

7.0 DISPERSION MODELLING RESULTS

The Beaches and South Riverdale domains were examined separately to gain insight on the contribution of the ABTP to each community. Each of the four ABTP scenarios were modelled with the 1996 meteorology for all seventeen (17) Chemicals of Concern (COC) using the appropriate building and emission profile developed above.

The CALPUFF model produced short term (1-hour and 24-hour) and annual average concentrations of the COCs over each of the study areas. The results of the modelling were compared to the Ontario Ambient Air Quality Criteria (AAQC) as well as the 24-hour time-averaged health benchmarks.

7.1 COMPARISON OF PREDICTED COC CONCENTRATIONS TO ONTARIO AIR QUALITY STANDARDS OR CRITERIA

The maximum predicted concentrations in each community are compared to the Ontario AAQC/POI of each COC in Table 7-1 and Table 7-3, respectively. These tables present the maximum predicted hourly, 24-hr and annual concentrations in each of the two communities, independently.

As illustrated, 16 of the 17 COCs meet their appropriate AAQC/POI for all time-averaging periods and scenarios. The only exception is B[a]P which exceeds the AAQC/POI for most time periods and scenarios other than the 24-hour and annual time averages on the future scenario (Scenario #4). Laboratory instruments used in the measurement of B[a]P at ABTP indicated that B[a]P was below the instrument's detection limit. The B[a]P emissions were estimated using the instruments minimum detection limit and this approach would tend to overestimate the amount of B[a]P released into the atmosphere.

Hydrogen sulphide (H₂S) and NO_x are the only other COCs for which the predicted concentrations are greater than 10% of their AAQC/POI (H₂S: ~70% to 20%; NO_x: ~15%) while the remaining COCs are typically less than 3% of their respective AAQC/POI.

With the exception of NO_x for 24-hour averaging period, the COC concentrations are lower under the future scenario (Scenario #4) than under scenarios 1, 2 or 3. The higher NO_x levels under Scenario #4 in the Beaches are a result of the addition of new structures to ABTP. These new structures generate wakes which cause plumes from elevated point sources, such as the natural gas fired boiler, to be brought to the ground very rapidly. Under Scenarios #3 and #4, there are no impacts of arsenic, cadmium, lead, PCBs and dioxins as these emissions are associated with the incinerator which was inoperative after 2002. Comparison between Scenario #1 (full incinerator operation) and Scenario #2 (partial incineration operation) shows higher predicted concentrations under partial incineration than full incineration for some COC. This is primarily due to the change in emissions which shows higher emissions for some COCs in

Scenario #2 than # 1. The actual concentrations for Scenarios 3 and 4 are likely to be even lower than what have been predicted because the emission inventory for these scenarios were derived using 2001 wastewater analytical data. The levels of many chemical pollutants are expected to decline in the future as a result of the City's enforcement of the revised Sewer Use By-law starting June 2001¹. The By-law has strict chemical discharge limits and requires industry to submit pollution prevention plans to the City on these pollutants.

Comparison between South Riverdale and Beaches typically shows that concentrations are in the same range for all COCs and time-averaging periods, respectively. Closer examination shows that COCs associated with incineration (e.g., arsenic, cadmium) have a slightly higher concentration in South Riverdale than in the Beaches when comparing Scenarios # 1 and #2. Under the future scenario, concentration differences between the communities are insignificant.

¹ City of Toronto By-law No. 457-2000. 2000. To regulate the discharge of sewage and land drainage.

Table 7-1 Comparison of Predicted COC's for Ontario AAQCs – The Beaches

Chemical	CAS No.	AAQC or POI (ug/m ³)				Scenario #1				Scenario #2				Scenario #3				Scenario #4			
						<i>Maximum Predicted Concentrations</i> (µg/m ³)				<i>Maximum Predicted Concentrations</i> (µg/m ³)				<i>Maximum Predicted Concentrations</i> (µg/m ³)				<i>Maximum Predicted Concentrations</i> (µg/m ³)			
		<i>POI</i> (1/2 hr)	<i>AAQC</i> (1 hr)	<i>AAQC</i> (24 hr)	<i>AAQC</i> (1 yr)	<i>(1/2 hr)</i>	<i>(1 hr)</i>	<i>(24 hr)</i>	<i>(1 yr)</i>	<i>(1/2 hr)</i>	<i>(1 hr)</i>	<i>(24 hr)</i>	<i>(1 yr)</i>	<i>(1/2 hr)</i>	<i>(1 hr)</i>	<i>(24 hr)</i>	<i>(1 yr)</i>	<i>(1/2 hr)</i>	<i>(1 hr)</i>	<i>(24 hr)</i>	<i>(1 yr)</i>
Arsenic	7440-38-2	1		0.3		0.00050	0.00042	0.000083	0.0000068	0.0015	0.0013	0.00025	0.000020	-	-	-	-	-	-	-	-
Benzene	71-43-2					0.93	0.78	0.15	0.013	0.27	0.22	0.029	0.0071	0.38	0.32	0.042	0.0074	0.13	0.11	0.016	0.0028
Benzo(a)pyrene	50-32-8	0.0033		0.0011	0.00022	0.13	0.10	0.020	0.0010	0.031	0.026	0.0050	0.00024	0.030	0.025	0.0067	0.00028	0.011	0.009	0.0010	0.00007
Bis(2-ethylhexyl)phthalate	117-81-7					1.5	1.3	0.25	0.012	0.31	0.26	0.050	0.0024	0.66	0.55	0.15	0.0061	0.24	0.20	0.022	0.0016
Cadmium	7440-43-9	5		2		0.026	0.022	0.0017	0.00014	0.035	0.029	0.0023	0.00019	-	-	-	-	-	-	-	-
Di-n-octyl phthalate	117-84-0	100		120		0.056	0.047	0.0091	0.00043	0.013	0.010	0.0020	0.00010	0.11	0.090	0.024	0.0010	0.040	0.033	0.0036	0.00026
Hexachlorobutadiene	87-68-3					0.22	0.18	0.032	0.0076	0.208	0.17	0.032	0.0072	0.35	0.29	0.034	0.0074	0.15	0.13	0.018	0.0031
Hydrogen Sulphide	7783-06-4	30	30			21.4	17.9	3.6	0.57	21.5	17.9	3.6	0.57	24.2	20.1	4.6	0.60	10.6	8.8	1.0	0.24
Lead	7439-92-1	6		2		0.029	0.024	0.0019	0.00015	0.081	0.068	0.0053	0.00043	-	-	-	-	-	-	-	-
Mercury	10102-44-0	5		2		0.015	0.012	0.00095	0.000077	0.029	0.024	0.0036	0.00027	4.2E-06	3.5E-06	9.4E-07	3.9E-08	1.5E-06	1.3E-06	1.4E-07	1.0E-08
Nitrogen Oxides	N/A-PM	500	400	200		66.7	55.6	6.4	0.66	62.1	51.8	5.3	0.50	39.5	32.9	5.8	0.53	49.7	41.4	7.3	0.53
PM _{2.5}				30		6.8	5.7	0.56	0.040	8.5	7.1	0.66	0.049	1.9	1.6	0.28	0.025	2.2	1.8	0.29	0.044
PCBs with 4 or More Cl (total)	7446-09-5	0.45			0.035	0.00016	0.00013	0.000011	8.5E-07	0.00018	0.00015	0.000011	9.3E-07	-	-	-	-	-	-	-	-
Sulphur Dioxide		830	690	275	55	8.7	7.3	1.6	0.37	18.2	15.2	2.30	0.52	16.9	14.1	1.7	0.35	7.5	6.2	0.88	0.15
Total Dioxins and Furans (as 2,3,7,8-TCDD eq)	7439-97-6	15.0E-06		5.0E-06		1.36E-08	1.11E-08	8.52E-10	7.07E-11	4.55E-09	3.76E-09	2.97E-10	2.37E-11	-	-	-	-	-	-	-	-
Total PAHs						9.0	7.5	1.4	0.068	9.0	7.5	1.4	0.068	0.66	0.55	0.15	0.0061	0.23	0.19	0.021	0.0015
Vinyl chloride	75-01-4	3		1	0.2	0.17	0.14	0.026	0.0056	0.19	0.16	0.033	0.0059	0.24	0.20	0.024	0.0052	0.11	0.09	0.01	0.0021

