Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant	SRB Technologies (Canada) Inc.
Subject	Application for the Renewal of Class IB Operating Licence for the Gaseous Tritium Light Source Facility in Pembroke, Ontario
Hearing Dates	October 25 and November 27, 2006

RECORD OF PROCEEDINGS

Applicant:	SRB Technologies (Canada) Inc.
Address/Location:	320-140 Boundary Road, Pembroke, Ontario K8A 6W5
Purpose:	Application for the Renewal of Class IB Operating Licence for the Gaseous Tritium Light Source Facility in Pembroke, Ontario
Application received:	May 23, 2006
Date(s) of hearing:	October 25, 2006 and November 27, 2006
Location:	Canadian Nuclear Safety Commission (CNSC) Public Hearing Room, 280 Slater St., 14th. Floor, Ottawa, Ontario
Members present:	L.J. Keen, Chair A.R. Graham C.R. Barnes J.A. Dosman M. J. McDill
Secretary:	M.A. Leblanc
Recording Secretary:	P. Bourassa
General Counsel:	J. Lavoie

Applicant Represented By	**Document Number**
• S. Levesque, President • S. MacDougall, Radiation Safety Officer • R. Fitzpatrick, General Manager • N. Morris, Ecometrix • R. Nicholson, Ecometrix • R. Osborne, Ranasara Consultant	CMD 06-H16.1 CMD 06-H16.1A CMD 06-H16.1B CMD 06-H16.1C CMD 06-H16.1D CMD 06-H16.1E
CNSC staff	**Document Number**
• B. Howden • H. Rabski • A. Erdman • C. Clement • A. Ray • P. Flavelle • P. Thompson • C. Purvis • M. McKee • J. Littlewood • S. Mihok • R. Lane • K. Owen	CMD 06-H16 CMD 06-H16.A CMD 06-H16.B CMD 06-H16.C CMD 06-H16.D CMD 06-H16.E CMD 06-H16.F
Intervenors	
See appendix A	
Others	
• Ministry of the Environment, represented by P. Kehoe, B. Eckert and V. Castro • City of Pembroke, represented by D. Atkinson, Utilities Superintendent	

Licence: Not renewed
Date of Decision: January 15, 2007

Table of Contents

Introduction

1. SRB Technologies (Canada) Inc. (SRBT) has applied to the Canadian Nuclear Safety Commission (CNSC[1]) for the renewal of its Class IB Nuclear Substance Processing Facility Operating Licence to operate a gaseous tritium light source manufacturing and recycling facility in Pembroke, Ontario. The restricted operating licence NSPFOL-13.01/2006 in effect at the time of the licence renewal application was due to expire on November 30, 2006. Following Day Two (November 27, 2006) of this proceeding to consider SRBT's operating licence application, the Commission extended the current licence for a two-month period to January 31, 2007 to continue its deliberations and make a final decision on the application.

2. The Commission had renewed SRBT's current licence on December 1, 2005 for a one-year period[2]. The licence imposed operational restrictions, including the one-year term, on SRBT's operation of the facility that were considered necessary by the Commission in light of deficiencies in SRBT's environmental protection program and performance. The licence also included, as licence conditions, the requirements of a Designated Officer Order issued to SRBT on November 16, 2005. This Order was issued following CNSC staff hypothesis of groundwater contamination in and around the area on which the SRBT facility is located. This was based on information that indicated high levels of tritium in samples of precipitation and standing water on the property where SRBT is located. As part of its licence conditions, SRBT was to submit a groundwater study report.

3. On March 31, 2006, SRBT submitted to CNSC staff a report titled, *Study of Tritium in Groundwater in the Vicinity of the SRB Pembroke Facility* (March 2006) – hereafter referred to as the "Groundwater Study Report", which confirmed groundwater contamination by tritium on the property where the licensed facility is located at concentrations in the vicinity of 60,000 Bq/l. CNSC staff determined that the Groundwater Study Report did not adequately define the magnitude of tritium contamination underlying the SRBT facility or consider the potential impact that the contaminated groundwater may have on the future land use of the site. CNSC staff thus requested, pursuant to subsection 12(2) of *the General Nuclear Safety and Control Regulations*[3] (GNSCR) that SRBT take additional measures and provide additional information respecting, *inter alia*, the groundwater contamination of the land on which the facility is located.

4. On August 12, 2006, SRBT submitted the additional information on the groundwater contamination respecting the magnitude of the contamination of the land located under the facility which confirmed the levels of contamination and the fact that mechanisms

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[1] In this *Record of Proceedings*, the *Canadian Nuclear Safety Commission* is referred to as the "CNSC" when referring to the organization and its staff in general, and as the "Commission" when referring to the tribunal component.

[2] Refer to the *Record of Proceedings* on the matter of the *Application for the Renewal of the Operating Licence for SRB Technologies (Canada) Inc.'s Gaseous Tritium Light Source Facility in Pembroke, Ontario*, date of proceeding September 15 and November 30, 2005.

[3] S.O.R./2000-202.

other than atmospheric dispersion are contributing to this contamination. This evidence, when taken together with other evidence, led CNSC staff to conclude that the operation of the SRBT facility has resulted in an unreasonable risk to the environment and that SRBT had not taken all reasonable precautions to protect the environment as required under paragraph 12(1)(*c*) of the GNSCR and had not taken all reasonable precautions to control the release of a radioactive nuclear substance into the environment as required under paragraph 12(1)(*f*) of the GNSCR. Thus, the Designated Officer issued an Order to SRBT on August 15, 2006 to prevent further contamination and unreasonable risk to the environment.

5. On August 30, 2006, the Commission reviewed and amended the Order[4] to require SRBT to submit for Day One (October 25, 2006), a detailed report describing the specific actions and measures that will be taken to: identify all the sources of groundwater contamination; contain those sources of groundwater contamination; prevent or mitigate further direct contamination of the soil and groundwater under the stacks; and remediate the contaminated groundwater. SRBT was also required to submit an implementation plan and schedule to address the actions described in the report.

6. SRBT initially applied for a licence to continue its current operations for a period of three years. However, during the course of the public hearing, and in response to the CNSC staff's recommendations, SRBT amended its application to seek permission to operate for a period of 18 months.

Issue

7. In considering the application, the Commission was required to decide, pursuant to subsection 24(4) of the *Nuclear Safety and Control Act*[5] (NSCA):

   a) if SRBT is qualified to carry on the activity that the licence would authorize; and

   b) if, in carrying on that activity, SRBT would 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.

Public Hearing

8. A two-day public hearing to consider SRBT's operating licence renewal application was originally scheduled for August 17 and October 25, 2006. It was adjourned to

[4] Refer to the *Record of Proceeding* on the matter of the *Review by the Commission of the Designated Officer Order issued to SRBT on August 15, 2006*, date of proceeding August 28, 2006.
[5] S.C. 1997, c. 9.

October 25 and November 27, 2006 so that the Commission could review the CNSC Designated Officer Order issued to SRBT on August 15, 2006. The Commission reviewed and amended the Designated Officer Order on August 30, 2006.

9. For Day One of the hearing (October 25, 2006), CNSC staff revised its licensing recommendation which it had previously submitted for Hearing Day One (originally scheduled for August 17, 2006). Accordingly, CNSC staff submitted a supplementary submission (CMD 06-H16.C) to replace CMD 06-H16 and CMD 06-H16.B. As SRBT was required to submit a report to the Commission, as described in paragraph 5 above, CNSC staff stated that it could not assess SRBT's application until it could review this report and thus did not make a recommendation to the Commission with regard to SRBT's application to renew its Nuclear Substance Processing Facility Operating Licence on Day One of the hearing. Based on the report submitted by SRBT to fulfil the requirements of the amended Order, CNSC staff submitted, for Day Two, a supplementary submission (CMD 06-H16.E) in which a recommendation to the Commission was made regarding the renewal of SRBT's operating licence.

10. The Commission, in making its decision, considered information presented for a public hearing held on October 25, 2006 and November 27, 2006 in Ottawa, Ontario. The public hearing was conducted in accordance with the *Canadian Nuclear Safety Commission Rules of Procedure*[6]. During the public hearing, the Commission received written submissions and heard oral presentations from CNSC staff (CMD 06-H16, CMD 06-H16.A, CMD 06-H16.B, CMD 06-H16.C, CMD 06-H16.D, CMD 06-H16.E and CMD 06-H16.F) and SRBT (CMD 06-H16.1, CMD 06-H16.1A, CMD 06-H16.1B, CMD 06-H16.1C, CMD 06-H16.1D and CMD 06-H16.1E). The Commission also considered oral and written submissions from 93 intervenors (see Appendix A for a detailed list of interventions).

