



SHIELD SOURCE INCORPORATED

RADIATION SAFETY ANNUAL REPORT

YEAR 2001

Submitted to:

**Canadian Nuclear Safety Commission
280 Slater Street
P.O. Box 1080
Ottawa, ON
K1P 5S9**

Written by:

**Peggy Hirst
Radiation Safety Officer**

Reviewed By:

**Susanne J. Tanney
General Manager**

Radiation Safety
2001 Annual Report
Shield Source Incorporated
Licence Number: NSPFOL-12.00/2003

Summary:

Shield Source Incorporated (SSI) is a Class 1B Nuclear Facility possessing a Nuclear Substance Processing Facility Operating Licence issued by the Canadian Nuclear Safety Commission (CNSC).

SSI submitted a revised Proposed Environmental Monitoring Program and a Report on Air Dispersion and Environmental Pathway Modeling to CNSC in November 2002. These documents were written by Golder Associates and currently remain under review by the CNSC.

Radiation Safety Personnel:

The Radiation Safety Committee consists of the following:

1. Office Assistant
2. Production Supervisor
3. GTLS Fill Operators (2)

A 3rd GTLS Fill Operator was hired, however all other radiation safety personnel remained the same in 2002.

Radiation safety meetings were held throughout the year with the Radiation Safety Officer (RSO), the Radiation Safety Committee and all other SSI employees. New and/or existing projects, procedures, policies, problems or concerns were discussed at each meeting. Topics such as operating procedures, liquid scintillation counting, bioassay procedures, emergency procedures and environmental monitoring were reviewed.

Tritium Use:

Shield Source fills phosphor coated borosilicate glass tubes with tritium gas and manufactures Egress signs.

In 2001 1.27×10^{16} Bq of domestic tritium and 3.75×10^{15} Bq of imported tritium was purchased totaling 1.65×10^{16} Bq.

7.87×10^{14} Bq were manufactured into light sources and shipped to various customers in Canada.

1.82×10^{16} Bq were manufactured into light sources and exported to various countries.

Shield Source is not equipped for tritium reclamation, therefore a total of 2.11×10^{15} Bq of tritium in light sources were exported for reclamation in 2001.

Contamination Control Program:

Surface contamination swabs were taken throughout the facility each week and analyzed through liquid scintillation. If an area was found to be above SSI criteria then the source of contamination was investigated. The area was washed and re-swabbed until criteria were met. No significant contamination problems occurred in 2001.

Incidents:

No incidents occurred that resulted in emission levels or personal exposures to exceed administrative or regulatory limits.

Personnel Dosimetry:

Personal radiation exposures for all employees were below the administrative limits. Attached in appendix A is a copy of the Year 2002 Radiation Exposures Summary for employees. As shown in appendix A, the dose levels ranged from 0.017 mSv to 1.743 mSv. The dose level for employees is directly related to the amount of time worked and the type of duties performed.

Waste Management:

Shield Source did not use a municipal garbage system for waste disposal in 2001. All waste was either recycled or shipped to Atomic Energy of Canada Limited in Chalk River for disposal.

There were 5 shipments of waste totaling 3.70×10^{12} Bq sent to Chalk River Laboratory in 2001. The following waste quantities were released to Chalk River:

5.01 m³ of general waste went into low-level sand trench, containing a total of 3.81×10^9 Bq.

1.92 m³ of contaminated waste went into Irus bunker, containing a total of 3.73×10^{12} Bq.

Waste water from Shield Source is currently collected into two holding tanks, analyzed and then discharged into a septic system. The septic tank was pumped out weekly and its contents were land spread according to the Waste Water Disposal Procedure in the SSI Radiation Safety and Procedure Manual.

A total of 28691 liters of waste water was released from the SSI holding tanks into the septic system. This waste water contained a total of 2.91×10^8 Bq, having an average of 1.01×10^4 Bq/L. The waste water was analyzed prior to being released into the septic system.

A total of 2.70×10^{13} Bq of Tritium Oxide and 1.05×10^{14} Bq of Tritium Gas were released to the atmosphere. These quantities meet both the regulatory and administrative emission requirements.

Environmental Monitoring Program (EMP):

In November 2002 SSI submitted to the CNSC two documents entitled "Proposed Environmental Monitoring Program" and "Air Dispersion and Environmental Pathway Modeling" written by Golder Associates revising SSI's Environmental Monitoring Program, Pathway Model Assessments and Derived Emission Limit calculations according to REPD's recommendations. These documents currently remain under review by the CNSC.

Environmental samples were collected monthly by SSI and sent to Monsenco Laboratories for analysis. The annual EMP report is attached under separate cover for review. This report includes a summary of the environmental monitoring results, including emissions data and critical group dose calculations and a summary of local land usage, meteorological data and unusual releases.

Radiation Safety Training:

Radiation Safety Meetings were held throughout the year with staff for approximately 1 hour each. New and/or existing projects, procedures, policies, problems or concerns were discussed at each meeting. Topics such as rig operating procedures, liquid scintillation counting and emergency procedures were reviewed.

The Production Supervisor and the Administrative Assistant remained as backup RSOs and were kept apprised of all radiation safety matters. Laboratory procedures and RSO duties were frequently reviewed.

Future Outlook:

Since the events of September 11, 2001, the market has seen a steady decline therefore new marketing techniques are being reviewed and implemented in order to stimulate revenue.

In 2002 SSI worked with a customer developing prototype signs. SSI plans to continue research and develop new products in order to explore foreign markets.

Appendix A

Personal Radiation Exposures

Job Classification	Job Description	2001 DOSE (mSv)				Total Dose
		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
0002	Office	0.007	0.006	0.006	0.005	0.024
0048	Office, Maintenance	0.335	0.164	0.279	0.175	0.953
0048	Machine Operator	0.448	0.643	0.349	0.367	1.807
0003	Office	0.005	0.064	0.003	0.037	0.109
0002	Office	-	0.005	0.009	0.009	0.023
0002	Office	0.005	0.009	0.006	0.004	0.024
0048	Machine Operator	0.215	0.082	-	-	0.298
0048	Assembly	0.011	0.005	0.003	0.003	0.022
0048	Assembly	0.003	0.010	0.004	0.007	0.024
0002	Office	0.006	0.005	0.003	0.002	0.016
0048	Machine Operator	0.266	0.644	0.500	0.471	1.881

Note: - employee absent and no urine samples were taken