

## Annual performance report for: **SUEZ recycling and recovery UK Ltd**

### **Sevenside Energy Recovery Centre**

**Permit Number:   EPR/ZP3937KL**

**Year: 2018**

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.

## **1.    Introduction**

Name and address of plant	Sevenside Energy Recovery Centre (SERC) Severn Road Sevenside Hallen South Gloucestershire BS10 7SP
Description of waste input	residual (non-recyclable) domestic and commercial & industrial waste
Operator contact details if members of the public have any questions	SERC Reception 0117 938 1229 SUEZ head office 0800 093 1103

## **2.    Plant description**

The installation is an Energy from Waste (EfW) plant which processes up to 400,000 tonnes of residual (non-recyclable) Commercial and Industrial and Municipal waste per annum, leading to a net export of approximately 35 MW of electrical energy to the National Grid. The facility comprises two identical moving grate incinerator combustion lines with a combined capacity of approximately 50 tonne/hr of waste of an approximate 9.8MJ/kg calorific value. The waste is delivered to the site by road, and rail by a dedicated onsite railhead served by two gantry cranes. The plant has two auxiliary burners to support start-up and shutdown on each incineration line, and a stand-by diesel generator to support emergency shutdown in the event of power failure.

The incinerator bottom ash (IBA) waste on the site is quenched to control dust fugitive emissions and transferred by covered conveyors to the onsite bottom ash recycling plant. The bottom ash recycling plant uses magnets, eddy current separators and a trommel to recover ferrous metals and non-ferrous metals from the bottom ash.

Hazardous air pollution control residues (APCR) from the flue gas treatment plant is collected and removed offsite for treatment. The treatment process involves the removal of contaminants and reuse of the fine ash material as an aggregate replacement in manufactured cement blocks.

SNCR (ammonia) is used to reduce emissions of oxides of nitrogen, lime to reduce acid gas emissions and carbon injection for reduction of organics including dioxins and PAH emissions. Bag filters within the flue gas treatment plant remove dust (particulates) from the emissions to air. The treated emissions to air are released through two 118 metre stacks comprising two flues that run the full length of the stack (one for each incineration line). A continuous emissions monitoring system (CEMS) is installed, as required by the permit, to provide continuous analysis of oxides of nitrogen, sulphur dioxide, carbon monoxide, hydrogen chloride, particulates, total organic carbon and ammonia emissions to air from the two stacks.

The main emissions to air from the site are the combustion gases (oxides of nitrogen, sulphur dioxide and particulates), along with small quantities of ammonia, nitrous oxide, hydrogen chloride, metals, dioxins and furans, and polyaromatic hydrocarbons. There are no emissions from the process to controlled waters. Water discharge of uncontaminated surface (rain)water is permitted.

The Severn Estuary SAC, SSSI, SPA and RAMSAR sites are within 10km of the site, along with the River Wye and Avon Gorge Woodlands.

### 3. Summary of Plant Operation

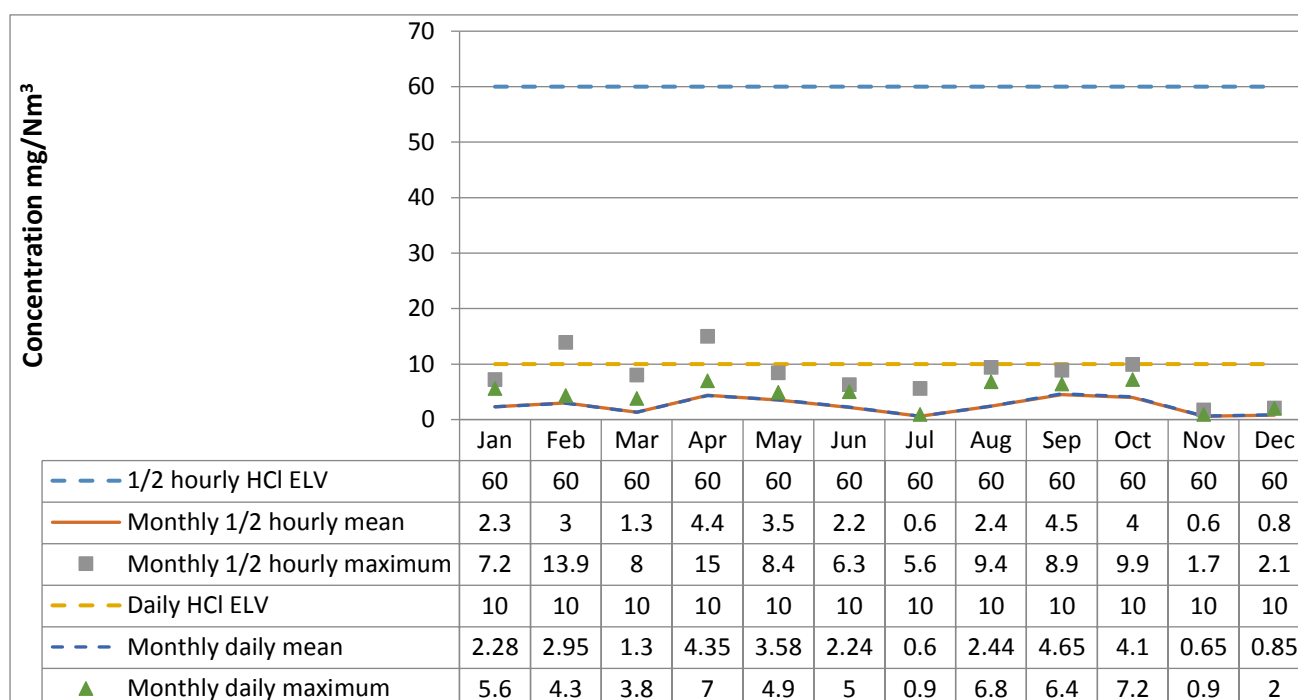
Municipal waste received	338,012 tonnes
Commercial and industrial waste received	37,855 tonnes
Refuse-derived fuel received	321 tonnes
Other waste received (diary waste)	1,276 tonnes
Total waste received	377,464 tonnes
Total plant operational hours	8,190.58 hours (turbine running hours)
Total hours of "abnormal operation" (see permit for definition)	5 hours
Total quantity of incinerator bottom ash (IBA) produced	65,542 tonnes
Disposal or recovery route for IBA	R04 - Recycling / reclamation – metals R05 - Recycling / reclamation - other inorganic materials
Did any batches of IBA test as hazardous? If yes, state quantity	none
Total quantity of air pollution control (APC) residues produced	10,195 tonnes
Disposal or recovery route for APC residues	R05 - Recycling / reclamation - other inorganic materials
Total electricity generated for export to the National Grid	261,063.08 MWh

