

# BIOMASS UK NO.2 LTD

**Annual Performance Report 2020**

**Permit EPR/AB3790ZB**

**Barry Energy Production Facility**

**Biomass UK No.2 Ltd**

Year: 2020

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This report is required under the Industrial Emissions Directive's Article 55(2) requirements on reporting and public information on waste incineration plants and co-incineration plants, which require the operator to produce an annual report on the functioning and monitoring of the plant and make it available to the public.

### Plant Description and Design

The Barry Energy Production Facility is a renewable energy generation facility which has been designed to recover energy from pre-prepared mixed waste wood feedstocks using gasification. The gasification facility is an Advanced Thermal Treatment (ATT) process that will produce a combustible synthesis gas, which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The Advanced Thermal Treatment (ATT) plant is designed to process shredded mixed waste wood feedstocks to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with an export capacity up to 10MWe (notionally 9.95MWe).

The Installation has been designed to process approximately 86,400 tonnes of pre-processed non-hazardous mixed waste wood per annum.

### Summary of Operational Processes and Procedures

The principle components of the process comprise the following:

*Waste Acceptance and Reception*: All waste wood is delivered directly into the fuel storage building via electrically operated roller shutter doors. When required, the waste is discharged onto the feedstock feed system, which delivers the waste into the gasification building. All waste is accepted in accordance to the sites waste acceptance procedures.

*Gasification*: The feedstock feed system delivers the waste into the fluidised bed gasification system where the waste is combusted to produce a synthetic gas (syngas). The syngas is then combusted to produce a high temperature flue-gas. A steam boiler then recovers the heat from the combustion gases through the conversion into superheated steam.

*Electricity Generation*: The superheated steam then passes to a Steam Turbine and Generator, which will export 10MWe (net) of renewable electricity onto the Local Distribution Network.

*Flue-Gas Cleaning*: Flue gas cleaning and pollution control consists of urea injection for De-NOx, lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other harmful substances. The stream has a baghouse system, which is designed to have the capacity to remove submicron dust particles within anticipated emission limit values (ELV's) stipulated by Chapter IV of the Industrial Emissions Directive (IED).

The plant is operated in accordance with its Environmental Management System which is designed to meet the requirements of ISO14001:2004.

**Summary of Plant Operations and Maintenance during the reporting year**

The plant completed hot commissioning in Q1 2020 and began the testing phase of the commissioning process in April. Unfortunately, due to lack of clarity around fuel supply during the COVID-19 pandemic and ongoing issues with the Local Authority (around regularisation of the planning consent) the plant has been in shut down since April 2020. It is anticipated that once these issues have been resolved the plant will resume operations so that testing can be completed prior to commencement of commercial operations.

**Operational Data**

|                         |                  |                  |        |
|-------------------------|------------------|------------------|--------|
| Plant Size              | 86,400 tonnes pa | MWth             | 10 MWe |
| No. of combustion lines | 1                | No. of Turbines: | 1      |

| Total waste received            | Unit   | Q1     | Q2     | Q3 | Q4 | Year Total |
|---------------------------------|--------|--------|--------|----|----|------------|
| Waste wood (biomass)            | Tonnes | 10,866 | 14,565 | -  | -  | 25,431     |
| Total waste wood co-incinerated |        | 10,866 | 14,565 | -  | -  | 25,431     |

| Energy Usage / Export          | Unit | Q1    | Q2    | Q3 | Q4 | Year Total | MWh/tonne incinerated |
|--------------------------------|------|-------|-------|----|----|------------|-----------------------|
| Electrical Energy Generated    | MWh  | 8,088 | 1,369 | -  | -  | 9,457      | 0                     |
| Electrical Energy Exported     |      | 7,403 | 1,309 | -  | -  | 8,712      | 0                     |
| Electrical Energy Used on site |      | 1,521 | 240   | -  | -  | 1,761      | 0                     |
| Power Imported                 |      | 56    | 195   | 35 | 6  | 292        | 0                     |
| Parasitic Load                 | %    | 9.1%  | 16.3% | -  | -  | 10.6%      |                       |
| Thermal Energy Produced        | MWh  | -     | -     | -  | -  | -          | -                     |
| Thermal Energy Used on site    |      | -     | -     | -  | -  | -          | -                     |

| Waste Disposal & Recovery | Unit   | Q1  | Q2 | Q3 | Q4 | Year Total | tonnes/tonne of waste co-incinerated |
|---------------------------|--------|-----|----|----|----|------------|--------------------------------------|
| APC Residues - produced   | tonnes | 173 | 28 | -  | -  | 201        | 0.8%                                 |
| Bottom Ash - produced     |        | 201 | 45 | -  | -  | 246        | 1.0%                                 |

| Raw Material Usage           | Unit           | Q1    | Q2    | Q3  | Q4  | Year Total | tonnes/tonne of waste co-incinerated |
|------------------------------|----------------|-------|-------|-----|-----|------------|--------------------------------------|
| Water Consumption            | m <sup>3</sup> | 6,500 | 1,227 | 210 | 124 | 8,061      | 0.32                                 |
| Urea Consumption             | tonnes         | 27    | -     | -   | -   | 27         | 0.00                                 |
| Activated Carbon Consumption | tonnes         | -     | -     | -   | -   | -          | -                                    |
| Lime Consumption             | tonnes         | 48    | 25    | -   | -   | 73         | 0.00                                 |
| Fuel oil Consumption         | tonnes         | 1,053 | 287   | -   | -   | 1,340      | 0.05                                 |

**2020 Annual Reporting Performance Form 1**

Permit EPR/AB37902B

Facility: Barry Energy Production Facility

Operator: Biomass UK No.2 Ltd

Form: Performance 1

Reporting of Performance Parameters for the Period from:

01 January 2020

31 December 2020

| Parameter                                     | Total Values | Units          | Specific Value | Units   |
|---|--------------|----------------|----------------|---|
| Electrical Energy imported from national grid | 292          | MWh            | 0.0            | MWh/tonne of waste co-incinerated (dry basis)             |
| Electrical Energy exported to national grid   | 8712         | MWh            | 0.3            | MWh/tonne of waste co-incinerated (dry basis)             |
| Electrical Energy used at the installation    | 1761         | MWh            | 0.1            | MWh/tonne of waste co-incinerated (dry basis)             |
| Fuel Oil consumption                          | 1340         | tonnes         | 0.05           | tonnes/tonne of waste co-incinerated (dry basis)          |
| Mass of bottom ash (including boiler ash)     | 246          | tonnes         | 0.009673233    | tonnes/tonne of waste co-incinerated (dry basis)          |
| Mass of APC residues produced                 | 201          | tonnes         | 0.0            | tonnes/tonne of waste co-incinerated (dry basis)          |
| Urea consumption                              | 27           | tonnes         | 0.0            | tonnes/tonne of waste co-incinerated (dry basis)          |
| Activated Carbon consumption                  | 0            | tonnes         | 0.0            | tonnes/tonne of waste co-incinerated (dry basis)          |
| Lime Consumption                              | 73           | tonnes         | 0.0            | tonnes/tonne of waste co-incinerated (dry basis)          |
| Water consumption                             | 8061         | m <sup>3</sup> | 0.3            | m <sup>3</sup> /tonne of waste co-incinerated (dry basis) |

**Operator's comments :**

The plant has been in shutdown since April 2020 due to planning conditions by WAG and the Local Authority. All data therefore relates only to the period January - April 2020.

