KIRKLEES
Energy from Waste Facility

2009 ANNUAL PERFORMANCE REPORT

DOCUMENT TITLE:	Kirklees – Energy from Waste Facility 2009 Annual Performance Report

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PREPARED BY:	**NAME**	**SIGNATURE**
Compliance Officer	Elena Deryagina	
Environment Support Manager – EfWs	Rita Greenwood	

APPROVED BY:	**NAME**	**SIGNATURE**
Plant Manager	Chris Mears	

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	SITA – Environment Department – Narborough SITA – Environment Support Manager SITA – Plant Manager Environment Agency Officer	1 1 1 1

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1. INTRODUCTION

Name of Company	SITA (Kirklees) Ltd
Name of Plant	SITA Kirklees – Energy from Waste Facility
Permit Number	BJ6178IX
Permit variation Number	EP3637XZ
Address	Vine Street Huddersfield West Yorkshire HD1 6BZ
Phone	01484 448730
Contact Name/Position	Rita Greenwood – Environment Support Manager EfWs
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, and commercial/trade. 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 is used to produce 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 bottom ash and Air Pollution Control Residue (APCR)

3. SUMMARY OF PLANT OPERATION

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

RECEPTION HALL

A 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

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 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 9.5 MWh.

BOTTOM ASH

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 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 tankered away for disposal.

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 plant		Not to exceed combined total of 150,000 t/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 7,823 Shutdown in March and in October for planned maintenance			
Residues produced	Bottom ash	APCR	metals	Other (specify)
Amount of each residue, including metals (where appropriate) recycled/land filled	24,571	5,768	2,816	_____
Electricity Produced/exported	Produced 81,371 M/w Exported 69,922 M/w			

Annual waste throughputs breakdown

Waste types	**EWC code**	**Tonnes**
Mixed Municipal Waste	20 03 01	126259
Commercial and Trade Waste	20 03 02	5557
MRF Reject material	20 03 01	3668.32

4. SUMMARY OF PLANT MONITORING

Permit monitoring requirements

Emission Point	Substance / Parameter	Emission Limit Value	Monitoring Frequency
A1	Hydrogen chloride	30 mg/m^3 over minimum 1 hour period	Biannual
A1	Hydrogen chloride	60 mg/m^3 ½-hr average	Continuous
A1	Hydrogen chloride	10 mg/m^3 daily average	Continuous
A1	Hydrogen fluoride	2 mg/m^3 over minimum 1 hour period	Biannual
A1	Carbon monoxide	100 mg/m^3 (average of ½-hour averages) over minimum 4 hour period	Biannual
A1	Carbon monoxide	100 mg/m^3 ½-hr average	Continuous
A1	Carbon monoxide	50 mg/m^3 daily average	Continuous
A1	Sulphur dioxide	200 mg/m^3 (average of ½-hour averages) over minimum 4 hour period	Biannual
A1	Sulphur dioxide	200 mg/m^3 ½-hr average	Continuous
A1	Sulphur dioxide	50 mg/m^3 daily average	Continuous
A1	Particulates	20 mg/m^{3}periodic over minimum 1-hour period	Biannual
A1	Particulates	30 mg/m^3 ½-hr average	Continuous
A1	Particulates	10 mg/m^3 daily average	Continuous
A1	Total Organic Carbon (TOC)	20 mg/m^{3}periodic over minimum 1-hour period	Biannual
A1	Total Organic Carbon (TOC)	20 mg/m^3 ½-hr average	Continuous
A1	Total Organic Carbon (TOC)	10 mg/m^3 daily average	Continuous
A1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	400 mg/m^3 (average of ½-hour averages) over minimum 4 hour period	Biannual
A1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	400 mg/m^3 ½-hr average	Continuous

