2000 ANNUAL REPORT ON

ENVIRONMENTAL MONITORING PROGRAM
SHIELD SOURCE INC.

Submitted to:

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EXECUTIVE SUMMARY

The monitoring program conducted in 2000 and discussed in this annual report was based on Twin Oaks (1997) in order to comply with permit requirements. However, it should be noted that changes to the current DELs and monitoring program have been suggested by SSI (Golder Associates 2000).

Stack emissions exceeded the AL during the week of August 18-24, 2000 due to human error that caused gas to contaminate fill machine oil. The act of changing the oil in the fill machines on August 19, 2000 caused an HTO reading in excess of the AL. All other emissions for 2000 were within the AL and therefore within the DEL as calculated by Twin Oaks (1997).

The water monitoring data suggest that deposition of tritium occurs primarily to the northeast with some deposition to the southwest within 600 m of the SSI stack. Tritium activity was approaching background levels in water samples collected from locations within 1500 meters of the SSI stack. No significant monthly trends in tritium activity were identified for either the air or water monitoring data.

The air monitoring data also suggest that deposition of tritium occurs primarily to the northeast within 600 m of the SSI stack. Air and water monitoring data do not reflect the spike in tritium oxide emissions that occurred from August 18 to 24.

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1. INTRODUCTION

1.1 Background Information

This Environmental Monitoring report is to be the environmental monitoring portion of Shield Source Inc.'s (SSI's) 2000 annual report to the Canadian Nuclear Safety Commission ("CNSC"). This report contains a summary of the environmental monitoring results including stack emissions, air and water monitoring data. In addition, a summary of the local land usage, meteorological data and unusual releases is included.

The revised environmental monitoring program (EMP) submitted to CNSC is still under review. Consequently, the monitoring program conducted in 2000 was consistent with that previously proposed by Twin Oaks Consulting (TOC).

1.2 Land Use Within the Monitoring Program Area

On January 30, 2001, [redacted] of Golder Associates' Whitby Office accompanied by [redacted], Production Supervisor of SSI, conducted a land use survey within the monitoring program area. Specifically, the land use survey was conducted in the eastern end of North Monaghan Township, adjacent to the SSI facility, and in the western end of Otonabee Township, within a 10 km radius of the SSI facility. The portions of the two townships included in the survey are located in the prevailing down-wind direction from the SSI facility. A map of the study area is included in our previous report entitled "Shield Source Inc. Proposed Environmental Monitoring Program", dated May, 2000.

The survey was conducted by observing land use from publicly accessible roads. It should be noted that icy road conditions were experienced at the time of the survey, and that not all roads within the area defined above were accessible by vehicle. Further, snow cover was present, precluding a detailed survey of some land uses (e.g., differentiation of crop land vs. pasture).

North Monaghan Township

The land use within the subject portion of North Monaghan Township generally consisted of rural residences, rural commercial operations (often within or adjoining rural residences), crop land, livestock agriculture and forest and wetland areas. Commercial and light industrial land uses were noted on the Peterborough Airport property, on which the subject facility is also located.

Otonabee Township

The land use within the subject portion of Otonabee Township generally consisted of:

- rural residences;
- the small hamlets of Assumption, Campbelltown, Crystal Springs, Stewart Hall, Wallace Point, Yankee Bonnet, and Zion;
- residential development adjacent to the Town of Peterborough City Limits;
- crop agriculture;
- livestock (predominantly cattle and horse farms) agriculture;
- commercial enterprises, including rural operations and those associated with residences or agriculture (e.g., farm machinery repair, auto wreckers, gas stations);
- a golf course;
- Mark S. Burnham Provincial Park; and,
- undeveloped forest and wetland areas.

The dominant land use within the subject portion of Otonabee Township was agriculture (crop and livestock).

1.3 Environmental Monitoring Locations

Ambient air and water sampling locations in 2000 were consistent with those identified by TOC, with SSI conducting the sampling throughout the year. The sampling locations and distances from the stack are summarized in the table below.