11. Following the two-day hearing, the Commission determined that additional time was needed to complete its deliberations before it could make a final decision on SRBT's application. As the current operating licence expired on November 30, 2006, the Commission decided to extend the licence for two months, until January 31, 2007, to ensure continued regulatory oversight of the facility.

Decision

12. The Commission is of the opinion that SRBT, in carrying on the activities for which it has applied and described in the proposed operating licence attached to CMD 06-H16.E, will not make adequate provision for the protection of the environment, pursuant to 24(4)(*b*) of the NSCA.

13. However, the Commission is of the opinion that SRBT is qualified to carry on certain limited activities relating to the possession of tritium and the maintenance of the facility. The Commission is also satisfied that SRBT, in carrying on these limited

[6] S.O.R./2000-211.

activities, would make adequate provision for the protection of the environment, health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

14. Based on its consideration of the matter, as described in more detail in the following sections of this *Record of Proceedings*,

> the Commission, pursuant to paragraph 24(4)(b) of the *Nuclear Safety and Control Act* (NSCA), does not renew Nuclear Substance Processing Facility Operating Licence NSPFOL-13.01/2007.
>
> Under the circumstances, however,
>
> the Commission, pursuant to subsection 24(4) of the NSCA, issues Nuclear Substance Processing Facility Possession Licence NSPFPL-13.00/2008 to SRB Technologies (Canada) Inc., for its Class IB facility located in Pembroke, Ontario. The licence is valid from February 1, 2007 to July 31, 2008.
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> In addition, pursuant to section 25 of the NSCA and subsection 8(2) of the GNSCR, the Commission suspends, effective February 17, 2007 and until further notice, all import licenses issued to SRBT under the *Nuclear Non-Proliferation Import and Export Control Regulations*. SRBT can apply for import licences in specific circumstances where SRBT requests to import nuclear substances in relation to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

15. With this decision, the Commission, pursuant to subsection 24(1) of the NSCA, establishes the following class of CNSC licence: Nuclear Substance Processing Facility Possession Licence. The Commission notes that classes of licences are established to authorize a licensee to carry on activities described in section 26 of the NSCA that are specified in the licence and for the period that is specified in the licence. The purpose of this new class of licence is for the general possession, transfer, management, storage and disposal of nuclear substances that are part of a Class IB facility.

16. Pursuant to subsection 24(5) of the NSCA, the Commission includes in the licence the following requirements:

- the licensee shall not import, obtain or receive additional nuclear substances after February 16, 2007, except in relation with article 28(2) of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management;

- as soon as practical, and no later than May 31, 2007, the licensee shall establish action levels with respect to stack emissions, to be approved by the

Commission or a person authorized by the Commission;

- the licensee shall have a qualified third party perform air emission monitoring, stack verification and environmental monitoring;
- the licensee shall seek the approval of the Commission or a person authorized by the Commission, to carry out remediation activities;
- the licensee shall conduct an organizational study to define the management capacity needed at the facility to manage the safety programs, the workers and contractors by July 31, 2007;
- the licensee shall have in place, by no later than July 31, 2007, the financial guarantee equivalent to the cost of safe shutdown state of the facility based on the revised cost estimate to be provided by SRBT by February 28, 2007;
- the licensee shall have the full amount of the financial guarantee in place no later than May 31, 2008; and
- all other conditions as proposed in the draft operating licence included in CMD 06-H16.E as they pertain to the activities authorized by the licence.

17. With this decision, the Commission requests that CNSC staff report to the Commission any non-compliance with the licence during the course of the 18-month licence period. Any non-compliance reports would be presented at public proceedings of the Commission.

18. With this decision, the Commission, pursuant to subsection 35(3) of the NSCA, revokes the CNSC Order issued by the Designated Officer on August 15, 2006 and amended by the Commission on August 30, 2006, on the basis that it is no longer applicable under the activities authorized by the Nuclear Substance Processing Facility Possession Licence NSPFPL-13.00/2008.

Issues and Commission Findings

19. In making its licensing decision under section 24 of the NSCA, the Commission considered a number of issues relating to SRBT's qualifications to carry on the proposed activities, and the adequacy of the proposed measures for protecting the environment, the health and safety of persons, national security and international obligations to which Canada has agreed. The Commission's findings on these issues are summarized in this section.

20. The findings of the Commission presented below are based on the Commission's consideration of all of the information and submissions available for reference on the record for the hearing.

Radiation Protection

Worker Protection

21. SRBT noted that it had revised its Radiation Safety Program to address the comments made by CNSC staff in their February 14, 2006 review.

22. CNSC staff reviewed the revised Radiation Protection manual and found it satisfactory. An inspection and review of the annual report also showed no major deficiencies in the implementation of the Radiation Safety Program. CNSC staff noted however that SRBT needed to formalize an ALARA (As Low As Reasonably Achievable) program and review the action levels.

23. CNSC staff explained that the radiological risks associated with the facility result from radiological hazards of tritium from inhalation, ingestion and absorption through skin. CNSC staff reported that, during the current licence period, the maximum individual effective dose to a worker was 3.61 millisievert per year (mSv/yr), well below the regulatory limit.

24. The Commission asked whether doses to workers were expected to decrease during the current licence period, considering that the facility has been operating under restrictive conditions. CNSC staff responded that the limited operation was not expected to impact the doses to workers since recent initiatives taken by SRBT have been directly linked to reducing external radiological emissions and thus did not modify internal procedures.

Public Protection

25. The Commission notes that the matter of public radiation protection is closely related to environmental protection. Therefore, the section below regarding Environmental Protection contains a further discussion of issues related to human and environmental health, including the various environmental pathways through which humans may be exposed to radiation from the facility.

26. With respect to estimated radiation doses that persons living in the vicinity of the SRBT facility may have received during the past licence period, CNSC staff reported that no member of the public has been exposed to radiation doses above the regulatory limit of 1 mSv/yr. Using independently measured concentrations and highly conservative exposure assumptions, CNSC staff stated that the approximate dose to the public in 2005 has been approximately 0.13 mSv/yr. However, CNSC staff noted that there remains uncertainty with respect to how the public doses have been estimated for the purpose of establishing operational controls and limits and, as a consequence, SRBT will need to recalculate the doses to the public for the last five years using a

revised Derived Release Limit (DRL). This revised DRL is currently being reviewed by CNSC staff.

27. The Concerned Citizens of Renfrew County, in its intervention, made reference to the Committee Examining Radiation Risks from Internal Emitters (CERRIE) as evidence of radiological risk being underestimated in Canada. The intervenor expressed the view that CNSC should review its findings on tritium dosimetry and revise the radiation dose coefficient associated with exposure to tritium.

28. The International Institute of Concern for Public Health submitted that the simple model used by the International Committee on Radiation Protection (ICRP) to determine the risk and effects of exposure to tritium should be rejected by the CNSC. The intervenor was of the view that chronic exposure to tritium should be evaluated by CNSC to consider the effects of the SRBT operations on the residents of Pembroke.

29. In response to the Commission who sought CNSC staff's opinion of this submission, CNSC staff stated that the intervenor's view regarding significant uncertainties associated with exposure to tritium have actually been debated in the international community. In this regard, the findings of the United Nations Committee on the Effects of Atomic Radiation do not lead the CNSC staff to modify the risk factor that is being used. CNSC staff noted that for doses in the range of the public dose limit, the most likely health outcome is none, and that there are no epidemiological studies that show any health effects at these doses. Thus, the available epidemiological evidence does not suggest that the predictions from the current risk models are wrong. With respect to chronic exposure to tritium, CNSC staff noted that, although members of the public have been chronically exposed to tritium in Pembroke, the dose received has never exceeded the public dose limit.

30. The Concerned Citizens of Renfrew County expressed the view that CNSC staff should not give reassurances that there are no human health impacts associated with the levels of tritium to which Pembroke residents are exposed, noting that there has been no scientific study to examine whether effects can be found near the SRBT facility. Several other intervenors, including B. Biederman, also expressed concern with the impact the levels of tritium found in the environment may have on public health. Similarly, some intervenors noted the levels of radioactivity in certain vegetables grown in the vicinity of SRBT's facility and expressed their concern with the impact on health the consumption of such vegetables may have.