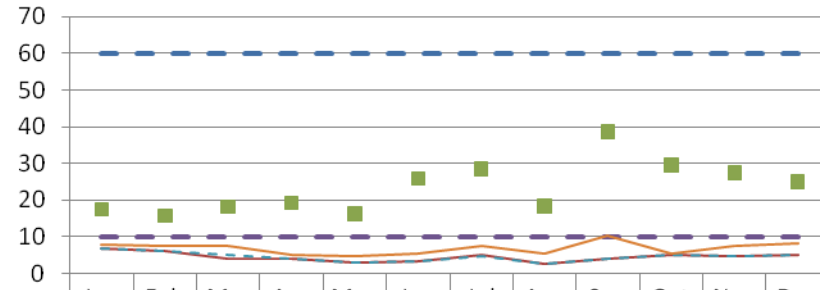
Emission Point	Substance / Parameter	Emission Limit Value	Monitoring Frequency
A1	Oxides of nitrogen (NO and NO_2 expressed as NO_2)	200 mg/m^3 daily average	Continuous
A1	Cadmium & thallium and their compounds (total)	0.05 mg/m^3 over minimum 30 minute, maximum 8 hour period	Biannual
A1	Mercury and its compounds	0.05 mg/m^3 over minimum 30 minute, maximum 8 hour period	Biannual
A1	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m^3 over minimum 30 minute, maximum 8 hour period	Biannual
A1	Dioxins / furans (I-TEQ)	0.1 ng/m^3 over minimum 6 hour, maximum 8 hour period	Biannual
A1	Dioxin-like PCBs (WHO-TEQ Humans / Mammals))	No limit applies	Biannual
A1	Dioxin-like PCBs (WHO-TEQ Fish)	No limit applies	Biannual
A1	Dioxin-like PCBs (WHO-TEQ Birds)	No limit applies	Biannual
A1	Dioxins / furans (WHO-TEQ Humans / Mammals)	No limit applies	Biannual
A1	Dioxins / furans (WHO-TEQ Fish)	No limit applies	Biannual
A1	Dioxins / furans (WHO-TEQ Birds)	No limit applies	Biannual
A1	Poly-cyclic aromatic hydrocarbons (PAHs)	No limit applies	Biannual
A1	Anthanthrene	No limit applies	Biannual
A1	Benzo{a}anthracene	No limit applies	Biannual
A1	Benzo[b]fluoranthene	No limit applies	Biannual
A1	Benzo[k]fluoranthene	No limit applies	Biannual
A1	Benzo[b]naph(2,1-d}thiophene	No limit applies	Biannual
A1	Benzo[c]phenanthrene	No limit applies	Biannual
A1	Benzo[ghi]perylene	No limit applies	Biannual
A1	Benzo[a]pyrene	No limit applies	Biannual
A1	Cholanthrene	No limit applies	Biannual
A1	Chrysene	No limit applies	Biannual
A1	Cyclopenta(c,d)pyrene	No limit applies	Biannual
A1	Dibenzo[ah]anthracene	No limit applies	Biannual
A1	Dibenzo[a,i]pyrene	No limit applies	Biannual

Emission Point	Substance / Parameter	Emission Limit Value	Monitoring Frequency
A1	Fluoranthene	No limit applies	Biannual
A1	Indo[1,2,3-cd]pyrene	No limit applies	Biannual
A1	Naphthalene	No limit applies	Biannual
A1	Nitrous Oxide	No limit applies	Biannual
A1	Ammonia	No limit applies	Biannual

CEMS data

The data collected from the CEMS has been represented in graphical form for 2009 (APPENDIX 1), an example of which is shown below.

HYDROGEN CHLORIDE



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	60	60	60	60	60	60	60	60	60	60	60	60
Monthly 1/2 hourly mean	6.7	6.1	4.2	4.1	3.1	3.5	5.2	2.7	4.1	5	4.9	5.2
Monthly 1/2 hourly maximum	17.5	15.8	18.2	19.3	16.3	25.8	28.5	18.4	38.6	29.5	27.5	25
Daily ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	6.7	6.1	5.1	4.2	3.1	3.5	4.9	2.6	4.1	5.1	4.9	5.2
Monthly daily maximum	8	7.4	7.5	5.2	4.8	5.3	7.7	5.6	10.3	5.6	7.7	8.4

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 PIEDC Pollution Inventory EDC reporting Form)

