

## Appendix 7.5: Sensitive Receptor Results

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## Appendix 7.5: Predicted Concentrations and Metal Deposition Rates at Discrete Sensitive Receptors

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- 7.5.1 The maximum predicted Process Contributions (PCs) and the maximum Predicted Environmental Concentrations (PECs) for the five years of meteorological data modelled are provided in Table 7.5.1 and Table 7.5.2 respectively.
- 7.5.2 For NO<sub>2</sub> and PM<sub>10</sub>, the annual-mean PCs are below 1% of the relevant Environmental Assessment Level (EAL) at all receptors (including receptors on Langhurstwood Road). As such, the impacts can be screened out as insignificant, without consideration of the PEC. Consequently, using the Environment Agency (EA) online guidance, the impacts can be screened out as insignificant, regardless of the background concentration.
- 7.5.3 The PECs at all sensitive receptors for all pollutants are below the relevant EALs.

**Table 7.5.1 Maximum Predicted Process Contributions ( $\mu\text{g}\cdot\text{m}^{-3}$ ) at Sensitive Receptors – Long-term Industrial Emissions Directive (IED) Concentrations**

Pollutant	Averaging Period	EAL	Station Road 1	Langhurst-wood Road 1	Cox Farm	Station Road 2	Langhurst-wood Road 2	Langhurst-wood Road 3	P10	R4
PM <sub>10</sub>	24 hour (90.41st percentile)	50	1.82E-02	4.33E-03	1.59E-02	4.74E-02	1.92E-02	2.38E-02	1.84E-02	2.06E-02
	24 hour (annual mean)	40	5.80E-03	2.55E-03	5.08E-03	9.95E-03	7.35E-03	8.19E-03	4.96E-03	4.79E-03
PM <sub>2.5</sub>	24 hour (annual mean)	25	5.80E-03	2.55E-03	5.08E-03	9.95E-03	7.35E-03	8.19E-03	4.96E-03	4.79E-03
HCl	1 hour (maximum)	750	9.23E-01	1.15E+00	8.03E-01	7.16E-01	1.03E+00	1.01E+00	5.34E-01	5.62E-01
HF	1 hour (maximum)	160	9.23E-02	1.15E-01	8.03E-02	7.16E-02	1.03E-01	1.01E-01	5.34E-02	5.62E-02
SO <sub>2</sub>	15 minute (99.90th percentile)	266	3.28E+00	2.58E+00	3.68E+00	3.23E+00	4.00E+00	4.42E+00	1.79E+00	1.87E+00
	1 hour (99.73th percentile)	350	2.32E+00	1.22E+00	2.37E+00	2.58E+00	2.26E+00	3.31E+00	1.34E+00	1.28E+00
	24 hour (99.18th percentile)	125	5.85E-01	3.27E-01	6.33E-01	6.21E-01	6.24E-01	7.39E-01	3.72E-01	3.83E-01
	1 hour (annual mean)	50	2.64E-02	1.16E-02	2.38E-02	4.95E-02	3.28E-02	3.88E-02	2.36E-02	2.28E-02
NO <sub>2</sub>	1 hour (99.79th percentile)	200	3.64E+00	2.05E+00	3.55E+00	3.82E+00	4.06E+00	4.72E+00	1.97E+00	1.91E+00
	1 hour (annual mean)	40	7.40E-02	3.24E-02	6.67E-02	1.39E-01	9.17E-02	1.09E-01	6.61E-02	6.40E-02
CO	8 hour (maximum daily running)	10000	2.21E+00	2.13E+00	2.61E+00	2.49E+00	2.34E+00	2.63E+00	2.29E+00	2.20E+00
Cd	1 hour (annual mean)	0.005	2.64E-05	1.16E-05	2.38E-05	4.95E-05	3.28E-05	3.88E-05	2.36E-05	2.28E-05
Tl	1 hour (maximum)	30	4.61E-03	5.73E-03	4.01E-03	3.58E-03	5.17E-03	5.07E-03	2.67E-03	2.81E-03
	1 hour (annual mean)	1	2.64E-05	1.16E-05	2.38E-05	4.95E-05	3.28E-05	3.88E-05	2.36E-05	2.28E-05
Hg	1 hour (maximum)	7.5	4.61E-03	5.73E-03	4.01E-03	3.58E-03	5.17E-03	5.07E-03	2.67E-03	2.81E-03
	1 hour (annual mean)	0.25	2.64E-05	1.16E-05	2.38E-05	4.95E-05	3.28E-05	3.88E-05	2.36E-05	2.28E-05
Sb	1 hour (maximum)	150	4.61E-02	5.73E-02	4.01E-02	3.58E-02	5.17E-02	5.07E-02	2.67E-02	2.81E-02
	1 hour (annual mean)	5	2.64E-04	1.16E-04	2.38E-04	4.95E-04	3.28E-04	3.88E-04	2.36E-04	2.28E-04
As	1 hour (annual mean)	0.003	2.64E-04	1.16E-04	2.38E-04	4.95E-04	3.28E-04	3.88E-04	2.36E-04	2.28E-04
Cr	1 hour (maximum)	150	4.61E-02	5.73E-02	4.01E-02	3.58E-02	5.17E-02	5.07E-02	2.67E-02	2.81E-02
	1 hour (annual mean)	5	2.64E-04	1.16E-04	2.38E-04	4.95E-04	3.28E-04	3.88E-04	2.36E-04	2.28E-04
Co	1 hour (maximum)	6	4.61E-02	5.73E-02	4.01E-02	3.58E-02	5.17E-02	5.07E-02	2.67E-02	2.81E-02

