

## Annual Performance Report 2016

SUEZ Tees Valley



### **Tees Valley Energy from Waste Facility**

### **ANNUAL PERFORMANCE REPORT 2016**

|                 |                                          |
|-----------------|------------------------------------------|
| <b>DOCUMENT</b> | Tees Valley – Energy from Waste Facility |
| <b>TITLE:</b>   | 2016 Annual Performance Report           |

|                    |              |
|--------------------|--------------|
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|--------------------|--------------|

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|---------------------|-----------------------|
| <b>PREPARED BY:</b> | <b>NAME</b>           |
| SHEQ Advisor        | Paula Bakes/Mark Bone |

|                     |                             |
|---------------------|-----------------------------|
| <b>APPROVED BY:</b> | <b>NAME</b>                 |
| Plant Manager       | Barry Fellows/Darren Thomas |

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## 1. INTRODUCTION

|                                                                   |                                                                                                                                                                                              |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of Company                                                   | SUEZ R&R UK (Tees Valley) Ltd                                                                                                                                                                |
| Name of Plant                                                     | Tees Valley – Energy from Waste Facility                                                                                                                                                     |
| Permit Number                                                     | VP3034SG                                                                                                                                                                                     |
| Permit variation Number                                           | FP3832UU                                                                                                                                                                                     |
| Address                                                           | Haverton Hill Road<br>Billingham<br>TS23 1PY                                                                                                                                                 |
| Phone                                                             | 01642 202300                                                                                                                                                                                 |
| Contact Name/Position                                             | Barry Fellows/Darren Thomas 01642202300                                                                                                                                                      |
| Further information, description of waste types burned and origin | Municipal household waste from local councils:<br>Stockton-on-Tees<br>Hartlepool<br>Middlesbrough<br>Redcar & Cleveland<br>North Tyneside<br>Northumberland<br>Durham<br>South Tyne and Wear |

## 2 PLANT DESCRIPTION

The Energy from Waste facility operates 24/7 and can receive up to 2,800 tonnes of municipal waste from local councils per week. The plant has five furnace lines with a combined processing capacity of 756,000 tonnes per annum. The heat produced by waste incineration is used to raise superheated steam which is harnessed to turn 3 x single-cylinder turbine linked to an electricity generator producing approx 55 MWh of electricity. Power produced, is sold to the National Grid

### 3. SUMMARY OF PLANT OPERATION

The plant has 5 Lines. Incoming waste is delivered to site by refuse collection trucks, it is checked in, weighted, then delivered into the reception hall.

#### RECEPTION HALL

2 large reception hall allows refuse collection trucks to manoeuvre and tip waste safely. Air needed for combustion is drawn into the furnace from here so that odour and dust do not escape from the building.

#### BUNKER

Waste vehicles reverse to a wheel stop and tip their loads into a large concrete bunker. Mixing of waste occurs as the crane driver sorts the waste looking for unsuitable wastes to be removed, and to improve the homogeneity of the incinerator feedstock.

#### CONTROL ROOM

There is 2 plant control rooms which centralises the operation of all equipment, including the grab crane used to mix and load waste into hoppers that feeds the furnace. All on-site functions are monitored automatically and manually. Its systems verify in real time that equipment is functioning properly, continuously monitor the combustion gas, and maximise the efficiency of the entire EfW process.

#### GRATE AND BOILER

Waste is lifted into the charging hoppers by the crane, from here waste falls into the furnace-charging chute and then onto the grate system for incineration. The thermal energy released from the burning is used to convert water to super-heated steam. At high pressure, this steam drives a turbine to generate electricity.

#### ELECTRICITY GENERATION

Electricity is generated at 11kv, with an electric capacity of 55 MWh.

#### BOTTOM ASH

Ash left on the grate after incineration is carried by conveyor to a storage bunker. In the bottom ash recycling facility a magnet above a conveyor extracts ferrous material for recycling. The remaining bottom ash processed for recycling.

#### AIR-COOLED AND WATER-COOLED CONDENSERS

After exiting the turbine, the air stream is cooled and condensed back into water through air condensers for line 3,4&5 and river water is used as the cooling media for line 1, and 2. This recovered water is treated and reused in the boilers to produce more steam.

## EMISSION CONTROL

The gases from the furnace are subject to a rigorous cleaning process involving selective non-catalytic reduction (SNCR), spray absorbers, and active carbon injection. This removes oxides of nitrogen, acidic gases, dioxins, and heavy metals from the gas stream.

### AIR POLLUTION CONTROL RESIDUE (APCR)

The cleaned gas is passed through fine-fabric bag filters to remove solid particles before it is emitted through the stack. The resultant APCR residue, or fly-ash, contains particles from the incineration process, lime used in the spray absorbers, salts and carbon dust. It is stored in a sealed silo until it is removed from site for disposal.

## EMISSIONS MONITORING

As they pass through the stack, the residual flue gases from the process are continuously monitored before release. Each incinerator line has an independent stack and emissions monitoring system. This data is relayed automatically to the control room.

## SURFACE WATER

Surface water run-off exits the installation to a pipeline that discharges to the River Tees. Surface water run-offs from fuel delivery areas are protected by oil/water interceptors. Periodic boiler blow down during maintenance of the incinerator are also discharged to this pipeline.

|                                                                                                                                                       |                                                                                    |                                                                                    |                                                       |                                                                                         |                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Plant size, including number of lines                                                                                                                 | <b>Line 1</b>                                                                      | <b>Line 2</b>                                                                      | <b>Line 3</b>                                         | <b>Line 4</b>                                                                           | <b>Line 5</b>                                                                             |
|                                                                                                                                                       | 14 t/hr for a waste Calorific Value of 10MJ/kg                                     | 14 t/hr for a waste Calorific Value of 10MJ/kg                                     | 17 t/hr for a waste Calorific Value of 10MJ/kg        | 17 t/hr for a waste Calorific Value of 10MJ/kg                                          | 17 t/hr for a waste Calorific Value of 10MJ/kg                                            |
| Annual waste throughputs                                                                                                                              | 614,287.70 tonnes, 4120.6 tonnes transferred to landfill                           |                                                                                    |                                                       |                                                                                         |                                                                                           |
| Total plant operational hours in the year and reasons for any significant outages (e.g. annual shutdown, abatement plant failure, boiler failure etc) | <b>Line 1</b>                                                                      | <b>Line 2</b>                                                                      | <b>Line 3</b>                                         | <b>Line 4</b>                                                                           | <b>Line 5</b>                                                                             |
|                                                                                                                                                       | 7424 hrs                                                                           | 7012 hrs                                                                           | 7092 hrs                                              | 8168.5hrs                                                                               | 8150hrs                                                                                   |
|                                                                                                                                                       | Planned Shutdowns                                                                  |                                                                                    |                                                       |                                                                                         |                                                                                           |
|                                                                                                                                                       | 12 <sup>th</sup> -26 <sup>th</sup> March<br>1 <sup>st</sup> -24 <sup>th</sup> Sept | 17 <sup>th</sup> -28 <sup>th</sup> March<br>9 <sup>th</sup> -29 <sup>th</sup> Sept | April 16<br>5 <sup>th</sup> -11 <sup>th</sup> October | 5 <sup>th</sup> -19 <sup>th</sup> Feb,<br>25 <sup>th</sup> Sept-<br>2 <sup>nd</sup> Oct | 23 <sup>rd</sup> Feb-8 <sup>th</sup> March<br>23 <sup>rd</sup> Sept-29 <sup>th</sup> Sept |
| Residues produced tonnes                                                                                                                              | Bottom Ash                                                                         | APCR                                                                               | Metals                                                | Other (specify)                                                                         |                                                                                           |
| Amount of each residue, including metals (where appropriate) recycled/land filled                                                                     | 144,127                                                                            | 23,848.72                                                                          | 0                                                     |                                                                                         |                                                                                           |
| Electricity Produced/exported                                                                                                                         | Produced – 337,621MWh<br>Exported – 296,587 MWh<br>Parasitic load – 41,034MWh      |                                                                                    |                                                       |                                                                                         |                                                                                           |

## ANNUAL WASTE BREAKDOWN

|                       |          |            |
|-----------------------|----------|------------|
| Waste types           | EWC code | Tonnes     |
| Mixed Municipal waste | 20 03 01 | 614,287.70 |

## 4. SUMMARY OF PLANT MONITORING

### Permit monitoring requirements

| Emission Point | Substance / Parameter                                                     | Emission                                                                    | Monitoring Frequency |
|----------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------|
|                |                                                                           | Limit Value                                                                 |                      |
| A1, A2, A3     | Hydrogen chloride                                                         | 60 mg/m <sup>3</sup> ½-hr average                                           | Continuous           |
| A1, A2, A3     | Hydrogen chloride                                                         | 10 mg/m <sup>3</sup> daily average                                          | Continuous           |
| A1, A2, A3     | Hydrogen fluoride                                                         | 2 mg/m <sup>3</sup> over minimum 1 hour period                              | Biannual             |
| A1, A2, A3     | Carbon monoxide                                                           | 150 mg/m <sup>3</sup> , 95% of all 10-minute averages in any 24-hour period | Continuous           |
| A1, A2, A3     | Carbon monoxide                                                           | 50 mg/m <sup>3</sup> daily average                                          | Continuous           |
| A1, A2, A3     | Sulphur dioxide                                                           | 200 mg/m <sup>3</sup> ½-hr average                                          | Continuous           |
| A1, A2, A3     | Sulphur dioxide                                                           | 50 mg/m <sup>3</sup> daily average                                          | Continuous           |
| A1, A2, A3     | Particulates                                                              | 30 mg/m <sup>3</sup> ½-hr average                                           | Continuous           |
| A1, A2, A3     | Particulates                                                              | 10 mg/m <sup>3</sup> daily average                                          | Continuous           |
| A1, A2, A3     | Total Organic Carbon (TOC)                                                | 20 mg/m <sup>3</sup> ½-hr average                                           | Continuous           |
| A1, A2, A3     | Total Organic Carbon (TOC)                                                | 10 mg/m <sup>3</sup> daily average                                          | Continuous           |
| A1, A2, A3     | Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> ) | 400 mg/m <sup>3</sup> ½-hr average                                          | Continuous           |
| A1, A2, A3     | Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> ) | 200 mg/m <sup>3</sup> daily average                                         | Continuous           |
| A1, A2, A3     | Cadmium & thallium and their compounds (total)                            | 0.05 mg/m <sup>3</sup> over minimum 30 minute, maximum 8 hour period        | Biannual             |
| A1, A2, A3     | Mercury and its compounds                                                 | 0.05 mg/m <sup>3</sup> over minimum 30 minute, maximum 8 hour period        | Biannual             |
| A1, A2, A3     | Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)          | 0.5 mg/m <sup>3</sup> over minimum 30 minute, maximum 8 hour period         | Biannual             |



|                   |                                                                               |                                                                  |            |
|-------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------|------------|
| A1, A2, A3        | Dioxins / furans (I-TEQ)                                                      | 0.1 ng/m <sup>3</sup> over minimum 6 hour, maximum 8 hour period | Biannual   |
| A1, A2, A3        | Dioxin-like PCBs (WHO-TEQ Humans / Mammals)                                   | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Dioxin-like PCBs (WHO-TEQ Fish)                                               | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Dioxin-like PCBs (WHO-TEQ Birds)                                              | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Dioxins / furans (WHO-TEQ Humans / Mammals)                                   | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Dioxins / furans (WHO-TEQ Fish)                                               | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Dioxins / furans (WHO-TEQ Birds)                                              | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Poly-cyclic aromatic hydrocarbons (PAHs)                                      | No limit applies                                                 | Biannual   |
| A1, A2, A3        | Nitrous Oxide                                                                 | No limit applies                                                 | Continuous |
| A1, A2, A3        | Ammonia                                                                       | No limit applies                                                 | Continuous |
| S1                | Visible oils and greases                                                      | None visible                                                     | Daily      |
| Bottom ash        | Total Organic Carbon                                                          | 3%                                                               | Quarterly  |
| Bottom ash & APCR | Sb, Cd, Ti, Hg, As, Pb, Cr, Co, Cu, Mn, Ni, V, Zn and their compounds (total) | No limit applies                                                 | Quarterly  |
| Bottom ash & APCR | Dioxins/furans and dioxin like PCBs                                           | No limit applies                                                 | Quarterly  |

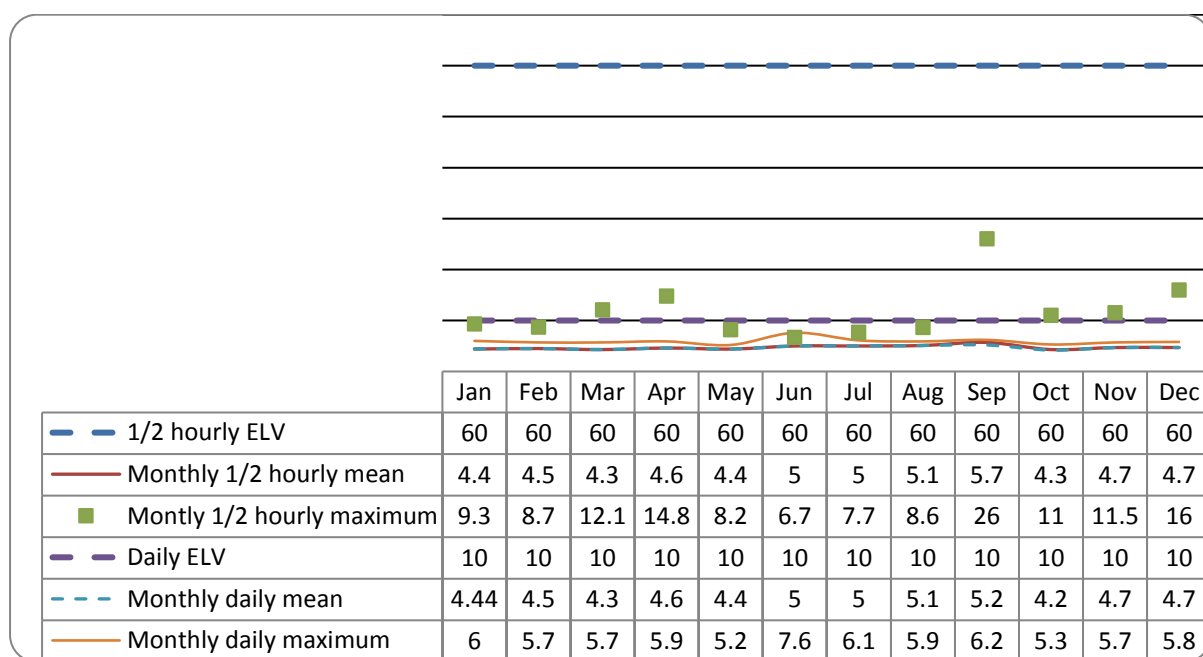
## Annual Reports & Quarterly Reports

| Parameter                            | Limits/units          | Frequency |
|--------------------------------------|-----------------------|-----------|
| Water Usage                          |                       | Annual    |
| Energy usage                         |                       | Annual    |
| Performance Indicators               |                       | Annual    |
| Waste Disposal/Recovery              |                       | Annual    |
| Pollution Inventory                  |                       | Annual    |
| Water Abstraction                    |                       | Weekly    |
| Total Municipal waste incinerated    | tonnes                | Quarterly |
| Total Commercial waste incinerated   | tonnes                | Quarterly |
| Electrical energy exported           | KWhrs                 | Quarterly |
| Electrical energy used               | KWhrs                 | Quarterly |
| Electrical energy imported           | KWhrs/tonne           | Quarterly |
| Fuel oil consumption                 | kg/tonne              | Quarterly |
| Mass of bottom ash produced          | kg/tonne              | Quarterly |
| Mass of bottom APC residues produced | kg/tonne              | Quarterly |
| Ammonia consumption                  | kg/tonne              | Quarterly |
| PAC consumption                      | kg/tonne              | Quarterly |
| Lime consumption                     | kg/tonne              | Quarterly |
| Water consumption                    | m <sup>3</sup> /tonne | Quarterly |
| Water Usage                          | tonnes                | Quarterly |

## CEMS Data

The data collected from the CEMS has been represented in graphical form an example of which is shown below. The graphs for line 1, 2, 3, 4&5 are in appendix 1.