Pollutant	**Reporting Threshold**	**brt (below recorded threshold) or releases**	**Notifiable releases**
Carbon Dioxide	10,000,000 kg	125,693,000	
Antimony Sb	1 kg	brt	
Arsenic As	1 Kg	brt	
Cadmium Cd	1 kg	brt	
Chromium Cr	10 kg	brt	
Copper Cu	10 kg	brt	
Lead Pb	100 kg	brt	
Manganese Mn	10 kg	brt	
Mercury Hg	1 kg	4.4 kg	
Nickel Ni	10 kg	brt	
Vanadium V	10 kg	brt	
Chlorine and inorganic chlorine compounds – as HCL	10,000 kg	brt	
Dioxins and furans (PCDDs/PCDFs)	0.00001 kg	0.00003 kg	
Fluorine and inorganic fluorine compounds – as HF	1,000 kg	brt	

Nitrogen oxides (NO and NO_2) as NO_2	100,000 kg	brt	
Non-methane volatile organic compounds	10,000 kg	brt	
Particulate matter	10,000 kg	brt	
Polychlorinated biphenyls (PCBs)	0.00001 kg	brt	
Sulphur oxides (SO_2 and SO_3) as SO_2	100,000 kg	brt	
Carbon monoxide as CO	100,000 Kg	brt	130.6 mg/nm^3

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**
Particulates	100%
Oxides of nitrogen	100%
Sulphur dioxide	100%
Carbon monoxide	99.99%
Total Organic Carbon	100%
Hydrogen chloride	100%
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%

Table showing non-compliance notified to the Environment Agency

Parameter	Date	Reason	Actions Taken
CO	16.08.09	Blockage in waste feed chute to furnace	Under investigation.
VOC	30.11.09	Failure of TOC analyser	Analyser replaced
TOC	03.12.09	Loss of hydrogen gas flow to TOC analyser. Operations staff was unaware of the problem due to the CEMS not having alarms or indicator on the CEMS report for gas flow problems. There was also a delay in identifying the problem as key members of staff were off ill	Alarm system and indicators on the CEMS report to be installed that highlights gas flow problem, or when an analyser reads zero. Additional CEMS awareness training to maintenance and operations staff

Table showing any enforcement actions (i.e. Notices or prosecutions)

Date	Notice	Reason
03.12.09	A site warning. Notification has been placed on the public register	The TOC CEM was down for more than 4 hours without the plant being shutdown. There was a loss of hydrogen gas flow to the TOC analyser. Operations staff was unaware of the problem as the CEM did not have alarms or indicator for gas flow problem. The identification of the problem was delayed as key members of staff were off ill.

6. SUMMARY OF PLANT IMPROVEMENTS

No outstanding permit improvement conditions. Internal improvements made during 2009 made to reduce environmental impact, summary in table below.

Ref	Details of improvement condition
1	Upgraded two rows of grate bars with improving cooling ducts
2	Redesign of pipe work for Atomiser Water/Lime Mixture
3	Milk of lime system was replaced with upgraded pumps
4	Started to change electric motors when burnt out to more efficient types

2010 Management Programme – Objectives & Targets

Objectives, Vision & Mission	Target	Success Measure
• Contribute to Corporate Values i.e. no more waste	• Contribution where appropriate to Corporate Objectives • 1. People: at least 90% of employees are satisfied in their job • 2. Professional: at least 90% of customers are satisfied with the service • 3. Protection: At least 90% of permitted facilities in Processing Business achieve a CCS score of <30. • 4. Protection: 10% improvement in Severity and Frequency Rates (H & S) • 5. Financial: No More Waste Plans	• Achievement of Corporate values
• MEET INTERNAL Opra SCORE	• Each site to achieve <30 OPRA score by end December 2010	• Monthly report
• Carry out Environmental Team Briefs	• Conduct 4 Environmental Team Briefs during 2009 relevant to the facility.	• Daily morning meetings recorded • Quarterly environmental meeting minutes
• Meet EA minimum requirements	• Ensure sufficient COTC cover for all sites	• Review COTC needs and register additional candidates as required
• Reduce oil and fuel consumption	• Reduce volume of diesel oil used	• Meter usage by on site vehicles • Monthly review of oil usage for EfW
• Reduce consumption of natural resources	• Reduce water consumption	• Install water savers in toilet cisterns
• Improve recycling	• Recycling bins throughout site	• Recycling bins and signs on site for paper, metal and plastic

