



SCOTGEN (DUMFRIES) LTD  
DARGAVEL ENERGY FROM WASTE FACILITY  
SITE STATUS REPORT – V5

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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 batch co-incinerator and regulated by means of a PPC Permit to meet the standards required by the Waste Incineration Directive. The site accepts hazardous and non-hazardous waste, which is thermally treating 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 gas exiting the SCC passes 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](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.

## 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 then occurred with the boiler superheater tubes (attributed to fouling, high temperature and corrosion) and the combustion activities were off-line until commissioning re-started on 11<sup>th</sup> March 2010 with waste again being treated from 29<sup>th</sup> March 2010. The plant was therefore not operational during January, February and most of March 2010.

In 2010/2011 it was recognised that the poor performance of the boilers was significantly affecting operational efficiency and impeding progress on two main areas of environmental compliance:

- control over the combustion air flows was leading to temperature and oxygen excursions which in turn led to short term emission limit breaches, bypass stack activations and incident notifications; and
- a long-term fix to the boiler issues was needed before superheated steam could be generated and the steam turbine connected to the system.

Therefore, a project to re-design the boilers was initiated and an Application to Vary the PPC Permit to accommodate this change is expected shortly. In the meantime, combustion activities have ceased (as of 14<sup>th</sup> April 2011) until the Application for the new boilers is received, determined and the new units installed (this process is likely to take several months). Scotgen estimate that export of electrical power to the grid will take place by February 2012.

Additional Plant design issue:

- the ash handling system (to the rear of the PGCs) regularly blocks due to fused material forming in the Primary Chambers. Modifications to the ash conveying system have been completed – however, the system is still not functioning as designed and ash is being removed (by bucket loader) from the front of the chamber. Further alterations to the PGC operating temperatures are now being considered to tackle the issue at source.

## **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 undertook an in-depth review of the Dargavel Facility over Tuesday 28th and Wednesday 29th September 2010. The audit highlighted several areas of improvement required to staff training and management control of site operations. The Operator has initiated an improvement plan which is subject to ongoing review by SEPA and a further in-depth audit of site procedures will take place during the summer shutdown (prior to recommencement of gasification activities).

## **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" together with details of the emission concentrations, 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.

Since operations re-started in March 2010 (data correct to – 30 April 2011) there have been 45 recorded noise complaints, 38 by-pass stack activations, 1 plant comms failure, 4 failures of the Continuous Emission Monitoring System and 284 notifications of short term ELV breaches: 19 VOC / 51 CO / 84 low temp at Secondary Combustion Chamber exit / 106 low O<sub>2</sub> / 6 NO<sub>2</sub> / 8 SO<sub>2</sub> / 3 HCl / 7 dust.

Most of these breaches last a few minutes until the process control systems react to bring emissions back within range - in general daily and annual average ELVs are met. Such breaches are not unexpected during commissioning and development of the technology as the Operator adjusts the system. Records for each incident are available for inspection on our Public Register.

The only public complaints have related to noise impact. In most cases, the source of the noise has been identified: automatic door closers have been fitted to minimise noise breakout from the main process building; broadband reversing alarms have been fitted to site mobile plant; an engineering fix (to reduce low frequency tonal noise associated with the main ID fans) was installed towards the end of August 2010; and steam venting is now carried out at a significantly reduced pressure with little on-going noise impact. Complaints of general broadband noise from the ID fans and cooling towers persist – however, the site is now closed and the new boiler design should result in a significantly reduced load on the main ID fans (with a consequent reduction in noise emissions). Future issues will include the design of sound attenuation for the proposed steam turbine unit and associated pipework.

## **SEPA Regulatory Activity**

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. A warning letter regarding waste handling was issued on 27 April 2010 and on 23 February 2011 SEPA advised the Operator that remedial plan was required by 25 March 2011 to demonstrate that the process could be operated without further breaches of the PPC Permit – the site is now closed.

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 on our Public Register.

SEPA inspect against compliance with the conditions of the PPC Permit and carry out routine waste audits during most site inspections. In addition, SEPA receive copies of waste consignment / waste transfer notes for all wastes entering the facility on a daily to weekly basis. We also carry out forward audits at the final off-site disposal locations for the site bottom ash residues.

This site is regulated by a Lead Officer (Specialist) from our Technical Support Unit with assistance from other Specialists (Process Engineers) and Officers from the Local Dumfries & Galloway Team as necessary. 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.

At present the Lead Officer's workload is largely taken up with regulating this site.

### **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<sub>x</sub> and SO<sub>x</sub>, 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 emission limit values 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.

Stack sampling for dioxins and furans was carried out during commissioning (August 2010) by the Operator and found to be compliant. From November onwards the Operator entered the "operational" phase which requires monthly sampling. Operator results so far have indicated that dioxin levels are compliant.

SEPA contracted 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<sup>-3</sup> compared to an ELV of 0.05mgm<sup>-3</sup>) and dioxins/furans (reported as 0.12ngm<sup>-3</sup> compared to an ELV of 0.1ngm<sup>-3</sup>). The final report was forwarded to SEPA in January 2011. 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 the mass emission results and stack measurements for the October report and it was noted that the emission results for mercury and dioxins were not in keeping with the other sets of sampling (carried out in August, November and December 2010). SEPA therefore arranged for the stack emissions to be re-tested by a third independent contractor – those results confirmed compliant emissions levels similar to the Operator's previous reports and other WID sites in Scotland.

Results for Q1 (January, February and March) 2011 have recently been received and placed on the Public register - both waste streams were noted to be in compliance with Permit ELVs.

### **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 2009, in early 2010 and again in June 2010 – results are available on the Public Register at our East Kilbride Office.

The “operational” phase monitoring requirements of the Permit commenced on 01 November 2010. Soil sampling: eight samples are to be taken per year for the first two years of operation, thereafter four samples per year. Sampling of soil in November and December 2010 was not possible due to the frozen ground conditions. Q1 2010 samples have been taken and results are awaited. Air sampling: in addition to ambient NO<sub>x</sub> and SO<sub>x</sub> monitoring (see annual report available on the Public Register), spot samples of “metals in air” are to be taken at 4 locations in the vicinity of the site during the first years of operation. Due to a delay in obtaining a suitable power supply to the sampling points – Scotgen were unable to commence monitoring of “metals in air” in November 2010 and are in on-going discussions with SEPA to progress this non-compliance.

### **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 non-hazardous ash is taken off-site and disposed of at a local landfill (Auchenlosh) in Dumfries and Galloway. “Fly Ash” and boiler residues are taken off-site for disposal at a suitable hazardous waste landfill sites (Avondale near Falkirk, or one of Augean’s three sites in England).

### **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 Discharge 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 indirect releases of process effluent.

The SUDS contains a lined basin with outlet (rather than a pond) 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 on the previously supplied 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.