Note: Predicted B[a]P concentrations are based on emissions estimated from laboratory measurements which were less than detect. Similarly for Total PAHs which were non-detect.

- No emissions
- Scenario 1 incinerator in full operation (pre 1996)
- Scenario 2 incinerator in partial operation (2000-2002)
- Scenario 3 incineration discontinued (2003-2004)
- Scenario 4 incineration discontinued and odour control measures implemented.

Table 7-3 Comparison of Predicted COC's for Ontario AAQCs – South Riverdale

Chemical	CAS No.	AAQC or POI(µg/m ³)				Scenario #1				Scenario #2				Scenario #3				Scenario #4			
						Maximum Predicted Concentrations (µg/m ³)				Maximum Predicted Concentrations (µg/m ³)				Maximum Predicted Concentrations (µg/m ³)				Maximum Predicted Concentrations (µg/m ³)			
		POI (1/2 hr)	AAQC (1 hr)	AAQC (24 hr)	AAQC (1 yr)	(1/2 hr)	(1 hr)	(24 hr)	(1 yr)	(1/2 hr)	(1 hr)	(24 hr)	(1 yr)	(1/2 hr)	(1 hr)	(24 hr)	(1 yr)	(1/2 hr)	(1 hr)	(24 hr)	(1 yr)
Arsenic	7440-38-2	1		0.3		0.00167	0.00139	0.000124	0.000012	0.0023	0.0019	0.00037	0.000035	-	-	-	-	-	-	-	-
Benzene	71-43-2					0.81	0.67	0.09	0.011	0.69	0.58	0.069	0.0087	1.19	0.99	0.119	0.0102	0.07	0.06	0.008	0.0014
Benzo[a]pyrene	50-32-8	0.0033		0.0011	0.00022	0.09	0.08	0.008	0.0009	0.023	0.019	0.0020	0.00022	0.024	0.020	0.0034	0.00027	0.014	0.012	0.0010	0.00013
Bis(2-ethylhexyl)phthalate	117-81-7	100		50		1.1	0.9	0.10	0.011	0.23	0.19	0.020	0.0022	0.54	0.45	0.075	0.0058	0.31	0.26	0.022	0.0029
Cadmium	7440-43-9	5		2		0.034	0.028	0.0025	0.00024	0.046	0.038	0.0034	0.00032	-	-	-	-	-	-	-	-
Di-n-octyl phthalate	117-84-0	100		120		0.041	0.034	0.0035	0.00039	0.009	0.008	0.0008	0.00009	0.09	0.073	0.0123	0.00096	0.05	0.042	0.0037	0.00047
Hexachlorobutadiene	87-68-3					0.20	0.17	0.027	0.0037	0.22	0.18	0.025	0.0045	0.36	0.30	0.042	0.0051	0.08	0.07	0.008	0.0012
Hydrogen Sulphide	7783-06-4	30	30			15.2	12.7	1.6	0.22	15.2	12.7	1.6	0.22	16.9	14.1	2.6	0.23	7.7	6.4	0.8	0.10
Lead	7439-92-1	6		2		0.038	0.031	0.0028	0.0003	0.105	0.088	0.0078	0.0007	-	-	-	-	-	-	-	-
Mercury	7439-97-6	5		2		0.019	0.016	0.0014	0.0001	0.037	0.031	0.0030	0.0004	3.42E-06	2.85E-06	4.78E-07	3.72E-08	1.98E-06	1.65E-06	1.42E-07	1.83E-08
Nitrogen Oxides	10102-44-0	500	400	200		93.9	78.2	7.6	1.18	85.0	70.8	6.9	0.91	60.3	50.3	6.4	0.91	40.3	33.6	6.2	1.04
PM _{2.5}				30		9.1	7.6	0.66	0.066	0.19	0.16	0.033	0.006	1.8	1.5	0.28	0.044	1.8	1.5	0.24	0.04
PCBs with 4 or More Cl (total)						2.10E-04	1.75E-04	1.56E-05	1.46E-06	2.30E-04	1.91E-04	1.71E-05	1.60E-06	-	-	-	-	-	-	-	-
Sulphur Dioxide	7446-09-5	830	690	275	55	10.9	9.1	1.4	0.21	18.2	15.1	2.8	0.47	17.3	14.4	1.9	0.24	4.0	3.3	0.4	0.05
Total Dioxins and Furans (as 2,3,7,8-TCDD eq)		15.0E-06		5.0E-06		1.75E-08	1.46E-08	1.30E-09	1.22E-10	5.87E-09	4.88E-09	4.37E-10	4.09E-11	-	-	-	-	-	-	-	-
Total PAHs						6.5	5.4	0.6	0.06	6.5	5.4	0.6	0.063	0.54	0.45	0.08	0.0058	0.30	0.25	0.02	0.0027
Vinyl Chloride	75-01-4	3		1		0.15	0.13	0.020	0.0029	0.18	0.15	0.021	0.0037	0.25	0.21	0.029	0.0035	0.06	0.05	0.006	0.0009

Note: Predicted B[a]P concentrations are based on emissions estimated from laboratory measurements which were less than detect. Similarly for Total PAHs which were non-detect.