### Hydrogen Chloride Line 1



The data for each parameter monitored is represented in an individual chart.  
Data represented is:

**½ Hourly Average ELV**- shows the ½ hourly emission limit value.

**Monthly ½ Hourly mean**- shows the average value for ½ hourly continuous monitoring for each month.

**Monthly ½ Hourly Average maximum**- shows the maximum of any half hourly average value.

**Daily Average ELV**- shows the daily emission limit value.

**Monthly Daily mean**- shows the average values for average daily continuous monitoring over the month.

**Monthly Daily Average maximum** shows the maximum value for daily continuous monitoring over the month.

The CEM's data reported has taken into account any measurement uncertainty.

**Table showing the annual emissions of monitored emissions.**

Data taken From Pollution Inventory reporting Form as reported to the Environment agency on their annual return.

| Parameter                                                                | Reporting Threshold |        |        | brt (below recorded threshold) or releases |         |         |         | Notifiable releases |
|--------------------------------------------------------------------------|---------------------|--------|--------|--------------------------------------------|---------|---------|---------|---------------------|
| Carbon Dioxide                                                           | 10,000,000 kg       |        |        | 614,287.70                                 |         |         |         | Appendix 2          |
|                                                                          |                     | Line 1 | Line 2 | Line 3                                     | Line 4  | Line 5  | Total   |                     |
| Ammonia                                                                  | 1000kg              | 1921   | Br     | 1745                                       | Br      | 1610    | 6780.7  |                     |
| Antimony Sb                                                              | 1kg                 | Br     | Br     | 13.8                                       | Br      | 1.11    | 17.1    |                     |
| Arsenic As                                                               | 1kg                 | 2.35   | Br     | Br                                         | Br      | 2.8     | 10.2    |                     |
| Cadmium Cd                                                               | 1kg                 | Br     | Br     | Br                                         | Br      | Br      | 6.0     |                     |
| Chromium Cr                                                              | 10kg                | 26     | 18     | Br                                         | 53      | 51      | 137     |                     |
| Copper Cu                                                                | 10kg                | Br     | Br     | 14.8                                       | Br      | Br      | 38      |                     |
| Lead Pb                                                                  | 100kg               | Br     | Br     | Br                                         | Br      | Br      | 144     |                     |
| Manganese Mn                                                             | 10kg                | Br     | Br     | 14.8                                       | Br      | Br      | 19.25   |                     |
| Mercury Hg                                                               | 1kg                 | Br     | 5.6    | Br                                         | 19.4    | Br      | 26      |                     |
| Nickel Ni                                                                | 10kg                | Br     | Br     | Br                                         | Br      | Br      | 19      |                     |
| Vanadium V                                                               | 10kg                | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |
| Chlorine and inorganic chlorine compounds - as HCl                       | 10,000kg            | Br     | Br     | Br                                         | Br      | Br      | 19041   |                     |
| Dioxins and furans (PCDDs/PCDFs)                                         | 0.00001kg           | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |
| Fluorine and inorganic fluorine compounds –as HF                         | 1,000kg             | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |
| Nitrogen oxides (NO and NO <sub>2</sub> ) as NO <sub>2</sub>             | 100,000kg           | Br     | Br     | 119,545                                    | 136,744 | 134,894 | 585,525 |                     |
| Non-methane volatile organic compounds                                   | 10,000kg            | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |
| Particulate matter                                                       | 10,000kg            | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |
| Polychlorinated biphenyls (PCBs)                                         | 0.00001kg           | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |
| Sulphur oxides (SO <sub>2</sub> and SO <sub>3</sub> ) as SO <sub>2</sub> | 100,000kg           | Br     | Br     | Br                                         | Br      | Br      | Br      |                     |

## 5. SUMMARY OF PLANT COMPLIANCE

Table showing percentage of the operating time the plant was in compliance with the permit conditions.

| Pollutants measured                                              | % of operational time plant was in compliance |        |        |        |        |
|------------------------------------------------------------------|-----------------------------------------------|--------|--------|--------|--------|
|                                                                  | Line 1                                        | Line 2 | Line 3 | Line 4 | Line 5 |
| Particulates                                                     | 100%                                          | 99.98% | 100%   | 100%   | 100%   |
| Oxides of nitrogen                                               | 100%                                          | 100%   | 100%   | 100%   | 100%   |
| Sulphur dioxide                                                  | 99.95%                                        | 100%   | 100%   | 100%   | 100%   |
| Carbon monoxide                                                  | 100%                                          | 100%   | 100%   | 100%   | 100%   |
| Total Organic Carbon                                             | 100%                                          | 100%   | 100%   | 99.99% | 100%   |
| Hydrogen chloride                                                | 99.99%                                        | 100%   | 100%   | 100%   | 100%   |
| Mercury                                                          | 100%                                          | 100%   | 100%   | 99.99% | 100%   |
| Cadmium & thallium                                               | 100%                                          | 100%   | 100%   | 100%   | 100%   |
| Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and V, including their compounds | 100%                                          | 100%   | 100%   | 100%   | 100%   |
| Dioxins/furans                                                   | 100%                                          | 100%   | 100%   | 100%   | 100%   |
| Hydrogen fluoride                                                | 100%                                          | 100%   | 100%   | 100%   | 100%   |

Table showing non-compliance notified to the Environment Agency

|        |            |              |
|--------|------------|--------------|
| Line 1 | 2 - Part C | 1 - Part A&B |
| Line 2 | 1 - Part C | 1 - Part A&B |
| Line 3 | 0 - Part C | 0 - Part A&B |
| Line 4 | 0 - Part C | 2 - Part A&B |
| Line 5 | 0 - Part C | 0 - Part A&B |

More information on the above breaches can be found in the Appendix 2 – Notifications Table

To date we have had 7 Site Warning these comprise of:

|                |            |
|----------------|------------|
| Line 1 – 4 CCS | Line 4 - 4 |
| Line 2 – 4 CCS | Line 5 - 0 |
| Line 3 – 0 CCS |            |

## 6. SUMMARY OF PLANT IMPROVEMENTS

Brief description of any plant improvements made to reduce environmental impact.

Table showing permit improvement conditions progress

| Ref  | Details of improvement condition |
|------|----------------------------------|
| IC1  | Submitted in 2009                |
| IC2  | Submitted in 2009                |
| IC3  | Submitted in 2009                |
| IC4  | Submitted in 2009                |
| IC5  | Submitted in 2009                |
| IC6  | Submitted February 2010          |
| IC7  | Submitted in 2009                |
| IC8  | Submitted February 2010          |
| IC9  | Submitted February 2010          |
| IC10 | Submitted April 2010             |
| IC11 | Submitted October 2010           |

Table showing permit improvement conditions progress – Lines 4&5

| Ref | Details of improvement condition |
|-----|----------------------------------|
| IC1 | Submitted June 2014              |
| IC2 | Submitted May 2014               |
| IC3 | Submitted February 2015          |
| IC4 | Submitted December 2015          |
| IC5 | Submitted November 2014          |

**Summary of plant improvements:** As required by Variation Notice Number EA/EPR/VP3034SG/V003, 11<sup>th</sup> December 2009

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IC1</b> | <b>Composition of boiler blow-down water</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|            | <p>The operator shall analyse the composition of boiler blow-down water utilising representative samples from lines A1 and A2, and line A3.</p> <p>A report shall be submitted to the Agency detailing the methods used and results obtained, together with data relating to the discharge frequencies of this effluent to emission point SW4.</p> <p>The report shall also include an impact assessment (for example H1) for the discharge of this stream to the River Tees. The results from this assessment may be used for the setting of limits or any additional monitoring requirements within Permit condition 2.2.2.8.</p>                                                                                                                                                                                                                                            |
| <b>IC2</b> | <b>Environmental impact assessment.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|            | <p>The operator shall undertake an environmental impact assessment (for example H1) for emissions of Nitrous Oxide (N<sub>2</sub>O) from the installation taking into account potential contributions of N<sub>2</sub>O towards global Warming.</p> <p>The results shall be submitted to the Agency together with a report detailing and identified improvements. This shall include, but not be limited to, proposals for the monitoring of Nitrous Oxide (N<sub>2</sub>O) emissions for the incinerator lines 1 and 2, in accordance with Indicative BAT requirements for the control of point-source emissions to air (2.2.1.2-36) SGN S5.01 "Guidance for the Incineration of Waste and Fuel Manufactured from or Including Waste".</p> <p>Future monitoring requirements may be imposed within condition 2.10.4 of the Permit following Completion of this condition.</p> |
| <b>IC3</b> | <b>Residence time, the minimum combustion temperature, and the oxygen content of the exhaust gasses from line 3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|            | <p>The Operator shall verify the residence time, the minimum combustion temperature, and the oxygen content of the exhaust gasses from line 3 in accordance with Article 11(3) of the Waste Incineration Directive.</p> <p>A summary report shall be provided to the Agency documenting the findings.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>IC4</b> | <b>Performance of Continuous Emissions Monitors for release point A3</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|            | <p>The Operator shall calibrate and verify the performance of Continuous Emissions Monitors for release point A3 and parameters specified within table 2.2.2 to BS EN 14181 and submit a summary report to the Environment Agency as evidence of compliance with the requirements of BS EN 14181.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IC5</b> | <b>Noise assessment</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|            | <p>The Operator shall undertake a noise assessment during normal operations for incineration line A3 in accordance with the procedures given in BS4142: 1997 (Rating industrial noise affecting mixes residential and industrial areas) and BS7445: 2003 (Description and measurement of environmental noise) or other methodology as agreed with the Agency – in order to verify the assessment provided within the application. The assessment shall include, but not be limited to: A view of the noise sources from the facility. Where any noise source(s) are identified as exhibiting tonal contributions, they shall be quantified by means of frequency analysis.</p> <p>A review of noise levels from static plant,</p> <p>A review of predicted noise levels from line A3 in order to substantiate those stated within the application.</p> <p>A report shall be provided to the Agency detailing the findings of the assessment.</p> |
| <b>IC6</b> | <b>Size distribution of the particulate matter</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|            | <p>The Operator shall submit a proposal to the Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission points A3, identifying the fractions within the PM<sub>10</sub>PM<sub>2.5</sub>and PM<sub>1.0</sub> ranges. The proposal shall include a timetable to carry out such tests and produce a report on the results.</p> <p>On receipt of written agreement by the Agency to the proposal and the timetable, the Operator shall carry out the tests and submit to the Agency a report on the results. Report on size distribution tests to be submitted to the Agency within 2 months of the end of the agreed timetable.</p>                                                                                                                                                                                                                                 |
| <b>IC7</b> | <b>Monitoring frequencies for monitoring Ammonia (NH<sub>3</sub>) and Nitrous Oxide (N<sub>2</sub>O) emissions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|            | <p>The Operator shall access current monitoring frequencies for monitoring Ammonia (NH<sub>3</sub>) and Nitrous Oxide (N<sub>2</sub>O) emissions from emission points A1, A2 and A3, and shall consider options available for the implementation of a continuous monitoring system.</p> <p>A written summary shall be provided to Agency documenting the findings, together with a timetable for the implementation of any improvements identified.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>IC8</b> | <b>SPMP</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|            | <p>The Operator shall update the Site Protection and Monitoring Plan in accordance with Permit condition 4.1.8 (VP3034SG), taken into account all relevant Agency Technical Guidance, including horizontal guidance note H7.</p> <p>The updated plan shall be submitted to the Agency in writing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>IC9</b> | <b>Bag Filter by-pass opens</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | The operator shall undertake a review of the conditions in which the bag filter by-pass opens and assess the implications if the by-pass were not open under such conditions. A written summary report shall be provided to the Environment Agency documenting the findings, together with a timetable for the implementation of any improvements identified. The report shall also include a written environmental impact assessment for those situations where the filter by-pass will open. |
| <b>IC10</b> | <b>Bag Filter by-pass during start up &amp; shut down</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|             | The operator shall undertake a review of the use of the bag filter by-pass during start up and shut down of all incineration lines. A written summary report shall be provided to the Environment Agency documenting the findings, together with a timetable for the implementation of any improvements identified. The report shall also include a written environmental impact assessment for any periods where the bag filter by-pass is opening during the start up sequence.              |
| <b>IC11</b> | <b>Acid Gases</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|             | The operator shall undertake a review of the control of acid gases (in particular sulphur dioxide) in relation to the plant and control philosophy so as to minimise plant disturbances and compliance with limits in table 2.2.2 of their permit.<br>A written summary report shall be provided to Environment Agency documenting findings, together with a timetable for the implementation of any improvements identified.                                                                  |

**Summary of plant improvements:** As required by Variation Notice Number EA/EPR/VP3034SG/V004, 6<sup>th</sup> September 2010

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IC1</b> | <p>Following commissioning of lines 4 and 5, the Operator shall supply a commissioning report detailing performance against the plan submitted in accordance with pre-operational measure PO03, table 1.6.2. The report shall include :-</p> <p>Demonstration that the plant complies in full with indicative BAT requirements and article 11 of the WID.</p> <p>Any abnormal waste generated as a result of commissioning.</p> <p>Details of any modifications made to the process during commissioning that change the details included within application EPR/VP3034SG/V004.</p> <p>A full record of monitored emissions from the plant during commissioning.</p> <p>Where emissions exceed stated limits, the reasons for such levels should be stated together with the action taken to correct matters.</p> |
| <b>IC2</b> | <p>The Operator shall submit a proposal to the Agency to carry out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air from emission points A29 and A30, identifying the fractions within the Pm10, Pm2.5 and Pm1.0 ranges.</p> <p>The proposal shall include a timetable to carry out such tests and produce a report on the results. On receipt of written agreement by the Agency (to the proposal and the timetable), the Operator shall carry out the tests and submit to the Agency a report on the results. Report on size distribution tests to be submitted to the Agency within 2 months of the end of the agreed timetable.</p>                                                                                                                     |
| <b>IC3</b> | <p>The Operator shall analyse the composition of boiler blow-down water utilising representative samples from lines 4 and 5 – for assessment with existing data collected from lines 1-3.</p> <p>A report shall be submitted to the Environment Agency detailing the methods used and results obtained, together with data relating to the discharge frequencies of this effluent to emission point S1.</p> <p>The report shall also include an impact assessment (using the Environment Agency's H1 or similar) for the discharge of this stream to the River Tees. The results from this assessment may be used for the setting of limits or any additional monitoring requirements within Permit condition 2.2.2.8.</p>                                                                                        |

