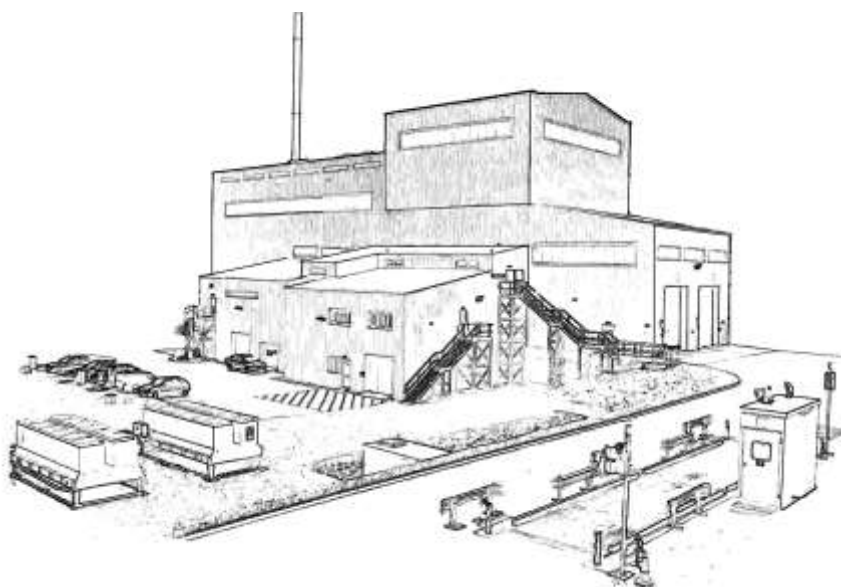


Shetland Islands Council Environmental Services

Energy Recovery Plant Annual Report

2021



Pollution Prevention and Control (Scotland) Regulations 2000

Permit Number: PPC/A/1003141

Prepared for: Scottish Environment Protection Agency

Prepared by: [REDACTED]



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Introduction

The Energy Recovery Plant was built for the Shetland Islands Council and is situated at Greenhead, Lerwick. The furnace is equipped with a traditional moving grate system for the incineration of mixed waste. The waste used is mainly municipal, generated from Shetland, Orkney and Aberdeen.

The energy from the furnace is transformed into hot water, which is fed into a District Heating Scheme.

Flue gases from the primary incineration stage are treated prior to discharge to the atmosphere by controlled secondary combustion, dry electrostatic precipitation and wet scrubbing and then dried before finally passing through bag filtration.

This is the Annual report for the Energy Recovery Plant for the months January – December 2021 inclusive.

Dioxins and Furans from the stack are monitored twice yearly and the discharge from the water treatment is monitored on a monthly basis.

This report contains information requested in table 2.1 of the authorisation and is submitted in accordance with the conditions.