31. In response to the intervenors' concerns, the CNSC staff noted that the Renfrew County District Health Unit provides regular reports on the health of the community and that a recent mortality report showed that the mortality rate of the community was similar to that of Ontario. CNSC staff also noted that there has been no conclusive evidence in the scientific literature that heredity defects are attributed to exposure from natural or artificial radiation, based on a large accumulation of research. In response to the Commission's enquiry with regard to the health risk to the community from the continued operation of SRBT's facility, CNSC staff stated that based on current

knowledge of radiation risk and doses to the public as a result of SRBT's operations, the risk to the public is undetectably small.

32. In this regard, the Commission sought further information from CNSC staff on the significance of the radioactivity found in the vegetables. CNSC staff responded that based on the results of radioactivity measures taken from vegetables since 1999, the highest reading would represent approximately seven percent of the regulatory dose limit when using conservative assumptions in calculating the corresponding dose.

33. CNSC staff also provided information in CMD 06-H16.F regarding the monitoring of the Ottawa River. CNSC staff noted that the Ottawa River is included in three Ontario Provincial Government monitoring programs. Furthermore, the Pembroke drinking water treatment plant is included in a radiological surveillance network as part of the Ontario Reactor Surveillance Program set up to assure the public in the vicinity of nuclear facilities that their health, safety, welfare and property are not affected by emissions from nuclear facilities. Data demonstrate that tritium concentrations for the last five years from the Pembroke drinking water treatment plant have been near or below 0.1% of the Ontario Drinking Water Standard.

Conclusion on Radiation Protection

34. Based on the information received, the Commission is satisfied that SRBT has made, and will continue to make adequate provisions for the protection of its workers from the effects of radiation.

35. The Commission notes that interventions in the preceding licensing hearing held in 2005 raised similar comments with respect to safe levels of tritium. In this respect, the Commission continues to be satisfied with the CNSC staff's reviews of the work and recommendations of the ICRP and other relevant technical committees and its uses of the best available environmental science in carrying out its regulatory activities, including the assessment of tritium behaviour and hazards, as was expressed during the 2005 hearing[7].

36. However, the Commission is also of the view that further research on tritium releases in Canada is needed to increase current knowledge. The Commission therefore requests that CNSC staff initiates research studies on tritium with the objective to enhance information available to guide regulatory oversight of tritium processing and tritium releases in Canada. The results of these studies will be reported to the Commission in a public proceeding.

37. With respect to the protection of the public, the Commission is of the opinion that the health and safety of the public has not been negatively affected by the tritium releases

[7] Refer to the *Record of Proceedings* on the matter of the *Application for the renewal of the operating licence for SRB Technologies (Canada) Inc.'s gaseous tritium light source facility in Pembroke, Ontario,* date of hearing September 15 and November 30, 2005

resulting from the operation of the SRBT facility. However, the Commission notes that the lifestyles of certain members of the public, as testified in the interventions, appear to have been compromised as a result of the operation of the facility. Although the prescribed limit of 1 mSv/yr for the general public has continued to be respected during the current licence period, the Commission expects that the licensee make every reasonable effort to continue to decrease the tritium releases to the environment.

38. In conclusion, the Commission is satisfied that, under the conditions of a possession licence, SRBT would make adequate provisions for the protection of persons from radiation at its facility. However, the Commission is not convinced that the licensee has made every reasonable effort to determine the sources, and to control and decrease the tritium releases to the environment. Further discussion on this issue is provided in the following section on Environmental Protection.

Environmental Protection

39. In considering SRBT's performance in protecting the environment, the Commission considered information on the adequacy and performance of SRBT's environmental protection program, including with respect to environmental monitoring, effluent monitoring and emission data, emission controls and remediation measures.

Environmental Monitoring Program

40. SRBT stated it had made a number of improvements to the Environmental Monitoring Program (EMP) during the current licence period. As evidence of some improvements, SRBT noted the sampling performed on local wells, pools, and urine from public and the increased number of passive air samplers (from 13 to 41), including installing samplers closer to the stack location to determine airborne concentrations closer to point of release. SRBT indicated that monthly monitoring of wells on site and annual sampling of several residential wells will continue during the requested licence period. Furthermore, there will be routine monitoring of snow, ditch and surface water around the facility and routine swipe measurements will be taken outside the facility to determine impact of precipitation. SRBT also noted that a third party, Atomic Energy of Canada Limited (AECL), had been contracted to perform all sampling and analysis of environmental results. Once the revised derived release limit is accepted, SRBT noted that a revision of the EMP will be done to address CNSC staff comments[8].

41. CNSC staff reported that SRBT's EMP and its implementation meet requirements, noting that previous issues with respect to quality assurance and quality control have been addressed. Overall, CNSC staff noted that SRBT had improved its environmental

[8] The Commission notes that detailed information and discussion on the derived release limit was the subject of the preceding licensing hearing held in 2005. For further detail, refer to the *Record of Proceedings* on the matter of the *Application for the renewal of the operating licence for SRB Technologies (Canada) Inc.'s gaseous tritium light source facility in Pembroke, Ontario*, date of hearing September 15 and November 30, 2005.

performance in most areas of environmental protection. CNSC staff also reported that SRBT has provided better trending analysis and interpretation of monitoring results. CNSC staff noted that the increase in the number of passive air samplers will provide broad coverage of expected aerial plume. As required by the current operating licence, environmental sampling has been conducted by a third party and should continue to provide reliable results. CNSC staff recommended that a third party continue to carry out the sampling during the proposed licence period, as SRBT has not yet shown the capability to perform the work.

42. To ensure that environmental monitoring covers all potentially affected areas, the Commission asked numerous questions with respect to the monitoring of the wells in the region. Specifically, the Commission inquired about the presence and use of wells in the municipality of Pembroke, the frequency of the well sampling proposed by SRBT and the reporting requirements of the results of the monitoring. SRBT provided information on the survey of wells it had conducted, noting that it was of the opinion that all wells had been identified. The Ontario Ministry of the Environment (MOE) confirmed that industry-led surveys such as the one conducted by SRBT is common and acceptable practice.

43. With respect to sampling and reporting of results, SRBT stated that its onsite wells will be monitored on a monthly basis while its offsite monitoring wells will be monitored every four months. Residential wells will also be monitored every four months, in addition to monthly passive air sampling. SRBT noted that as soon as these results are available, they would be posted on the company's Web site.

44. The Commission also sought an explanation regarding the variance in the average atmospheric concentrations of tritium, as reported in CNSC staff CMD 06-H16C. SRBT explained that the measured results were dependent on weather and wind conditions. CNSC staff also noted that weather patterns influence the concentrations of tritium measured at the various passive air samplers. CNSC staff further noted that the collected data have been used to improve the EMP and are under constant scrutiny to understand the dynamics of the tritium releases. CNSC staff is confident that the data are reliable and demonstrate that the revised derived release limit atmospheric model, currently being reviewed by CNSC staff, will conservatively predict the expected dose to the public.

45. The Commission is concerned that there appears to have been incomplete information with respect to the identification and use of wells in the vicinity of the SRBT facility. In this respect, the Commission is not convinced that the environmental monitoring program adequately covers the entire area potentially affected by the operation of the facility. Furthermore, the Commission is concerned that the dynamics of the tritium releases are not sufficiently understood to ensure a correct interpretation of the collected data and thus an adequate EMP.

Effluent Monitoring and Emission Data

46. SRBT presented improvements made to the stack monitoring, including equipment upgrades and increased frequency of stack maintenance. Pitot tubes have been installed permanently on the stacks and have been monitored and maintained by a third party on monthly basis. SRBT has performed daily stack flow verification while a more detailed annual verification will be conducted by a third party. SRBT has also noted that a new bubbler system has been installed which provides more accurate and conservative method of measuring emissions.

47. SRBT noted that tritium emissions in weekly total activity released in 2006 is showing decreased tritium emission corresponding to a 97% reduction of total tritium released since 2000. SRBT further noted that it has demonstrated that it can operate within a weekly action level based on emission limits.

48. CNSC staff reported that SRBT's effluent monitoring program and its implementation meet requirements. CNSC staff noted that SRBT has demonstrated that the stacks are now performing as designed and the effective stack height is being maintained.

49. With the objective to determine stack emissions that would not result in unreasonable risk to persons using wells beyond the property boundary at SRBT, CNSC staff re-evaluated the derivation of emission limits using actual measured data and conservative assumptions. Thus to limit the concentration of tritium at the edge of the property to 1750 bequerels per litre (Bq/l), i.e. 25% of the Canadian Drinking Water Quality Guideline, CNSC staff recommended that a limit of 135,000 GBq of tritium oxide (HTO) and 521,075 GBq of total tritium be imposed on emissions from the ventilation stacks.