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IC4</b> | The Operator shall carry out an assessment of the impact of emissions to air of Arsenic, Nickel and Chromium (VI) having regard to the using the Environmental Assessment Level (EAL) for the metal compounds in the Pm10 fraction and the 2009 report of the Expert Panel on Air Quality Standards – Guidelines for Metal and Metalloids in Ambient Air for the Protection of Human Health. The assessment shall predict the impact of Arsenic, Nickel and Chromium (VI) against the guidelines through the use of emissions monitoring data during the first year of operation of lines 4 and 5 together with existing site data from lines 1 – 3. A report on the assessment shall be made to the Environment Agency. |
| <b>IC5</b> | The Operator shall calibrate and verify the performance of Continuous Emissions Monitors for release points A29 and A30 and parameters specified within table 2.2.2 to BS EN 15267-3 and submit a summary report to the Environment Agency as evidence of compliance with the requirements of BS EN 15267-3.                                                                                                                                                                                                                                                                                                                                                                                                             |

## FURTHER INFORMATION

Further information available at [www.sita.co.uk](http://www.sita.co.uk)

## APPENDIX

Breaches

Releases to air graphs

Hydrogen chloride

Sulphur dioxide

Carbon monoxide

Oxides of nitrogen

Total Organic Carbon (VOC)

Particulates

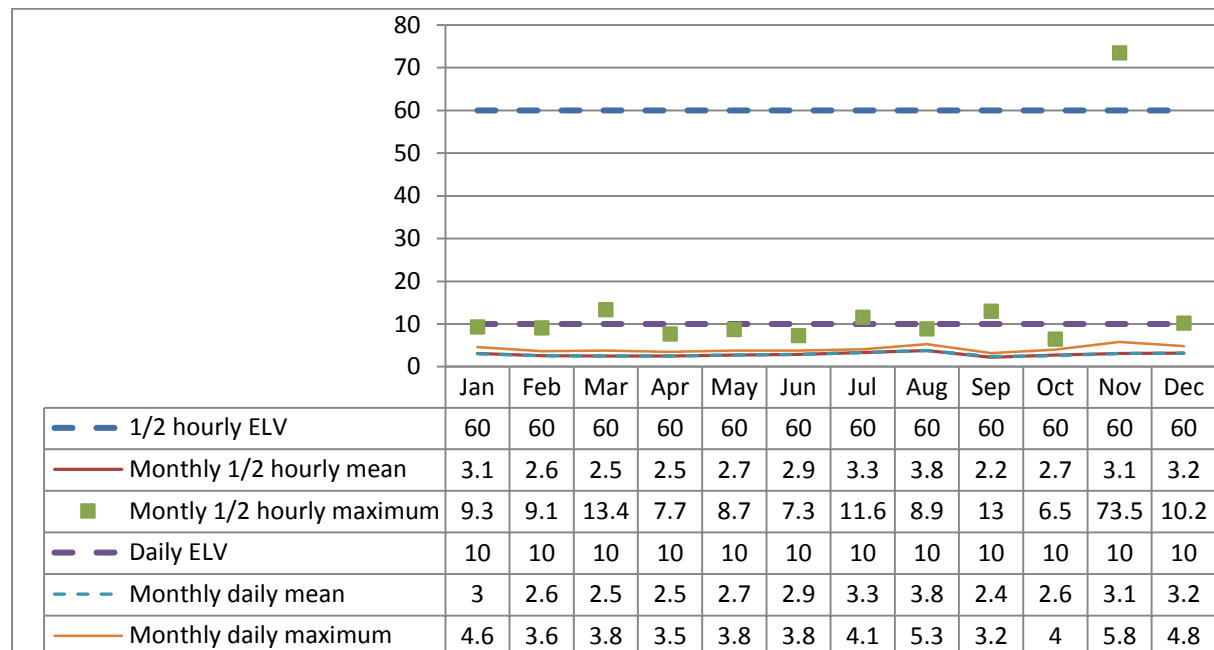
Ammonia

| Parameter                  | Date     | Reason                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Actions Taken                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TV001/16 – SO <sub>2</sub> | 02.02.16 | Failure of dosing system booster pump                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Waste feeding was ceased.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| TV002/16- Dust             | 05.03.16 | Failure of dust analyser.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Waste feeding was ceased when the potential dust breach occurred with the cause of high dust attributed to false readings due to faulty dust probe. Dust spiked suddenly, waste feed was ceased straight away due to having no stand-by analyser. Instrument technician called out to check the probe which he did. The probe was cleaned and refitted. Line was being brought off due to GSA restriction and it was during this time the dust readings spiked again (no waste feed). The dust probe was changed for spare and we have no further issues to report. |
| TV003/16 – SO <sub>2</sub> | 09.04.16 | <p>On 9<sup>th</sup> April Line 1 had an SO<sub>2</sub> spike it is believed that this could be down to quality of waste as Line 2 had simultaneously spike, but line 2 remained well within ELV limits.</p> <p>All dosing and recirculation systems were checked for normal operation and no faults were found.</p> <p>Lime dosing was increased to maximum and reactor cooling water set point was reduced to minimum to assist lime activation.</p> <p>It seems the treatment system was unable to cope with the sudden increase.</p> <p>All remaining lines remained within the ELV's</p> | Investigations and trials ongoing to determine cause of the difference in treatment systems between Lines 1&2 -- as discussed previously, currently trialling uplifted base lime dosing levels"                                                                                                                                                                                                                                                                                                                                                                     |
| TV004/16 – SO <sub>2</sub> | 14.05.16 | <p>On the 14<sup>th</sup> May there was an SO<sub>2</sub> spike on both Lines.</p> <p>Increased SO<sub>2</sub> levels had been noticed earlier and lime dosing had been increased on both lines. Earlier in the morning the increased dosing had been sufficient enough to control the SO<sub>2</sub>.</p>                                                                                                                                                                                                                                                                                    | <p>6 sigma project started to understand and eliminate variability (spikes)in SO<sub>2</sub></p> <p>Discuss with Shift Managers the importance &amp; requirements for CA waste to be segregated and mixed effectively – TBT to be issued</p>                                                                                                                                                                                                                                                                                                                        |

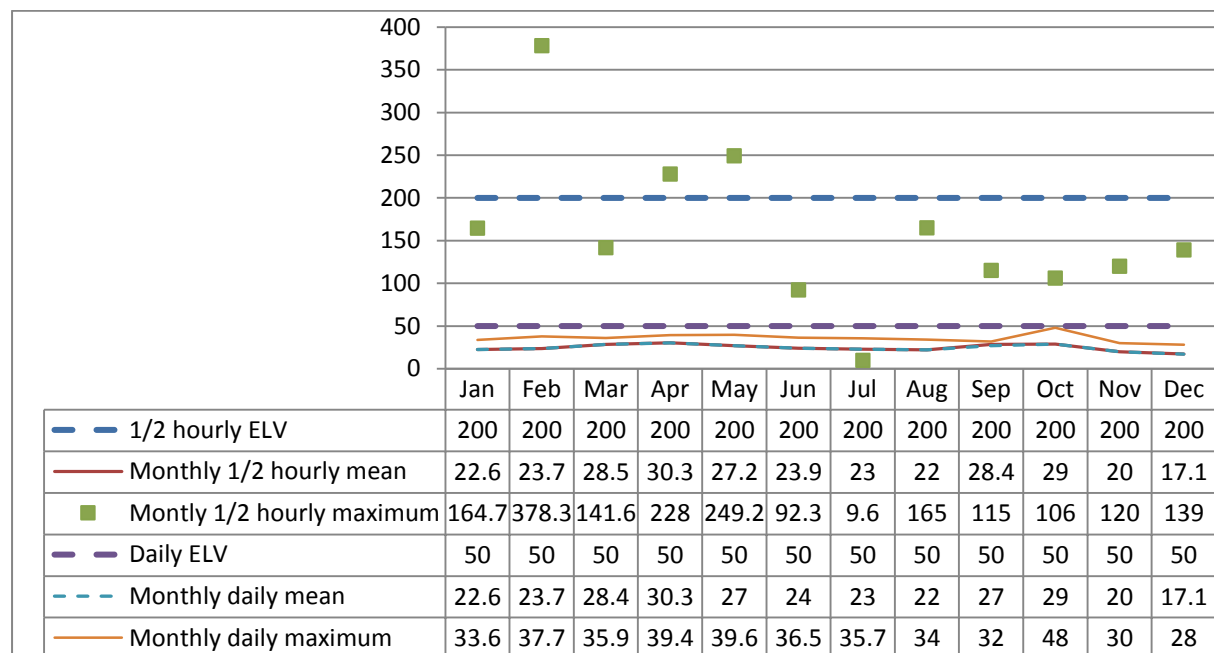
|                    |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                         |
|--------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |          | <p>When the SO<sub>2</sub> increased again the dosing system was checked and working normally on both lines, the lime dosing was set to maximum &amp; cooling water temperature was set to minimum to provide maximum water. Production set was reduced &amp; gas analysers checked for correct readings.</p> <p>As both lines had saw elevated SO<sub>2</sub> simultaneously it could suggest poor quality of waste may have caused the increase. CA waste deliveries were higher than normal and although mixing in the normal manner took place it was not adequate for this amount of waste.</p> <p>SO<sub>2</sub> levels returned back to normal ELV limits and the remaining CA was mixed &amp; fed without any issues.</p> <p>All remaining lines remained within the ELV's</p> |                                                                                                                                                                                                                                                                                                         |
| TV005/16 – Mercury |          | <p>The operation of the bag filter, and carbon dosing checked, and within operational parameters. Waste streams were investigated and there was no new waste or abnormal deliveries noted.</p> <p>Periodic testing conducted by accredited company and results re-checked.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Retest of Mercury if agreed with the EA                                                                                                                                                                                                                                                                 |
| TV006/16- VOC      | 10.11.16 | <p>On 10<sup>th</sup> November, during high voltage switch gear training the release for switchover did not illuminate. This was tried several times before the "off button" finally pressed which resulted in total blackout of line 4 and subsequent loss of power to all equipment. All switchgear was immediately reset and plant returned to service safely.</p> <p>Daily limits were not exceeded and the plant was stable both before and after the trip event.</p>                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• When de-coupling power supplies procedures should be followed to ensure the castel interlock key is fully engaged and turned 90 degrees.</li> <li>• Training instructions should also reflect this so all personnel know the potential consequences</li> </ul> |

|                |          |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|----------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TV007/16 – HCl | 30.11.16 | Failure of Lime dosing metering system | <p>Increased levels of HCl had been noticed and Lime dosing increased to maximum as per procedure. The production set point was dropped to 38t/hr and then stopped feeding waste as HCl levels still rose. Lime flow rate seen to rise to maximum and HCl continued to increase.</p> <p>Checks around dosing system identified a potential lack of flow despite showing full flow on DCS. During checking the system flow re-established and control was regained. Subsequent level checks of the lime silo show no level drop for a short period during this time despite showing full flow on DCS. Lime dosing screw had stopped.</p> <ol style="list-style-type: none"> <li>1) A full clean and overhaul of lime dosing feed system to be conducted during next planned outage.</li> <li>2) Investigate the potential for fitting a motion sensor to the dosing screw (or similar).</li> <li>3) Investigate potential for independent lime flow metering system.</li> </ol> |
|----------------|----------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

