troops around the globe
- Soldier survival equipment
- Targeting devices including those exclusively supplied to the U.K. Ministry of Defence
- Products jointly developed with Special Forces for covert operations
- Dial illumination for navigational equipment
- Fail safe control and switch illumination

We currently have a very large order book with delivery commitments in the upcoming months. In most cases these customers depend on the products exclusively developed and produced by our company.

2.3 Value Of Ten Year Licence Term

A ten year licence term is crucial to many aspects of the operations in order to continue to grow or maintain the current business in a sustainable fashion, and to continue to offer quality products to our customers and operate the facility in a continuously safe and compliant fashion.

CNSC Staff can be assured that the current vision for the operation of the facility over a 10 year licence term and in the future does not significantly deviate in strategy from the operations that have occurred during the current licence period, or for the coming period. The facility will continue to be safe over the period of 10 years and beyond.

Based on the discussions contained in CMD-02-M12, CMD-02-M12.A and CMD02-M63, SRBT believes that a licence term of 10 years would be beneficial, appropriate, and justified.

2.3.1 Allocation Resources

A ten year licence term will allow resources that would otherwise be dedicated to relicensing to be dedicated to researching technological advancements to further reduce the ratio of tritium that is released to the environment during routine processing.

Experience has shown that resources must be allocated to the relicensing process which could otherwise be allocated to identifying ways to reduce emissions, strive towards lower staff doses, and numerous other important initiatives and requirements.

2.3.2 Attracting And Retaining Qualified Staff

Company growth is sustained through the addition of more qualified staff. Although SRBT has been successful in retaining its employees, a longer term licence provides even more confidence to current and prospective staff that their employment is stable.

The pool of available qualified staff to our facility could present a challenge given industry and demographical shifts in the area. Experience has demonstrated that it is can be challenging to attract and retain qualified staff with shorter term licenses. A 10 year licence would provide staff more job security and greatly facilitate the hire of new staff to support growth or to fill a vacant position.

2.3.3 Securing Long Term Contracts

The stability offered by a 10 year licence would also further ensure SRBT's ability to secure long term contracts with customers and suppliers. Experience has demonstrated that customers and suppliers are less willing to sign contracts beyond a licence term.

Long term contracts with our customers can allow SRBT to provide them with fixed pricing and more accurately forecast sales, which is crucial in planning purchases and in turn dedicate a fixed part of its revenue to emission reduction initiatives.

Likewise, long term contracts with our suppliers can allow SRBT to more accurately forecast costs and in turn dedicate a fixed part of revenue to emission reduction initiatives.

2.3.4 Securing Financing

Experience has shown that financial institutions will be more willing to provide financing should the facility be licensed for a period of ten years as this would provide assurance that the facility will be operating thereby generating revenue over that period.

The financing to help introduce and fund further emission reduction initiatives and the purchase of modern safety equipment, radiation and environmental protection equipment and tools would be facilitated with a 10 year licence term.

Furthermore the financing of external training opportunities will be facilitated which will contribute to safety. Management and workers will participate in external training courses, conferences and conventions where a safety benefit can be realized.

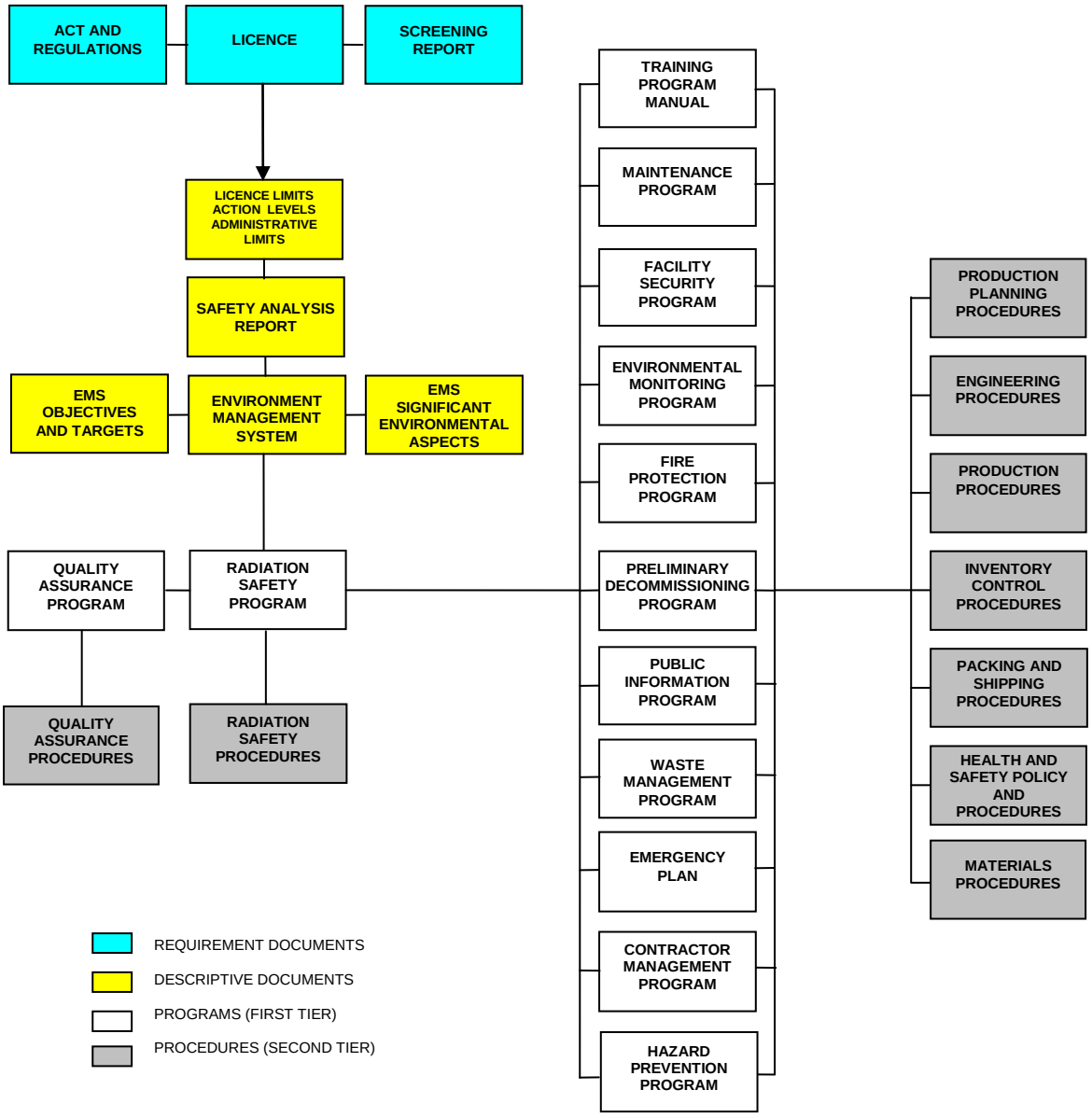
Financing opportunities would provide further assurance that the decommissioning fund will reach its full value.

3.0 SAFETY AND CONTROL AREAS

3.1 Management System

Our Management System is comprised of programs, procedures and associated documents that are in place with the purpose of meeting the Nuclear Safety and Control Act, Regulations and conditions of the Licence[1]. These documents are necessary to ensure that SRBT is qualified to carry out the activity licensed and to ensure that, in carrying on that activity, SRBT makes adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security:

FIGURE 5: MANAGEMENT SYSTEM DOCUMENT STRUCTURE



The same programs and procedures that were in place when the current licence[1] was issued five years ago are still in place. Over the term of the current licence[1], a number of programs and procedures were improved and complemented by additional programs and procedures to further ensure the protection of the public, the workers and the environment.

3.1.1 Management System Improvements

Over the past licensing term, the CNSC has published several new regulatory documents that are of a scope that includes the operation of our facility. As well, the Canadian Standards Association has continued to renew and revise their nuclear standards, of which several of these also apply to our licensed activities.

As a company, our documented mission is to continuously improve company programs in order to meet or exceed the requirements of the Nuclear Safety and Control Act, the regulations pursuant to the Act, and our operating licence[1], in order to strive to achieve higher grades in all safety areas.

In line with this mission, SRBT has done considerable work in analyzing the latest standards and regulatory documents, and revising our safety programs to meet or exceed these requirements. This ensures that our programs remain relevant, refreshed and updated, and maximizes safety margins to persons and the environment.

Our Management System is evolving in a planned and controlled fashion in order to meet the latest CSA standard, N286-12, *Management system requirements for nuclear facilities*. This is further discussed in detail in section 3.1.2.

Our Waste Management Program[2] has been revised to align with the latest versions of the CSA N292-series of standards, including N292.0-14, *General principles for the management of radioactive waste and irradiated fuel*; N292.3-14, *Management of low and intermediate-level radioactive waste*; and N292.5-11, *Guideline for the exemption or clearance from regulatory control of materials that contain, or potentially contain, nuclear substances*. We are proud that the latest version of our program[2] was deemed acceptable by CNSC staff on March 3, 2015[9].

Our Fire Protection Program[3] and Fire Hazards Analysis[4] have undergone detailed review and are planned for revision to reflect the new CSA standard N393-13, *Fire protection for facilities that process, handle or store nuclear substances*. This version of the standard was published in 2013, and is to replace the NFPA-801 standard as the requirement.

A new Training Program Manual[5] has been developed and implemented as a result of the publication of CNSC Regulatory Document 2.2.2, *Personnel Training*, in 2014. SRBT now manages critical staff training activities in a systematic approach, including each of the five key processes in a cyclic manner – analysis, design, development, implementation and evaluation. CNSC staff has been instrumental in providing guidance on the development of this new, systematic approach to training at our facility, which provides greater assurance that human performance errors, and their safety impact, are effectively minimized.

Much of the guidance relating to maintenance of nuclear structures, systems and components is focused on the maintenance of nuclear power plants. SRBT is a relatively unique facility, and much of this guidance clearly does not apply to our operations. Proactively, the Maintenance Program[6] was reviewed and revised to incorporate several useful aspects of maintenance programs aimed at nuclear power plants. This review used the guidance of CNSC Regulatory Document RD/GD- 210, *Maintenance Programs for Nuclear Power Plants*, and as a result, such concepts as critical spare parts and master equipment lists have now been incorporated to the extent possible in our management of maintenance.

During the licence term, our Emergency Plan[7] was revised twice to address lessons learned from the catastrophic events at the Fukushima-Daiichi nuclear power station in Japan. The Emergency Plan[7] is once more being revised to reflect the new Regulatory Document 2.10.1, *Nuclear Emergency Preparedness and Response*, recently published by the CNSC in October 2014. To help in this improvement initiative, SRBT conducted a comprehensive gap analysis[10] between our plan and the regulatory document, and CNSC staff has been kept informed of our progress in this regard.

Our Public Information Program[8] was revised to address the requirements of RD/GD-99.3*, Public Information and Disclosure*, issued in March 2012. The program[8] has been renewed and refreshed to reflect the latest guidance, and in order to continue to demonstrate that we are committed to foster an atmosphere of openness and transparency regarding our operations, the health and safety of the public, and of the environment. We are pleased that the program[8] was accepted by CNSC staff on October 31, 2014[11].

3.1.2 Management System Transition To N286-12

Throughout the past five years, SRBT has continued to conduct all aspects of our business in compliance with our accepted quality assurance program.

The SRBT Quality Manual[12] is the top-tier document which defines our key processes, and management responsibilities and accountabilities. The manual[12] ensures that our operations are conducted in a controlled manner, with safety as the paramount consideration in all aspects of our licensed activities.

This manual[12] was revised in September 2014 to reflect organizational improvements, and to provide greater clarity on how our management system addresses the requirements and expectations of CNSC staff.

In 2012, the Canadian Standards Association expanded the scope of standard N286, which had been last published in 2005 under the title *Management system requirements for nuclear power plants*. The broadened scope of the 2012 version of this standard is reflected in the change in title - *Management system requirements for nuclear facilities*.

On June 13, 2014, CNSC staff informed SRBT that the new 2012 version of this standard was to be the new set of requirements for our management system. As a result, SRBT conducted a comprehensive gap analysis[13] between our Quality Manual[12] and the N286-12 standard, and subsequently developed an expansive action plan[14] to address the gaps in a systematic and risk-informed manner, while ensuring our operations remain safely managed and controlled at all times.

The gap analysis[13] and action plan[14] was submitted to CNSC staff on September 8, 2014, with CNSC staff noting their satisfaction with these submissions on November 6, 2014[15]. Several additional recommendations were made by CNSC staff during a promotional site visit on November 25, 2014, and these shall also be taken into consideration as our new management system evolves.

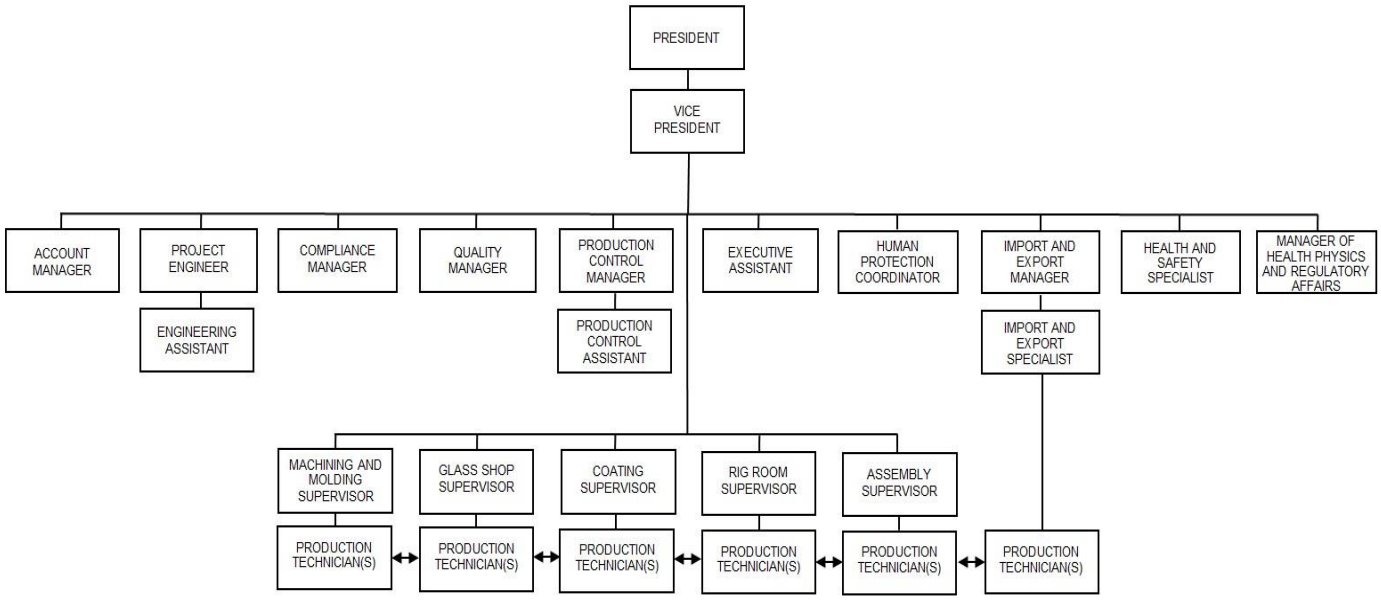
The action plan[14] has been well underway since it was submitted, and work to align our management system is to continue for the next 18 months. By the end of 2016, SRBT's goal is to have a management system which meets or exceeds the requirements of N286-12. Throughout the execution of the plan, SRBT has also committed to keep CNSC staff formally updated on our progress in this area.