50. The Commission questioned if CNSC staff had sufficient oversight over the monitoring and review of the real-time data to verify whether there are excessive peaks of tritium emission at any one time. CNSC staff responded that the information available from SRBT's weekly emission monitoring does indicate variability in rates of emissions. However, the program is designed to provide assurance that emission limits are respected through the verification of the total annual release limit and weekly control limits. The recorded releases are verified through compliance activities throughout the licence period. As for the real-time monitor, it is used to identify situations on a very short-term basis for SRBT to take action as necessary, for example if a peak release were to represent a loss of control. These recorded measures are also verified during compliance activities. Furthermore, the current licence and proposed operating licence contain a condition that sets the level at which the licensee would have to report to the CNSC as a meaningful and measurable way to identify a potential loss of control at the SRBT facility.

51. Regarding SRBT's submission that emissions have been decreasing in the last several years, the Commission recognizes SRBT's recent efforts with respect to reducing emissions. However, the Commission is also of the view that emissions may in part have been reduced as a result of SRBT operating the facility under a restrictive licence during the current licence period.

52. Furthermore, as noted during the Commission's proceeding held August 28, 2006 to review the Order issued to SRBT on August 15, 2006, the Commission considers that SRBT's efforts with respect to environmental monitoring and environmental protection appear to have been initiated as a result of compliance actions from CNSC. The Commission again expresses the view that there is a responsibility on the part of the licensee to ensure the protection of the environment. In this regards, the Commission is of the view that the licensee's approach to environmental protection has been to take incremental steps towards improvement based on compliance measures by CNSC staff, rather than considering the impacts of its operation as a whole and the interdependence of its individual functions.

Groundwater Monitoring

53. CNSC staff reported that SRBT's environmental protection has been unacceptable (rated "E") mainly due to the groundwater contamination at levels that would be detrimental to its use by humans. Although data collected over time by SRBT and by independent monitoring indicate that members of the public around the SRBT facility were protected, data obtained over the last year from the groundwater monitoring have demonstrated that emissions are not being properly controlled to protect the environment close to the facility. CNSC staff noted at Day One of the hearing that the groundwater study conducted to date does not adequately define the magnitude of tritium contamination underlying the facility nor consider impact on future land use. However, considering that additional work has now provided a better understanding of the distribution of tritium on and beneath the site, CNSC staff expressed the view that SRBT's "Detailed Report and Implementation Plan", as presented in CMD 06-H16.1D at Day Two of the hearing, was adequate to address the issues associated with the groundwater contamination. This includes the monitoring as well as systematic and quantitative analysis of sources of groundwater contamination.

54. The Concerned Citizens of Renfrew County submitted that the groundwater study showed unacceptable contamination of public resources. The intervenor stated that there was evidence of build-up of tritium in both soil and groundwater and evidence to suggest that groundwater contamination continued to increase, even during last months of restricted operations. The intervenor also expressed the view that the Commission may be unaware of the role of oxidation of elemental tritium (HT to HTO) and its effects on the environment that result in build-up in the environment.

55. Several other intervenors, including Mr. Yuill whose well has been found to be contaminated with tritium to levels up to 2,700 Bq/l, stated their concern with the level

of radioactivity found in the wells off-site of the facility.

56. With respect to the intervenors' comments and concerns, the Commission asked for further information regarding CNSC staff's understanding of the behaviour of tritium in the environment. CNSC staff provided information on the experiment done in Chalk River in the 1990's, noting that that monitoring examined the behaviour of HT and its conversion in soils at different distances from a release point. Based on other scientific information about long-term processes and accumulation, CNSC staff noted that tritium in the environment does not seem to reside much longer than four years as organically-bound tritium. CNSC staff added that this organically-bound tritium would be the main concern regarding accumulation in the soil. CNSC staff concluded that all of the information obtained to date from various sources, including air and water concentrations, does not indicate that the emission of large quantities of HT as a result of the operations of SRBT's facility has produced any unusual result.

57. The Commission expressed its concern with the unacceptable rating of SRBT's environmental protection program. To assist in determining whether SRBT has the ability to adequately protect the environment, the Commission inquired whether SRBT fully understood what was expected in terms of improvements to its environmental protection program to reach an acceptable level.

58. With respect to the protection of the environment, CNSC staff expressed the view that the regulatory controls proposed in the operating licence, which includes strict release limits, combined with CNSC staff's continued enhanced regulatory oversight at this facility, which includes increased frequency of inspection, will ensure that there is no unreasonable risk to the environment as a result of the operation of the facility.

59. Furthermore, CNSC staff clearly explained what the expectations were by first providing an explanation of how the rating system for environmental protection was derived from the requirements in the NSCA and associated regulations. These regulations specify that the licensee needs to have measures in place to control the release of radioactive and hazardous substances into the environment, including on the site. There needs to be an Environmental Monitoring Program, an Effluent Monitoring Program as well as policies and procedures in place to protect the environment. When these requirements are met, then there is assurance that the requirements of the NSCA are being met and that there is no unreasonable risk to the environment. CNSC staff noted that it has seen improvements over the current licence period in this regard, although there are still elements that need further improvements. This would include SRBT's ability to carry out all of its monitoring on its own without using a third party. CNSC staff also noted that one of the key components towards an improved rating is controlling the source of contamination to the groundwater. In this regard, CNSC staff is of the view that SRBT's "Detailed Report and Implementation Plan" will address this issue.

60. In conclusion, CNSC staff expressed the view that SRBT has the ability to improve its program, as demonstrated by the improvements it has made over the current licence

period. These improvements, combined with the successful execution of the proposed plans during the proposed licence period, indicate, in CNSC staff's opinion, that SRBT could achieve a satisfactory environmental protection program.

61. The Commission considered the Order issued to SRBT on November 16, 2005 to conduct a groundwater contamination study, based on concerns with respect to the concentrations of tritium found in well water, as well as in the precipitation and runoff (puddles, etc) near the facility. In 2006, CNSC staff had concluded from this Groundwater Study Report that the source of tritium in groundwater underlying the facility and on the property where it is located, and any plume that might exist in the groundwater had not been identified. This conclusion was one of the factors that led to a second Order issued to SRBT on August 15, 2006. At the proceeding held on August 28, 2006[9] to review the Order, CNSC staff stated that there were uncertainties and lack of knowledge regarding the contamination of the groundwater. As a result of the Commission's review and amendment of the Order, SRBT was required to submit, for consideration at this licence renewal hearing, a detailed report describing the specific actions and measures that will be taken to: identify all the sources of groundwater contamination; to contain those sources; to prevent or mitigate further direct contamination; and to remediate the contaminated groundwater.

62. SRBT submitted a recent depth to bedrock study to assist in understanding the source of the groundwater contamination. SRBT noted that the report indicates a large variability in the depth to bedrock. SRBT's consultant added that the next phase of the study would include investigating the top of the bedrock to confirm both the hydraulic conductivity in that zone and to obtain water samples to look for zones of elevated tritium. As well, the next phase could also investigate deeper into the bedrock to confirm whether there are vertical gradients within the bedrock. SRBT could also conduct follow-up work on the groundwater system to verify that any elevated concentrations of tritium are moving as predicted, that is to the Muskrat River, and do not represent an environmental risk.

63. In this regard, the Commission expressed its view that unless there are more wells that are drilled through the stratigraphy, it would be difficult to understand or rule out the possibility of groundwater moving downwards towards bedrock and therefore to the Muskrat River in a more aggressive way than is being modelled at the present time. The Commission is of the view that insufficient information is currently available to determine the source of groundwater contamination and thus the behaviour of the tritium releases to the environment.

64. The Commission considered the "Detailed Report and Implementation Plan" as submitted on September 25 and modified on November 9, 2006 by SRBT. The Commission is not satisfied that this report fulfils the requirements of the Order and its objectives to identify, control and mitigate the sources of tritium contamination. As the licensee has not been able to identify all the sources of contamination of the wells, the

[9] Refer to the *Record of Proceeding* on the matter of the *Review by the Commission of the Designated Officer Order issued to SRBT on August 15, 2006*, date of proceeding August 28, 2006.

Commission is of the opinion that the contributing sources to contamination are not well understood, nor identified by the licensee. In this regard, the Commission can only conclude that there are unexplained and uncontrolled events occurring during the operation of the facility, resulting in contaminated wells in the area external to the licensee's site perimeter.