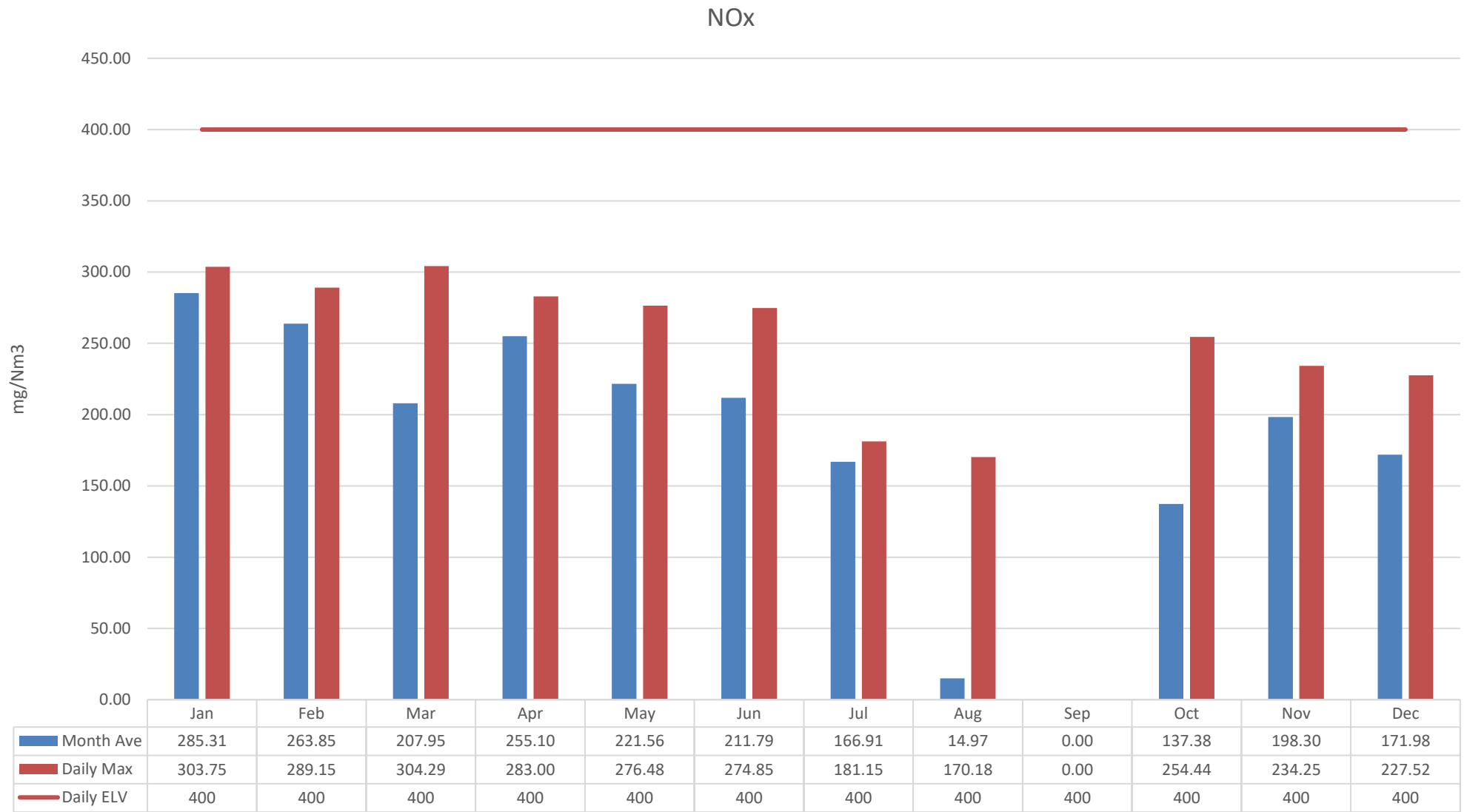
All continuous emission information in the report is obtained automatically from the reporting PC, which is an integrated part of the incinerator plant's Control Regulating and Monitoring system.

Information referring to water discharges is the result of samples analysed by external laboratories.

