

Appendix 5A

Air Pollution Emission Rates

Appendix 5A – Emission rates

Emission Rates of NO₂

General Equation:

Emission rate = emission factor x conversion factor

Dock No. 1

Generators EG1 & EG2

Rated output of the diesel generator (EG1 & EG2) 650 kW

NO₂ Emission Rate (USEPA AP-42, 5th Edition, Table 3.4.1)

Uncontrolled NO_x emission factor 0.024 lb/hp-hr

Uncontrolled NO_x emission factor 14.592 g/kW-hr

Uncontrolled NO₂ emission rate (20% of NO_x) **0.5269 g/s**

Dock No. 3

Generators G1, G2 & G3

Rated output of the diesel generator (G1, G2 & G3) 485 kW

NO₂ Emission Rate (USEPA AP-42, 5th Edition, Table 3.4.1)

Uncontrolled NO_x emission factor 0.024 lb/hp-hr

Uncontrolled NO_x emission factor 14.592 g/kW-hr

Uncontrolled NO₂ emission rate (20% of NO_x) **0.3932 g/s**

Generator G4

Rated output of the diesel generator (G4) 160 kW

NO₂ Emission Rate (USEPA AP-42, 5th Edition, Table 3.3.1)

Uncontrolled NO_x emission factor 0.031 lb/hp-hr

Uncontrolled NO_x emission factor 18.848 g/kW-hr

Uncontrolled NO₂ emission rate (20% of NO_x) **0.1675 g/s**

Generator G5

Rated output of the diesel generator (G5) 229 kW

NO₂ Emission Rate (USEPA AP-42, 5th Edition, Table 3.3.1)

Uncontrolled NO_x emission factor 0.031 lb/hp-hr

Uncontrolled NO_x emission factor 18.848 g/kW-hr

Uncontrolled NO₂ emission rate (20% of NO_x) **0.2398 g/s**

Note:

1) To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608.

Emission Rates of SO₂

Maximum Sulphur Content in fuel 0.5 % by weight

Assume density of fuel 0.85 kg/L

Molar mass of sulphur 32 g/mol

Molar mass of SO₂ 64 g/mol

Dock No. 1

Generators EG1 & EG2

Fuel consumption rate 174.9 L/hr

148.7 kg/hr

Mass of sulphur burnt 0.743 kg/hr

No. of mole of sulphur burnt 23.2 mol/hr

No. of mole of SO₂ formed 23.2 mol/hr

SO₂ emission rate 1,487.7 g/hr

0.4130 g/s

Dock No. 3

Generators G1, G2 & G3

Fuel consumption rate	137.6 L/hr
	117.0 kg/hr
Mass of sulphur burnt	0.585 kg/hr
No. of mole of sulphur burnt	18.3 mol/hr
No. of mole of SO ₂ formed	18.3 mol/hr
SO ₂ emission rate	1,169.6 g/hr
	0.3249 g/s

Generator G4

Fuel consumption rate	43.1 L/hr
	36.6 kg/hr
Mass of sulphur burnt	0.183 kg/hr
No. of mole of sulphur burnt	5.7 mol/hr
No. of mole of SO ₂ formed	5.7 mol/hr
SO ₂ emission rate	366.1 g/hr
	0.1018 g/s

Generator G5

Fuel consumption rate	53.1 L/hr
	45.1 kg/hr
Mass of sulphur burnt	0.226 kg/hr
No. of mole of sulphur burnt	7.1 mol/hr
No. of mole of SO ₂ formed	7.1 mol/hr
SO ₂ emission rate	451.4 g/hr
	0.1254 g/s