- No emissions
- Scenario 1 incinerator in full operation (pre 1996)
- Scenario 2 incinerator in partial operation (2000-2002)
- Scenario 3 incineration discontinued (2003-2004)
- Scenario 4 incineration discontinued and odour control measures implemented.

7.2 COMPARISON OF PREDICTED COC CONCENTRATIONS TO HEALTH BENCHMARKS

For those chemicals whose AAQCs and POI standards have been identified by the MOE as requiring regulatory review, Toronto Public Health has selected a set of ambient air quality health benchmarks to compare to the predicted maximum concentrations. The maximum predicted concentrations in each community are compared to the Health Benchmarks of each COC in Table 7-5 and Table 7-7, respectively. Cadmium, B[a]P and H₂S exceed a Health Benchmark for any scenario. Hydrogen sulphide meets the upper Health Benchmark but exceeds the lower limit. Cadmium is above the Health Benchmark under Scenario #1 and #2 (incinerator operational) while H₂S meets the Health Benchmarks in both communities for the future scenario. B[a]P concentrations are above the Health Benchmark for all scenarios but meet the 24-hr AAQC for the future scenario (Scenario #4) in both communities. Emissions of B[a]P were estimated from analytical laboratory data which indicated that B[a]P was below the detection limits of the laboratory instrument. Using the minimum detection limit of the instrument will over-estimate the amount of B[a]P released into the airshed and the predicted concentrations.

Figure 7-1 to Figure 7-4 show the maximum 24-hour average concentrations of H₂S over the area surrounding the facility for all four (4) scenarios. The figures are typical of the other substances, illustrating the changes in concentration between the four (4) scenarios as well as how the concentrations compare to the Health Benchmark for H₂S. Similar figures for the other sixteen (16) chemicals can be found in Appendix F.

There are similarities between all the figures presented in Appendix F. In general, the maximum concentrations decrease between Scenario 1 and Scenario 4 as emissions have decreased. The dispersion pattern around the ABTP also changes between scenarios. With respect to H₂S, in Scenario 1 and 2, a majority of the emissions are released from the low-elevation sources (i.e., clarifiers, grit tanks, etc) resulting in a dispersion pattern similar to concentric rings around the plant. In Scenario 3, the emissions do not change but the dispersion pattern changes as a result of the addition of the Pelletizer Building which generates building wake effects. In Scenario 4, the majority of emissions are from the tall stack which reduces the concentrations around the ABTP. In other figures, the influence of the stack is more predominant. Concentrations occur further away from the plant and follow the wind patterns for the area. In reviewing Appendix F figures, the influence of emitting emissions from an elevated source is demonstrated.

Comparison of maximum predicted COC concentrations between the two communities shows some subtle differences in concentrations as compared to the AAQC or benchmark. Under Scenario 1, South Riverdale has higher levels of arsenic, cadmium and NO₂ which are primarily released from the stack. The Beaches has higher concentrations of benzene, B[a]P/PAHs and vinyl chloride which are associated primarily from low-elevation sources. This apparent anomaly is because there is stretch of the Beaches which is adjacent to the ABTP, higher concentrations are not unexpected. Under Scenario 4, a majority of the emissions are released from the elevated stack and the impact is a function of the wind pattern. As shown in Figure 6-1, the winds are more frequent and at a higher speed from the southwest which will generate a high impact at locations to the northeast (i.e., The Beaches.)

**Table 7-5 Comparison of Maximum Predicted Concentrations to Health Benchmarks
– The Beaches**

Chemical	CAS No.	AAQC 24 hr ($\mu\text{g}/\text{m}^3$)	Health Benchmark 24 hr ($\mu\text{g}/\text{m}^3$)	24-hour Average Maximum Predicted Concentrations ($\mu\text{g}/\text{m}^3$)			
				Scenario #1	Scenario #2	Scenario #3	Scenario #4
Arsenic	7440-38-2		0.00066 ^c	0.000083	0.000251	-	-
Benzene	71-43-2		0.3 ^c	0.15	0.029	0.042	0.016
Benzo[a]pyrene	50-32-8	0.0011 ^a	0.000012 ^{b, c}	0.020	0.0050	0.0067	0.0010
Bis(2-ethylhexyl)phthalate	117-81-7	50		0.25	0.050	0.15	0.022
Cadmium	7440-43-9	2	0.0006 ^c	0.0017	0.0023	-	-
Di-n-octyl phthalate	117-84-0	120		0.0091	0.0020	0.024	0.0036
Hexachlorobutadiene	87-68-3		1.19	0.032	0.032	0.034	0.018
Hydrogen Sulphide	7783-06-4		2-10	3.56	3.57	4.60	1.04
Lead	7439-92-1	2		0.0019	0.0053	-	-
Mercury	7439-97-6		0.3	0.00095	0.00356	0.00000094	0.00000015
Nitrogen Oxides	10102-44-0	200		6.38	5.26	5.75	7.26
PM _{2.5}	N/A-PM	30		0.56	0.66	0.28	0.29
PCBs with 4 or More Cl (total)			0.00175 ^c	0.000011	0.000011	-	-
Sulphur Dioxide	7446-09-5	275		1.57	2.30	1.65	0.88
Total Dioxins and Furans (as 2,3,7,8-TCDD eq)		5.0E-06		8.78E-10	2.97E-10	-	-
Total PAHs				1.44	1.44	0.15	0.021
Vinyl Chloride	75-01-4		0.1 ^c	0.026	0.033	0.024	0.013

^a - This is based on B[a]P only

^b - This is based on B[a]P as a surrogate for the toxicity of the whole PAH mixture. The risk from exposure to total PAHs in the air would be negligible if B[a]P level is found to be below this health benchmark for B[a]P.