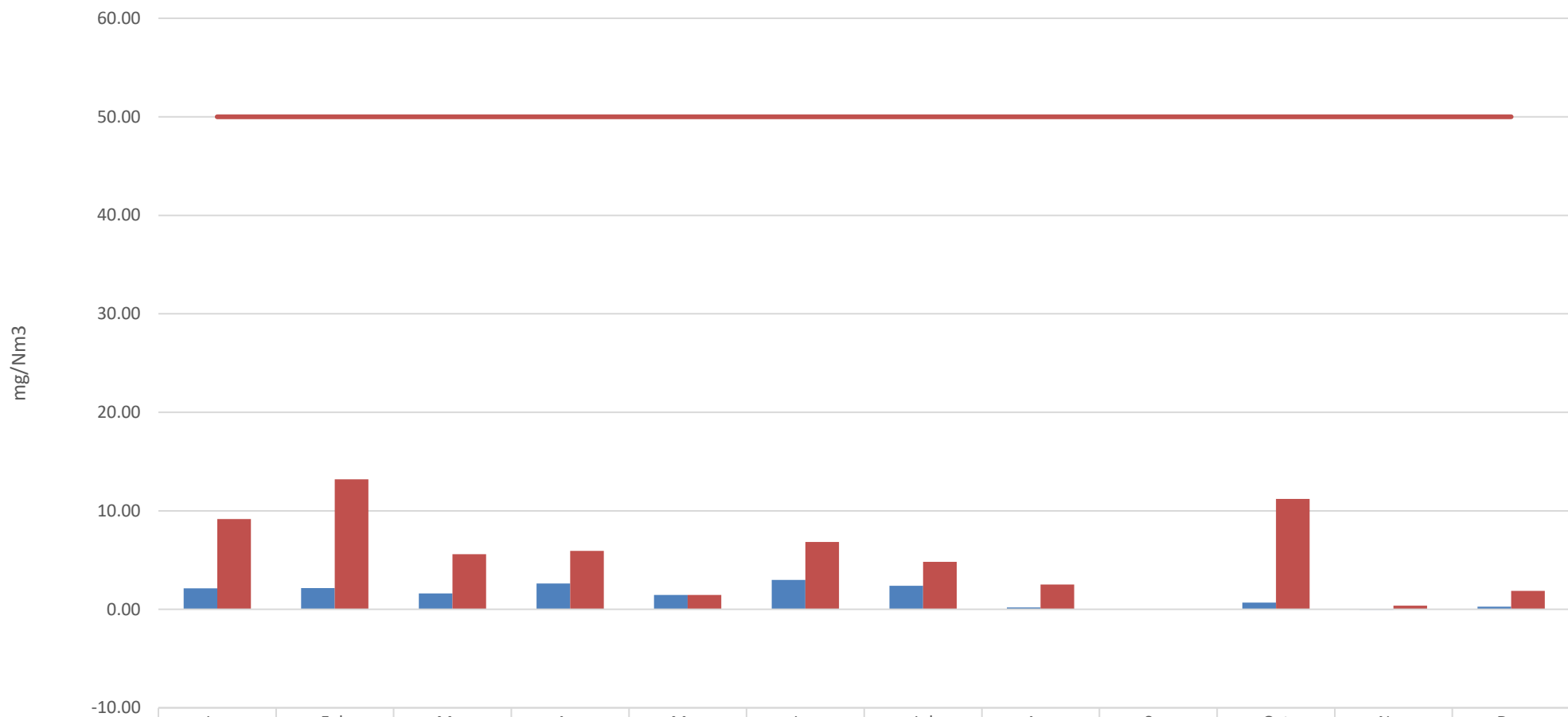
Waste values are obtained from the weighbridge report PC.

During 2021 the plant was shut down for maintenance and repairs on 4 occasions.

The plant underwent a major upgrade between August and October 2021 to install water cooled wear zones to the furnace. This has cut carbon emissions and improved the overall performance of the incinerator.

[illegible]