Emission Control and Remediation

65. SRBT noted that, as part of its efforts to further mitigate tritium emissions, it had implemented a variety of initiatives such as removing the scroll pumps, decreasing the heating cycles of pyrophoric units to 18 filling cycles and new units to 15 cycles only. In July 2006, SRBT began using inert gas to purge the residual tritium in the filling rigs which resulted in reduced emissions to the environment. Furthermore, modifications to the production design have also resulted in a decrease in the volume released.

66. CNSC staff reported that the reduced number of heating cycles has improved efficiency of the pyrophoric uranium traps to retain tritium. CNSC staff noted that the installation of a molecular sieve (tritium oxide trap) on one filling rig, as part of a pilot project, was not as successful as other mitigation measures. CNSC staff noted that SRBT's ongoing commitment to research and development is essential in identifying additional potential means of further reducing emissions.

67. CNSC staff also noted that SRBT has taken and has proposed acceptable measures to contain the identified fugitive emissions sources. In this regard, SRBT listed measures taken to date that include the discontinued use of air conditioners, the isolation of liquid releases in the waste room, the repair of holes, cracks or openings in the ventilation units and the collection of liquid to be disposed in accordance with its Waste Management Program.

68. As a further measure of control of its emissions, SRBT proposed to construct a Precipitation Diversion System (PDS) to capture and manage tritium-contaminated precipitation in the close proximity to the stacks. The collected water would be released to the municipal sewer in accordance with an annual release limit of 200 GBq and in a controlled manner. SRBT would perform monthly measurements at the sewage treatment plant and report the results.

69. CNSC staff expressed the view that the collection of the precipitation from the stack and the controlled and managed release to the sewer system would limit the risk to the environment under the stack to a reasonable level. CNSC staff noted that the interception of precipitation by the new roof and the concrete catch basin should help in preventing any contamination originating from the possible diffusion of tritium through the various materials of the ventilation stacks to enter the groundwater.

70. Concerned that the practice of releasing radionuclides to the municipal sewer may not be a reasonable approach to controlling releases, the Commission sought further

information from CNSC staff. In response, CNSC staff noted that the discharge of liquids contaminated with radionuclides to the sewer systems is a common practice that many licence holders from the CNSC have in their operating manuals. It is consistent with international practices for the management of liquids contaminated with radionuclides. The MOE noted that the discharge to a sanitary sewer is regulated by the municipal Sewer Use Bylaw and that there are criteria for numerous parameters as it applies to radionuclides. The Municipal Sewer Use Bylaw states that a discharge is acceptable provided there is a licence and, as well, that the municipality agrees to the discharge. The MOE also noted that it regulates the discharge from the sewage treatment plant to the natural environment and that, provided that the provincial standards are met at the end of the pipe, the discharge to the sanitary sewer would be an acceptable practice. However, the MOE also noted that it would expect that all mitigation measures and best management practices be undertaken at the facility to reduce the loading at source.

71. Several intervenors expressed concerns with this proposed release to the municipal sewers. These intervenors were of the opinion that the releases would create unacceptable risks to the health of the public and the environment as well as be a hazard to workers at the sewage treatment plant.

72. The Ottawa Riverkeeper submitted that the proposed PDS plan is flawed and will not address the problem of tritium as a persistent pollutant. The intervenor was concerned about the lack of figures for total loading of tritium into the environment and suggested that total loading should be considered instead of only basing the evaluation of this proposed PDS on drinking water standards. Furthermore, the intervenor expressed the view that proposed mitigation measures, including the restrictive operations of the facility, are not controlling the pollution at the source. The intervenor concluded that there was a need to understand the behaviour of the tritium emissions and take into consideration the significant assumptions that are being made.

73. The Ottawa Riverkeeper and V. Young, among other intervenors, expressed the view that, based on the uncertainties associated with the behaviour of tritium, a precautionary approach should be used in the decision-making for this licence application.

74. The Commission sought further information regarding the proposed practice to discharge accumulated contaminated water to the municipal sewer and the acceptability of the proposed release limit. The MOE representative noted that the batch discharge proposed by SRBT would not exceed the Ontario drinking water objectives. CNSC staff explained that under established clearance levels for this type of material, this practice could be considered consistent with international practices set by the International Atomic Energy Agency (IAEA) for regulatory exemption of radionuclides released to the environment. CNSC staff further noted that the proposed release limit of 200 GBq, which represents one fifth of the acceptable clearance levels set by the IAEA, is based on conservative assumptions and historical data from the

operation of the facility and takes into consideration potential exposure to workers and potential use of sludge.

75. The Commission sought further information regarding the monitoring of the releases to the municipal sewer. CNSC staff responded that the monitoring would include both small releases resulting from equipment washes and other similar procedures as well as the releases of the collected precipitation from the PDS. SRBT explained that a daily sample would be taken of the sludge at the sewage treatment plant and aggregated for a weekly measure.

76. The Commission further asked whether other options had been considered by SRBT besides releasing the contaminated water to the municipal sewer. CNSC staff noted that only one proposal was presented by SRBT. The licensee responded that it had reviewed other options and that it had been unsuccessful at finding a party that would receive this material. SRBT had also considered methods of extracting the tritium from the contaminated water but could not find a feasible method.

77. Concerned that the proposed approach to release the accumulated water from the PDS to the municipal sewer may impact the environment in the event of pipe failure, the Commission inquired whether the sewage line piping was reliable to ensure that there were no unknown releases between the facility and the treatment plant. SRBT responded that any potential leaks would be small as the sewage line is not pressurized. CNSC staff stated that it was not aware if there had been any assessments of the sewage line.

78. The Commission considered SRBT's "Detailed Report and Implementation Plan" with respect to remediation methods. Concerned that the proposed schedule for this matter is beyond the proposed licence period, the Commission sought further information with regard to potential remediation measures. SRBT responded that the proposed timeline had been set based on the need to get a full understanding of the groundwater conditions at the site and delineate any areas or zones of elevated tritium levels in the groundwater. This would provide SRBT with the information to evaluate with confidence what remediation method could be used and develop plans for remediation. CNSC staff expressed its satisfaction with SRBT's proposed approach and noted that the effectiveness of passive remediation of the groundwater below the stacks should be assessed to determine whether any measures would need to be implemented in the future.

79. Considering that contamination of groundwater both on and off the facility site was first brought to the attention of the licensee by CNSC staff in 2005, the Commission is not satisfied with the progress made towards implementation of remediation measures to date nor with the planned actions for the proposed licence period. In this regard, the Commission expects that remediation measures be evaluated, and, as appropriate, recommended and planned for future implementation during the proposed licence period.

Conclusion on Environmental Protection

80. The Commission is concerned with the length of time SRBT has taken to correct all of the environmental protection program deficiencies identified by the CNSC staff. Based on past performance demonstrated over the last several years, the Commission is not convinced that SRBT has the ability to meet the requirements of the NSCA with respect to the protection of the environment while operating its facility.

81. The Commission is concerned about SRBT's performance and is of the opinion that it does not currently possess the qualifications to adequately carry out environmental monitoring. Therefore, the Commission requires that all aspects of the environmental program be carried out by a qualified third party consultant during the licence period, as appropriate for the activities authorized by a possession licence. This includes effluent and environmental monitoring.

82. As noted during the licensing hearing[10] held in 2005, the Commission continues to be of the view that a better understanding of the groundwater contamination is needed, both to determine whether further regulatory action is necessary and to address a need for public information on this issue. In this regard, the Commission states that any operation of the facility that includes tritium processing cannot be carried out until the groundwater contamination has been assessed to the satisfaction of the Commission.

83. Although the Commission acknowledges the work undertaken by SRBT during the current licence period to improve its environmental protection program, the Commission is of the opinion that, pursuant to paragraph 12(1)(*f*) of the GNSCR, SRBT has not taken all reasonable precautions to protect the environment and to control the release of a radioactive nuclear substance within the site of the licensed activity and into the environment.

84. The Commission is therefore of the opinion that the licensee has not made adequate provision for the protection of the environment while carrying on the activity that its current operating licence has authorized. Consequently, the Commission is of the opinion that SRBT will not make adequate provision for the protection of the environment when carrying out activities, including the processing of tritium, that the requested operating licence would authorize.

85. The Commission, taking into account the restrictive nature of a licence to possess tritium and maintain the facility, is satisfied, however, that SRBT would make adequate provision for the protection of the environment during an 18-month period while carrying on the activities that such a licence would authorize.

