



SCOTGEN (DUMFRIES) LTD  
DARGAVEL ENERGY FROM WASTE FACILITY  
SITE STATUS REPORT – V4

Author:

Date: 01 February 2011

Jim McIntyre  
Specialist I  
Ops Technical Support Unit

## 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 takes hazardous and non-hazardous waste, thermally treating the waste in one of two identical waste lines. Each Line consists of 4 primary combustion chambers (PGC), 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. No breaches of permit conditions were recorded between 10<sup>th</sup> December and 11<sup>th</sup> March.

SEPA receive monthly commissioning update reports plus specific commissioning tests reports (as described in Section 3.9.4 of the PPC Permit) as the tests are completed.

SEPA wrote to the Operator advising that the Permit Conditions relating to "operational monitoring requirements" should take effect from 01 November 2010.

## Recent improvements:

carbon deposits on the burner heads had lead to loss of efficiency and reliability of some burners. Modification to purge fuel lines has been successfully trialled and all burners sets now modified.

## On-going issues:

- 1) control over the combustion air flows to prevent temperature and oxygen excursions which can lead to emission limit breaches and incident notifications;
- 2) proposals for a long-term fix to the boiler issues are expected shortly and need to be resolved before the steam turbine can be connected to the system. Scotgen estimate that export of electrical power to the grid will take place by February 2012; and
- 3) the ash handling system regularly blocks due to fused material forming in the Primary Gasification Chambers (PGC). Modifications to the ash conveying system have been completed and 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 Process Engineering Unit undertook an in-depth review of the Dargavel Facility over Tuesday 28th and Wednesday 29th September 2010. Specifically, three teams assessed compliance against the following areas:

- Team 1 – environmental management systems, available staff resource, job competency requirements, staff training, staffing levels (especially at night and weekends), implementation of operating procedures by shop floor staff, supervision and management control;
- Team 2 – proposals for new boiler system and timelines for power generation (i.e. connection of turbine), Primary Gasification and Secondary Combustion Chamber fan and burner systems (on-going program / operator issues with oxygen v's temp control and a design issue with carbon deposits at burner head), plant / program / procedural modifications to fan control systems following notified incidents, interlocks and the Continuous Emission Monitoring Systems;
- Team 3 - waste reception, sampling, handling and storage / ash handling, burnout, sampling, storage and disposal; and
- Additionally - loading of the Primary Gasification Chambers and control over the sequencing of batches within each waste stream arched over the work of each Inspection Team.

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.

## 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 commissioning re-started in March 2010 (data correct to – 01 February 2011) there have been 40 recorded noise complaints, 37 by-pass stack activations, 1 plant comms failure, 4 failures of the Continuous Emission Monitoring System and 276 short term ELV breaches: 18 VOC / 48 CO / 84 low temp at Secondary Combustion Chamber exit / 103 low O<sub>2</sub> / 6 NO<sub>2</sub> / 8 SO<sub>2</sub> / 3 HCl / 6 dust.

Most of these breaches last a few minutes until the process control systems react to bring emissions back within range. Such breaches are not unexpected during commissioning as the Operator adjusts the system. Records for each incident are available for inspection on our Public Register (at East Kilbride).

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 and are being investigated. 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. No other formal enforcement action has been taken in relation to the commissioning ELV breaches.

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 (waste and ash handling is checked ~monthly at present). In addition, SEPA also 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 Operations Technical Support Manager- SW.

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 were found to be compliant (report available on the Public Register). From November onwards the Operator has entered the "operational" phase which requires monthly sampling. The November and December reports indicate that dioxin levels were compliant.

SEPA's contractor carried out compliance monitoring for all Waste Incineration Directive pollutants in October 2010 – the results showed Emission Limit Value (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 showing these breaches was forwarded to SEPA in January 2011. These emission results for mercury and dioxins are not in keeping with the three other sets of sampling (carried out in August, November and December 2010) which showed compliance with the relevant ELVs. Other issues have been raised with the mass emission results and stack measurements for October – SEPA have therefore arranged for the stack emissions to be re-tested by a third independent contractor. All emission monitoring reports are placed on the Public Register as they become available.

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.

Environmental monitoring – the “operational” 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. Air sampling: 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 “metals in air” in November and have advised that it will commence January 2011. All results, will be available on the Public Register as they become available.

### **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” is 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 Sustainable Urban Drainage System (SUDS) which takes surface water run-off – this system would also provide a 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.