CO



Month Ave

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Daily Max

9.18

13.21

5.60

5.93

1.46

6.83

4.83

2.51

0.00

11.21

0.38

1.87

Daily ELV

50

50

50

50

50

50

50

50

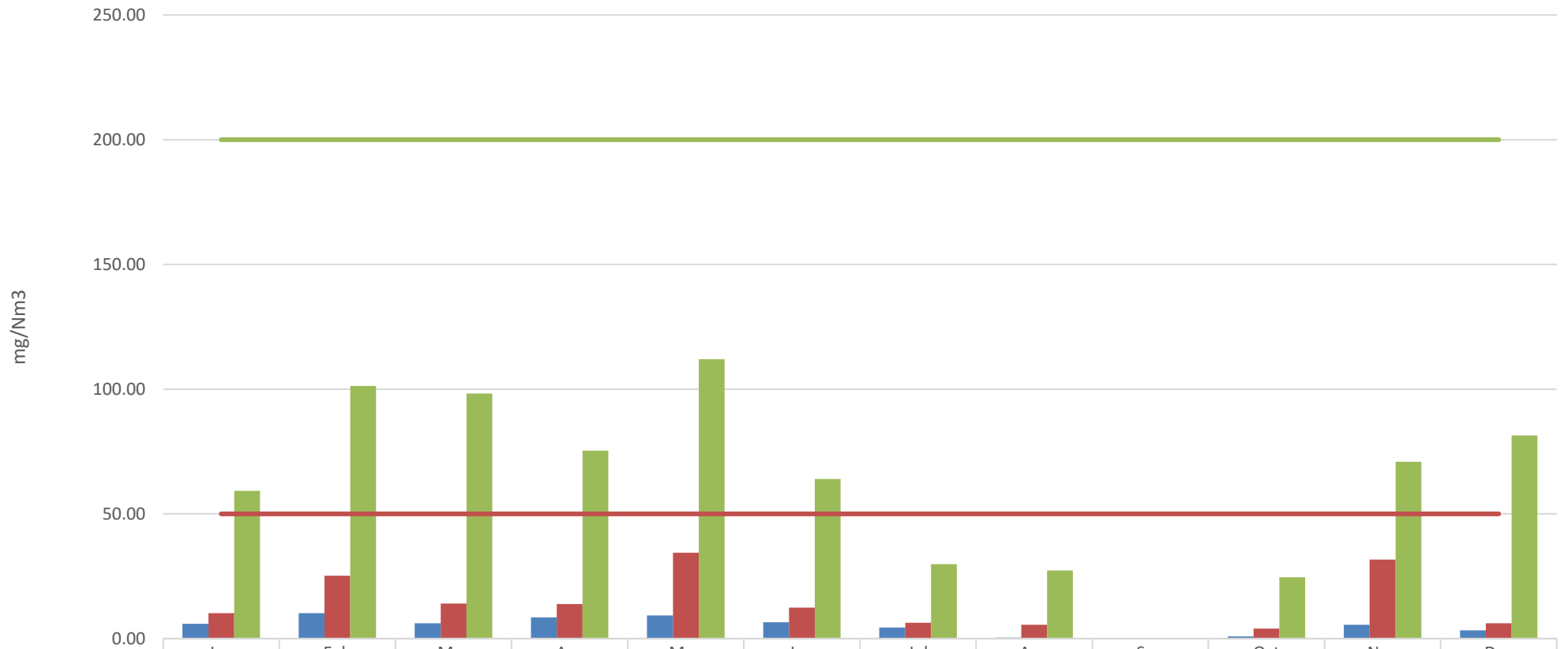
50

50

50

50

SO2

[illegible]