3.2 Organizational Structure

The following organizational chart represents the current structure at the company that ensures SRBT meets the Nuclear Safety and Control Act, Regulations and conditions of the Licence[1].

This organization is necessary to ensure that SRBT is qualified to carry out the activity licensed and ensures that, in carrying on that activity, SRBT makes adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security:

FIGURE 6: ORGANIZATIONAL CHART



3.2.1 Organizational Changes

Over the term of the current licence[1] a number of organizational improvements have been made to further ensure the protection of the public, the workers and the environment.

Over the licence term our staff increased from 15 to 43 employees. All but one employee that was employed when the licence[1] was issued in July 2010 are working in the exact same positions.

New staff with expertise and qualifications in areas of radiation, conventional and nuclear safety were added to our organization which had a direct impact in further increasing nuclear safety at the facility, and a positive impact on ensuring that our operations continue to remain safe and compliant, that worker exposures remain as low as reasonably achievable, and that SRBT continues to ensure the protection of workers, the public and the environment.

In October 2012 the General Manager position was renamed Vice President to clearly demonstrate the authority of this position on other Management and to further reinforce that the individual holding this position will assume full duties of the President in their absence, and otherwise assist the President in their duties.

On November 19, 2012 a new position of Import and Export Specialist was added to the organization. The Import and Export Specialist is mainly responsible for assisting the Import and Export Manager. In order to ensure more coverage in the event of prolonged absence of the Import and Export Manager and during times of high workload, Senior Management decided to add this new position. The Import and Export Specialist is mainly responsible for assisting the Import and Export Manager with receipt and authorizing receipt of tritium, tritium sources and products containing tritium sources, maintain accurate tritium inventory records, prepare, submit and maintain all import and export permits and transport and documentation of shipments that contain tritium.

On May 1, 2013 a new position of Health and Safety Specialist was added to the organization in order to provide more focus and emphasis on Conventional Health and Safety. The individual in this position has received external training in various aspects of Health and Safety and has almost six years of work experience working in different positions at SRBT.

On May 24, 2013 the Fire Protection Committee added another member. This employee has been employed at SRBT for over two years and has now become a volunteer firefighter for the Municipality of l'Isle-aux-Allumettes, and will thereby be enrolled in a Fire Fighter 1 course. Between September 2 and 4, 2013 this same individual also successfully completed Ontario Fire Code Inspection Training from Nadine International Inc. a Fire Protection Consultant with experience with a number of other CNSC Licensees.

On September 16, 2013 a new position of Project Engineer was added to the organization. The individual in this position has a bachelor of engineering from an accredited Canadian University and has almost two years of work experience working at another major CNSC-licensed facility. The Project Engineer is mainly responsible for research and development activities and for maintaining engineering documentation to ensure that customer requirements, requirements of the NSCA, Regulations, conditions of the licence[1] and ISO 9001: 2008 are met. The Project Engineer is also responsible for the design and implementation of the Maintenance Program[6] to ensure that requirements of the NSCA, Regulations and conditions of the licence[1] are met.

On October 28, 2013 in order to ensure more coverage in the event of prolonged absence of the Production Control Manager and during times of high workload a new position of Production Control Assistant was added to the organization. The Production Control Assistant is mainly responsible for assisting the Production Control Manager with processing of customer purchase orders, providing, in advance of receipt to the Import and Export Manager, details on receipt and purchases of tritium, tritium sources and products containing tritium sources to ensure compliance with the NSCA, Regulations and conditions of the licence[1]. The Production Control Assistant is also responsible for assisting Production Control Manager and the Import and Export Manager in the tabulation and the review of the month end tritium inventory.

On April 1, 2014 Senior Management decided to create a new position of Compliance Manager to the organization. The Compliance Manager's main focus is to perform independent internal audits and further ensuring compliance of all work areas with company programs and procedures. This is an entirely new management position reporting directly to the President. This individual has formal training in auditing and has been employed at the facility for over 17 years in various capacities. This individual is being trained by a consultant with over thirty years of experience performing inspections and audits with the Canadian Nuclear Safety Commission.

On April 1, 2014 a new position of Manager of Health Physics and Regulatory Affairs was added to the organization. This individual holds a bachelor of science degree from an accredited Canadian University, and brings over 13 years of experience working in the field of radiation protection and health physics, as well as over 5 years of experience in the field of nuclear safety regulation and inspection. The Manager of Health Physics and Regulatory Affairs is mainly responsible for oversight of all company Health Physics activities to ensure that the requirements of the Nuclear Safety and Control Act (NSCA), Regulations, conditions of the licence[1] and ISO 9001 are met, and is also responsible for communicating with CNSC Staff and ensuring that deadlines for submission of responses and documents are met.

On April 1, 2014 a full time third-party consultant was hired with over thirty years of experience with the Canadian Nuclear Safety Commission, in order to provide training and mentorship to key staff, as well as technical support on special projects and activities as required by Senior Management.

Each one of the noted improvements in our organization had a direct impact in further increasing nuclear safety at the facility, and a positive impact on ensuring that our operations continue to remain safe and compliant, that worker exposures remain as low as reasonably achievable, and that SRBT continues to ensure the protection of workers, the public and the environment.

SRBT has successfully grown the business in a sustainable and controlled fashion throughout the licensing period. Staffing levels have risen in step with production gains, while continuing emission reduction initiatives have been effective in ensuring that our effect on the environment and the public remains minimized, well below regulatory requirements, and as low as reasonably achievable.

3.2.2 Experienced Workforce

By the end of 2014 our workforce had an average experience of just under 9 years with an average age of just over 40 years of age.

The seven members of the Health Physics Team had a combined 107 years of work experience directly with the company.

The company is now wholly-owned by the President Stephane Levesque and Vice President Ross Fitzpatrick who are Canadian residents, reside locally and have a full time, hands on role at the facility and together have more than 42 years of experience in the manufacture of tritium light sources and devices.

Careful consideration was taken when appointing new staff to ensure continued Nuclear Safety. The activities of five work areas (marked in yellow in Table 1) **do not** involve tasks that affect Nuclear Safety. Generally employees hired as Production Technicians are first appointed to one of these five work areas. These positions do not in any way impact the company's ability to ensure that the requirements of the Nuclear Safety and Control Act, Regulations and conditions of the licence[1] are met.

TABLE 1: NUCLEAR SAFETY TASKS PERFORMED PER WORK AREA

WORK AREA	AVERAGE YEARS EXPERIENCE	RESPONSIBLE FOR PROGRAMS AND PROCEDURES THAT AFFECT NUCLEAR SAFETY	PROCESS TRITIUM	HANDLE SEALED TRITIUM SOURCES
Administration	12.94	X		
Rig Room	9.20		X	X
Glass Blowing	7.76			
Assembly	6.75			X
Machining & Molding	5.77			
Coating	4.91			
Shipping	0.82			
Cleaning	0.21			

The Rig Room is the department where tritium processing takes place, and has the highest average work experience with the company of any production department. The average work experience of the staff within this department is just over 9 years. The Supervisor and another employee in this department have over 23 years of experience and perform or oversee all activities that involve tritium processing or handling of tritium sources.

The Assembly Department is where tritium sources are handled by staff for assembly into products or for packaging. The tritium is contained in the source at this stage and the possibility of tritium exposure is low. The Supervisor in this department has almost 16 years of experience and performs or oversees all activities of five other staff members with the support of the Human Protection Coordinator who is a member of the Health Physics Team and has over 23 years of experience working at the company.

It is also important to note that staff in management and supervisory positions already has experience being in charge of this number of employees. Overall staffing levels and staffing levels in each department are within those between 2000 and 2006 where current Management and Production Supervisors were in the same positions.

With the increased staff Senior Management make a point to visit each work area on a daily basis and to speak to most staff about their work and to see if any issue needed resolving.

3.2.3 Committee Meetings

Prior to the issuance of the current licence[1], as a result of addressing the recommendations of the Organizational Study[16] SRBT Senior Management has formally constituted committees in the organizational structure:

- Health Physics Committee
- Workplace health and safety Committee
- Executive Committee
- Fire Protection Committee
- Mitigation Committee
- Public information Committee
- Waste management Committee

Over the term of the current licence[1] two new Committees were constituted:

- Production Committee
- Training Committee

Committees have been instrumental in the development and refinement of company programs and procedures and at identifying ways to reduce emissions and improve safety at the facility.

During the initial growth phase in 2013 an increased number of short informal meetings took place to ensure communication was maintained primarily to ensure new staff did not decrease the level of safety at the facility. Formal committee meetings were reserved for more significant decision making and matters.

In 2014 Committee Meetings increased in order to foster communication within the growing staff and to support new safety initiatives. We expect Committee Meetings to continue to be the main force to improve Nuclear Safety in the future and new Committees will continue to be instituted as deemed appropriate:

TABLE 2: COMMITTEE MEETINGS 2010-2014

COMMITTEE	2010	2011	2012	2013	2014
Health Physics	20	18	11	11	25
Fire Protection	5	5	6	5	5
Executive	2	1	7	4	4
Mitigation	6	6	7	5	4
Public Information	4	5	4	4	6
Workplace Health And Safety	12	12	13	12	17
Waste Management	4	2	2	1	1
Other	3	18	24	16	23
Production	N/A	N/A	4	1	1
Training	N/A	N/A	N/A	N/A	5
Total	**56**	**67**	**78**	**59**	**91**

3.3 Performance Assessment, Improvement And Management Reviews

3.3.1 CNSC Inspections And Facility Visits

Throughout the term of the licence[1] CNSC Staff conducted a number of compliance inspections, facility visits and promotional visits.

As a result of these inspections and visits CNSC Staff raised 12 Action Notices and 8 recommendations. As of March 11, 2015, all issues were satisfactorily addressed by SRBT and **no** CNSC-issued action remain open.

TABLE 3: CNSC ISSUED ACTIONS 2010-2014

TYPE OF FINDING	2010	2011	2012	2013	2014
Action Notice	1	3	3	1	1
Recommendation	2	2	2	1	1

The purpose of the inspection was to verify compliance with the NSCA, CNSC Regulations and the CNSC operating licence NSPFOL-13.00/2015[1] and Licence Conditions Handbook[17].

The scope of these inspections and visits included the following elements:

- Waste Management
- Environment Protection
- Management Systems and Safety Culture
- Personnel Qualifications And Training
- Occupational Health and Safety
- Fitness For Service
- Physical Security
- Quality Management System
- Maintenance And Calibration
- Worker Exposure and Dose control
- Radiation Instrumentation And Detection Equipment
- Personnel Dosimetry
- Contamination Control
- Radiation Protection
- Operational Performance
- Human Performance
- Packaging and Transport
- Conventional Health and Safety
- Public Information
- Systematic approach to training (SAT)
- Management System Transition to N286-12
- Emergency Exercise

SRBT expects that CNSC Staff will continue to conduct a number of compliance inspections, facility visits and promotional visits during the proposed term of the licence. SRBT is committed to continue to address any findings identified by CNSC Staff as a result of these inspections and facility visits.

3.3.2 ISO 9001: 2008 Registrar Audits

SRB Technologies (Canada) Inc. continues to maintain a quality management system that is registered to ISO 9001: 2008 by BSI Management Systems. Over the term of the current licence[1] yearly surveillance assessment were performed by BSI Management Systems.

As a result of these surveillance assessments BSI Management Systems Staff raised 4 Non Conformances (NCR's) and 10 opportunities for improvements. As of March 11, 2015, all issues were satisfactorily addressed by SRBT and **no** BSI Management Systems-issued actions remain open.

TABLE 4: ISO 9001 REGISTRAR ISSUED ACTIONS 2010-2014

TYPE OF FINDING	2010	2011	2012	2013	2014
Non Conformance (NCR)	0	2	2	0	0
Opportunity For Improvement	0	2	4	1	3

The purpose of the surveillance assessments were to verify that SRBT operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the design and manufacture of tritium filled light sources, self-powered luminous signs, markers and emergency lighting for military, commercial, aerospace and scientific applications.

The scope of the surveillance assessments included the following elements:

- Management Engagement
- Sales
- Production Planning
- Engineering
- Design Control
- Internal Audits
- Corrective and Preventive Action
- Customer Satisfaction
- Management Review
- Glass Blowing
- Coating
- Rig Room (Tritium Processing)
- Molding and Machining
- Assembly
- Final Inspection
- Scintillation
- Training
- Human Resources

SRBT intends on maintaining ISO 9001 certification through the proposed licence period and will continue to be subjected to annual surveillance assessments. SRBT is committed to continue to address any findings identified by BSI Management Systems as a result of these assessments.

3.3.3 Internal Audits

Throughout the term of the licence[1] internal audits have been performed. The audits performed focused on activities associated with developing, managing and implementing various company safety programs.

Until April 2014 the audits were performed solely by our Quality Manager. On April 1, 2014 Senior Management decided to create a new position of Compliance Manager to the organization. The Compliance Manager's main focus is to perform independent internal audits and further ensuring compliance of all work areas with company programs and procedures. This is an entirely new management position reporting directly to the President.

As expected the much greater emphasis on internal auditing has increased the number of Non Conformances and Opportunities for Improvement in 2014.

As a result of these internal audits SRBT Staff raised 110 Non Conformances (NCR's) and 65 opportunities for improvements. As of March 11, 2015, all outstanding issues are being addressed and are expected to be closed by SRBT Staff in 2015.

TABLE 5: INTERNAL AUDITS ISSUED ACTIONS 2010-2014

TYPE OF FINDING	2010	2011	2012	2013	2014
Non Conformance (NCR)	18	14	14	21	43
Opportunity For Improvement	5	4	10	1	45

A total of 18 audits of the following areas are scheduled in 2015:

- Tritium Laboratory
- Waste Management
- Maintenance
- Environmental Protection
- Dosimetry Service
- Milling and Molding, Glass Blowing and Coating
- Materials/Production Control
- Emergency Management and Fire Protection
- Quality Assurance
- Engineering
- Radiation protection
- Training
- Rig Room and Assembly
- Public Information Program[8] and Financial Guarantee[18]
- Shipping
- Conventional Health and Safety
- Accounting Financial
- Safety Analysis

SRBT is committed to the internal audit program through the proposed licence period and to continue to address any findings identified by the Compliance Manager and/or Quality Manager as a result of these internal audits.