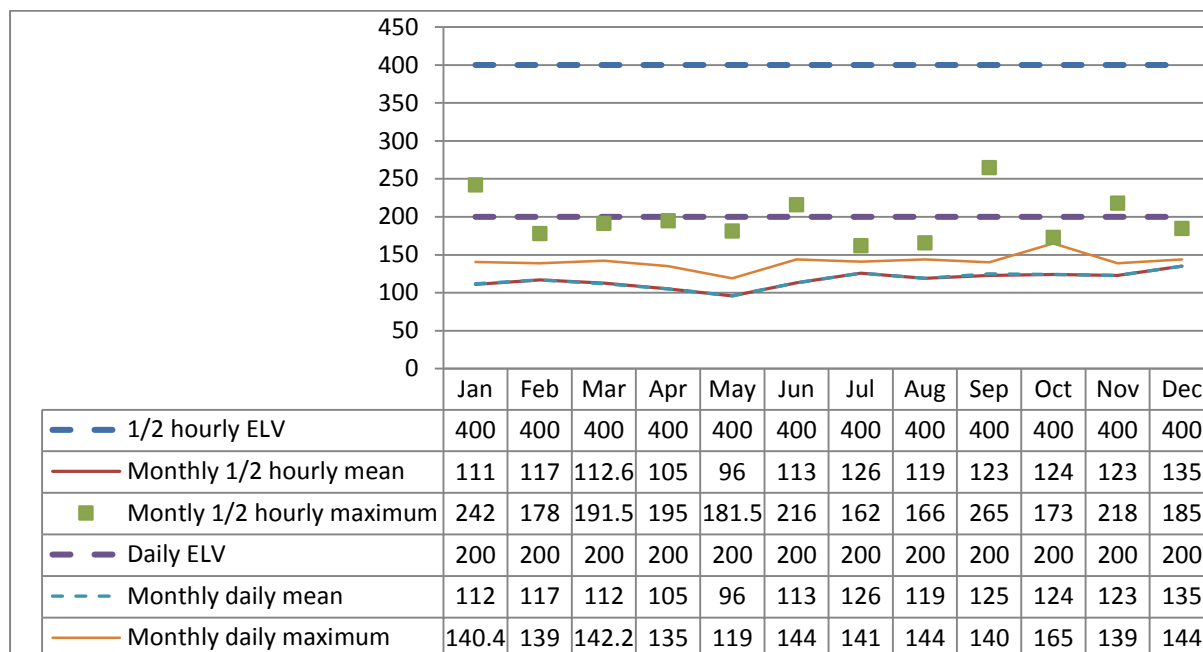
## HCL Line 1



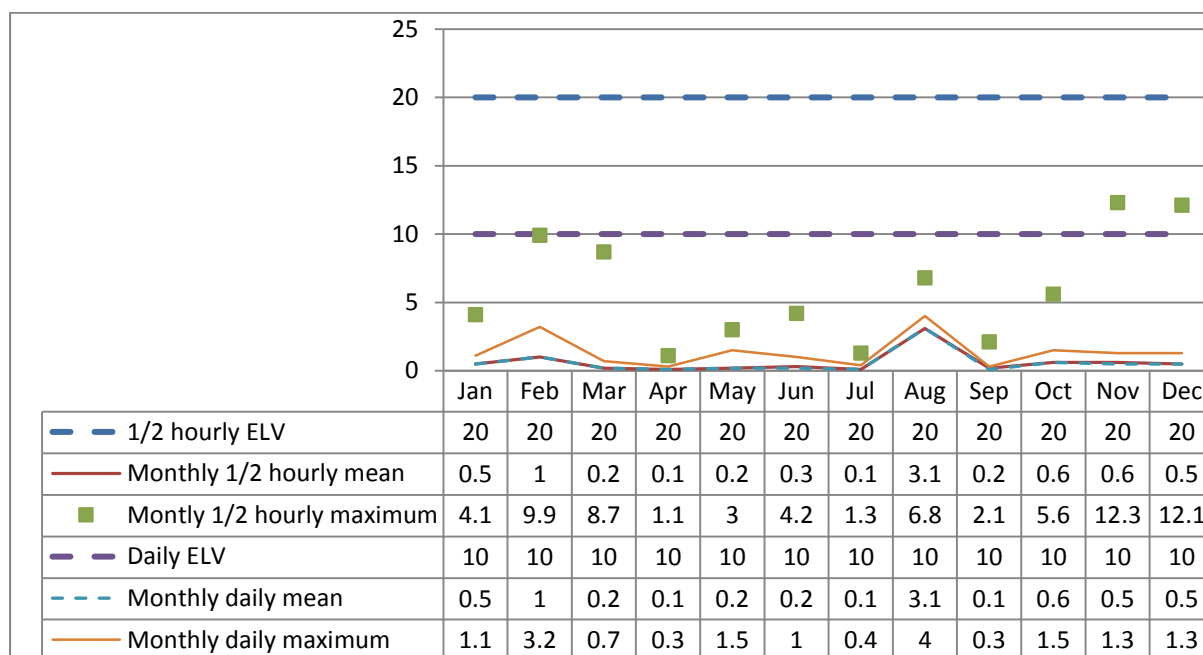
## SO2 Line 1



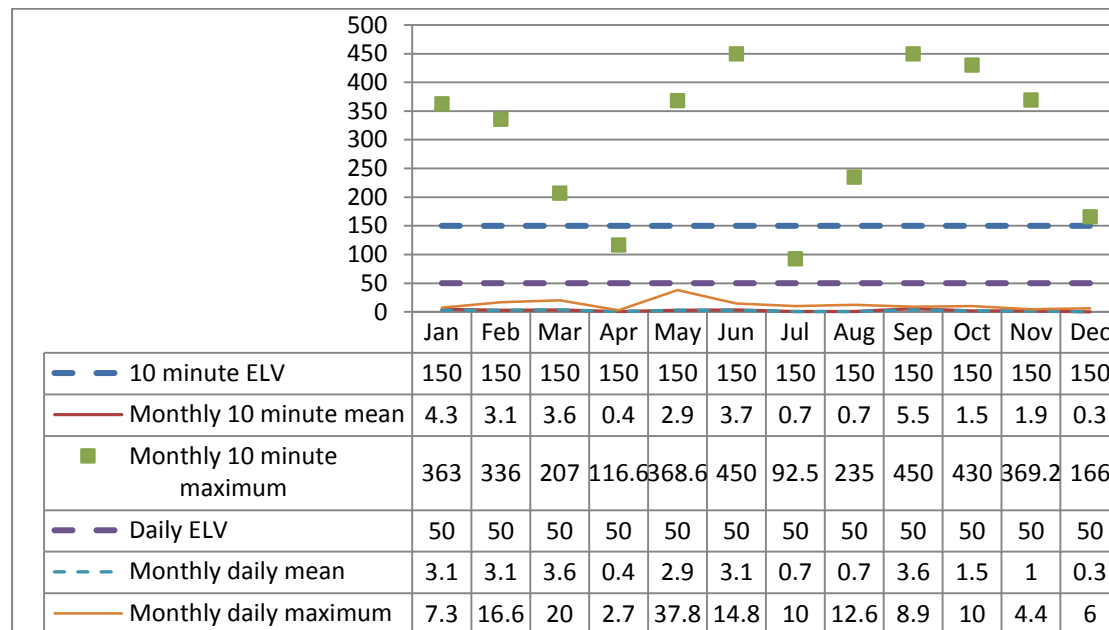
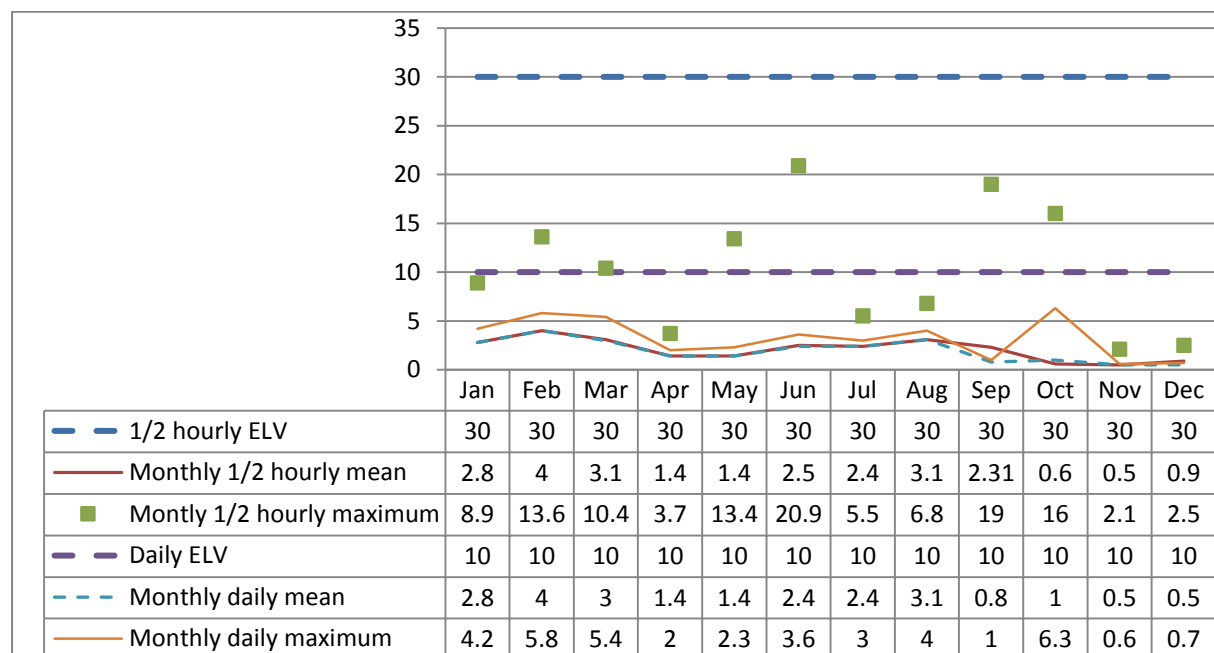
### Nox Line 1

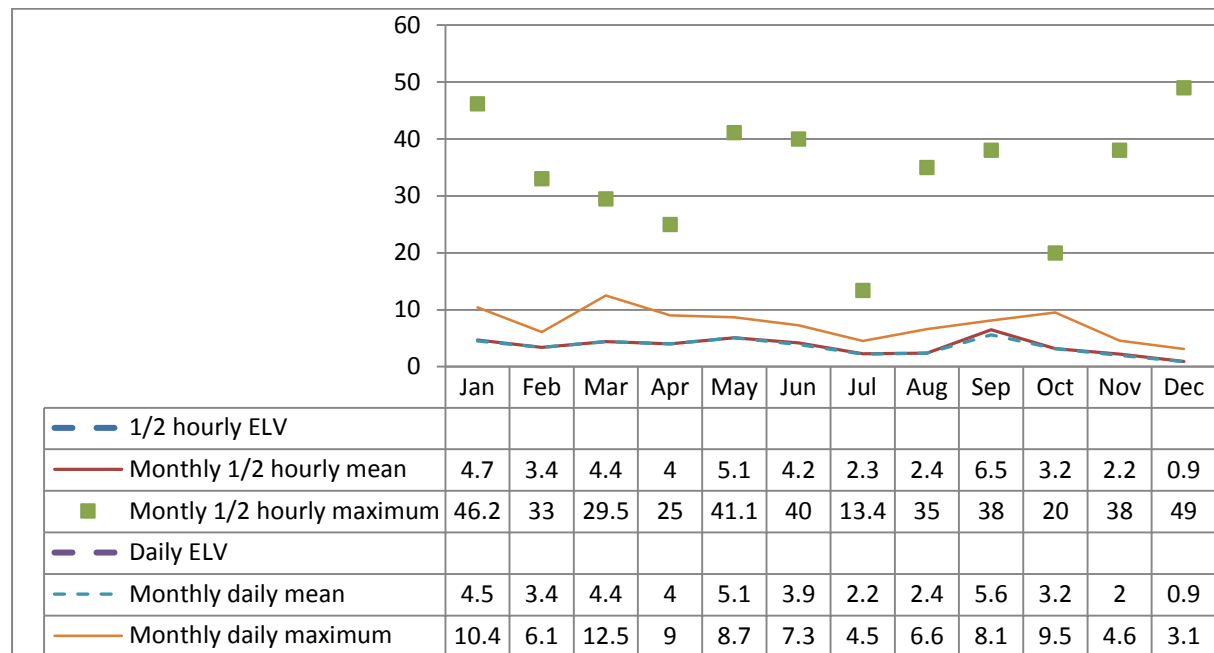
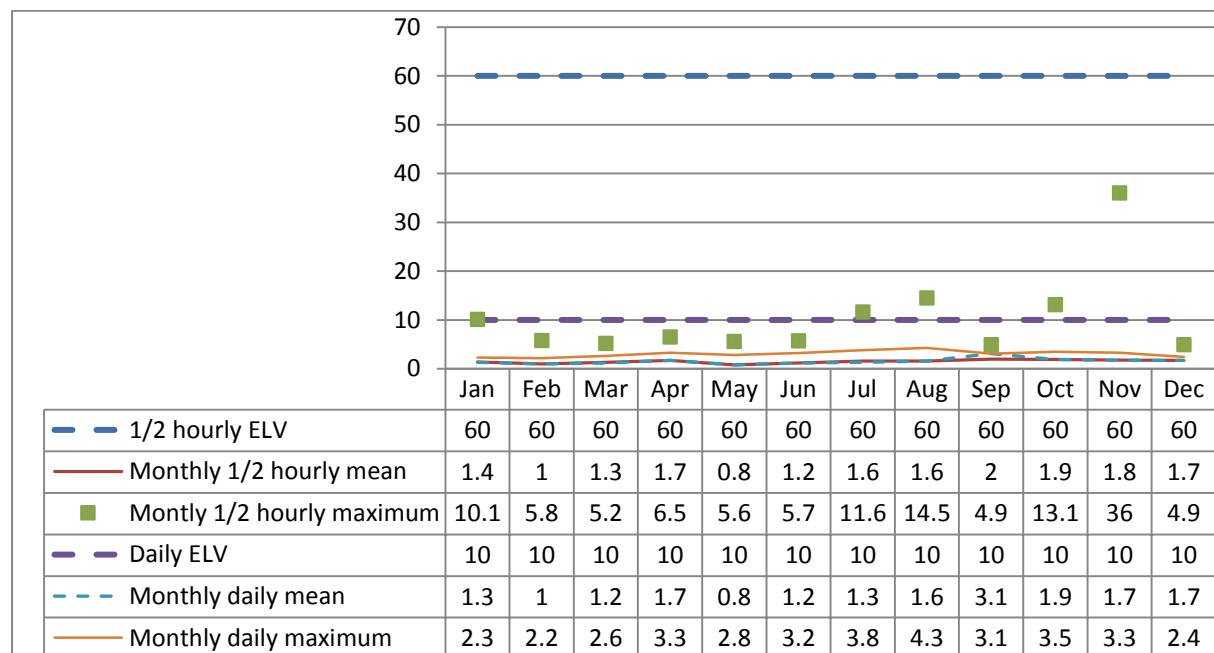


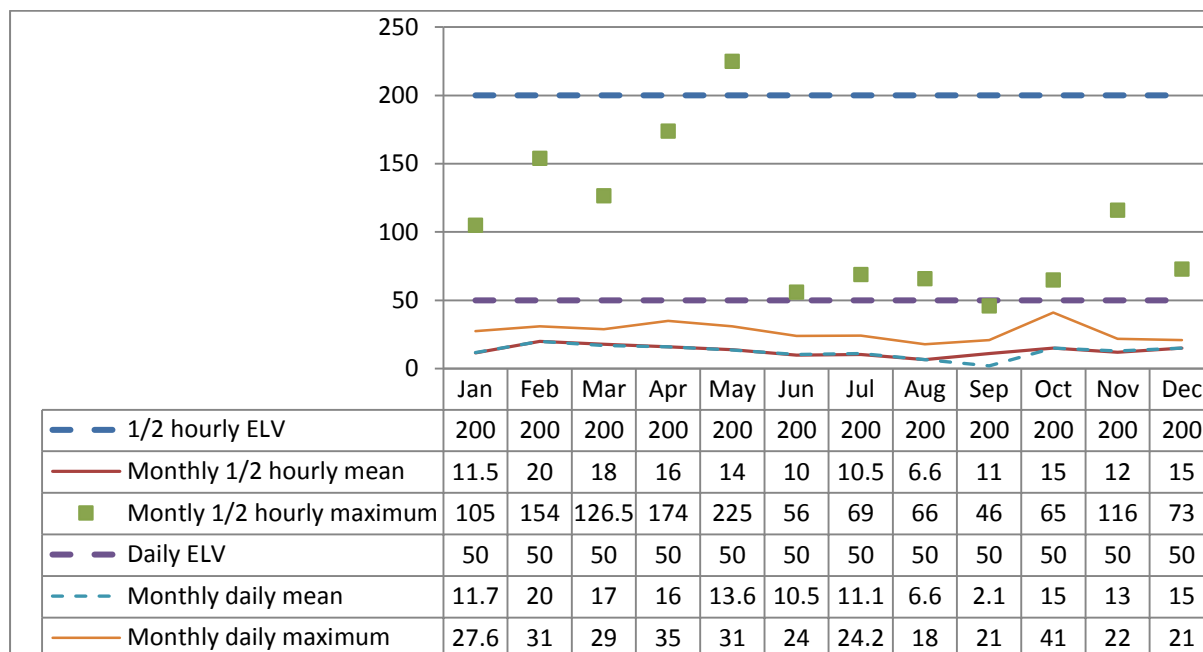
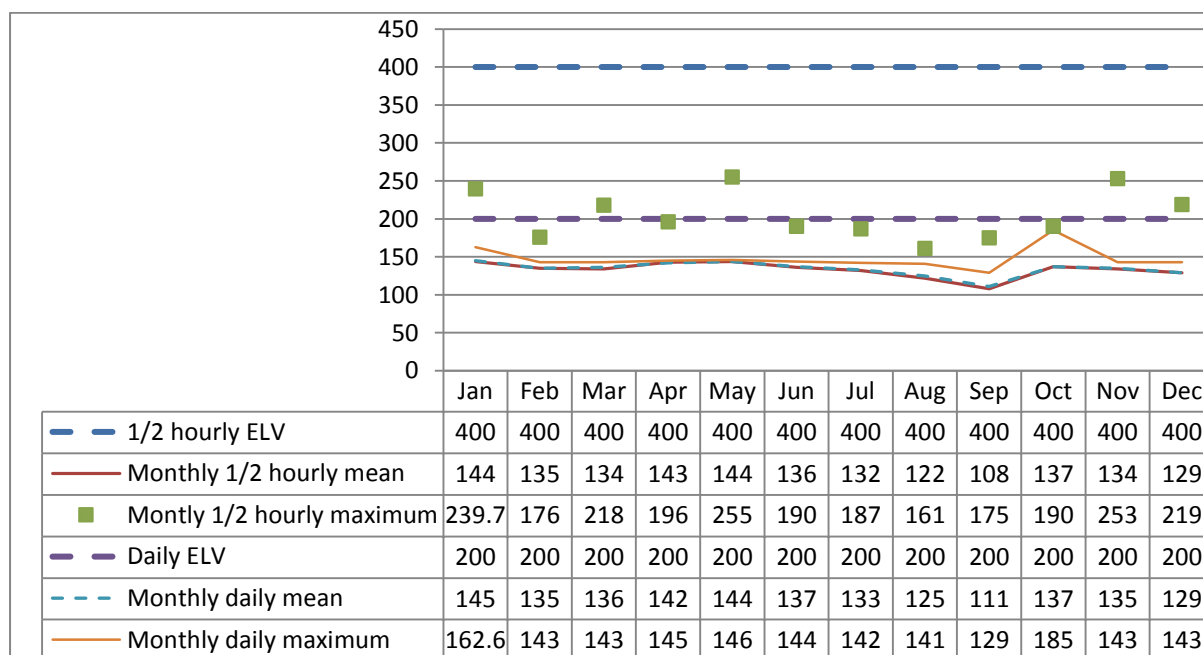
### VOC Line 1



