



SCOTGEN (DUMFRIES) LTD
DARGAVEL ENERGY FROM WASTE FACILITY
SITE STATUS REPORT – V11

Author:

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Site Details

Site Operator: **Scotgen (Dumfries) Ltd.**

National Grid Ref: **NY 0141 7730**

Address: **Dargavel Stores, Dumfries, DG1 3PG**

Telephone: **01387 240066**

Licenses: **PPC/A/1022412 (plus CAR/R/101129 sewage & CAR/L/1033239 abstraction)**

Background Information

This Installation is designed as a continuous batch incinerator with energy recovery; it is regulated by means of a PPC Permit to meet the standards required by the European Waste Incineration Directive. The site accepts hazardous and non-hazardous waste, which is thermally treated in one of two identical waste Lines. Each Line consists of 4 Primary Gasification Chambers (PGCs), which generate synthesis gas that is combusted in a Secondary Combustion Chamber (SCC). The hot gases exiting the SCC pass through a boiler pack to produce steam which will ultimately drive a turbine to produce electricity.

A link to the PPC Permit and a comprehensive assessment of the original Application "the Determination Document" can be found via the Public Participation Directive section of our website: http://www.sepa.org.uk/air/process_industry_regulation/pollution_prevention_control/public_participation_directive/ppd_consultations/closed/a1022412_14may09.aspx

The Permit Application, all emission monitoring, commissioning, quarterly, annual and incident reports relating to this site are available electronically from SEPA's Registrars at East Kilbride.

Financial Provision

Scotgen (Dumfries) Ltd are required to maintain adequate financial provision to operate the process in line with the requirements of their PPC Permit (this includes clearing the site of waste should the plant close). At the time of permitting, financial provision was in place by means of a "parent company guarantee". However, last year, Scotgen's former parent company (Ascot Environmental Ltd) went into administration and the previously established arrangements for financial provision fell. SEPA have been in negotiations with Scotgen regarding the re-establishment of adequate financial provision and this is expected to be in place March / April 2013.

Commissioning History

The plant was Permitted in May 2009 and commenced cold (July), then hot (September) commissioning later that year. The first waste (clean wood) was burned in October 2009 and commissioning then progressed to municipal waste in December 2009. Problems occurred with the boiler superheater tubes (attributed to fouling, high temperature and corrosion), resulting in the combustion activities being taken off-line to facilitate interim boiler modifications. Commissioning re-started on 11th March 2010, with waste again being thermally treated from 29th March 2010. The plant was therefore not operational during most of January-March 2010.

Boiler problems persisted and in 2010/2011 it was recognised that the poor performance of these units was significantly affecting plant operational efficiency and environmental compliance. The plant therefore closed in April 2011 for ~12 months to allow the design and installation of new boiler systems. The plant re-started commissioning (utilising the new boilers) in March 2012.

Site Commissioning Plan

Scotgen's Permit has recently been varied to require commissioning activities to be brought to a conclusion and energy to be recovered with a high level of efficiency by 30th June 2013.

Additional Plant Design Issue

The original ash handling system (conveyor removal from the rear of the PGCs) has failed to operate as designed. A new system with integral water spray bars was proposed in December 2012 and will be installed shortly.

Control of Site Operations

A detailed assessment of the site control, monitoring and interlock systems can be found in the above link to the PPC Permit and the Permit Determination Decision Document. The PPC Permit

requires routine monitoring of incoming waste, emissions to air, emissions to water and analysis of the ash residue. There are also daily visual, noise and odour assessments carried out by on-site staff and by SEPA Officers during inspection.

In order to assess the effectiveness of site control; SEPA's Technical Support Unit undertake regular reviews of operational systems and working practices at the Dargavel Facility. Recent audits have noted a distinct improvement in the planning element of the Environmental Management System with many new operating procedures introduced and previously identified gaps in existing procedures amended as required. In general, staff training and management control of site operations has significantly improved during the plant commissioning period.