3.3.4 Ontario Power Generation Audits

Ontario Power Generation who supplies SRB Technologies (Canada) Inc. with tritium gas performed 3 audits of the facility during the term of the licence[1], in 2010, 2011 and 2012. These audits did not identify any issues. The next audit is expected to take place sometime in 2015.

The following were reviewed during each audits:

- Operating License
- Operating procedures involving tritium
- Inventory Control Process
- Inventory Control Records
- Storage, use and handling of Tritium Isotopes
- Training activities and records for Safe Storage, Use and handling of Tritium Isotopes
- Physical security measures at the facility
- Tritium stack monitoring procedures
- Instrument calibration records for tritium accounting

SRBT is expected to be subjected to other audits by Ontario Power Generation through the proposed licence period and to continue to address any findings identified.

3.3.5 Pembroke Fire Department Inspections

Over the term of the current licence[1] the Pembroke Fire Department conducted annual fire inspections of the facility against the Ontario Fire Code.

As a result of these inspections the Pembroke Fire Department identified 9 minor violations of the Ontario Fire Code. As of March 11, 2015, all issues were satisfactorily addressed by SRBT and **no** Pembroke Fire Department issued action remain open.

TABLE 6: PEMBROKE FIRE DEPARTMENT INSPECTION ACTIONS 2010-2014

TYPE OF FINDING	2010	2011	2012	2013	2014
Minor Violations	2	1	0	5	1

At SRBT's request the Pembroke Fire Department perform annual inspections of SRBT and therefore annual inspections by the Pembroke Fire Department are expected to continue during the proposed term of the licence[1]. SRBT is committed to continue to address any findings identified.

3.3.6 Fire Protection Consultant Inspections

On an annual basis, as required by licence NSPFOL-13.00/2015[1] and section 3.11 of the Licence Conditions Handbook LCH-SRBT-R000[17], a Fire Protection Consultant, performs a third party review of compliance with the requirements of the National Fire Code, 2005, and National Fire Protection Association, NFPA-801, 2008 edition: Standard for Fire Protection for Facilities Handling Radioactive Materials.

As a result of these inspections the Fire Protection Consultant made 2 findings and made some recommendations to ensure that the Fire Alarm System is in full compliance with the requirements of CAN/ULC-S536. As of March 11, 2015, all issues were satisfactorily addressed by SRBT and **no** Fire Protection Consultant finding or recommendation remains open.

TABLE 7: FIRE PROTECTION CONSULTANT INSPECTION ACTIONS 2010-2014

TYPE OF FINDING	2010	2011	2012	2013	2014
Findings	0	0	2	0	0
Recommendations	0	0	0	1	0

Fire Protection Consultant Inspections are expected to continue during the proposed term of the renewed licence. SRBT is committed to continue to address any findings identified.

3.3.7 Underwriters Laboratories

Underwriters Laboratories (UL) provides safety-related certification, validation, testing, inspection, auditing, advising and training services to a wide range of clients, including manufacturers.

During the existing licence term UL performed quarterly visits of our facility to ensure that products that we produced which are listed with UL are produced using the materials, procedures and testing parameters required under the specific UL listing. Only minor issues were identified and immediately addressed.

Quarterly visits by UL are expected to continue during the proposed term of the licence. SRBT is committed to continue to address any findings identified.

3.3.8 Audits From Customers

SRBT supplies products for military, commercial, aerospace and scientific applications.

Throughout the term of the licence[1] a number of customers using these products audited our facility and only identified minor issues which have since been addressed. During the proposed licence term SRBT is committed to continue to address any issues identified during audits from customers.

3.3.9 Benchmarking

Throughout the term of the existing licence[1], on an annual basis individuals responsible for specific programs and procedures at SRBT regularly looked at process problems, corrective actions as well as trending and used this information to benchmark elsewhere in or out of the organization in order to improve the effectiveness of these programs and procedures and to help define where improvements could be made.

Benchmarking against other CNSC Licensees was encouraged. The documents of other CNSC Licensees were continuously reviewed:

- Commission Member Documents
- Proceedings, Including Reasons for Decision
- Documents from other licensees

Meetings with the Quality Manager and Senior Management will take place on an annual basis to discuss the results of the benchmarking activities performed and to define areas of improvement.

SRBT is committed to continue to perform these benchmarking activities during the proposed term of the licence.

3.3.10 Self-Assessments

Throughout the term of the existing licence[1], on an annual basis routine self-assessments by Organizational Managers were undertaken to identify, correct and prevent problems that hinder the achievement of the company's vision, mission, goals, values and policy and to assess the adequacy and effectiveness of the Quality Management System.

Self-assessments were performed by review of:

- Analysis and trending of performance data against historical data
- Input from stakeholders (public, contractors, regulators, etc.)
- Workspace inspections or observations
- Routine communications with staff to determine whether expectations are understood
- Training and coaching results
- Corrective and preventive actions raised throughout the organization
- Internal audit results

Meetings with the Quality Manager and Senior Management will take place on an annual basis to discuss the results of the self-assessments and to define areas of improvement.

SRBT is committed to continue to perform these self-assessments activities during the proposed term of the licence.

3.4 Human Performance Management

Throughout the term of the current operating licence[1], SRBT has continued to effectively train our employees in all key aspects of our licensed activities and operations.

Employees who affect safety, and who perform processes related to our licensed activities are trained and qualified. No employee is permitted to perform a task unsupervised until they have been reviewed and their training record indicates successful completion of training to the defined task. Training programs are monitored and assessed regularly, and the competency of personnel is reviewed to maintain their effectiveness and skill levels.

3.4.1 SAT Based Training

The concept of a 'systematic' approach to training (SAT) has long been implemented in large nuclear facilities, such as nuclear power plants. A SAT-based training program is employed in order to cyclically analyze, define, design, develop, implement, evaluate, document and manage training. This approach ensures that an organization implements high-quality training that meets operational requirements, maximizes safety, and minimizes potential human errors, as well as the magnitude of consequences due to those errors.

In August 2014, the CNSC published a new regulatory document, REGDOC 2.2.2, *Personnel Training.* This document establishes the requirements and guidance for nuclear facilities with respect to how training is managed. Prior to publication, CNSC staff informed SRBT that the document, once published, would represent the compliance verification criteria under the SCA of Human Performance Management.

Since publication, SRBT has invested a significant amount of effort into developing high-quality processes to govern how training is managed and performed in our facility. An analysis of the entire set of facility work activities was performed to determine the initial scope of the first cycle of the new SAT-based program, resulting in the identification of seven key activities where systematically-developed training shall be applied.

The Executive Committee formally established a new "Training Committee", who is tasked with ensuring that the requirements of a SAT-based program are implemented. The SRBT Training Program Manual[5] was developed which fully documents how the program is executed, and how compliance with REGDOC 2.2.2 is achieved and recorded. This manual[5] was submitted to CNSC staff on January 26, 2015, and subsequently reviewed and accepted on March 3, 2015[19].

Organizational managers have all been familiarized with the expectations and requirements of this new approach to how we train our staff. SRBT continues to work towards implementation of the first three systematically developed training activities by April 2015; our plan is to have completed the inaugural cycle of the SAT by the fourth calendar quarter of 2015, and have fully developed and implemented the seven SAT-based training activities.

Once the new systematic approach has been fully realized, SRBT expects that an even higher level of safe operations will be achieved. As our organization continues to grow, the SAT-approach will ensure that all of the most critical licensed activities are conducted by effective, well-trained and safe employees.

3.4.2 Radiation Protection Training

Over the past five years, the work force at SRBT has increased significantly, resulting in a large amount of training being conducted to satisfy the requirements of our Radiation Safety Program[20] and our Quality Manual[12]. New staff members receive introductory training in radiation safety, even if they are not expected to handle nuclear substances as part of their responsibilities.

In addition, an annual all-staff training session has been conducted every year, where a refresher training session is provided to the entire complement of workers and management.

The training includes information with respect to natural radiation exposure, anticipated health effects from radiation exposure, tritium, proper handling of tritium throughout the facility, emissions monitoring, environmental monitoring, fire safety, security, the non-conformance process, licensing, overview of other licensees and facilities, public relations, emergency preparedness and safety features within the facility and open dialogue with a question and answer session. Attendance is mandatory for all staff, including top management, and testing is administered to ensure workers understand and retain the information. A written test is provided to all participants. The pass criterion for the test is 75%. Any wrong answer on the test is also discussed in detail as a group with all employees and with employees individually.

During the licensing term, very few safety-significant human performance related events occurred, which is a testament to our dedication in ensuring personnel receive timely and relevant training to perform their assigned tasks.

3.4.3 Fire Extinguisher Training

Yearly fire extinguisher training is performed for all staff by the Pembroke Fire Department and will continue to be performed during the term of the new licence.

3.4.4 Fire Responder Training

During the term of the existing licence[1] there was training given by SRBT Staff to Fire Responders. SRBT and the Pembroke Fire Chief determine if this training is required if any changes have occurred at SRBT's facility, if the training has not been performed for a number of years or if there are a number of new firefighters and/or volunteers that have not yet taken the training. The training of fire responders will continue to take place over the course of the next licence period.

3.4.5 TDG Training

Training in the transportation of dangerous goods (TDG) has continued to be performed by an external consultant for those staff responsible for ensuring the safe and effective packaging and transport of our products. TDG certificates are renewed through training every two years.

3.4.6 Health Physics Training

During the course of the current licence[1] cross training was implemented amongst the members of the health physics team to ensure more coverage in the event of prolonged absence of an individual and during times of high workload in specific areas of responsibility. These types of initiatives will continue to be undertaken in the proposed licence period.

3.4.7 Fire Protection Committee Member Training

Fire Protection Committee members received external training during the course of this existing licence[1] and this training will continue during the course of the proposed licence period.

3.4.8 Health And Safety Training

Health and Safety Committee members received external training during the course of this existing licence[1] in various aspects of Health and Safety:

- Canada Labour Code Part II Orientation
- Legislative Changes to CLC Part II
- Fire Safety
- Lockout/Tagout
- WHMIS for Managers and Supervisors
- Accident Investigation
- Office Ergonomics
- Manual Materials Handling
- Health and Safety Committees
- Violence in The workplace
- Investigating Workplace Harassment
- Hazard Identification, Assessment and Control
- Developing an Occupational Health and Safety Program
- Health and Safety for Managers and Supervisors
- Workplace Inspections
- Musculoskeletal Disorders: Prevention
- Medical Emergencies in the Workplace

This training will continue during the course of the proposed licence period.

3.5 Operating Performance

3.5.1 Conduct Of Licensed Activity

SRBT has continued to safely operate our Class I nuclear facility throughout the current licensing period, which authorizes our company to:

- Operate a tritium processing facility,
- Possess, transfer, use, process, manage and store nuclear substances related to the operation of the facility, and,
- Possess a maximum of 6,000 TBq of tritium in any form.

Our company has grown significantly in the last five years, with an expanded staff complement and increased fabrication of our unique products. We have added key expertise in several critical areas to the management team, including engineering, health physics and radiation safety, conventional safety, self-assessment and internal audit.

Our programs and processes have continued to evolve to meet or exceed regulatory requirements and expectations, with safety as an overriding priority in all aspects of our licensed activities.

The volume of tritium processed has continued to trend upward with the success of our products. Despite this increase in production, our relative impact on the environment has remained low and stable. Our team strives to minimize the amount of tritium released to the environment for every unit of tritium processed – we refer to this as the 'released to processed' ratio. This ratio (marked in yellow in Table 8) is an excellent indicator of the overall effectiveness of our emission-reducing initiatives. The following table illustrates how this ratio has trended since 2010.

TABLE 8: RATIO TRITIUM RELEASED TO TRITIUM PROCESSED 2010-2014

DESCRIPTION	2010	2011	2012	2013	2014
Total Tritium Released To Atmosphere (TBq/Year)	36.43	55.68	29.90	78.88	66.16
Tritium Processed (TBq/Year)	6,643.73	7,342.45	10,224.59	30,544.80	28,714.12
Released To Processed (%)	0.55	0.76	0.29	0.26	0.23
Increase (+) Reduction (-) (%)	-31	+38	-62	-10	-12

Throughout the licence period, SRBT has continuously possessed, transferred, used, processed, managed and stored all nuclear substances related to the operation of our facility in compliance with the requirements of our licence[1].

FIGURE 7: FILLING AND END-SEALING TRITIUM LIGHT SOURCES

The possession limit of 6,000 TBq has been adhered to through careful inventory-control practices and management. This material has continued to be safely used, processed, managed and stored in compliance with our licence[1]. All transfers of nuclear substances have been conducted in compliance with the requirements of our packaging and transport processes, our waste management processes, and the regulatory requirements for the import and export of nuclear substances.

3.5.2 Reporting And Trending

Each year, SRBT is required to document and submit an Annual Compliance Report (ACR) to CNSC staff; this has been completed every year during the licence term, and CNSC staff have commented on, and accepted each report in turn.

In the spirit of openness and transparency, we publish the final versions of our ACR on our website so that all members of the public who wish to do so may read about our operating performance.

Each year our management team trends data on several environmental objectives and targets, to ensure that we continue to improve our operations with respect to our effect on the environment. These objectives and targets were reviewed and revised twice during the licence term as a direct result of the trending performed.

SRBT has continued to provide CNSC staff with comprehensive reports on our Environmental Monitoring Program[21] on a quarterly basis. Within these reports, key data and indicators are trended over time in order to establish that SRBT is making adequate provisions to protect the public and the environment, and to validate environmental models such as air distribution patterns and groundwater tritium concentration response.

We have continued to fulfill our reporting obligations with respect to exceedances of action levels. During the licence term, a single action level exceedance was reported[22] relating to tritium releases to atmosphere; an investigation was conducted resulting in a corrective action plan[23] which was accepted by CNSC Staff[24]. Both the initial and final detailed report on this event were posted to our public website, in accordance with our Public Information Program[8].

Finally, the reporting requirements relating to our dosimetry services licence[25] and our import and export permits have also been met consistently throughout the past five years.

SRBT is fully committed to ensuring that safety is the overriding priority in all facets of the operation of the facility, and that our operating performance continues to be acceptable throughout the next licence term and beyond. As stated in our overall management system documentation, we will always ensure that our corporate vision for the company is fulfilled – that we will “strive to maintain or exceed the standing required to allow our company to process tritium and manufacture life safety devices”.