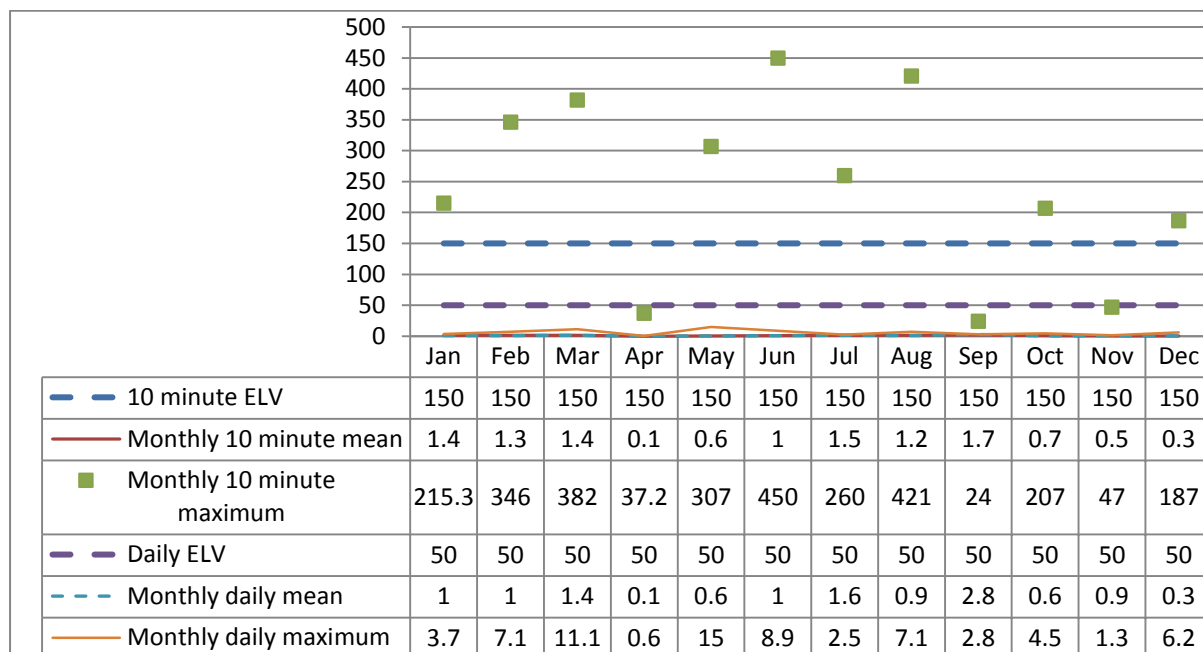


**CO Line 1****Dust Line 1**

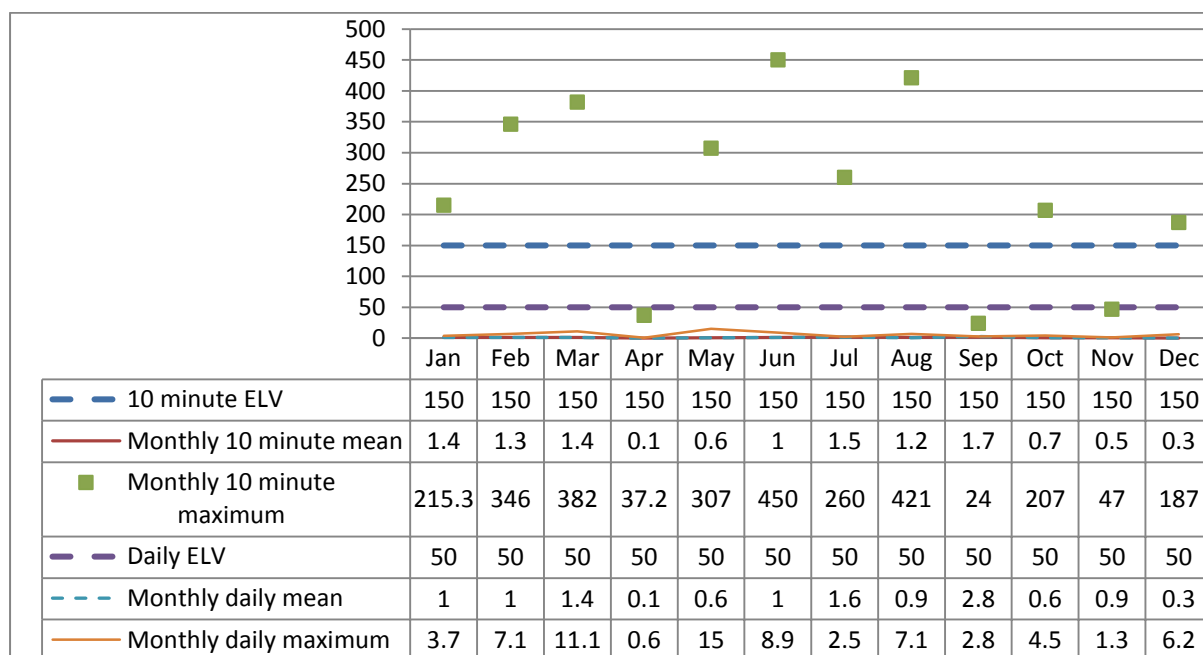
**NH3 Line 1****HCl Line 2**

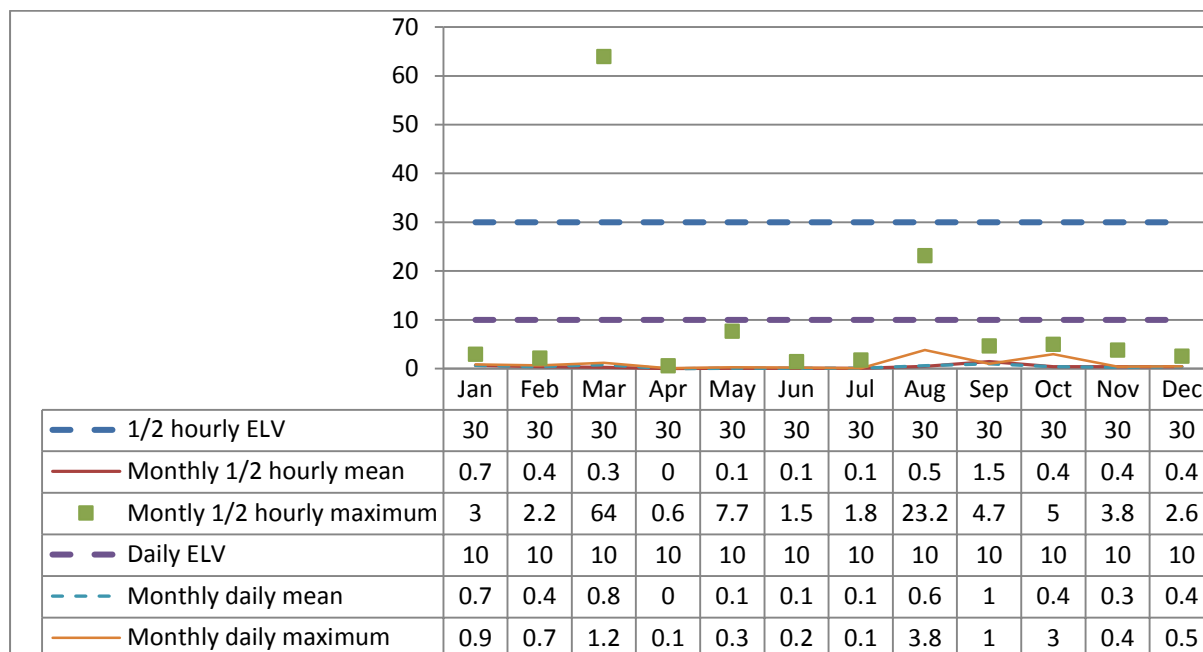
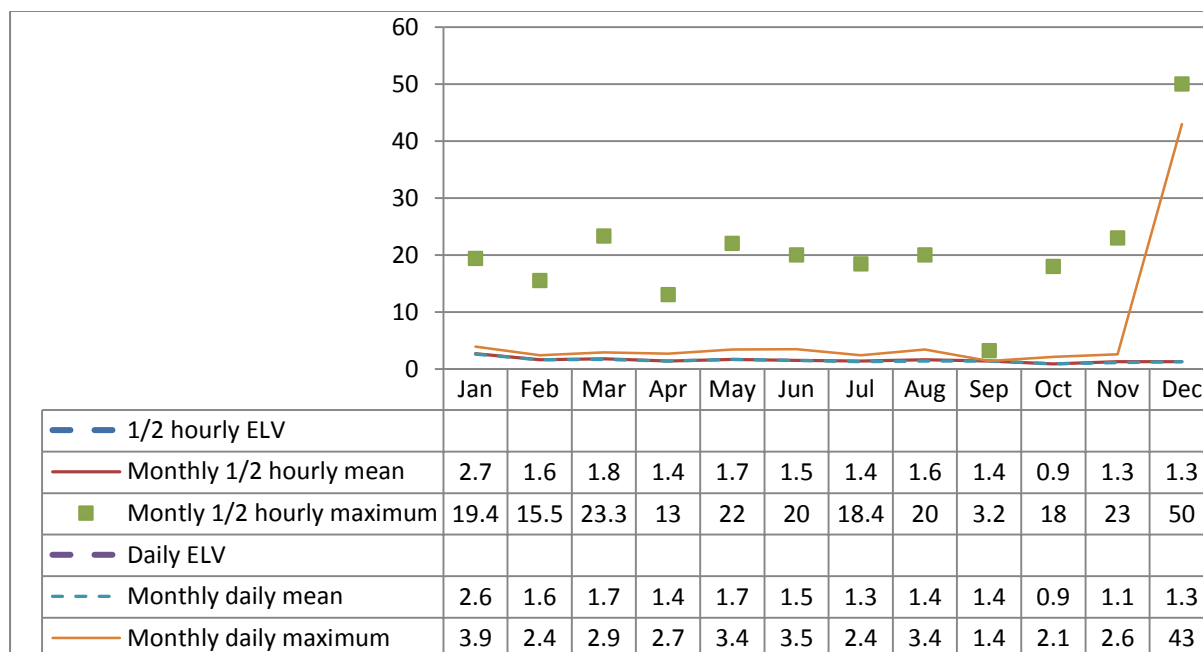
SO<sub>2</sub> Line 2NO<sub>x</sub> Line 2

## CO Line 2

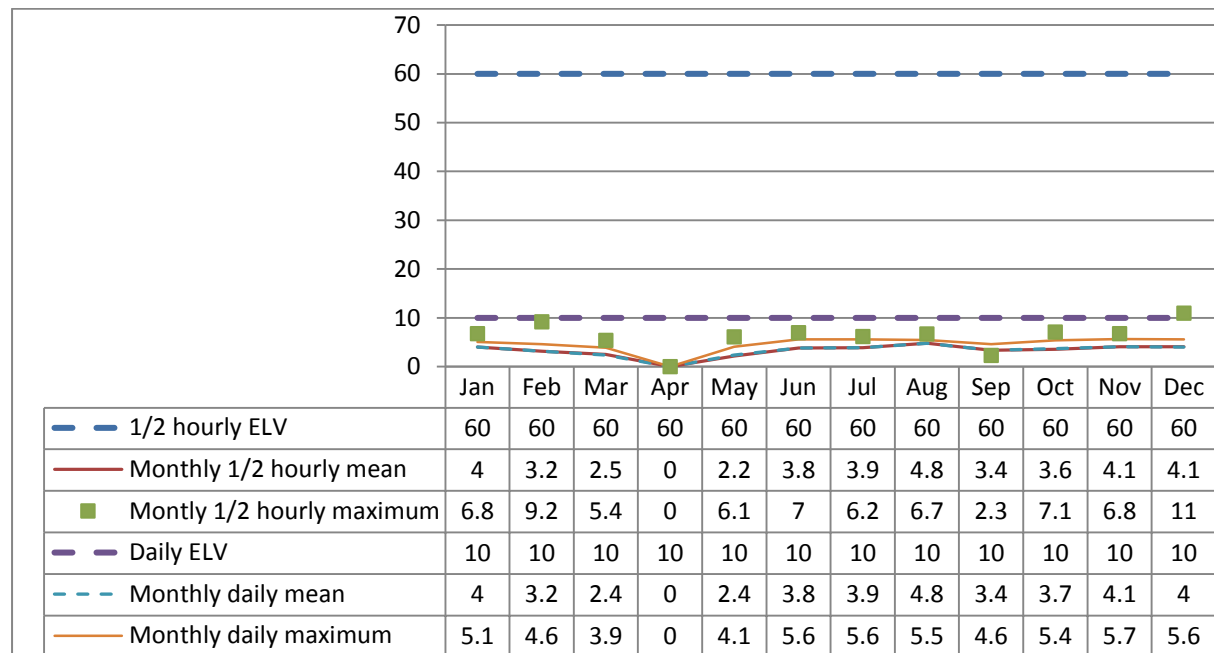
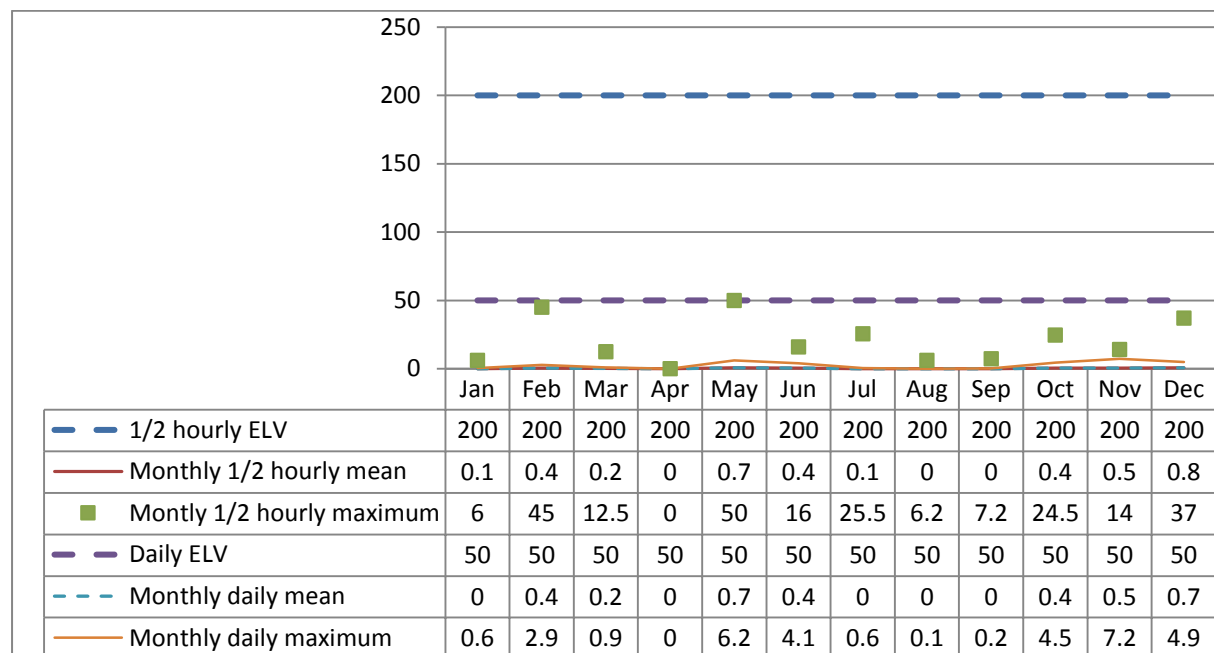