HCl

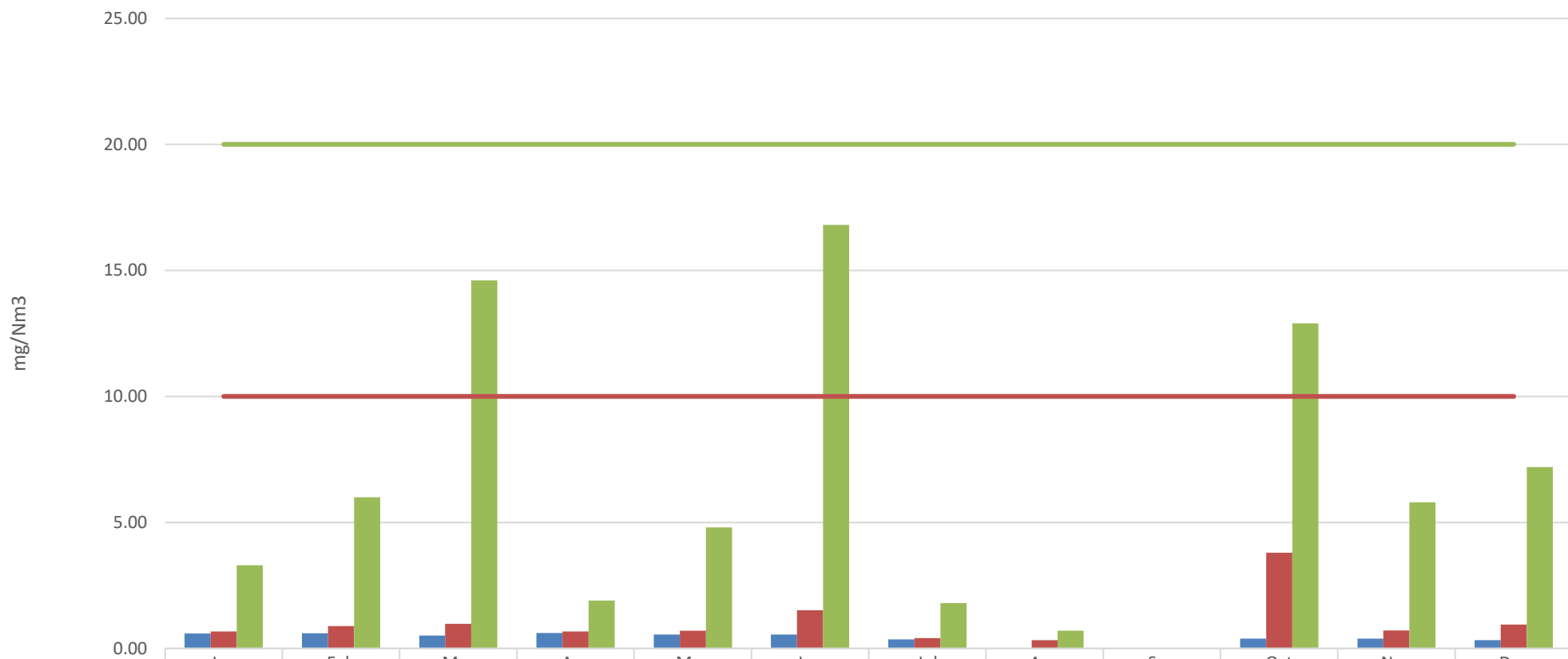
mg/Nm3



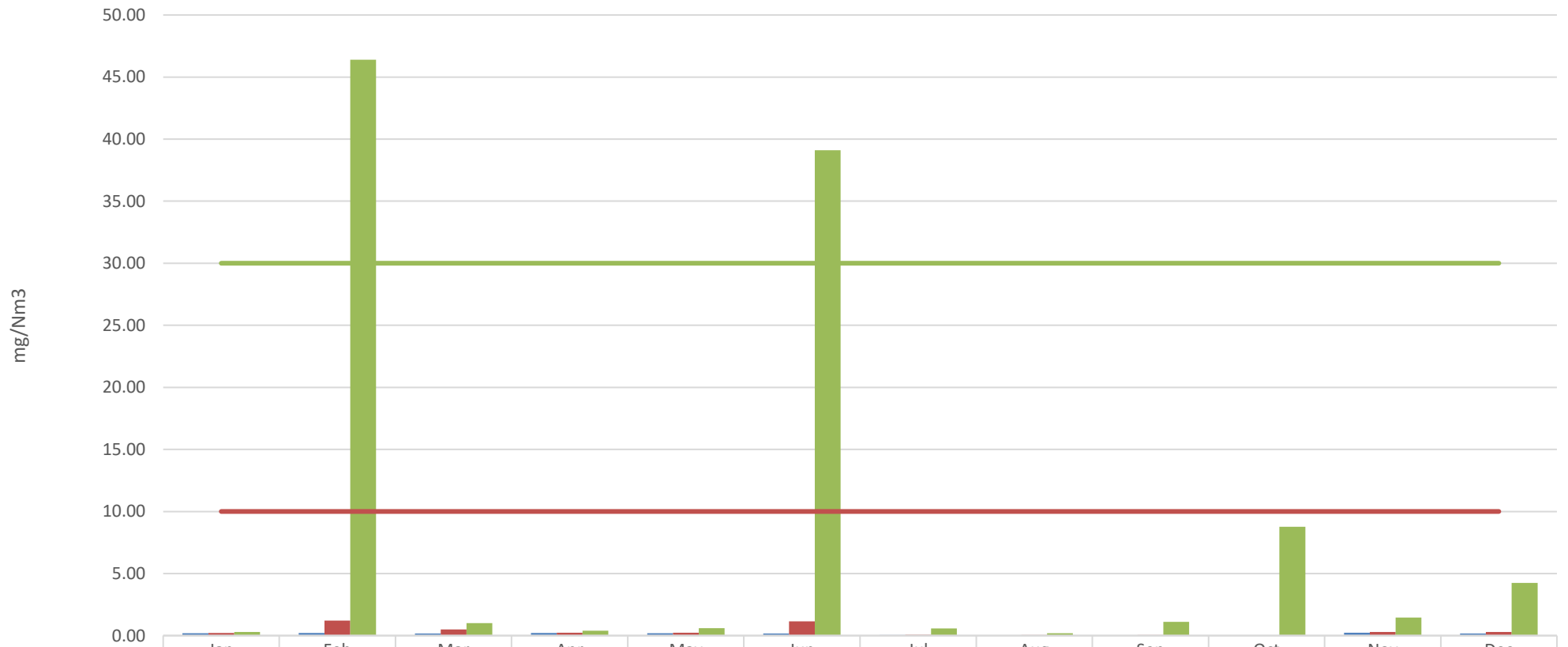
