

APPENDIX 10 DETAILED EMISSIONS INVENTORY AND DETAILED AIR QUALITY ASSESSMENT RESULTS

Table A1 Plant Combustion Emission Factors

Plant	Emission Factors				Units
	Carbon monoxide	Oxides of nitrogen	PM _{2.5}	PM ₁₀	
Primary Truck	11.40	9.20	0.54	0.54	g/kWh
Primary Loader	3.50	6.40	0.20	0.20	g/kWh
Lighting Plant	8.00	7.50	0.80	0.80	g/kWh

Table A2 Total Plant Combustion Emissions

Plant	Number	Total Emissions (g/s)			
		CO	NO _x	PM _{2.5}	PM ₁₀
Primary Truck	34	108.205	87.323	5.126	5.126
Primary Loader	2	1.180	2.158	0.067	0.067
Lighting Plant	7	0.078	0.073	0.008	0.008

Table A3 Fugitive Dust Emissions

Dust source	Emission factor type	Emission Factor		Unit	Variable tpa or km	Total unmitigated emissions (g/s)		Emission Control	Emission reduction (%)	Total mitigated emissions (g/s)	
		TSP	PM ₁₀			TSP	PM ₁₀			TSP	PM ₁₀
Crushing	Primary crushing	0.20	0.02	kg/t	6,500,000	41.22	4.12	None	100%	41.22	4.12
Excavation	Handling	0.06	0.03	kg/t	35,000,000	66.59	33.30	None	100%	66.59	33.30
Loading trucks	Handling	0.06	0.03	kg/t	6,500,000	12.37	6.18	Water sprays	50%	6.18	3.09
Unloading onto stockpile	Handling	0.06	0.03	kg/t	6,500,000	12.37	6.18	Water sprays	50%	6.18	3.09
Dump truck	Wheel generated dust from unpaved roads at industrial sites	4.23	1.25	kg/VKT	514,706	69.04	20.40	Water sprays on roads	50%	34.52	10.20
Shovel	Bulldozer on material other than coal	17.00	4.10	kg/h/vehicle	35,040	18.89	4.56	No control	100%	18.89	4.56
Wheel Loader	Wheel generated dust from unpaved roads at industrial sites	4.23	1.25	kg/VKT	87,600	11.75	3.47	No control	100%	11.75	3.47
Blasting	Blasting	200.82	104.06	kg/blast	9,410	2.32	1.20	Safety Berm/Below Ground	30%	1.63	0.84
Wind erosion WRD A	Wind erosion	0.40	0.20	kg/ha/hr	112.00	12.44	6.22	Safety Berm/Below Ground	100%	12.44	6.22
Wind erosion WRD B	Wind erosion	0.40	0.20	kg/ha/hr	85.00	9.44	4.72	Safety Berm/Below Ground	30%	6.61	3.31

Dust source	Emission factor type	Emission Factor		Unit	Variable tpa or km	Total unmitigated emissions (g/s)		Emission Control	Emission reduction (%)	Total mitigated emissions (g/s)	
		TSP	PM ₁₀			TSP	PM ₁₀			TSP	PM ₁₀
Wind erosion WRD C	Wind erosion	0.40	0.20	kg/ha/hr	93.00	10.33	5.17	Safety Berm/Bel ow Ground	30%	7.23	3.62
Wind erosion ROM (Run of Mine) Pad	Wind erosion	0.40	0.20	kg/ha/hr	14.00	1.56	0.78	Safety Berm/Bel ow Ground	30%	1.09	0.54
Wind erosion LGO (Low Grade) Stockpile	Wind erosion	0.40	0.20	kg/ha/hr	9.00	1.00	0.50	Safety Berm/Bel ow Ground	30%	0.70	0.35
Wind erosion TMF	Wind erosion	0.40	0.20	kg/ha/hr	214.00	23.78	11.89	Safety Berm/Bel ow Ground	30%	16.64	8.32
Wind erosion (pit)	Wind erosion	0.40	0.20	kg/ha/hr	160	17.78	8.89	Safety Berm/Bel ow Ground	30%	12.44	6.22

Table A4 Modelled Pollutant Concentrations at Sensitive Receptors – Before Mitigation