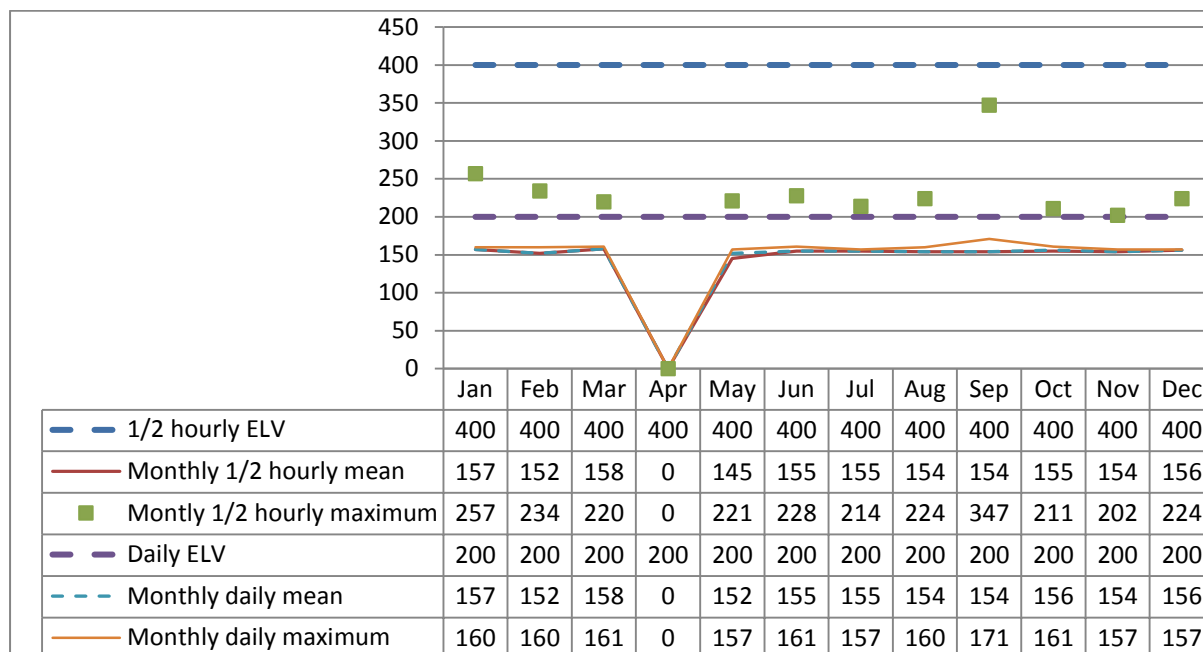
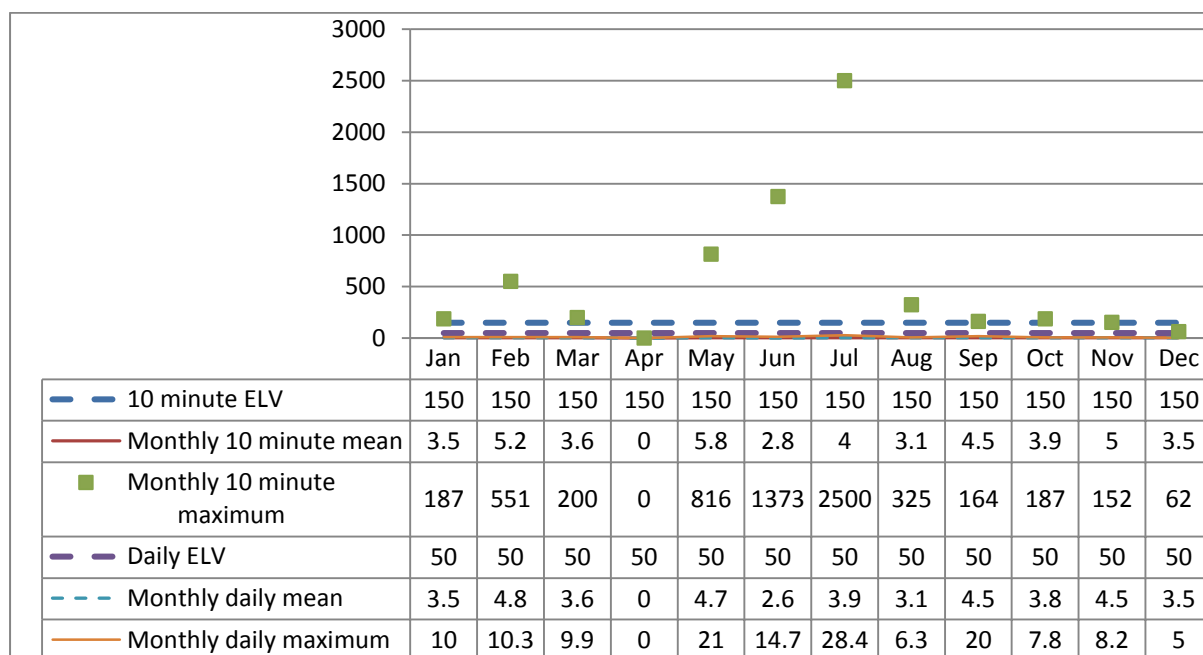
## VOC Line 2