Pollutant	Averaging Period	EAL	Station Road 1	Langhurst-wood Road 1	Cox Farm	Station Road 2	Langhurst-wood Road 2	Langhurst-wood Road 3	P10	R4
	1 hour (annual mean)	0.2	2.64E-04	1.16E-04	2.38E-04	4.95E-04	3.28E-04	3.88E-04	2.36E-04	2.28E-04
Cu	1 hour (maximum)	200	4.61E-02	5.73E-02	4.01E-02	3.58E-02	5.17E-02	5.07E-02	2.67E-02	2.81E-02
	1 hour (annual mean)	10	2.64E-04	1.16E-04	2.38E-04	4.95E-04	3.28E-04	3.88E-04	2.36E-04	2.28E-04
Pb	1 hour (annual mean)	0.25	2.64E-04	1.16E-04	2.38E-04	4.95E-04	3.28E-04	3.88E-04	2.36E-04	2.28E-04
Mn	1 hour (maximum)	1500	4.61E-02	5.73E-02	4.01E-02	3.58E-02	5.17E-02	5.07E-02	2.67E-02	2.81E-02
	1 hour (annual mean)	0.15	2.6E-04	1.2E-04	2.4E-04	4.9E-04	3.3E-04	3.9E-04	2.4E-04	2.3E-04
Ni	1 hour (annual mean)	0.02	2.6E-04	1.2E-04	2.4E-04	4.9E-04	3.3E-04	3.9E-04	2.4E-04	2.3E-04
V	1 hour (maximum)	5	4.6E-02	5.7E-02	4.0E-02	3.6E-02	5.2E-02	5.1E-02	2.7E-02	2.8E-02
	1 hour (annual mean)	1	2.6E-04	1.2E-04	2.4E-04	4.9E-04	3.3E-04	3.9E-04	2.4E-04	2.3E-04
Dioxins & Furans	1 hour (annual mean)	-	5.3E-11	2.3E-11	4.8E-11	9.9E-11	6.6E-11	7.8E-11	4.7E-11	4.6E-11
PAHs	1 hour (annual mean)	0.00025	5.3E-06	2.3E-06	4.8E-06	9.9E-06	6.6E-06	7.8E-06	4.7E-06	4.6E-06
PCB	1 hour (annual mean)	0.2	2.6E-06	1.2E-06	2.4E-06	4.9E-06	3.3E-06	3.9E-06	2.4E-06	2.3E-06

