

## Annual Performance Report 2016

Kirklees EfW



### **KIRKLEES** **Energy from Waste Facility**

### **ANNUAL** **PERFORMANCE REPORT 2016**

<b>DOCUMENT</b>	Kirklees – Energy from Waste Facility
<b>TITLE:</b>	2016 Annual Performance Report

<b>ISSUE DATE:</b>	January 2017
--------------------	--------------

<b>PREPARED BY:</b>	<b>NAME</b>
SHEQ Advisor	Lee Townend

<b>APPROVED BY:</b>	<b>NAME</b>
Plant Manager	Mark Ryan

<b>REPORT DISTRIBUTION:</b>	<b>NAME</b>	<b>No. of Copies</b>
	SITA – Environment Department – Narborough	1
	SITA – SHEQ Manager North	1
	SITA – Plant Manager	1
	Environment Agency Officer	1

## CONTENTS

1. Introduction
2. Plant description
3. Summary of plant operation
4. Permit variation
5. Summary of plant monitoring
6. Summary of plant compliance
7. Summary of plant improvements
8. Further information

## 1. INTRODUCTION

Name of Company	SUEZ R&R UK (Kirklees) Ltd
Name of Plant	Kirklees – Energy from Waste Facility
Permit Number	BJ6178IX
Permit variation Number	EP3637XZ
Address	Vine Street Huddersfield West Yorkshire HD1 6NT
Phone	01484 448 701
Contact Name/Position	Mark Ryan – Plant Manager
Further information, description of waste types burned and origin	Municipal household waste from Kirklees council  Commercial and trade waste  Rejects from material recovery facility

## 2. PLANT DESCRIPTION

This non-hazardous waste incinerator operates 24/7 and can receive up to 150,000 tonnes of municipal waste from Kirklees Council as well as commercial/trade waste. The plant has one furnace line with a processing capacity of 136,000 tonnes per annum. The heat produced by waste incineration is used to raise superheated steam which generates 9.5 MWh of electricity.

Activities associated with the incineration are receipt and storage of municipal waste, production of steam and electricity, abatement of flue gas and handling of Incinerator Bottom Ash (IBA) and Air Pollution Control Residue (APCR).

## 3. SUMMARY OF PLANT OPERATION

Incoming waste is delivered to site by refuse collection trucks. It is then checked in, weighed and delivered into the reception hall.

### RECEPTION HALL

A large reception hall allows for 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 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 material to be removed, and to improve the homogeneity of the incinerator feedstock.

### CONTROL ROOM

The plant's control room centralises the operation of all equipment, including the grab crane used to mix and load waste into a hopper 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 it 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 9.5 MWh.

**INCINERATOR BOTTOM ASH (IBA)**

Ash left on the grate after incineration is carried by conveyor, after quenching, to a storage bunker. A magnet above the conveyor extracts ferrous material for recycling. The remaining bottom ash is trucked off-site for recycling.

**AIR-COOLED CONDENSERS**

After exiting the turbine, the air stream is cooled and condensed back into water through air condensers. 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 passes 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 tankered away for recycling.

**EMISSIONS MONITORING**

As they pass through the stack, the residual flue gases from the process are continuously monitored before release. This data is relayed automatically to the control room.

Plant size, including number of lines	136,000 t/yr Single line			
Annual waste throughputs	Mixed Municipal Waste Commercial and Trade Waste Rejects from Materials Recovery Facility Not to exceed a combined total of 150,000t/yr			
Total plant operational hours in the year and reasons for any significant outages (e.g. annual shutdown, abatement plant failure, boiler failure etc.)	Operating hours: 8067 Scheduled shutdown 1: 4 <sup>th</sup> – 21 <sup>st</sup> June Scheduled shutdown 2: 3 <sup>rd</sup> - 9 <sup>th</sup> November			
Residues produced	Bottom ash	APCR	Metals	Other waste (bulky waste)
Amount of each residue, including metals (where appropriate) recycled/land filled	25,528t	5,114t	2,748t	3,521t
Electricity	Produced: 72,436 M/w Exported: 62,556 M/w Parasitic load: 9,880 M/w			

**Annual waste throughput**

Waste types	EWC code	Tonnes
Mixed Municipal Waste	20 03 01	127,510

#### 4. PERMIT VARIATION

As part of permit variation – EPR/BJ6178IX/V005 issued on 29<sup>th</sup> July 2011, the following changes were permitted by the Environment Agency as part of a minor technical variation:

- 1) The revision of the carbon monoxide air emission limit to be in line with the Waste Incineration Directive requirements.
- 2) The revision of the bi-annual air emission monitoring requirements to be brought in line with the Waste Incineration Directive requirements.
- 3) The replacement of the existing noise condition with the standard Environmental Permitting Regulations noise and vibration condition.
- 4) To include the production of urea solution as a directly associated activity.