• Improve energy efficiency	• Feasibility study on district heating	• Report on district heating scheme
• Reduce the amount of energy use	• Develop initiatives to use energy saving products • Review parasitic load to reduce energy consumption	• Investigate and implement energy saving products to reduce consumptions e.g. low energy lighting, motion sensors • Energy plan • Quarterly review of electricity consumption

7. FURTHER INFORMATION

Further information available at www.sita.co.uk

APPENDIX

Releases to air graphs

Hydrogen chloride

Sulphur dioxide

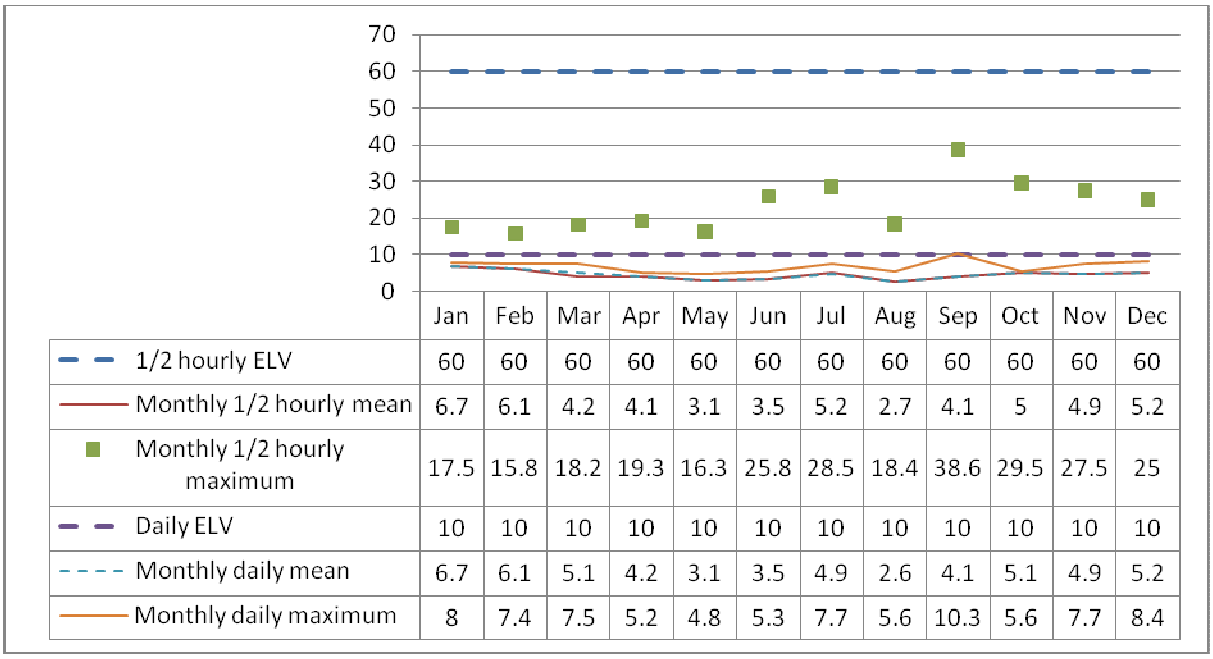
Carbon monoxide

Oxides of nitrogen

Total Organic Carbon (VOC)

