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Subject: CNSC Review of SRB Technologies (Canada) Inc's 2013 Annual Compliance Report

Dear Ms. Petseva,

This letter is in response to the CNSC Staff's Review of SRB Technologies (Canada) Inc.'s 2013 Annual Compliance Report dated June 20, 2014[1].

As explained in my e-mail[2] to Mike Rinker from CNSC Staff dated August 13, 2014 SRB has already posted the 2013 Annual Compliance Report[3] on its web site and provided copies to members of the public. We therefore propose as we did in previous years to issue an "Addendum[4]" to the Annual Compliance Report[3] that addresses CNSC Staff comments.

This "Addendum[4]" will also be posted on our web site and in future be included with any copy of the 2013 Annual Compliance Report[3] that is provided to a member of the public.

ACOPR Section II
Executive Summary

Action Requested by CNSC:

Potential conflict of interest in stating that preference will be given specifically to hiring "individuals working for the CNSC…" Suggest removing the above statement and leaving in the second half of the sentence regarding hiring individuals familiar with CNSC Regulations.

Action taken by SRB:

As we have already posted the Annual Compliance Report on our web site and provided copies to members of the public, we propose that we issue an Addendum[4] to the report[3] as we did in previous years that addresses CNSC Staff comments. Any reference to "individuals working for the CNSC" will not be included in future correspondence or report.

It should be noted that this was only stated to clearly reflect that the individuals who would be hired would be familiar with CNSC Regulations.

ACOPR Section 1.2
Facility Operations

Action Requested by CNSC:

SRB does not provide a summary of any significant modifications carried out at the facility. If there is no modification, SRB should have stated it to ensure that the information is not missing.

Action taken by SRB:

Page 3, section 1.2 titled "Facility Operation", first paragraph of the 2013 Annual Compliance Report[3] states that "no building modifications were made".

Page 7, section 1.4.1 titled "Building Modifications" of the 2013 Annual Compliance Report[3] states that "no modifications were made to the building during 2013".

Pages 7 and 8, section 1.4.2 titled "Document Modification" of the 2013 Annual Compliance Report[3] states and describes a number of program and procedures improvements that have been made.

The above information will be included in section 1.2 of future annual compliance reports.

Action Requested by CNSC:

SRB did not specifically provide a summary of the organization structure and key personnel.

Action taken by SRB:

Page 1 and 2, section 1.2 titled "Facility Operations" of the "Addendum[4]" includes a summary of the organization structure and key personnel.

The above information will be included in section 1.2 of future annual compliance reports.

ACOPR Section 1.4
Facility Modification

Action Requested by CNSC:

SRB did not specifically state if they will have any modification that will require the Commission's authorization. If there is no modification, SRB should have stated this to ensure that the information is not missing.

Action taken by SRB:

Page 3, section 1.4.1 titled "Building Modifications" and section 1.4.2 titled "Document Modification" of the "Addendum[4]" includes a statement to confirm that the Commission's authorization was not required.

The above information will be included in section 1.4 of future annual compliance reports.

ACOPR Section 2.1.1
Management System

Action Requested by CNSC:

The report stated that all staff are "continuously reminded to maintain a healthy safety culture in identified areas that may need improvement...". There should be a direct link between these type of reminders and the quality management system processes or procedures as well as the documented/defined SRB safety culture.

Action taken by SRB:

Section 2.1.1 of future annual compliance reports will include this information.

ACOPR Section 2.1.2
Human Performance Management

1. **Action Requested by CNSC:**

The description of the Production Control Assistant does not include a discussion of qualifications and experience. Suggest including a mention of qualifications and experience similar to previous two positions. If this is a development position, provide a rationale for this. (i.e. see previous discussion following the Health and Safety Specialist & Project Engineer sections).

Action taken by SRB:

Page 3, section 2.1.2.1 titled "Organizational Improvements" of the "Addendum[4]" includes the qualifications of the Production Control Assistant.

2. **Action Requested by CNSC:**

The title of this section is "Stable Workforce". Although the report stated that no worker has left the company, it does begin by stating that "In 2013 our staff increased from 22 to 36." This represents around a 60% growth in the number of worker in 2013. While there is some stability in existing workers, this section may require a different title to avoid confusion. (i.e. Growing Workforce, or Expanding and Stable Workforce, etc.) Consequently, there must be some substantial discussion of the planned or implemented human performance actions or steps taken by management (For example, as in Pg.33, Sec.2.3.1.9, para.3) to successfully adapt to the large influx of workers while maintaining/improving safe operations throughout the organization.

Action taken by SRB:

Pages 3 and 4, section 2.1.2.12 titled "Adaptation To Growing Workforce" of the "Addendum[4]" and pages 5, 6 and 7, section 2.1.2.13 titled "Training Of New Work Force" of the "Addendum[4]" includes some substantial discussion of the implemented human performance actions or steps taken by management to successfully adapt to the large influx of workers while maintaining and improving safe operations throughout the organization.

ACOPR Section 2.2.2
Physical Design

Action Requested by CNSC:

No general comments on how the overall design basis for the facility is validated and maintained were provided; however CNSC staff note that SRB did not make any physical changes during the review period.

Action taken by SRB:

Section 2.2.2 of future annual compliance reports will include more detailed information.

ACOPR Section 2.3.1
Radiation Protection

Action Requested by CNSC:

There was no discussion of personnel contamination events.

Action taken by SRB:

The facility solely processes tritium where exposure is monitored by bioassay. Page 24 and 25, Section 2.3.1.2 titled "Staff Radiation Exposure" of the Annual Compliance Report[3] discusses bioassay results for personnel and a more detailed overview of the results are reported in Appendix H of the Annual Compliance Report[3].

As reported on page 25 and 26, sections 2.3.1.3 and 2.3.1.4 of the Annual Compliance Report[3], no action level or administrative limit were exceeded in 2013.

There were no "personnel contamination events"

Action Requested by CNSC:

Summary of Radiation Protection Program Improvements
This section does not exist in the report.

However, CNSC staff note the improved method for identifying new routine swipe locations for improving contamination control.

Action taken by SRB:

Page 8, section 2.3.1.12 titled "Summary of Radiation Protection Program Improvements" has now been added to the Addendum[4].

Section 2.3.1.12 titled "Summary of Radiation Protection Program Improvements" will be included in section 1.2 of future annual compliance reports.

Action Requested by CNSC:

Summary of the continuous improvements under ALARA Performance

Did not discuss goals and targets under the ALARA program for the past or upcoming year.

Action taken by SRB:

The goals and targets under the ALARA program for the past or upcoming year were discussed on pages 31, 32 and 33 section 2.3.1.8 titled "Summary of Radiation Protection Program Performance" of the Annual Compliance Report[3].

Other improvements for the upcoming year are discussed on page 65, section 3.1.3 titled "Improvement Plans and Future Outlook" of the Annual Compliance Report[3].

Action Requested by CNSC:

Summary of Inventory Control Measures

There was no discussion on non-production sealed and unsealed sources that are used or possessed by SRB. If applicable, this should be included.