#### 5. SUMMARY OF PLANT MONITORING

Permit monitoring requirements

Table 6.1.2: Emission limits to air and monitoring during normal operation				
A1	Particulate matter	30 mg/m <sup>3</sup> ½-hr average	Continuous measurement	BS ISO 10155 <sup>9,7</sup>
A1	Particulate matter	10 mg/m <sup>3</sup> Daily average	Continuous measurement	BS ISO 10155 <sup>9,7</sup>
A1	Total Organic Carbon (TOC)	20 mg/m <sup>3</sup> ½-hr average	Continuous measurement	BS EN 12619-2 <sup>9,7</sup>
A1	Total Organic Carbon (TOC)	10 mg/m <sup>3</sup> Daily average	Continuous measurement	BS EN 12619-2 <sup>9,7</sup>
A1	Hydrogen chloride	60 mg/m <sup>3</sup> ½-hr average	Continuous measurement	MCERTS certified instruments <sup>10, 8</sup>
A1	Hydrogen chloride	10 mg/m <sup>3</sup> Daily average	Continuous measurement	MCERTS certified instruments <sup>10, 8</sup>
A1	Hydrogen fluoride	2 mg/m <sup>3</sup> Periodic over minimum 1-hour period	Bi-annual	USEPA Method 26/26A