^c - The health benchmark corresponds to an excess lifetime cancer risk of one in a million (or 1 E-6), which meets Health Canada and MOE benchmark of negligible risk.

- Scenario 1 incinerator in full operation (pre 1996)
- Scenario 2 incinerator in partial operation (2000-2002)
- Scenario 3 incineration discontinued (2003-2004)
- Scenario 4 incineration discontinued and odour control measures implemented.

Table 7-7 Comparison of Predicted Concentrations to Health Benchmarks – South Riverdale

Chemical	CAS No.	AAQC 24 hr	Health Benchmark 24 hr	24-hour Average Concentration ($\mu\text{g}/\text{m}^3$)			
		($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	Scenario #1	Scenario #2	Scenario #3	Scenario #4
Arsenic	7440-38-2		0.00066 ^c	0.00012	0.00037	-	-
Benzene	71-43-2		0.3 ^c	0.090	0.069	0.12	0.008
Benzo[a]pyrene	50-32-8	0.0011 ^a	0.000012 ^{b, c}	0.0079	0.0020	0.0034	0.0010
Bis(2-ethylhexyl)phthalate	117-81-7	50		0.10	0.020	0.075	0.022
Cadmium	7440-43-9	2	0.0006 ^c	0.0025	0.0034	-	-
Di-n-octyl phthalate	117-84-0	120		0.0035	0.00079	0.012	0.0037
Hexachlorobutadiene	87-68-3		1.19	0.027	0.025	0.042	0.008
Hydrogen Sulphide	7783-06-4		2-10	1.6	1.6	2.6	0.8
Lead	7439-92-1	2		0.0028	0.0078	-	-
Mercury	7439-97-6		0.3	0.0014	0.0030	0.00000048	0.00000014
Nitrogen Oxides	10102-44-0	200		7.6	6.9	6.4	6.2
PM _{2.5}	N/A-PM	30		0.66	0.033	0.28	0.24
PCBs with 4 or More Cl (total)			0.00175 ^c	0.000016	0.000017	-	-
Sulphur Dioxide	7446-09-5	275		1.4	2.8	1.9	0.38
Total Dioxins and Furans (as 2,3,7,8-TCDD eq)		5.0E-06		1.30E-09	4.37E-10	-	-
Total PAHs				0.56	0.56	0.08	0.021
Vinyl Chloride	75-01-4		0.1 ^c	0.020	0.021	0.029	0.0055

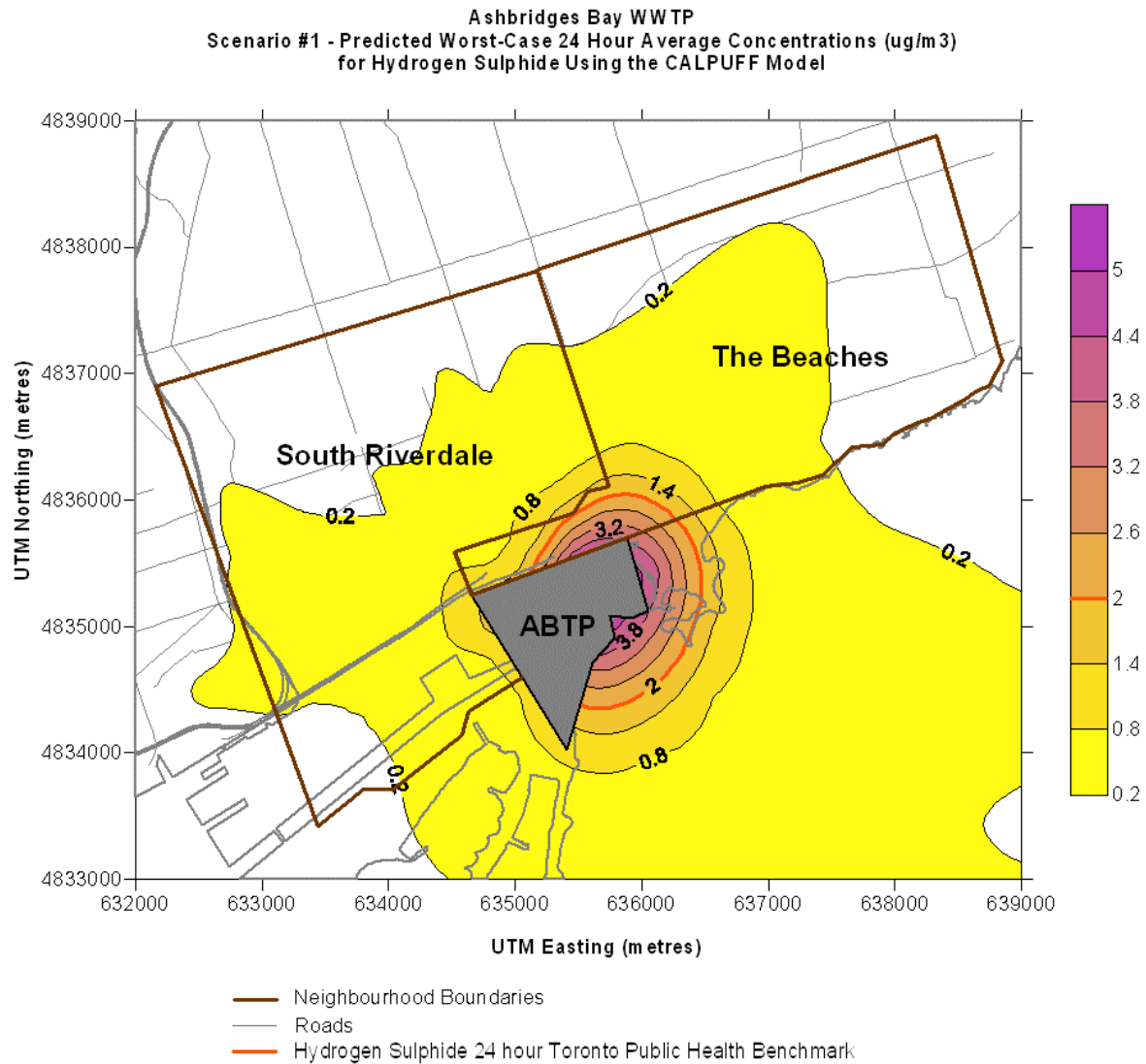
^a – This is based on B[a]P only

^b - This is based on B[a]P as a surrogate for the toxicity of the whole PAH mixture. The risk from exposure to total PAHs in the air would be negligible if B[a]P level is found to be below this health benchmark for B[a]P.