Action taken by SRB:

Page 7, section 2.3.1.11 titled "Summary Of Inventory Control Procedure" in "Addendum[4]" includes discussion on non-production sealed and unsealed sources that are used or possessed by SRB.

This information will be included in section 2.3.1.11 of future annual compliance reports.

ACOPR Section 2.3.3
Environment Protection
Presentation of Air and Water Release Monitoring Results

Action Requested by CNSC:

The statement on passive air samplers: "The average total concentration for all 40 PAS's in 2013 was 95.53 Bq/m^3 and is 2.20 times greater than the average total concentration for all 40 PAS's in 2012 which was 43.36 Bq/m^{3}" is misleading and should be revised in future annual reports. The spreadsheet on Page A1 is calculating the sums rather than the average of the 40 samplers.

Action taken by SRB:

Page 8, section 2.3.3.1 titled "Passive Air Samplers" of the "Addendum[4]" clarifies that the "sum of the average concentrations..." rather than the "average total concentration...".

This information will continue to be included in section 2.3.3.1 of future annual compliance reports.

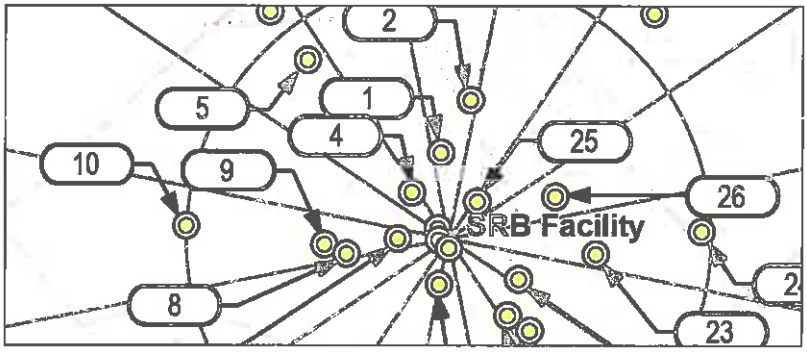
ACOPR Section 2.3.3
Environment Protection
Discussion of the Significance of Air and Water Release Monitoring Results

1. Action Requested by CNSC:

Regarding the HTO in air results (PAS results), the highest value which SRB has chosen for the public dose is that from sampler NW250 (avg. = 5.65 Bq/m^3), however, Appendix J shows the results for NE250 (avg. = 8.49 Bq/m^3) to be higher. SRB should explain why the value of NE250 was not used.

Action taken by SRB:

The value of NE250 (25) was not used as this passive air sampler is not located anywhere close to a residence or to the critical group. The sampler is located across the street from SRB in the far side of a backyard of a local business (Superior Propane). Sampler NW250 (4) is located near the closest residence where the critical group is located.



2. Action Requested by CNSC:

In the 2013 public dose calculations, the dose from inhalation is conservative, in that the inhalation rates for adults and the skin absorption factor selected by SRB are higher than those in CSA N288.1. However, the dose to a child, from inhalation for HTO would be higher than that to an adult or infant. It is recommended that in future ACR's SRB include this age group.

Action taken by SRB:

Rather than to wait for future Annual Compliance Reports SRB included, starting on page 9, section 2.3.3.12 titled "Public Dose For 2013" of the "Addendum[4]" the dose to a child from inhalation, skin absorption, consumption of well water, produce and milk.

3. Action Requested by CNSC:

Annual produce consumption rates selected by SRB are lower than those recommended by CSA N288.1-08. The basis for the values selected by SRB should be provided.

Action taken by SRB:

Page 9, section 2.3.3.12 titled "Public Dose For 2013" of the "Addendum[4]" reflects the annual produce consumption rates recommended by CSA N288.1-08

4. Action Requested by CNSC:

The transfer of HT in air to HTO in plant water has not been included. It inclusion would increase the dose from produce consumption. SRB should assess the impact of including this pathway.

Action taken by SRB:

It should be noted that SRB's calculation of dose is based on direct measures of HTO in various media (air, water, produce). These empirical measures of HTO inherently include all possible contributions related to HT emissions. That is, the transfer of HT in air to HTO in plant water is captured in the measure of total plant HTO. We therefore believe that there is no need for additional calculations specific to HTO associated with HT emissions as these are already included in the direct measurements.

Action Requested by CNSC:

Discussion on Environmental Protection Program Effectiveness
This is not discussed under the Environmental Protection Program section.

Action taken by SRB:

Page 17, section 2.3.3.13 titled "Discussion on Environmental Protection Program Effectiveness" is included in the "Addendum[4]" and will be included in future Annual Compliance Reports.

Action Requested by CNSC:

Summary of Environmental Protection Program Improvements
This is not discussed under the Environmental Protection Program section.

Action taken by SRB:

Page 18, section 2.3.3.14 titled "Summary of Environmental Protection Program Improvements" is included in the "Addendum[4]" and will be included in future Annual Compliance Reports.

Action Requested by SRB:

Summary of the Environmental Protection Program Performance
This is not discussed under the Environmental Protection Program section.

Action taken by SRB:

Page 18 and 19, section 2.3.3.15 titled "Summary of Environmental Protection Program Improvements" is included in the "Addendum[4]" and will be included in future Annual Compliance Reports.

Action Requested by SRB:

No discussion on soil sampling is provided.

Action taken by SRB:

Soil sampling is not part of SRB's Environmental Monitoring Program. No soil sampling has taken place in 2013 but some is scheduled for 2014.

Page 19, section 2.3.3.16 titled "Soil Sampling" is included in the "Addendum[4]" and will be included in future Annual Compliance Reports.

ACOPR Section 2.3.5
Waste and By-product Management

Action Requested by SRB:

Specific Criteria for disposal is not included-only a general statement that waste is under the exemption quantities listed in the NSRD Regulations.

Action taken by SRB:

Page 19, section 2.3.5.3 titled "Storage of Radioactive Waste" is included in the "Addendum[4]" and provides further detail on specific criteria for disposal.

ACOPR Section 3.1.3
Improvement Plans and Future Outlook

Action Requested by SRB:

This paragraph states "Senior Management have decided to appoint a new individual in 2014 that will be partly dedicated to performing internal audits and further ensuring compliance of all work area with company programs and procedures." It is not clear from the word "new individual" whether the person is new staff member and in one of the three new positions (health & safety specialist, project engineer, production control assistant) or whether it is an existing staff member assigned to a newly developed position. The Organizational Chart (Figure 1) does not indicate which position would perform the internal audits.

Action taken by SRB:

Additional information has been included on page 20, section 3.1.3.10 of the "Addendum[4]".

The Organizational Chart does not indicate which position would perform the internal audits as this position was not created by the end of 2013 it could therefore not be reflected in the Organizational Chart.

Action Requested by SRB:

SRB did not specifically state if they will have any modification that will require the Commission's authorization. If there is no modification planned for the next year, SRB should have stated this to ensure that the information is not missing.

Actions taken by SRB:

Page 20, section 3.1.4.4 titled "Modifications That Will Require The Commission's Approval" is included in the "Addendum[4]" and will be included in future Annual Compliance Reports.