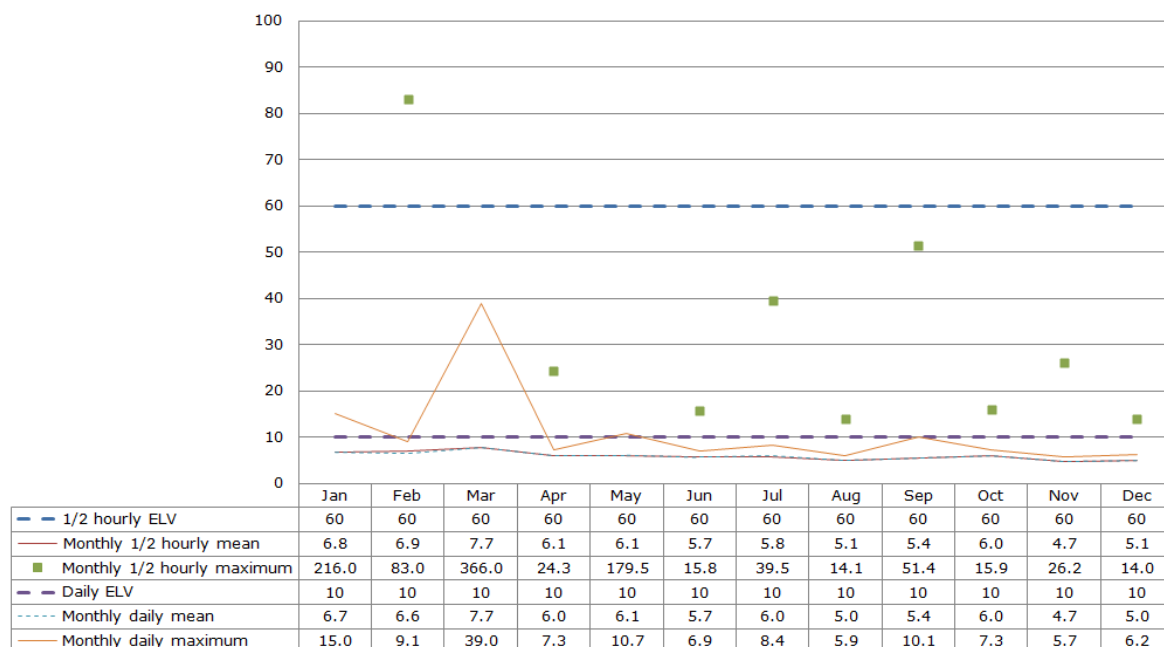


A1	Carbon monoxide	150 mg/m <sup>3</sup> 95% of all 10-minute averages in any 24-hour period	Continuous measurement	ISO 12039 <sup>4,8</sup>
A1	Carbon monoxide	50 mg/m <sup>3</sup> Daily average	Continuous measurement	ISO 12039 <sup>4,8</sup>
A1	Sulphur dioxide	200 mg/m <sup>3</sup> ½-hr average	Continuous measurement	BS 6069-4.4 <sup>9,6</sup>
A1	Sulphur dioxide	50 mg/m <sup>3</sup> Daily average	Continuous measurement	BS 6069-4.4 <sup>9,6</sup>
A1	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 measurement	ISO 10849 <sup>9,6</sup>
A1	Oxides of nitrogen (NO and NO <sub>2</sub> expressed as NO <sub>2</sub> )	200 mg/m <sup>3</sup> Daily average	Continuous measurement	ISO 10849 <sup>9,6</sup>
A1	Cadmium & thallium and their components (total) <sub>3</sub>	0.05mg/m <sup>3</sup> periodic over minimum 30 minute, maximum 8 hour period	Biannual	BS EN 14385
A1	Mercury and its components <sub>3</sub>	0.05mg/m <sup>3</sup> periodic over minimum 30 minute, maximum 8 hour period	Biannual	BS EN 13211
A1	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total) <sub>3</sub>	0.5mg/m <sup>3</sup> periodic over minimum 30 minute, maximum 8 hour period	Biannual	BS EN 14385
A1	Dioxins / furans (I-TEQ)	0.1 ng/m <sup>3</sup> periodic over minimum 6 hours, maximum 8 hour period	Biannual	BS EN 1948
Rest of table as stated in current permit BJ6178IX, with foot notes.				

### CEMS data

The data collected from the CEMS has been represented in graphical form for 2014 (APPENDIX 1), an example of which is shown below.

## HYDROGEN CHLORIDE



The data represented is:

**½ Hourly ELV** – shows the ½ hourly emission limit value.

**Monthly ½ Hourly mean** – shows the average values for ½ hourly continuous monitoring over the month.

**Monthly ½ Hourly maximum** – shows the maximum value for ½ hourly continuous monitoring over the month.

**Daily ELV** – shows the daily emission limit value.

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

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

### **The annual mass emissions of monitored pollutants**

(Data was taken from Pollution Inventory reporting Form)

<b>Pollutant</b>	<b>Reporting Threshold</b>	<b>brt (below recorded threshold) or releases</b>	<b>Notifiable releases</b>
<b>Carbon Dioxide</b>	10,000,000 kg	127,510,000 kg	N/A
<b>Antimony Sb</b>	1 kg	1.58 kg	N/A
<b>Arsenic As</b>	1 Kg	brt	N/A
<b>Cadmium Cd</b>	1 kg	brt	N/A
<b>Chromium Cr</b>	10 kg	brt	N/A
<b>Copper Cu</b>	10 kg	brt	N/A
<b>Lead Pb</b>	100 kg	brt	N/A
<b>Manganese Mn</b>	10 kg	brt	N/A
<b>Mercury Hg</b>	1 kg	brt	N/A
<b>Nickel Ni</b>	10 kg	brt	N/A
<b>Vanadium V</b>	10 kg	brt	N/A
<b>Chlorine and inorganic chlorine compounds – as HCL</b>	10,000 kg	brt	N/A
<b>Dioxins and furans (PCDDs/PCDFs) as WHO-TEQ</b>	0.00001 kg	brt	N/A
<b>Fluorine and inorganic fluorine compounds – as HF</b>	1,000 kg	brt	N/A
<b>Nitrogen oxides (NO and NO2) as NO2</b>	100,000 kg	135120.7 kg	N/A

<b>Non-methane volatile organic compounds</b>	10,000 kg	brt	N/A
<b>Particulate matter</b>	10,000 kg	brt	N/A
<b>Polychlorinated biphenyls (PCBs)</b>	0.00001 kg	0.01095 kg	N/A
<b>Sulphur oxides (SO<sub>2</sub> and SO<sub>3</sub>) as SO<sub>2</sub></b>	100,000 kg	brt	N/A
<b>Carbon monoxide as CO</b>	100,000 Kg	brt	N/A

## 6. SUMMARY OF PLANT COMPLIANCE

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

<b>Pollutants measured</b>	<b>% of operational time plant was in compliance</b>
Particulates	100%
Oxides of nitrogen	100%
Sulphur dioxide	99.99%
Carbon monoxide	99.99%
Total Organic Carbon	100%
Hydrogen chloride	99.99%
Mercury	100%
Cadmium & thallium	100%
Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and V, including their compounds	100%
Dioxins/furans	100%

Hydrogen fluoride	100%
-------------------	------

## 7. SUMMARY OF PLANT IMPROVEMENTS

Currently there are no outstanding permit improvement conditions.

