

Annual performance report for: Tilbury Green Power Plant Limited

Permit Number: **EPR/KP3936ZB**

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	Tilbury Green Power Former Cargill Sweeteners Facility Tilbury Dock Essex RM18 7PU
Description of waste input	Waste Wood
Operator contact details if members of the public have any questions	Tilbury Green Power TGPIInfo@esb.ie

2. Plant description

The facility is located in the western section of the Port of Tilbury which is on the north side of the Thames Estuary at national grid reference TQ620771. The residential areas of Grays and Tilbury are situated nearby. The Thames Estuary & Marshes Special Protection Area (SPA) and Ramsar are located within 10km and there are also several Sites of Special Scientific Interest (SSSIs) and local wildlife sites located within 2km.

The main features of the permit are as follows:

The facility will comprise of two lines (Lines 1 and 2) with a maximum capacity totalling 490,000 tonnes per annum (tpa). The facility will be designed to be compliant with the requirements of Chapter IV of the Industrial Emissions Directive (IED) – Waste Incineration and Co-incineration. Lines 1 and 2 will have the capacity to generate up to 40 MWe and 20 MWe respectively of electricity, for use at the facility and export to the grid.

Line 1 consists of a biomass co-incineration facility with a maximum capacity of 320,000 tpa. This also includes a waste wood processing facility for the preparation of biomass for co-incineration.

Line 2 has yet to be constructed. However, once it has, it will consist of a SRF incineration facility with a maximum capacity of 170,000 tpa. This will include an SRF preparation facility for separating recyclables from non-hazardous municipal (MSW) and commercial and industrial waste (C&I) to produce SRF.

The combustion process employs a travelling grate system with the hot combustion gases being passed through a boiler. The steam generated in each boiler stream will be fed to a steam turbine (one per line) to generate electricity (both lines up to 60 MWe). The electricity will be used at the facility and exported to the national grid.

Each line has its own air pollution control system to minimise emissions to air. The system consists of Selective Non-Catalytic Reduction (SNCR) for oxides of nitrogen (by injection of urea into the furnace chambers before the boilers), dry lime (for acid gases, preceding the fabric filter), activated carbon (for dioxins, furans and metals, preceding the fabric filter) and a multi-compartment fabric filter (for particulate matter, which will include metals, dioxins and furans, spent lime and spent carbon).

This report covers reporting requirements for Line 1 Facility only. Line 2 facility is yet to be constructed.

Variation and consolidation application number EPR/KP3936ZB/V002 2

The treated exhaust gases are released via a 100 metre high stack. The emissions to air will comply with the emission limits in Annex VI of the IED.

Continuous and periodic monitoring is to be undertaken for the exhaust gases in the stack as required by Chapter IV and Annex VI of the IED.

Solid residues will be sampled on a regular basis to assess bottom ash burnout and to monitor the levels of specified pollutants.

Process effluents will be generated from boiler blow down losses and the water treatment facilities and will be collected and treated in the sedimentation basin. Treatment will provide acid dosing for pH adjustment and settlement of waste waters prior to discharge to sewer under a trade effluent consent.

Uncontaminated surface water run-off will be collected in the surface water drainage system. Where possible it will be harvested for domestic use with the remainder being discharged off site.

To ensure effective management of the facility a documented environmental management system (EMS) will be in place which will become certified to the ISO 14001 standard.

3. Summary of Plant Operation

Waste wood (biomass) received	83921 tonnes
Total waste received	83920 tonnes
Total plant operational hours	2870.36 hours
Total hours of "abnormal operation" (see permit for definition)	2.25 hours
Total quantity of incinerator bottom ash (IBA) produced	4743.71 tonnes
Disposal or recovery route for IBA	Disposal Via Augean EMRF Treatment Stamford Road Kings Cliffe Peterborough PE8 6XX Permit Number: EPR/TP3430GW
Did any batches of IBA test as hazardous? If yes, state quantity	4743.71 tonnes
Total quantity of air pollution control (APC) residues produced	1242.36 tonnes
Disposal or recovery route for APC residues	Disposal Via Augean EMRF Treatment Stamford Road Kings Cliffe Peterborough PE8 6XX

