Millbrook Power Project

Preliminary Environmental Information Report (2017) – Appendices

Volume D

Air Quality

On behalf of **Millbrook Power Ltd**

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6.1 – Air Quality Cumulative Modelling

Air Quality

6.1 – Cumulative Dispersion Modelling Inputs

Emissions Data

The emissions data for the Covanta plant are shown in Table A.1.

Table A.1: Emissions Data for the Covanta RRF

Parameter	Value Per Generator
Type	EFW
Number of stacks (3 flues)	1
Discharge Location	501247, 241049
Discharge Height (m)	105
Equivalent Total Flue Diameter (mm)	3,118
Discharge temperature (^oC)	137
Total Flow rate (m^3/s)	144.9
Total Flow rate (Nm^3/s, dry, reference O_2)	117.3
Exit velocity (m/s)	18.9
NO_x concentration (mg/Nm^3)	200
Total NO_x emission rate (g/s)	23.5
CO Concentration (mg/Nm^3)	25
Total CO emission rate (g/s)	2.9

Table A.2: Covanta RRF Buildings Dimensions

Covanta			
	Height	**Length**	**Width**
G2 boiler house	38	34	33
G2 refuse hall	36	38	10

The Covanta buildings were included in the model of the cumulative impacts.

6.2 – Cumulative Impacts

Table A.3: Short-term Results of Stack Modelling for Human Health Sensitive Receptors, with Covanta

ID	Nitrogen Dioxide (NO_2)		Carbon Monoxide (CO)	
	Hourly mean PC ($\mu g/m^3$)	Percentage of EAL (%)	Running 8 hour mean PC ($\mu g/m^3$)	Percentage of EAL (%)
R1	5.7	2.8	19.7	0.2
R2	5.6	2.8	23.7	0.2
R3	5.3	2.6	16.3	0.2
R4	5.5	2.7	23.1	0.2
R5	2.8	1.4	5.2	0.1
R6	3.9	1.9	7.5	0.1
R7	4.4	2.2	9.5	0.1
R8	4.6	2.3	10.9	0.1
R9	4.0	2.0	9.0	0.1
R10	3.6	1.8	10.0	0.1
R11	3.5	1.8	8.6	0.1
R12	3.6	1.8	7.4	0.1
R13	3.6	1.8	5.2	0.1
R14	4.8	2.4	6.1	0.1
R15	2.6	1.3	16.8	0.2
R16	4.8	2.4	6.3	0.1
R17	4.3	2.1	5.3	0.1
R18	3.2	1.6	4.7	0.0
R19	2.6	1.3	2.3	0.0
R20	3.6	1.8	9.8	0.1
Screening Criteria	**20**	**10**	**1,000**	**10**

Table A.4: Short-term Results of Stack Modelling for Human Health Sensitive Receptors, with Covanta

ID	Nitrogen Dioxide (NO_2)		Carbon Monoxide (CO)	
	PEC ($\mu g/m^3$)	Percentage of EAL (%)	Running 8 hour mean PEC ($\mu g/m^3$)	Percentage of EAL (%)
R1	13.7	34.2	619.7	6.2
R2	14.0	35.0	623.7	6.2
R3	14.0	35.0	616.3	6.2
R4	14.0	35.0	623.1	6.2
R5	11.3	28.3	605.2	6.1
R6	11.9	29.8	607.5	6.1
R7	11.9	29.7	609.5	6.1
R8	13.0	32.5	610.9	6.1
R9	11.9	29.6	609.0	6.1
R10	13.2	32.9	610.0	6.1
R11	12.8	32.1	608.6	6.1
R12	12.8	32.1	607.4	6.1
R13	12.6	31.6	605.2	6.1
R14	11.7	29.3	606.1	6.1
R15	11.7	29.3	616.8	6.2
R16	14.0	35.1	606.3	6.1
R17	14.0	35.1	605.3	6.1
R18	12.9	32.3	604.7	6.0
R19	12.4	30.9	602.3	6.0
R20	11.8	29.6	609.8	6.1
Environmental Assessment Level	**200**	**100**	**10,000**	**100**

Table A.5: Long-term Results of Stack Modelling for Human Health Sensitive Receptors, with Covanta