ACOPR Section 3.1.4
Safety Performance Objectives for Following Year

Action Requested by SRB:

SRB provided a summary of any proposed or foreseen changes to procedures, production, capacity, organization and licensing documents but not for any changes to equipment. However, section 3.1.3 states that SRB is planning to purchase a new bubbler and portable tritium.

Action taken by SRB:

Page 20 and 21, sections 3.1.4.4 through 3.1.4.8 of the Addendum[4] include a summary of proposed or foreseen changes to equipment, procedures, organization and licensing documents.

If you require any additional information or wish to discuss this matter further, please do not hesitate to contact me.

Best Regards,

Stephane Levesque
President

Cc: N. Belleau SRB
R. Fitzpatrick SRB
K. Levesque SRB
J. MacDonald SRB
T. Sennett SRB
B. St-Pierre SRB

[1] CNSC Staff letter, Nadia Petseva to Stephane Levesque, "CNSC staff's review of SRB Technologies (Canada) Inc.'s 2013 Annual Compliance Report", June 20, 2014.

[2] SRB Technologies (Canada) Inc. e-mail, Stephane Levesque to Mike Rinker, "CNSC staff's review of SRB Technologies (Canada) Inc. 2013 Annual Compliance Report", August 13, 2014.

[3] SRB Technologies (Canada) Inc., "2013 Annual Compliance Report", NSPFOL-13.00/2015, March 31, 2014.

[4] SRB Technologies (Canada) Inc., "Addendum to the 2013 Annual Compliance Report", NSPFOL-13.00/2015, August 18, 2014.

TABLE OF CONTENTS

DESCRIPTION **PAGE**

LIST OF TABLES

NUMBER TITLE PAGE

LIST OF FIGURES

NUMBER **TITLE** **PAGE**

1.1 GENERAL INTRODUCTION

This "Addendum" to the 2013 Annual Compliance Report[75] addresses comments in the CNSC Staff's Review[76] of SRB Technologies (Canada) Inc.'s 2013 Annual Compliance Report dated June 20, 2014.

This "Addendum" is written in a way that it provides additional information or clarification on information already provided in the 2013 Annual Compliance Report[75].

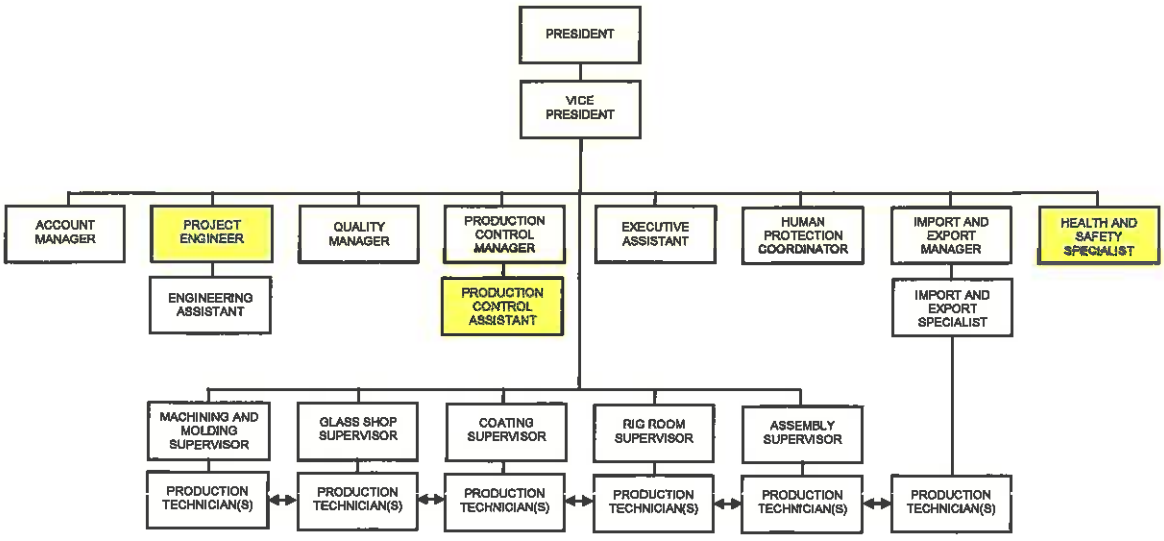
For ease of review and consistency the "Addendum" uses the same section numbers, section titles, table numbers, graph numbers and reference numbers as used in the 2013 Annual Compliance Report[75].

1.2 FACILITY OPERATION

The following organizational chart includes the positions that are required at the facility as a result of addressing the recommendations of the Organizational Study[10][11] that was performed in support of maintaining a processing licence.

Each position is held by a single individual who possesses the "qualifications" and "experience requirements" of the position. Positions highlighted in yellow have been created in 2013:

FIGURE 1: ORGANIZATIONAL CHART



A total of 36 employees work at the company including 13 administrative employees and 23 production employees.

The 13 administrative employees include:

Two members of Senior Management,

- President has the overall responsibility for the facility and ensures that all licensing requirements are met.
- Vice President assumes the full duties of the President in his absence or otherwise assists the President's in his duties.

Eight individuals at the Management level,

- Quality Manager is mainly responsible for the company Quality Assurance Program.
- Human Protection Coordinator is mainly responsible for identifying ways to reduce staff radiological exposure and for implementing of radiation safety procedures.
- Import and Export Manager is mainly responsible for the transport and receipt of radioactive materials.
- Executive Assistant is mainly responsible for environmental measurement and for providing administrative support to the President.
- Production Control Manager is mainly responsible for all company purchasing and production planning activities.
- Project Engineer is mainly responsible for all company research and development activities and the company maintenance program.
- Account Manager is mainly responsible for all company accounting activities.
- Health and Safety Specialist is mainly responsible for ensuring staff health and safety and ensuring compliance with the Occupational Health and Safety Regulations.

Three employees that assist individuals at the Management level,

- Import and Export Specialist assists the Import and Export Manager in their duties.
- Production Control Assistant assists the Production Control Manager in their duties.
- Engineering Assistant assists the Project Engineer in their duties.

The 20 production employees include:

Five Production Supervisors,

- Glass Shop Supervisor is responsible for all the activities within the Glass Shop Department.
- Coating Supervisor is responsible for all the activities within the Coating Department.
- Rig Room Supervisor is responsible for all the activities within the Rig Room Department.
- Assembly Supervisor is responsible for all the activities within the Assembly Department.
- Machining and Molding Supervisor is responsible for all the activities within the Machining and Molding Department.

Fifteen Production Technicians,

- Production Technicians who are responsible for performing production activities to company procedures.

1.4.1 BUILDING MODIFICATIONS

No modifications were made to the building during 2013 therefore the Commission's authorization was not required.

1.4.2 DOCUMENT MODIFICATION

None of the program and procedure improvements made during 2013 required the Commission's authorization.

2.1.2.1 ORGANIZATIONAL IMPROVEMENTS

The Production Control Assistant is an entry level position working under close supervision of the Production Control Manager. The positon requires an individual that possesses good computer skills and that has experience or educational background in office administration.

The individual in this position has an Office Assistant Executive Diploma from an accredited Canadian College and did a placement at a local Doctor's office.

2.1.2.12 ADAPTATION TO GROWING WORKFORCE

In 2013 our staff increased from 22 to 36. Several steps were taken to ensure continued protection of the public and the environment.