3.6 Safety Analysis

Our operating practices and processes have continued to be conducted in full alignment with the latest version of SRBT's Safety Analysis Report (SAR)[26], and associated technical reports.

As a Class I nuclear facility, a comprehensive safety case must be established and maintained to ensure that operations will remain safe throughout all operational phases of the facility. Through the current licence period, there have been no activities that have been conducted that were outside of the scope of the accepted safety case.

In response to the catastrophic events at the Fukushima-Daiichi nuclear power station in Japan in 2011, SRBT conducted a comprehensive review of our safety case which resulted in revisions and updates to key safety programs, such as the Emergency Plan[7]. This review concluded that the overall safety case for SRBT remained valid.

With the incorporation of the new CSA standard N286-12, *Management system requirements for nuclear facilities,* as part of the regulatory expectations relating to our facility, SRBT conducted a gap analysis[13] to determine areas that require action to bring our management system into compliance with the standard. Specific requirements relating to safety analysis for isotope processing facilities are included in the latest revision of N286-12, which notes that "the safety analysis process shall be established and controlled".

Although we have always maintained an accepted SAR[26], one of the gaps identified was that a formal process for conducting safety analysis was not sufficiently established as a process in our systems. As a result, as part of our action plan[14] to align our management system with N286-12, we are developing this process in a risk-informed fashion.

This new Safety Analysis process is one of the first deliverables in our plan; once this process is defined and documented, our current SAR[26] will be reviewed and revised in line with the new process. We expect the SAR[26] to be revised and submitted to CNSC staff by the end of 2015.

As always, SRBT will continue to respond to events in the nuclear industry and beyond that could influence or otherwise affect our safety analysis[26]. It is not expected that our licensed activities and processes will change over the coming years. However, should emissions-reducing initiatives identify any technical and engineered systems that could increase the level of safety if incorporated, these emissions-reducing initiatives will be thoroughly analyzed with respect to safety, in consultation with CNSC staff and the Commission required, prior to implementation.

3.7 Physical Design

3.7.1 Design Governance

The overall design basis of key structures, systems and components (SSC) relating to the facility and our licensed activities, and relating to safety, has not been altered in any significant way over the term of the current operating licence[1]. Some component modifications have been implemented to improve safety and reliability, and reduce the impact of our operations; however, the facility and system designs continue to remain valid.

Design processes are controlled by the Engineering Department, and they are executed in close cooperation with the organizational management that is responsible for each SSC. If changes are required to the design or configuration of any SSC, SRBT employs an engineering change process[27] which is aimed at ensuring changes are performed in a safe and controlled manner.

One notable change that was performed during the licensing period was the reduction in the diameter of process tubing used on tritium processing equipment. This change was aimed at significantly reducing the amount of tritium remaining in the equipment at the conclusion of a processing cycle, thus reducing the amount of tritium that is ultimately released to the environment via the active ventilation systems.

This change in internal diameter of the tubing effectively reduced the average tritium emitted per process cycle by 65% - a major contribution to the minimization of our environmental impact. This change was initially performed without invoking the engineering change process, as both the old and the new tubing diameters were within the analyzed design dimensions in the Safety Analysis Report[26], while the materials and system configurations remained the same. As such, this was initially assessed as a simple change in valid configurations permitted by the design.

CNSC staff concurred that the change was very positive and in line with emission-reduction initiatives, but also identified that the manner in which the change was executed was not consistent with the regulatory expectations relating to change management[28]. SRBT took this finding very seriously, and committed to ensure that change control was applied retroactively to provide documented safety assurance. The smaller diameter tubing was subsequently analyzed fully, retroactively processed through an expanded engineering change control strategy, and submitted to CNSC staff, who accepted SRBTs actions and records as sufficient to address the original finding[29].

SRBT has incorporated the lessons learned from this non-conformance into the way we now handle engineering and design changes.

Several types of devices that SRBT manufactures are certified by the CNSC based upon submitted design information. These certified design packages continue to govern how these products are manufactured, and have not changed since. Certification of several of these devices will be required to be renewed during the next licence term; SRBT does not anticipate altering the certified designs in any way.

The governance of the physical design of the facility and associated SSCs will continue to be applied in a rigorous manner throughout the next licence term and beyond.

3.7.2 Facility Design

The SSCs that relate to our licensed activities have not been significantly modified or changed during the current licence term. Any design modifications made to key safety-related equipment have been implemented in a controlled fashion, including the establishment of a documented risk assessment, commissioning plan, and training considerations.

Some key equipment has undergone modernization to ensure that reliability and accuracy are maintained high. For example, in response to the events associated with Shield Source International in 2012, SRBT reviewed the monitoring equipment used for stack emissions, and subsequently modernized the real-time stack monitors, the recorders associated with these monitors, and the tritium-in-air sampling systems used to establish weekly releases. These changes were all controlled using engineering change processes.

Going forth into the next licence term, SRBT is committed to continue to implement and improve the processes that govern the physical design of SSCs, as well as associated changes. Several deliverables associated with the N286-12 action plan[14] described in section 3.1 of this CMD are focused on renewing our internal design and engineering processes to align with the requirements of the new CSA standard.

3.8 Fitness For Service

As a manufacturing company, SRBT owns and operates several pieces of equipment, several of which constitute structures, systems and components (SSCs) which have a bearing on safety and our licensed activities. Such equipment includes the active ventilation systems and associated emissions monitoring equipment, the tritium processing rigs, tritium-in-air monitors, and liquid scintillation counters.

All of our equipment is kept in a condition that is fit for service, including the SSCs associated with tritium monitoring and processing. During the term of the current licence[1], we are proud to note that there were no significant equipment failures that presented a safety concern.

Senior Management has committed extensive resources to the modernization and renewal of safety-critical SSCs in service at SRBT. Several examples are discussed below. These initiatives provide further confidence that our critical SSCs will continue to function reliably and effectively throughout the next licensing term.

3.8.1 Ventilation Systems

All ventilation systems were maintained in fully operational condition with no major system failures during the current licence term; this includes the active ventilation systems. System down-time was almost exclusively related to the performance of routine maintenance, and corrective maintenance was very rarely required to be performed. Down-time associated with corrective maintenance activities did not typically exceed more than a few hours. Equipment is maintained on a quarterly or semi-annual basis. Equipment maintenance was performed under contract with a fully licensed maintenance and TSSA certified local HVAC contract provider.

The extremely low frequency of required corrective maintenance on this key system is a testament to the effectiveness of our routine preventive maintenance strategies, and the quality of the maintenance work.

3.8.2 Stack Flow Performance

The active ventilation systems are extracted to the two main stacks which constitute the release point for our gaseous emissions of tritium. The performance of the system is a critical component of our licensed activities; if minimum system performance is not achieved processing operations are immediately stopped until corrective actions can be taken to establish minimum air flow.

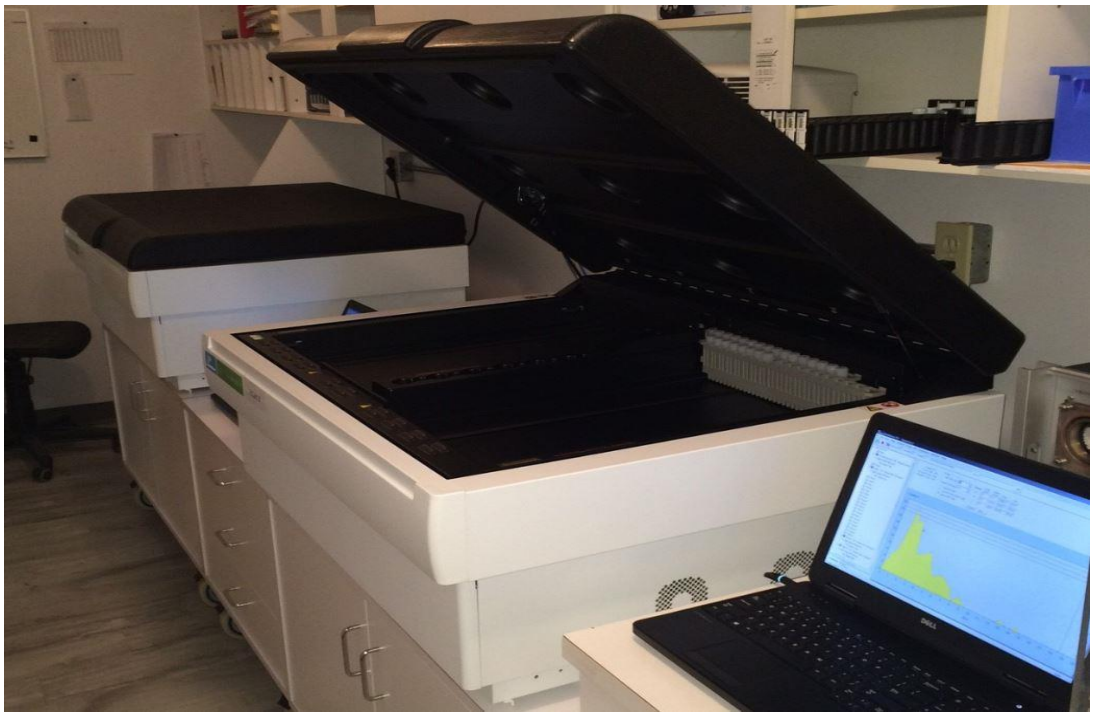
Daily measurements are undertaken prior to beginning processing operations, to confirm the system is operating as required. Independent third-party verification of stack performance is also performed on an annual basis, with the system having been confirmed as operating within design requirements each year of our current licence term. These annual verifications are planned to continue into the next licence term.

3.8.3 Liquid Scintillation Counters

SRBT has always used liquid scintillation counting for the vast majority of tritium assessments in several different media types (contamination 'swipes', bioassay, water concentrations, etc). In early 2014, the manufacturer of the two systems in use informed SRBT that the LSC counters used for most of the current licence term were nearing 'end-of-life', and maintenance activities in the future could not be guaranteed.

As a result, SRBT purchased two brand-new counters using our 'New Equipment, Process or Activity' process, as required by our Quality Manual[12]. These units have been installed, tested, commissioned and approved for use in a controlled manner, and intercomparison testing by an independent third party confirmed that they accurately measure tritium levels in our samples. The two new systems will continue to be maintained and calibrated on an annual basis by a qualified service representative from the manufacturer of the equipment, to ensure their functionality, accuracy and reliability.

FIGURE 8: NEW LIQUID SCINTILLATION COUNTING EQUIPMENT



3.8.4 Portable Tritium-in-Air Monitors

Portable tritium-in-air monitors (TAMs) are maintained in all areas of the facility where the potential exists for tritium to be present, either because of the nature of the processing performed, or because of an unplanned event such as light breakage.

For most of the licence term, at least three portable units were available to staff. In 2014, SRBT purchased and received five (5) new portable tritium-in-air monitors. These new units have increased the available equipment that our staff can use to assess tritium concentrations during our activities.

All departmental employees have received familiarization training in the use of these new units, and they have functioned well in the field. This equipment is calibrated on an annual basis, with records of this calibration kept on file.

3.8.5 Room Tritium-in-Air Monitors

Stationary tritium-in-air monitors are located in rooms and areas where the potential exists for tritium to be present, either because of the nature of the processing performed, or because of an unplanned event such as light breakage.

FIGURE 9: TRITIUM-IN-AIR MONITOR IN ZONE 2

In 2014, the number of stationary TAMs was increase to five, with three units continuing to be deployed in Zone 3, one unit in Zone 2, and now a new unit in the Zone 1 shipping area. This new station provides an early warning signal of a problem should a light or device be damaged during packaging activities. This type of event rarely occurs; however, the installation of a new monitor demonstrates our commitment to ensuring doses remain as low as reasonably achievable.

This equipment is calibrated on an annual basis, with records of this calibration kept on file.

3.8.6 Stack Monitoring Equipment

Stack monitoring equipment is incorporated for each of the two main active ventilation systems. For each air handling unit, the monitoring equipment includes:

- A tritium-in-air monitor (TAM) connected to real-time recording devices,
- A tritium-in-air sampling systems ('bubbler') for sampling, collecting and discriminating HTO and HT released to atmosphere,
- A flow measurement device which accurately measures the time the system has operated, the flow rate of sample air to the bubbler, and the total volume of air sampled.

Each TAM connected to the real-time recording devices is calibrated annually, and quarterly checks are also conducted to ensure agreement between the measured tritium concentration and the values recorded. Flow measurement devices also must be replaced with newly calibrated units on an annual basis.

FIGURE 10: STACK MONITORING EQUIPMENT

Throughout the current licence term, independent third party verification of our stack monitoring systems has been performed to confirm that our measurements are accurate, and that our equipment continues to function reliably and effectively. Verification activities were performed in 2011, 2013 and 2015. Going forth, as a result of the lessons learned from the events in 2012 relating to Shield Source International (SSI), SRBT has decided to increase the frequency of system verifications, and plan on ensuring this process is conducted each year.

Also as a result of the lessons learned from the events in 2012 relating to SSI, SRBT committed significant resources to upgrading and modernizing the key equipment associated with our stack monitoring systems. In the fourth quarter of 2014, SRBT purchased and received two new bubbler systems. These new bubbler units are like-for-like replacements intended to be exchanged with units that have performed sampling reliably and accurately since 2006. The new

units were tested, readied for use and commissioned in late 2014. An independent third-party performed verification activities in early 2015, confirming that the new bubblers function as required, and provide an accurate and reliable measure of our weekly emissions.

The two removed bubbler systems have been returned to the original manufacturer to undergo a comprehensive refurbishment process, including sample pump changes, catalytic oven replacements, and installation of digital temperature controllers. By the end of April 2015, SRBT expects to have two refurbished bubbler systems available as critical spare components should either of our new systems experience breakdown.

The tritium-in-air monitors (TAMs) that sample our atmospheric emissions in real time were also replaced with modern units in 2014. The new TAMs can provide SRBT with twice the maximum concentration reading when compared with the older units, and use digital circuitry that allows for extremely sensitive measurements that were not possible before. This has allowed our staff to identify and effectively address even small changes in our emissions.

The real-time stack monitoring system has been further augmented with the installation of a second chart recorder to supplement the original analog unit. The new ‘Datachart’ recorder is digital and fully programmable, with information logged and retained for further analysis. Health physics team members can now break down emissions in a detailed fashion, pinpointing the exact moment in time that an event began and terminated, and even providing a way to mathematically estimate the amount of tritium emitted over any selected time period.

In all cases, changes to the stack monitoring equipment followed our engineering change processes, to ensure that the changes were done in a controlled fashion, that the system design remained valid, and that the changes did not compromise the safety functions or accuracy of the systems.