Reporting of Annual Production / Treatment for the Period from: 01 January 2020

to:

| Parameter  | Value | Unit   |
|--|-------|--------|
| Total Waste Wood Received                        | 25431 | Tonnes |
| Total Waste Wood Co-incinerated                  | 25431 | Tonnes |
| Electrical Energy Generated                      | 9457  | MWh    |
| Electrical Energy Exported                       | 8712  | MWh    |
| Electrical Energy Used on Installation           | 1761  | MWh    |
| Thermal Energy produced                          | 0     | MWh    |
| Thermal Energy used on installation              | 0     | MWh    |
| Total bottom ash (including boiler ash produced) | 246   | Tonnes |
| Total APC residue produced                       | 201   | Tonnes |

**Operator's comments :**

The plant has been in shutdown since April 2020 due to planning conditions by WAG and the Local Authority. All data therefore relates only to the period January - April 2020.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

## Summary of Permit Compliance

### Compliance with permit limits for continuously monitored pollutants

The plant met its emission limits as shown in the table below:

| Substance            | Percentage time compliant during operation |             |
|----------------------|--|-------------|
|                      | Half-hourly limit                          | Daily limit |
| Particulates         | 100%                                       | 100%        |
| Oxides of nitrogen   | 100%                                       | 99%         |
| Sulphur dioxide      | 100%                                       | 100%        |
| Carbon monoxide      | 100%                                       | 100%        |
| Total organic carbon | 100%                                       | 100%        |
| Hydrogen chloride    | 100%                                       | 99%         |
| Hydrogen fluoride    | 100%                                       | 99%         |
| Ammonia              | N/A  | 100%        |

### Summary of any notifications or non-compliances under the permit

| Date       | Summary of notification or non-compliance<br>[including Line/Reference] | Reason                                   | Measures taken to<br>prevent<br>reoccurrence       |
|------------|---|--|--|
| 04/08/2020 | Cat 4 Non-compliance for late submission of Q1 Quarterly Reporting      | Operational difficulties due to Covid-19 | Site manager fully informed of reporting deadlines |
|            |   |  |  |
|            |   |  |  |
|            |   |  |  |
|            |   |  |  |

### Summary of any complaints received and actions taken to resolve them.

| Date       | Summary of complaint [including<br>Line/Reference] | Reason *   | Measures taken to<br>prevent<br>reoccurrence |
|------------|--|--|--|
| 22/04/2020 | Odour complaint to EA                              | Visible steam emission from burn down of wood chip prior to shutdown | Unsubstantiated                              |
| 17/07/2020 | Noise complaint to EA                              | Unsubstantiated - plant in shut down                                 | N/A  |
|            |  |  |  |
|            |  |  |  |
|            |  |  |  |

\* including whether substantiated by the operator or the EA



**Summary of Plant Improvements****Summary of any efficiency improvements that have been completed within the year.**

The plant was operational only in Q1 of 2020 in which commissioning was finalised. There have therefore been no efficiency improvements this year.

**Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.**

All Pre-operational conditions of the permit have now been completed with the final PO5 and PO6 having been signed off in January 2020.

Plant undergoing commissioning and only operational in Q1 2020, therefore no improvement conditions have yet been completed and submitted.

**Summary of any changes to the plant or operating techniques which required a variation to the permit and a summary of the resulting environmental impact.**

A variation to the permit was undertaken in March 2019 to allow periodic rather than continuous monitoring of hydrogen fluoride at the plant. QAL-2 and AST testing has yet to be completed as the plant has only been sporadically operational in Q1 2020 with not enough consecutive days operation on which to perform such testing.

**Summary of any other improvements made to the plant or planned to be made and a summary of the resulting environmental benefits.**

To ensure accurate measurement of the waste wood undergoing incineration, improvements are planned for the weigh belt measuring instrument on the feed system.

2020 Annual Reporting Residues Form 1

Permit EPR/AB3790ZB Operator: Biomass UK No.2 Ltd  
 Facility: Barry Energy Production Facility Form: Performance 1

Reporting of Residue Quality Period from: 01 January 2020 to: 31 December 2020

Residue Composition (TOC, Metals, Dioxins, etc.)

|   | TOC<br><3 % | Sb<br>mg/kg | Cd<br>mg/kg | Tl<br>mg/kg | Hg<br>mg/kg | Pb<br>mg/kg | Cr<br>mg/kg | Cu<br>mg/kg | Mn<br>mg/kg | Ni<br>mg/kg | As<br>mg/kg | Co<br>mg/kg | V<br>mg/kg | Zn<br>mg/kg | Dioxin/furan<br>I-TEQ ng/kg | Dioxin / Furan<br>WHO-TEQ ng/kg |       |      | Dioxin-like PCBs<br>WHO-TEQ ng/kg |       |      |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-----------------------------|---------------------------------|-------|------|-----------------------------------|-------|------|
|   |             |             |             |             |             |             |             |             |             |             |             |             |            |             |                             | Humans/mammals                  | Birds | Fish | Humans/mammals                    | Birds | Fish |
| Bottom Ash<br>(including<br>boiler ash) |             |             |             |             |             |             |             |             |             |             |             |             |            |             |                             |                                 |       |      |                                   |       |      |
| APC<br>Residues                         | N/A         |             |             |             |             |             |             |             |             |             |             |             |            |             |                             |                                 |       |      |                                   |       |      |

Reporting of Ash solubility Period from: N/A to:

Ash Solubility (Metals)

|   | Sb<br>mg/kg | Cd<br>mg/kg | Tl<br>mg/kg | Hg<br>mg/kg | Pb<br>mg/kg | Cr<br>mg/kg | Cu<br>mg/kg | Mn<br>mg/kg | Ni<br>mg/kg | As<br>mg/kg | Co<br>mg/kg | V<br>mg/kg | Zn<br>mg/kg |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|
| Bottom Ash<br>(including<br>boiler ash) |             |             |             |             |             |             |             |             |             |             |             |            |             |
| APC<br>Residues                         |             |             |             |             |             |             |             |             |             |             |             |            |             |