Table 1
2000 Sampling Locations

Location	Water	Air	Approximate Distance and Direction from Stack
Tap Water Blank	W17		
Field Sample	W16		
Well House	W15	A1	120 m northeast
Hydro Pole		A2	150 m southeast
Tap Water Airport Terminal/Environment	W5	A4	240 m southeast
Airport Road Culvert	W6		870 m south
Cavan Creek	W7	A7	1500 m south
Fraserville Access	W8	A13	2500 m south
Sign at Airport Entrance		A5	210 m east
Pond Across from SSI	W1	A11	220 m northeast
Chain Link Fence Mel O'Brien Way		A3	210 m northwest
Tree Line West of Stack	W3	A12	210 m southwest
Tree Line South of West Stack	W2	A8	570 m southwest
Sign at Corner of Mel O'Brien Way		A6	150 m northeast
Culvert – Mervin Line West	W4		500 m northwest
Mervin Line – Otonabee River	W9	A10	1625 m northeast
Culvert at HWY 115 Access	W10		1250m north
Culvert at Beardsmore Road	W11	A15	1500 m north
Worboy Court	W12		1875 m north
Monaghan Road – Otonabee River	W13		5000 m northeast
Mahood Line		A14	2750 m east
Matchette Line	W14	A9	2750 m east
[redacted] Farm			
SSI Compound			<50 m

2. SUMMARY OF ENVIRONMENTAL MONITORING RESULTS

2.1 Stack Emissions

2.1.1 Daily, Weekly, Monthly and Yearly Emission Data

The SSI sampling program at SSI and surrounding area consists of three types of samples collected – stack emissions, ambient air samples and ambient water samples. The results of stack sampling are described below. The results of ambient air sampling are provided in Section 2.2 and ambient water data is provided in Section 2.3.

Daily records of total (HTO+HT) stack emissions for the 2000 reporting year, stack emission HT activity readings taken on specific days, and the resulting calculated HTO emission activities were provided to Golder Associates by SSI. The HTO/HT data was in turn used to calculate weekly and monthly HTO and HT emission activity.

According to the SSI "Radiation Safety and Procedure Manual" (i.e., the Manual) HT stack emission activity readings are required on the last day of a seven day interval in order to calculate weekly HTO and HT emission activity. When HT activity readings were not taken on the last day of the seven day interval (e.g., reading skipped, reading occurred in the middle of the interval, etc.), weekly HT and HTO stack emission activities were calculated using a pro-rated average that employed the same principles as the monthly HTO and HT activity calculations defined on page 23 of the Manual. For 2000, approximately 25% of the weekly HT readings were performed on the last day of the seven day interval, leaving 75% of the data as pro-rated average calculations. Rounding errors associated with the pro-rated average calculations resulted in the negligible under-reporting of 6 Ci for 2000, or approximately 0.2% of the total HTO and HT stack emissions reported by SSI. Using the weekly data, monthly HTO and HT activities were calculated using the formula defined on page 23 of the Manual. Yearly HTO and HT stack emissions activities were calculated by summing the monthly data. The totals mentioned above are reported in Section 2.1.2.

Using the data provided by SSI, weekly and yearly HTO and HT stack emissions were summarized and compared to the Derived Emissions Limit (DEL) and the Administrative Limit (AL) values originally calculated by Twin Oaks Consulting (TOC) in 1997. The Manual indicates that the AL is 1% of the DEL. A summary of the weekly and yearly DEL and AL values (in Curies only) is included in Table 2.

Table 2
Weekly and Yearly DEL and AL Values

Description	TOC	
	DEL (Ci)	AL (Ci)
HTO per Week	2,688	27
HT per Week	155,225	1,552
HTO per Year	139,776	1,398
HT per Year	8.07E+06	80,717

The yearly and weekly data is provided in Section 2.1.2 below.