0.0000

[illegible]

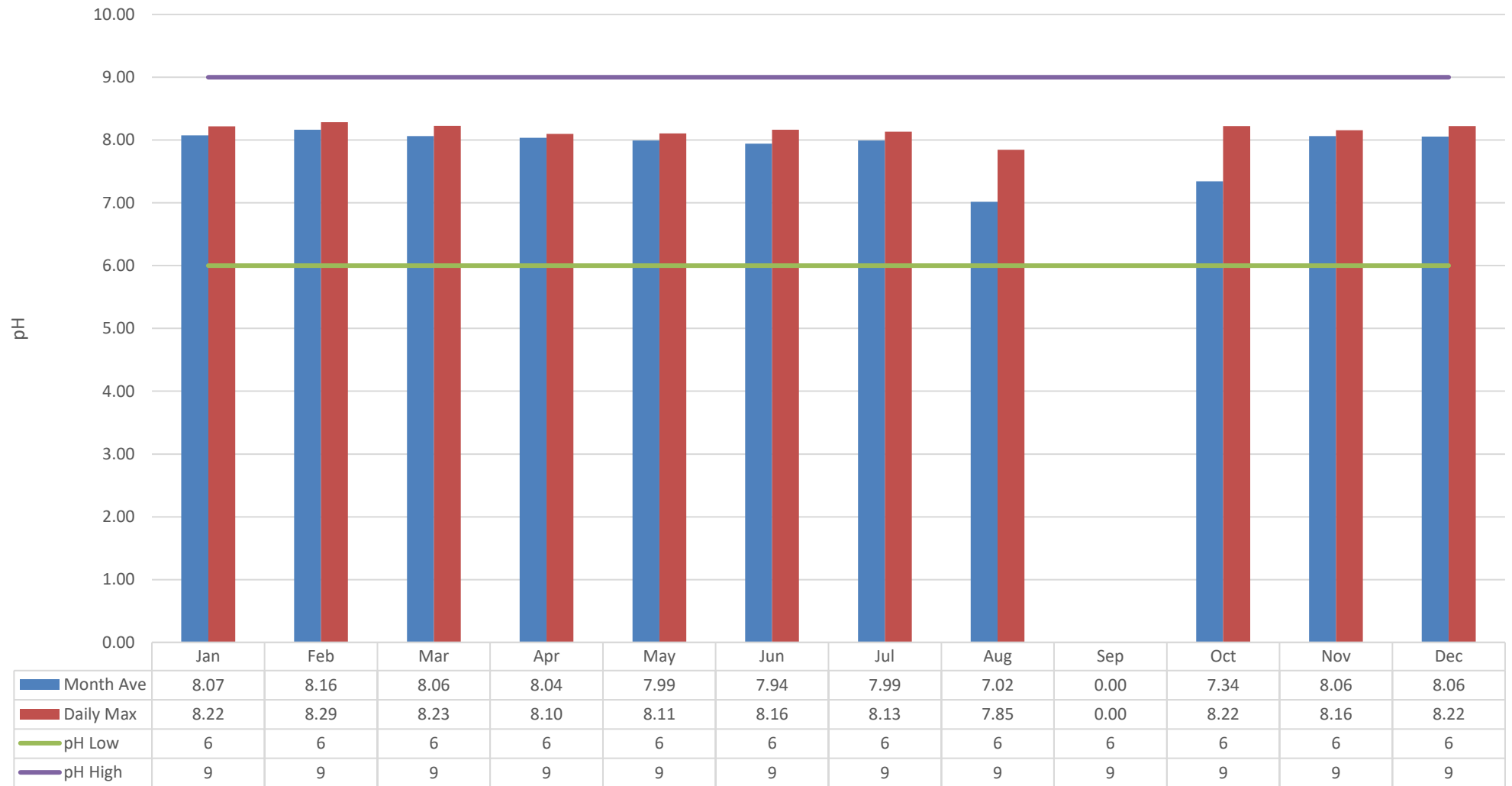
TOC

[illegible]