ID	Receptor	Pollutant Concentration, µg/m ³ and averaging period									
		Maximum 8 hour CO	Annual Mean SO ₂	10 minute Mean SO ₂	Annual mean NO ₂	Maximum Hourly NO ₂	Annual mean PM ₁₀	Maximum Daily PM ₁₀	90.41 Percentile Daily Mean PM ₁₀	Annual Mean PM _{2.5}	Maximum Daily Mean PM _{2.5}
1	Angovia_1	2452.3	3.2	247.6	9.0	1208.0	23.4	489.2	42.6	8.8	80.5
2	Angovia_2	2679.0	3.2	260.0	9.3	1275.1	24.3	534.5	43.8	8.9	86.8
3	Angovia_3	3299.9	3.2	258.8	9.5	1257.9	24.1	612.4	43.3	8.9	99.4
4	Angovia_4	4428.4	3.3	265.7	10.2	1281.9	25.4	784.6	45.9	9.1	125.4
5	Angovia_5	5172.8	3.4	307.7	11.0	1495.0	26.9	908.1	49.1	9.3	143.6
6	Angovia_6	5842.9	3.5	351.7	11.8	1698.1	28.2	1011.4	50.7	9.5	159.1
7	Angovia_7	5114.8	3.4	363.8	11.7	1712.7	27.5	884.1	49.7	9.4	140.7
8	Angovia_8	4329.4	3.5	339.2	11.7	1628.6	27.3	758.7	49.8	9.4	122.1
9	Akakro_1	451.0	3.1	90.8	7.4	408.9	19.6	144.0	37.6	8.3	31.4
10	Akakro_2	413.0	3.0	88.1	7.4	402.6	19.5	141.5	37.4	8.3	31.1
11	Akakro_3	470.3	3.0	113.5	7.4	451.9	19.5	152.9	37.4	8.3	32.8
12	Akakro_4	486.6	3.0	122.6	7.4	465.2	19.5	157.9	37.3	8.3	33.5
13	Yobou_1	392.2	3.0	106.5	7.2	350.7	19.0	98.1	36.9	8.2	25.0
14	Yobou_2	408.2	3.0	111.7	7.2	364.3	19.0	99.9	37.0	8.2	25.3
15	Bokasso_1	169.4	3.0	24.4	7.1	159.3	18.7	75.2	36.7	8.2	21.6
16	Bokasso_2	186.8	3.0	32.5	7.1	174.2	18.7	72.7	36.7	8.2	21.1
17	Kouakou_1	735.3	3.1	179.1	7.7	695.4	19.9	160.5	38.9	8.3	34.5
18	Kouakou_2	797.6	3.1	174.8	7.7	698.9	19.9	169.5	38.9	8.3	35.9
19	Kouakou_3	833.7	3.1	184.8	7.7	729.9	20.0	175.0	38.9	8.3	36.7

ID	Receptor	Pollutant Concentration, µg/m ³ and averaging period									
		Maximum 8 hour CO	Annual Mean SO ₂	10 minute Mean SO ₂	Annual mean NO ₂	Maximum Hourly NO ₂	Annual mean PM ₁₀	Maximum Daily PM ₁₀	90.41 Percentile Daily Mean PM ₁₀	Annual Mean PM _{2.5}	Maximum Daily Mean PM _{2.5}
20	Kouakou_4	834.2	3.1	188.4	7.7	730.3	19.9	175.2	39.0	8.3	36.7
21	Kossou_1	938.3	3.0	77.9	7.2	282.5	18.9	82.0	38.0	8.2	22.7
22	Kossou_2	768.6	3.0	58.0	7.3	233.8	19.1	85.7	38.2	8.2	22.9
23	Settlement_1	640.1	3.2	135.6	8.6	544.7	21.8	182.9	44.4	8.6	36.8
24	Settlement_2	598.1	3.3	138.2	9.7	588.7	23.6	219.9	48.2	8.8	42.5
25	Settlement_3	174.8	3.1	84.5	7.5	313.9	19.6	110.9	39.5	8.3	26.8

Table A5 Modelled Pollutant Concentrations at Sensitive Receptors – With Mitigation

ID	Receptor	Pollutant Concentration, µg/m ³ and averaging period									
		Maximum 8 hour CO	Annual Mean SO ₂	10 minute Mean SO ₂	Annual mean NO ₂	Maximum Hourly NO ₂	Annual mean PM ₁₀	Maximum Daily PM ₁₀	90.41 Percentile Daily Mean PM ₁₀	Annual Mean PM _{2.5}	Maximum Daily Mean PM _{2.5}
1	Angovia_1	2452.3	3.2	247.6	9.0	1208.0	22.6	407.5	41.6	8.7	72.4
2	Angovia_2	2679.0	3.2	260.0	9.3	1275.1	23.3	445.7	43.2	8.8	77.9
3	Angovia_3	3299.9	3.2	258.8	9.5	1257.9	23.1	504.0	42.3	8.8	88.6
4	Angovia_4	4428.4	3.3	265.7	10.2	1281.9	24.1	639.9	44.3	8.9	111.0
5	Angovia_5	5172.8	3.4	307.7	11.0	1495.0	25.4	739.3	46.9	9.1	126.7
6	Angovia_6	5842.9	3.5	351.7	11.8	1698.1	26.4	820.2	48.0	9.3	140.0