## 8. FURTHER INFORMATION

Further information available at: [www.suez.com](http://www.suez.com)

## APPENDIX

Releases to air graphs

Hydrogen chloride

Sulphur dioxide

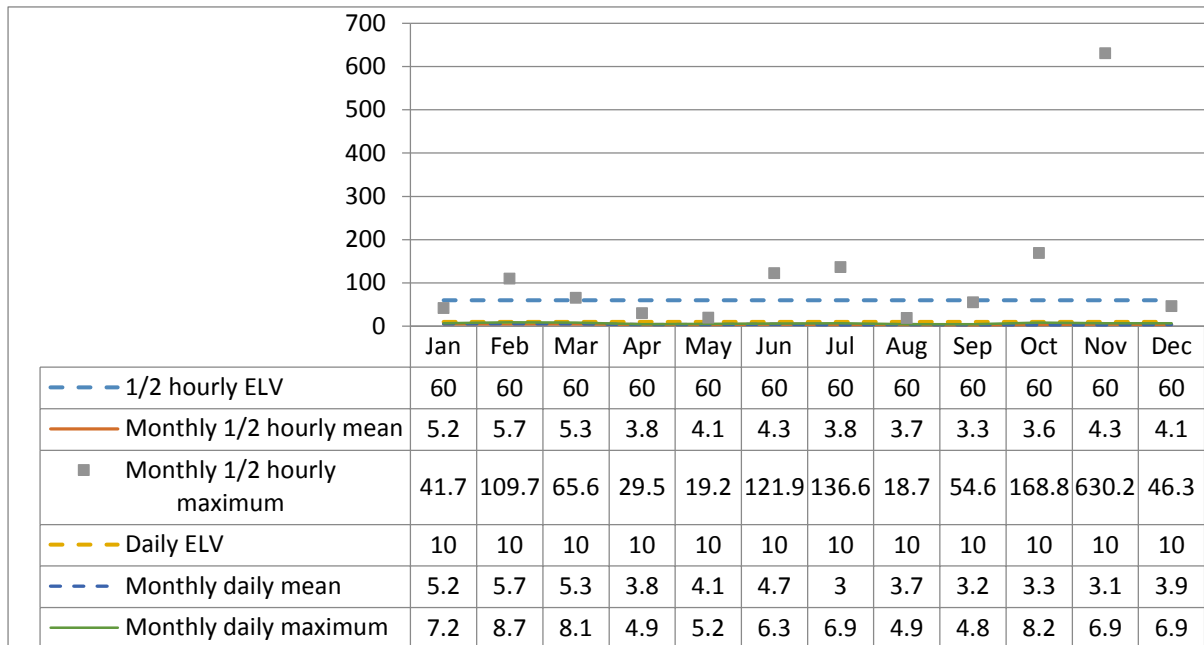
Carbon monoxide

Oxides of nitrogen

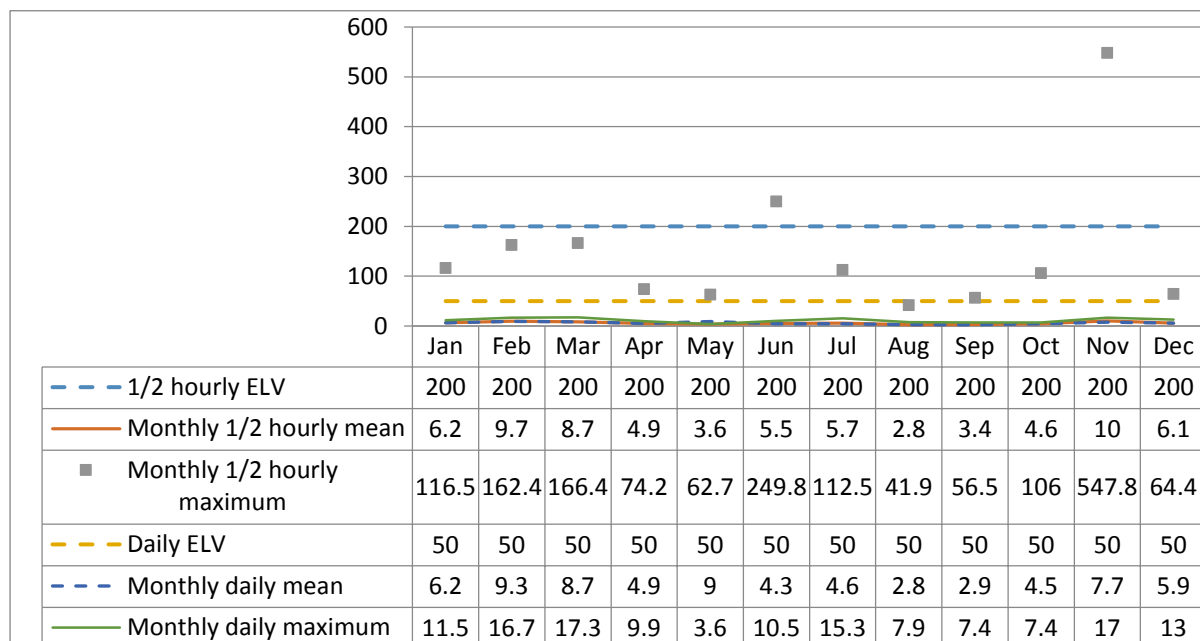
Total Organic Carbon (VOC)

