

**SRB Technologies (Canada) Inc.
CNSC License NSPFOL-13.00/2005
Annual Compliance Report (Rev. 2)
Year 2001**

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2001 Annual Compliance Report

Forward

During the year 2001, SRB Technologies operated under license issued by the Canadian Nuclear Safety Commission designating SRBT(C)I as a Class 1B Nuclear Facility:

? NSPFOL-13.00/2005: Nuclear Substance Processing Facility Operating License

The CNSC issued license expires December 31, 2005.

As SRB Technologies (Canada) Inc. is presently licensed under the CNSC, this Annual Compliance Report is prepared as per the requirements of the CNSC issued license: NSPFOL-13.00/2005.

In accordance with Condition R2 of NSPFOL-13.00/2005, the following report has been prepared for submission to the CNSC for the year 2001.

2001 Annual Compliance Report

Facility Operations

Facility performance

The SRBT(C)I facility has during 2001 operated without any reportable occurrences. In accordance with the recommendations of the CNSC and through management due diligence the following items have been implemented:

- (a) **The Fire Safety Plan has been revised to conform to the OFC/NFC for the facility and has received the approval of the Pembroke Fire Department Officials.**

The SRB Technologies (Canada) Inc. 'Fire Safety Plan', issued November 16, 2002, was developed in an effort to protect the employees, neighbours, and the environment from undue exposure due to the operations of the facility. The plan was developed as part of the Joint Health and Safety committee initiative for ongoing safety training as required in Section 2.8.2 of the Ontario Fire Code and the National Fire Code.

- (b) **The facility positive pressure systems have been upgraded and tested to TSSA requirements.**

All positive pressure piping systems within the SRB Technologies (Canada) Inc. facility have been upgraded and tested to meet the requirements for TSSA standards. The positive pressure systems include the following:

- i) Compressed air- instrument air supply
- ii) Oxygen- glass blowing systems
- iii) Natural gas- glass blowing and filling rig systems
- iv) Acetylene- filling rig system
- v) Carbon dioxide- laser cutting systems

- (c) **The physical security system has been upgraded to meet CNSC requirements.**

The facility security systems have been upgraded to enable early detection and warning of fire and smoke throughout the facility. The enhancements enable accurate determination of the source of any problem situations through the central panel identification system. Further enhancements to the facility were incorporated to reduce the potential for unauthorized access during off hours including increased security on door hinges, electronic door locks, security cages for wall type air conditioner units.

- (d) **Enhanced security measures have been incorporated to mitigate the threat due to terrorist activities.**

A vulnerability assessment of the SRB Technologies (Canada) Inc. facility was carried out in accordance with order # 01-D1 from the CNSC. The following risks were assessed:

- Risk inherent to the transport of typical shipments of nuclear substances to the facility.
- Risk inherent to the transport of present shipments of nuclear substances from the facility.
- Risk of threat and/or sabotage from internal agents.
- Risk of threat and/or sabotage from external agents.

The above risks were reviewed and measures to mitigate those risks were incorporated and submitted to the CNSC.

- (e) **Anti-corrosive and flammable chemical storage systems have been incorporated.**

Several fire proof and anti-corrosive cabinets were procured for the storage of organic flammables and acid/caustic chemicals used in the processes in accordance with requirements of the National Fire Code and the Ontario Fire Code.

Equipment performance

All equipment related to Radiation Safety has been maintained in accordance with the SRBT Radiation Safety Procedures Manual.

The Wallac 1215 and the Wallac 1409 liquid scintillation counters were serviced in accordance with procedure LSC-QA, Liquid Scintillation-QA under contract with Fisher Scientific.

All pipetters and dispensers for sampling methods used in the following procedures were calibration checked and maintained in accordance with procedure RSO-011, Equipment Calibration:

RSO-001	Daily Facility Contamination Monitoring
RSO-004	Bioassay
RSO-006	Stack Monitoring
RSO-007	Environmental Monitoring
RSP-006	Betalight™ Scintillation

All Becton-Dickenson Triton Model 955B tritium-in-air monitors were calibrated and maintained in accordance with procedure RSO-011, Equipment Calibration.

The stack monitoring equipment has been maintained in fully operational condition as per procedure RSO-006, Stack Monitoring. Spare parts are maintained in the event of component failures to minimize downtime. The procedure RSO-006 has been amended to include daily checks on the stack monitoring system to ensure proper operation.

Reportable Occurrences

Safety or Safety-related System Failure

There were no safety or safety-related failures during the year 2001.

Inaccuracy or Incompleteness in the Documents Listed in Appendix A

There were no noted inaccuracies or areas of incompleteness in any of the documents listed in Appendix A of the CNSC license.