Of the 14 newly hired employees in 2013 three were hired in newly created administrative positions. Only employees in administration are responsible for the design and implementation of programs and procedures that ensure that the requirements of the Nuclear Safety and Control Act, Regulations and conditions of the licence[1] are met.

Two of these positions have a direct impact in further increasing Nuclear Safety at the facility and are performed by experienced individuals. The Health and Safety Specialist was added to the organization in order to provide more focus and emphasis on occupational 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 prior work experience working in different positions at SRB. The Project Engineer was added to the organization to ensure that research and development activities, engineering documentation and maintenance program ensure that requirements of the Nuclear Safety and Control Act, Regulations and conditions of the licence[1] are met. 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 CNSC Licensed facility. The third individual is an entry level position working under close supervision of the Production Control Manager and will not be involved in the design and implementation of programs and procedures.

The activities of three work areas (marked in yellow on the Table 23) do not involve tasks that affect Nuclear Safety. The 11 employees hired as Production Technicians were appointed to one of these three 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 23: NUCLEAR SAFETY TASKS PERFORMED PER WORK AREA

WORK AREA	AVERAGE EXPERIENCE	RESPONSIBLE FOR PROGRAMS AND PROCEDURES THAT AFFECT NUCLEAR SAFETY	PROCESS TRITIUM	HANDLE TRITIUM SOURCES
ADMINISTRATION	13.22	X		
RIG ROOM	8.20		X	X
GLASS SHOP	6.76			
ASSEMBLY	5.50			X
MACHINING MOLDING	4.77			
COATING	3.46			

The Rig Room, the department where tritium processing takes place 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 8 years. The Supervisor and another employee in this department have over 22 years 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 15 years experience and perform or oversee all activities of only two other staff members.

It is also important to note that staff in management and supervisory positions already have 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.

An increased number of short informal meetings took place in 2013 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.

Senior Management made 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.

2.1.2.13 TRAINING OF NEW WORK FORCE

Training of new employees is carefully performed even if those employees are not intended to process tritium or handle tritium sources. This enhances Safety Culture throughout the facility and contribute to further ensuring that all reasonable precautions are taken to protect the environment and the health and safety of persons.

2.1.2.13.1 INITIAL TRAINING ON NEW PROCEDURES

All new employees were provided with the Indoctrination Training, even those that were not intended to work in the departments that process tritium or handle tritium sources.

Individuals were trained by individuals who could perform the task in question proficiently and who have been trained themselves at performing the task in question. The training, individual to be trained and trainer was approved at a higher level of authority.

For the most part one-on-one training using oral assessments was the primary form of training being used. Oral assessments in some form were and continue to be an integral part of any qualification process. Knowledge of a subject is always required for qualification and oral examinations are an effective method of determining whether the person understands the task. The main benefit of oral assessment is that it allowed the assessor to probe the depth of knowledge and understanding of a trainee in a way that is difficult to achieve with written assessments. It also allowed the assessor to adapt the questions dynamically according to the trainee's response.

When an individual was being trained to perform a task, the individual was provided the procedure and the trainer explained how to perform the procedure. The trainer discussed the consequences of not performing the procedure or aspects of the procedures or wrongly performing a step of the procedure.

The trainer discussed with the trainee instances where the procedure can result in problems and described to the trainee measures that should be taken in the eventuality of these problems occurring.

Consequences in terms of not meeting the Nuclear Safety and Control Act, Regulations and conditions of the Licence[1] were explained in detail to all staff where applicable.

The trainee was then expected to answer a number of oral questions at the discretion of the trainer, numerous questions were asked until the trainer was satisfied that the procedure and associated benefits and consequences were understood by the trainee.

The trainer then performed the procedure in front of the trainee and questions the trainee on each step being performed. This was repeated until the trainer was satisfied that the task could be performed by the trainee under constant and direct supervision from the trainer.

Attention was given to ensure that questions were asked in a manner which did not lead the trainee to the answer. The trainer stated the questions clearly and gave the trainee reasonable time to think and answer. Only one question was asked at a time. Additional or follow-up questions were not asked before the trainee had time to answer the original question. Additional questions could have lead the trainee to the answer.

The trainer encouraged the trainee to explain what the trainee understood. This ensured understanding of the principle rather than just memorization of the words of the concept. If the trainee gave an incorrect, partially correct, or unclear answer to a question, the topic was probed further to establish the trainee's true level of knowledge and understanding.

Once this was achieved to the satisfaction of the trainer the trainee was asked to perform the task under constant and direct supervision from the trainer. More training was performed if the trainee was not yet comfortable performing the task. The trainee was not expected to perform the task until the trainee felt comfortable performing the task. Once the trainee agreed to performing the task under the constant and direct supervision of the trainer, the trainer asked the trainee questions for each step being performed by the trainee and probed the trainee's knowledge on the reasons for performing the task and the consequence for not or improperly performing the task. Once the task had been performed correctly by the trainee a number of times the trainer at its discretion qualified the individual to perform the task by themselves.

Also, where training was performed had to be performed for all staff or a large group, training was deliberately performed in smaller groups in order to allow the best interaction with the trainer. For example fire extinguisher training, Indoctrination Training and training on using an Automated External Defibrillator (AED) were performed in small groups.

2.1.2.13.2 OVERSIGHT OF NEW TRAINEE

After the initial training on a new procedure had been completed it is understood that a new trainee could become complacent therefore the area supervisor or individual at a higher level of authority was diligent in reviewing the activities of the newly trained individual.

Spot checks were also performed to ensure that all tasks were being performed to procedure. These spot checks were performed by the area supervisor or individual at a higher level of authority or designated individual. During these spot checks the new trainee was asked to explain what the trainee understood. This was to confirm that the trainee had not lost understanding of the principle rather than just memorization of the words of the concept. During the spot checks the trainee was also asked to discuss instances where the procedure could result in problems and describe to the trainer measures that should be taken in the eventuality of these problems occurring.

2.1.2.13.3 COMPLEMENTARY TRAINING

If anything new is found or learned by the area supervisor or individual at a higher level of authority it is their responsibility to use this knowledge to complement the training of all individuals who perform the task.

2.3.1.11 SUMMARY OF INVENTORY CONTROL MEASURES

Depleted uranium in metallic form for use in tritium traps are utilized during the course of production, 7.27 Kg were on site at the end of 2013:

TABLE 24: DEPLETED URANIUM INVENTORY BREAKDOWN

QTY	DESCRIPTION	DEPLETED URANIUM IN EACH (GRAMS)	TOTAL DEPLETED URANIUM (GRAMS)
1	LOOSE FORM	NA	3,456
9	ACTIVE P.U.T.T.	30 +/- 1 GRAM	272
34	NON-ACTIVE P.U.T.T.	30 +/- 1 GRAM	1,025
1	U-BED	240	240
4	AMERSHAM CONTAINERS THAT WE OWN (0666AY)	405	1,620
2	AMERSHAM CONTAINERS THAT WE OWN (3605D)	320	640
1	P.U.T.T. (STUCK IN EMPTY BASE)	17	17
		TOTAL	**7,270**

The operations require the use of liquid scintillation counters. Liquid scintillation counters on site have external standard sources incorporated as part of the instruments, including:

- Two Eu-152 740 kBq sources, each source is in one of two Wallac 1409 liquid scintillation counter currently used at the facility.