^c - The health benchmark corresponds to an excess lifetime cancer risk of one in a million (or 1 E-6), which meets Health Canada and MOE benchmark of negligible risk.

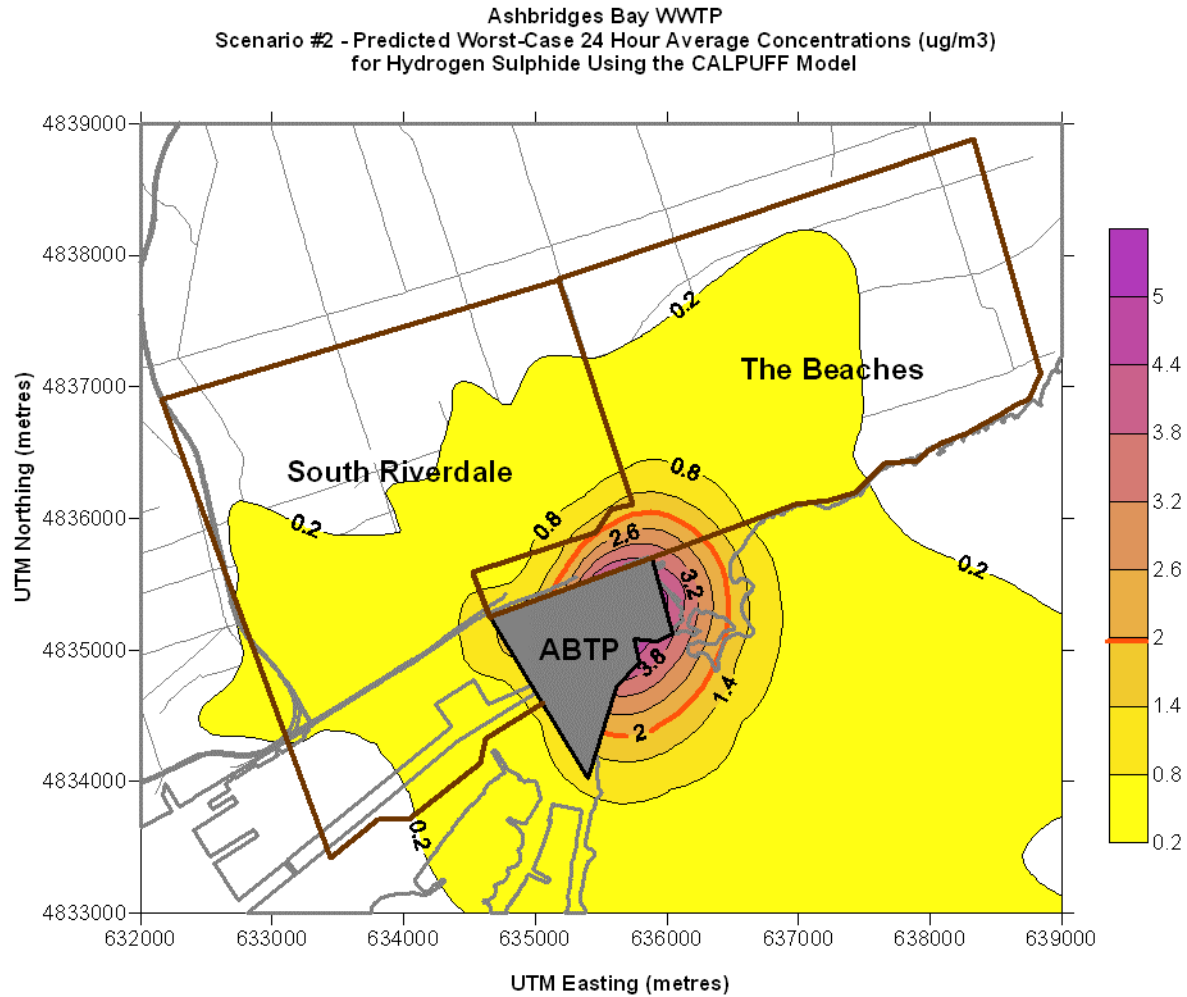
- Scenario 1 incinerator in full operation (pre 1996)
- Scenario 2 incinerator in partial operation (2000-2002)
- Scenario 3 incineration discontinued (2003-2004)
- Scenario 4 incineration discontinued and odour control measures implemented.

