



SCOTGEN (DUMFRIES) LTD
DARGAVEL ENERGY FROM WASTE FACILITY
SITE STATUS REPORT – V10

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, on 18th May 2012, 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 by the end of November 2012.

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 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 in March 2012.

Current Plant Re-Commissioning

Boiler fouling over the first 6 months of commissioning appears significantly reduced. Scotgen are currently experiencing difficulties in generating steam of the quality expected which has delayed final commissioning of the steam turbine system. Scotgen now hope to be in a position to generate electrical energy by late spring / early summer 2013.

Additional Plant Design Issue

The ash handling system (to the rear of the PGCs) requires modification - ash is currently removed by bucket loader from the front of the chamber. In the short term, interim upgrades to the dust suppression systems were proposed and accepted on 18 July 2011. In the medium term, detailed design proposals for a new ash conveying system are expected by the end of Dec 2012.

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

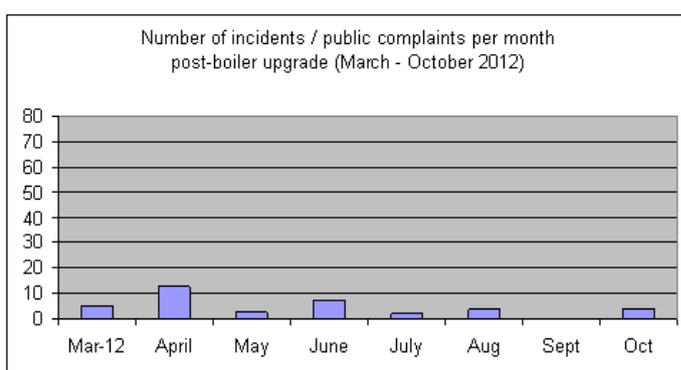
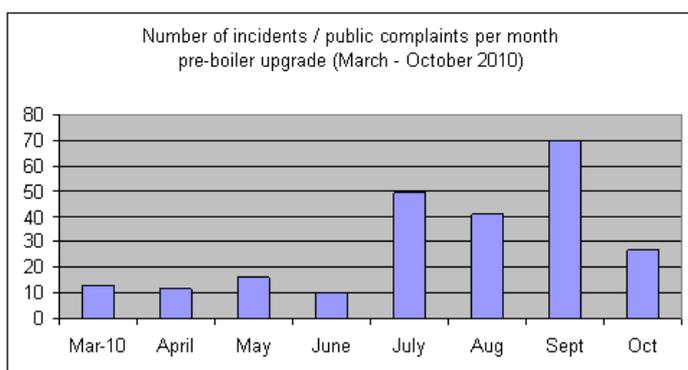
The PPC Permit requires that the cause of each Emission Limit Value (ELV) breach or "malfunction of equipment which had the potential to cause pollution" is reported to SEPA as an "incident". Each report contains details of the cause of the incident, the emission concentrations, what impact it had on 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 initial 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 this year.

Since commissioning re-started in March 2012 (data correct to 01 Nov 2012), there have been 7 noise complaints, 14 bypass stack activations, 2 low temperature, 10 low O₂, 3 dioxin failures, 1 plant comms failure, 1 failure of the daily HCl limit, 1 complaint of flies and 1 incident of accepting waste outside operational hours. In addition SEPA have received 33 notifications of short term ELV exceedances: 11 VOC / 11 CO / 11 HCl 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. It is also noted that since March 2012, the number of incidents and public complaints has significantly reduced from ~1 per 90 operational hours to ~1 per 360 operational hours: i.e. the plant is now running 4 times longer (without incident) than before the recent upgrades. 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 have been four recent incidents (3 dioxin breaches and a pressurised steam line burst) during which SEPA has either used its regulatory powers to require the plant to close, or the Operator has voluntarily initiated plant closure. The plant closures were to allow thorough investigation of these incidents and rectification of the problems before the plant could continue operation. Since there is no evidence of significant pollution being caused, SEPA's position is in line with its enforcement policy and DEFRA guidance on this matter. However, this enforcement position remains under constant review depending on the seriousness of incidents and continued progress towards finalisation of commissioning activities. Power generation from this plant is expected by spring / summer 2013.

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 on the Public Register 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.

SEPA contract UKAS accredited consultants to undertake compliance monitoring for all Waste Incineration Directive (WID) pollutants. In October 2010, the results showed ELV breaches for mercury (reported as 1.95mgm⁻³ compared to an ELV of 0.05mgm⁻³) and dioxins/furans (reported as 0.12ngm⁻³ compared to an ELV of 0.1ngm⁻³). SEPA investigated the process records and plant conditions at the time of sampling and could find no process fault to explain the results. Several other issues were raised with this contractor's mass emission results and stack measurements and it was noted that the emission results for mercury were not in keeping with any other sets of sampling data. Due to concerns over the quality of the emissions monitoring report, SEPA arranged for the stack emissions to be re-tested by a third independent contractor – those results confirmed compliant emission levels similar to both SEPA's and the Operator's previous reports.