## 4. Summary of Plant Emissions

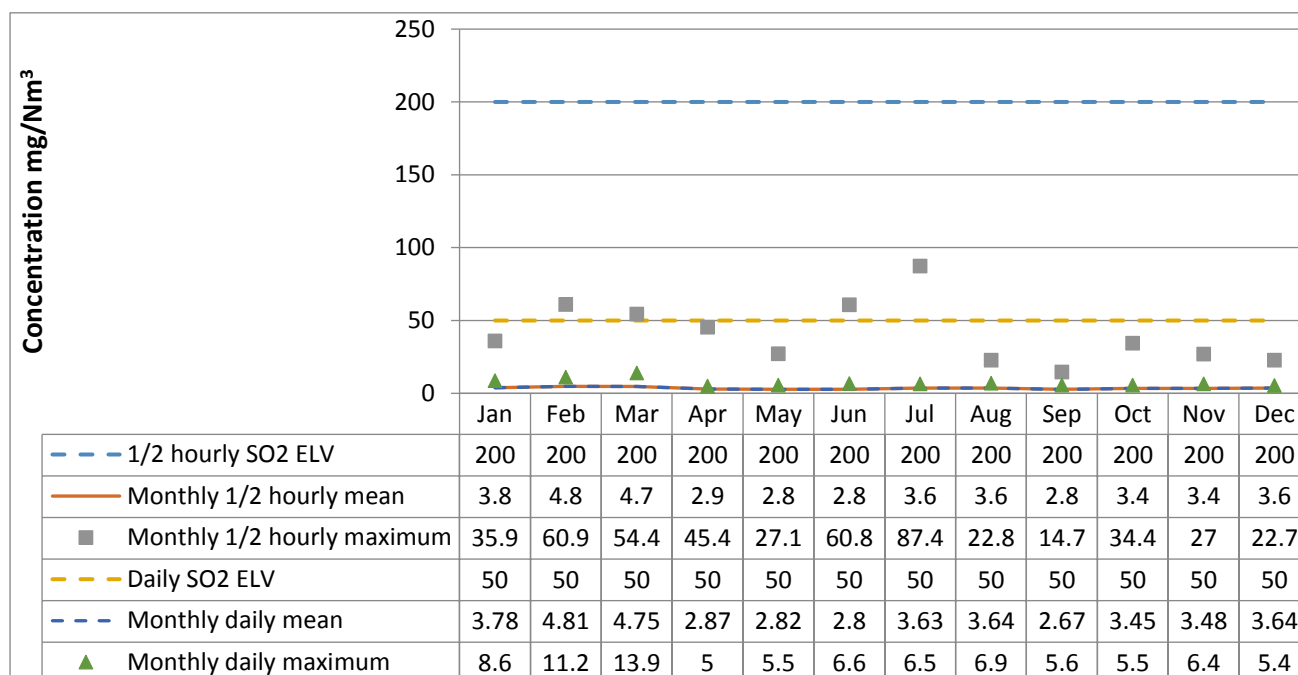
### 4.1 Summary of continuous emissions monitoring results for emissions to air

The following charts show the performance of the plant against its emission limit values (ELVs) for substances that are continuously monitored. Carbon monoxide charts reflect the permit variation that was issued 17 August 2018 to amend ELV from 30 minute averaging periods to 10 minute averaging periods.