- One Ra-226 370 kBq source that was in a Wallac 1215 liquid scintillation counter which was used at the facility but is no longer operational.

2.3.1.12 SUMMARY OF RADIATION PROTECTION PROGRAM IMPROVEMENTS

SRB undertook a complete review of operating conditions and of the "Licence Limit, Action Levels and Administrative Limit" document[41] to ensure that action levels are adequate to detect the emergence of a potential loss of control of the Radiation Protection Program. As a result SRB implemented new action levels and administrative limits for effective dose to workers.

During 2013, quarterly Health Physics Committee meetings[44][45][46][47] were held to review swipe results. The purpose of the review was to determine if the sampling locations chosen are effective in identifying areas where contamination may be present. The sampling locations were methodically compared against each other and approximately 20% of locations with the highest pass-rate for the quarter, which were the areas least likely to exceed the administrative limits, were replaced by new locations selected at the discretion of the Health Physics Committee.

The pass rate is slightly lower in 2013 than it was in 2012 which demonstrates that our program is effective at identifying areas with contamination.

2.3.3.1 PASSIVE AIR SAMPLERS

Page 37, sixth paragraph of section 2.3.3.1 titled "Passive Air Samplers" of the 2013 Annual Compliance Report[75] states that "The average total concentration for all 40 PAS`s in 2013 was 95.53 Bq/$m^3$ and is 2.20 times greater than the average total concentration for all 40 PAS`s in 2012 which was 43.36 Bq/m^3. The statement is not explained properly and should read "The sum of the average concentrations for all 40 PAS`s in 2013 was 95.53 Bq/$m^3$ and is 2.20 times greater than the sum of the average concentrations for all 40 PAS`s in 2012 which was 43.36 Bq/m^3."

2.3.3.12 PUBLIC DOSE FOR 2013

The calculation method used to determine the dose to the 'Critical Group' as defined in the SRB Environment Monitoring Program (EMP)[48] is described in the EMP[48] document using the effective dose coefficients found in CSA Guideline N288.1-08[77].

TABLE 25: CSA GUIDELINE N288.1-08 EFFECTIVE DOSE COEFFICIENTS FOR H-3 (HTO)

AGE GROUP	EFFECTIVE DOSE COEFFICIENT (µSv/Bq)
INFANT	5.3E-5
CHILD	2.5E-5
ADULT	2.0E-5

The dose assessed for the Critical Group is a summation of:

- Tritium uptake from inhalation and absorption through skin at the place of residence and/or the place of work, ($P_{(i)19}$ and $P_{(e)19}$), and
- Tritium uptake due to consumption of well water (P_{29}), and
- Tritium uptake due to consumption of produce (P_{49}), and
- Tritium uptake due to consumption of dairy products (P_{59}).

Dose due to inhalation

The closest residence to Passive Air Sampler NW250 is located at the intersection of Boundary Road and International Drive at approximately 240 meters from the point of release. The 2013 average concentration of tritium oxide in air at Passive Air Sampler NW250 has been determined to be 5.65 Bq/m^3.

Three passive air samplers are located close to the SRB facility and represent the tritium oxide in air ($P_{(i)19}$ and $P_{(e)19}$) concentrations for the critical group member (adult worker) at samplers 1, 2, and 13. The sampler indicating the highest tritium oxide in air concentration is used to calculate the P19 dose values while at work. The highest average result for 2013 for PAS # 1, PAS # 2, and PAS # 13 is 8.82 Bq/m^3 at PAS # 13.

Using the following inhalation rates coefficients found in CSA Guideline N288.1-08[77] and assuming 2,080 hours (23.744%) of work per year with 6,680 hours (76.256%) at home for a total of 8,760 hours per year:

TABLE 26: CSA GUIDELINE N288.1-08 INHALATION RATES

AGE GROUP	INHALATION RATE (m^3/a)
INFANT	2,740
CHILD	7,850
ADULT	8,400

$P_{(i)19}$: Adult worker dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined critical group equals 5.65 Bq/m^3.

$P_{(i)19r}$ = [H-3_{air}] (Bq/m^3) Breathing Rate (m^3/a) x DCF_{H3} (µSv/Bq)
= 5.65 Bq/m^3 x 8,400 m^3/a x (76.256% of the time) x 2.0E-05 µSv/Bq
= 0.724 µSv/a

$P_{(i)19}$: Adult worker dose due to HTO inhaled at work

Taking the highest concentration between Passive Air Samplers #1, #2, and #13 is Passive Air Samplers #13 at 8.82 Bq/m^3.

$P_{(i)19w}$ = [H-3_{air}] (Bq/m^3) Breathing Rate (m^3/a) x DCF_{H3} (µSv/Bq)
= 8.82 Bq/m^3 x 8,400 m^3/a x (23.744% of the time) x 2.0E-05 µSv/Bq
= 0.352 µSv/a.

$P_{(i)19}$: Adult resident dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined critical group equals 5.65 Bq/m^3:

$P_{(i)19}$ = [H-3_{air}] (Bq/m^3) Breathing Rate (m^3/a) x DCF_{H3} (µSv/Bq)
= 5.65 Bq/m^3 x 8,400 m^3/a x 2.0E-05 µSv/Bq
= 0.949 µSv/a

$P_{(i)19}$: Infant resident dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined critical group equals 5.65 Bq/m^3:

$P_{(i)19}$ = [H-3_{air}] (Bq/m^3) Breathing Rate (m^3/a) x DCF_{H3} (µSv/Bq)
= 5.65 Bq/m^3 x 2,740 m^3/a x 5.3E-05 µSv/Bq
= 0.820 µSv/a

$P_{(i)19}$: Child resident dose due to HTO inhaled at residence

The average value for tritium oxide in air for the sampler representing the place of residence for the defined critical group equals 5.65 Bq/m^3:

$P_{(i)19}$ = [H-3_{air}] (Bq/m^3) Breathing Rate (m^3/a) x DCF_{H3} (µSv/Bq)
= 5.65 Bq/m^3 x 7,850 m^3/a x 2.5E-05 µSv/Bq
= 1.109 µSv/a

Dose due to skin absorption

$P_{(e)19}$: Adult worker dose due to skin absorption of HTO at residence

The dose due to skin absorption is equal to the dose due to inhalation.

$P_{(e)19r}$ = 0.724 µSv/a

$P_{(e)19}$: Adult worker dose due to skin absorption of HTO at work

The dose due to skin absorption is equal to the dose due to inhalation.

$P_{(e)19w}$ = 0.352 µSv/a

$P_{(e)19}$: Adult resident dose due to skin absorption of HTO at residence

The dose due to skin absorption is equal to the dose due to inhalation.

$P_{(e)19}$ = 0.949 µSv/a

$P_{(e)19}$: Infant resident dose due to skin absorption of HTO at residence

The dose due to skin absorption is equal to the dose due to inhalation.