Operator's comments :

Residue testing has not been carried out in 2020. The plant was sporadically operational only in Q1 2020 and did not reach sufficient stability to be able to carry out residue testing.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

**Emissions to Water**

| Summary of monitoring undertaken and compliance |  |
|---|--|
| N/A   |  |
|   |  |
|   |  |

| Commentary on any specific events |             |
|-----------------------------------|-------------|
| Date & Event                      | Description |
|                                   |             |
|                                   |             |
|                                   |             |

**Emissions to Water / Sewer**

| Parameter | Monitoring Frequency | Limit | Target | Max. | Average |
|-----------|----------------------|-------|--------|------|---------|
|           |                      |       |        |      |         |
|           |                      |       |        |      |         |
|           |                      |       |        |      |         |
|           |                      |       |        |      |         |
|           |                      |       |        |      |         |
|           |                      |       |        |      |         |
|           |                      |       |        |      |         |

**Emissions to Air (periodically monitored)****Summary of monitoring undertaken, standards used and compliance**

Not applicable at this stage. QAL-2 Periodic monitoring and AST testing was not undertaken in Q1 2020 due to the sporadic nature of operations meaning there were not enough consecutive days on which to undertake the testing. The plant has been in shutdown since April 2020, upon re-commencement of operations QAL-2 periodic monitoring will be undertaken at the earliest opportunity.

**Results of emissions to air that are periodically monitored**

| Substance   | Ref. Period      | Emission Limit Value       | Average |    |    |    |       |
|---|------------------|----------------------------|---------|----|----|----|-------|
|   |                  |                            | Q1      | Q2 | Q3 | Q4 | Total |
| Hydrogen fluoride                                     | min 1 hr         | 3 mg/m <sup>3</sup>        |         |    |    |    |       |
| Cd and Th and their compounds                         | 30 min, max 8hrs | 0.05 mg/m <sup>3</sup>     |         |    |    |    |       |
| Hg and its compounds                                  | 30 min, max 8hrs | 0.05 mg/m <sup>3</sup>     |         |    |    |    |       |
| Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V and their compounds | 30 min, max 8hrs | 0.5 mg/m <sup>3</sup>      |         |    |    |    |       |
| Dioxins & Furans (I-TEQ)                              | 6-8hrs           | 0.01 ng/m <sup>3</sup>     |         |    |    |    |       |
| Dioxins & Furans (WHO-TEQ Humans / Mammals)           | 6-8hrs           | None set ng/m <sup>3</sup> |         |    |    |    |       |
| Dioxins & Furans (WHO-TEQ Fish)                       | 6-8hrs           | None set ng/m <sup>3</sup> |         |    |    |    |       |
| Dioxins & Furans (WHO-TEQ Birds)                      | 6-8hrs           | None set ng/m <sup>3</sup> |         |    |    |    |       |
| PCBs (WHO-TEQ Humans / Mammals)                       | 6-8hrs           | None set ng/m <sup>3</sup> |         |    |    |    |       |
| PCBs (WHO-TEQ Fish)                                   | 6-8hrs           | None set ng/m <sup>3</sup> |         |    |    |    |       |
| PCBs (WHO-TEQ Birds)                                  | 6-8hrs           | None set ng/m <sup>3</sup> |         |    |    |    |       |
| Total PAHs  | 6-8hrs           | 0.001 mg/m <sup>3</sup>    |         |    |    |    |       |

**Comments :**

## Annual Performance Report 2020

### Emissions to Air (continuously monitored)

#### Summary of monitoring undertaken, standards used and compliance

CEMS equipment has been in calibration and operational since December 2019. Plant has been in shutdown since April 2020. All data therefore relates only to the period January - April 2020.

#### Results of emissions to air that are continuously monitored

| Substance            | Reference Period | Emission Limit Value  | A1   |       |
|----------------------|------------------|-----------------------|------|-------|
|                      |                  |                       | Max. | Avg.  |
| Oxides of nitrogen   | Daily mean       | 300 mg/m <sup>3</sup> | 334  | 221.3 |
|                      | ½ hourly mean    | 600 mg/m <sup>3</sup> | 529  | 221.3 |
| Particulates         | Daily mean       | 15 mg/m <sup>3</sup>  | 0.3  | <1    |
|                      | ½ hourly mean    | 45 mg/m <sup>3</sup>  | 0.3  | 0.2   |
| Total Organic Carbon | Daily mean       | 15 mg/m <sup>3</sup>  | 0.1  | 0.0   |
|                      | ½ hourly mean    | 30 mg/m <sup>3</sup>  | 3    | 0.0   |
| Hydrogen chloride    | Daily mean       | 15 mg/m <sup>3</sup>  | 19   | 5.7   |
|                      | ½ hourly mean    | 90 mg/m <sup>3</sup>  | 40   | 1.4   |
| Hydrogen fluoride    | Daily mean       | 6 mg/m <sup>3</sup>   | 2.2  | 0.5   |
|                      | ½ hourly mean    | 1.5 mg/m <sup>3</sup> | 2.4  | 0.5   |
| Sulphur dioxide      | Daily mean       | 75 mg/m <sup>3</sup>  | 34   | 7.0   |
|                      | ½ hourly mean    | 300 mg/m <sup>3</sup> | 57   | 7.3   |
| Carbon monoxide      | Daily mean       | 75 mg/m <sup>3</sup>  | 46   | 17.0  |
|                      | ½ hourly mean    | 150 mg/m <sup>3</sup> | 64   | 16.8  |
| Ammonia              | Daily mean       | 5 mg/m <sup>3</sup>   | 30   | 5.3   |
| Nitrous oxide        | Daily mean       | No Limit Set          | 7    | 1.1   |