Table 7.5.2 Maximum Predicted Environmental Concentrations ( $\mu\text{g.m}^{-3}$ ) at Sensitive Receptors – Long-term IED Concentrations

Pollutant	Averaging Period	EAL	Station Road 1	Langhurst-wood Road 1	Cox Farm	Station Road 2	Langhurst-wood Road 2	Langhurst-wood Road 3	P10	R4
PM <sub>10</sub>	24 hour (90.41st percentile)	50	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	24 hour (annual mean)	40	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
PM <sub>2.5</sub>	24 hour (annual mean)	25	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
HCl	1 hour (maximum)	750	1.3	1.5	1.2	1.1	1.4	1.4	0.9	0.9
HF	1 hour (maximum)	160	2.6	2.6	2.5	2.5	2.6	2.6	2.5	2.5
SO <sub>2</sub>	15 minute (99.90th percentile)	266	6.4	5.7	6.8	6.4	7.1	7.6	4.9	5.0
	1 hour (99.73th percentile)	350	5.5	4.4	5.5	5.7	5.4	6.4	4.5	4.4
	24 hour (99.18th percentile)	125	3.7	3.5	3.8	3.8	3.8	3.9	3.5	3.5
	1 hour (annual mean)	50	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
NO <sub>2</sub>	1 hour (99.79th percentile)	200	27.4	25.8	27.4	27.6	27.9	28.5	25.8	25.7
	1 hour (annual mean)	40	12.0	11.9	12.0	12.0	12.0	12.0	12.0	12.0
CO	8 hour (maximum daily running)	10000	502.2	502.1	502.6	502.5	502.3	502.6	502.3	502.2
Cd	1 hour (annual mean)	0.005	2.76E-04	2.62E-04	2.74E-04	2.99E-04	2.83E-04	2.89E-04	2.74E-04	2.73E-04
Tl	1 hour (maximum)	30	-	-	-	-	-	-	-	-
	1 hour (annual mean)	1	-	-	-	-	-	-	-	-
Hg	1 hour (maximum)	7.5	7.08E-03	8.20E-03	6.48E-03	6.05E-03	7.64E-03	7.54E-03	5.14E-03	5.28E-03
	1 hour (annual mean)	0.25	2.50E-03	2.48E-03	2.49E-03	2.52E-03	2.50E-03	2.51E-03	2.49E-03	2.49E-03
Sb	1 hour (maximum)	150	-	-	-	-	-	-	-	-
	1 hour (annual mean)	5	-	-	-	-	-	-	-	-
As	1 hour (annual mean)	0.003	1.25E-03	1.11E-03	1.23E-03	1.48E-03	1.32E-03	1.38E-03	1.23E-03	1.22E-03
Cr	1 hour (maximum)	150	5.04E-02	6.16E-02	4.44E-02	4.01E-02	5.60E-02	5.50E-02	3.10E-02	3.24E-02
	1 hour (annual mean)	5	4.56E-03	4.42E-03	4.54E-03	4.79E-03	4.63E-03	4.69E-03	4.54E-03	4.53E-03
Co	1 hour (maximum)	6	4.63E-02	5.74E-02	4.03E-02	3.59E-02	5.18E-02	5.09E-02	2.68E-02	2.82E-02