2.1.2 Exceedences of the DEL and AL

Yearly Stack Emissions

The total HTO and HT stack emissions for 2000 did not exceed the respective yearly DELs or ALs calculated by TOC (Table 3).

Table 3
Annual Stack Emissions Compared with DEL and AL

Year	TRITIUM OXIDE (HTO) PER YEAR (Ci)			TRITIUM GAS (HT) PER YEAR (Ci)		
	STACK EMISSIONS	Twin Oaks		STACK EMISSIONS	Twin Oaks	
		DEL 139,776	AL 1,398		DEL 8.07E+06	AL 80,717
		Exceedance of DEL or AL (% exceeded by)			Exceedance of DEL or AL (% exceeded by)	
2000	861.714	--	--	2,481.990	--	--

Notes:
DEL = Derived Emission Limit
AL = Administrative Limit (= 1% of DEL)

Weekly Stack Emissions

The weekly HTO and HT stack emissions activities did not at any time during 2000 exceed the weekly DEL values (Table 4).

The HTO stack emissions activity from the week of August 18 to 24, 2001 exceeded the weekly AL by 58% (Table 4).

No weekly HT stack emissions activity exceeded the weekly AL at any time in 2000 (Table 4).

2.1.3 Explanation for Exceedances (Unusual Occurrences)

The exceedance of the AL (as determined by the TOC calculations) from the week of August 18 to August 24, 2001 was related to an incident documented in the report entitled "*DRAFT COPY, Radiation Safety 2000 Annual Report*" by SSI. According to the report, the HTO emission of 40.5 Ci (1.5 TBq) was related to human error that caused gas to contaminate the oil in the fill machines. The act of changing the oil in the fill machines on August 19, 2000 caused an HTO reading in excess of the AL as calculated by TOC. Stack emissions below the AL were observed subsequent to the oil change.

2.1.4 Data Trends

Stack emission data did not show an identifiable correlation with seasonal change. A comparison of monthly HTO and HT stack emissions values in 2000 with those from 1999, shows no observable repetition of annual trends.

However, HTO stack emissions generally increased from the beginning of the reporting year until the oil change in the fill machines on August 18, 2000, as documented by SSI. Subsequent to that event, HTO stack emissions generally decreased. Further, HT stack emissions were generally lower (prior to the oil change).