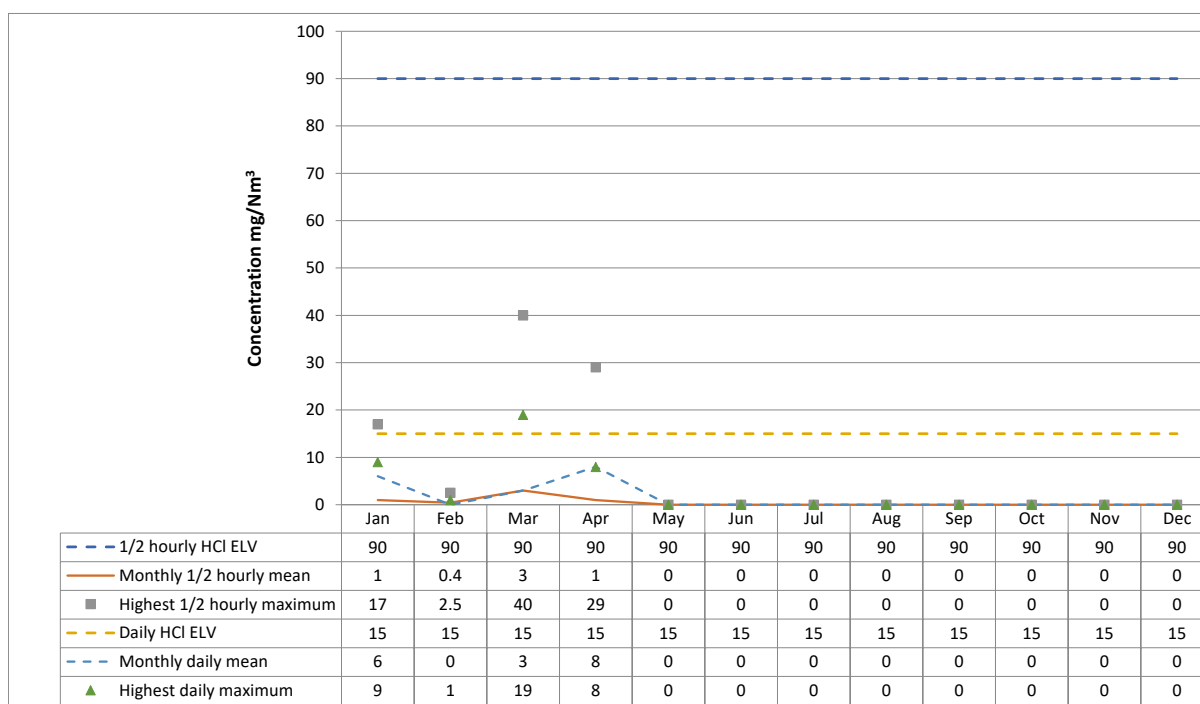
\* = delete or amend as appropriate

#### Comments :

## Monitoring of Hydrogen Chloride emissions

## Whole Installation

| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly HCl ELV           | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily HCl ELV           | Monthly daily mean | Highest daily maximum |
| Jan                | 90                           | 1                       | 17                         | 15                      | 6                  | 9                     |
| Feb                | 90                           | 0.4                     | 2.5                        | 15                      | <1                 | 1                     |
| Mar                | 90                           | 3                       | 40                         | 15                      | 3                  | 19                    |
| Apr                | 90                           | 1                       | 29                         | 15                      | 8                  | 8                     |
| May                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Jun                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Jul                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Aug                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Sep                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Oct                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Nov                | 90                           | -                       | -                          | 15                      | -                  | -                     |
| Dec                | 90                           | -                       | -                          | 15                      | -                  | -                     |



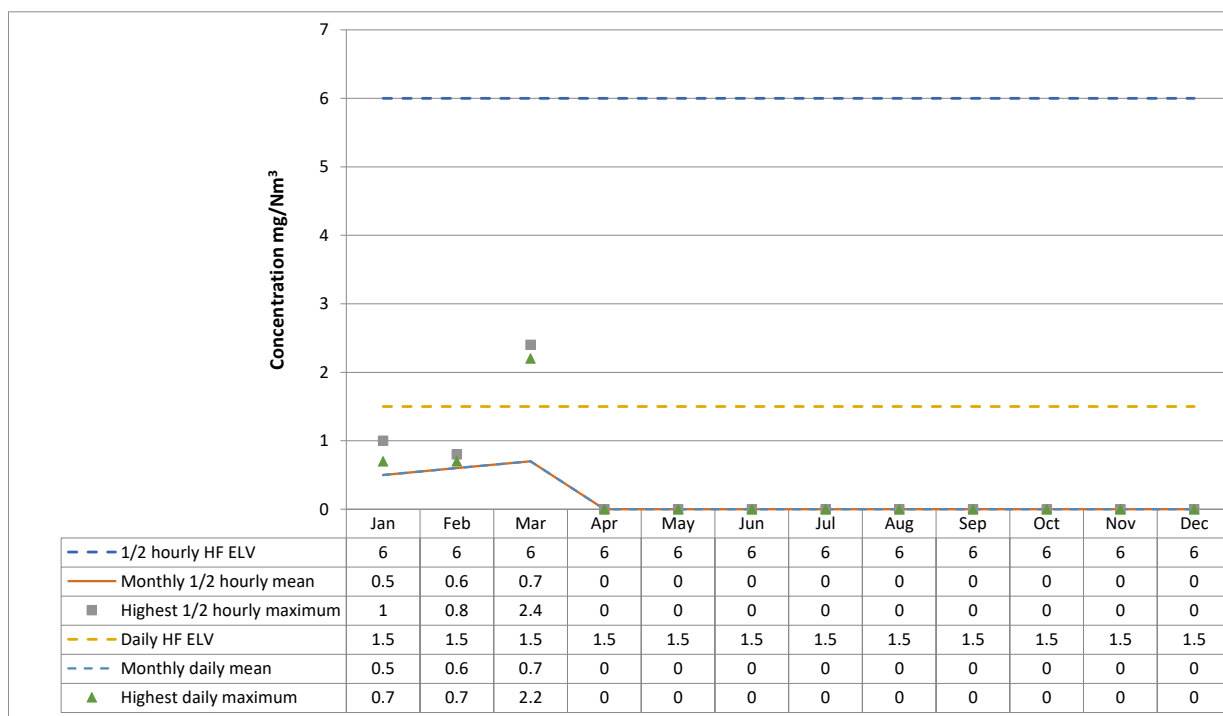
## Comments :

Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Hydrogen Fluoride emissions

## Whole Installation

| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly HF ELV            | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily HF ELV            | Monthly daily mean | Highest daily maximum |
| Jan                | 6                            | 0.5                     | 1                          | 1.5                     | 0.5                | 0.7                   |
| Feb                | 6                            | 0.6                     | 0.8                        | 1.5                     | 0.6                | 0.7                   |
| Mar                | 6                            | 0.7                     | 2.4                        | 1.5                     | 0.7                | 2.2                   |
| Apr                | 6                            | 0                       | 0                          | 1.5                     | 0                  | 0                     |
| May                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Jun                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Jul                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Aug                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Sep                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Oct                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Nov                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |
| Dec                | 6                            | -                       | -                          | 1.5                     | -                  | -                     |