ID	Nitrogen Dioxide (NO_2)			
	Annual mean PC ($\mu g/m^3$)	Percentage of EAL (%)	Annual mean PEC ($\mu g/m^3$)	Percentage of EAL (%)
R1	0.19	0.5	13.7	34.2
R2	0.20	0.5	14.0	35.0
R3	0.21	0.5	14.0	35.0
R4	0.20	0.5	14.0	35.0
R5	0.06	0.2	11.3	28.3
R6	0.09	0.2	11.9	29.8
R7	0.09	0.2	11.9	29.7
R8	0.09	0.2	13.0	32.5
R9	0.08	0.2	11.9	29.6
R10	0.05	0.1	13.2	32.9
R11	0.04	0.1	12.8	32.1
R12	0.03	0.1	12.8	32.1
R13	0.02	0.1	12.6	31.6
R14	0.04	0.1	11.7	29.3
R15	0.02	0.0	11.7	29.3
R16	0.03	0.1	14.0	35.1
R17	0.03	0.1	14.0	35.1
R18	0.02	0.0	12.9	32.3
R19	0.02	0.1	12.4	30.9
R20	0.07	0.2	11.8	29.6
Criteria	**0.4**	**1**	**40**	**100**

Table A.6: Long-term NO_x Results of Stack Modelling for Ecological Receptors, with Covanta

ID	Habitat Type	Background Concentration (µg/m^3)	Critical Level (µg/m^3)	PC (µg/m^3)	PC/CL (%)	PEC (µg/m^3)	PEC/CL (%)
E1	Lowland mixed deciduous woodland	15.2	30	0.08	0.26%	15.31	51.0%
	Neutral grassland	15.2	30	0.08	0.26%	15.31	51.0%
E2	Lowland Heathlands	20.1	30	0.03	0.10%	20.11	67.0%
E3	Broadleaved, mixed and yew woodland	16.3	30	0.18	0.60%	16.48	54.9%
E4	Calcareous grassland	16.3	30	0.03	0.09%	16.33	54.4%
E5	Neutral grassland	16.4	30	0.02	0.05%	16.46	54.9%
E6	Broadleaved, mixed and yew woodland	20.1	30	0.03	0.11%	20.11	67.0%
E7	Neutral grassland	16.1	30	0.06	0.20%	16.20	54.0%
E8	Calcareous grassland	17.1	30	0.03	0.09%	17.15	57.2%
E9	Broadleaved, mixed and yew woodland	17.1	30	0.03	0.09%	17.15	57.2%
E10	Broadleaved, mixed and yew woodland	16.2	30	0.05	0.16%	16.23	54.1%
E11	Broadleaved, mixed and yew woodland	19.0	30	0.20	0.66%	19.21	64.0%
E12	Broadleaved, mixed and yew woodland	17.1	30	0.03	0.09%	17.15	57.2%
E13	Acid grassland	18.5	30	0.04	0.15%	18.51	61.7%
E14	Neutral grassland	21.2	30	0.03	0.09%	21.26	70.9%
E15	Neutral grassland	20.0	30	0.03	0.11%	20.08	66.9%

Table A.7: Daily NO_x Results of Stack Modelling for Ecological Receptors, with Covanta

ID	Habitat Type	Background Concentration (µg/m³)	Critical Level (µg/m³)	PC (µg/m³)	PC/CL (%)	PEC (µg/m³)	PEC/CL (%)
E1	Lowland mixed deciduous woodland	15.23	75	4.9	6.6%	20.2	26.9%
	Neutral grassland	15.23	75	4.9	6.6%	20.2	26.9%
E2	Lowland Heathlands	20.08	75	1.9	2.5%	22.0	29.3%
E3	Broadleaved, mixed and yew woodland	16.30	75	10.4	13.8%	26.7	35.6%
E4	Calcareous grassland	16.30	75	6.1	8.2%	22.4	29.9%
E5	Neutral grassland	16.44	75	3.2	4.3%	19.7	26.2%
E6	Broadleaved, mixed and yew woodland	20.08	75	2.5	3.3%	22.6	30.1%
E7	Neutral grassland	16.14	75	4.8	6.3%	20.9	27.9%
E8	Calcareous grassland	17.12	75	2.3	3.1%	19.4	25.9%
E9	Broadleaved, mixed and yew woodland	17.12	75	2.6	3.4%	19.7	26.2%
E10	Broadleaved, mixed and yew woodland	16.18	75	4.0	5.3%	20.2	26.9%
E11	Broadleaved, mixed and yew woodland	19.01	75	7.5	10.0%	26.5	35.3%
E12	Broadleaved, mixed and yew woodland	17.12	75	2.7	3.6%	19.8	26.4%
E13	Acid grassland	18.47	75	3.6	4.8%	22.1	29.4%
E14	Neutral grassland	21.23	75	2.3	3.0%	23.5	31.3%
E15	Neutral grassland	20.05	75	3.1	4.2%	23.2	30.9%