Figure 7-1 24-hour Average Hydrogen Sulphide Concentrations for Scenario #1



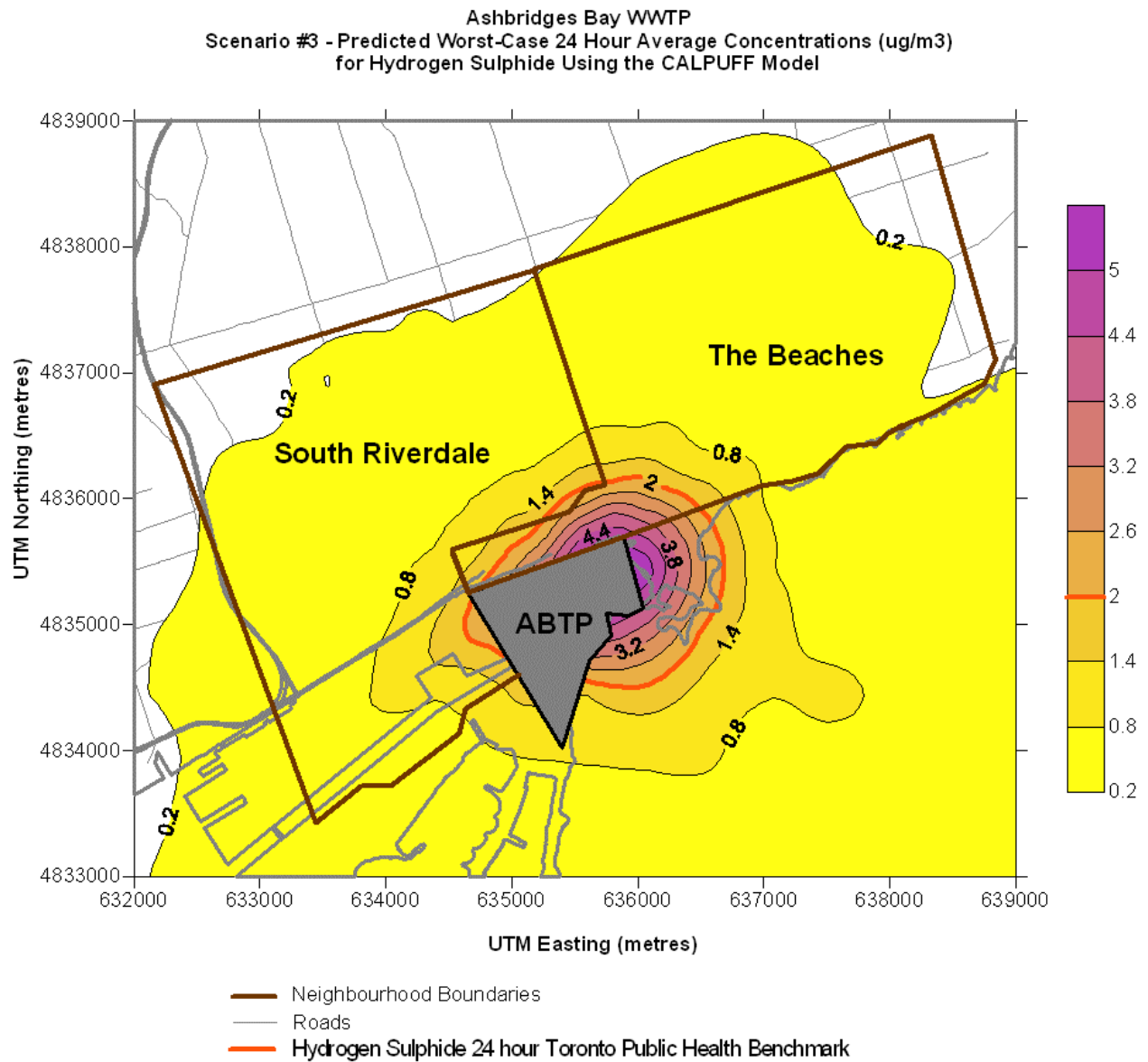
There is no 24 hour AAQC for Hydrogen Sulphide.

Figure 7-2 24-hour Average Hydrogen Sulphide Concentrations for Scenario #2



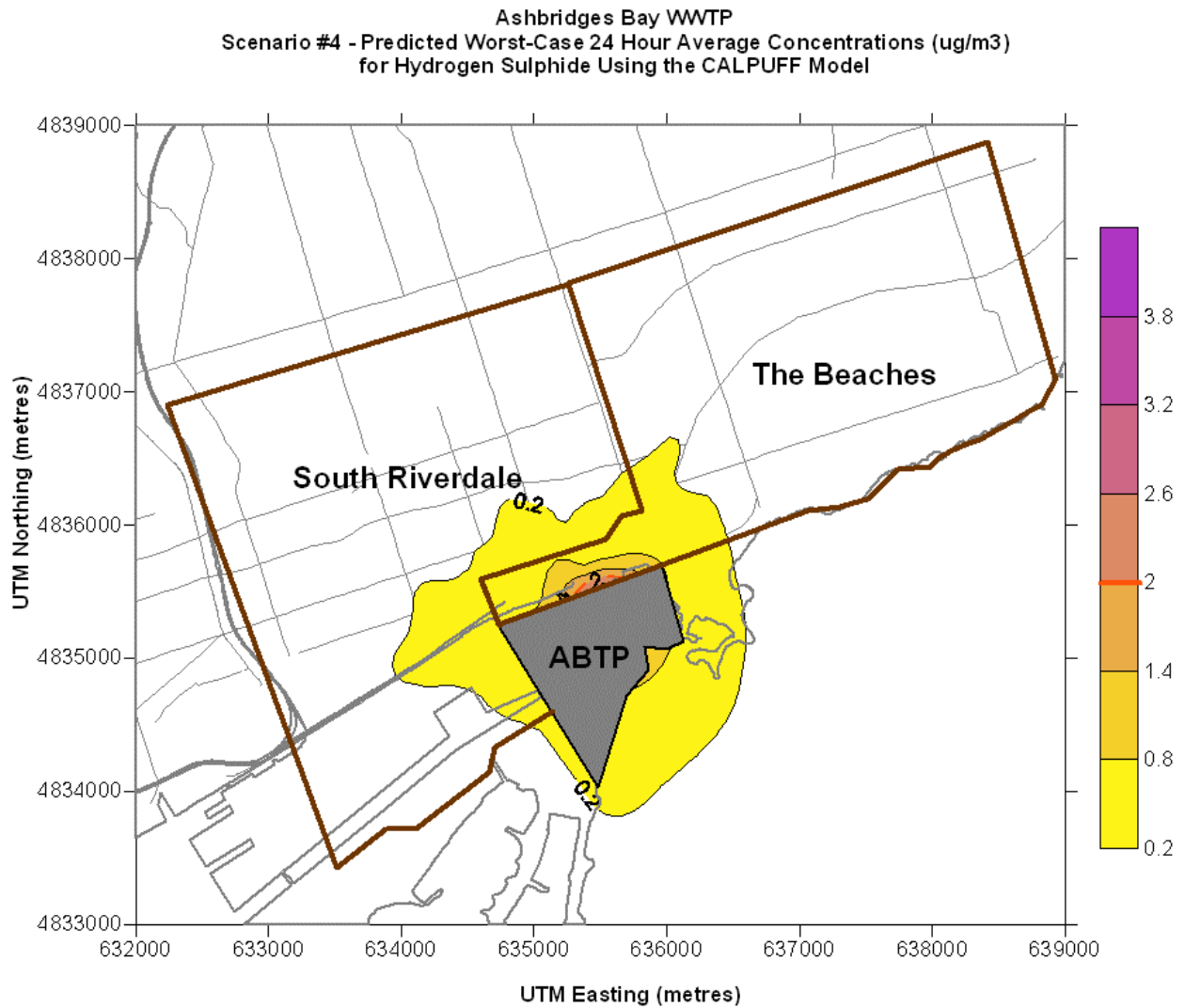
There is no 24 hour AAQC for Hydrogen Sulphide.