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[10] Refer to the *Record of Proceedings* on the matter of the *Application for the renewal of the operating licence for SRB Technologies (Canada) Inc.'s gaseous tritium light source facility in Pembroke, Ontario,* date of hearing September 15 and November 30, 2005.

Operating Performance

86. The Commission considered SRBT's current and past operating performance as an indication of its qualifications to operate its facility and, in doing so, to provide adequate protection for the environment, persons, national security and international obligations.

87. SRBT stated that it has developed a Maintenance Program and a Waste Management Program, noting that it has increased the stack maintenance which is now performed on a monthly basis by third party. SRBT further noted that it has updated the safety analysis report in July 2006.

88. CNSC staff reported that, as part of its compliance activities, it had inspected the facility on a routine basis and during unannounced visits during the licence period. Based on these inspections and the review of annual reports, CNSC staff stated that, through routine inspections of the facility, SRBT has operated the facility according to regulatory requirements, including licence restrictions and weekly release limits. CNSC staff noted that SRBT has made considerable progress in this area; for example, it has demonstrated over the past nine months improvements in monitoring releases by installing a new bubbler system and having it independently verified. SRBT has improved the operational performance of the stack and has investigated ways to decrease the tritium releases at the facility.

89. The Concerned Citizens of Renfrew County submitted that the facility should be operated as a closed system which would include internal capture and recycling of fugitive emissions. The intervenor was of the view that SRBT's facility does not meet minimum international standards for tritium handling and that it should be closed or relocated.

90. The Ottawa Riverkeeper expressed its understanding that there are only three or four facilities similar to SRBT in the world and there appeared to have been no learning done between those facilities or the relevant regulators with respect to how the facility can carry out its operations while reducing the emissions. The intervenor concluded that this should be considered by the CNSC to take a precautionary approach to licensing this facility.

91. The Commission inquired whether any developmental process either in Canada or in other comparable countries with respect to nuclear regulation was available that would consider the facility and its impacts on the environment as a whole. CNSC staff responded that there were no international guides for this for this type of facility but that the CNSC staff uses international standards relating to safe handling of tritium and radiation protection. With respect to safe handling practices of tritium, the Commission asked whether CNSC staff was aware of any other studies that have been done or are planned on this specific subject area. CNSC staff noted that it was not aware of such studies.

Conclusion on Operating Performance

92. Considering that there is little information on what would be considered a tritium-processing facility exercising best practices, the Commission is of the view that further study and evaluation of tritium processing facilities in the world should be conducted by CNSC staff. The need to carry out further studies was also discussed in paragraph 36 of this Record of Proceedings.

93. Based on the information received, the Commission is not satisfied with the past performance of SRBT and therefore is not confident that SRBT would be able, at this time, to perform the proposed operations in compliance with the applicable CNSC requirements. Given the history and existing circumstances of this licensee, the Commission is not prepared to allow the operation of the facility as originally applied for by SRBT.

94. However, the Commission is of the view that, under a licence to possess tritium and maintain the facility, SRBT is qualified to carry on the activities that such a licence would authorize while assuring that the environment and public health would be protected under any reasonably foreseeable unplanned event. These activities include the general possession, transfer, management, storage and disposal of nuclear substances. The manipulation of tritium with the objectives to safely store tritium and clean equipment is included in these activities.

95. In this regard, the Commission is of the view that the gaseous emissions of tritium that occur when the facility is not processing are reasonable and will not negatively impact the environment. The Commission further notes that process water, which would result from the activities authorized by the licence, would continue to be released to the municipal sewer. The Commission is of the view that these releases are reasonable and will not negatively impact the environment. Furthermore, the Commission expects that SRBT will continue to ventilate the facility and monitor its emissions under a possession licence.

Performance Assurance

96. In addition to examining past performance, the Commission examined certain aspects of SRBT's operations and management to obtain an indication about the likely acceptable future performance of the facility.

Quality Assurance

97. CNSC staff noted that the quality program for the safe operation of the facility is a documented, planned and interrelated system of processes, approved by SRBT's senior management, identifying how requirements are to be met and how processes are to be

implemented and maintained. CNSC staff concluded that SRBT's quality management program and its implementation meet requirements.

98. SRBT submitted that it was committed to continuous improvement, as demonstrated by its words and actions.

Organizational Management

99. The Commission considered the information provided with respect to SRBT's performance in all safety areas and particularly in environmental protection. Regarding the latter, the Commission notes that SRBT has had to use a third party to carry out its monitoring activities during the current licence period. Furthermore, as noted in paragraph 52 of this Record of Proceedings, the Commission is also of the view that SRBT appears to react to CNSC's compliance activities rather than proactively take measures in a responsible manner to demonstrate it is qualified to carry its activities and make adequate provision for the protection of the environment and the health and safety of the public.

100. The Commission also considered that the CNSC staff has had to increase its regulatory oversight of this facility for a prolonged period due to SRBT's performance.

101. Thus, based on these considerations, the Commission concludes that there exist deficiencies in the organization management. The Commission is of the view that organizational study would be needed to determine what qualified workers and appropriate management capacity are needed at the facility to manage the safety programs, the workers and contractors.

Conclusion on Performance Assurance

102. The Commission is not convinced that SRBT currently has the necessary quality assurance program and organizational management oversight to support a licence for the continued full or restricted operation of the facility. As noted during the licensing hearing[11] held in 2005, the Commission concludes that SRBT has not anticipated and responded proactively to emerging performance problems and issues. The Commission is strongly of the view that licensees, as in the case of SRBT, should not be waiting for regulatory compliance activities to prompt the correction of deficiencies, or to implement program improvements.

[11] Refer to the *Record of Proceedings* on the matter of the *Application for the renewal of the operating licence for SRB Technologies (Canada) Inc.'s gaseous tritium light source facility in Pembroke, Ontario,* date of hearing September 15 and November 30, 2005.

Fire Protection

103. SRBT stated that all fire protection issues are now reviewed by the Pembroke Fire Department and a third party consultant. These parties will also conduct annual inspections of the facility. SRBT noted that all findings from their respective inspections have been addressed and that a revised Fire Protection Program had been submitted to CNSC staff. SRBT also noted that during the current licence period, it has funded the majority of the National Fire Protection Association (NFPA) courses to the Pembroke Fire Department. Furthermore, a sprinkler system, approved by its consultant and the Pembroke Fire Department, is being installed and fire alarm control panel has been installed to monitor the sprinkler fire alarms.

104. CNSC staff stated that SRBT's Fire Protection Program does not meet requirements although the implementation of the program does meet requirements. CNSC staff noted that is was currently reviewing the revised program submitted in April 2006 and the fire hazard analysis. CNSC staff also noted that previous findings have now been addressed by SRBT, including the installation of a sprinkler system. With respect to the National Building Code of Canada and the National Fire Code of Canada, CNSC staff proposed a licence condition for SRBT to comply with the revised 2005 editions.

105. Based on the information received, and considering that SRBT will be making further improvements to its program, the Commission concludes that fire protection at SRBT's facility is adequate for the proposed operations and licence period.

Security

106. Based on security inspections carried out during the licence period, CNSC staff reported that SRBT has made, and will continue to make, adequate provisions to meet all necessary security requirements.

107. Based on this information, the Commission concludes that SRBT has made, and will continue to make, adequate provisions for ensuring the physical security of its facility.

Decommissioning Plan and Financial Guarantee

108. In order to ensure that adequate resources will be available to meet the same regulatory requirements for safety, environmental protection and security during the future decommissioning of SRBT's facility, the Commission requires that adequate plans and financial guarantees for decommissioning and long-term management of waste be put in place and maintained acceptable to the CNSC.

109. SRBT noted that it had hired a consultant to develop a preliminary decommissioning plan (PDP) which was submitted to the CNSC staff in March 2006. SRBT has also looked at various options to obtain funding measures for a financial guarantee. In March 2006, SRBT was successful in establishing a decommissioning fund in which it has been making monthly contributions. SRBT submitted that it was prepared to have this fund in a form that can be secured by CNSC.