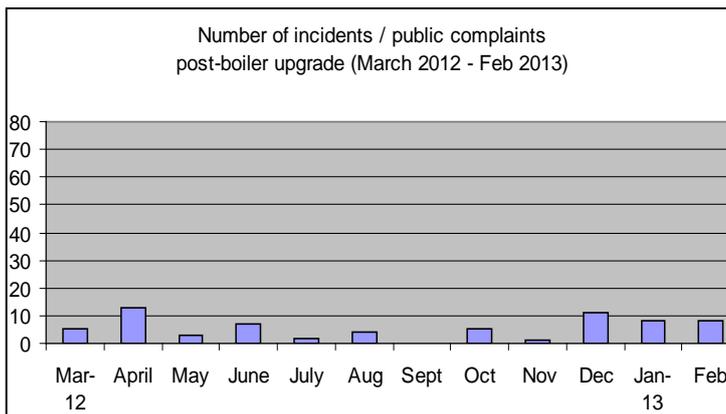
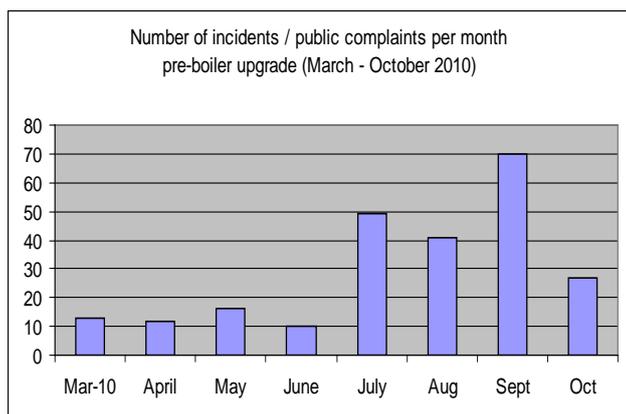
Reported Incidents

The PPC Permit requires that the cause of each Emission Limit Value (ELV) breach or "malfunction of equipment which had the potential to cause pollution" is reported to SEPA as an "incident". Each report contains details of the cause of the incident, the emission concentrations, what impact it had on the environment, the immediate actions taken by the Operator to bring the system back into compliance and the system adjustments carried out to minimise the risk of a repetition under similar process conditions. All such reports are available in both hard copy and electronically from our Registrars.

Since waste processing operations began in December 2009 until shut-down in April 2011, there were 45 noise complaints, 38 by-pass stack activations, ~200 reported emission limit breaches (mainly short term low temperature and O₂ levels), two dioxin emission breaches and ~100 notifications of short term exceedances – see previous Site Status Reports for details. The number of breaches during the first 2 years of commissioning phase at this site (May 2009 – April 2011) were largely due to an inherent boiler design issue. The plant then closed for ~12 months to design and install new boilers, and began re-commissioning in late March 2012.

Since commissioning re-started (data correct to 11 March 2013), there have been 11 noise complaints, 23 bypass stack activations, 3 low temperature, 21 low O₂, 4 dioxin, and 1 plant comms failure, 1 failure of the daily HCl limit, 1 failure of daily NO_x limit, 1 failure of the heavy metals limit, 1 complaint of flies, 1 incident of accepting waste outside operational hours, and 2 incidents of dark smoke emissions from the bypass stacks. In addition SEPA have received several notifications of short term ELV exceedances which did not result in Permit breaches.

Whilst the number of permit breaches is still higher than SEPA would wish to see, there has been no demonstrable significant effect on the environment. Prior to installation of the new boilers, the incident rate was ~1 per 31 waste stream operational hours. Following installation of the new boilers, the incident rate is noted to have improved (between March and December 2012) to ~ 1 per 156 waste stream operational hours: i.e. the plant is now running ~5 times longer (without incident) than before the installation of new boilers. The graphs below highlight this trend:



Current noise complaints are associated with the large amount of steam which is being vented until the turbine system can be fully commissioned.