Figure 7-3 24-hour Average Hydrogen Sulphide Concentrations for Scenario #3



There is no 24 hour AAQC for Hydrogen Sulphide.

Figure 7-4 24-hour Average Hydrogen Sulphide Concentrations for Scenario #4



There is no 24 hour AAQC for Hydrogen Sulphide.

7.3 COMPARISON OF PREDICTED COC CONCENTRATIONS TO TORONTO AMBIENT MEASUREMENTS

Environment Canada/MOE operate air quality monitoring stations in Toronto but none of these stations are within the South Riverdale/Beaches communities. The air quality measurements provide a point of comparison for the model results. The predicted results of Scenario #1 can be compared with measurements of 1995 as the incinerator was in full operation at this time. Similarly, Scenario #2 can be compared to measurements between 2000 and 2002 as the incinerator was in partial operation. As shown on Table 7-9, predicted maximum 24 hr COC levels are typically below the range of maximum measurements for both scenarios, with the exception of B[a]P and PAH.

Mean ambient air quality levels as described in Section 6.2, were taken as the mean of all 24-hr observations for the scenario period of interest. The worst case potential exposure to the communities can be estimated by combining these mean ambient levels with the maximum predicted concentrations in the communities. This approach will overestimate the potential available substance in the air since the operation of the ABTP makes a contribution to the City's air quality measurements which is included in the mean ambient levels (i.e., double counting).

With the exception of B[a]P, total worst case concentrations in the Beaches and South Riverdale are below the Ontario AAQC as presented on Table 7-11 and Table 7-13, respectively. Arsenic, benzene, B[a]P and cadmium are shown to be above the TPH Health Benchmarks, but for these compounds, ambient levels are already above the TPH benchmarks. With the exception of B[a]P, PAH, cadmium and lead, the ABTP is a minor contributor to the total potential substance present in air.

ABTP's B[a]P and PAH emissions contribute to the measured levels within the Toronto airshed, but the findings indicate that the predicted maximum 24-hr levels due to ABTP are higher than the measured levels. This supports the notion that PAH/ B[a]P emissions from ABTP were overestimated by a large margin given that PAH/B[a]P were not detected in all source measurements.

Other sources of emissions which may contribute to the Beaches and South Riverdale air quality include local expressways, heavy traffic roadways, island airport and other major industrial sources. In general, the ABTP is a relatively minor source of combustion products when compared to these other sources.

Table 7-9 Comparison of Predicted Maximum Concentrations with Maximum Toronto Ambient Air Observations

Chemical	CAS No.	AAQC 24 hr	Health Benchmark 24 hr	Maximum Predicted Beaches 24-hour Concentration		Maximum Predicted South Riverdale 24-hour Concentration		Measured Pre-1996 (Scenario #1)		Measured 2000-2002 (Scenario #2)	
		($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	Scenario #1 ($\mu\text{g}/\text{m}^3$)	Scenario #2 ($\mu\text{g}/\text{m}^3$)	Scenario #1 ($\mu\text{g}/\text{m}^3$)	Scenario #2 ($\mu\text{g}/\text{m}^3$)	Range of 24 hr Max ($\mu\text{g}/\text{m}^3$)		Range of 24 hr Max ($\mu\text{g}/\text{m}^3$)	
Arsenic	7440-38-2		0.00066 ^c	0.000083	0.000251	0.00012	0.00037	0.0096	0.0031	0.0065	0.0039
Benzene	71-43-2		0.3 ^c	0.15	0.029	0.09	0.069	13.08	4.66	13.40	1.51
Benzo[a]pyrene	50-32-8	0.0011 ^a	0.000012 ^{b, c}	0.02	0.005	0.0079	0.002	0.00061	0.00061	0.00099	0.00015
Bis(2-ethylhexyl)phthalate	117-81-7	50		0.25	0.05	0.1	0.02	-	-	-	-
Cadmium	7440-43-9	2	0.0006 ^c	0.0017	0.0023	0.0025	0.0034	0.0033	0.0033	0.0036	0.0033
Di-n-octyl phthalate	117-84-0	120		0.0091	0.002	0.0035	0.00079	-	-	-	-
Hexachlorobutadiene	87-68-3		1.19	0.032	0.032	0.027	0.025	-	-	-	-
Hydrogen Sulphide	6/4/7783		2-10	3.56	3.57	1.6	1.6	-	-	-	-
Lead	7439-92-1	2		0.0019	0.0053	0.0028	0.0078	0.026	0.021	0.042	0.026
Mercury	7439-97-6		0.3	0.00095	0.00356	0.0014	0.003	-	-	-	-
Nitrogen Oxides	10102-44-0	200		6.38	5.26	7.6	6.9	-	-	-	-
PM _{2.5}		30		0.56	0.66	0.66	0.033	-	-	-	-
PCBs with 4 or More Cl (total)			0.00175 ^c	0.000011	0.000011	0.000016	0.000017	-	-	-	-
Sulphur Dioxide	7446-09-5	275		1.57	2.3	1.4	2.8	-	-	-	-
Total Dioxins and Furans (as 2,3,7,8-TCDD eq)		5.0E-06		8.78E-10	2.97E-10	1.30E-09	4.37E-10	-	-	2.90E-07	3.87E-08
Total PAHs				1.44	1.44	0.56	0.56	0.097	0.097	0.200	0.046
Vinyl Chloride	75-01-4		0.1 ^c	0.026	0.033	0.02	0.021	-	-	-	-

^a - This is based on B[a]P only

^b - This is based on B[a]P as a surrogate for the toxicity of the whole PAH mixture. The risk from exposure to total PAHs in the air would be negligible if B[a]P level is found to be below this health benchmark for B[a]P. PAH/B[a]P levels are based on non-detect levels taken as the minimum detection limits and over-estimate ABTP's contribution to ambient air.

^c - The health benchmark corresponds to an excess lifetime cancer risk of one in a million (or 1 E-6), which meets Health Canada and MOE benchmark of negligible risk.