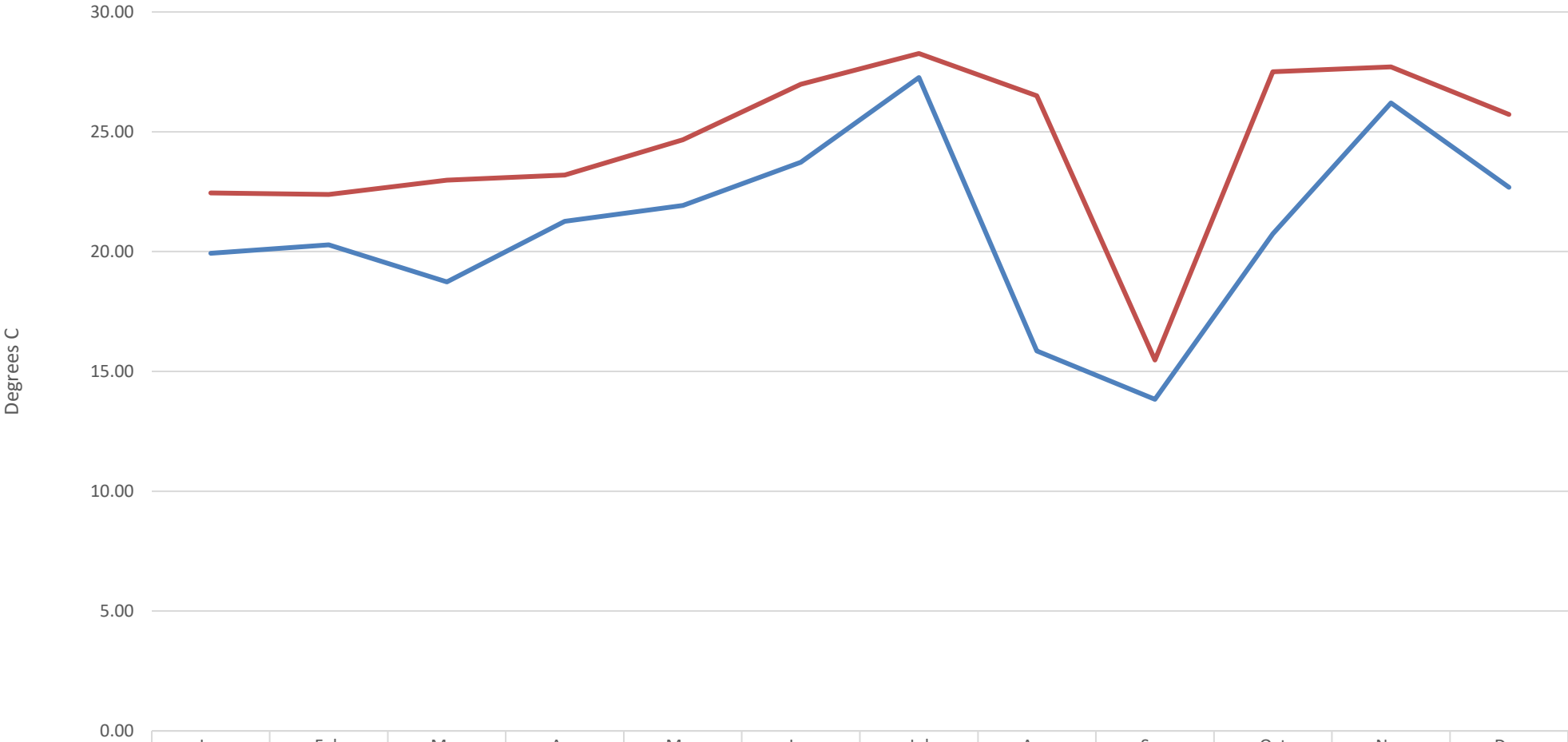
Dust

[illegible]