There were five serious incidents in 2012 (4 dioxin breaches in May/June, and October, and a pressurised steam line burst in August) during which SEPA either used its regulatory powers to require the plant to close, or the Operator voluntarily initiated plant closure. The plant closures were to allow thorough investigation of these incidents and rectification of the problems before the plant could re-start commissioning.

There were 3 dioxin ELV breaches, in May and June 2012, related to a trial processing of “oily rags” at an SCC exit temperature of >850°C. This trial was abandoned and oily rags are now processed at >1,100°C. The pressurised steam line burst in August 2012 resulted from faulty temperature controllers on the system which have now been replaced.

In October 2012 a further dioxin breach occurred due to boiler tube leaks affecting the performance of the abatement systems. This incident resulted in the service of an Enforcement Notice which imposed operating restrictions on the site and required Scotgen to carry out specified works to demonstrate that their plant was capable of meeting the dioxin ELV. Scotgen have made significant progress in complying with the requirements of this Notice. Improvements to both systems and procedures have been achieved and final compliance will now be assessed through a recently agreed testing program (which is now underway).

Since there was no evidence of significant pollution being caused, SEPA’s position is in line with our published enforcement policy and DEFRA guidance on this matter. However, the enforcement position remains under constant review depending on the seriousness of incidents and continued progress towards finalisation of commissioning activities.

Discharges to Air

The air quality modelling studies (carried out as part of the original PPC Application), and monthly ambient air quality monitoring for NO_x and SO_x at 4 locations around the site, are available electronically from the Registrars at our East Kilbride Office. Monthly, quarterly and annual summary monitoring reports of emissions from process vents (as detailed in Table 6.1 of the PPC Permit) are also available.

Dioxins and Furans

Annexes 1 & 3 of Schedule 6 of the PPC Permit specify the dioxin ELVs for this Installation and how they are to be monitored and calculated. Section 4.2.3 and the Table on page 90 of the Permit Determination Document provide details of guideline values and how these were assessed by SEPA. The Operator is required to carry out extractive sampling on each Waste Stream once per month.

The following Table notes dioxin/furan ELV breaches since commissioning re-started in March 2012:

Test date	Results (ngm ⁻³ I-TEQ)	Comments (dioxin emissions limit 0.1 ngm ⁻³ I-TEQ)
29 May 2012	0.25	This was the first of 3 failures on Waste Steam 1 resulting in plant closure.
21 June 2012	0.14	Initial investigation suggested faulty pollution abatement systems as the cause.
30 June 2012	0.13	The identified fault in the pollution abatement equipment was rectified; however, a further breach occurred. The trial was therefore abandoned. Upon review, an issue with PGC loading density was later identified as a likely contributory factor to the ELV May-June breaches.
17 Oct 2012	0.14	Fault traced to significant boiler tube leaks which affected the performance of the abatement systems. This failure resulted in the service of an Enforcement Notice.
19 Feb 2013	0.22* (*invalid result)	In accordance with the international monitoring standard BS EN 1948-1, this result was deemed “invalid” due to contamination of the sample (the field blank dioxin/furan result returning a figure of 0.16 ngm ⁻³ I-TEQ). A retest was undertaken by SEPA on 27 Feb 2013 and found to pass the ELV for dioxins/furans (result <0.07 ngm ⁻³ I-TEQ). Further tests have also been undertaken by Scotgen and SEPA await these results.

Discharges to Land

All ashes and boiler residues are taken off-site for appropriate disposal; there are no disposals to land at this Installation. All ash residues are sampled and analysed prior to off-site disposal.

Discharges to the Water Environment

Process effluent - there are no direct discharges of process effluent to sewer at this Installation. Process effluent (arising from water cooling tower discharges, boiler blow down and cleaning of plant) is removed by vacuum tanker to the main sewer at Locharmoss (under a Trade Effluent Consent from Scottish Water) which is then treated at Troqueer Waste Water Treatment Plant.

Surface water - this site has an impermeable surface to prevent emissions to groundwater. There are no routes for direct discharge to groundwater from the PPC activities on-site. The site is served by a contained drainage system (in the areas where hazardous chemicals may be unloaded or stored) and a Sustainable Urban Drainage System (SUDS) which takes surface water run-off.