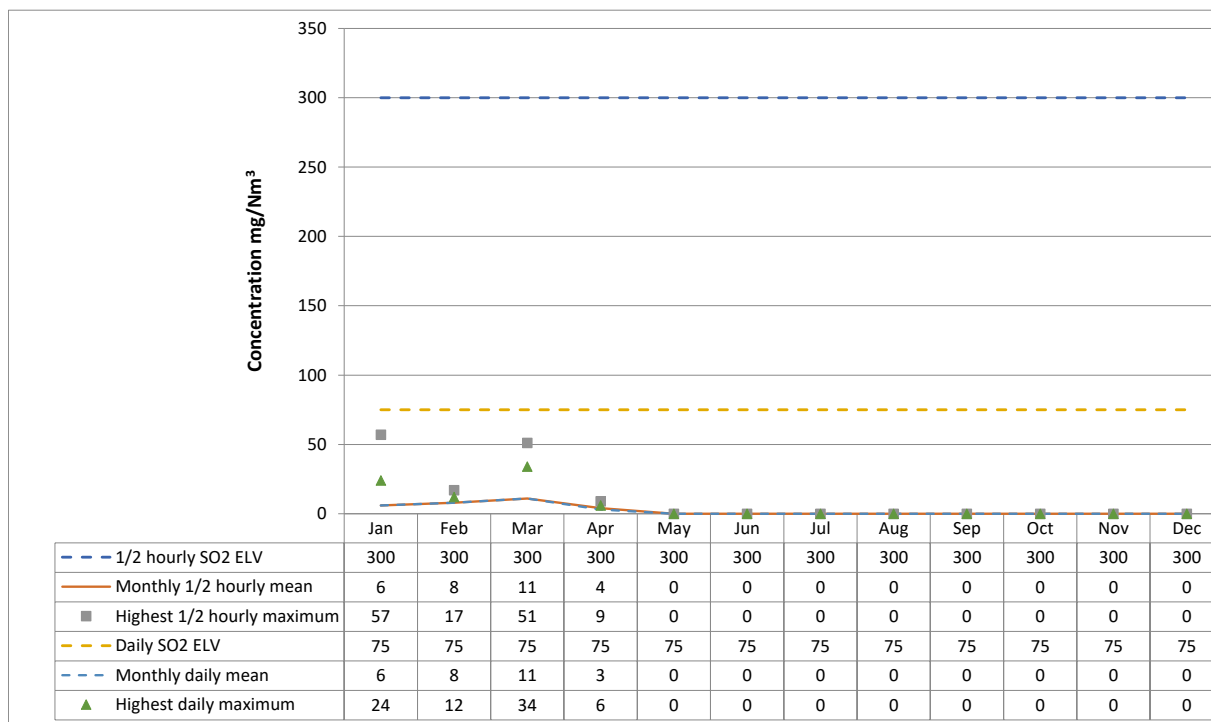
**Comments :**

Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Sulphur dioxide emissions

## Whole Installation

| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly SO2 ELV           | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily SO2 ELV           | Monthly daily mean | Highest daily maximum |
| Jan                | 300                          | 6                       | 57                         | 75                      | 6                  | 24                    |
| Feb                | 300                          | 8                       | 17                         | 75                      | 8                  | 12                    |
| Mar                | 300                          | 11                      | 51                         | 75                      | 11                 | 34                    |
| Apr                | 300                          | 4                       | 9                          | 75                      | 3                  | 6                     |
| May                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Jun                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Jul                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Aug                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Sep                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Oct                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Nov                | 300                          | -                       | -                          | 75                      | -                  | -                     |
| Dec                | 300                          | -                       | -                          | 75                      | -                  | -                     |

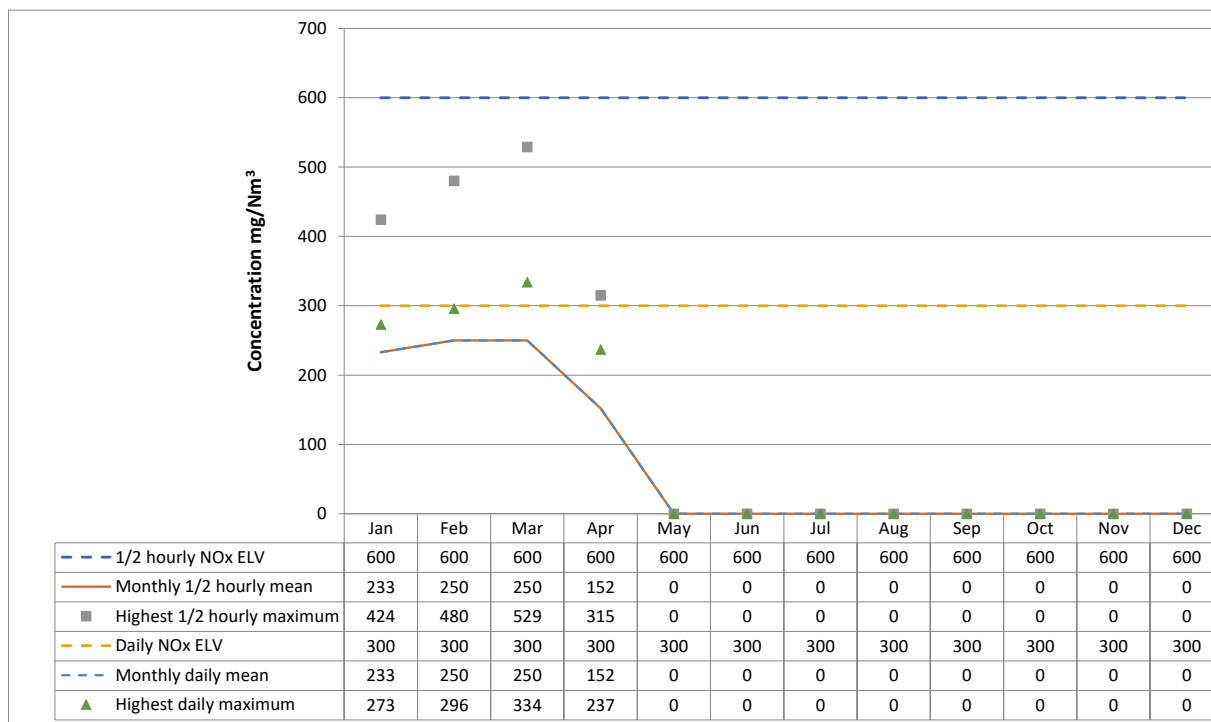
**Comments :**

Plant operational sporadically in January - April 2020. Shut down since April 2020.