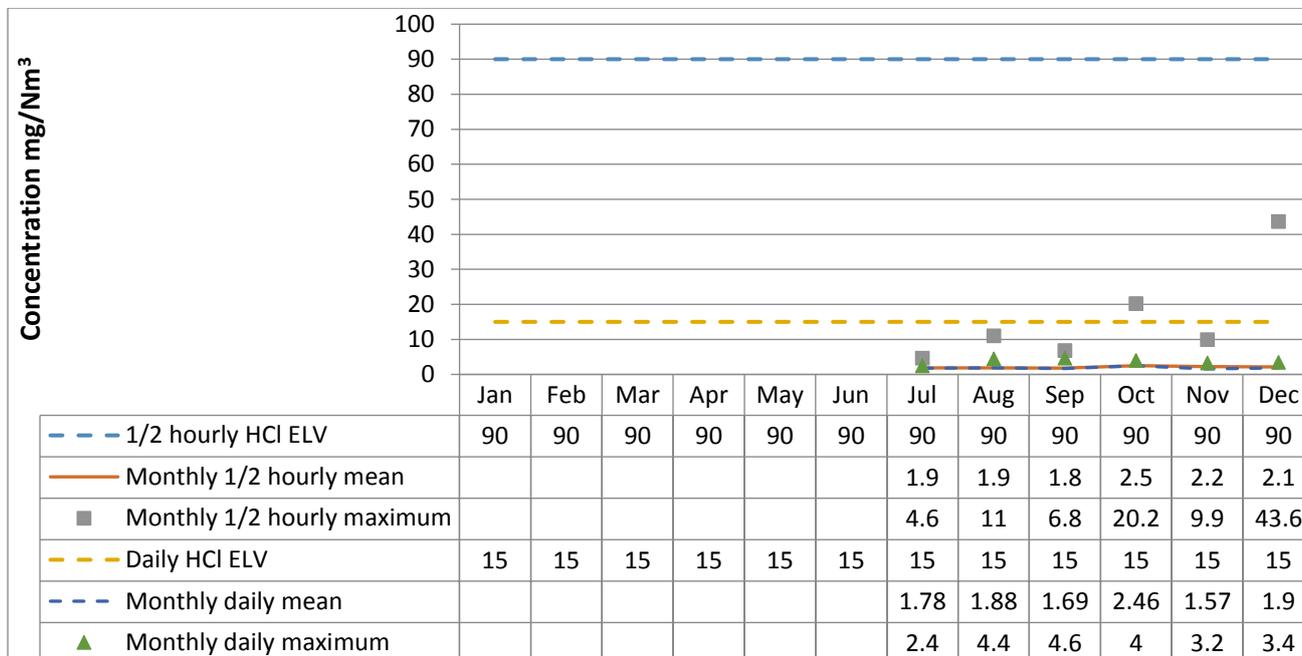
	Permit Number: EPR/TP3430GW
Total electricity generated for export to the National Grid	104166.4 MWh