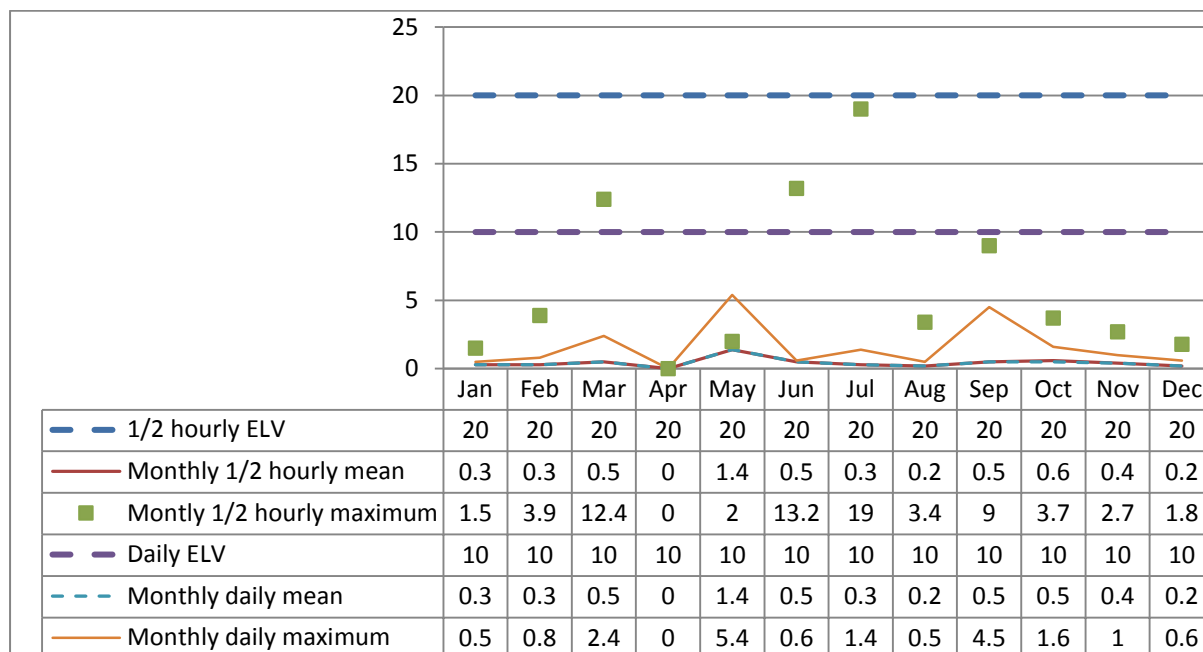
**Dust Line 2****NH3 Line 2**

## HCL Line 3

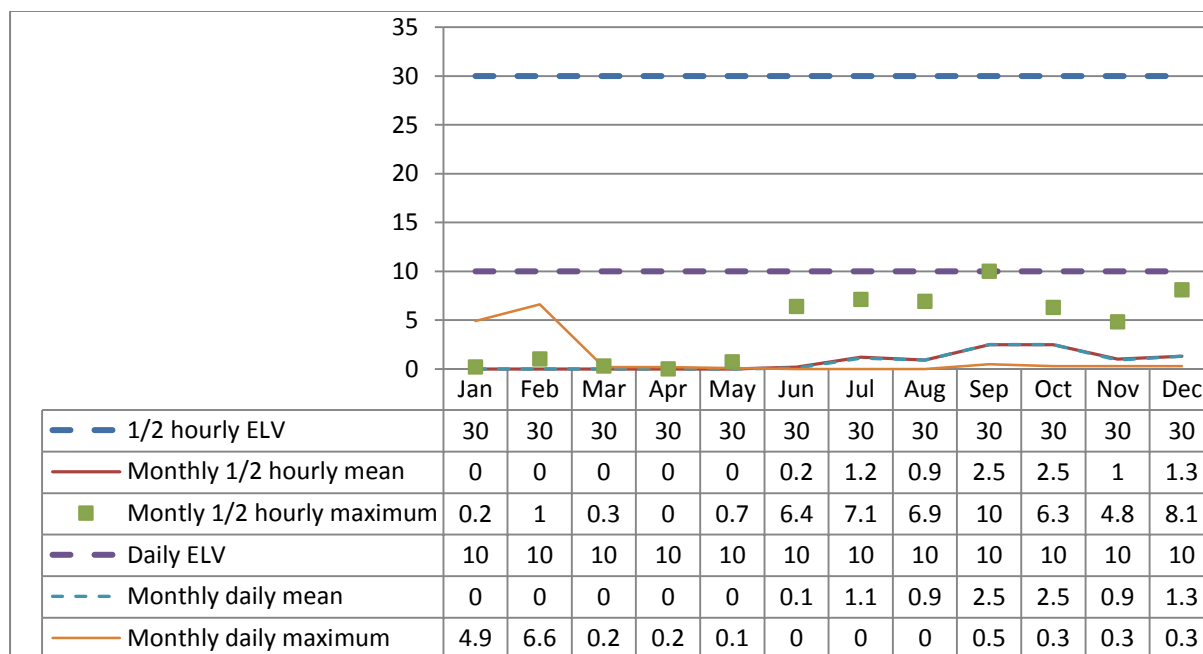
SO<sub>2</sub>

**NOx Line 3****CO Line 3**

## VOC Line 3

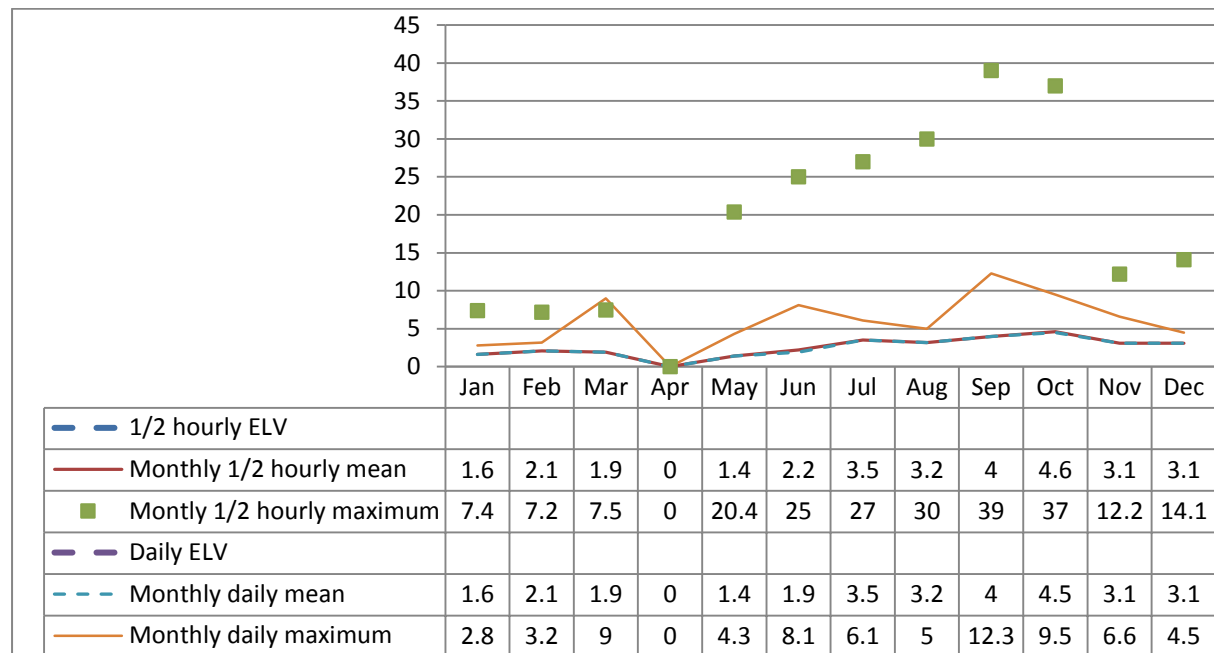


## Dust Line 3

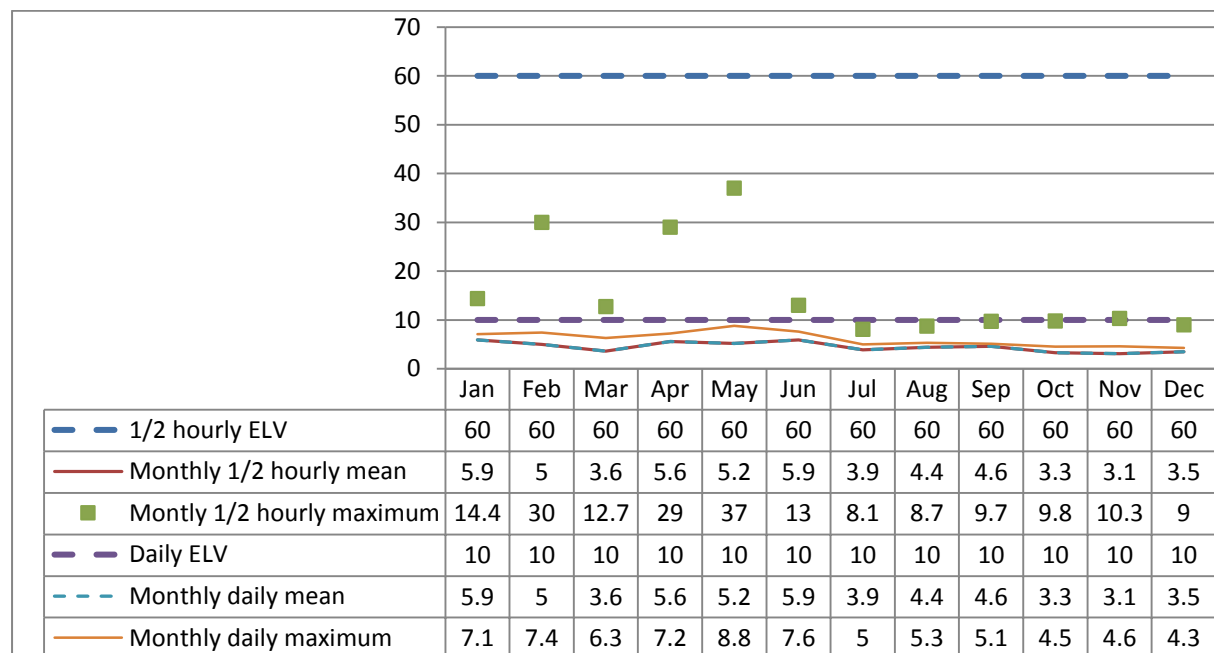


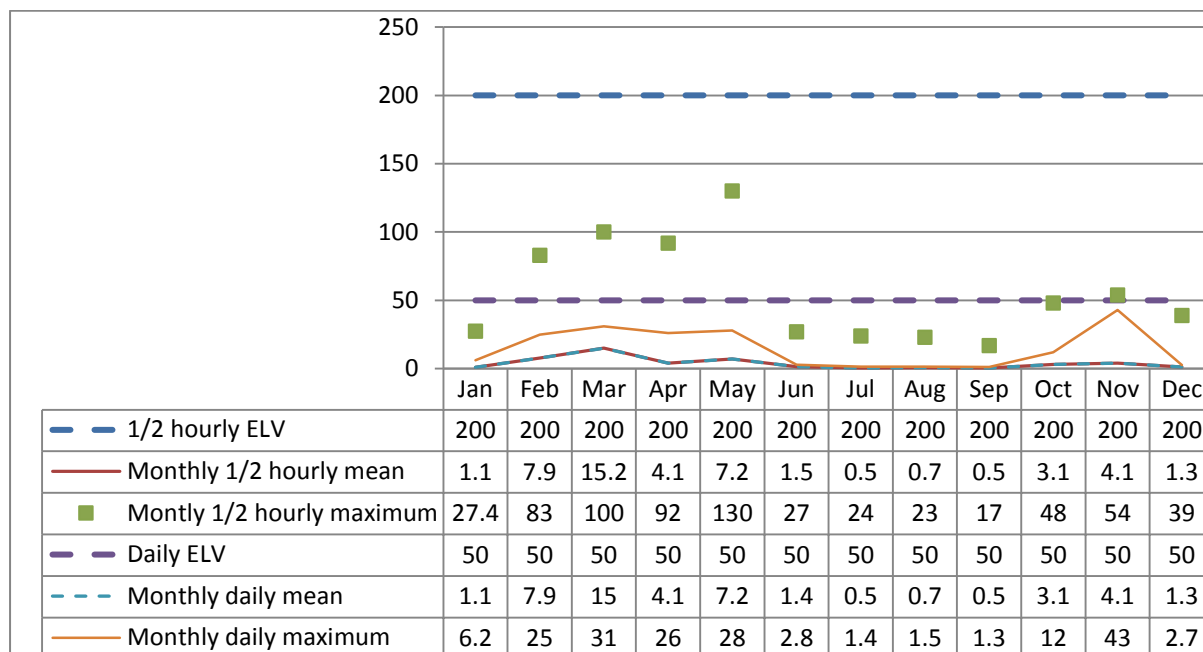
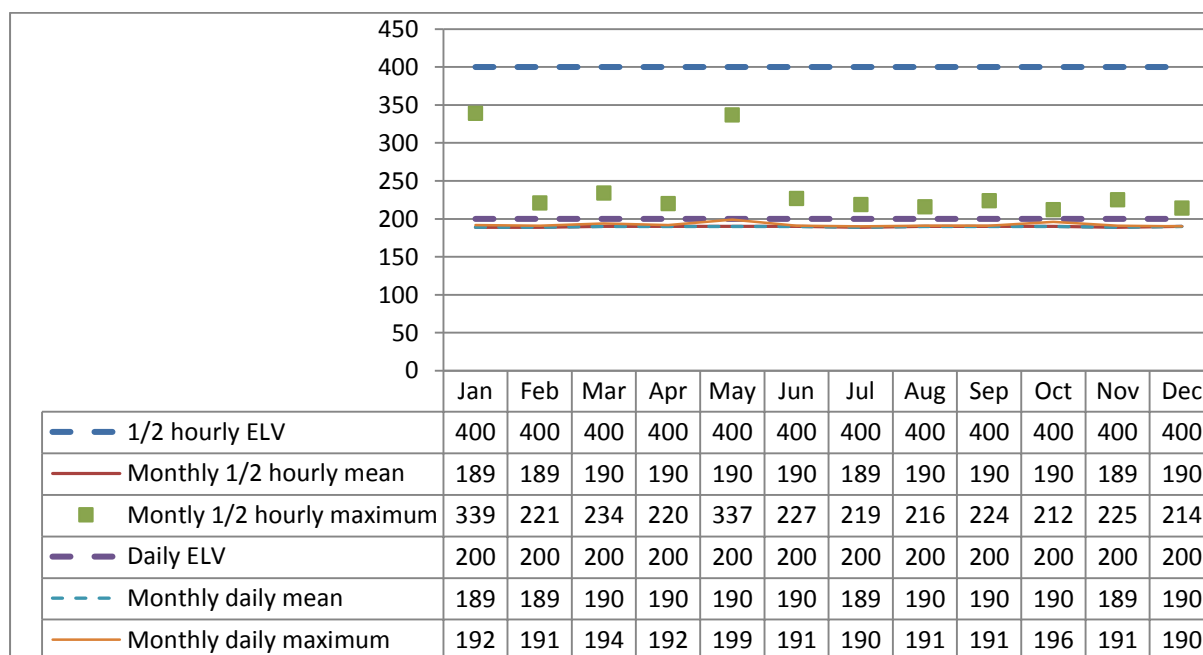


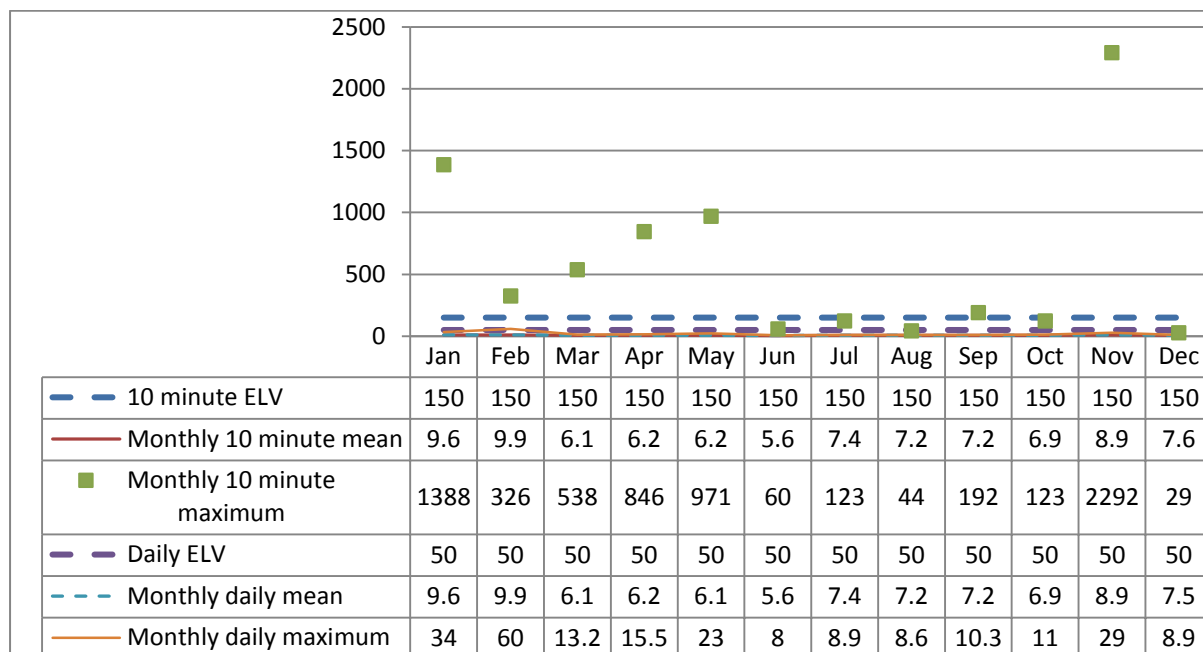
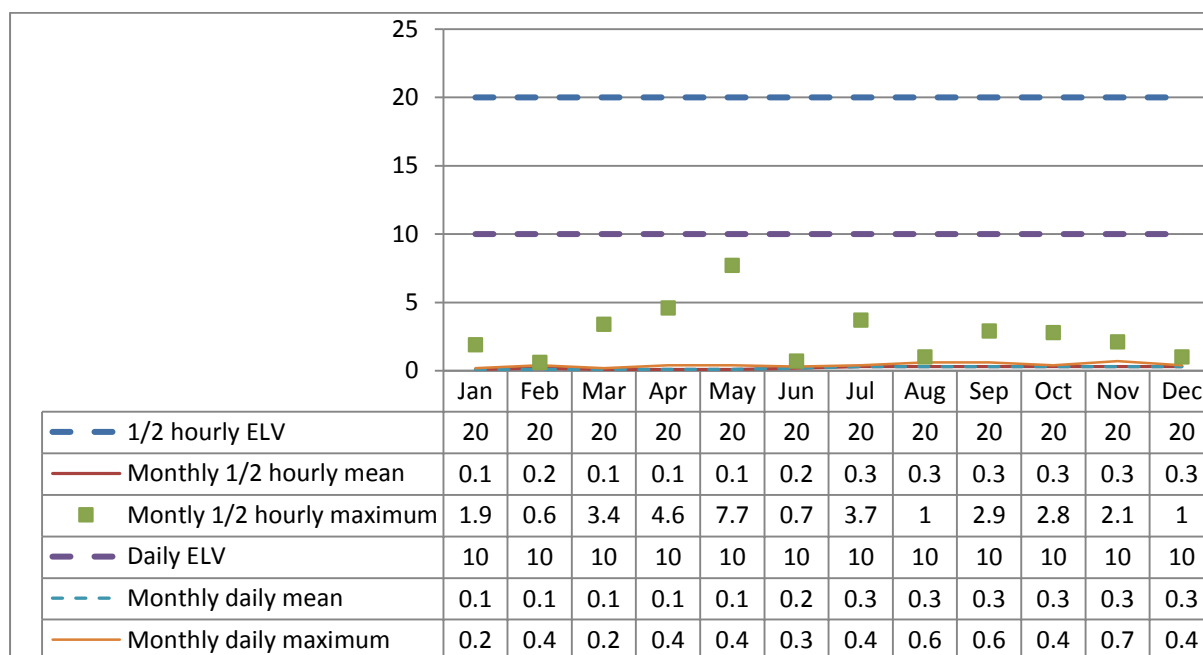
## NH3 Line 3

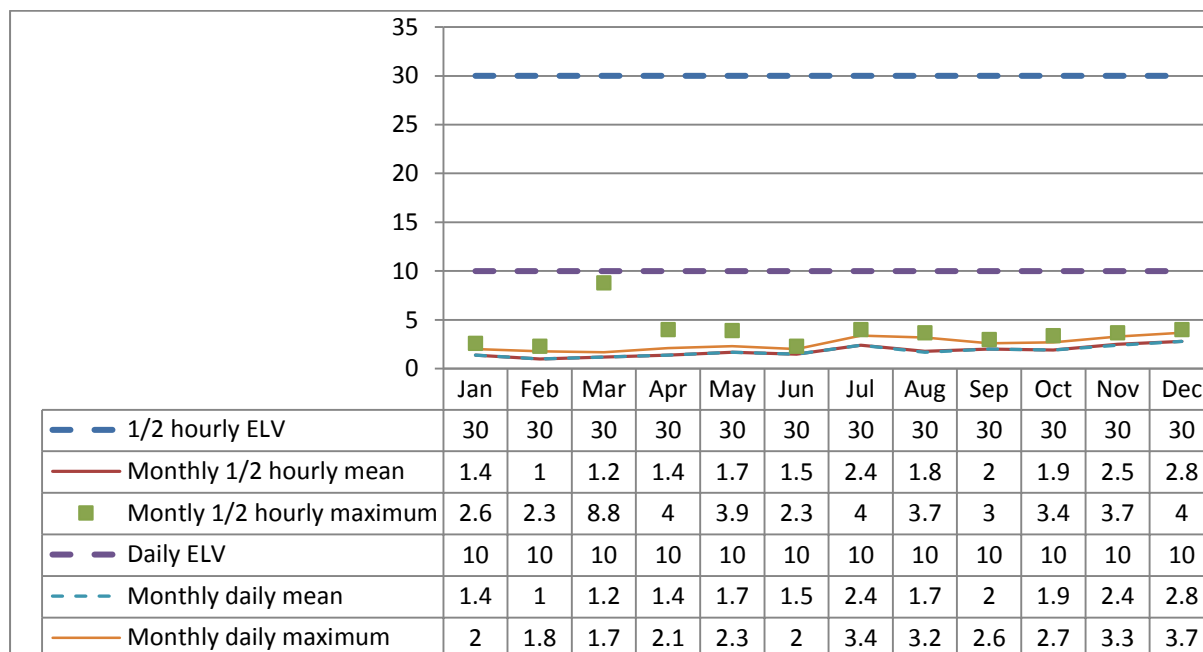
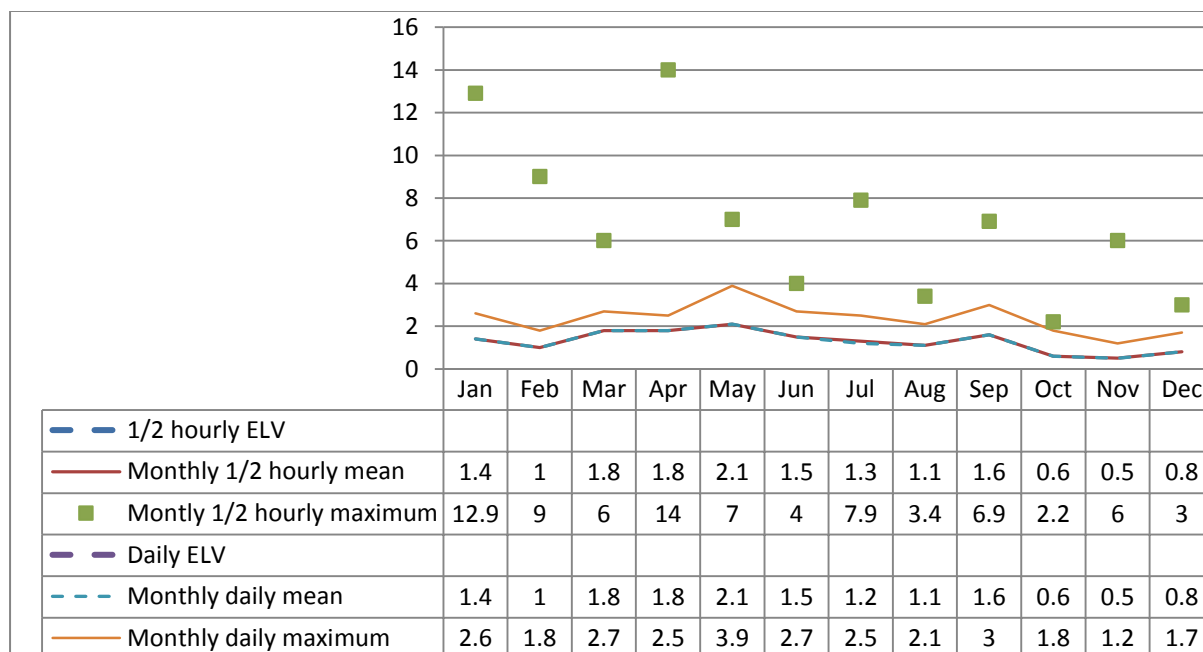