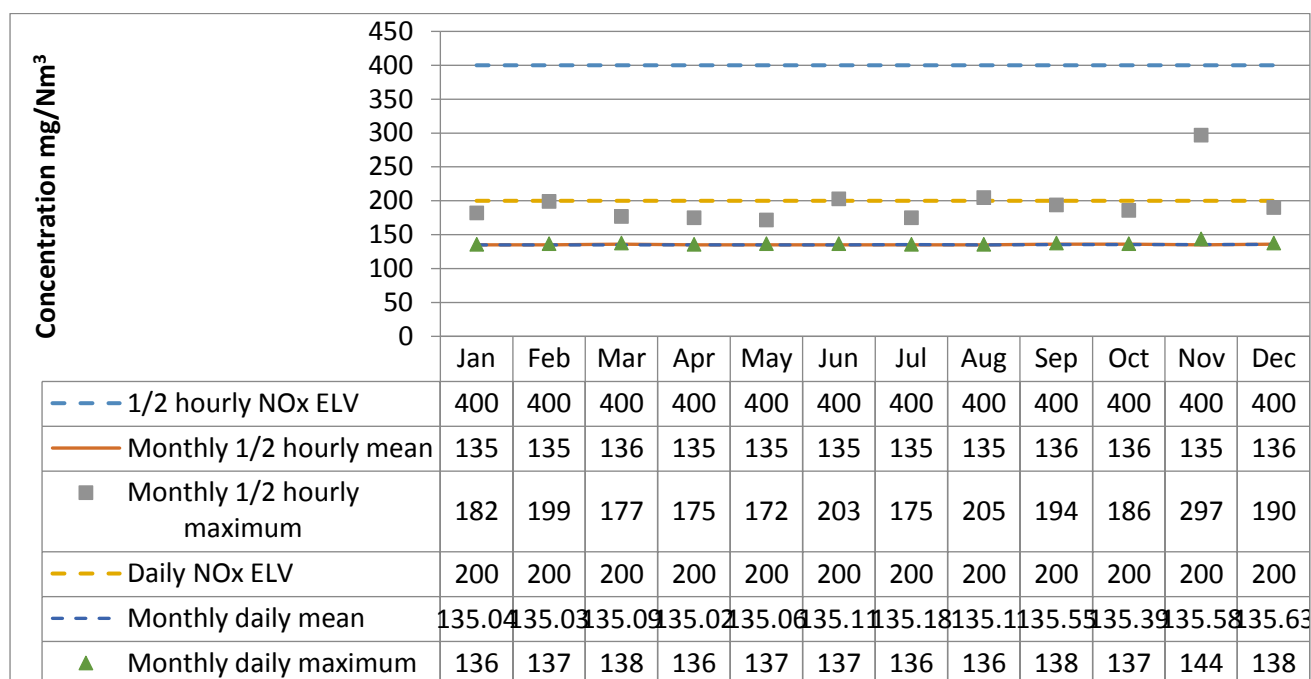
#### Line 1 - Hydrogen chloride



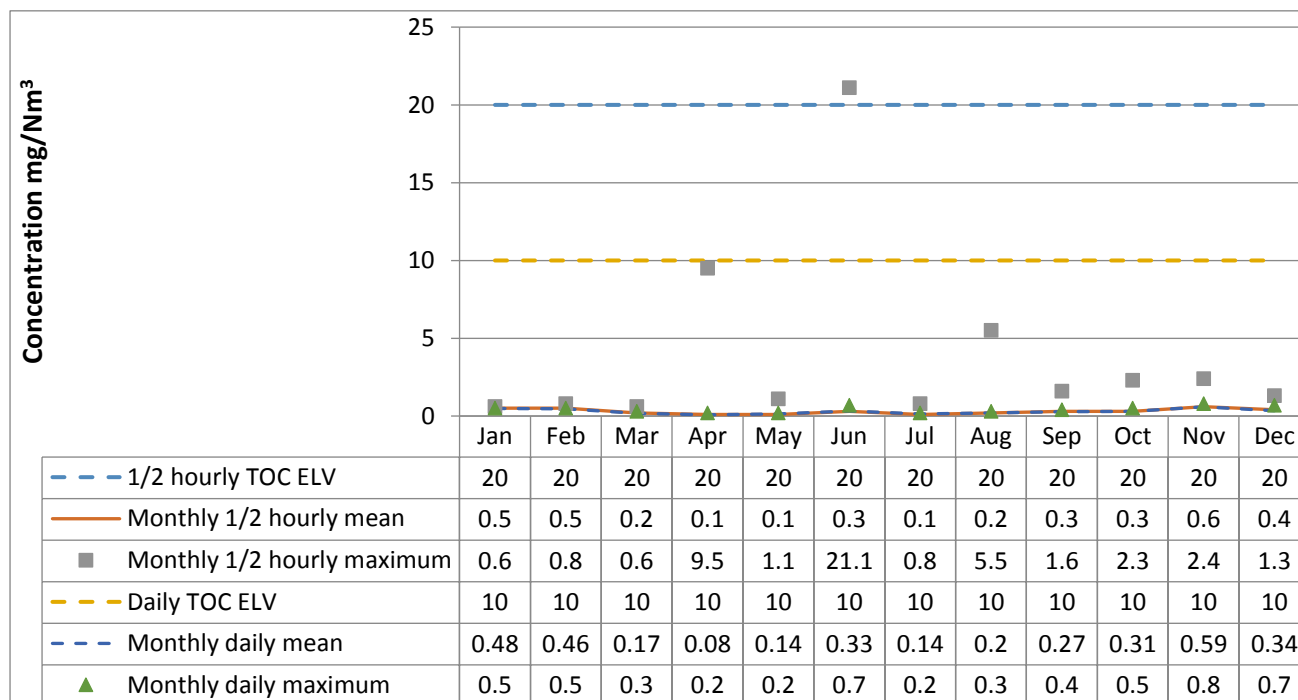
## Line 1 – Sulphur dioxide



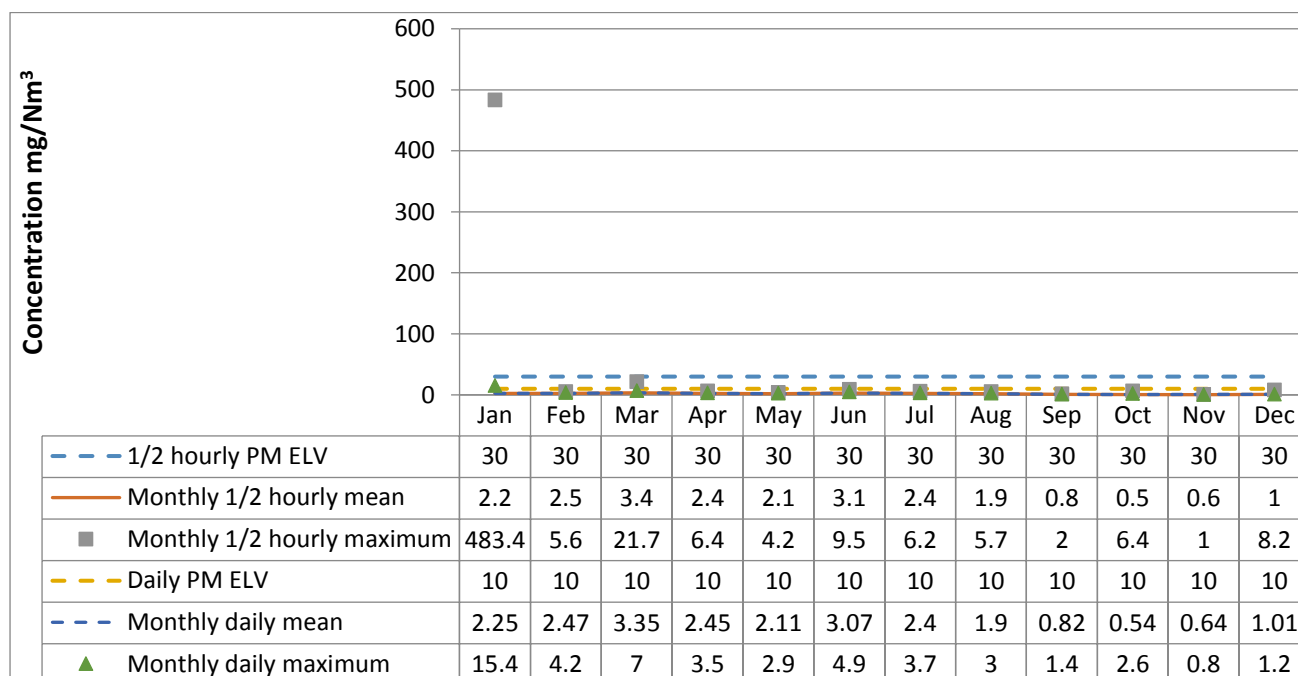
## Line 1 – Oxides of nitrogen



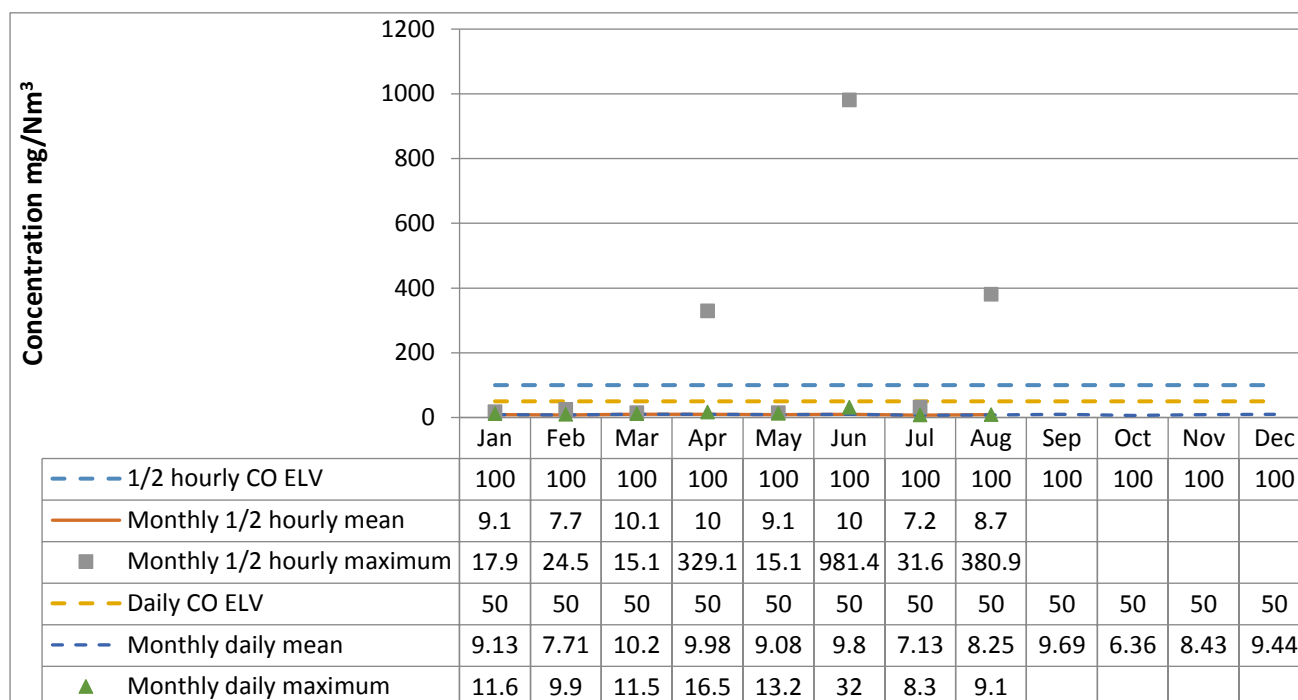