4. Summary of Plant Emissions

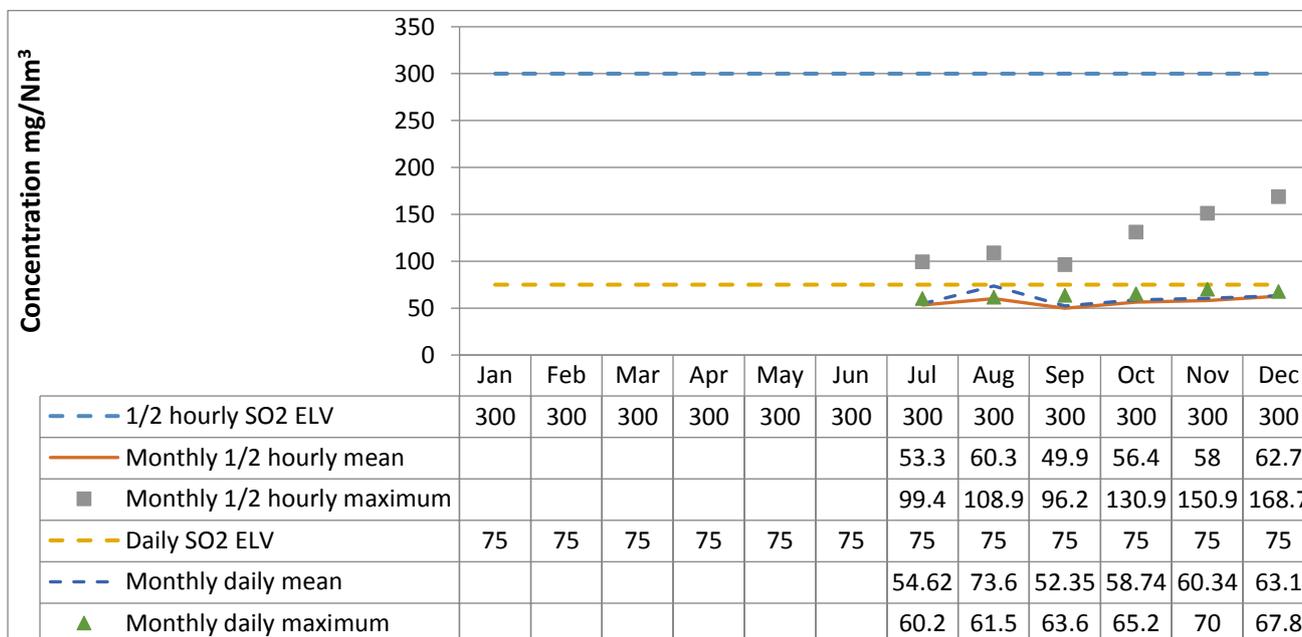
4.1 Summary of continuous emissions monitoring results for emissions to air

The following charts show the performance of the plant against its emission limit values (ELVs) for substances that are continuously monitored.