Table 4
Weekly Stack Emissions Compared with DEL and AL

DATE FROM	DATE TO	TRITIUM OXIDE (HTO) PER 7(1) DAYS (Ci) STACK EMISSIONS (2)	Twin Oaks DEL 2,688	Twin Oaks AL 27	TRITIUM GAS (HT) PER 7(1) DAYS (Ci) STACK EMISSIONS (2)	Twin Oaks DEL 155,225	Twin Oaks AL 1,552
			Exceedance of DEL or AL (% exceeded by)			Exceedance of DEL or AL (% exceeded by)	
Dec 24	Dec 30	26.198	--	--	0.000	--	--
Dec 31	Jan 6	22.854	--	--	14.613	--	--
Jan 7	Jan 13	12.819	--	--	20.604	--	--
Jan 14	Jan 20	7.534	--	--	23.366	--	--
Jan 21	Jan 27	8.696	--	--	72.651	--	--
Jan 28	Feb 3	8.780	--	--	26.855	--	--
Feb 4	Feb 10	7.866	--	--	7.634	--	--
Feb 11	Feb 17	9.349	--	--	28.030	--	--
Feb 18	Feb 24	9.348	--	--	8.403	--	--
Feb 25	Mar 2	10.375	--	--	8.270	--	--
Mar 3	Mar 9	10.968	--	--	6.123	--	--
Mar 10	Mar 16	14.531	--	--	23.604	--	--
Mar 17	Mar 23	12.608	--	--	22.637	--	--
Mar 24	Mar 30	12.567	--	--	25.525	--	--
Mar 31	Apr 6	13.267	--	--	39.012	--	--
Apr 7	Apr 13	13.267	--	--	22.886	--	--
Apr 14	Apr 20	24.044	--	--	116.346	--	--
Apr 21	Apr 27	23.277	--	--	11.514	--	--
Apr 28	May 4	24.353	--	--	54.635	--	--
May 5	May 11	25.135	--	--	38.975	--	--
May 12	May 18	25.272	--	--	72.301	--	--
May 19	May 25	21.968	--	--	15.361	--	--
May 26	Jun 1	23.038	--	--	17.170	--	--
Jun 2	Jun 8	25.724	--	--	15.420	--	--
Jun 9	Jun 15	19.782	--	--	21.160	--	--
Jun 16	Jun 22	15.183	--	--	23.125	--	--
Jun 23	Jun 29	23.046	--	--	15.838	--	--
Jun 30	Jul 6	19.414	--	--	10.035	--	--
Jul 7	Jul 13	24.372	--	--	39.190	--	--
Jul 14	Jul 20	23.442	--	--	14.825	--	--
Jul 21	Jul 27	18.759	--	--	18.815	--	--
Jul 28	Aug 3	15.007	--	--	42.296	--	--
Aug 4	Aug 10	16.869	--	--	19.308	--	--
Aug 11	Aug 17	20.116	--	--	13.710	--	--
Aug 18	Aug 24	42.617	--	58%	93.758	--	--
Aug 25	Aug 31	17.627	--	--	49.821	--	--
Sep 1	Sep 7	18.442	--	--	38.736	--	--
Sep 8	Sep 14	18.455	--	--	76.242	--	--
Sep 15	Sep 21	14.870	--	--	88.519	--	--
Sep 22	Sep 28	13.794	--	--	71.280	--	--
Sep 29	Oct 5	14.934	--	--	71.266	--	--
Oct 6	Oct 12	14.008	--	--	57.221	--	--
Oct 13	Oct 19	16.358	--	--	93.139	--	--
Oct 20	Oct 26	16.151	--	--	105.054	--	--
Oct 27	Nov 2	18.050	--	--	51.927	--	--
Nov 3	Nov 9	7.450	--	--	56.447	--	--
Nov 10	Nov 16	7.450	--	--	76.316	--	--
Nov 17	Nov 23	8.058	--	--	94.678	--	--
Nov 24	Nov 30	7.848	--	--	97.312	--	--
Dec 1	Dec 7	8.338	--	--	91.357	--	--
Dec 8	Dec 14	7.953	--	--	116.295	--	--
Dec 15	Dec 21	8.753	--	--	152.623	--	--
Dec 22	Dec 28	7.533	--	--	59.588	--	--
Dec 29	Jan 2	3.195	--	--	40.543	--	--

Notes:

DEL = Derived Emission Limit

AL = Administrative Limit (= 1% of DEL)

(1) = Note that reading for Dec. 29, 2000 to Jan. 02, 2001 encompasses only 5 days.
DEL, AL and exceedances are pro-rated for this interval for comparison purposes.

(2) = 24% of HTO/HT emission values based on actual readings, 76% based on pro-rated calculations

Other than one weekly AL exceedance, the activity of HTO stack emissions remained within a relatively uniform range. By comparison, the HT stack emissions fluctuated within a much greater range. Further, a given spike in the HT stack emissions concentration was not necessarily related to a spike in the HTO stack emissions.

2.2 Ambient Air Data

2.2.1 Sampling Method

Passive air monitors were used to assess tritium activity in air. The samplers consist of scintillation vials filled with distilled water and capped with a diffusion cap (designed by Ontario Hydro Technologies). Tritium oxide and tritium gas diffuse into the vial and dissolve in the distilled water. Ethylene glycol is added to the distilled water during the winter months to prevent freezing. The samplers are deployed one metre above the ground by attaching them to an available surface (post, tree). The sampler is attached so that it always faces the SSI facility. A small plastic plant pot is suspended in the inverted position over the sampler to protect it. The sampler is left for one-month period and then retrieved for analysis. The sampling liquid is analyzed by scintillation counting.