3.8.7 Weather Station

The weather station contributes data to the Environmental Monitoring Program[21], and also acts as the sensor monitoring precipitation. The reliable function of this equipment ensures that SRBT continues to refrain from processing tritium during precipitation events.

Maintenance has been performed as per the manufacturer’s recommendation, every two years. The system was maintained in 2011, 2012 and again in 2014, and shall continue to be maintained at least every two years, with all records kept on file.

3.8.8 Maintenance Program

As a Class I nuclear facility, SRBT is required to establish a Maintenance Program[6] which underwent revision during the current licence term.

Our program[6] was revised to proactively incorporate several useful elements from programs that are in place at nuclear power plants. Guidance to this effect is available in CNSC Regulatory Guide RD/GD-210, *Maintenance Programs for Nuclear Power Plants.* Such concepts as critical spare parts and master equipment lists have been added to our program[6] in order to further enhance the quality and effectiveness of our maintenance activities.

We feel that this initiative further demonstrates that SRBT continues to strive to meet or exceed the requirements relating to our licensed activities.

Maintenance activities will continue to be executed in line with the requirements of our program[6] throughout the next licence term.

3.9 Radiation Protection

SRBT has always implemented an effective and robust radiation protection program in the form our Radiation Safety Program[20] document.

The primary philosophy behind the design of our program[20] is the concept of maintaining radiation exposures to workers and the members of the public as low as reasonably achievable (ALARA).

For the entirety of the current licence term, the Radiation Safety Program[20] has been closely managed by a Committee of Senior Management and employees. Our Health Physics Committee has always included the President and the Vice-President, as well as several other management team members. All key radiation protection considerations and decisions are made in consultation with the Committee.

In 2014, this committee was further expanded to include the newly hired Manager of Health Physics and Regulatory Affairs. This individual has considerable experience in all facets of radiation protection, contamination control and the application of the ALARA concept, and is directly responsible for the oversight of all company health physics activities, the communication of the Health Physics Team, and the design, implementation and accuracy of the Radiation Safety Program[20].

With the addition of this team member, the Health Physics committee currently possesses a combined total of 107 person-years worked at SRBT.

The Radiation Safety Program[20] continues to be implemented in an effective manner. Key metrics are very positive, including the radiation dose received by nuclear energy workers, as well as the calculated maximum radiation dose to members of the public.

3.9.1 Dose To The Workers

TABLE 9: DOSE TO WORKERS 2010-2014

DOSE	2010 (mSv)	2011 (mSv)	2012 (mSv)	2013 (mSv)	2014 (mSv)	LIMIT (mSv)
Maximum	0.88	1.15	0.80	1.93	1.29	50
Average	0.11	0.25	0.11	0.21	0.10	

Throughout the current licence term, the average and maximum radiation doses to workers employed at SRBT have been maintained very low when compared to the regulatory limit for committed effective dose of 50 mSv (marked in yellow in Table 9).

Minor fluctuations year to year are attributed to variations in the amount and types of tritium light sources produced, as well as the implementation of various ALARA-driven improvements.

Throughout the term of the existing licence[1] SRBT has selected yearly targets to reduce maximum and average occupational dose based on production output. During the term of the proposed licence SRBT is committed to selecting targets to further reduce occupational exposure. Going into 2015, a long term goal of the SRBT Health Physics Team is to implement the Radiation Safety Program[20] in an effective and controlled manner, in order to achieve the ALARA-driven goal of all workers having an annual committed effective dose no greater than the dose limit of 1 mSv for the general public.

3.9.2 Dose To The Public

TABLE 10: DOSE TO THE PUBLIC 2010-2014

DOSE	2010 (mSv)	2011 (mSv)	2012 (mSv)	2013 (mSv)	2014 (mSv)	LIMIT (mSv)
Adult Worker	0.0050	0.0050	0.0049	0.0068	0.0067	1.0000

The ALARA concept is not only applied to our workers, but also to the quantity and type of tritium that is released to the environment through our effluent pathways. Several improvements to the ways that we handle tritium in our processes have produced significant gains by reducing the tritium emitted from the facility. As a result, even though the amount of tritium processed has trended upward over the past few years, the calculated public dose based on our comprehensive environmental monitoring plan has remained extremely low, never exceeding 1% of the regulatory limit of 1 mSv (marked in yellow in Table 10).

The calculation methodology for maximum public dose assumes highly conservative, worst-case scenarios for all environmental monitoring parameters that contribute to the calculation. Realistic committed effective dose values to any member of the public would be significantly less than the calculated values presented here.

3.9.3 Radiation Hazard Control

Radiation hazards which are present as part of our licensed activities are controlled through several aspects of our Radiation Safety Program[20].

The design and maintenance of our active ventilation systems provides an effective means of protecting our workers from the internal hazards presented by the intake of tritium, in both gaseous elemental and oxide forms.

A comprehensive program of contamination control is executed in our facility. All areas of our facility are assessed routinely for the presence of tritium contamination; this includes areas where tritium is never handled or present. In a typical week of operation, over 200 contamination assessments are conducted in work areas, and on items that are being removed from active operating areas in Zone 2 and 3. Contamination that exceeds administrative control limits is addressed promptly by decontamination and reassessment.

The Health Physics Team performs a comprehensive review of contamination control data on a quarterly basis. The sampling strategies for each radiological zone are reviewed and adjusted in order to ensure that the routine areas sampled provide the most useful and meaningful data for proper hazard control. Sampled areas that consistently fall below our administrative limits are considered for change in favour of new areas that may present a contamination concern.

FIGURE 11: NON-FIXED CONTAMINATION ASSESSMENT IN ZONE 3

Low-level waste materials are stored in segregated areas of the facility dedicated to safe storage of this waste. Waste is not permitted to aggregate unnecessarily, and is frequently checked to ensure the integrity and safety of the storage areas and packages.

Our real-time stack monitoring systems help the Health Physics Team and production technicians effectively diagnose potential problems that may be contributing to unnecessary fugitive emissions. This system is critical in ensuring that the radiation hazards are controlled with respect to our environment and the public.

3.9.4 Radiation Protection Program Performance

During the current licence term, there were no exceedances of any action levels associated with radiation protection. This includes action levels for tritium concentration in bioassay samples, for committed effective dose received per quarter and per year, and specific action levels relating to pregnant nuclear energy workers.

These action levels were revised in 2013, and formally incorporated into our descriptive licensing document 'Licence Limits, Action Levels, and Administrative Limits'[30] in 2014. Each action level was lowered to ensure that they were set at levels that were meaningful, and could be expected to act as better indicators of program control and performance. CNSC staff accepted these new action levels[31], which will be reviewed and revised if warranted routinely going forward.

3.9.5 Application of ALARA

The Health Physics Team is responsible to monitor and review all of our licensed activities, and make recommendations for ensuring that radiation doses are continually maintained ALARA.

New employees are provided with an initial session of radiation safety training before they are permitted to work in our active zones. Testing is administered to ensure that workers fully understand their responsibilities and expectations with respect to radiation protection while working in the facility.

In addition, annual Radiation Safety Training sessions are held with all staff where strategies are outlined that can be used to keep radiation doses low. This training includes testing, and is a mandatory condition of the Radiation Safety Program[20] for all worker and all levels of management, including the President and Vice-President.

SRBT has invested a considerable amount of resources into the people and equipment that ensure the radiation protection of workers and the members of the public. Despite our satisfactory performance in this area, our management is totally committed to continue to strive to drive doses lower, to keep radiation hazards controlled, and to minimize our radiological impact on the environment and the public.

3.10 Conventional Health And Safety

The safety of the entire set of our operations is of paramount importance, and safety is the primary consideration in everything that we do. This philosophy extends not only through our licensed activities, but all work that is performed in the facility.

One measure of the effectiveness of any conventional health and safety program is the number of lost-time incidents that occur over time.

SRBT has grown from a total staff complement (including management) of 15 employees, up to the current value of 43 employees. Despite the increase in workforce (and by extension, the amount of person-hours worked at the facility), the number of Lost Time Incidents (LTI's) has been kept very low throughout the current licence term.

TABLE 11: LOST TIME INCIDENTS 2010-2014

	2010	2011	2012	2013	2014
Lost Time Incidents	0	1	0	0	0

Even though the number of LTI's is low, in the opinion of the SRBT management team, the occurrence of any lost-time incident is of significant concern.

In 2013, a new position was created in our organization to focus on the monitoring and management of conventional safety hazards in our facility.

The Health and Safety Specialist chairs the workplace health and safety committee, and continually researches ways to ensure that workers receive the best protection when they are performing potentially hazardous tasks.

This individual is also responsible for ensuring that our Hazard Prevention Program[32] is implemented effectively and that it meets or exceeds all regulatory requirements relating to conventional health and safety, including the provisions of Part II of the Canada Labour Code.

The Health and Safety Committee is comprised of members of both management and staff, and meets on at least a monthly basis.

Workplace inspections are performed by the committee members, and discussions are frequently held with workers in the field to determine if there are hazards which can be addressed. Supervisors in each of the departments are responsible to ensure that their staff is properly trained to perform tasks, and that all measures and safety precautions are followed to ensure the health and safety of all workers.

Although the vast majority of work in our facility is conducted by our employees, any visitors or contractors who perform work on the facility premises are familiarized with the safety rules and expectations for the area that they occupy. Visitors and contractors are closely monitored while on site, to ensure that they are following safety practices, and any concerns they may have are addressed promptly.

During the current licence term, supervisors and designates completed Emergency First Aid, CPR Level ‘C’ and Automatic Electronic Defibrillator training provided by the Ottawa Paramedic Services. Over 30% of our employees are qualified to administer at least this level of first aid should a serious workplace injury occur.

All of our workers are proud of our safety record, and each individual employee is strongly committed to ensuring their own safety, and the safety of their fellow workers.

3.11 Environmental Protection

3.11.1 Atmospheric Emissions

SRBT's releases to the atmosphere continue to be effectively controlled and are consistently well below the release limits prescribed in the current[1] and proposed operating licence:

TABLE 12: ATMOSPHERIC EMISSIONS 2010-2014

NUCLEAR SUBSTANCE AND FORM	2010 (TBq)	2011 (TBq)	2012 (TBq)	2013 (TBq)	2014 (TBq)	LIMIT (TBq)
Tritium As Tritium Oxide (HTO)	9.17	12.50	8.36	17.82	10.71	67.20
Total Tritium As Tritium Oxide (HTO) And Tritium Gas (HT)	36.43	55.68	29.90	78.88	66.16	448.00

On average throughout the term of the existing licence[1], the emissions of "HTO" were maintained at less than 27% of the licence limit and the emissions of "HTO + HT" were maintained at 18% of the licence limit (marked in yellow in Table 12).

Despite having increased tritium processed by approximately 4.5 times between 2010 and 2014, atmospheric emissions have risen at less than half of that rate.

Emission reduction initiatives have been successful in reducing the ratio of tritium released to atmosphere versus processed from 0.55% in 2010 to 0.23% in 2014. For the first 8 weeks in 2015, this ratio is less than 0.12%. This ratio was as high as 1.70% in 2008.

This ratio is an excellent indicator of the overall effectiveness of our emission-reducing initiatives. The following table illustrates how this ratio has trended since 2010.

TABLE 13: RATIO TRITIUM RELEASED TO TRITIUM PROCESSED 2010-2014

	2010	2011	2012	2013	2014
Total Tritium As Tritium Oxide (HTO) And Tritium Gas (HT) (TBq)	36.43	55.68	29.90	78.88	66.16
Tritium Processed (TBq/Year)	6,643.73	7,342.45	10,224.59	30,544.80	28,714.12
Released To Processed (%)	0.55	0.76	0.29	0.26	0.23
Increase (+) Reduction (-) (%)	-31	+38	-62	-10	-12

Throughout the term of the existing licence[1] SRBT has selected yearly targets to reduce overall air emissions based on production output. During the term of the proposed licence SRBT is committed to selecting targets to further reduce air emissions.

During the licensing period, there were no significant safety-related events, and only a single action level exceedance. During the period of October 28 to November 4, 2014, there was a gaseous tritium action level exceedance of the weekly action level for total tritium of 7.75 TBq, representing 3.7% of the annual release limit for total tritium. SRBT conducted an investigation and identified contributing causes, root causes and corrective actions. SRBT's investigation concluded that the higher tritium emissions were related to two contributing events; leakage of gaseous tritium light sources and mechanical failure of a valve on a filling rig.

Significant, dedicated resources will be directed in the coming years specifically focused on finding ways to further minimize our environmental impact.

3.11.2 Liquid Effluent

SRBT's liquid releases continue to be effectively controlled and are consistently well below the release limits prescribed in the current[1] and proposed operating licence:

TABLE 14: LIQUID EMISSIONS 2010-2014

NUCLEAR SUBSTANCE AND FORM	2010	2011	2012	2013	2014	LIMIT
Tritium Water Soluble (TBq/Year)	0.007	0.008	0.012	0.009	0.013	0.200

On average throughout the term of the existing licence[1], liquid emissions were maintained at 6.5% of the licence limit (marked in yellow in Table 14).

In addition to the observing the yearly limit throughout the term of the existing licence[1] SRBT has selected targets to reduce overall liquid emissions on a daily basis.

3.11.3 Environmental Monitoring

During the course of the licence[1] SRB Technologies (Canada) Inc. has maintained an Environmental Monitoring Program[21] that provides data for site-specific determination of tritium concentrations along the various pathways for exposure probabilities to the public due to the activities of the operations. Most samples are analyzed and collected by a third party contracted by SRBT.

3.11.3.1 Air Monitoring

A total of 40 passive air samplers (PAS) are located throughout a two kilometer radius from the SRBT facility, in eight sectors, ranging in distance at 250, 500, 1,000, and 2,000 meters.

The samples were collected on a monthly basis by a third party laboratory for tritium concentration assessment by the third party laboratory.

The PASs represent tritium exposure pathways for inhalation and skin absorption and used in the calculations for critical group annual estimated dose.