Water Discharge pH



Water Discharge Temperature



Month Ave

Daily Max

Jan

Feb

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

19.93

20.29

18.73

21.27

21.92

23.73

27.26

15.86

13.84

20.74

26.20

22.68

22.45

22.38

22.98

23.19

24.66

26.98

28.27

26.51

15.48

27.50

27.71

25.73

Water Discharge Flow



Periodic Monitoring

Periodic emissions to atmosphere sampling was carried out by Element Materials Technology in July (EGL-3791), and December (EMT02286)

See Appendix 1

Analysis of ashes and water was carried out by SOCOTEC in June (21064411), and December (21120694).

See Appendix 2

Incidents

There was a high Max 30 Min Dust reading on 26th February as the plant was in emergency shutdown due to main power failure at 21:15. Circuit breaker module was replaced and power was restored at 00:30.

There was a high 30 Min Max Dust reading on the 5th of June - this occurred while the plant was shutdown, no waste was being fed at this time.

Quantities of waste accepted to the premises in 2021 (kg)

Waste Type	Kg
Clinical	58360
Municipal	18886280
Offshore	0
Fish	110120
Total	19054760

Abnormal Operating Event

Date	Device Name	Duration of Failure (Minutes)	Emission Fail (Yes/No)
03/01/2021	Dry Injection	10	No
10/01/2021	Dry Injection	24	No
31/01/2021	Dry Injection	0:05	No
07/03/2021	Dry Injection	0:04	No
11/04/2021	Dry Injection	0:04	No
18/04/2021	Dry Injection	0:09	No
18/04/2021	Dry Injection	0:11	No
16/05/2021	Dry Injection	0:05	No
20/06/2021	Dry Injection	0:06	No
27/06/2021	Dry Injection	0:19	No
25/07/2021	Dry Injection	0:06	No
01/08/2021	Dry Injection	0:11	No
19/10/2021	Dry Injection	0:04	No
07/11/2021	Dry Injection	0:06	No
12/12/2021	Dry Injection	0:06	No
26/12/2021	Dry Injection	0:06	No

Raw material Utilisation

Item	Component	Unit	Quantity
Electricity from Grid		MW	2,091
Gas Oil		ltr	69773
Gas Treatment	Sorbalite	tonne	3800
	Caustic Solution	ltr	128000
	Urea	ltr	0
Water	Mains	m3	13238
	Spring	m3	1098
Effluent Treatment	HCl	ltr	820
	FeCl	ltr	2050
	TMT	ltr	3075
	Lime	tonne	72000
	Polymer	Kg	46

Hours of Operation

Total hours of operation – 6645

Water Discharge – Mass emissions

Mass emissions is calculated using the values from the monthly water samples and the total flow discharge of 8290 m³.

Metal	Kg/Year
Arsenic	0.0000058
Cadmium	0.0000128
Chromium	0.0001075
Copper	0.0000166
Lead	0.0000166
Mercury	0.0000001
Nickel	0.0009849
Thallium	0.0000622
Zinc	0.0003233

Emissions to Air – Mass emissions

Mass release rates calculated as an average over x2 tests July (EGL-3791) December (EMT02286). Total operational hours of 6645.

Component	Kg/Year
Particulate matter	149.18025
PCDD/PCDF, (WHO TEQ)	3.78765E-07
PAHs	0.11396175
PCBs	2.05995E-08
Total 'metals'	12.6255
Cadmium + Thallium	0.126255
Mercury	0.0166125
Ammonia	18.27375
Hydrogen chloride	61.233675
Hydrogen fluoride	8.6385
VOCs, as C	53.49225
Carbon monoxide	467.1435
Oxides of nitrogen, as NO2	20240.67
Sulphur Dioxide	1966.92

Remarks

The reported data is defined in section 6.4.3 and submitted as section 2.4.2 of the permit.

Appendix 1

Appendix 2