## Line 1 – Total organic carbon



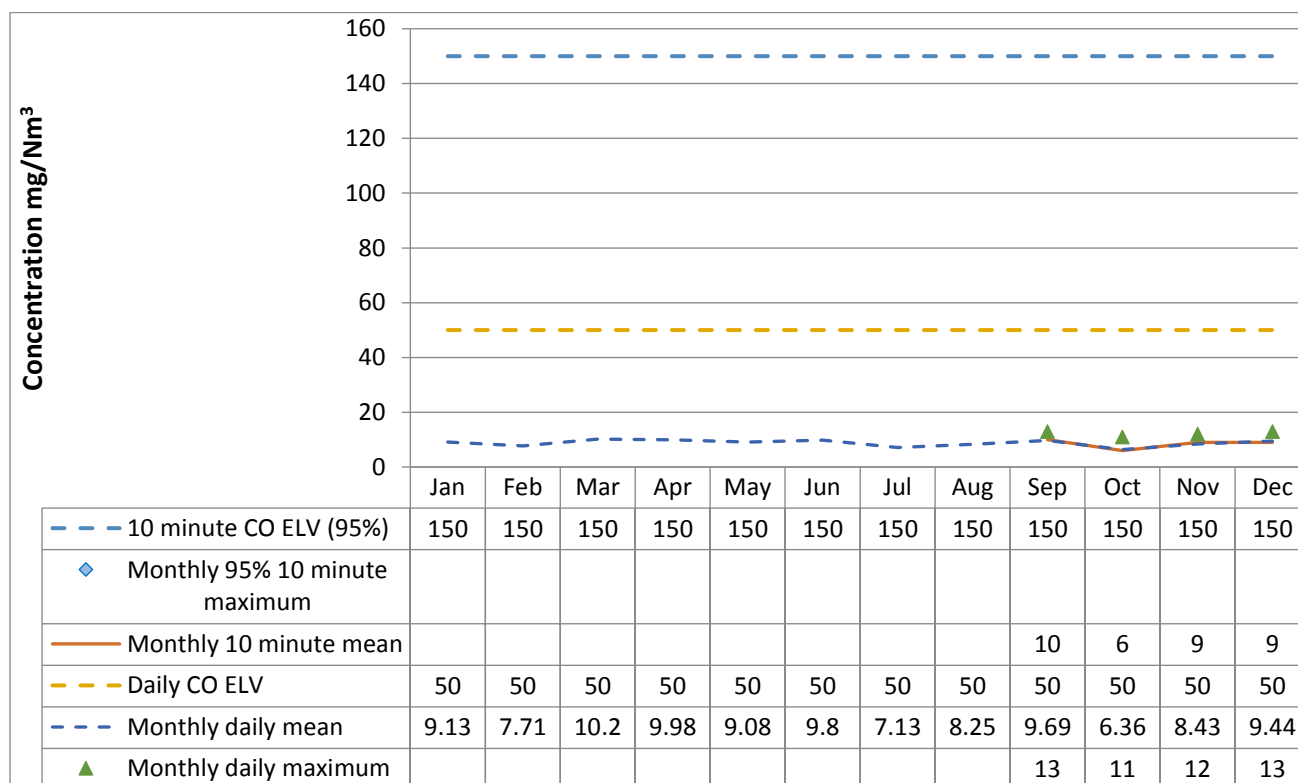
## Line 1 – Particulates



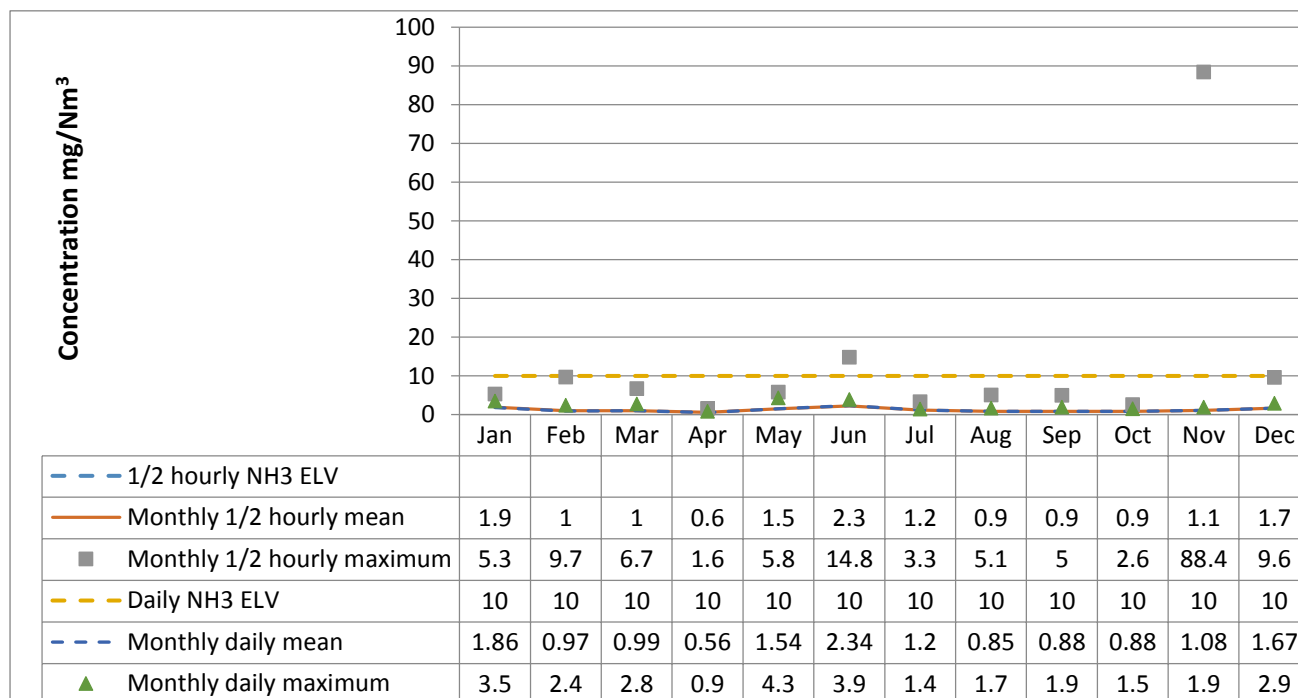
## Line 1 – Carbon monoxide (½ hour averaging periods)



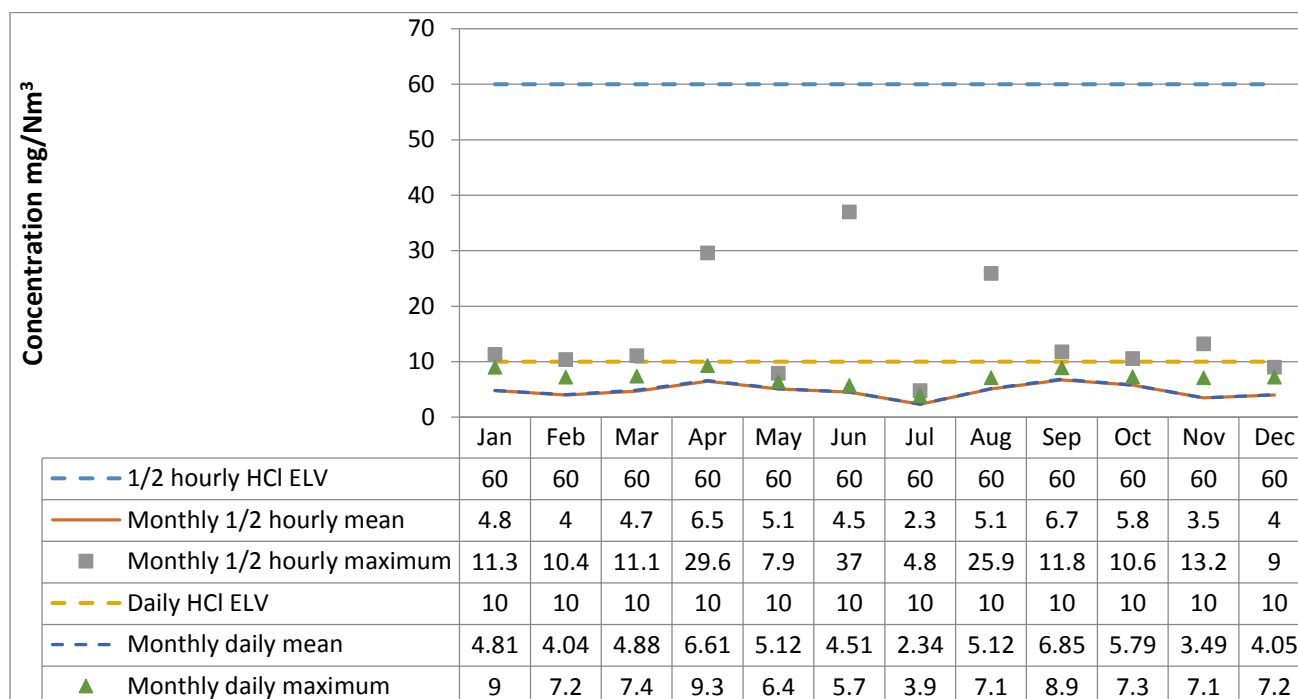
## Line 1 – Carbon Monoxide (10 minute averaging periods)