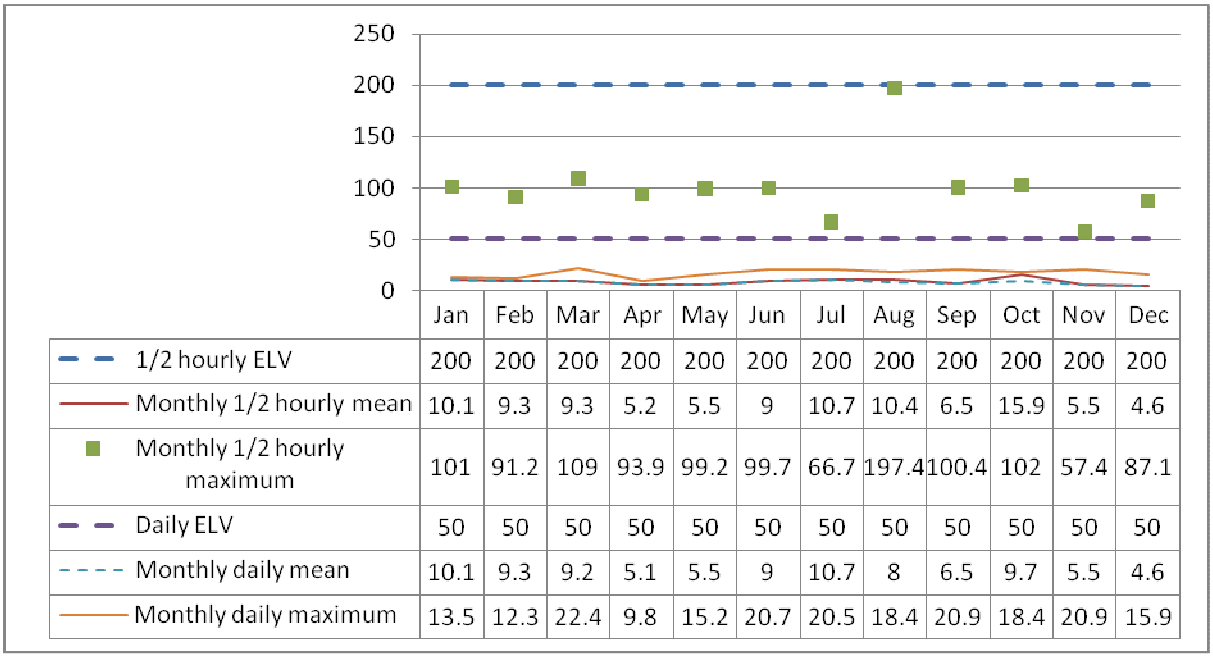
Particulates

HYDROGEN CHLORIDE



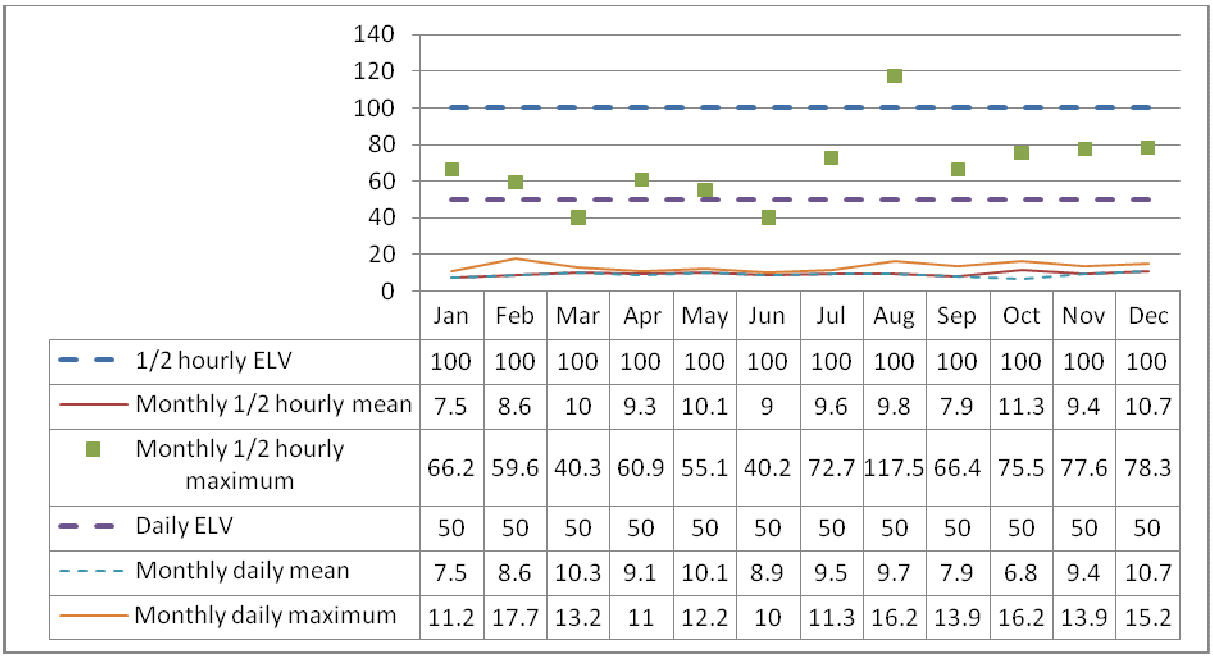
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	60	60	60	60	60	60	60	60	60	60	60	60
Monthly 1/2 hourly mean	6.7	6.1	4.2	4.1	3.1	3.5	5.2	2.7	4.1	5	4.9	5.2
Monthly 1/2 hourly maximum	17.5	15.8	18.2	19.3	16.3	25.8	28.5	18.4	38.6	29.5	27.5	25
Daily ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	6.7	6.1	5.1	4.2	3.1	3.5	4.9	2.6	4.1	5.1	4.9	5.2
Monthly daily maximum	8	7.4	7.5	5.2	4.8	5.3	7.7	5.6	10.3	5.6	7.7	8.4