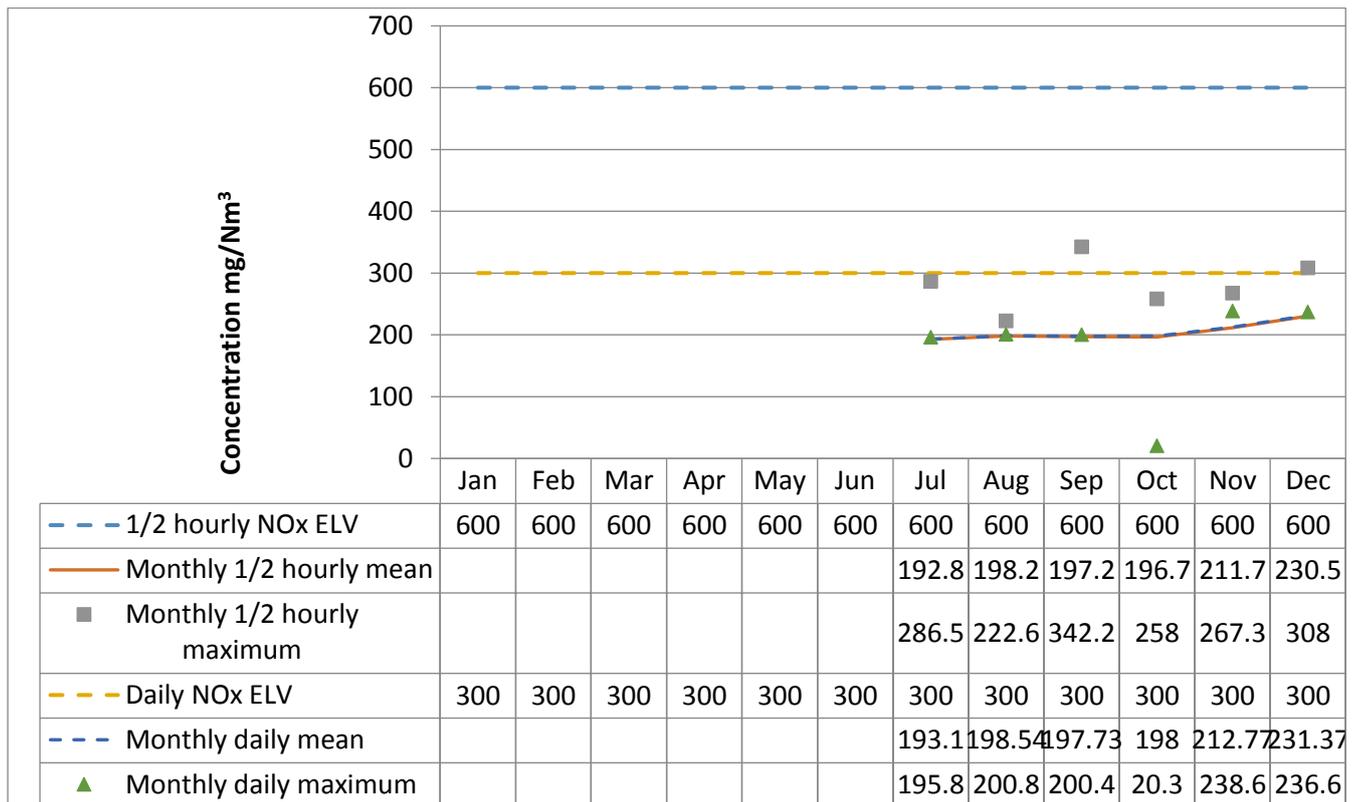
Line 1 - Hydrogen chloride



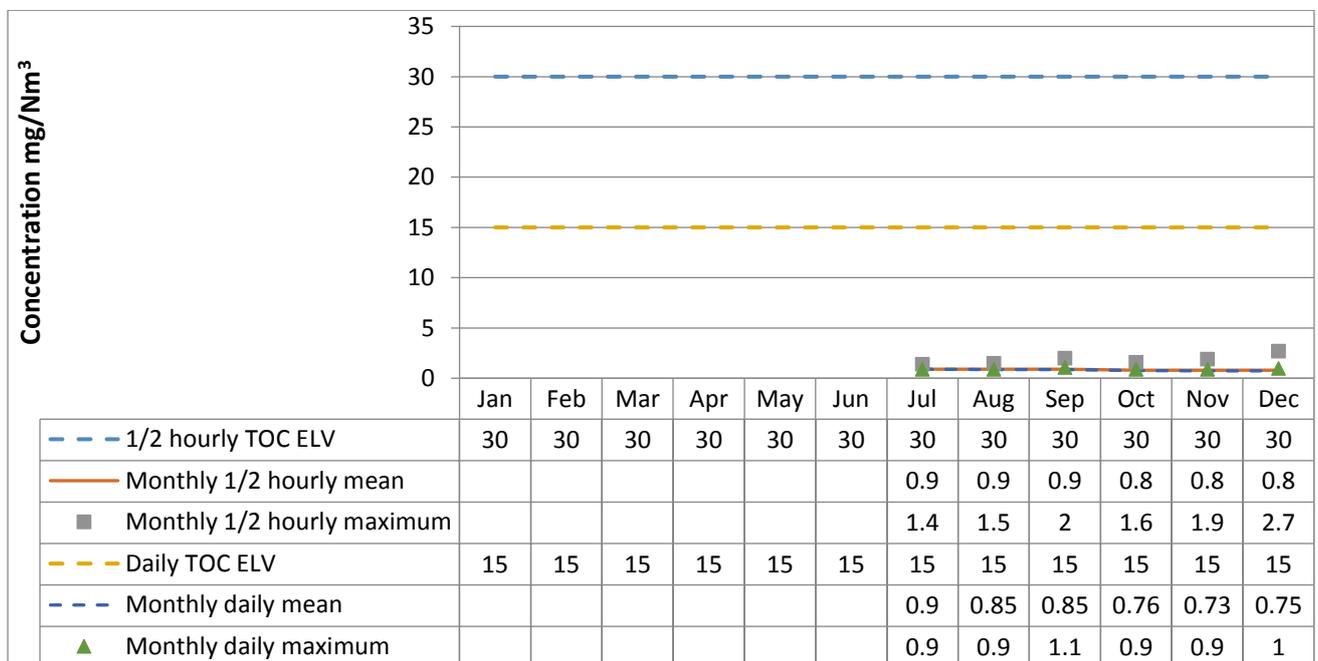
Line 1 – Sulphur dioxide



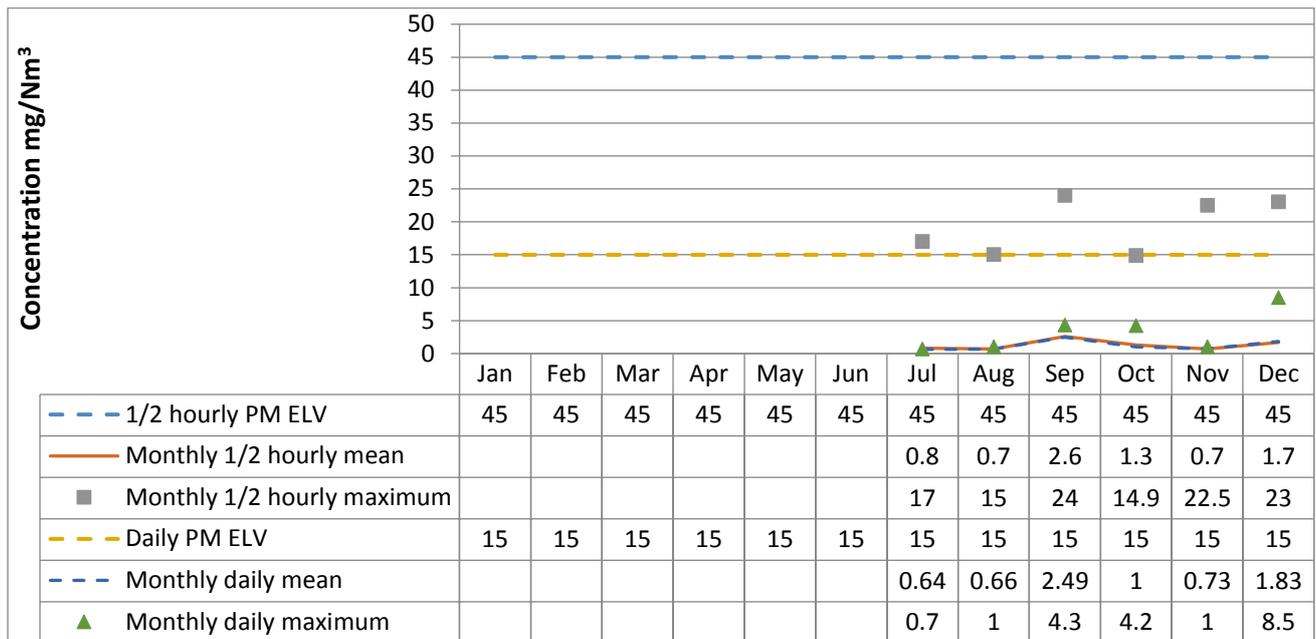
Line 1 – Oxides of nitrogen



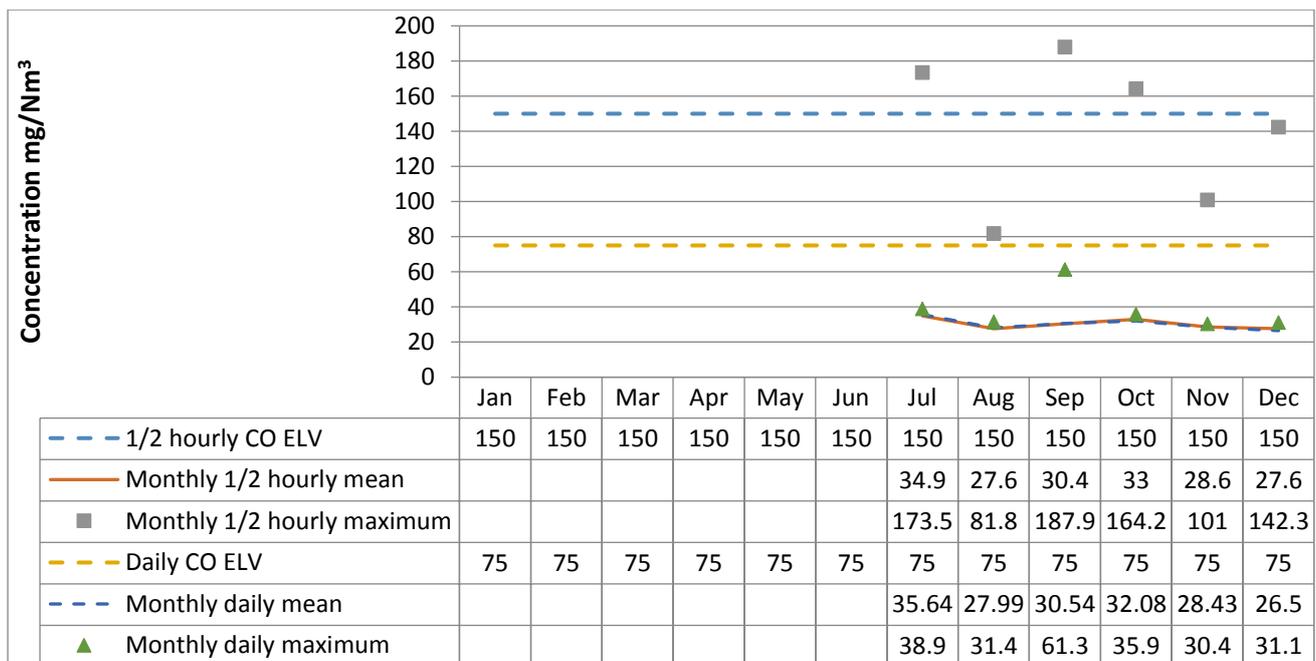
Line 1 – Total organic carbon



Line 1 – Particulates



Line 1 – Carbon monoxide



4.2 Summary of periodic monitoring results for emissions to air

The table below shows the results of periodically monitored substances.

Substance	Emission limit value	Results			
		N/A	N/A	09/11/2018 (Q3)	17/12/2018 (Q4)
Mercury and its compounds	0.05 mg/m ³	X mg/m ³	X mg/m ³	0.001mg/m ³	0.003mg/m ³
Cadmium & thallium and their compounds (total)	0.05 mg/m ³	X mg/m ³	X mg/m ³	0.001mg/m ³	0.0005mg/m ³
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/m ³	X mg/m ³	X mg/m ³	0.144mg/m ³	0.045mg/m ³
Dioxins and furans (I-TEQ)	0.1 ng/m ³	X ng/m ³	X ng/m ³	0.0052ng/m ³	0.005ng/m ³
Hydrogen Fluoride	3 mg/m ³	X mg/m ³	X mg/m ³	0.06 mg/m ³	0.12mg/m ³

4.3 Summary of monitoring results for emissions to water

There are no emissions to water from the process [other than clean surface water].