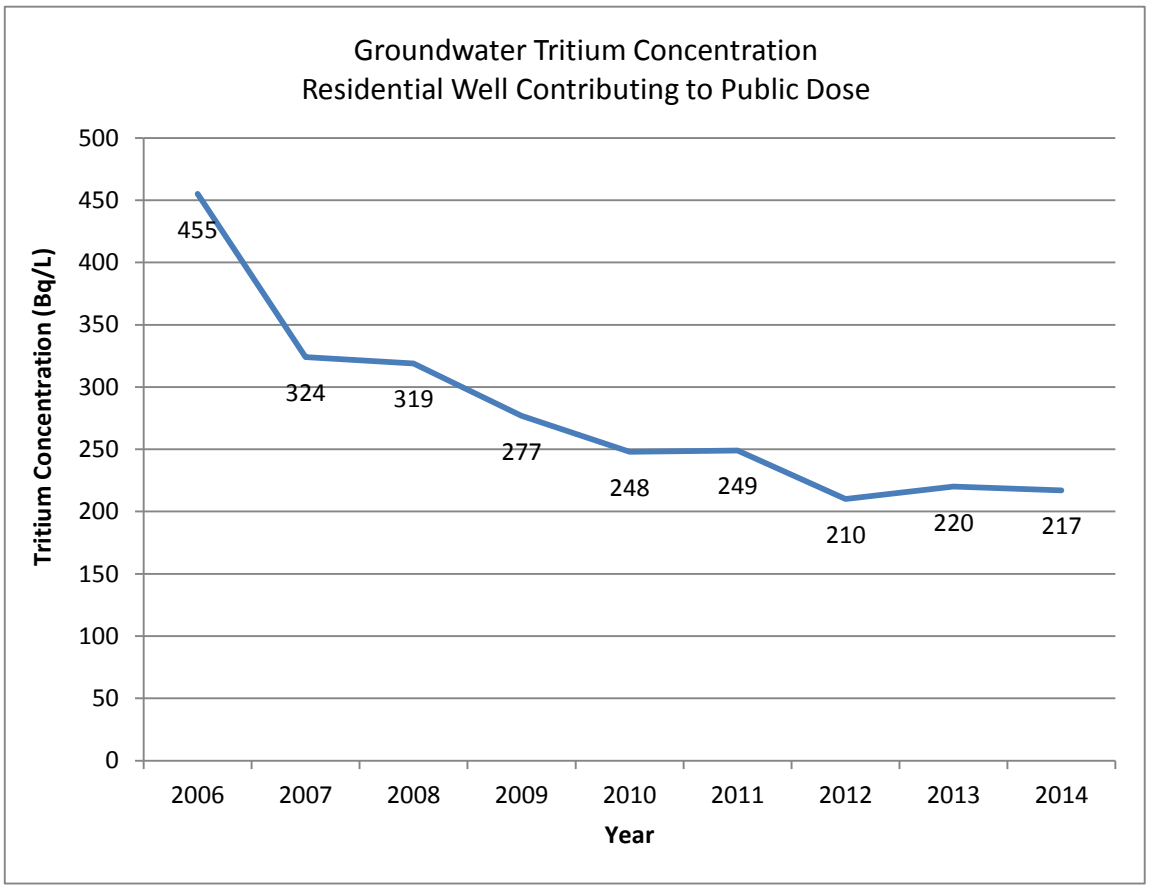
3.11.3.2 Groundwater Monitoring

Since 2006, SRBT has implemented and maintained a comprehensive groundwater monitoring program as part of our overall Environmental Monitoring Program[21].

Dedicated, engineered sampling wells are used to establish tritium concentrations in the groundwater each month at various depths and in differing geologic strata. Variations are trended over time to measure the response of historical contamination of the local aquifer. Since the program was established, groundwater measurements have been in very good agreement with established hydrogeological modelling predictions.

In addition, several local residences permit SRBT to acquire samples three times annually, to provide additional data for our program. In 2014, the highest average residential well tritium concentration value was measured at 217 Bq/L, a value that continues trend downward, and remains far below the Ontario Drinking Water Quality Standard of 7,000 Bq/L.

FIGURE 12: RESIDENTIAL WELL WITH HIGHEST CONCENTRATION

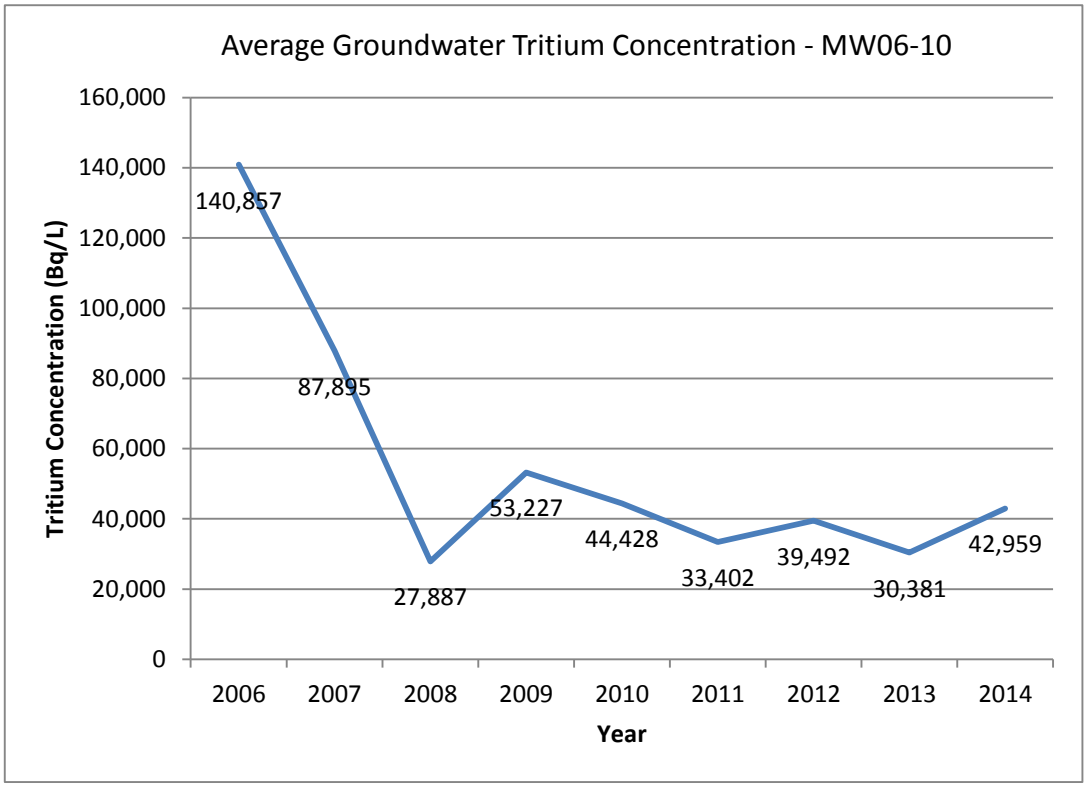


More importantly, public dose values attributed to groundwater consumption have decreased significantly over the past several years as a direct result of our efforts to minimize our environmental impact.

Throughout the current licence term, SRBT has continued to provide a compilation of the entire set of groundwater monitoring data to CNSC staff on a monthly basis.

Of the now 34 monitoring wells, by the end of 2014 the concentrations of only two wells now exceed the Ontario Drinking Water Guideline of 7,000 Bq/L. These two wells (MW06-10 and MW07-13) are located on the SRBT site within 50 meters of the stack and showed either decreasing or steady concentrations in 2014. The highest average tritium concentration in any well remains in monitoring well MW06-10 which is located in the stack area. The average concentrations in the majority of the monitoring wells continue to decrease since being drilled. For example in 2007 the concentration of 8 wells exceeded 7,000 Bq/L.

FIGURE 13: MONITORING WELL WITH HIGHEST CONCENTRATION



While most of the released tritium in the air is dispersed, some of it will reach the soil through dry and wet deposition. Infiltrated precipitation water brings tritium into the groundwater below it. The deposition of tritium on and around the facility from air emissions and resulting soil moisture and standing water are the sole direct contributor to tritium found in groundwater.

Groundwater is affected by the percolation of soil moisture and standing water from the surface.

FIGURE 14: SAMPLING GROUNDWATER MONITORING WELLS

Current concentrations in the wells are expected to eventually gradually decrease once all historical emissions have flushed through the system and/or decayed with some influence of higher concentrations in nearby wells from lateral underground water flow. This will be confirmed by continuous monitoring of the existing network of wells. The rate at which this decrease will occur is dependent on the level and speed of recharge of the groundwater on and around the SRBT facility.

3.11.3.3 Other Monitoring

SRBT's Environmental Monitoring Program[21] includes much more than air and groundwater monitoring.

Precipitation monitoring is conducted every month at 8 sample stations dispersed in all directions. As a direct result of our policy of ceasing tritium processing operations during precipitation events (snow or rain), the measured values of tritium in precipitation have remained low. Over the period of 2010 – 2014, the average concentration of tritium in precipitation is 72 Bq/L; in 2014 in particular, the average concentration of tritium in precipitation was measured as 42 Bq/L.

Produce sampling is conducted each September during the harvest season. A range of produce types are obtained from nearby residents who offer samples. Typical samples including root vegetables, tree fruits and other common garden produce. Tritium concentration values obtained each year are used in our calculation of public dose, with conservative assumptions on the amounts of local produce that is consumed by the critical group. The annual average tritium concentration in residential produce has continued to remain low – over the last four seasons, the average has been measured as 86 Bq/L.

Locally produced milk is sampled three times annually, with results also contributing to our public dose calculations. The maximum value measured from locally produced and distributed milk was 9 Bq/L during the current licence term, with the majority of measurements nearing or falling below the minimum detectable activity level of the independent third party's measurement process, which ranged from 3 – 6 Bq/L. Annually, wine is sampled from a local 'brew-your-own' business located in the building directly north of our facility. Over the past five years, the average wine measurement was 9.8 Bq/L.

Nearby surface water is sampled and assessed during months when the river is not frozen over. In 2014, all measurements of river water were assessed to be less than the minimum detectable activity level of the independent third party's measurement process, which ranged from 3 – 6 Bq/L.

Facility downspouts divert rainwater that accumulates on the roof and discharges it to the ground; this water is also sampled and measured for tritium concentrations during periods of significant rain.

3.11.3.4 Environmental Monitoring Program Revision

As part of our continuous improvement, SRBT plans on conducting an analysis of the latest set of CSA standards relating to environmental monitoring and effluent monitoring programs, and comparing our current programs to the applicable portions of these standards.

This gap analysis is scheduled to be completed during the second half of 2015, and a new revision of our Environmental Monitoring Program[21] will be submitted to CNSC staff for review, comment and acceptance in the first half of 2016.

SRBT will always be strongly committed to comprehensively and accurately monitor our effluent and our environment.

3.12 Emergency Management and Fire Protection

3.12.1 Fire Protection

Most of the credible potential hazards that are associated with the operation of our facility are associated the occurrence of fire within the building. As a result, SRBT implements and maintains a comprehensive Fire Protection Program[3] that meets the requirements of NFPA standard 801. This program[3] is routinely reviewed by management, and independent third parties, to ensure that fire protection capacity is maximized.

Several aspects of how SRBT meets the requirements relating to fire protection are discussed below.

3.12.1.1 Fire Protection Committee

SRBT has instituted a Fire Protection Committee to manage all aspects of fire protection, and to identify fire protection weaknesses at the facility. The committee seeks input from other staff, contractors or third party experts, and incorporates recommendations to improve fire protection.

The Committee meets at least every quarter to discuss all aspects of fire protection. During the licence period, the committee met a total of 26 times, and always at least 5 times a year.

The committee is comprised of the Vice President and staff that have significant experience in fire protection. This includes an individual who is qualified as a volunteer firefighter in the local area.

3.12.1.2 Fire Protection Program and Procedures

During the current licence term, the Fire Protection Program[3] was revised three times to ensure that the most up to date information was included, and that recommendations from the committee and other stakeholders were incorporated.

In December of 2013, the Canadian Standards Association published a new standard relating to fire protection. CSA N393-13, *Fire protection for facilities that process, handle, or store nuclear substances,* encompasses a facility such as SRBT within its intended scope.

CNSC staff notified SRBT in June 2014 that CSA N393-13 was to form the new regulatory requirements applied to our facility relating to fire protection[33]. As a result, SRBT undertook a gap analysis[34] between our current Fire Protection Program[3] and the new standard. This gap analysis[34] and a proposed implementation plan[34] was accepted by CNSC staff in December 2014[35], and SRBT expects a new revision of our Fire Protection Program to be issued by July 31, 2015.

3.12.1.3 Maintenance of the Sprinkler System

Throughout the current licence term, quarterly maintenance was conducted on the facility fire sprinkler system, and weekly checks of various valves and line pressures were conducted by qualified staff. This practice is required by our program[3], and will continue throughout the coming licence term.

3.12.1.4 Fire Protection Equipment Inspections

In addition to maintenance of sprinklers, routine inspections of emergency lighting and fire extinguishers are performed on a monthly basis by qualified staff. Independent and qualified third parties also perform inspections of this equipment on an annual basis as part of our program[3].

Any deficiencies are remedied quickly to ensure that this equipment is always in a state of readiness.

3.12.1.5 Fire Extinguisher Training

All SRBT staff, including management, receives annual, hands-on training on the effective use of fire extinguishers. Representatives from the Pembroke Fire Department train each staff member individually, and then a practical exercise is conducted where the trainee must successfully extinguish a controlled fire using a portable fire extinguisher.

FIGURE 15: FIRE EXTINGUISHER TRAINING

This training was conducted every year during the current licence term, and this practice will continue.

3.12.1.6 Fire Protection Committee Member Training

Members of the Fire Protection Committee have received external training relating to performing inspections to the Ontario Fire Code. This training is provided by a consultant with extensive experience in fire protection as applied to nuclear facilities.

3.12.1.7 Fire Responder Training

Fire responders receive facility familiarization training when necessary to ensure that they are prepared to respond should a fire emergency occur at the facility. This training also includes a component relating to the properties of tritium and the radiation safety risks associated with our operations.

In February 2015, representatives from the Pembroke Fire Department participated in an emergency exercise, which is viewed as an additional method of training and learning for all parties involved. Feedback was received and incorporated into our improvement plan.

3.12.1.8 Fire Alarm Drills

Over the current licence term, at least five fire alarm drills were conducted every year, with a total of 27 drills having taken place over the last five years. Staff response is assessed during each drill, and feedback solicited at the conclusion of the drill to ensure that improvements are identified and addressed in a timely fashion.

3.12.1.9 Fire Protection Consultant Inspections

As required by licence[1], an annual third party review of compliance with the requirements of the National Fire Code 2005 and the Nation Fire Protection Association NFPA-801 2008 has been completed every year during the current licence term. This practice will continue going into the next licence term.

Any findings resulting from this review are quickly addressed in order to ensure the best level of fire protection at our facility.

3.12.1.10 Pembroke Fire Department Inspections

Annual fire inspections are conducted by the local fire department, and any recommendations and violations are remedied quickly in order to ensure the best level of fire protection at our facility.

3.12.2 Emergency Preparedness

As a licensed Class I nuclear facility, SRBT is required to implement and maintain a program for emergency preparedness to address on-site and off-site events which can affect the facility.

3.12.2.1 Emergency Plan

In compliance with this requirement, SRBT has developed, implemented and maintained an Emergency Plan[7] which was revised twice during the current licence term in response to the catastrophic events at the Fukushima Daiichi nuclear power station in Japan in 2011. CNSC staff accepted the latest revision of the plan document in 2013.