The passive air monitoring data must be converted from Bq/L in sampling liquid to Bq/m^3 in air. There is no standardized and accepted calculation for this conversion. Numerous assumptions must be made in order to estimate the volume of air sampled by a passive device. The conversion calculation and the assumptions made are presented in Appendix I.

2.2.2 Results

The ambient air monitoring data collected during 2000 is provided in Table 5.

Based on the assumptions used to convert the passive sampling data from Bq/L in sampling liquid to Bq/m^3 in air, tritium activity in air averaged over the year 2000 sampling period, was estimated to be less than 3 Bq/m^3 at all sample locations.

Table 5
Ambient Air Monitoring Data (Bq/m^3)[1]

ENVIRONMENTAL AIR SAMPLES [Bq/m^3]

DATE	Station 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
12-Jan-00	1.59	1.02	0.42	0.42	0.42	0.49	0.47	1.45	0.42	—	0.68	1.78	0.42	0.42	—
29-Feb-00	0.19	0.40	0.19	0.19	0.19	12.6	12.5	12.8	0.19	—	0.19	0.71	0.45	0.22	—
17-Mar-00	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	—	0.54	0.54	0.54	0.54	—
01-May-00	0.88	0.45	0.23	0.23	0.23	0.74	0.23	0.28	0.23	—	0.23	0.60	0.23	0.23	—
23-May-00	4.98	0.43	0.50	1.00	0.90	1.98	—	0.43	0.43	—	0.66	—	—	0.43	—
21-Jun-00	1.83	—	0.35	0.35	0.35	2.13	0.36	0.35	—	—	—	0.37	0.35	0.35	—
19-Jul-00	3.26	4.46	0.65	0.62	0.99	2.22	0.33	0.43	0.33	—	1.08	0.33	—	0.33	—
22-Aug-00	2.02	1.63	0.36	0.51	0.55	0.77	0.30	0.30	0.30	—	—	0.30	0.30	0.30	—
20-Sep-00	3.27	2.28	1.16	1.37	1.34	2.57	0.69	1.07	0.68	—	—	0.92	0.64	0.88	—
19-Oct-00	2.76	1.60	0.34	0.51	0.71	1.51	0.34	0.42	0.34	—	1.51	0.59	0.34	0.34	—
21-Nov-00	1.10	—	0.32	0.32	0.56	0.44	0.32	0.32	0.32	—	0.46	0.32	—	0.32	—
Average	2.04	1.42	0.46	0.55	0.62	2.4	1.6	1.7	0.38	—	0.67	0.65	0.41	0.40	—
Maximum	4.98	4.46	1.16	1.37	1.34	12.6	12.5	12.8	0.68	—	1.51	1.78	0.64	0.88	—
95th Percentile	4.13	3.59	0.90	1.19	1.16	7.57	7.16	7.13	0.62	—	1.36	1.39	0.61	0.71	—
Distance from Stack m	120	150	210	240	210	150	1500	570	2750	1625	220	210	2500	2750	1500
Direction	NE	SE	NW	SE	E	NE	S	SW	E	NW	NE	SW	S	E	N

— no sample collected or analyzed

1 Derived from Bq/L results (Appendix I)

The highest annual average tritium activities were 2 and 2.4 Bq/m^3, collected from sample locations 1 and 6, respectively. Sample locations 1 and 6 are located 120 and 150 meters northeast of the SSI stack, respectively. The monthly measurements from locations 1 and 6 also tended to be greater than at other locations.

The maximum monthly measured tritium activities were from sample locations 6, 7 and 8, collected on February 29. The estimated activities were 13 Bq/m^3 at each location. The elevated activities do not correspond to a peak in tritium emissions from the facility during the same time period. In addition, these sample locations are located at different distances and directions from the SSI stack. The elevated tritium activities in these samples may be a result of cross contamination during sampling, storage or analysis.