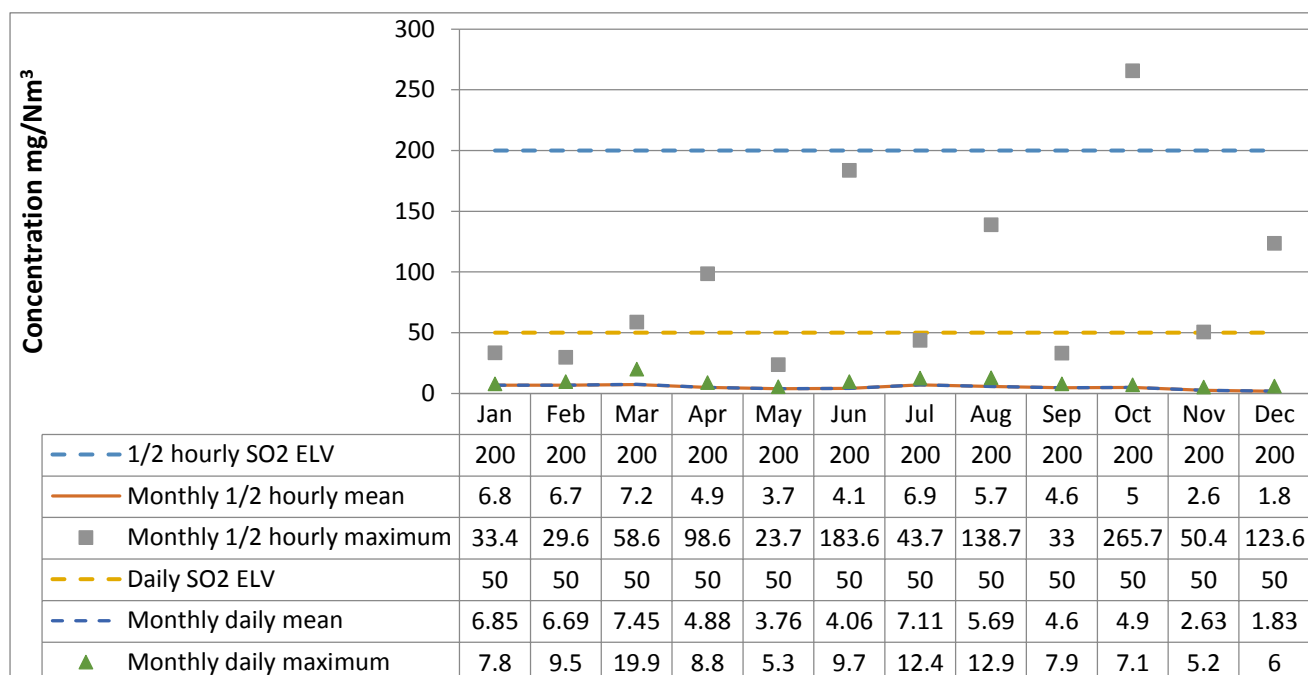
## Line 1 – Ammonia



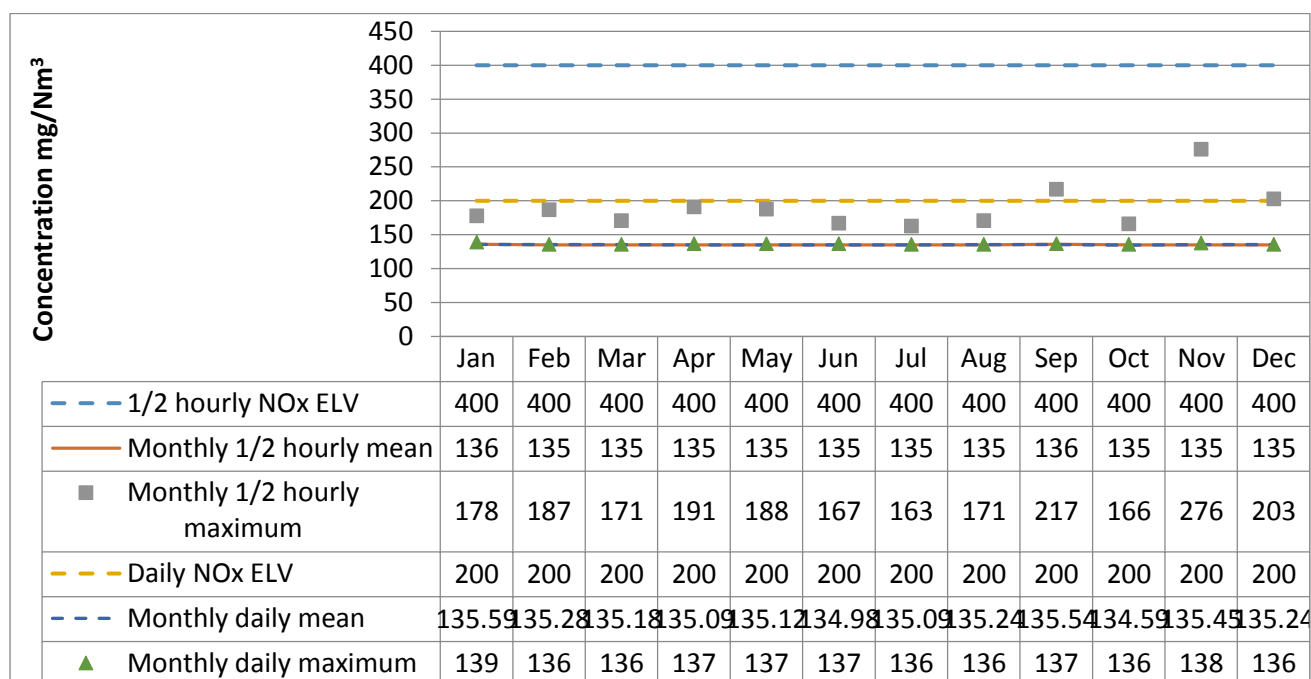
## Line 2 - Hydrogen chloride



## Line 2 – Sulphur dioxide

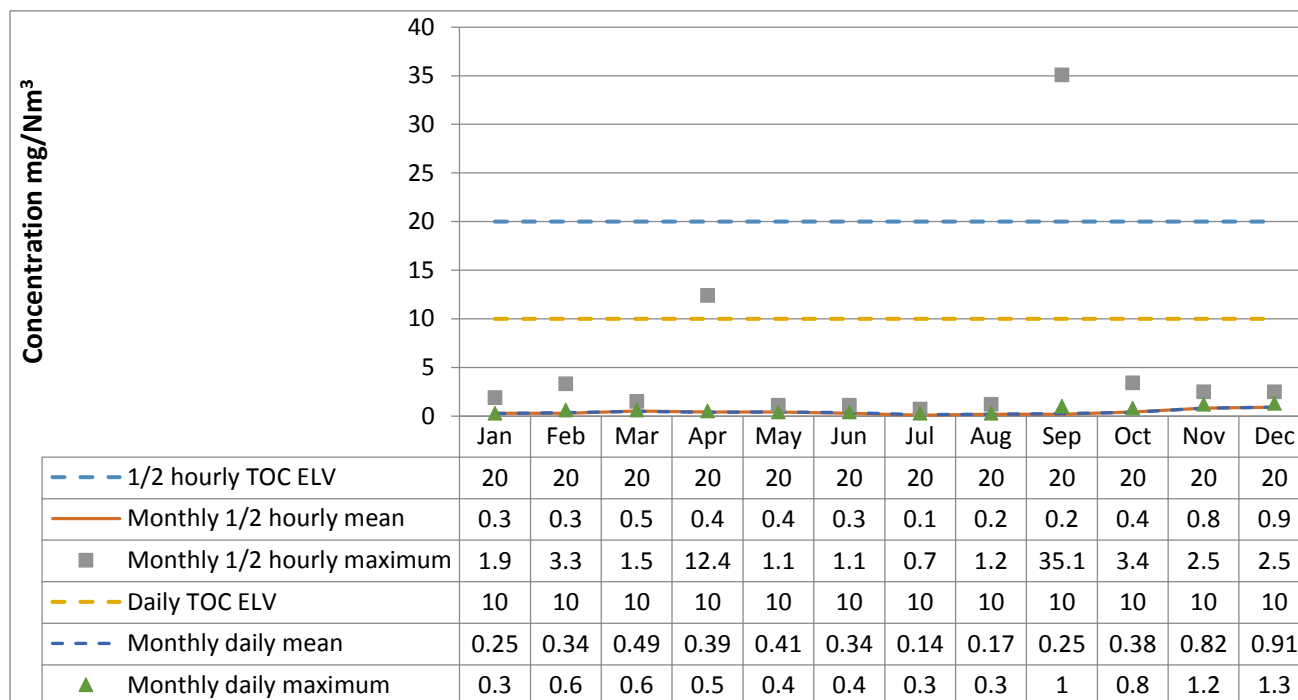


## Line 2 – Oxides of nitrogen

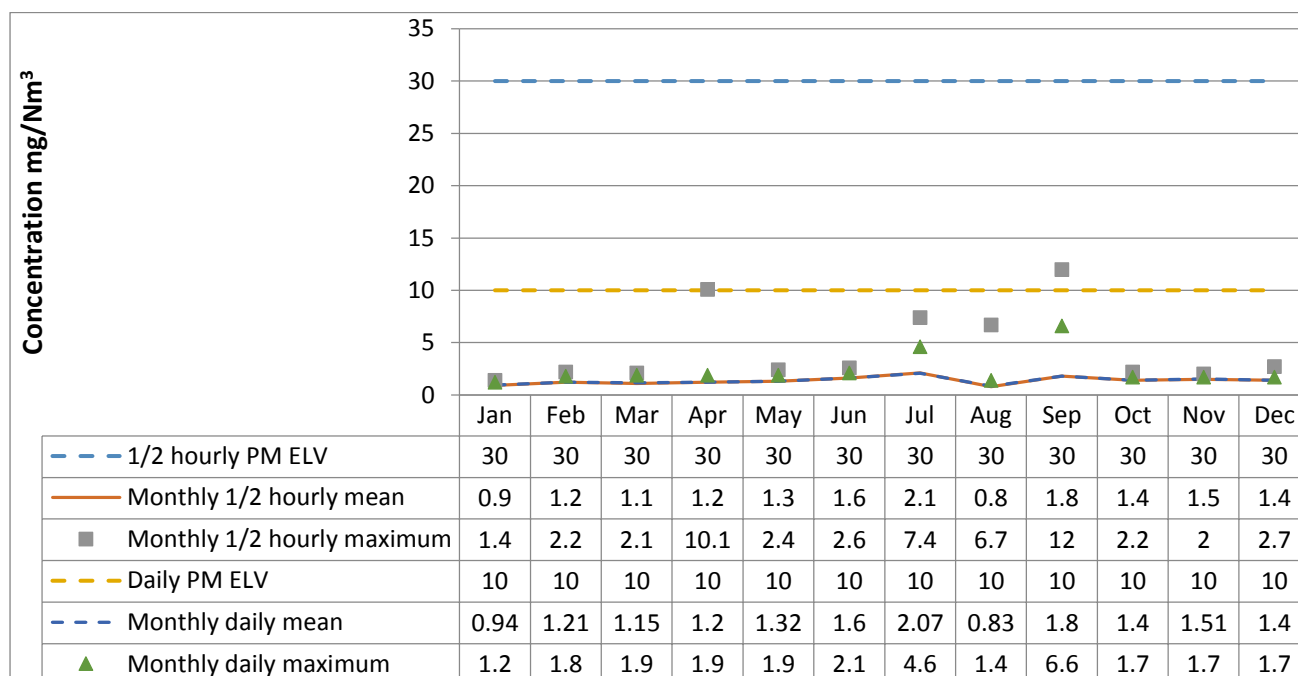




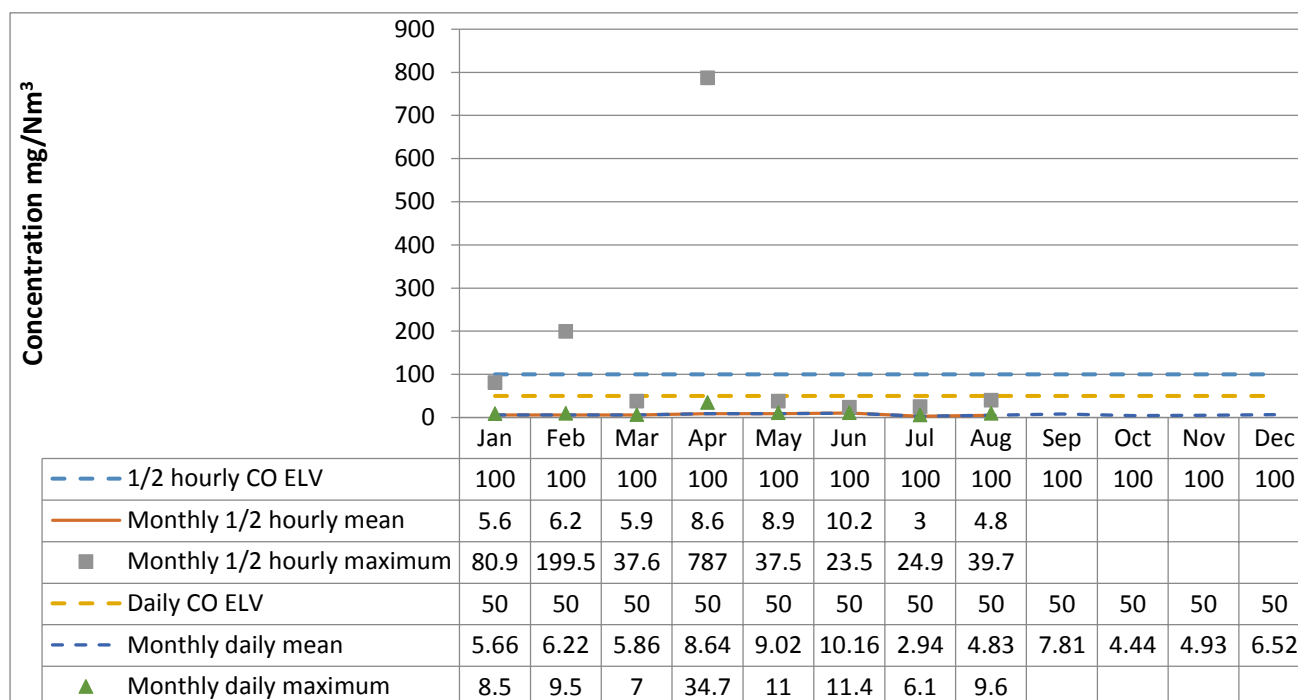
## Line 2 – Total organic carbon



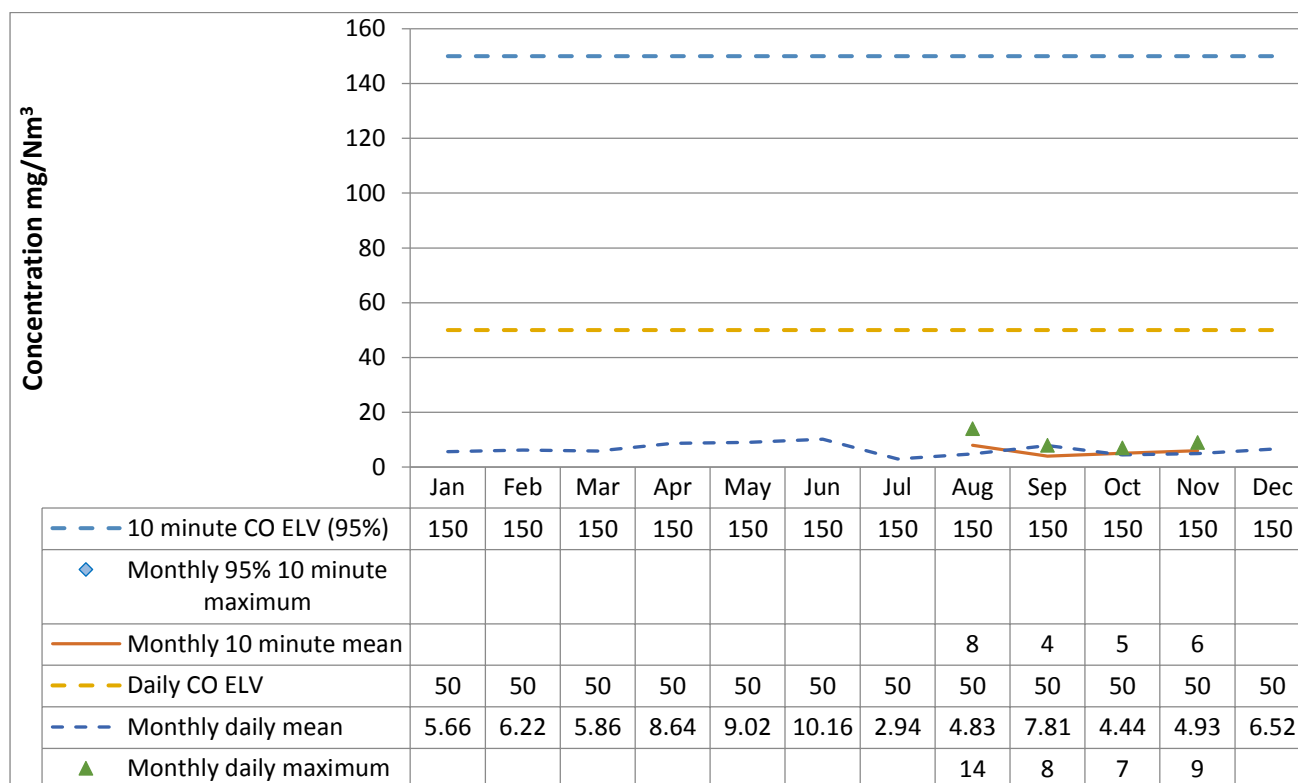
## Line 2 – Particulates



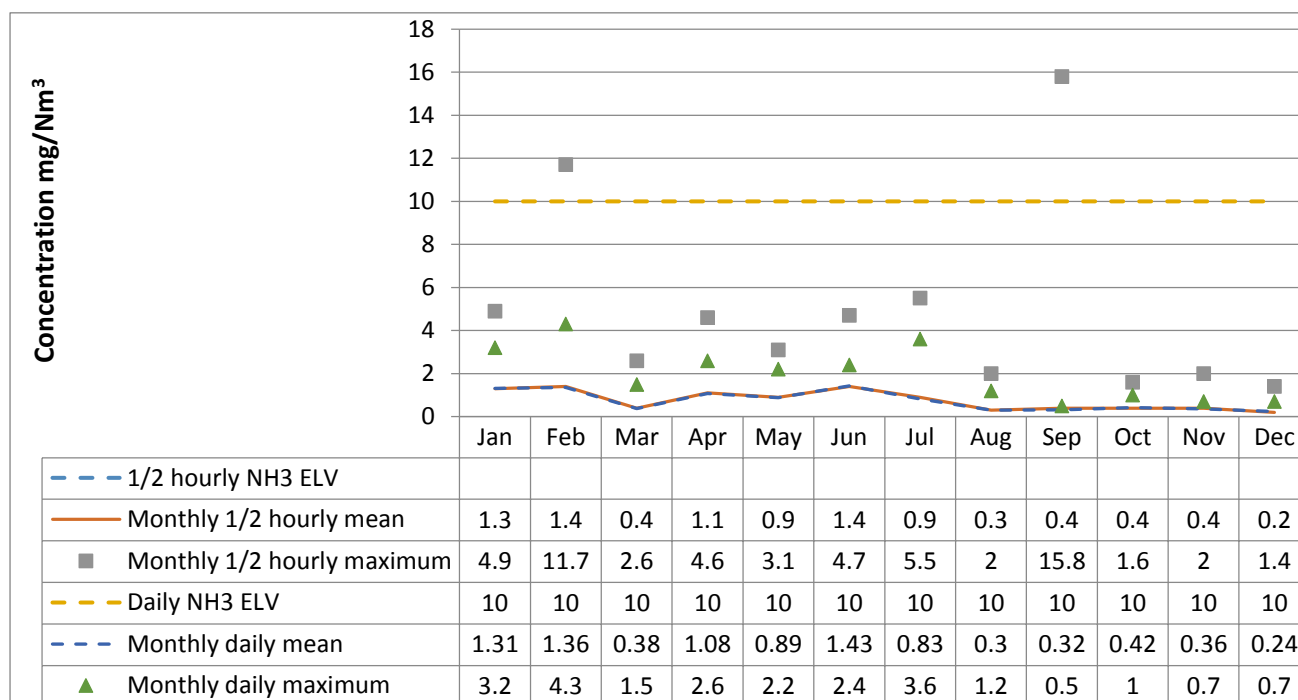
## Line 2 - Carbon monoxide (½ hour averaging periods)



## Line 2 – Carbon monoxide (10 minute averaging periods)



## Line 2 - Ammonia



## 4.2 Summary of periodic monitoring results for emissions to air

The table below shows the results of periodically monitored substances.