Particulates

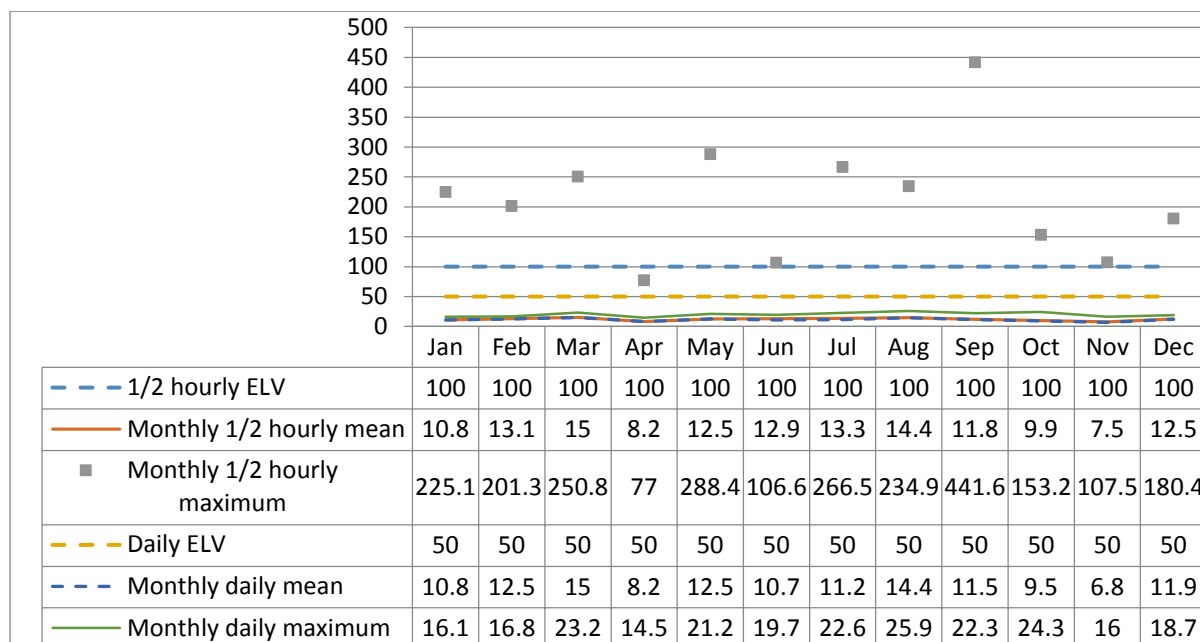
## HYDROGEN CHLORIDE



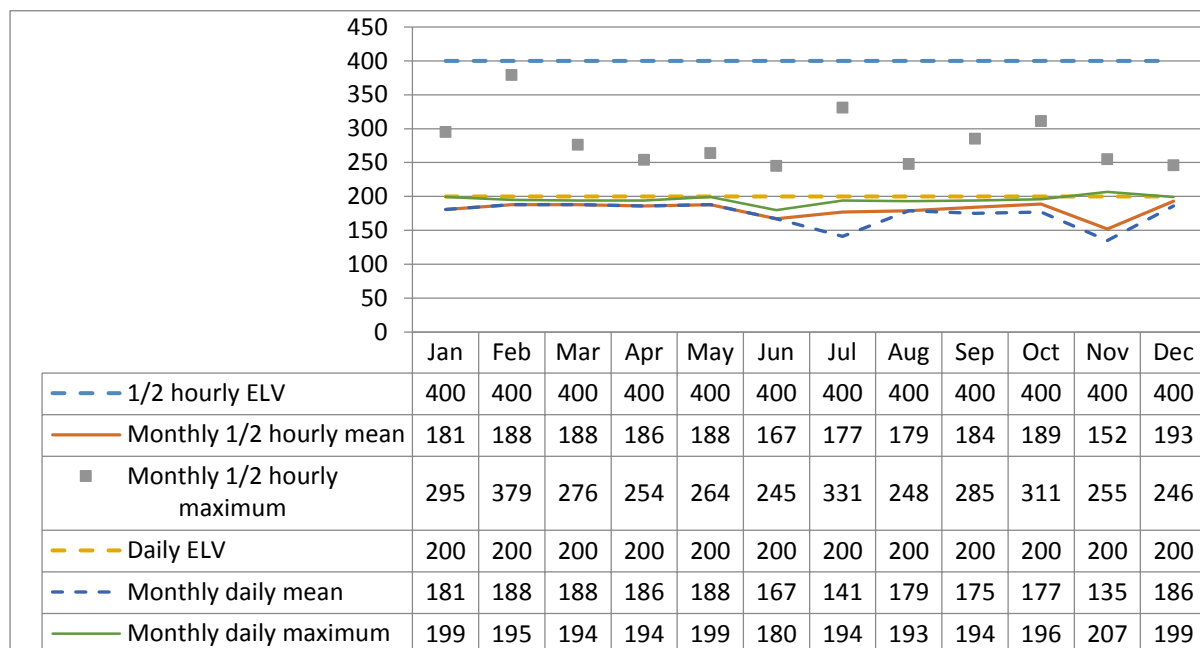