The SUDS provides an additional measure of containment / treatment for any accidental or indirect releases of process effluent. The system consists of a lined basin with outlet designed to allow surface water to gradually pass through the retention system. The sizing of the SUDS was detailed in Appendix 4 of the original Application and SEPA's assessment of it can be found via the link to our PPC Permit and Determination Document.

The PPC Permit requires weekly (pH, suspended solids, conductivity, temperature and hydrocarbons) and monthly (Biological Oxygen Demand) monitoring of the SUDS system by the Operator; reporting of results on a quarterly basis and an annual inspection of the systems which protect groundwater. To date, there have been no issues with discharges to the water environment from this Installation.

Environmental Monitoring

The PPC Permit required sampling of soils (for metals, dioxins and furans) at 4 locations around the site prior to commencement of waste burning operations.

The "operational" phase monitoring requirements of the Permit commenced on 01 November 2010 and requires two rounds of soil sampling per year (at each of the 4 agreed locations) for the first two years of operation; thereafter one set of samples per year. All results so far have been less than half the Scottish rural average and there is no upward trend evident. However, this assessment is limited by the relatively few samples collected and the fact that the Dumfries EFW Plant has had extensive periods of shutdown and reduced operating capacity.

Air sampling: in addition to ambient NO_x and SO_x monitoring, spot samples of "metals in air" are required from 4 locations in the vicinity of the site during the first years of operation. However, due to a delay in obtaining a suitable power supply to the sampling points; Scotgen did not commence this monitoring until December 2011. During all operational periods, emissions of specific metals and metallic compounds were monitored directly from the main process stacks on a monthly basis. It should also be recognised that, from initial Permitting (May 2009) until now, the plant has suffered a number of extended shutdowns and would therefore not have been emitting any pollutants for large periods of that time. Since commissioning re-started in March 2012, there has been one breach of the ELV for heavy metals (06 Feb 2013). This failure was ~4 times the ELV and attributed to a rogue item within the waste incineration batch. Procedures are in place to test and inspect the waste both prior to acceptance at the site and on-site during PGC loading.

SEPA Regulatory Activity

This site is regulated by a Lead Officer (Specialist) from our Operations Technical Support Unit with assistance from other Specialists (Process Engineers) and Officers from the Local Dumfries & Galloway Team as necessary. At present the Lead Officer's workload is largely taken up with regulating this site. Other SEPA staff provide advice on scientific, policy, access to information and legal matters as they arise. The Lead Officer reports to SEPA through the Technical Support Unit Manager who is SEPA's Sector Lead for the Thermal Treatment of Wastes in Scotland.

SEPA closely monitors the operation of the plant, receives commissioning reports and monitoring data submissions, carries out inspections and, where necessary, writes formally to the Operator on specific issues.

In addition to incident reports (as they occur) and commissioning reports, SEPA also receive quarterly, 6-monthly and annual environmental monitoring reports (on emissions to air, water, land, and ash residue). All reports are available from our Registers in East Kilbride who can forward electronic copies to those who request them. SEPA inspect against compliance with the conditions of the PPC Permit and carry out routine waste audits during most site inspections. SEPA receive copies of waste consignment notes for all wastes entering the facility and also carry out forward audits at the final off-site disposal locations for the site bottom ash residues.

SEPA charge an annual subsistence fee to each regulated site. The charging scheme is approved by Scottish Ministers and based on perceived pollution risk across an industry Sector rather than individual workload undertaken at a specific site. However, the system is weighted such that Operators who are determined to be “very poor” under the annual compliance assessment scheme receive a penalty on their fees (+10%). In 2012 Scotgen were assessed as “very poor”. There is an equivalent reduction for those operators who are assessed as “excellent”. The annual subsistence fee paid by Scotgen Dumfries Ltd for the financial year 2012/13 was £31570. However, due to the large workload at this site, it is recognised that SEPA are unlikely to achieve full cost recovery this year.