5. Summary of Permit Compliance

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

Date	Summary of notification or non-compliance	Reason	Measures taken to prevent reoccurrence
13/07/2018	CO Breach of 173.5mg/l	A spike in the CO concentration was identified and O ₂ was utilized in order to control it. However due to issues with the O ₂ deliverance system it was not possible reduce the CO concentration within the necessary time.	Water sootblowing has been reduced to increase furnace temperatures to adjust to the new furnace temperature settings and operators have been instructed to use a new increased O ₂ correction limit in the event the fuel supply is interrupted.
13/07/2018	CO Breach of 161mg/l	A spike in the CO concentration was detected due to the loss of a rotary valve, which caused an imbalance in the deliverance of O ₂ .	EPC contractor investigated the logic within the DCS system. Rotary cleared and returned to service.
16/09/2018	CO Breach of 187.9mg/m ³	A spike in the CO concentration was detected due to the loss of a rotary valve, which caused an imbalance in the deliverance of O ₂ .	The boiler control system has been upgraded to automate the O ₂ deliverance system by the EPC contractor in order to allow the control system to make automatic adjustments to control O ₂ levels within the boiler to adjust combustion parameters to counteract any CO elevation caused by rotary valve blockages.
16/09/2018	CO Breach of 172.8mg/m ³	A spike in the CO concentration was detected due to the loss of a rotary valve, which caused an imbalance in the deliverance of O ₂ .	Plant load adjusted & excess O ₂ set point increased to prevent further CO spikes while operating on 5 fuel delivery chutes until rotary valve gearbox is replaced.
16/09/2018	CO Breach of 165.1mg/m ³	A spike in the CO concentration was detected due to the loss of a rotary valve, which caused an imbalance in the deliverance of O ₂ .	Plant load adjusted to prevent CO excursions
19/09/2018	Fire Incident	CO detectors alarmed within the wood storage building which alerted operators to investigate a	Deluge system activated within the wood storage building to prevent the fire spreading. The Site