Pollutant	Averaging Period	EAL	Station Road 1	Langhurst-wood Road 1	Cox Farm	Station Road 2	Langhurst-wood Road 2	Langhurst-wood Road 3	P10	R4
Cu	1 hour (annual mean)	0.2	3.84E-04	2.36E-04	3.58E-04	6.15E-04	4.48E-04	5.08E-04	3.56E-04	3.48E-04
	1 hour (maximum)	200	6.17E-02	7.28E-02	5.57E-02	5.13E-02	6.72E-02	6.63E-02	4.22E-02	4.36E-02
	1 hour (annual mean)	10	1.58E-02	1.56E-02	1.58E-02	1.60E-02	1.59E-02	1.59E-02	1.58E-02	1.58E-02
Pb	1 hour (annual mean)	0.25	1.15E-02	1.14E-02	1.15E-02	1.17E-02	1.16E-02	1.16E-02	1.15E-02	1.15E-02
Mn	1 hour (maximum)	1500	5.18E-02	6.29E-02	4.58E-02	4.15E-02	5.73E-02	5.64E-02	3.24E-02	3.38E-02
	1 hour (annual mean)	0.15	5.95E-03	5.81E-03	5.93E-03	6.18E-03	6.02E-03	6.08E-03	5.93E-03	5.92E-03
Ni	1 hour (annual mean)	0.02	1.14E-03	9.96E-04	1.12E-03	1.37E-03	1.21E-03	1.27E-03	1.12E-03	1.11E-03
V	1 hour (maximum)	5	4.71E-02	5.83E-02	4.11E-02	3.68E-02	5.27E-02	5.17E-02	2.77E-02	2.91E-02
	1 hour (annual mean)	1	1.26E-03	1.12E-03	1.24E-03	1.49E-03	1.33E-03	1.39E-03	1.24E-03	1.23E-03
Dioxins & Furans	1 hour (annual mean)	-	2.68E-08	2.67E-08	2.67E-08	2.68E-08	2.68E-08	2.68E-08	2.67E-08	2.67E-08
PAHs	1 hour (annual mean)	0.00025	2.35E-04	2.32E-04	2.35E-04	2.40E-04	2.37E-04	2.38E-04	2.35E-04	2.35E-04
PCB	1 hour (annual mean)	0.2	6.70E-05	6.56E-05	6.68E-05	6.93E-05	6.77E-05	6.83E-05	6.68E-05	6.67E-05

- 7.5.4 The maximum predicted metal deposition PC as a percentage of the relevant EAL is provided in Table 7.5.3. The percentage is below 1% of the EAL at all pollutants except Hg and As.
- 7.5.5 For Hg, the maximum predicted PC is 3% of the EAL. The *Best Available Techniques (BAT) Reference Document on Waste Incineration* (Draft 1, Table 5.7, May 2017) indicates that in reality BAT-associated Hg emissions levels from new plant are likely to be in the range 5 – 20 µg.m<sup>-3</sup>. This is between 10% and 40% of the IED emission concentration limit. Taking the maximum of this range, if the emission concentration for Hg was 40% of the IED limit, the maximum PC would be 0.4 x 3% = 1.2% of the EAL. On that basis, the predicted Hg deposition rate is not considered significant.
- 7.5.6 For As, the maximum predicted PC is 6% of the EAL. The predictions are based on the assumption that arsenic comprises the total of the group 3 metals emissions. In reality, the IED emission limit applies to all nine of the group 3 metals. The EA *'Releases from waste incinerators – Guidance on assessing group 3 metal stack emissions from incinerators'* version 4 (undated), provides a summary of 34 measured values for each metal recorded at 18 municipal waste and waste wood co-incinerators between 2007 and 2015. For As, the measured concentration varies from 0.04% to 5% of the IED emission concentration limit. Taking the maximum of this range, if the emission concentration for As was 5% of the IED limit, the maximum PC would be 0.05 x 6% = 0.3%, well below 1% of the EAL. On that basis, the predicted As deposition is not considered significant.

Table 7.5.3 Maximum Predicted Metal Deposition Rates as a Percentage of the Relevant EAL

Metal	EAL (mg.m <sup>-2</sup> .d <sup>-1</sup> )	% of EAL							
		Station Road 1	Langhurstwood Rd 1	Cox Farm	Station Road 2	Langhurstwood Rd 2	Langhurstwood Rd 3	P10	R4
Cd	0.009	1	0	1	1	1	1	1	1
Hg	0.004	2	1	2	3	2	3	2	1
As	0.02	3	2	3	6	4	5	3	3
Cr	1.5	0	0	0	0	0	0	0	0
Cu	0.25	0	0	0	1	0	0	0	0
Pb	1.1	0	0	0	0	0	0	0	0
Ni	0.11	1	0	1	1	1	1	1	1