In general the tritium activity estimates in air decrease with progressive distance from the SSI stack.

2.3 Ambient Water Monitoring

2.3.1 Sampling Method

Water samples from 17 locations were collected and analyzed on a monthly basis. Water samples were collected in suitable sample bottles and triple rinsed with the sample water. The water samples were analyzed by scintillation counting.

2.3.2 Results

The ambient water monitoring data collected during 2000 are provided in Table 6.

The highest monthly and annual average tritium activities were detected in samples from locations 15 and 1. Sample locations 15 and 1 are located 120 and 220 meters northeast of the SSI stack, respectively. Elevated tritium activities were also observed in sample locations 2 and 3. Sample locations 2 and 3 are located 570 and 210 meters southwest of the SSI stack, respectively.

There is moderate variability among the monthly measurements in the samples collected from the same location. However there does not appear to be a monthly tritium activity trend among the locations.

Overall there is a distinct trend of decreasing activity in water with distance from the SSI stack. Tritium activity in most samples collected from locations greater that 1500 meters from the SSI stack was less than the detection limit.

Of the samples collected from locations greater than a 1000 metres from the stack, there appears to be elevated tritium activity in samples collected on September 20. The elevated activity is also observed in the field control sample (16) and the tap water control sample (17). These elevated activities may have resulted from cross contamination during the sampling, storage or analysis.

Table 6
Ambient Water Monitoring Data (Bq/L)

ENVIRONMENTAL WATER SAMPLES [Bq/L]																	
	Station																
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
12-Jan-00	3030	—	582	202	151	<50	113	204	<50	56.8	<50	<50	<50	<50	3174*	<50	<50
29-Feb-00	2525	540	862	<50	<50	169	171	<50	<50	<50	57.6	52.9	100.2	<50	67.6*	<50	<50
17-Mar-00	2078	456	477	115	<50	131	<50	<50	<50	84.7	<50	<50	<50	<50	5281*	<50	<50
01-May-00	1427	488	1163	138	<56	141	<56	<56	<56	<56	<56	<56	<56	<56	2984*	<56	<56
23-May-00	1248	755	492	173	<51	136	<51	<51	<51	<51	<51	64.7	<51	<51	3127*	<51	<51
21-Jun-00	987	509	275	90.7	<55.2	<55.2	<55.2	<55.2	<55.2	<55.2	<55.2	<55.2	<55.2	<55.2	4054*	<55.2	<55.2
19-Jul-00	2824	285	413	134	<49.6	145	<49.6	—	<49.6	<49.6	<49.6	<49.6	<49.6	<49.6	3317*	<49.6	<49.6
22-Aug-00	1083	n/a	—	86.7	<54.7	70.7	<54.7	—	145	<54.7	<54.7	<54.7	<54.7	<54.7	3101*	<54.7	<54.7
20-Sep-00	1270	235	—	203	105	181	84.0	108	96.0	150	144	136	125	121	2797*	109	116
19-Oct-00	1746	321	—	115	<53.2	113	<53.2*	<53.2	<53.2	75.3	75.3	<53.2	<53.2	<53.2	3316	<53.2	<53.2
21-Nov-00	2380*	435	706	<57.4	<57.4	263	<57.4	<57.4	<57.4	<57.4	<57.4	<57.4	<57.4	<57.4	2523	<57.4	<57.4
Average	1951	447	621	124	67	132	69	76	65	67	64	62	64	59	3088	58	58
Maximum	3030	755	1163	203	151	263	171	204	145	150	144	136	125	121	5473	109	116
95th Percentile	2906	669	1058	202	128	222	136	166	121	117	110	100	113	89	5192	83	87
Distance from Stack m	220	570	210	500	240	870	1500	2500	1625	1250	1500	1875	5000	2750	120	Field	Tap
Direction	NE	SW	SW	NW	SE	S	S	S	NE	N	N	N	NE	E	NE	Control	Water

— no sample collected or analyzed
* value is an average of three samples

3. SUMMARY

The monitoring program conducted in 2000 and discussed in this annual report was based on Twin Oaks (1997) in order to comply with permit requirements. However, it should be noted that changes to the current DELs and monitoring program have been suggested by SSI (Golder Associates 2000).