Table A.8: Results of stack modelling for ecological sensitive receptors: nutrient nitrogen deposition, with Covanta

ID	Habitat Type	Background Concentration (kgN/ha/yr)	Critical Load (kgN/ha/yr)	PC (kgN/ha/yr)	PC/CL (%)	PEC (kgN/ha/yr)	PEC/CL (%)
			Lower		Lower		Lower
E1	Broadleaved, mixed and yew woodland	29.40	15	0.016	0.10%	29.42	196.1%
	Neutral grassland	17.20	20	0.008	0.04%	17.21	86.0%
E2	Lowland Heathlands	17.10	10	0.003	0.03%	17.10	171.0%
E3	Broadleaved, mixed and yew woodland	29.40	10	0.036	0.36%	29.44	294.4%
E4	Calcareous grassland	17.22	15	0.003	0.02%	17.22	114.8%
E5	Neutral grassland	17.22	20	0.002	0.01%	17.22	86.1%
E6	Broadleaved, mixed and yew woodland	29.12	10	0.007	0.07%	29.13	291.3%
E7	Neutral grassland	17.22	20	0.006	0.03%	17.23	86.1%
E8	Calcareous grassland	17.08	15	0.003	0.02%	17.08	113.9%
E9	Broadleaved, mixed and yew woodland	29.12	10	0.006	0.06%	29.13	291.3%
E10	Broadleaved, mixed and yew woodland	29.12	10	0.010	0.10%	29.13	291.3%
E11	Broadleaved, mixed and yew woodland	29.40	10	0.040	0.40%	29.44	294.4%
E12	Broadleaved, mixed and yew woodland	29.12	10	0.005	0.05%	29.13	291.3%
E13	Acid grassland	17.08	10	0.004	0.04%	17.08	170.8%
E14	Neutral grassland	17.08	20	0.003	0.01%	17.08	85.4%
E15	Neutral grassland	17.50	20	0.003	0.02%	17.50	87.5%

Table A.9: Results of stack modelling for ecological sensitive receptors: acid deposition, with Covanta

ID	Habitat Type	Background Concentration (keqN/ha/yr)	Critical Load (keqN/ha/yr)	PC (keqN/ha/yr)	PC/CL (%)	PEC (keqN/ha/yr)	PEC/CL (%)
E1	Broadleaved, mixed and yew woodland	2.15	1.890	0.0011	0.06%	2.151	113.8%
	Neutral grassland	1.25	4.928	0.0006	0.01%	1.251	25.4%
E2	Lowland Heathlands	1.22	1.352	0.0002	0.02%	1.220	90.3%
E3	Broadleaved, mixed and yew woodland	2.10	1.10	0.0026	0.24%	2.103	191.1%
E4	Calcareous grassland	1.23	4.74	0.0002	0.00%	1.230	26.0%
E5	Neutral grassland	1.23	4.74	0.0001	0.00%	1.230	26.0%
E6	Broadleaved, mixed and yew woodland	2.08	1.10	0.0005	0.04%	2.080	189.1%
E7	Neutral grassland	1.23	4.74	0.0004	0.01%	1.230	26.0%
E8	Calcareous grassland	1.22	4.74	0.0002	0.00%	1.220	25.7%
E9	Broadleaved, mixed and yew woodland	2.08	1.10	0.0004	0.04%	2.080	189.1%
E10	Broadleaved, mixed and yew woodland	2.08	1.10	0.0007	0.06%	2.081	189.2%
E11	Broadleaved, mixed and yew woodland	2.10	1.10	0.0028	0.26%	2.103	191.2%
E12	Broadleaved, mixed and yew woodland	2.08	1.10	0.0004	0.04%	2.080	189.1%
E13	Acid grassland	1.22	0.68	0.0003	0.05%	1.220	179.5%
E14	Neutral grassland	1.22	4.74	0.0002	0.00%	1.220	25.7%
E15	Neutral grassland	1.25	4.74	0.0002	0.00%	1.250	26.4%