$P_{(e)19}$ = 0.820 µSv/a

$P_{(e)19}$: Child resident dose due to skin absorption of HTO at residence

The dose due to skin absorption is equal to the dose due to inhalation.

$P_{(e)19}$ = 1.109 µSv/a

Dose due to consumption of well water

The tritium uptake due to consumption of well water is calculated by taking the average tritium concentration of the water sampled.

Using the following annual consumption rates found in CSA Guideline N288.1-08[77]:

TABLE 27: CSA GUIDELINE N288.1-08 WATER CONSUMPTION RATES

AGE GROUP	WELL WATER CONSUMPTION RATE (L/a)
INFANT	357.7
CHILD	511.0
ADULT	839.5

The highest concentration in a residential well used as the sole source of the drinking water is found in RW-8 at 220 Bq/L and will therefore be used in the calculation of the public dose.

P_{29}: Adult dose due to consumption of well water

P_{29} = $[H\text{-}3]_{well}$ x M x 2.0E-05 µSv/Bq;
= [220 Bq/L] x 839.5 L/a x 2.0E-05 µSv/Bq
= 3.694 µSv/a

P_{29}: Infant dose due to consumption of well water

P_{29} = $[H\text{-}3]_{well}$ x M x 5.3E-05 µSv/Bq;
= [220 Bq/L] x 357.7 L/a x 5.3E-05 µSv/Bq
= 4.171 µSv/a

P_{29}: Child dose due to consumption of well water

P_{29} = $[H\text{-}3]_{well}$ x M x 5.3E-05 µSv/Bq;
= [220 Bq/L] x 511 L/a x 2.5E-05 µSv/Bq
= 2.811 µSv/a

Dose due to consumption of produce

The tritium uptake due to consumption of produce, both locally purchased and home grown is calculated by taking the average tritium concentration of produce purchased from the local market and consuming 70% of the annual total and by taking the average tritium concentration from local gardens and consuming 30% of the annual total.

Using the following annual consumption rates for produce found in CSA Guideline N288.1-08[77]:

TABLE 28: CSA GUIDELINE N288.1-08 PRODUCE CONSUMPTION RATES

AGE GROUP	FRUIT CONSUMPTION RATE (Kg/a)	ABOVE GROUND VEGETABLES CONSUMPTION RATE (Kg/a)	ROOT VEGETABLES CONSUMPTION RATE (Kg/a)	TOTAL CONSUMPTION RATE (Kg/a)
INFANT	66.1	43.8	23.4	133.3
CHILD	93.1	113.5	63.1	269.7
ADULT	174.5	234.3	104	512.8

If we assume the average concentration in produce purchased from a market to be 63 Bq/L and if we assume the average concentration in produce from the local gardens with the highest average concentration of 122 Bq/L at 416 Boundary Road. Historically the average concentration of all produce in all gardens was used but it was determined that using the garden with the highest average concentrations would be more conservative.

P_{49}: Adult dose due to consumption of produce (HTO)

P_{49HTO} = $[[H_{prod,market}] + [H_{prod,res}]] \times 2.0E\text{-}05$ µSv/Bq
= $[[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.7] + $[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.3]] x 2.0E-5 µSv/Bq
= [[63 Bq/kg x 512.8 kg/a x 0.7] + [122 Bq/kg x 512.8 kg/a x 0.3]] x 2.0E-05 µSv/Bq
= [[22,614 Bq/a] + [18,768 Bq/a]] x 2.0E-05 µSv/Bq
= 0.828 µSv/a

P_{49}: Infant dose due to consumption of produce (HTO)

P_{49HTO} = $[[H_{prod,market}] + [H_{prod,res}]] \times 5.3E\text{-}05$ µSv/Bq
= $[[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.7] + $[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.3]] x 5.3E-5 µSv/Bq
= [[63 Bq/kg x 133.3 kg/a x 0.7] + [122 Bq/kg x 133.3 kg/a x 0.3]] x 5.3E-05 µSv/Bq
= [[5,879 Bq/a] + [4,879 Bq/a]] x 5.3E-05 µSv/Bq
= 0.570 µSv/a

P_{49}: Child dose due to consumption of produce (HTO)

P_{49HTO} = $[[H_{prod,market}] + [H_{prod,res}]] \times 2.5E\text{-}05$ µSv/Bq
= $[[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.7] + $[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.3]] x 2.5E-5 µSv/Bq
= [[63 Bq/kg x 269.7 kg/a x 0.7] + [122 Bq/kg x 269.7 kg/a x 0.3]] x 2.5E-05 µSv/Bq
= [[11,894 Bq/a] + [9,871 Bq/a]] x 2.5E-05 µSv/Bq
= 0.544 µSv/a

For OBT, the same equations are applied, using the same ingestion rates and fractions. Since measures of OBT are not available, the measured HTO amount can be used to estimate the OBT. The transfer parameter from HTO in air to HTO in the plant (on a fresh weight basis) is given by:

$$P_{14HTO} = RF_p \cdot [1 - DW_p] / H_a$$

The transfer parameter from HTO in air to OBT in a plant (fresh weight basis) is:

$$P_{14HTO-OBT} = RF_p \cdot DW_p \cdot ID_p \cdot WE_p / H_a$$

Where: RF_p = Reduction factor – default is 0.68

DW_p = Dry weight of plant – default value of 0.1 for generic fruit and vegetables

ID_p = Isotopic discrimination factor for plant metabolism (unitless) - default is 0.8

WE_p = Water equivalent of the plant dry matter (L water • kg^{-1} dry plant) – default value for all plants is 0.56

H_a = Atmospheric absolute humidity - a generic default value of 0.011 L/m^3 can be used.

In using the default values and combining the equations, the amount of OBT in a plant (fresh weight basis) can be determined by multiplying the HTO measure for plants for the same location by 0.05.

If we assume the average concentration in produce purchased from a market to be 63 Bq/L and if we assume the average concentration in produce from the local gardens with the highest average concentration of 122 Bq/L at 416 Boundary Road.

Then the values for OBT will be 3.15 Bq/L produce purchased from a market and 6.1 Bq/L in produce from local gardens:

TABLE 29: CSA GUIDELINE N288.1-08 EFFECTIVE DOSE COEFFICIENTS FOR H-3 (OBT)

AGE GROUP	EFFECTIVE DOSE COEFFICIENT (µSv/Bq)
INFANT	1.3E-4
CHILD	6.3E-5
ADULT	4.6E-5

P_{49}: Adult dose due to consumption of produce (OBT)

P_{49OBT} = $[[H_{prod,market}] + [H_{prod,res}]]$ x 4.6E-05 µSv/Bq
= $[[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.7] + $[H\text{-}3_{veg}]$ (Bq/kg) x (kg) x 0.3]] x 4.6E-5 µSv/Bq
= [[3.15 Bq/kg x 512.8 kg/a x 0.7] + [6.1 Bq/kg x 512.8 kg/a x 0.3]] x 4.6E-05 µSv/Bq
= [[1,131 Bq/a] + [938 Bq/a]] x 4.6E-05 µSv/Bq
= 0.095 µSv/a

P_{49}: Infant dose due to consumption of produce (OBT)