## Monitoring of Oxides of Nitrogen emissions Whole Installation (A1)

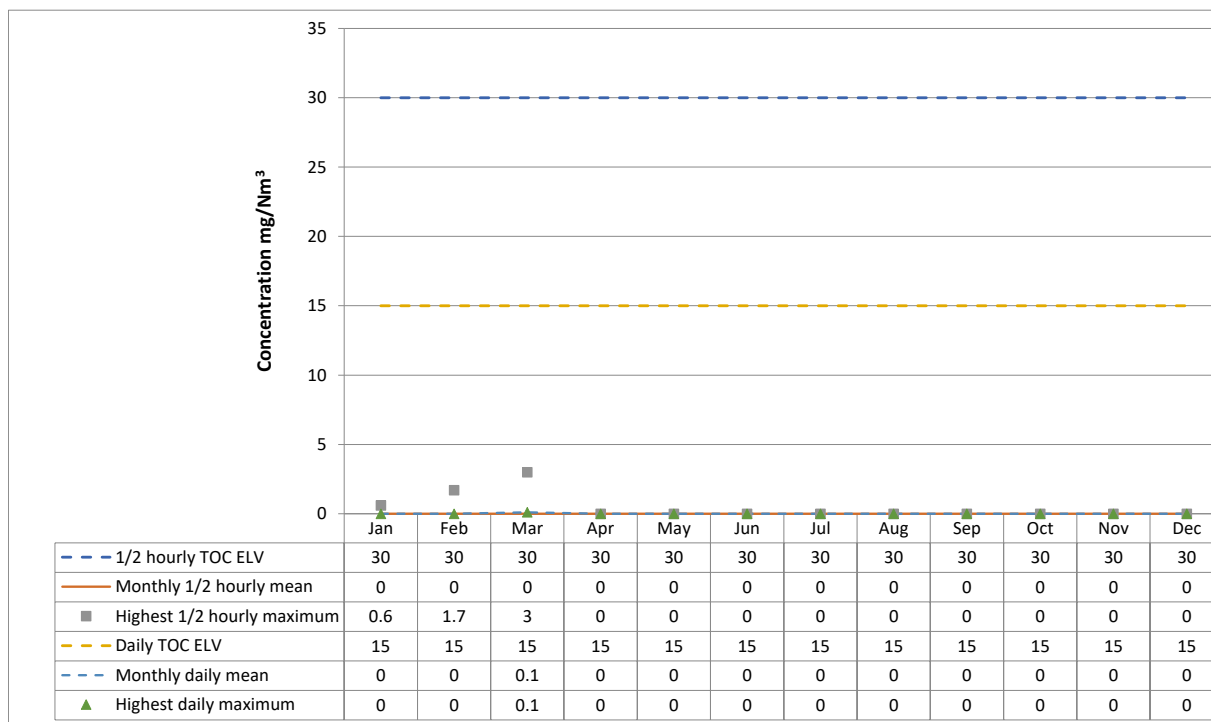
| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly NOx ELV           | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily NOx ELV           | Monthly daily mean | Highest daily maximum |
| Jan                | 600                          | 233                     | 424                        | 300                     | 233                | 273                   |
| Feb                | 600                          | 250                     | 480                        | 300                     | 250                | 296                   |
| Mar                | 600                          | 250                     | 529                        | 300                     | 250                | 334                   |
| Apr                | 600                          | 152                     | 315                        | 300                     | 152                | 237                   |
| May                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Jun                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Jul                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Aug                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Sep                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Oct                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Nov                | 600                          | -                       | -                          | 300                     | -                  | -                     |
| Dec                | 600                          | -                       | -                          | 300                     | -                  | -                     |

**Comments :**

Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Total organic carbon emissions Whole Installation

| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly TOC ELV           | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily TOC ELV           | Monthly daily mean | Highest daily maximum |
| Jan                | 30                           | -                       | 0.6                        | 15                      | 0                  | 0                     |
| Feb                | 30                           | 0                       | 1.7                        | 15                      | 0                  | 0                     |
| Mar                | 30                           | 0                       | 3                          | 15                      | 0.1                | 0.1                   |
| Apr                | 30                           | 0                       | 0                          | 15                      | 0                  | 0                     |
| May                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Jun                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Jul                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Aug                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Sep                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Oct                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Nov                | 30                           | -                       | -                          | 15                      | -                  | -                     |
| Dec                | 30                           | -                       | -                          | 15                      | -                  | -                     |

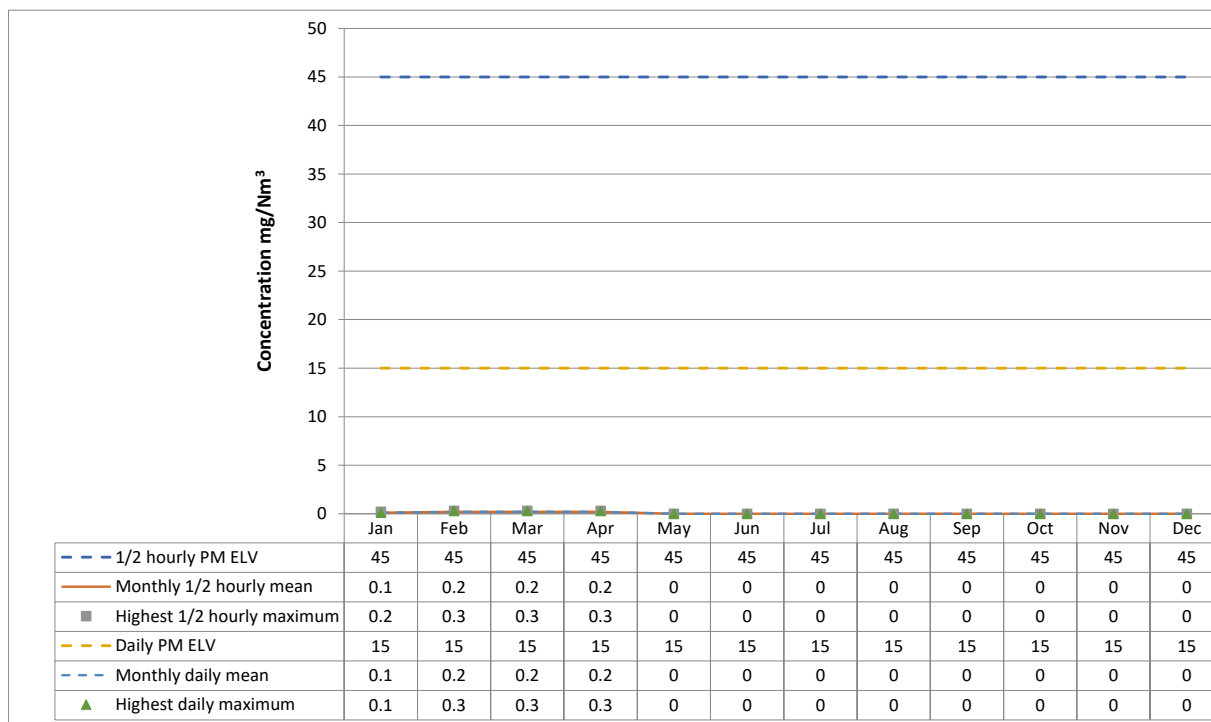
**Comments :**

Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Particulate matter emissions