Hazard Beyond Safety Report Description

During the year 2001 there were no areas identified that were considered beyond the safety report description.

Environment Monitoring Program

Failure Resulting in Loss of Data Collection

During the year 2001 passive tritium-in-air samplers were sampled on a quarterly basis for the purpose of determining the tritium hydrate concentrations at various points throughout the community. On April 20, 2001, it was noted that one of the sample bottle holders was removed from its post. Upon further inspection it was observed that the holder and its bracket were on the ground and the sample bottle was missing. Further inspection of the remaining sample stations indicated that in total 8 sample bottles were missing. The issue was brought to the attention of the CNSC immediately on April 20, 2001. Replacement samplers were installed within 5 working days. The data lost due to the lost samplers accounted for about 24 days of sampling time.

The local police force was informed of the situation, briefed on the importance of the monitoring program and its components.

SRB Technologies (Canada) Inc. Annual Compliance Report for Year 2001 (Rev. 2)

It was a recommendation from the CNSC that SRBT consider a sampling frequency of monthly for the passive air samplers. This would reduce the effective loss of data to a maximum of one month versus three months of lost data. SRBT has considered this recommendation and had followed through to commence a monthly sampling frequency beginning January 2002.

Calculated Dose Result to Public in Excess of 250-uSv per Quarter

The total effective dose equivalent to any member of the public due to the operations of the SRBT facility did at no time exceed 250-uSv per quarter. This has been determined using the data obtained through the stack monitoring analysis performed on a weekly basis and the results of the analysis of the passive tritium-in-air monitors performed on a quarterly basis. Also included for the purpose of dose assessment is the data from the assessment of tritium in locally grown fruit and vegetables.

Program Amendments

The sample station number 7, which was located at 111 Springfield Crescent, had been moved to a new location at 209 Market Street. The move is not expected to create any noticeable change in monitoring results. The CNSC was informed by fax dated May 4, 2001 with respect to the change.

SRB Technologies (Canada) Inc. Annual Compliance Report for Year 2001 (Rev. 2)

Table 1. 2001 Passive Air Sampler Results and Estimated Individual Dose

Monitor	Time Period	LSC Result (Bq)	H-3 Concentration (Bq/m3)	Delta Time (Days)	Estimated Dose for Period (mSv)
Control (10)	Q1	1.40	3.08	91	
	Q2	0.00	ND	91	
	Q3	0.00	ND	91	
	Q4	4.00	8.80	91	
1	Q1	29.3	61.30	91	0.003
	Q2	*50.5*	126.25	91	0.007
	Q3	75.0	164.8	91	0.009
	Q4	224.4	484.3	91	0.017
	Annual			365	0.036
2	Q1	26.6	58.5	91	0.003
	Q2	*52.0*	130.0	91	0.007
	Q3	41.0	90.1	91	0.005
	Q4	42.3	93.0	91	0.005
	Annual			365	0.020
3	Q1	11.5	22.1	91	0.001
	Q2	*21.3*	53.2	91	0.003
	Q3	34.0	74.7	91	0.004
	Q4	45.1	99.1	91	0.005
	Annual			365	0.013
4	Q1	49.3	105.3	91	0.006
	Q2	*51.3*	128.2	91	0.007
	Q3	20.0	44.0	91	0.002
	Q4	51.2	112.4	91	0.006
	Annual			365	0.021
5	Q1	7.6	13.6	91	0.001
	Q2	*6.0*	15.0	91	0.001
	Q3	11.0	24.2	91	0.001
	Q4	17.9	39.2	91	0.001
	Annual			365	0.004
6	Q1	7.4	13.2	91	0.001
	Q2	*2.6*	6.5	91	0.0003
	Q3	2.0	4.4	91	0.0002
	Q4	13.0	28.6	91	0.001
	Annual			365	0.002
7	Q1	1.5	<0.59	91	<0.00003
	Q2	4.4	11.0	91	0.001
	Q3	2.0	4.4	91	0.0002
	Q4	8.3	18.2	91	0.001
	Annual			365	0.002
8	Q1	1.4	<0.59	91	<0.00003
	Q2	3.4	8.5	91	0.0004
	Q3	3.0	6.6	91	0.0003
	Q4	17.3	38.0	91	0.002
	Annual			365	0.002
9	Q1	5.4	8.7	91	0.0004
	Q2	7.6	19.0	91	0.001
	Q3	8.0	17.6	91	0.001
	Q4	17.5	38.4	91	0.002
	Annual			365	0.008
11	Q1	1.6	0.6	91	0.00003
	Q2	*1.5*	3.75	91	0.0002
	Q3	2.0	4.4	91	0.0002
	Q4	14.6	32.0	91	0.002
	Annual			365	0.002
12	Q1	1.2	<0.59	91	<0.00003
	Q2	0.0	<0.59	91	<0.00003
	Q3	0	<0.59	91	<0.00003
	Q4	12.7	28.0	91	0.001
	Annual			365	0.001
13	Q1	5.5	9.05	91	0.0005
	Q2	*35.2*	88.0	91	0.005
	Q3	117.0	257.1	91	0.013
	Q4	184.5	405.5	91	0.021
	Annual			365	0.039