SULPHUR DIOXIDE



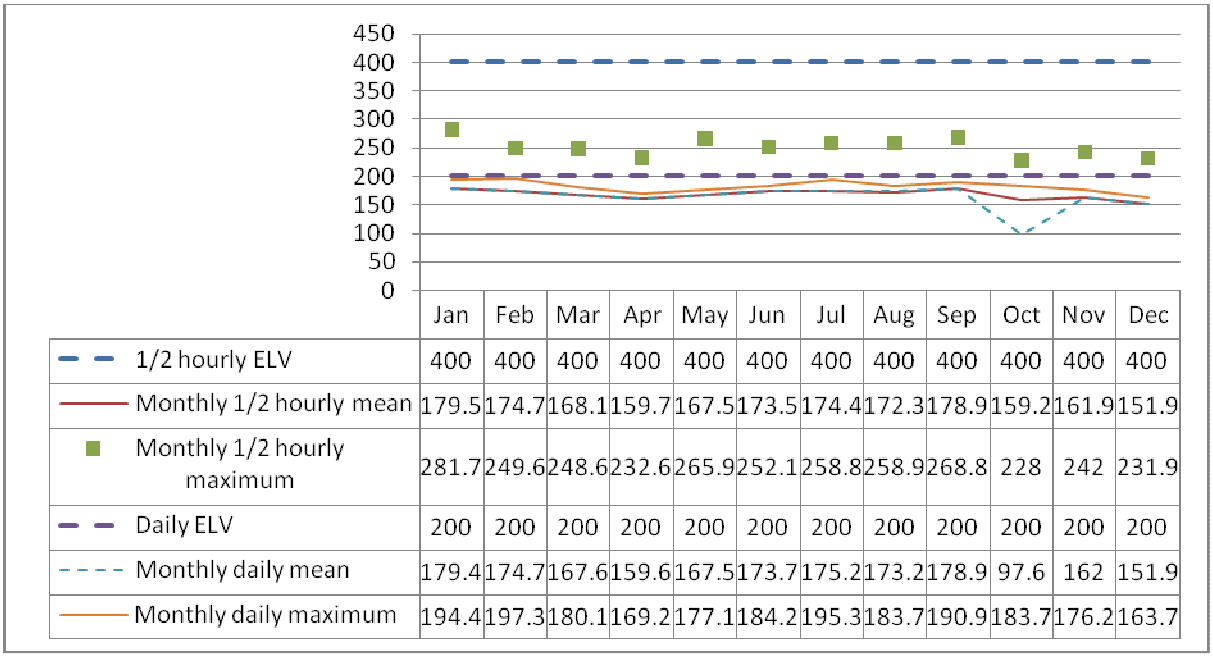
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly 1/2 hourly mean	10.1	9.3	9.3	5.2	5.5	9	10.7	10.4	6.5	15.9	5.5	4.6
Monthly 1/2 hourly maximum	101	91.2	109	93.9	99.2	99.7	66.7	197.4	100.4	102	57.4	87.1
Daily ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	10.1	9.3	9.2	5.1	5.5	9	10.7	8	6.5	9.7	5.5	4.6
Monthly daily maximum	13.5	12.3	22.4	9.8	15.2	20.7	20.5	18.4	20.9	18.4	20.9	15.9