Scenario 1 incinerator in full operation (pre 1996)
Scenario 2 incinerator in partial operation (2000-2002)

Table 7-11 Predicted Total Potential 24-Hour Concentrations – The Beaches

Chemical	CAS Number	AAQC 24 hr (µg/m ³)	Health Benchmark 24 hr (µg/m ³)	Scenario #1 (pre-1996)				Scenario #2 (2000-2002)			
				ATBP Predicted Maximum (µg/m ³)	Ambient Measured (µg/m ³)	Total Predicted Concentration (µg/m ³)	ABTP % of Total	ATBP Predicted Maximum (µg/m ³)	Ambient Measured (µg/m ³)	Total Predicted Concentration (µg/m ³)	ABTP % of Total
Arsenic	7440-38-2	0.3	0.00066 ^c	0.00008	0.002	0.002	5%	0.00025	0.001	0.002	16%
Benzene	71-43-2		0.3 ^c	0.150	1.9	2.03	7%	0.029	1.2	1.18	2%
Benzo[a]pyrene	50-32-8	0.0011 ^a	0.000012 ^{b, c}	0.020	0.0002	0.020	99%	0.005	0.0001	0.005	98%
Bis(2-ethylhexyl)phthalate	117-81-7	50		0.250	-			0.050	-		
Cadmium	7440-43-9	2	0.0006 ^c	0.002	0.003	0.004	39%	0.002	0.003	0.005	43%
Di-n-octyl phthalate	117-84-0	120		0.009	-			0.002	-		
Hexachlorobutadiene	87-68-3		1.19	0.032	-			0.032	-		
Hydrogen Sulphide	7783-06-4		2-10	3.560	-			3.570	-		
Lead	7439-92-1	2		0.002	0.009	0.010	18%	0.005	0.007	0.012	45%
Mercury	7439-97-6	2.5	0.3	0.001	-			0.004	-		
Nitrogen Oxides	10102-44-0	200		6.380	104	110	6%	5.26	78	83	6%
PM _{2.5}		30		0.56	-			0.66	8.89	9.55	6%
PCBs with 4 or More Cl (total)		0.15	0.00175 ^c	0.000011	-			0.000011	-		
Sulphur Dioxide	7446-09-5	275		1.57	11.1	12.7	12%	2.3	12.3	14.6	16%
Total Dioxins and Furans (as 2,3,7,8 TCDD eq)		5.0E-06		8.78E-10	-			2.97E-10	3.40E-08	3.43E-08	0.87%
Total PAHs				1.440	0.037	1.5	98%	1.440	0.026	1.5	98%
Vinyl Chloride	75-01-4	1	0.1 ^c	0.026				0.033			

^a – This is based on B[a]P only

^b - This is based on B[a]P as a surrogate for the toxicity of the whole PAH mixture. The risk from exposure to total PAHs in the air would be negligible if B[a]P level is found to be below this health benchmark for B[a]P. PAH/B[a]P levels are based on non-detect levels taken as the minimum detection limits and over-estimate ABTP’s contribution to ambient air.

Scenario 1 incinerator in full operation (pre 1996)

Scenario 2 incinerator in partial operation (2000-2002)

^c - The health benchmark corresponds to an excess lifetime cancer risk of one in a million (or 1 E-6), which meets Health Canada and MOE benchmark of negligible risk.

Total predicted concentration is maximum 24-hour predicted concentration plus measured ambient levels.

ABTP % of total is the predicted ABTP concentration divided by the total predicted concentration

Table 7-13 Predicted Total Potential 24-Hour Concentrations – South Riverdale

Chemical	CAS Number	AAQC 24 hr (µg/m ³)	Health Benchmark 24 hr (µg/m ³)	Scenario #1 (pre-1996)				Scenario # 2 (2000-2002)			
				ATBP Predicted Maximum (µg/m ³)	Ambient Measured (µg/m ³)	Total Predicted Concentration (µg/m ³)	ABTP % of Total	ATBP Predicted Maximum (µg/m ³)	Ambient Measured (µg/m ³)	Total Predicted Concentration (µg/m ³)	ABTP % of Total
Arsenic	7440-38-2	0.3	0.00066 ^c	0.00012	0.002	0.002	6%	0.00037	0.001	0.002	21%
Benzene	71-43-2		0.3 ^c	0.090	1.9	1.97	5%	0.069	1.2	1.22	6%
Benzo[a]pyrene	50-32-8	0.0011 ^a	0.000012 ^{b, c}	0.008	0.0002	0.008	98%	0.002	0.0001	0.002	94%
Bis(2-ethylhexyl)phthalate	117-81-7	50		0.100	-			0.020	-		
Cadmium	7440-43-9	2	0.0006 ^c	0.003	0.003	0.005	48%	0.003	0.003	0.006	53%
Di-n-octyl phthalate	117-84-0	120		0.004	-			0.001	-		
Hexachlorobutadiene	87-68-3		1.19	0.027	-			0.025	-		
Hydrogen Sulphide	7783-06-4		2-10	1.600	-			1.600	-		
Lead	7439-92-1	2		0.003	0.009	0.011	25%	0.008	0.007	0.014	54%
Mercury	7439-97-6	2.5	0.3	0.001	-			0.003	-		
Nitrogen Oxides	10102-44-0	200		7.6	104	111	7%	6.9	78	85	8%
PM _{2.5}		30		0.66	-			0.033	8.89	8.92	0.4%
PCBs with 4 or More Cl (total)		0.15	0.00175 ^c	0.000016	-			0.000017	-		
Sulphur Dioxide	7446-09-5	275		1.4	11.1	12.5	11%	2.8	12.3	15.1	19%
Total Dioxins and Furans (as 2,3,7,8-TCDD eq)		5.0E-06		1.30E-09	-			4.37E-10	3.40E-08	3.44E-08	1.3%
Total PAHs				0.560	0.037	0.6	94%	0.560	0.026	0.6	96%
Vinyl Chloride	75-01-4	1	0.1 ^c	0.020				0.021			

^a – This is based on B[a]P only

^b - This is based on B[a]P as a surrogate for the toxicity of the whole PAH mixture. The risk from exposure to total PAHs in the air would be negligible if B[a]P level is found to be below this health benchmark for B[a]P. PAH/B[a]P levels are based on non-detect levels taken as the minimum detection limits and over-estimate ABTP's contribution to ambient air.

^c - The health benchmark corresponds to an excess lifetime cancer risk of one in a million (or 1 E-6), which meets Health Canada and MOE benchmark of negligible risk.

Scenario 1 incinerator in full operation (pre 1996)

Scenario 2 incinerator in partial operation (2000-2002)

Total predicted concentration is maximum 24-hour predicted concentration plus measured ambient levels.

ABTP % of total is the predicted ABTP concentration divided by the total predicted concentration