P_{49OBT} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 1.3E-4 µSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 1.3E-4 µSv/Bq
= [[3.15 Bq/kg x 133.3 kg/a x 0.7] + [6.1 Bq/kg x 133.3 kg/a x 0.3]] x 1.3E-4 µSv/Bq
= [[293.93 Bq/a] + [243.94 Bq/a]] x 1.3E-4 µSv/Bq
= 0.070 µSv/a

P_{49}: Child dose due to consumption of produce (OBT)

P_{49OBT} = [[$H_{prod,market}$] + [$H_{prod,res}$]] x 1.3E-4 µSv/Bq
= [[H-3_{veg}] (Bq/kg) x (kg) x 0.7] + [H-3_{veg}] (Bq/kg) x (kg) x 0.3]] x 1.3E-4 µSv/Bq
= [[3.15 Bq/kg x 269.7 kg/a x 0.7] + [6.1 Bq/kg x 269.7 kg/a x 0.3]] x 6.3E-5 µSv/Bq
= [[594.69 Bq/a] + [493.55 Bq/a]] x 6.3E-5 µSv/Bq
= 0.069 µSv/a

P_{49}: Adult dose due to consumption of produce (HTO + OBT)

P_{49} = P_{49HTO} + P_{49OBT}
= 0.828 µSv/a + 0.095 µSv/a
= 0.923 µSv/a

P_{49}: Infant dose due to consumption of produce (HTO + OBT)

P_{49} = P_{49HTO} + P_{49OBT}
= 0.570 µSv/a + 0.070 µSv/a
= 0.64 µSv/a

P_{49}: Child dose due to consumption of produce (HTO + OBT)

P_{49} = P_{49HTO} + P_{49OBT}
= 0.544 µSv/a + 0.069 µSv/a
= 0.613 µSv/a

Dose due to consumption of local milk

The tritium uptake due to consumption of milk, from a local producer and distributor is calculated by taking the average tritium concentration of the milk sampled.

Using the following annual milk consumption rates found in CSA Guideline N288.1-08[77]:

TABLE 30: CSA GUIDELINE N288.1-08 MILK CONSUMPTION RATES

AGE GROUP	WELL WATER CONSUMPTION RATE (L/a)
INFANT	370.84
CHILD	305.14
ADULT	265.355

The average concentration in milk being 5 Bq/L but adjusting for the density of milk 5 Bq/L x 0.97 L/kg = 4.85 Bq/kg.

P_{59}: Adult dose due to consumption of milk

P_{59} = $[H\text{-}3]_{dairy}$ x M x 2.0E-05 µSv/Bq;
= [4.85 Bq/kg] x 265.355 kg/a x 2.0E-05 µSv/Bq
= 0.026 µSv/a

P_{59}: Infant dose due to consumption of milk

P_{59} = $[H\text{-}3]_{dairy}$ x M x 5.3E-05 µSv/Bq;
= [4.85 Bq/kg] x 370.84 kg/a x 5.3E-05 µSv/Bq
= 0.095 µSv/a

P_{59}: Child dose due to consumption of milk

P_{59} = $[H\text{-}3]_{dairy}$ x M x 5.3E-05 µSv/Bq;
= [4.85 Bq/kg] x 305.14 kg/a x 2.5E-05 µSv/Bq
= 0.037 µSv/a

Critical group annual dose due to tritium uptake based on EMP

Based on the EMP[48] results the annual dose (P_{total}) due to tritium uptake from inhalation and skin absorption, consumption of local produce, local milk and well water equates to a maximum of 6.795 µSv/a for an adult worker of the critical group in 2013 compared to 4.949 µSv/a in 2012.

TABLE 31: 2013 REVISED CRITICAL GROUP ANNUAL DOSE DUE TO TRITIUM UPTAKE BASED ON EMP

DOSE CONTRIBUTOR		ADULT WORKER ANNUAL DOSE (µSv/a)	ADULT RESIDENT ANNUAL DOSE (µSv/a)	INFANT RESIDENT ANNUAL DOSE (µSv/a)	CHILD RESIDENT ANNUAL DOSE (µSv/a)
DOSE DUE TO INHALATION AT WORK	$P_{(I)19}$	0.352	N/A	N/A	N/A
DOSE DUE TO SKIN ABSORPTION AT WORK	$P_{(E)19}$	0.352	N/A	N/A	N/A
DOSE DUE TO INHALATION AT RESIDENCE	$P_{(I)19}$	0.724	0.949	0.820	1.109
DOSE DUE TO SKIN ABSORPTION AT RESIDENCE	$P_{(E)19}$	0.724	0.949	0.820	1.109
DOSE DUE TO CONSUMPTION OF WELL WATER	P_{29}	3.694	3.694	4.171	2.811
DOSE DUE TO CONSUMPTION OF PRODUCE	P_{49}	0.923	0.923	0.64	0.613
DOSE DUE TO CONSUMPTION OF MILK	P_{59}	0.026	0.026	0.095	0.037
TOTAL DOSE DUE TO TRITIUM UPTAKE	P_{TOTAL}	6.795	6.541	6.546	5.679

2.3.3.13 DISCUSSION ON ENVIRONMENTAL PROTECTION PROGRAM EFFECTIVENESS

The Environment Protection Program[48] has been effective in measuring tritium in the environment and at ensuring the prevention of unreasonable risk to the environment.

A total of 40 passive air samplers (PAS) are located throughout a two kilometer radius from the SRB facility, in eight sectors, ranging in distance at 250, 500, 1,000, and 2,000 meters. Our passive air sampler system is effective and provides the full extent of tritium concentrations in air resulting from the emissions from the facility and in turn effective at providing real data to accurately estimate the dose to a member of the critical group resulting from the emissions from the facility.

Our groundwater studies and ensuing reports[50][51][52][53] includes monitoring data from 49 wells drilled at different depths in the stratigraphy including 37 wells located within approximately 150 meters of our stacks. Our well monitoring system is effective at providing the full extent of tritium concentrations in groundwater resulting from the emissions from the facility and in turn effective at providing real data to accurately estimate the dose to a member of the critical group resulting from the emissions from the facility.

Tritium concentrations in precipitation are measured in all facility downspouts and in eight precipitation monitors that are installed near existing air monitoring stations that are located approximately 250 m from the facility. This precipitation monitoring system is effective at monitoring soil moisture concentrations resulting from the emissions from the facility and in turn effective at providing real data to accurately estimate the future groundwater conditions resulting from the emissions from the facility.

Tritium concentrations in both milk and produce that are consumed by residents living near the facility are measured. This data is effective at providing the full extent of tritium concentrations in human food resulting from the emissions from the facility and in turn effective at providing real data to accurately estimate the dose to a member of the critical group resulting from the emissions from the facility.

Sewage samples were taken at the Pollution Control Plant for tritium concentration assessment to quantify any possible impact on sewage plant workers and the environment. Results were effective at demonstrating that workers are not at risk as a result of the exposure to tritium levels associated with releases to the sewer from SRB.

2.3.3.14 SUMMARY OF ENVIRONMENTAL PROTECTION PROGRAM IMPROVEMENTS

Some minor improvements were made to the Environment Protection Program[48] in 2013 predominantly to further ensure validity of results.