### Line 1 (A1)

Substance	Emission limit value	Results	
		07/02/18	06/08/18
Mercury and its compounds	0.05 mg/m <sup>3</sup>	0.0022 mg/m <sup>3</sup>	0.00042 mg/m <sup>3</sup>
Cadmium & thallium and their compounds (total)	0.05 mg/m <sup>3</sup>	0.0017 mg/m <sup>3</sup>	< 0.0010 mg/m <sup>3</sup>
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m <sup>3</sup>	0.23 mg/m <sup>3</sup>	0.059 mg/m <sup>3</sup>
Dioxins and furans (I-TEQ)	0.1 ng/m <sup>3</sup>	0.0057 ng/m <sup>3</sup>	0.0024 ng/m <sup>3</sup>
Hydrogen Fluoride	2 mg/m <sup>3</sup>	< 0.054 mg/m <sup>3</sup>	0.061 mg/m <sup>3</sup>
Ammonia	10 mg/m <sup>3</sup>	0.86 mg/m <sup>3</sup>	0.44 mg/m <sup>3</sup>

Line 2 (A2)

Substance	Emission limit value	Results	
		07/02/18	06/08/18
Mercury and its compounds	0.05 mg/m <sup>3</sup>	0.0013 mg/m <sup>3</sup>	0.0028 mg/m <sup>3</sup>
Cadmium & thallium and their compounds (total)	0.05 mg/m <sup>3</sup>	0.0023 mg/m <sup>3</sup>	0.00086 mg/m <sup>3</sup>
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m <sup>3</sup>	0.072 mg/m <sup>3</sup>	0.28 mg/m <sup>3</sup>
Dioxins and furans (I-TEQ)	0.1 ng/m <sup>3</sup>	0.0079 ng/m <sup>3</sup>	0.0063 ng/m <sup>3</sup>
Hydrogen Fluoride	2 mg/m <sup>3</sup>	< 0.044 mg/m <sup>3</sup>	0.071 mg/m <sup>3</sup>
Ammonia	10 mg/m <sup>3</sup>	0.68 mg/m <sup>3</sup>	0.44 mg/m <sup>3</sup>