SRBT is a small facility, and maintains an agreement with the Pembroke Fire Department as a primary responder in case of emergency. As a key part of this agreement, SRBT ensures that fire fighters are provided with familiarization tours of the facility on a routine basis, and that information is provided to them about our operations, and the areas where nuclear substances are stored and used. In addition, key members of management are available at all times to assist in the response to any emergency situation, and assess any potential radiological hazards that may arise.

Equipment that would be critical in establishing the potential radiological hazard during an emergency is stored and maintained off-site, in order to ensure that SRBT has access to these tools in case the facility is not accessible during the initial phases of an emergency.

With the publication of CNSC regulatory document REGDOC 2.10.1, *Nuclear Emergency Preparedness and Response*, SRBT has once again committed to ensure our Emergency Plan[7] is upgraded to the latest set of requirements. Our program[7] has been analyzed for gaps[10] against the new regulatory document, and arrangements made for a major revision of the Emergency Plan based on this analysis. We expect the plan to be revised and submitted to CNSC staff in September of 2015.

3.12.2.2 Emergency Exercise

On February 9, 2015, SRBT conducted a full-scale emergency training exercise in concert with the Pembroke Fire Department and the City of Pembroke. A simulated emergency situation was initiated in our Zone 2 area, where tritium light sources are installed into various safety signs and devices.

Within the exercise design, both fire and radiological hazards were simulated in order to challenge the response of the fire department and our staff and management. Observers were present from the City of Pembroke and the CNSC staff to assess all aspects of the response against our current Emergency Plan[7], as well as against the new requirements of REGDOC 2.10.1.

Significant input was solicited and accepted from all SRBT staff, the various responders and participants, and observers during post-exercise discussions. The exercise was an extremely useful activity to help our facility in the development of the next revision of the Emergency Plan going into the next licence term.

FIGURE 16: EMERGENCY TRAINING EXERCISE

Overall, a very good response to the simulated emergency was noted by the group of participants and observers, including CNSC staff. The potential hazards were contained and brought under control within an acceptable time frame in a safe and efficient fashion. All responders safely executed their duties with efficiency and professionalism.

Even though the response was acceptable, in the spirit of continuous improvement, SRBT has identified 38 minor areas that can be further developed in order to provide even greater assurance of safety should an emergency situation occur. These minor issues have been itemized and reported to CNSC staff[36] and are being addressed through a corrective action which will be included in the final report.

None of the issues presents a major safety concern, but each item presents SRBT with an additional opportunity for improvement in an area where excellent performance must be assured.

SRBT plans to continue to maintain and grow our Emergency Plan[7], as well as our effective partnerships with local emergency response organizations throughout the coming licence term and beyond. Additional emergency exercises will be planned, designed and executed on a routine basis to ensure that we are ready to act in the unlikely event that an emergency situation arises.

3.13 Waste Management

3.13.1 Waste Management Program

Throughout the current licence term, SRBT has maintained and applied an effective Waste Management Program[2]. This program[2] governs the ways that our company manages all types of waste materials, including radioactive wastes.

The program[2] is overseen by our Waste Management Committee. This committee meets on a regular basis to discuss and address issues with waste of all types (conventional, hazardous, radioactive and mixed), and determine additional measures that can be taken to effectively minimize the amount of waste generated.

The committee is comprised of members of management, supervision, and workers on the floor. This permits any issue to be discussed from all perspectives in our organization, a strategy that has resulted in frequent and significant gains in waste reduction.

In 2014, the Canadian Standards Association published two key nuclear standards that pertain to SRBT's management of radioactive waste materials. Both N292.0-14, *General principles for the management of radioactive waste and irradiated fuel*, and N292.3-14, *Management of low- and intermediate-level radioactive waste* were extensively consulted when the revision process was initiated for our Waste Management Program[2].

The latest revision of the SRBT Waste Management Program[2] was finalized and submitted to CNSC staff on December 23, 2014[37], and subsequently accepted by CNSC staff on March 3, 2015[9]. The revised program[2] now includes a set of new procedures focused on the key processes discussed in the standards which constitute an effective waste management program.

3.13.2 Radioactive Consignments

Between 2010 and 2014 inclusive, SRBT made 23 low-level waste consignments to licensed waste management facilities, averaging 4.6 consignments per year. Continuous effort is made to reduce the amount of this type of contaminated waste material.

3.13.3 Storage of Radioactive Waste

As defined in our Waste Management Program[2], SRBT generates two types of radioactive waste that require temporary storage on-site prior to disposal through approved pathways.

3.13.3.1 Very Low-Level Waste Interim Storage

Waste that meets certain program criteria is deemed to be very low-level waste (VLLW), and is segregated and stored as such until clearance testing can be performed. The contamination levels on the waste materials are measured by sampling, and conservatively assessed and compared to clearance levels. If the material meets clearance criteria, the waste can be disposed of as clearance-level waste (CLW); if the waste does not meet these criteria and cannot be effectively decontaminated, the material is then stored and managed as low-level waste (LLW).

3.13.3.2 Low-Level Waste Storage

Low-level waste (LLW) is any waste with activity levels that exceeds regulatory clearance levels or exemption quantities for tritium.

LLW is collected in various sealed receptacles and subsequently stored in drums in the Waste Storage Room to await transfer to a licensed waste management facility.

3.13.4 Hazardous Material Collection and Storage

Throughout the current licence term, no hazardous wastes that require non-conventional handling have been collected or stored in the facility. Through the Waste Management Committee, SRBT strives to ensure that non-hazardous materials are always used in our processes as much as possible, and that any waste generated is effectively minimized.

3.13.5 Waste Minimization

SRBT continually diverts clean and uncontaminated materials from becoming unnecessarily contaminated by reducing the materials that are physically transferred into our active areas (Zones 2 and 3).

The Waste Management Committee continually assesses work practices to determine if the philosophy of waste minimization is being effectively applied.

Going forth into the next licence term, waste materials of all types will continue to be managed effectively through the implementation of our Waste Management Program[2].

3.14 Security

SRBT had no security related events over the current licensing period.

SRB Technologies (Canada) Inc. has a Security Program[38] for the facility in accordance with CNSC regulatory requirements and CNSC Staff expectations.

New staff members are required to qualify for a Facility Access Security Clearance (FASC), even if they are not expected to handle nuclear substances as part of their responsibilities.

Individuals and contractors that visit the facility are required to also have an FASC or be escorted at all times by an individual with a valid FASC.

Over the course of the existing licence[1] several physical upgrades and security enhancements were made to improve nuclear security at the facility. Maintenance of the entire security system is performed by an independent third party at least every 6 months.

Any minor issues identified during Physical Security Inspections performed by CNSC Staff were promptly addressed and our Facility Security Program[38] was revised accordingly.

3.15 Safeguards and Non-Proliferation

In addition to our tritium processing operations, SRBT possesses, uses, stores and manages an extremely small quantity of depleted uranium, which is a controlled nuclear substance.

This material is used as storage media for tritium gas on our processing equipment, a well-understood and widely-used strategy for manipulating and storing tritium in its gaseous, elemental state. By using depleted uranium in this fashion, we can ensure that the quantity of gaseous tritium being used during any given processing operation is restricted. This helps to ensure that the consequences of any unplanned event are minimized with respect to radiation and environmental protection, by ensuring that any release of tritium is limited.

During the current licence term, the International Atomic Energy Agency has not conducted any verification activities of our inventory of this material, nor requested any information on this matter. As a licensee, and pursuant to the General Nuclear Safety and Control Regulations, SRBT is fully committed to ensure that we meet all applicable regulatory requirements relating to Canada's obligations relating to nuclear non-proliferation and safeguards.

Should a safeguards verification activity be requested or conducted, or a request for information made by the IAEA, SRBT will provide all accommodation to the agency and CNSC staff in order to satisfy our responsibilities in this safety and control area.

3.16 Packaging and Transport

3.16.1 Import and Export Activities

SRBT ships packages containing tritium light sources and devices across the globe. In order to ship or receive these products outside of Canada, SRBT is required to obtain import and export licenses, which typically limit the quantity of tritium that can be shipped during the valid licence period.

Throughout the current licence term, in all instances where it was required, these licences were applied for and acquired in advance of shipping. Prior- and post-notifications were made to the CNSC for all international shipments where the licence required this to be performed and annual reports were compiled for each licence issued.

In 2014, in consultation with SRBT, CNSC began the process of reducing the administrative burden associated with ensuring the issuance of prior- and post-notifications required as part of our import and export activities. This was accomplished by permitting SRBT to report this information to the CNSC in the form of an annual report, rather than by sending the required notifications on a shipment-by-shipment basis.

This initiative has been very positive, allowing our shipping department to focus even more on ensuring safety and compliance in packaging and transport of our products.

FIGURE 17: PACKAGING ACTIVITIES

3.16.2 Shipping Activities

SRBT has grown the business throughout the term of the current licence[1], resulting in an upward trend in the number of consignments that are offered for transport. For example, between 2013 and 2014, the number of consignments increased from 744 shipments to 13 countries, to 1,122 shipments to 19 countries. On average, about 90% of our shipments are destined for customers in Canada or the United States.

Despite the increase in the number of consignments, over the past five years there have been no occurrences of safety-significant transport incidents involving our packages. Our packaging and transport activities continue to comply with CNSC regulatory requirements, including the Packaging and Transport of Nuclear Substances Regulations, IAEA Safety Standards Series TS-R-1, and the Transport of Dangerous Goods regulations published by IATA.

All staff members involved in offering shipments of dangerous goods for transport are certified as trained in accordance with requirements every two years.

SRBT is proud of our continuing record of safety and compliance in this area. The activities conducted by SRBT relating to packaging and transport of nuclear substances will continue to be compliant with the applicable regulatory requirements and our operating licence.

4.0 OTHER MATTERS OF REGULATORY INTEREST

4.1 Public Information Program

4.1.1 Direct Interaction with the Public

We received only two inquiries from members of the public during the term of the existing licence[1].

One of these inquiries was from a member of the public in 2014 who requested our licence application by e-mail. An e-mail was sent the same day with the licence application attached also explaining that the application could be found on our website.

Another inquiry from the same individual in 2011 requesting our Annual Compliance Report which was due to be posted on our web site in a few days. An e-mail was sent the same day with the copy of the Annual Compliance Report attached, as planned the report was later posted on our website. In 2012, 2013 and 2014 we proactively contacted this same individual and provided them a copy of our Annual Compliance Reports again a few days in advance of it being posted on our web site.

TABLE 15: INQUIRIES FROM THE PUBLIC 2010-2014

	2010	2011	2012	2013	2014
Inquiries From The Public	0	1	0	0	1

Throughout the term of the current licence[1] we have sampled water from a number of wells belonging to the public every four months for tritium concentration. On a yearly basis we also sample produce from gardens belonging to members of the public for tritium concentration. We promptly provide each member of the public with a report of the sample results along with the anticipated radioactive exposure due to tritium from consuming either the water or produce. We provide members of the public a comparison of this exposure against the CNSC limit and against radioactive exposure from other known sources, such as cosmic radiation, x-rays, etc.

Plant tours have proven to be a useful tool for SRBT to reach the public. We began tracking plant tours late in 2011 and recorded that a total of 98 plants tours were given between late 2011 to the end of 2014. Plant tours have been provided to 55 members of the general public, to representatives from 15 various local institutions, to representatives of 13 local existing and prospective suppliers and to 15 existing and prospective customers.

TABLE 16: PLANT TOURS 2010-2014

	2010	2011	2012	2013	2014
General Public	N/A	1	9	17	28
Local Institutions	N/A	2	3	6	4
Local Suppliers	N/A	0	0	3	10
Customers	N/A	0	0	9	6
Total	**N/A**	**3**	**12**	**35**	**48**

In anticipation of licence renewal, on November 18, 2014, SRBT made a presentation to Pembroke City Council and provided information on operations, emissions, monitoring results and other current activities. The presentation was also televised on Cogeco Cable.

On September 9, 2014, SRBT posted on our website our licence renewal application along with the press release informing the public of our application.

SRBT also provided the press release informing the following stakeholders of our licence application along with an information pamphlet and survey with postage paid return envelope:

- Individuals living within 500 meters of the facility (185 residences)
- Residents with wells or gardens that are being monitored by SRB
- Local and adjacent businesses (28 businesses)
- Local media, television, print and radio
- Local special interest groups
- Local Aboriginal groups
- Local elected officials at the Municipal, Provincial and Federal level

Of the 250 surveys that were sent a total of 24 were returned back representing a 9.6% response rate. Responses were mostly positive with few concerns expressed. The survey and information pamphlet are also posted on our website.

4.1.2 Public Information Program

The Public Information Program[8] was revised on August 1, 2014 (Revision 8) to address the comments received from CNSC Staff[39] and to reflect the requirements of Regulatory Document RD/GD-99.3, *Public Information and Disclosure,* issued by the Canadian Nuclear Safety Commission in March 2012.

On October 31, 2014 CNSC staff approved[11] SRBT's Public Information Program[8] (Revision 8) stating it met all the criteria outlined in the Regulatory Document RD/GD-99.3, *Public Information and Disclosure* and was deemed fully satisfactory.

SRBT's latest Public Information Program[8] demonstrates SRBT's commitment to openness and transparency by being vastly improved by more broadly reaching stakeholders using more methods of providing information.

4.1.3 Public Information Committee

SRBT Senior Management has formally constituted a Public Information Committee in the organizational structure shortly before the current licence[1] was issued. This Committee is comprised of at least the President and a member of the health physics team.

Meetings are held at least on a quarterly basis to discuss the public's perceived opinion of SRBT, to review media coverage and discuss aspects of the existing Public Information Program and Public Disclosure Protocol[8]. The information gathered during these meetings on the public's perceived opinion of SRBT is used to develop possible new Public Information initiatives to improve the Public Information Program and Public Disclosure Protocol[8]. The Public Information Committee specifically reviews public inquiries, public survey results and media coverage against historical data to define opportunity for improvement and make recommendations accordingly. The Public Information Committee continuously seeks input from other staff, contractors or other individuals who may have recommendations to improve the public relations program for the company.

During the current licensing term there have been a total of 23 minuted meetings discussing several topics including interactions with a member of the public, website updates, mailings to the public, revisions of our groundwater brochure[40], general information brochure[41] and pamphlet[42]

TABLE 17: PUBLIC INFORMATION COMMITTEE MEETINGS 2010-2014

	2010	2011	2012	2013	2014
Meetings	4	5	4	4	6

4.1.4 Website

During the term of the existing licence[1] the website was frequently updated to provide up to date information on the facility including environmental monitoring results from passive air samplers, air emissions, produce and groundwater. The main page provides a number of possible information sources for the public on tritium and radiation exposure.