As reported in general observations of the Quarterly Report[54] for the third quarter, two results were found to be grossly high due to cross contamination or an error that occurred during sampling for a sample collected on August 1, 2013. Review of the chart recorder for the actual day the sample was taken on August 1, 2013 does however show two larger releases of tritium, one at approximately 11 a.m. and one at approximately 2 p.m., we had no record to indicate the specific time when the samples were taken but it is probable that it was at either of these times and that this may have contributed to a higher measurement but it is more likely that samples were simply cross contaminated or an error occurred during sampling. As an improvement we have since directed the third party to include the time at which each sample is taken to provide additional information should future investigations of potential errors be undertaken.

As another improvement, to provide further assurance and increase validity of future results it was decided that no tritium processing would take place during times where sampling is performed as this may affect the measurements taken of the environment and result in an erroneous high result overestimating the monthly exposure of tritium to the environment.

Although sampling is performed by a third party SRB is required to purge wells before samples are taken and to measure the water level within each well, as an improvement a new employee was trained to perform these tasks in 2013.

2.3.3.15 SUMMARY OF ENVIRONMENTAL PROTECTION PROGRAM PERFORMANCE

The Environmental Protection Program[48] performed well at proving data to validate that the release limit is protective of the environment and that emissions are being monitored accurately.

Tritium concentrations in precipitation are measured in eight precipitation monitors that are installed near existing air monitoring stations that are located approximately 250 m from the facility. The tritium concentration in precipitation monitors and downspouts are generally lower than the concentrations that are expected by the model. This means that the model used to define the estimated values was adequate in overestimating the impact from the emissions on soil moisture and in turn protective of groundwater.

Another indicator that the Environmental Protection Program[48] is performing properly is in the ability of the sets of data to correlate.

Total air emissions in 2013 have increased by 2.64 times from what they were in 2012. It is therefore reasonable to assume that if the Environmental Protection Program is performing as designed that a similar increase in environmental data be observed as we have witnessed in 2013:

- The sum of the average concentrations for all 40 PAS`s in 2013 was 2.20 times greater than the sum of the average concentrations for all 40 PAS`s in 2012.
- The average tritium concentration for all six downspouts in 2013 was 2.09 times greater than the average tritium concentration for all six downspouts in 2012.
- The average tritium concentration precipitation monitors in 2013 was 1.87 times greater than the average tritium concentration for precipitation monitors in 2012.
- The average tritium concentration in produce for 2013 is 1.90 times greater than the average tritium concentration in produce for 2012.

2.3.3.16 SOIL SAMPLING

Soil sampling is not part of SRB's Environmental Monitoring Program[48]. No soil sampling has taken place in 2013 but some is scheduled for 2014.

2.3.5.3 STORAGE OF RADIOACTIVE WASTE

Waste that is only minimally contaminated and meets the clearance limits in accordance with the Nuclear Substances and Radiation Devices Regulations is deemed to be "Very Low-Level Waste" (VLLW). The activity of the VLLW that SRB possesses, falls under Schedule 1 Exemption Quantities, which means that the waste is below 100 bg/g, and is therefore limited to transferring or disposing of no more than 1 tonne of material per year per pathway or disposal route. Therefore, any additional waste that is produced throughout the year above the 1 tonne limit is stored on-site until it is transferred or disposed.

Examples of such "general waste" are typically paper towel, gloves, disposable lab coats, shoe covers, etc. The VLLW that is stored on-site was collected in various receptacles throughout the facility, assessed, and ultimately placed into storage awaiting transfer or disposal.

3.1.3.10 ORGANIZATIONAL IMPROVEMENTS

Senior Management have decided to appoint a new individual in 2014 that will be partly dedicated to performing internal audits and further ensuring compliance of all work areas with company programs and procedures.

This will be an entirely new management position reporting directly to the President. This individual has formal training in auditing and currently holds the position of Import and Export Manager and has been employed at the facility for over 17 years in various capacities. The individual will leave their position of Import and Export Manager and be appointed to this new position and in turn the Import and Export Specialist who possesses all the necessary training will be appointed as the new Import and Export Manager.

3.1.4.4 MODIFICATIONS THAT WILL REQUIRE THE COMMISSION'S APPROVAL

No modifications to the building or to our Programs and Procedures are planned that will require the Commission's authorization in 2014.

3.1.4.5 PROPOSED OR FORESEEN CHANGES TO EQUIPMENT

Some changes to equipment are expected in 2014.

New bubbler monitoring equipment will be purchased in order to ensure that emissions are conservatively overestimated. Change is outlined in more detail in section 3.1.3.12 titled "New Bubbler Purchase" of the Annual Compliance Report[75].

In order to help identify localized sources of tritium more portable Tritium-In-Air monitors will be purchased. Change is outlined in more detail in section 3.1.3.13 titled "Portable Tritium-In-Air Monitor Purchase" of the Annual Compliance Report[75].

3.1.4.6 PROPOSED OR FORESEEN CHANGES TO PROCEDURES

A number of changes to programs and procedures are planned in 2014 in anticipation of licensing. Changes are expected to the Safety Analysis[33] and Hypothetical Scenarios[34], Preliminary Decommissioning Plan[18], Maintenance Program[31], Quality Manual[29], Waste Management program[59], Contractor Management Program[71], Derived Release Limits[57] and Public Information Program[63].

All changes are discussed in more detail in sections 3.1.3.1 through 3.1.3.8 of the Annual Compliance Report[75].

3.1.4.7 PROPOSED OR FORESEEN CHANGES TO ORGANIZATION

Changes to the organization are expected to be made in 2014.

An entirely new management position reporting directly to the President will be partly dedicated to performing internal audits and further ensuring compliance of all work areas with company programs and procedures.

SRB will seek to add to the organization one or more individuals with an educational background and/or work experience in Health Physics. In order to further ensure our revised programs and procedures meet and exceed CNSC Staff requirements.

Changes are outlined in detail in section 3.1.3.10 titled "Organizational Improvements" of both this Addendum and of the Annual Compliance Report[75].

3.1.4.8 PROPOSED OR FORESEEN CHANGES TO LICENSING DOCUMENTS

No foreseen changes to licensing documents are planned in 2014.

REFERENCES

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

[10] SRB Technologies (Canada) Inc., "Organizational Study", July 31, 2007.

[11] SRB Technologies (Canada) Inc., "Supplemental to Organizational Study", December 31, 2007.

[18] SRB Technologies (Canada) Inc., "Preliminary Decommissioning Plan", Revision G, June 23, 2013.

[29] SRB Technologies (Canada) Inc., "Quality Manual", Revision G, May 16, 2008.

[31] SRB Technologies (Canada) Inc., "Maintenance Program", (Revision 4), February 24, 2009.

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

[34] SRB Technologies (Canada) Inc., "Review of Hypothetical Incident Scenarios", February 22, 2008.

[41] SRB Technologies (Canada) Inc., "Licence Limit, Action Levels and Administrative Limit", Revision C, May 16, 2008.

[44] SRB Technologies (Canada) Inc., Meeting Minutes, Health Physics Team, January 4, 2013.

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