SRB Technologies (Canada) Inc. Annual Compliance Report for Year 2001 (Rev. 2)

The asterisks in the above table are to indicate the samplers suffered unauthorized removal and the results are based on the activity for the time period following replacement. As per the fax dated April 23, 2001 to CNSC, sampler numbers 1, 2, 3, 4, 5, 6, 11, and 13 were missing as of April 20, 2001.

Defined Critical Group

In accordance with the DEL calculations for the SRBT facility, the critical group was defined hypothetically as an individual that occupies the residence at 400 Boundary Road for 16 hour per day through the week (Mon. to Fri.) and 24 hours per day during the weekend (Sat. and Sun.). That hypothetical individual works at or near the facility for 8 hours per day, 5 days per week (Mon. to Fri.).

Sample 4 shows a dose of 0.021 mSv for 24 hours per day, 7 days per week, which when calculated to the DEL specifications is 0.016 mSv per year plus the dose received at the highest of samples 1 and 13 for 8 hours per day, 5 days per week (Mon. to Fri.) is 0.009 mSv per year.

The maximum dose to that defined individual due to inhalation/ingestion of tritium in the hydrate form is 0.025 mSv per year, representing 2.5% DEL.

Table 2. 2001 Annual Dose Due to Dairy, Fruit and Vegetable Consumption

Samples	Tritium Concentration	Consumption	Annual Dose
	(Bq/L)	(L/da)	(mSv)
Dairy	36.9	0.567	0.0001
Fruit and Vegetables	907.2	0.413	0.003

Calculated Maximum Annual Dose

The maximum dose to the most exposed member of the public for the year 2001 was 0.028 mSv due to inhalation/ingestion and consumption of fruit, vegetables and dairy products based on that person being a working adult working at or near the SRBT facility and living at the residence as described in the DEL calculations for SRBT.

SRB Technologies (Canada) Inc. Annual Compliance Report for Year 2001 (Rev. 2)

2001 Stack Monitoring Results

Table 3. 2001 Weekly Stack Monitoring Results including %DEL for each evaluated component

Week	HTO (TBq)	HT (TBq)	%DEL (public dose limit of 1 mSv/a)		
			Adult worker	Adult non-worker	Infant
1	1.92	7.12	0.45	0.39	0.23
2	0.96	3.56	0.22	0.20	0.12
3	1.90	27.08	0.47	0.42	0.30
4	2.02	27.02	0.50	0.45	0.32
5	1.87	27.35	0.47	0.42	0.30
6	2.23	24.00	0.54	0.48	0.33
7	1.52	2.47	0.38	0.34	0.25
8	1.28	31.26	0.34	0.30	0.25
9	1.28	29.53	0.33	0.30	0.25
10	0.64	24.29	0.18	0.17	0.16
11	1.04	24.94	0.27	0.25	0.20
12	1.49	29.08	0.38	0.34	0.27
13	1.81	30.07	0.46	0.41	0.30
14	2.12	39.35	0.54	0.48	0.37
15	0.45	7.54	0.11	0.10	0.08
16	0.57	13.30	0.15	0.13	0.11
17	1.40	25.34	0.36	0.32	0.24
18	6.07	31.70	1.43	1.26	0.76
19	0.58	23.71	0.17	0.15	0.15
20	0.63	23.00	0.18	0.16	0.15
21	1.88	40.10	0.49	0.44	0.35
22	0.68	20.37	0.18	0.17	0.15
23	1.38	32.88	0.36	0.33	0.27
24	2.76	43.63	0.69	0.62	0.46
25	2.03	47.72	0.53	0.48	0.39
26	1.85	35.57	0.47	0.42	0.33
27	2.50	39.47	0.63	0.56	0.41
28	5.80	17.20	1.38	1.19	0.68
29	1.69	29.73	0.43	0.38	0.29
30	1.47	13.70	0.35	0.31	0.21
31	2.42	25.84	0.59	0.52	0.35
32	3.33	35.25	0.81	0.72	0.48
33	1.59	25.89	0.40	0.36	0.27
34	2.37	27.18	0.58	0.51	0.35
35	1.21	26.56	0.32	0.28	0.23
36	1.74	25.93	0.43	0.39	0.28
37	1.09	21.90	0.28	0.25	0.20
38	1.49	26.18	0.38	0.34	0.26
39	0.90	21.80	0.24	0.21	0.18
40	1.81	19.45	0.44	0.39	0.26
41	2.69	28.29	0.66	0.58	0.39
42	3.03	22.75	0.72	0.64	0.41
43	1.78	30.42	0.45	0.40	0.30
44	3.05	39.89	0.75	0.67	0.47
45	1.85	32.50	0.47	0.42	0.32
46	2.09	1.84	0.48	0.42	0.23
47	0.46	6.57	0.11	0.10	0.07
48	2.19	44.20	0.56	0.51	0.40
49	3.14	12.40	0.73	0.65	0.38
50	2.63	4.31	0.60	0.53	0.30
51	2.89	26.58	0.70	0.62	0.41
52	3.06	7.58	0.71	0.62	0.35
53	0.72	4.57	0.17	0.15	0.09
Ave %DEL			0.47	0.42	0.30