CARBON MONOXIDE



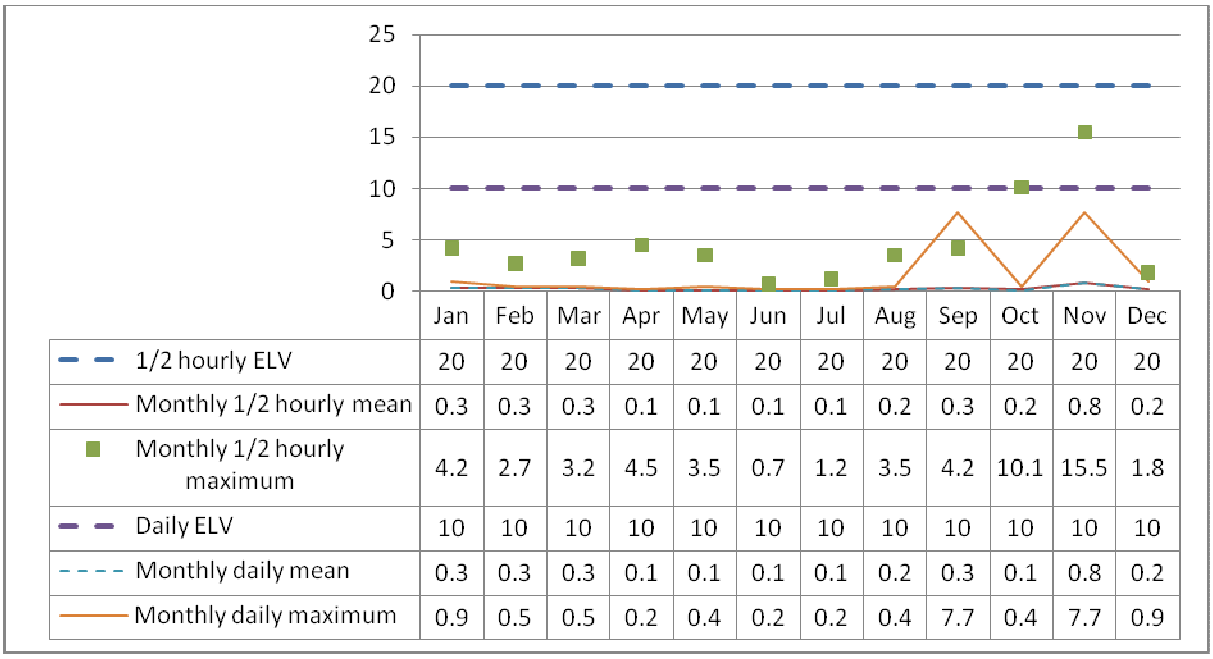
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	100	100	100	100	100	100	100	100	100	100	100	100
Monthly 1/2 hourly mean	7.5	8.6	10	9.3	10.1	9	9.6	9.8	7.9	11.3	9.4	10.7
Monthly 1/2 hourly maximum	66.2	59.6	40.3	60.9	55.1	40.2	72.7	117.5	66.4	75.5	77.6	78.3
Daily ELV	50	50	50	50	50	50	50	50	50	50	50	50
Monthly daily mean	7.5	8.6	10.3	9.1	10.1	8.9	9.5	9.7	7.9	6.8	9.4	10.7
Monthly daily maximum	11.2	17.7	13.2	11	12.2	10	11.3	16.2	13.9	16.2	13.9	15.2