## Whole Installation

| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly PM ELV            | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily PM ELV            | Monthly daily mean | Highest daily maximum |
| Jan                | 45                           | 0.1                     | 0.2                        | 15                      | 0.1                | 0.1                   |
| Feb                | 45                           | 0.2                     | 0.3                        | 15                      | 0.2                | 0.3                   |
| Mar                | 45                           | 0.2                     | 0.3                        | 15                      | 0.2                | 0.3                   |
| Apr                | 45                           | 0.2                     | 0.3                        | 15                      | 0.2                | 0.3                   |
| May                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Jun                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Jul                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Aug                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Sep                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Oct                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Nov                | 45                           | -                       | -                          | 15                      | -                  | -                     |
| Dec                | 45                           | -                       | -                          | 15                      | -                  | -                     |



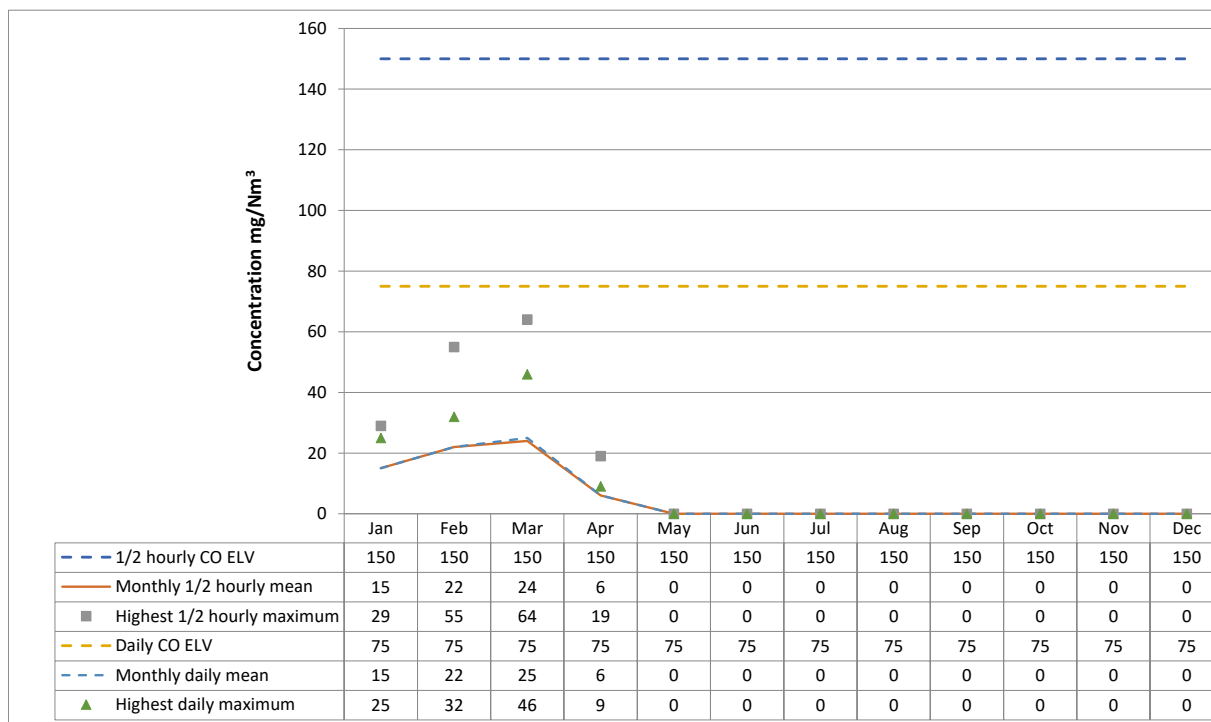
## Comments :

Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Carbon Monoxide (half hourly)

## Whole Installation

| mg/Nm <sup>3</sup> | 1/2 Hourly Reference Periods |                         |                            | Daily Reference Periods |                    |                       |
|--------------------|------------------------------|-------------------------|----------------------------|-------------------------|--------------------|-----------------------|
| 2020               | 1/2 hourly CO ELV            | Monthly 1/2 hourly mean | Highest 1/2 hourly maximum | Daily CO ELV            | Monthly daily mean | Highest daily maximum |
| Jan                | 150                          | 15                      | 29                         | 75                      | 15                 | 25                    |
| Feb                | 150                          | 22                      | 55                         | 75                      | 22                 | 32                    |
| Mar                | 150                          | 24                      | 64                         | 75                      | 25                 | 46                    |
| Apr                | 150                          | 6                       | 19                         | 75                      | 6                  | 9                     |
| May                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Jun                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Jul                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Aug                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Sep                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Oct                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Nov                | 150                          | -                       | -                          | 75                      | -                  | -                     |
| Dec                | 150                          | -                       | -                          | 75                      | -                  | -                     |

**Comments :**

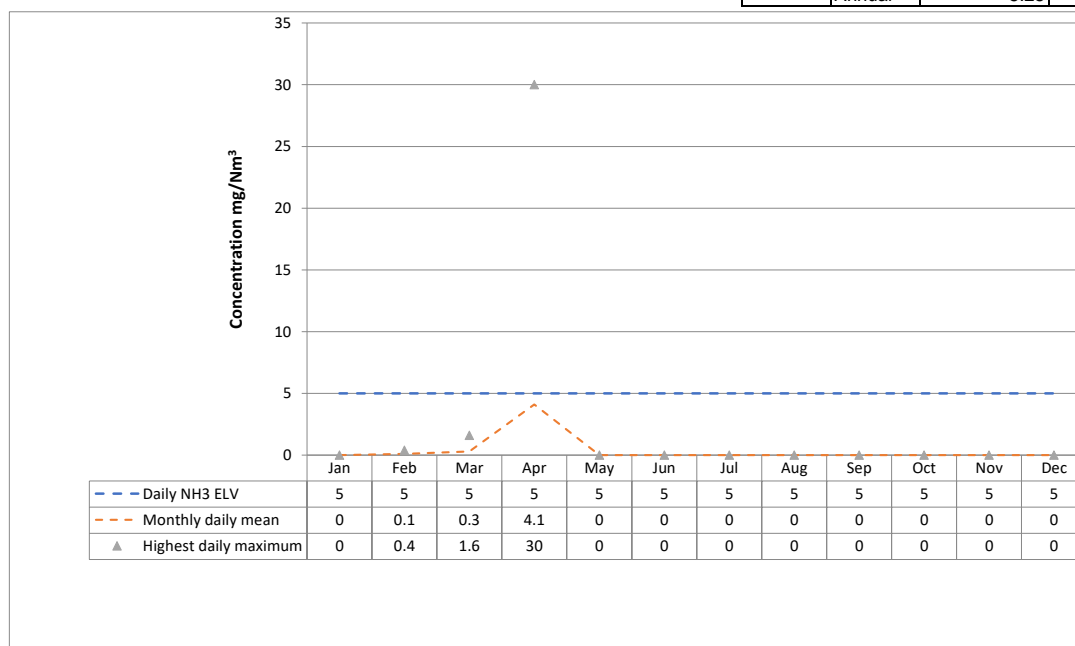
Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Ammonia emissions