Stack emissions exceeded the AL during the week of August 18-24, 2000 due to human error that caused gas to contaminate fill machine oil. The act of changing the oil in the fill machines on August 19, 2000 caused an HTO reading in excess of the AL. All other emissions for 2000 were within the AL and within the DEL.

The water monitoring data suggest that deposition of tritium occurs primarily to the northeast with some deposition to the southwest within 600 m of the SSI stack. Tritium activity was approaching background levels in water samples collected from locations within 1500 meters of the SSI stack. No significant monthly trends in tritium activity were identified for either the air or water monitoring data.

The air monitoring data also suggest that deposition of tritium occurs primarily to the northeast. Air and water monitoring data do not reflect the spike in tritium oxide emissions that occurred from August 18 to 24.

4. CLOSURE

We trust that this report is suited to your requirements. If you have any questions regarding the material contained herein, please contact the undersigned [redacted] at [redacted], or [redacted] at [redacted].

Thank you,

GOLDER ASSOCIATES LTD.

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APPENDIX I

CONVERSION CALCULATIONS

CONVERSION FROM BQ/L TO BQ/M^3 IN PASSIVE SAMPLERS

The laboratory analysis results for the air monitoring stations have been provided to SSI on the basis of the tritium activity in the liquid from the collection vials. However, these results must be converted to concentrations activities before they can be used. The method used for the conversion has been derived from the approach provided to SSI by Ontario Power Generation (OPG).

To illustrate how the conversion would be applied to SSI, it has been applied to a worked example. In the example, a sample collected over a period of 15 days was found to have a tritium level of 150.2 Bq/L in the sample vial liquid.

The conversion includes several steps, the first of which is the conversion of the laboratory disintegrations per minute per millitre (ml), as follows:

$$150.2\, {}^{Bq}\!/\!_{L} \times 0.001\, {}^{L}\!/\!_{mL} \times 60\, {}^{dpm}\!/\!_{Bq} = 9.012\, {}^{dpm}\!/\!_{mL}$$

This activity level was then converted to an activity per unit of time by incorporating the duration of the sampling in the following manner:

$$\frac{9.012\, {}^{dpm}\!/\!_{mL}}{15\, days \times 24\, {}^{hr}\!/\!_{day}} = 0.025 \frac{dpm}{hr \times mL}$$

Based on the OPG methodology, the sampling vials should pick up tritium activity at a rate of:

$$5000 \frac{dpm}{DAC \times hr \times mL}$$

The derived air concentration (DAC) to which the vial was exposed can be calculated by taking the ratio of the activity in the vial and the OPG reference level:

$$\frac{0.025 \, {}^{dpm}\!\big/_{(hr \times mL)}}{5000 \, {}^{dpm}\!\big/_{(DAC \times hr \times mL)}} = 5.00 \times 10^{-6} \, DAC$$

According to the OPG memorandum, each DAC unit is equal to 10 $\mu Ci/m^3$. By substituting this value into the above formulae and converting to Becquerels, the airborne concentration was calculated as:

$$5.00 \times 10^{-6} \, DAC \times 10 \frac{{}^{\mu Ci}\!\big/_{m^3}}{DAC} \times 37000 \, {}^{Bq}\!\big/_{\mu Ci} = 1.852 \frac{Bq}{m^3}$$

This conversion was applied to all of the laboratory results from the SSI air monitoring stations. The results from these calculations are presented in Table 5.