ID	Receptor	Pollutant Concentration, $\mu\text{g}/\text{m}^3$ and averaging period									
		Maximum 8 hour CO	Annual Mean SO ₂	10 minute Mean SO ₂	Annual mean NO ₂	Maximum Hourly NO ₂	Annual mean PM ₁₀	Maximum Daily PM ₁₀	90.41 Percentile Daily Mean PM ₁₀	Annual Mean PM _{2.5}	Maximum Daily Mean PM _{2.5}
7	Angovia_7	5114.8	3.4	363.8	11.7	1712.7	25.8	715.3	47.4	9.2	123.8
8	Angovia_8	4329.4	3.5	339.2	11.7	1628.6	25.6	613.5	47.8	9.2	107.5
9	Akakro_1	451.0	3.1	90.8	7.4	408.9	19.3	124.0	37.3	8.2	29.4
10	Akakro_2	413.0	3.0	88.1	7.4	402.6	19.2	121.8	37.2	8.2	29.1
11	Akakro_3	470.3	3.0	113.5	7.4	451.9	19.2	130.2	37.2	8.2	30.6
12	Akakro_4	486.6	3.0	122.6	7.4	465.2	19.2	133.6	37.2	8.2	31.1
13	Yobou_1	392.2	3.0	106.5	7.2	350.7	18.8	85.5	36.9	8.2	23.7
14	Yobou_2	408.2	3.0	111.7	7.2	364.3	18.8	87.2	36.9	8.2	24.0
15	Bokasso_1	169.4	3.0	24.4	7.1	159.3	18.6	67.7	36.7	8.1	20.9
16	Bokasso_2	186.8	3.0	32.5	7.1	174.2	18.6	65.0	36.7	8.1	20.5
17	Kouakou_1	735.3	3.1	179.1	7.7	695.4	19.6	135.5	38.4	8.3	32.0
18	Kouakou_2	797.6	3.1	174.8	7.7	698.9	19.6	142.5	38.3	8.3	33.2
19	Kouakou_3	833.7	3.1	184.8	7.7	729.9	19.6	146.8	38.3	8.3	33.9
20	Kouakou_4	834.2	3.1	188.4	7.7	730.3	19.5	146.8	38.3	8.3	33.9
21	Kossou_1	938.3	3.0	77.9	7.2	282.5	18.8	72.7	37.7	8.2	21.8
22	Kossou_2	768.6	3.0	58.0	7.3	233.8	18.9	74.7	37.9	8.2	21.8
23	Settlement_1	640.1	3.2	135.6	8.6	544.7	21.1	151.6	42.9	8.5	33.8
24	Settlement_2	598.1	3.3	138.2	9.7	588.7	22.5	181.4	45.7	8.7	38.8
25	Settlement_3	174.8	3.1	84.5	7.5	313.9	19.3	95.5	38.9	8.2	25.3

Table A5 Modelled Deposition Rates at Sensitive Receptors

ID	Receptor	Maximum 24 hour deposition rate, mg/m ² /day	
		Without Mitigation	With Mitigation
1	Angovia_1	10.7	9.0
2	Angovia_2	12.6	10.7
3	Angovia_3	11.9	9.9
4	Angovia_4	14.6	12.2
5	Angovia_5	18.1	15.2
6	Angovia_6	21.7	18.0
7	Angovia_7	21.0	17.3
8	Angovia_8	22.4	18.3
9	Akakro_1	1.5	1.1
10	Akakro_2	1.3	1.0
11	Akakro_3	1.2	0.9
12	Akakro_4	1.1	0.9
13	Yobou_1	0.9	0.7
14	Yobou_2	0.9	0.7
15	Bokasso_1	0.4	0.3
16	Bokasso_2	0.4	0.3
17	Kouakou_1	4.0	3.1
18	Kouakou_2	4.1	3.2
19	Kouakou_3	4.4	3.3
20	Kouakou_4	4.5	3.5
21	Kossou_1	2.4	1.8
22	Kossou_2	2.8	2.2
23	Settlement_1	14.4	11.3
24	Settlement_2	22.3	17.4
25	Settlement_3	5.9	4.6