A new updated website was launched on February 25, 2015. The web site continues to provide current environmental monitoring data and content on tritium and now includes current content on emergency preparedness, the safe transport of tritium to the facility and products from the facility, and how to safely dispose of products. It was designed so that content is more accessible, easier to find, and in plain language. All company web site and domain names are now also all directed to this site.

FIGURE 18: SRBT WEBSITE (www.srbtechnologies.com)

4.1.5 Facebook

A Facebook page for SRBT was also launched on February 3, 2015 and linked to our website providing another means of reaching the public.

4.1.6 Collaboration

In the summers of 2012, 2013 and 2014 SRBT collaborated with the CNSC, the University of Ottawa and L'Institut de Radioprotection et de Sûreté Nucléaire (IRSN) on the research field campaign on “Tritium Measurements in the Terrestrial and Air Environments“.

The project involved extensive monitoring of tritium in the environment in the vicinity of SRBT. As part of the project SRBT provided plant tours to all IRSN members involved as well as providing storage space for some equipment, electricity to power some of this equipment and made available all weather station monitoring data as well as all facility air emission and passive air sampler data.

SRBT expects to take part in other collaborations over the course of the next licence term in the field of education, emission reductions and environmental monitoring.

4.1.7 Community Support

SRBT has supported the local community by providing support to various organizations and causes.

SRBT is a member of the Algonquin College Radiation Safety Program Advisory Committee and during the summer of 2015, SRBT will be employing a summer student who is currently studying the Radiation Safety Program at Algonquin College.

SRBT has supported Main Street Community Services who provides research based programs for children with special needs.

SRBT has supported causes such as the Canadian Cancer Society and the Canadian Breast Cancer Foundation, Community Living Upper Ottawa Valley, Bernadette McCann House for Women.

SRBT also supports a number of local sports team and charitable events.

4.2 Cost Recovery

In 2010, the Commission exempted SRBT from subsection 24(2) of the NSCA and Part 2 of the CNSC Cost Recovery Fees Regulations (CRFR) to the extent to which the requirements apply to the timing of the payments of the prescribed fee arrears or adjustments.

The exemption was temporary and conditional upon the payment of the fees, as per the schedule stipulated under Licence Condition 16.1 of the current operating licence[1].

SRBT complied with the repayment schedule stipulated in the current licence[1] and the final payment and total cost adjustments were paid on September 25, 2013.

SRBT now makes regular payments and expects to continue to remain in compliance during the proposed term of the new licence.

4.3 Financial Guarantees

CNSC Regulatory Guide G-206 titled "*Financial Guarantees for the Decommissioning of Licensed Activities*" provides guidance regarding the establishment and maintenance of measures to fund the decommissioning of activities licensed by the CNSC.

To be acceptable to the CNSC, a funding measure must provide assurance that adequate resources will be available to fund decommissioning activities based on information provided to the CNSC. The financial guarantee must be at arm's length from the licensee and the CNSC must be assured that it or its agents can, upon demand, access or direct adequate funds if a licensee is not available to fulfil its obligations for decommissioning.

4.3.1 Current Funding

A Financial Guarantee was approved[43] by the Commission for this facility on June 26, 2008 based on the previous revision of the Preliminary Decommissioning Plan[44]. This financial guarantee of **$550,476.00** was funded by installments made to an Escrow account in October and April of each year with the last installment made in April 2014.

4.3.2 Proposed Funding

SRBT hired consultants Doug McNab of D&J Consulting and Terry Donahue of RadSafe Canada Ltd., to revise SRBT's PDP[44] to address both CNSC Staff comments and make changes and improvements to the PDP based on their knowledge of decommissioning other CNSC licensed facilities.

Mr. Donahue and Mr. McNab were recently directly involved in the full Decommissioning of Shield Source Inc. which was a CNSC licensed facility with operations very similar to that of SRB.

SRBT provided CNSC staff a revised Preliminary Decommissioning Plan[45], Cost Estimate and Financial Guarantee; the revised Cost Estimate reflected inflationary increases since the plan was approved by the Commission in 2008.

These documents were also revised using guidelines found in G-219 - *Decommissioning Planning for Licensed Activities*, G-206 - *Financial Guarantees for the Decommissioning of Licensed Activities* and CSA Standard N294-09, *Decommissioning of facilities containing nuclear substances*.

As part of revising the Preliminary Decommissioning Plan SRBT further investigated methods for establishing a Financial Guarantee as outlined in Regulatory Guide G-206. This review concluded that the method currently used to fund the Financial Guarantee which was approved by the Commission for this facility in June 26, 2008 continues to be the only available method of funding for SRB. This method is appropriate to our individual situation as allowed in Regulatory Guide G-206.

SRBT thereby proposes to fund the increase of **$102,012.00** to the revised Financial Guarantee of **$652,488.00** by making six equal installments of **$17,002.00**, in October and April of each year, over a three year period, to the Escrow Account. With the Commission's approval we propose that the first payment towards the revised Financial Guarantee begin in October 2015 with the renewal of the licence effective July 1, 2015.

SRBT proposes to continue to follow a payment schedule as shown in the table below.

TABLE 18: FINANCIAL GUARANTEE PAYMENT SCHEDULE

PAYMENT DUE DATE	DECOMMISSIONING ESCROW ACCOUNT DEPOSITS
October 31, 2015	$17,002.00
April 30, 2016	$17,002.00
October 31, 2016	$17,002.00
April 30, 2017	$17,002.00
October 31, 2017	$17,002.00
April 30, 2018	$17,002.00

SRBT proposes to continue to use a revised Escrow Agreement[46] and a revised Financial Security and Access Agreement[18] to be approved by CNSC Staff to provide access to these funds.

Historical annual inflationary indexes are typically below the annual accrued interest rate of the Escrow Account. SRBT proposes that all accrued interest in the existing Escrow Account remain in that account and be used to address inflationary indexing.

4.4 Future Outlook

As our company embarks on our next licence term, we are committed to several long term organizational goals.

4.4.1 Commitment To Product Development In Safety Applications

We are committed to ensuring that our products are developed with a focus on contributing to the safety of people in situations where reliable illumination is needed.

SRBT is planning to embark on a campaign of new product development, solely aimed at areas where our innovative and unique technology can augment safety for people in hazardous or challenging situations. We will be applying for regulatory certification of these new devices during the next licence term.

SRBT will continue to distribute our products only to responsible and reputable customers for purposes that are safety-oriented or certified by relevant jurisdictional authorities.

4.4.2 Commitment To Research Of Emission Reduction Initiatives

We are committed to ensuring that our products are manufactured safely and responsibly and to continually reduce our environmental impact on our local community.

Senior Management is fully committed to allocating increased financial and human resources to researching tritium emission-reduction strategies and technologies. These resources are planned to be directly proportional to our annual revenue levels, specifically, for the first 5 years of the next licence term, no less than 5% of our annual profit shall be allocated to this initiative.

4.4.3 Commitment To Integration With Scientific and Nuclear Community

In addition, we plan on increasing our integration with the scientific and nuclear community to advance education, our emission reduction and environmental monitoring initiatives.

Recently, SRBT became a member of the Canadian Nuclear Association, a partnership which will provide ample opportunity to network and learn from industry peers.

4.4.4 Commitment To Reduction Of Occupational Doses

We are committed to ensuring that all of our employees who manufacture and ship our products are always protected and safe when working in our facility.

As always, the safety and protection of our workers is a key priority for our business. We are extremely proud of the level of safety that is experienced by any member of our team – our record over the past five years has shown that we effectively protect our staff from conventional and radiation hazards.

Despite this record, we are not satisfied, and will continue to strive to lower the doses to our workers to less than the public dose limit of 1 mSv.

5.0 REFERENCES

[1] Canadian Nuclear Safety Commission, “Nuclear Substance Processing Facility Operating Licence”, NSPFOL-13.00/2015

[2] SRB Technologies (Canada) Inc., “Waste Management Program”, Revision C, December 23, 2014

[3] SRB Technologies (Canada) Inc., “Fire Protection Program”, February 14, 2013

[4] Nadine International Inc. Report, “Fire Hazards Analysis for SRB Technologies (Canada) Inc., Pembroke, Ontario”, prepared by Ajwad Gebara, March 31, 2010

[5] SRB Technologies (Canada) Inc., “Training Program Manual”, Revision A, January 25, 2015

[6] SRB Technologies (Canada) Inc., “Maintenance Program”, Revision 6, December 22, 2014

[7] SRB Technologies (Canada) Inc., “Emergency Plan”, Revision 4, February 14, 2013

[8] SRB Technologies (Canada) Inc., “Public Information Program”, Revision 8, August 1, 2014

[9] Letter from J. Campbell (CNSC) to S. Levesque (SRBT), CNSC Staff Assessment of SRB Technologies (Canada) Inc.’s Waste Management Program Rev C, dated March 3, 2015 [12] SRB Technologies (Canada) Inc., “Quality Manual”, Revision H, September 12, 2014

[10] Letter and attachment from S. Leveque (SRBT) to J. Campbell (CNSC), Gap Analysis – REGDOC 2.10.1 and SRBT Emergency Plan, dated January 26, 2015

[11] Letter from R. Buhr (CNSC) to S. Levesque (SRBT), CNSC assessment of SRB Technologies (Canada) Inc.'s Public Information Program, October 31, 2014

[12] SRB Technologies (Canada) Inc., “Quality Manual”, Revision H, September 12, 2014

[13] SRB Technologies (Canada) Inc., “Gap Analysis – N286-12 vs. SRBT Management System”, September 8, 2014

[14] SRB Technologies (Canada) Inc., “Implementation Plan – Alignment of SRBT Management System with N286-12”, September 8, 2014

[15] Email from R. Buhr (CNSC) to S. Levesque (SRBT), *Quality Manual and CSA N286 Gap Analysis,* dated November 6, 2014

[16] SRB Technologies (Canada) Inc., “Organizational Study”, July 31, 2007.

[17] Canadian Nuclear Safety Commission, “Compliance Framework Document associated to the SRB Technologies (Canada) Inc. Nuclear Substance Processing Facility Operating Licence NSPFOL-13.00/2015, Effective: July 1, 2010”, LCH-SRBT-R000, signed July 30, 2010.

[18] SRB Technologies (Canada) Inc., “Financial Security And Access Agreement”, Revision 1, February 16, 2015.

[19] Letter from J. Campbell (CNSC) to S. Leveque (SRBT), *CNSC Staff Assessment of SRB Technologies (Canada) Inc’s Training Program Manual,* dated March 3, 2015

[20] SRB Technologies (Canada) Inc. “Radiation Safety Program”, Revision XI, September 12, 2014

[21] SRB Technologies (Canada) Inc., “Environment Monitoring Program Document”, February 28, 2006

[22] Letter from S. Levesque (SRBT) to M. Rinker, *Action Level Exceedance*, November 5, 2014

5.0 REFERENCES (continued)

[23] Letter and attachment from S. Levesque (SRBT) to M. Rinker, Final Written Report: November 4 Action Level Exceedance, December 2, 2014 (attachment: "Final Written Report – Action Level Exceedance – November 4, 2014")

[24] Letter from J. Campbell (CNSC) to S. Levesque (SRBT), SRB Final Report on November 4, 2014 Action Level Exceedance, January 23, 2015.

[25] Canadian Nuclear Safety Commission, "Dosimetry Service Licence", 11341-3-18.0, expiry May 31, 2018.

[26] SRB Technologies (Canada) Inc., "Safety Analysis Report", Revision II, dated July 4, 2006.

[27] SRB Technologies (Canada) Inc., "Engineering Change", Issue G, April 26, 2013

[28] Letter and Inspection Report from N. Petseva (CNSC) to S. Levesque (SRBT), *CNSC Type II Environmental Protection Inspection conducted at SRB Technologies (Canada) Inc., April 10, 2014,* dated May 5, 2014

[29] Letter from R. Buhr (CNSC) to S. Levesque (SRBT), *CNSC Staff's review and Closure of Action Notice SRB-2014-04-10-A1*, dated November 12, 2014

[30] SRB Technologies (Canada) Inc., "Licence Limits, Action Levels and Administrative Limits", Revision E, August 15, 2014

[31] Letter from R. Buhr (CNSC) to S. Levesque (SRBT), *SRB Licence Limits Action Levels and Administrative Limits,* dated November 7, 2014

[32] SRB Technologies (Canada) Inc. "Hazard Prevention Program", Revision C, February 26, 2010

[33] Letter from M. Rinker (CNSC) to S. Levesque (SRBT), *Implementation of CSA N393: Fire Protection for Facilities that Process, Handle or Store Nuclear Substances,* dated June 2, 2014

[34] Letter and attachment from S. Leveque (SRBT) to M. Rinker (CNSC), *Gap Analysis – CSA Standard N393-13, Fire Protection for Facilities that Process, Handle or Store Nuclear Substances,* dated October 29, 2014

[35] Letter from J. Campbell (CNSC) to S. Levesque (SRBT), *CNSC Staff response to SRBT's Gap Analysis – CSA Standard N393-13, Fire Protection for Facilities that Process, Handle or Store Nuclear Substances,* dated December 10, 2014

[36] Letter and attachment from S. Leveque (SRBT) to J. Campbell (CNSC), *Emergency Exercise Meeting Minutes – February 10, 2015*, dated March 3, 2015

[37] Letter and attachment from S. Leveque (SRBT) to J. Campbell (CNSC), *Submission of Revised SRBT Waste Management Program*, dated December 23, 2014

[38] SRB Technologies (Canada) Inc., "Facility Security Program", March 4, 2015.

[39] Letter from N. Petseva (CNSC) to S. Levesque (SRBT), CNSC review of SRB Technologies Public Information and Disclosure Program, dated June 10, 2014

[40] SRB Technologies (Canada) Inc., "Groundwater Brochure", Issue 3, August 22, 2014.

[41] SRB Technologies (Canada) Inc., "General Brochure", Issue 16, August 20, 2014.

[42] SRB Technologies (Canada) Inc., "Pamphlet", Issue 24, Issue 16, August 20, 2014.

5.0 REFERENCES (continued)

[43] Canadian Nuclear Safety Commission, “Records of Proceedings, Including Reasons for Decision, Application to Resume the Processing and Use of Tritium at the Gaseous Tritium Light Source Facility in Pembroke, Ontario”, June 26, 2008.

[44] SRB Technologies (Canada) Inc., “Preliminary Decommissioning Plan”, March 14, 2006.

[45] SRB Technologies (Canada) Inc., “Preliminary Decommissioning Plan”, November 13, 2014.

[46] SRB Technologies (Canada) Inc., “Escrow Agreement”, Revision 1, February 16, 2015.