The average %DEL for 2001 based on stack emissions data was calculated to be 0.47% for a working adult, 0.42% for a non-working adult and 0.30% for an infant based on the CNSC regulated annual public dose limit of 1.0mSv per year.

Personnel Nuclear Energy Worker (NEW) Radiation Exposures

The personnel radiation exposures for the 47 SRBT staff monitored under DSL-1-1.0/2005 are summarized in the following table:

Table 4. 2001 Dose Results to NEW's

Year	Dose (mSv)							
	Maximum Annual Dose			Maximum 5-year Dose			Average Annual Dose	Collective Annual Dose
	Actual	SRBT Admin.	CNSC Limit	Actual	SRBT Admin.	CNSC Limit		
2001	3.11	5.0	50.0	6.31	25.0	100.0	0.29	13.65

As shown in Table 4 there were no radiation exposures to SRBT staff in excess of regulatory or administrative limits during the year 2001.

The exposures are significantly low enough to review whether dose monitoring was required, in accordance with CNSC regulatory requirements. However, as the potential to receive a dose in excess of any of the established limits remains probable, the dosimetry program is deemed necessary.

The minimum reportable dose for the applicable sampling periods is 0.005 mSv, therefore the maximum non-reportable dose for any worker on weekly sampling frequency is 0.26 mSv/year.

All internal dosimetry results have been submitted to the National Dose Registry of Health Canada on a timely basis. Reporting has been performed quarterly.

The SRBT dosimetry program is performed under license DSL-1-1.0/2005, issued by the CNSC.

Changes to Organization Structure

There were no major changes to the organizational structure during the year 2001.

The position of Health Physics Technician (H.P. Tech.) has been added to the staff of the Health Physics department. The H.P. Tech. has been added as a compliment to the Corporate Health Physicist (Corp. H.P.) in carrying out the daily regimen of tasks and procedures required to maintain CNSC and ISO-9001 compliance. Further duties and responsibilities added to the H.P. department include the shipping of product to customers worldwide. The H.P. Tech. is to receive ongoing training to compliment the tasks to be performed.

SRB Technologies (Canada) Inc. Annual Compliance Report for Year 2001 (Rev. 2)

SRBT Environment Monitoring Program Results								
Monitor	Analysis Results (Bq/M3)							
	2000				2001			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	110.8	101.3	76.5	80.0	61.3	126.2	164.8	484.3
2	<0.6	54.9	35.5	39.1	58.5	130.0	90.1	84.2
3		34.8	18.9	20.9	22.1	53.2	74.7	90.3
4	131.9	37.0	22.8	34.2	105.3	128.2	44.0	103.6
5		<0.6	5.7	9.0	13.6	15.0	24.2	30.4
6			12.2	10.9	13.2	6.5	4.4	19.8
7	<0.6	<0.6	<0.6	<0.6	<0.6	11.0	4.4	9.4
8	<0.6	<0.6	<0.6	2.9	<0.6	8.5	6.6	29.2
9	15.8	8.4	10.2	10.9	8.7	19.0	17.6	29.6
10	5.5	2.6	3.5	10.1	3.1	<0.6	<0.6	8.8
11	<0.6	<0.6	<0.6	0.7	0.6	3.8	4.4	23.2
12	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	19.2
13	<0.6	61.2	25.9	25.9	9.0	88.0	257.1	396.7