## HCI Line 4

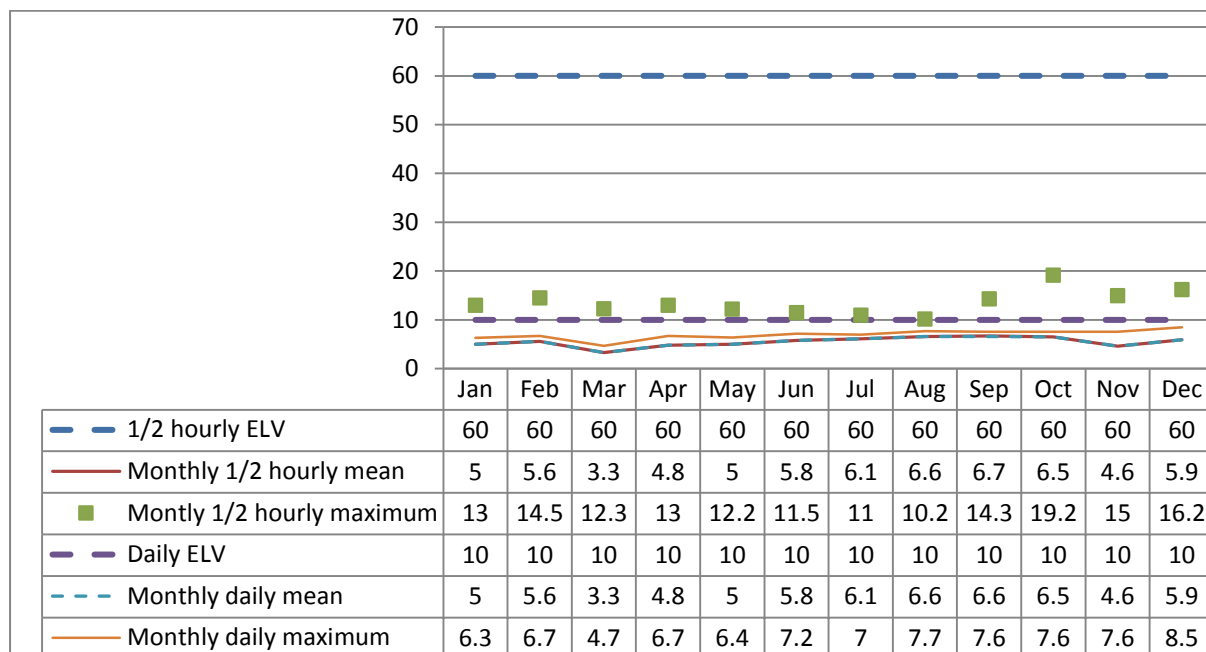


SO<sub>2</sub> Line 4NO<sub>x</sub> Line 4

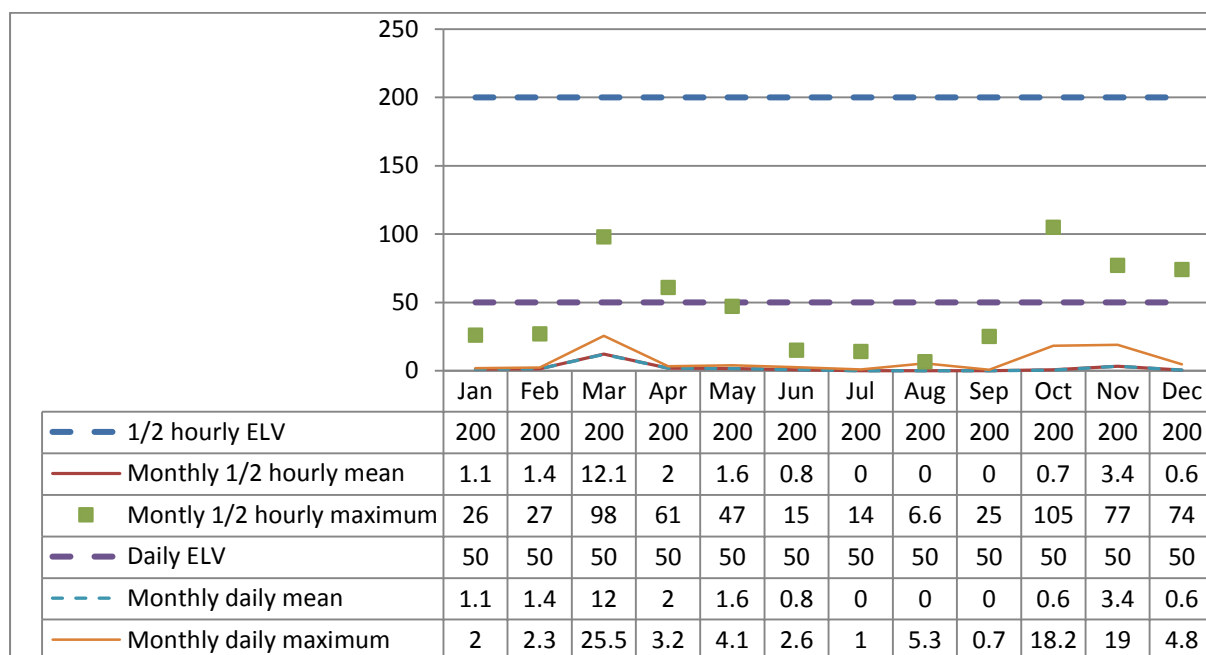
**CO Line 4****VOC Line 4**

**Dust Line 4****NH3 Line 4**

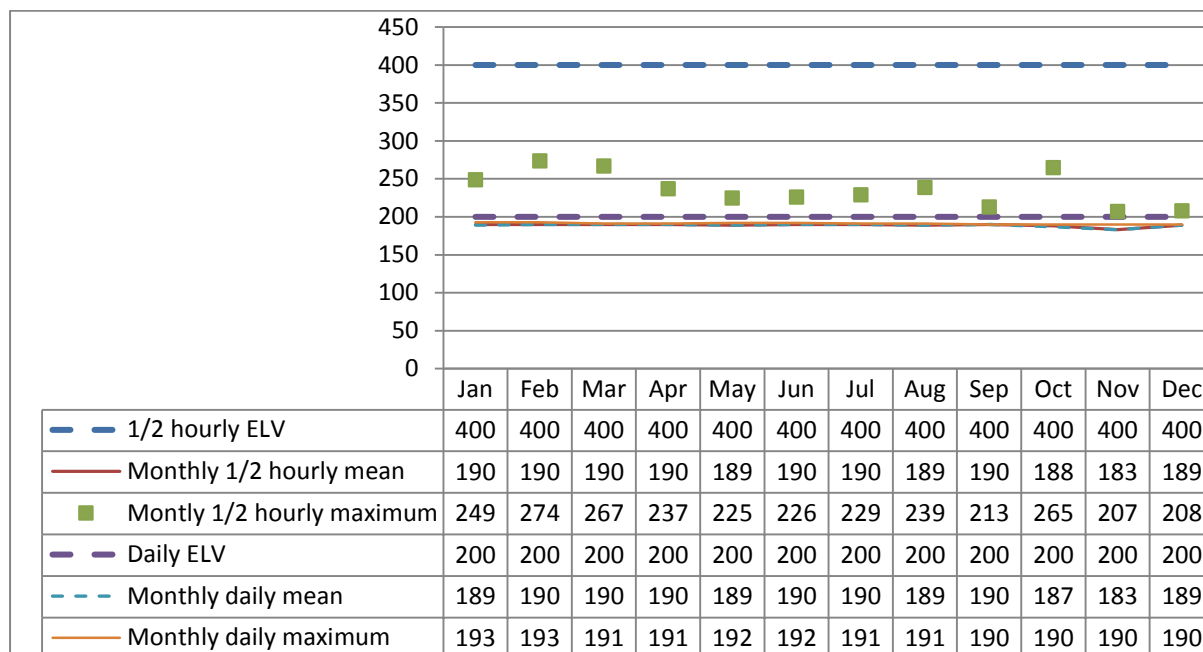
## HCI Line 5



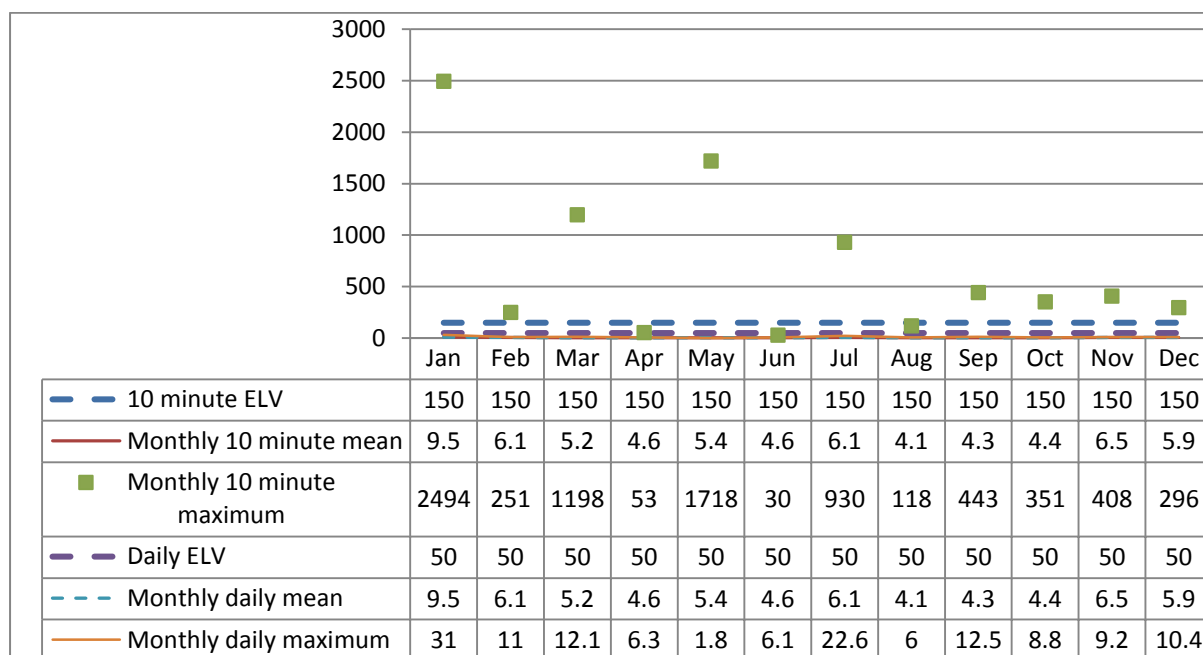
## SO2 Line 5



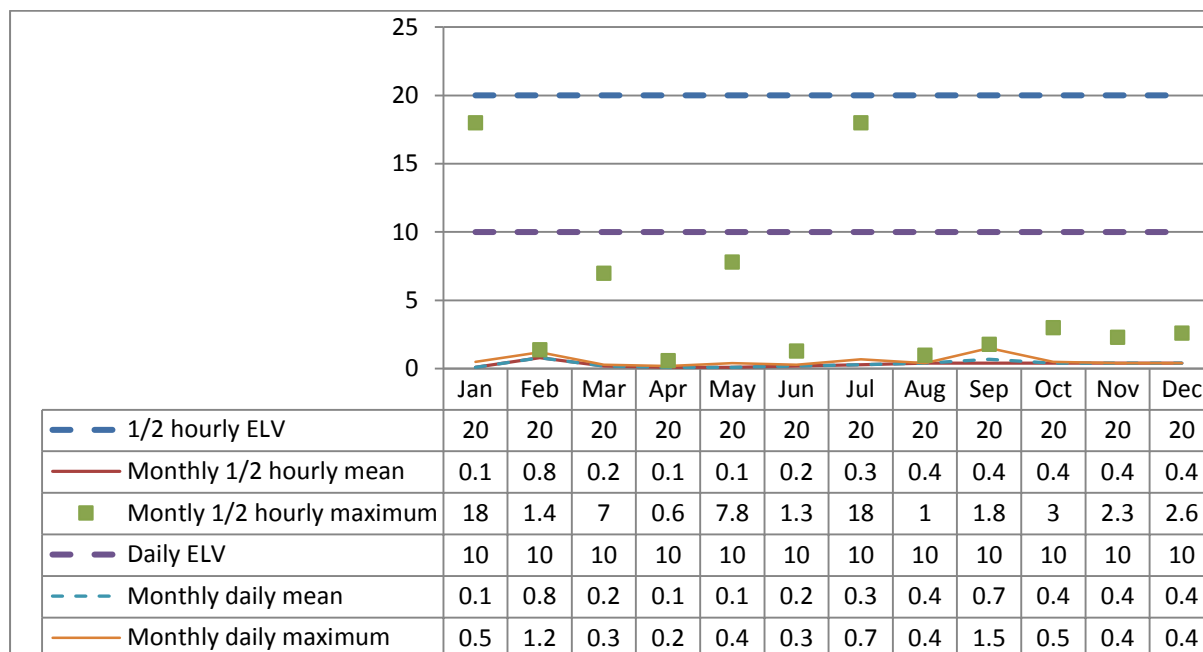
## NOx Line 5



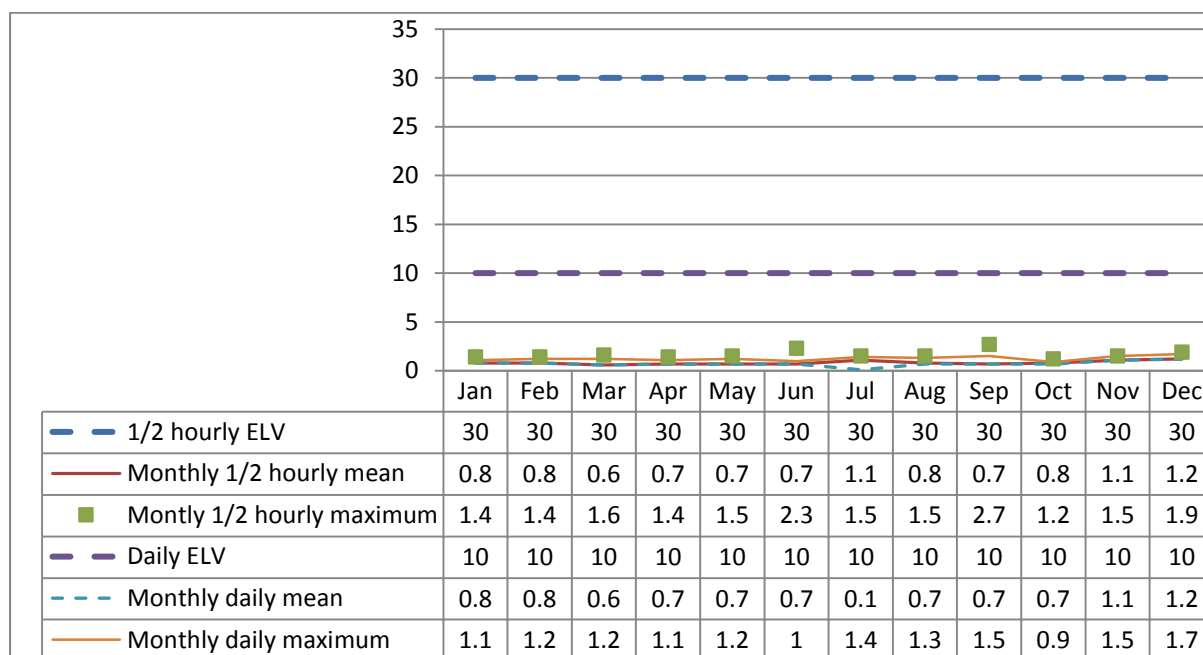
## CO Line 5



## VOC Line 5



## Dust Line 5



**NH3 Line 5**