110. CNSC staff noted that the current licence includes a condition for SRBT to have an acceptable financial guarantee in place by October 31, 2006. CNSC staff also noted that at the time of the licensing hearing in 2005, SRBT's Preliminary Decommissioning Plan (PDP) was not acceptable. As part of SRBT's Action Plan submitted during the course of that hearing, SRBT had committed to revising the PDP and submitting it by March 17, 2006, which was done. CNSC staff reported that it has reviewed the PDP using CNSC Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities* (2004) as guidance. Comments were sent to SRBT in early July 2006. The only item outstanding is related to the cost estimate and the financial guarantee. As a result, SRBT was advised in early July 2006 that it still had to revise the associated cost estimate. SRBT had not yet met this licence condition at the time of the licence renewal hearing.

111. SRBT explained that it had not yet revised the cost estimate as it had been focusing its efforts on meeting the requirements of the Order issued by the Designated Officer on August 18, 2006 and amended by the Commission on August 30, 2006. SRBT noted that it has committed to provide a revised cost estimate to CNSC staff by January 30, 2007 and a funding proposal by February 28, 2007.

112. In the Record of Proceedings of the licensing hearing held in 2005, the Commission had noted its satisfaction that SRBT was taking the steps necessary to ensure that an acceptable decommissioning plan and related financial guarantee would be in place within the year. In this regard, considering that the cost estimates and financial guarantee are still not acceptable, the Commission is concerned that SRBT has not made every reasonable effort to meet the current licence condition.

113. To ensure that SRBT addresses this matter as a priority, the Commission requires that SRBT have in place, by no later than July 31, 2007, the financial guarantee that represents the cost of the safe shutdown state. This financial guarantee shall be based on the revised cost estimate to be submitted by SRBT by February 28, 2007 and approved by CNSC staff. This would include such activities as the removal of any stock, work in progress, tritium, waste containing tritium and hazardous materials and hazardous waste from the facility on site. The Commission requires that the remaining financial guarantee that represents the final phase to fully decommission the facility be in place no later than May 31, 2008.

International Obligations

114. CNSC staff stated that tritium is not a safeguarded material under the Canada IAEA Safeguards Agreement. However, for the past few years, the IAEA has been implementing new measures to strengthen the international safeguards regime. As a consequence, CNSC staff stated that it is taking steps to ensure that it can respond to any IAEA request concerning nuclear material in Canada, including material that is of little or no safeguards significance. In this regard, CNSC staff proposed safeguards conditions to be added to the operating licence.

115. With respect to import and export of tritium, CNSC staff submitted that SRBT complies with the NSCA to seek regulatory authorization for the export of its products. SRBT supplies all information pertinent to the authorization process when submitting applications for authorization to export controlled nuclear substances pursuant to the requirements of the *Nuclear Non-Proliferation Import and Export Control Regulations*[12].

116. The Commission sought further information with respect to the import and export licences for tritium. In response, CNSC staff assured the Commission that all licences issued to SRBT for import and export of tritium have respected the Canadian non-proliferation policy as well as Canada's international commitments. CNSC staff noted that Canada maintains more stringent controls than the international commitments require, through the requirements in the *Nuclear Non-Proliferation Import and Export Control Regulations* and through Canada's 1986 *Tritium Export Guidelines*.

117. CNSC staff explained that, as required by the *Nuclear Non-Proliferation Import and Export Control Regulations*, section 3(f), for each licence application, detailed information on the end use and end user of each export has been provided by SRBT and this information is verified through a rigorous process that CNSC staff conducts to evaluate the end use and end user. CNSC staff further noted that all exports of tritium require an export licence from the CNSC.

118. With the issuance of a possession licence under the circumstances, the Commission states that SRBT will not be allowed to import, obtain, acquire or receive additional nuclear substances under the licence, unless in relation with article 28(2) of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Consequently, pursuant to section 25 of the NSCA and subsection 8(2) of the GNSCR and effective February 17, 2007, the Commission suspends, until further notice, all import licenses issued to SRBT under the *Nuclear Non-Proliferation Import and Export Control Regulations.* SRBT can apply for import licences in specific circumstances where SRBT requests to import nuclear substances in relation to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

[12] S.O.R. 2000/210.

119. Under the appropriate limitations that will be reflected in the licence, the Commission is of the opinion that SRBT will continue to make adequate provisions in the areas of safeguards and non-proliferation that are necessary for maintaining national security and measures necessary for implementing international agreements to which Canada has agreed.

Public Information

120. SRBT provided an overview of the improvements it has made to its Public Information Program during the current licence period. In this regard, SRBT noted that it had expanded its target audience to include local special interest groups, local media, commercial neighbours, and local businesses. Pamphlets were sent on June 29, 2006 to 12,000 regional residences, businesses, facilities, and organizations. Presentations were made to the municipal council and updates were provided to local groups to provide information on the company, its associated risks and contact number for further information. SRBT also noted that a brochure, which contains more detailed information on tritium and its impacts, is readily available. SRBT has also provided an annual report to the City Council which includes information on emissions, monitoring data, public dose, and other licensing activity and business matters. SRBT noted that it has also developed a new Web site to provide information on community involvement, compliance reports, public meeting notifications, and contact information, among others. SRBT has also submitted that it is finalizing the details to hold an initial annual public information session and concluded that it will evaluate the effectiveness of its program on an annual basis and amend it as necessary.

121. CNSC staff stated that SRBT's Public Information Program was assessed against the criteria found in CNSC Regulatory Guide G-217, *Licensee Public Information Programs* (January 2004), and concluded that the program is acceptable.

122. The Ottawa Riverkeeper noted that SRBT is operating under restrictive operating parameters only because it has been given orders from the CNSC. It is that intervenor's opinion that nothing has come from this licensee to give the public any kind of indication it is committed to protecting the water, air and soil around the facility.

123. Based on the information received, the Commission is satisfied with the improvements made to date and is of the view that SRBT's Public Information Program is adequate for the proposed licence period.

Canadian Environmental Assessment Act

124. Before making a licensing decision, the Commission must be satisfied that all applicable requirements of the *Canadian Environmental Assessment Act* (CEAA) have been fulfilled.

125. In this case, CNSC staff had submitted its recommendation to the Commission on its determination whether an environmental assessment was needed before the renewal of SRBT's operating licence, including the approval of the proposed Precipitation Diversion System (PDS). As the Commission has decided not to renew SRBT's operating licence and does not approve of the PDS, the Commission did not consider CNSC staff's recommendation as it is no longer applicable.

126. However, the Commission considered whether it was required to ensure the conduct of an environmental assessment before the issuance of a possession licence. The Commission notes that the issuance of this licence is made pursuant to subsection 24(2) of the NSCA. Also, the activities authorized under such a licence would involve undertakings in relation to a physical work. Therefore, there is both a project and a trigger under the CEAA.

127. The Commission has determined, however, that the activities authorized by a possession licence are within the scope of the activities previously assessed. Therefore, the project can be excluded by referencing the *Exclusion List Regulations*. The project is excluded on the basis that a CEAA environmental assessment screening decision, completed December 15, 2000, concluded that the operation of the facility, which includes possession of tritium and maintenance of the facility, was not likely to cause significant adverse environmental effects, taking into account the implementation of mitigations measures.

128. As noted in paragraph 15 of this Record of Proceedings, the Commission states that the purpose of establishing classes of licences is to authorize a licensee to carry on activities described in section 26 of the NSCA. In this case, the changes brought by the issuance of a possession licence do not transform the activities authorized under such a licence into a new proposal as these activities are included in the activities authorized under SRBT's current operating licence.

129. The Commission is satisfied that the requirements of the CEAA for an environmental assessment of the activities to be authorized under a possession licence have been fulfilled. The Commission thus concludes that a further environmental assessment under the CEAA is not required for the current licensing action.

Licence Length

130. Based on recent information and recommendations by CNSC staff, SRBT has amended its application for an operating licence from a three-year to an 18-month licence. CNSC staff could not make a recommendation on Day One of the hearing. However, based on information obtained thereafter, CNSC staff recommended on Day Two that the Commission accept and grant the proposed 18-month term.

131. Several intervenors also representing community based organizations and members of the public did not support the renewal of SRBT's operating licence. The Concerned Citizens of Renfrew County submitted that the Commission cannot renew the licence as the continued operation of the facility would be inconsistent with NSCA as it appears impossible to limit risk to the environment. This intervenor, along with several others, expressed the view that the potential impact of the facility on future use of land should also be a consideration for not renewing the operating licence.

132. Based on the information provided and considerations made, the Commission denies SRBT's application for the renewal of its operating licence. The Commission, as expressed in various sections of this Record of Proceeding, is of the opinion that SRBT has not demonstrated that it has made nor will it make adequate provision for the protection of the environment while carrying on the activities that an operating licence would authorize, specifically the processing of tritium.