| mg/Nm <sup>3</sup> | Daily Reference Periods |                    |                       |
|--------------------|-------------------------|--------------------|-----------------------|
| 2020               | Daily NH3 ELV           | Monthly daily mean | Highest daily maximum |
| Jan                | 5                       | 0                  | 0                     |
| Feb                | 5                       | 0.1                | 0.4                   |
| Mar                | 5                       | 0.3                | 1.6                   |
| Apr                | 5                       | 4.1                | 30                    |
| May                | 5                       | -                  | -                     |
| Jun                | 5                       | -                  | -                     |
| Jul                | 5                       | -                  | -                     |
| Aug                | 5                       | -                  | -                     |
| Sep                | 5                       | -                  | -                     |
| Oct                | 5                       | -                  | -                     |
| Nov                | 5                       | -                  | -                     |
| Dec                | 5                       | -                  | -                     |

## Monitoring of Ammonia Per Combustion Line

| 2020 | mg/Nm <sup>3</sup> | Monthly daily mean | Monthly daily maximum |
|------|--------------------|--------------------|-----------------------|
| A1   | Jan                | <1                 | <1                    |
|      | Feb                | <1                 | <1                    |
|      | Mar                | 2                  | 2                     |
|      | Apr                | 8.5                | 30                    |
|      | May                | -                  | -                     |
|      | Jun                | -                  | -                     |
|      | Jul                | -                  | -                     |
|      | Aug                | -                  | -                     |
|      | Sep                | -                  | -                     |
|      | Oct                | -                  | -                     |
|      | Nov                | -                  | -                     |
|      | Dec                | -                  | -                     |
|      | Annual             | 5.25               | 30                    |



## Comments :

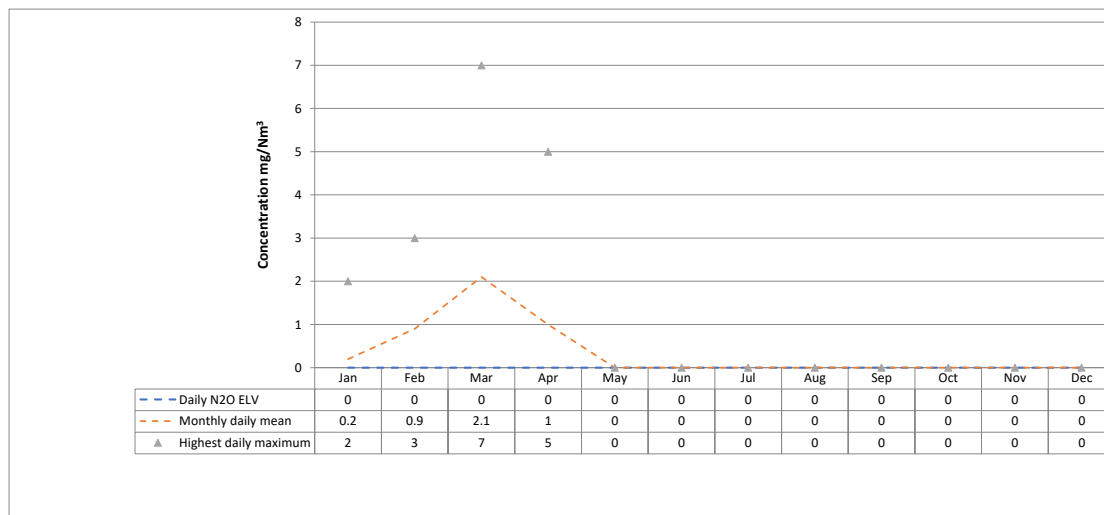
Plant operational sporadically in January - April 2020. Shut down since April 2020.

## Monitoring of Nitrous Oxide emissions

| mg/Nm <sup>3</sup> | Daily Reference Periods |                    |                       |
|--------------------|-------------------------|--------------------|-----------------------|
|                    | Daily N2O ELV           | Monthly daily mean | Highest daily maximum |
| 2020               |                         |                    |                       |
| Jan                | 0                       | 0.2                | 2                     |
| Feb                | 0                       | 0.9                | 3                     |
| Mar                | 0                       | 2.1                | 7                     |
| Apr                | 0                       | 1                  | 5                     |
| May                | 0                       | -                  | -                     |
| Jun                | 0                       | -                  | -                     |
| Jul                | 0                       | -                  | -                     |
| Aug                | 0                       | -                  | -                     |
| Sep                | 0                       | -                  | -                     |
| Oct                | 0                       | -                  | -                     |
| Nov                | 0                       | -                  | -                     |
| Dec                | 0                       | -                  | -                     |

## Monitoring of Nitrous Oxide € Per Combustion Line

| 2020   | mg/Nm3 | Monthly daily mean | Monthly daily maximum |
|--------|--------|--------------------|-----------------------|
| A1     | Jan    | 0.2                | 2                     |
|        | Feb    | 0.9                | 3                     |
|        | Mar    | 2.1                | 7                     |
|        | Apr    | 1                  | 5                     |
|        | May    | -                  | -                     |
|        | Jun    | -                  | -                     |
|        | Jul    | -                  | -                     |
|        | Aug    | -                  | -                     |
|        | Sep    | -                  | -                     |
|        | Oct    | -                  | -                     |
|        | Nov    | -                  | -                     |
|        | Dec    | -                  | -                     |
| Annual |        | 1.05               | 7                     |



## Comments :

An indicated ELV value of zero in the table above means that no nitrous oxide limit is set in the permit.