### 4.3 Summary of monitoring results for emissions to water

The following tables summarises the results of monitoring of emissions to water for each month:

#### Total suspended solids

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekly/monthly ELV (mg/l)	30											
W1 weekly maximum	6	9	12	24	ND	ND	ND	ND	ND	ND	< 5	< 5
W2 monthly maximum	< 5	6	11	< 5	NS	7	9	5	5	8	< 5	6

ND – no discharge / NS – not sampled

#### Total petroleum hydrocarbons

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Weekly/monthly ELV (mg/l)	5											
W1 weekly maximum	0.09	0.06	0.64	0.041	ND	ND	ND	ND	ND	ND	0.026	0.012
W2 monthly maximum	0.03	0.02	0.02	0.010	NS	0.031	0.021	0.03	0.019	<0.01	0.018	0.066

ND – no discharge / NS – not sampled

## 5. Summary of Permit Compliance

### 5.1 Compliance with permit limits for continuously monitored pollutants

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

Line 1

Substance	Percentage time compliant during operation	
	Half-hourly limit	Daily limit
Particulates	100 %	100 %
Oxides of nitrogen	100 %	100 %
Sulphur dioxide	100 %	100 %
Carbon monoxide	99.99 %	100 %
Total organic carbon	100 %	100 %
Hydrogen chloride	100 %	100 %
Ammonia	100 %	100 %

Line 2

Substance	Percentage time compliant during operation	
	Half-hourly limit	Daily limit
Particulates	100 %	100 %
Oxides of nitrogen	100 %	100 %
Sulphur dioxide	99.99 %	100 %
Carbon monoxide	99.98 %	100 %
Total organic carbon	99.99 %	100 %
Hydrogen chloride	100 %	100 %
Ammonia	100 %	100 %

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

Date	Summary of notification or non-compliance	Reason	Measures taken to prevent reoccurrence
26/01/18	Elevated particulate results on Line 1 during CEMS maintenance work	Erroneous readings caused by disturbance of dust probes recorded as 2 hour period of abnormal operation	None - intrusive work on stack analysers may cause temporary disturbance, carry out maintenance task as quickly as possible

Date	Summary of notification or non-compliance	Reason	Measures taken to prevent reoccurrence
16/04/18	Breach of CO ½ hourly limit on Line 2	Gas cylinder discharge in furnace caused plant trip	Extra checks on incoming waste and permit variation to amend CO ½ hourly ELV to 10 minute ELV
23/04/18	2 x Breach of CO ½ hourly limit on Line 1	Gas cylinder discharge in furnace caused plant trip	Extra checks on incoming waste and permit variation to amend CO ½ hourly ELV to 10 minute ELV
02/06/18	Breach of CO and VOC ½ hourly limits on Line 1	Gas cylinder discharge in furnace caused plant trip	Extra checks on incoming waste and permit variation to amend CO ½ hourly ELV to 10 minute ELV
15/06/18	W2 water discharge not sampled during June	Administrative error	Additional sample taken during June and water sampling requirements added to mainsaver to generate weekly/monthly works orders for sampling
08/08/18	VOC analysis unavailable on the CEMS for period of 4 hours	Maintenance tech, during fault finding on standby ammonia analyser, turned off VOC analysers	Maintenance procedures updated to include additional checks during fault finding activities
04/09/18	Breach of CO and VOC ½ hourly limits on Line 2	Plant trip due to software error on superheater temperature probes	Defect notification report raised against HZI
22/09/18	No CEMS Data available for 60 minute period of Line 1 & 2	Software failure affected comms between analysers and CEMS system	System back on line within 1 hour with telephone support from service contract provider
16/10/18	CEMS data unavailable for ½ hour during plant operation	Error by contractor during CEMS service	Issue corrected by CEMS engineer within 8 minutes
18/10/18	Erroneous CEMS data on Line 2	Failed auto calibration and software engineer had left himself signed into the PC.	Software access provided with telephone support and additional checks on service contractor to be implemented
24/10/18	Breach of SO2 ½ hourly average on Line 2	Blocked lime venture	Increased maintenance schedule

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

Date of complaint	Summary of complaint	Reason for complaint including whether substantiated by the operator or the EA	If substantiated, measures to prevent reoccurrence
05/02/18	Resident from Severn Beach village complained of burning smell notified by EA	Complainant attributed the smell to the new incineration plant – complaint unsubstantiated by the EA and SUEZ	Operations Team confirmed that there were no activities on site on the day in question that could have caused a burning smell. Written response provide to EA to this effect. No further action.
29/10/18	Dust complaint ongoing since early 2017 closed out.	Neighbouring business believed that dust was being generated on the site and being blown by the wind and deposited on the cars in their car park. Not substantiated by EA and SUEZ.	12 month programme of dust monitoring was carried out and concluded in October 2018. The data demonstrated that SUEZ activities were not the cause of nuisance dust reported by the complainant.

## 6. Summary of plant improvements

Summary of any permit improvement conditions that have been completed within the year and the resulting environmental benefits.
<p><b>Improvement Condition 1</b> – post commissioning report.  24/01/18 Compliance Assessment Report (CAR) received from EA approving submission subject to completion of outstanding noise monitoring.  31/07/18 submission of GPT2 noise monitoring assessment which indicates no likely noise impact on identified receptors from plant operation.  26/09/18 CAR received from EA approving IC1 submission. Compliance with Industrial Emissions Directive confirmed.</p> <p><b>Improvement Condition 3</b> – Chromium VI emissions to air  21/05/18 Info sent to EA regarding laboratory detection limits for CrVI.  31/07/18 submission of IC3 report, no measurable concentrations detected in emissions from the plant.</p> <p><b>Improvement Condition 4</b> – report on particulate size distribution in exhaust gas emissions to air  11/01/18 CAR received from the EA approving IC4 submission.</p> <p><b>Improvement Condition 5</b> – report on reuse, recycling or disposal route for IBA and APCR residues generated on site</p>

06/02/18 CAR received from the EA approving IC5 submission. Current agreed recovery routes result in >99% of process residues being recovered.

**Improvement Condition 6 – bottom ash recycling plant operator competency**

18/04/18 Further information submitted to the EA to demonstrate competency of contractor operating the plant.

05/11/18 CAR received from EA approving IC6 submission.

**Improvement Condition 7 – Site specific dust management plant for bottom ash recycling plant**

12/02/18 CAR received from the EA approving IC7 submission. Subsequent dust complaint and dust monitoring has proven the effectiveness of the dust management system in preventing offsite emissions of dust.

**Improvement Condition 8 – soil and groundwater monitoring proposals for compliance with Industrial Emissions Directive**

31/01/18 Monitoring proposals report submitted to EA. Will demonstrate impact of plant operation on soil and groundwater conditions.

**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.**

Permit Variation issued 17/08/18 to change the half hourly ELV of 100mg/m<sup>3</sup> for carbon monoxide (CO) to a 10 minute ELV of 150mg/m<sup>3</sup>. CO emissions from the plant are controlled purely by the combustion conditions i.e. adjustments to temperature and flow rate of primary and secondary air. There is no mitigation of CO emissions provided by the flue gas treatment systems employed, therefore any temporary disturbance of the combustion conditions such as that caused by a gas cylinder discharge in the furnace causes a rapid change in combustion conditions which the control system cannot adjust to quickly enough to prevent a rapid increase in CO production in the furnace. The 100% compliance requirement for the half hourly ELV means that events beyond our control are penalised in terms of permit compliance. Adoption of the 10 minute average ELV requires 95% compliance with the ELV over a rolling 24 hour period. This allows for combustion condition changes beyond operator control to not affect the overall compliance performance of the plant while still complying with the emission requirements of the Industrial Emissions Directive. An assessment was included in the variation application to show there would be no impact of this change on overall emissions to air.

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



None