133. However, the Commission is of the opinion that SRBT is qualified to carry out the activities that would be authorized under a possession licence and will make adequate provision to protect the environment and health and safety of the public while carrying on those activities. Thus, the Commission issues a possession licence to SRBT for an 18-month period.

134. The Commission is of the view that the issuance of a possession licence for an 18-month period will provide regulatory control of the facility and prevent any further impact on the environment. The licence will also allow SRBT to evaluate and plan remediation activities. The licence period will also give the licensee an opportunity to plan its business strategy to set out what is required to be authorized to process tritium, at this location or anywhere else in Canada.

135. With respect to interim reporting, the Commission requests that CNSC staff report to the Commission any non-compliance with the licence.

Conclusion

136. The Commission has considered the information and submissions of SRBT, CNSC staff and intervenors as presented in the material available for reference on the record.

137. Based on this information, the Commission concludes that SRBT's performance has been consistently below requirements during the previous and current licence period. The Commission is not satisfied that SRBT can, at this time, continue its operation of the facility. The Commission, however, is of the view that SRBT can continue to possess tritium and maintain the facility while SRBT evaluates if it can make the necessary improvements to support an application for resumption of the operation of the facility.

138. The Commission has based its decision on the view that the licensee has not taken all reasonable precautions to control the release of a radioactive nuclear substance within the site of the licensed activity and into the environment as a result of the licensed activity, pursuant to paragraph 12(1)(*f*) of the GNSCR. The Commission is also of the opinion that the licensee is not qualified to carry out environmental and effluent monitoring, that the licensee has been unable to explain the events that result in contaminated wells in the area external to the licensee's site perimeter, and that the contributing sources to the groundwater contamination are not well understood, nor identified. Furthermore, the Commission has considered the fact that the licensee has again failed to meet its licence condition to a have an acceptable financial guarantee in place.

139. The Commission concludes therefore that SRBT is qualified to carry on the activities that would be permitted under a possession licence. Furthermore, the Commission concludes that in carrying on those activities, SRBT will 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.

140. The Commission therefore issues, pursuant to section 24 of the NSCA, Nuclear Substance Processing Facility Possession Licence NSPFPL-13.00/2008 to SRB Technologies (Canada) Inc., for its facility located in Pembroke, Ontario. The licence is valid from February 1, 2007 to July 31, 2008.

141. The Commission includes in the licence the conditions described in paragraph 16 of this Record of Proceedings.

142. With this decision, the Commission requests that the CNSC staff report to the Commission if SRBT fails to respect the licence conditions. The Commission notes that appropriate regulatory action will be considered if there is non-compliance on the part of SRB Technologies (Canada) Inc.

143. In addition, pursuant to section 25 of the NSCA and subsection 8(2) of the GNSCR and effective February 17, 2007, the Commission suspends, until further notice, all import licenses issued to SRBT under the *Nuclear Non-Proliferation Import and Export Control Regulations*. SRBT can apply for import licences in specific circumstances where SRBT requests to import nuclear substances in relation to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Linda J. Keen,
President
Canadian Nuclear Safety Commission

Date of decision: January 15, 2007
Date of release of Reasons for Decision: January 31, 2007

Appendix A – Intervenors

Intervenors	Document Number
Concerned Citizens of Renfrew County, represented by Hugh Benevides	CMD 06-H16.2 CMD 06-H16.2A CMD 06-H16.2B CMD 06-H16.2C
Wesley Stuber	CMD 06-H16.3
Bob Nye	CMD 06-H16.4
Alfred G. Villeneuve	CMD 06-H16.5
Families Againts Radiation Exposure (F.A.R.E.), represented by Graham Brown	CMD 06-H16.6 CMD 06-H16.6A
International Institute of Concern for Public Health, represented by Dr. R. Bertell	CMD 06-H16.7
Graham Brown	CMD 06-H16.8
Beatrice Biederman	CMD 06-H16.9
Kathrin Winkler	CMD 06-H16.10
Valence Young	CMD 06-H16.11
Donal O'Grady	CMD 06-H16.12
John A. Bateson	CMD 06-H16.13
Chris Michener	CMD 06-H16.14
Ole Hendrickson	CMD 06-H16.15 CMD 06-H16.15A
Kelly O'Grady	CMD 06-H16.16 CMD 06-H16.16A
Michael O'Grady	CMD 06-H16.17 CMD 06-H16.17A
Peggy Patterson	CMD 06-H16.18
Jim Yuill	CMD 06-H16.19
Linda Reiche	CMD 06-H16.20
Pat Seawright	CMD 06-H16.21
Wayne Peever	CMD 06-H16.22
Phillis Kirby	CMD 06-H16.23
Ashely Chartrand	CMD 06-H16.24
City of Pembroke, represented by Mayor Ed Jacyno	CMD 06-H16.25
Melanie McClelland	CMD 06-H16.26
Paul Schwartzentruber	CMD 06-H16.27
Michelle Poff	CMD 06-H16.28
Dorothy Goldin Rosenberg	CMD 06-H16.29
Lynn Jones	CMD 06-H16.30 CMD 06-H16.30A
Institute of the Environment, University of Ottawa, represented by Charles Caccia	CMD 06-H16.31
Ottawa Riverkeeper	CMD 06-H16.32

Tanya Sennett	CMD 06-H16.33
Derrick Dupuis	CMD 06-H16.34
Carol Gudz	CMD 06-H16.35
Bernie Buechman	CMD 06-H16.36
Edith Hanatschek	CMD 06-H16.37
Gerrie Storr	CMD 06-H16.38
Natalie Jalette	CMD 06-H16.39
Katrina Storr-Stronach	CMD 06-H16.40
Dave Poff	CMD 06-H16.41
Ted Cooper	CMD 06-H16.42
Jennifer Reid	CMD 06-H16.43
Doug Rayner	CMD 06-H16.44
Andrew Reid	CMD 06-H16.45
Pembroke Fire Department	CMD 06-H16.46
Virginia Montelone	CMD 06-H16.47
Beverley Popkie	CMD 06-H16.48
Norman J. Caroll	CMD 06-H16.49
Theresa Malone	CMD 06-H16.50
Larry TerMarsch	CMD 06-H16.51
Marie Poff	CMD 06-H16.52
Fran Dawson	CMD 06-H16.53
1306 citizens of Renfrew County	CMD 06-H16.54
Lori Reid	CMD 06-H16.55
Jennifer A. Joyce	CMD 06-H16.56
Darwin Thomas	CMD 06-H16.57
Loretta Young	CMD 06-H16.58
Patricia Thomas	CMD 06-H16.59
Tammy Premo	CMD 06-H16.60
André R. Pellerin	CMD 06-H16.61
Maureen Cobham and Margaret Jones	CMD 06-H16.62
Leah Mackay	CMD 06-H16.63
Sean Sharpe	CMD 06-H16.64
Marylin Waito	CMD 06-H16.65
Laura Charles	CMD 06-H16.66
Cathy LaRiviere	CMD 06-H16.67
Kool Temp/Valley Refrigeration	CMD 06-H16.68
Brian Pullen, Terence Bartlett, Michael Dougan and Derek Earl	CMD 06-H16.69
Lindsay Jones	CMD 06-H16.70
Chris Graham	CMD 06-H16.71
898702 Ontario Inc.	CMD 06-H16.72
Katie Belec	CMD 06-H16.73
Donna Buder	CMD 06-H16.74
Angela Ferns	CMD 06-H16.75
Christine Gauthier	CMD 06-H16.76
Debbie Gervais	CMD 06-H16.77

Suzanne Grahl	CMD 06-H16.78
Shirley Keller	CMD 06-H16.79
Theresa McCann	CMD 06-H16.80
Josh Rosamond	CMD 06-H16.81
Christina Stewart	CMD 06-H16.82
Lori Trenhaile	CMD 06-H16.83
Chris Mitchell	CMD 06-H16.84
Richard Foster	CMD 06-H16.85
Nathalie Belleau	CMD 06-H16.86
Mary-Ann Foster	CMD 06-H16.87
Kevin Voldock	CMD 06-H16.88
Carolyn Levesque	CMD 06-H16.89
Environmental Advisory Committee, City of Ottawa	CMD 06-H16.90
Brenda St-Pierre	CMD 06-H16.91
Stephen Blok	CMD 06-H16.92
Canadian Coalition for Nuclear Responsibility	CMD 06-H16.93
Rick Bradshaw	CMD 06-H16.94