## SULPHUR DIOXIDE



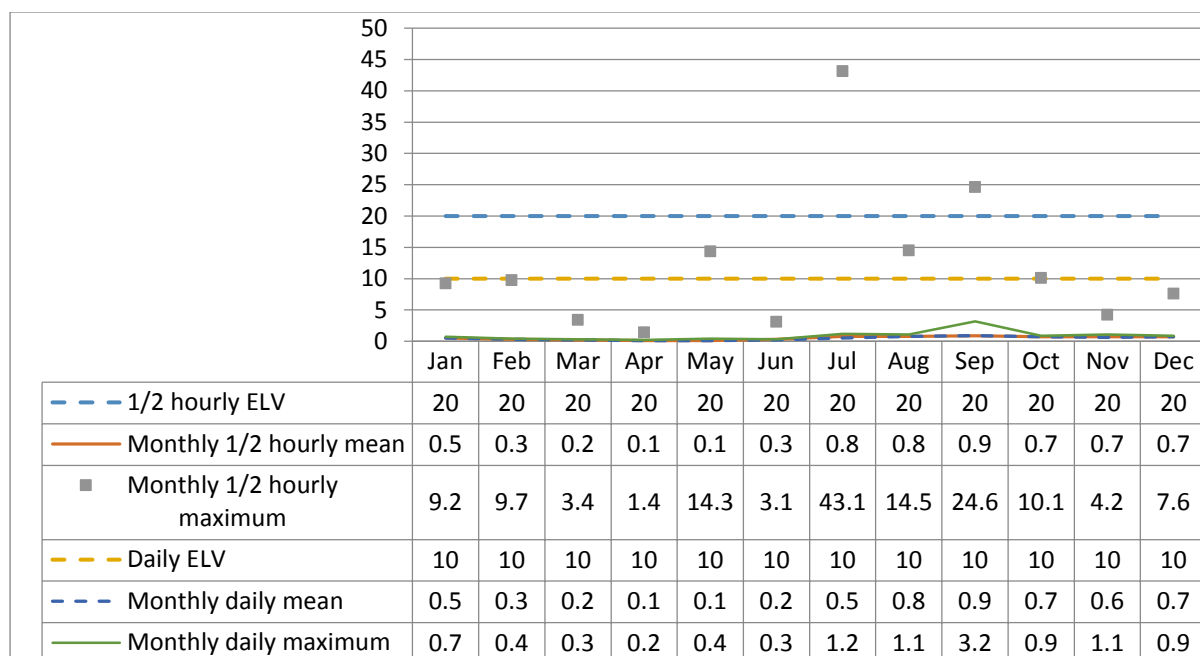
## CARBON MONOXIDE



## OXIDES OF NITROGEN



## TOTAL ORGANIC CARBON (VOC)





## PARTICULATES