		potential fire. Operator confirmed that the CO readings were correct and smoke was seen as being generated within the wood storage building. The decision was made to contact the emergency services and to initiate a plant shutdown. Site Management were also informed who attended site and are working in collaboration with the emergency services to manage the situation.	Management team and the Fire service initiated a plant restart to allow the fuel stock to be processed through the boiler in a controlled manner to remove the fuel quickly and safely to prevent the fire from spreading within the wood storage building.
15/08/2018	Heavy Metals 0.9727mg/m3	During the Q2 monitoring program carried out by SOCOTEC it was recorded that the heavy metals emission concentration exceeded the levels set out within the environmental permit.	The breach was recorded through a single sample, in order to determine if this was a single occurrence or if it is a representative sample of the site emissions it is planned that during Q3 sampling more than one sample shall be collected and analysed.
20/10/2018	CO Breach of 164.2mg/m3	A spike in the CO concentration was detected due to the loss of a rotary valve, which caused an imbalance in the deliverance of O ₂ .	O ₂ deliverance was adjusted to assist in mitigating the spike in CO

5.2 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
16/09/2018	Bright lights and noise similar to forklift truck movements throughout the night.	Bright lights are stairs safety lights and to the H&S standards. Forklift noise unsubstantiated.	
20/09/2018	Sounds of alarm	Substantiated	A site fire incident in the WSB which commenced on 19/09 PM and continues to be managed by site Operations personnel on 21/09.
20/09/2018	Smell of burning wood	Substantiated	As mentioned above a fire incident was being handled at the time the complaint was received.
02/10/18, 10:14	Noise 24/7	Unsubstantiated	
02/10/18, 11:43	Dust on neighbouring properties	Substantiated – Associated with Stobart Activities.	Requested correct/ reviewed usage of Stobart dust suppression systems.
03/10/18, 22:45	Squeaking noise complaint	Unsubstantiated as Plant shutdown	
19/10/18, 03:00	Noise Complaint	Unsubstantiated as Plant shutdown	
06/11/18, 18:30	Noise Complaint	Squeaky noise	Possibly a fuel handling conveyor running empty. Operating procedures changed.
09/11/18	Smell of burning toast	Unsubstantiated	
20/11/18, 11:37	Noise and Smell	Complainant lived close by.	Complainant engaged and given a tour of the facility and seemed satisfied.

6. Summary of plant improvements

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

The plant has been under construction since September 2016. Takeover and commercial operation was scheduled for July 2017, however due to various delays this was not achieved until January 22nd 2019. Through continual communication with our EA Officer the plant's testing and commissioning phase was classed as completed from the 1st July 2018. As the plant is brand new, no formal plant improvements have been undertaken outside of the trimming and optimisation of the plant running.

Our permit required the completion of a set of Improvement programme requirements, all obligations to date have been met as detailed below.

IC1 A written report on the implementation of an Environmental Management System and the progress it made in the certification of the system by an external body. Report submitted 12th March 2018. To be updated with a programme.

IC2 A written proposal to carry out tests to determine the size distribution of particulate matter in the exhaust gas emissions to air, identifying the fractions within the PM₁₀ and PM_{2.5} ranges.

Proposal submitted and subsequent testing carried out. A Full report was submitted to the EA on 9th January 2019.

IC3 A written report on the commissioning of the installation. The report shall summarise the environmental performance of the plant as installed against the design parameters set out in the application.

The final report was submitted to the EA 21st January 2019.

IC4 Shall carry out checks to verify the residence time, minimum temperature and Oxygen content of the exhaust gases in the furnace whilst operating under the anticipated most favourable conditions.

Report submitted to the EA 11th July 2018.

IC5 Written report describing the performance and optimisation of the SNCR System and combustion settings to minimise oxides of Nitrogen emissions within the emission limit values.

Report submitted to the EA 22nd October 2018.

IC6 is due for submission in early Q4 of 2019; IC7 is due for submission early Q1 2020.

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.

None

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

None

7. Details of any public liaison planned for 2019:

Date and time	Description	Location
Q1-2019	Newsletter to be produced.	Distributed to local homes.
Q1-2019	Emissions data to be sent to local councillor.	

If you wish to be involved in the public liaison programme, please contact tgpinfo@esb.ie