Scotgen reported a breach for dioxins/furans (reported as 0.13ngm⁻³) from sampling which occurred on 05 April 2011 (prior to cessation of combustion activities). The breach occurred during abnormal operating conditions on one waste stream (a significant water leak within the boiler). SEPA considered this a serious matter and, following an investigation by our Technical Support Unit, a warning letter was issued to Scotgen.

The plant ordinarily processes hazardous wastes at an incineration temperature of 1,100°C. After the initial plant commissioning that started in late March 2012, the Operator requested that a trial be undertaken on Waste Stream 1 to assess if specific low risk hazardous wastes could be incinerated at temperatures of 850°C rather than at 1,100°C. This is specifically allowed for in the Waste Incineration Directive (Directive 200/76/EC) which requires that only certain hazardous wastes (containing more than 1% of halogenated organic compounds) are required to be incinerated at over 1,100°C. SEPA agreed to this, on a trial basis during commissioning, in May 2012.

In June 2012, Scotgen reported a breach of the emission limit value on Waste Stream 1 for dioxins/furans from sampling which occurred on 29 May 2012. As soon as these results were confirmed to SEPA, and as part of the investigation into this incident, further testing of dioxin emissions from Waste Stream 1 was undertaken immediately before the plant was shut down.

Throughout the above period, testing of emissions from Waste Stream 2, operating at 1,100°C indicated compliance with the dioxin emission limit conditions. The results of all testing on Waste Stream 1 over this period are summarised in the table below:

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. Testing at commissioning trial conditions. Plant shutdown after testing.
30 June 2012	0.13	Fault in pollution abatement equipment rectified. Plant re-started. Testing at commissioning trial conditions, subsequent operation at normal conditions.
6 July 2012	0.02	Further modifications made (trial at 850°C abandoned). Processing temperature increased back to 1100°C. Plant shutdown after testing.
26 July 2012	0.01	Operation and testing at normal conditions. Plant allowed to re-start commissioning after 2 nd positive result.

The cause of the breaches was found to be a blockage in the activated carbon injection system combined with the specific operating conditions evident in the commissioning trials being undertaken at the time of testing. SEPA has subsequently allowed the resumption of waste incineration, at 850°C for non-hazardous waste and 1100°C for hazardous waste, as part of the plant commissioning process. However, further trials to process certain types of specified hazardous waste material at the lower WID permissible temperature of 850°C have been prohibited.

The plant was recently closed following an incident (steam leak on Waste Stream 1) on 06 August 2012 and no monthly tests were carried out that month. Waste Stream 2 was re-started on 07 September and monthly testing has shown that it remains compliant with the permit dioxin emission limit requirements. Waste Stream 1 was restarted on 17 October; however, it had to be closed down again on 30 October due to a further leak in the boiler system.

Discharges to Land

There are no disposals to land at this Installation. All ash residues are sampled and analysed prior to disposal. Recycling routes for the non-hazardous "Bottom Ash" are being sought (e.g. cement product manufacture). However, at present all ashes and boiler residues are taken off-site for 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 / 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. These samples were taken at the start of commissioning in October 2009, in December 2009 and again in June 2010.

The “operational” phase monitoring requirements of the Permit commenced on 01 November 2010 and require 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. Sampling of soil in November and December 2010 was not possible due to the frozen ground conditions. Three rounds of sampling were therefore arranged for 2011. 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 only ever operated to ~30% 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. The samples are currently being aggregated and analysed and will be reported as part of the site’s 2012 annual monitoring submissions. During all operational periods emissions of specific metals, and metallic compounds, were monitored directly from the main process stacks in compliance with PPC Permit requirements 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.

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. Two formal warning letters have been issued to Scotgen; the first (related to waste handling issues) was issued on 27 April 2010; and the second (related to an earlier dioxin breach) was issued on 31 August 2011. In relation to the notified dioxin breaches in May / June this year, SEPA required that the site be closed until an investigation into the causes of the breach had been made and proposals brought forward to prevent a repetition. The pipe burst in August 2012 did not result in any significant impact on the environment and was dealt with by voluntary site closure.

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 to view in hard copy at our Public Register in East Kilbride, or our Registrars 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 (like Scotgen Dumfries Ltd) receive a penalty on their fees (+10%). There is an equivalent reduction for those operators who are assessed as “excellent”. The annual subsistence fee paid by Scotgen Dumfries Ltd was £31570 in 2012/13. However, due to the large workload at this site, it is recognised that SEPA are unlikely to achieve full cost recovery this year.