OXIDES OF NITROGEN



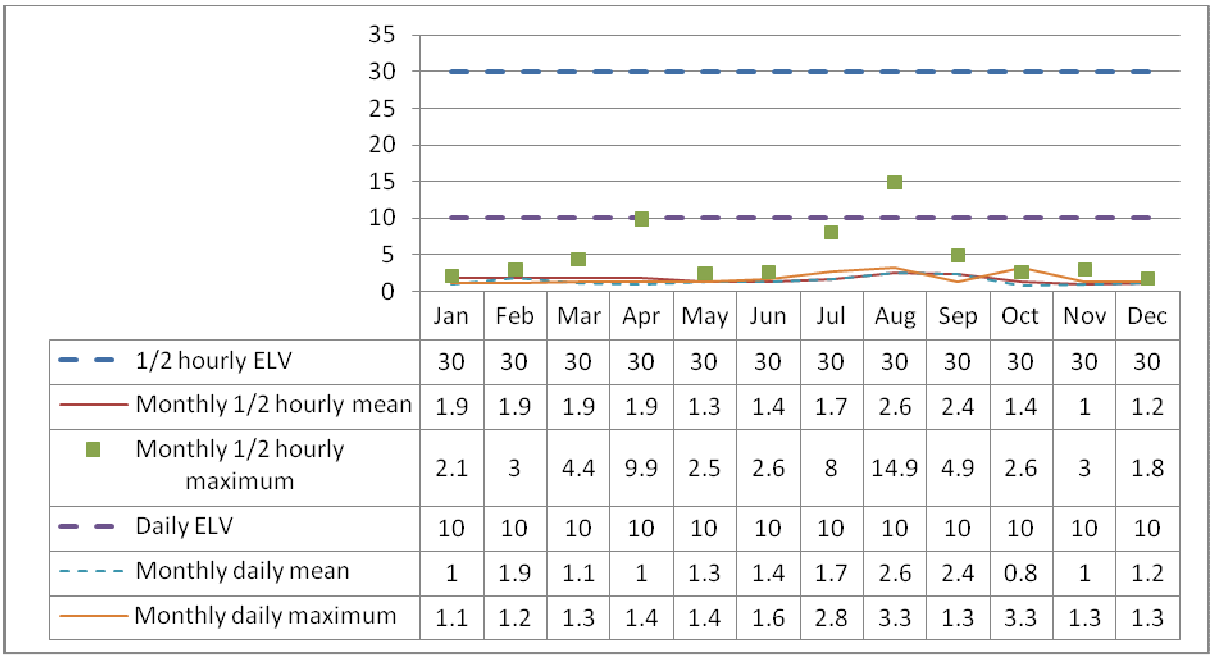
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	400	400	400	400	400	400	400	400	400	400	400	400
Monthly 1/2 hourly mean	179.5	174.7	168.1	159.7	167.5	173.5	174.4	172.3	178.9	159.2	161.9	151.9
Monthly 1/2 hourly maximum	281.7	249.6	248.6	232.6	265.9	252.1	258.8	258.9	268.8	228	242	231.9
Daily ELV	200	200	200	200	200	200	200	200	200	200	200	200
Monthly daily mean	179.4	174.7	167.6	159.6	167.5	173.7	175.2	173.2	178.9	97.6	162	151.9
Monthly daily maximum	194.4	197.3	180.1	169.2	177.1	184.2	195.3	183.7	190.9	183.7	176.2	163.7

TOTAL ORGANIC CARBON (VOC)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	20	20	20	20	20	20	20	20	20	20	20	20
Monthly 1/2 hourly mean	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.8	0.2
Monthly 1/2 hourly maximum	4.2	2.7	3.2	4.5	3.5	0.7	1.2	3.5	4.2	10.1	15.5	1.8
Daily ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.8	0.2
Monthly daily maximum	0.9	0.5	0.5	0.2	0.4	0.2	0.2	0.4	7.7	0.4	7.7	0.9

PARTICULATES



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1/2 hourly ELV	30	30	30	30	30	30	30	30	30	30	30	30
Monthly 1/2 hourly mean	1.9	1.9	1.9	1.9	1.3	1.4	1.7	2.6	2.4	1.4	1	1.2
Monthly 1/2 hourly maximum	2.1	3	4.4	9.9	2.5	2.6	8	14.9	4.9	2.6	3	1.8
Daily ELV	10	10	10	10	10	10	10	10	10	10	10	10
Monthly daily mean	1	1.9	1.1	1	1.3	1.4	1.7	2.6	2.4	0.8	1	1.2
Monthly daily maximum	1.1	1.2	1.3	1.4	1.4	1.6	2.8	3.3	1.3	3.3	1.3	1.3