

Process Waste

Introduction

The TEGCO Immingham Ltd Installation at Netherlands Way, Stallingborough, Grimsby, DN41 8DF is an Energy from Waste (EfW) process. The installation is designed to consume 320,000 Te/yr of Refuse Derived Fuel (RDF) based on 10 MJ/kg (LHV), producing: -

- 12 MW electrical export,
- 51 MW thermal export (60 Te/hr) as steam (no condensate return).

The installation is a Combined Heat & Power (CHP) plant sized and is designed to replace the steam and electricity currently generated by an existing CHP plant on an adjacent industrial plant. The existing CHP plant is reaching the end of its operational life and will be decommissioned when the installation is operational.

The need to continue to take waste in the event that steam and/or electricity cannot be exported (e.g. customer is shutdown), the installation is designed such that all steam generated at normal waste feed can pass through the turbine and condenser resulting in 24 MW electrical export.

A proportion of the RDF is sourced from local waste management companies and transported to the installation by road. The remaining is sourced from further afield and transported by rail to 1 of 2 local railheads and the final transfer from the railhead to the installation is by road.

The installation will operate continuously (24 hr/day & 7 day/week) for >8,000 hr/yr.

The installation consists of 2 off 20 Te/hr incineration lines (combustor, boiler & feed-water system) and a single turbine and air cooled condenser.

The installation is designed not to generate any waste water from the process during normal operation.

The installation is designed to be fully compliant with the 2019 European BREF for Waste Incineration (JRC 118637) and the associated BAT Conclusions published in the Official Journal of the European Union on 3rd December 2019.

Waste Recovery and Disposal

The main residue streams arising from each of the treatment processes are as follows:

- Bottom ash from the EfW combustion process,
- Fly ash EfW combustion process,
- FGCr from the EfW process,
- Waste water (Process Water Waste Pit),
- Sludge (Process Water Waste Pit),
- Used filter bags (from FGC system),
- Other minor waste streams

As described below, the waste recovery and disposal techniques are in accordance with the indicative BAT requirements. The quantities of wastes generated from the normal operation of the installation are summarised in the Non-Technical Description.

Bottom ash, Fly ash and FGCr sampling and analysis procedures are consistent with the requirements of Environment Agency Technical Guidance Note (Monitoring) M4 “Guidelines for Ash Sampling and Analysis”

Prior to the transfer of any residues/wastes off-site, the residues/wastes are tested in accordance with the requirements of the EA’s Technical Guidance ‘WM2: Hazardous Waste: Interpretation of the definition and classification of hazardous waste’ where appropriate.

Any materials which are transferred to landfill from the installation will be Waste Acceptance Criteria (WAC) tested - leachability tested - to ensure that they meet the WAC for the landfill that they are to be transferred to.

In accordance with the requirements of Article 4 of the Waste Framework Directive, TEGCO will periodically review the options for the reuse recycling and recover of all residues generated by the facility

Bottom Ash

Bottom ash is a non-hazardous waste which can be recycled.

Bottom ash has been used for at least 20 years in Europe as a substitute for valuable primary aggregate materials in the construction of roads and embankments. TEGCO will transfer bottom ash to a suitably licenced off-site bottom ash reprocessing facility. In the event that a suitable recovery facility cannot be identified, it will be transferred for disposal in a licenced off-site non-hazardous landfill.

Bottom ash will be removed from site in closed/sheeted trailers thereby minimising the chance of spillage and dust emissions. The trailers are filled by overhead crane within a closed building to prevent emissions to the environment during loading.

Fly Ash

Fly ash, arising from the boiler and flue gas ducts is handled separately to both Bottom ash and FGCr. The Fly ash is expected to be a non-hazardous waste which can be exported to suitably licenced off-site ash processing facilities (as per Bottom ash above).

Should a suitable processing facility cannot be identified (and Fly ash is non-hazardous), it will be transferred for disposal in an off-site non-hazardous landfill.

In the event that the Fly ash proves not to be non-hazardous, TEGCO will attempt to identify suitable licenced off-site treatment facilities (as per FGCr below) to allow the Fly ash to be reused as a product or raw material. If this is not possible, the Fly ash will be treated to minimise its hazardous properties and sent for disposal in a licenced off-site landfill.

Fly ash will be removed from site in enclosed tankers thereby minimising the chance of spillage and dust emissions. During the tanker filling operation, displaced air will vent back to the silo and to atmosphere through the bag filter.

Flue Gas Cleaning Residues (FGCr)

FGCr are predominantly composed of calcium as hydroxide, carbonate, sulphate and chloride/hydroxide complexes. Typical major element concentration ranges for the UK residues are as follows:

- 30-36% w/w calcium;
- 12-15% w/w chlorine;
- 8-10% w/w carbonate (as C); and

- 3-4% w/w sulphate (as S).

Silicon, aluminium, iron, magnesium and fluorine are also likely to be present in addition to traces of dioxins and the TEGCO has reviewed the availability of waste management options for the FGCr. There are waste treatment facilities which can treat the FGCr to produce a product; and there are other facilities which are able to treat the FGCr (e.g. through neutralisation) prior to disposal in a licenced landfill.

It may be possible to send the residue to an effluent treatment contractor, to be used to neutralise acids and similar materials or to be used in the production of concrete building products. Using the residues in this way avoids the use of primary materials. If this option is not practicable then it will be sent to a licenced landfill for treatment and disposal as a hazardous waste.

For the purposes of this application it has been assumed that the FGCr will be sent to landfill, however, TEGCO will review the options for the treatment of FGCr to recover a product from the residue when: -

- Sufficient operating data has been obtained to characterise the properties of the FGCr,
- Whenever TEGCO becomes aware of a potential use/treatment facility,
- On a regular basis (not greater than every 5 years) as part of routine environmental performance/BAT reviews etc.

FGCr will be removed from site in enclosed tankers thereby minimising the chance of spillage and dust emissions. During the tanker filling operation, displaced air will vent back to the silo and to atmosphere through the bag filter.

Waste Water

While in normal operation there is no discharge of waste water, periodically waste water (from the Process Waste Water Pit) may need to be sent for disposal. This could be due to maintenance activities, emergency drain down of a boiler system or extreme weather.

The water in the Pit is expected to be classified as non-hazardous, pH neutral and with low levels of oxygen scavengers & corrosion inhibitors present. The contents of the pit will be sampled and analysed to allow characterisation before being sent for disposal at a suitable licenced installation (e.g. sewage treatment plant).

Provision has been made to allow discharge into the North Beck Drain via surface water drains at a future date. This connection is physically isolated (valve removed and lines blanked) and will not be made until:-

1. Operational data allows water to be adequately characterised and demonstrated to be acceptable for discharge;
2. A permit variation has been obtained from the Environment Agency authorising such a discharge and specified monitoring and other control measures are agreed with the Environment Agency.

Sludge

Sludge is expected to collect in the Waste Water Pit during commissioning (e.g. passivation products during commissioning of boiler & steam systems) and will have to be removed. The sludge is expected to be classified non-hazardous, pH neutral and with low levels of oxygen scavengers & corrosion inhibitors present. The contents of the pit will be sampled and analysed to allow characterisation before being sent for disposal at a suitable licenced installation (e.g. biomass plant).

Used Filter Bags

The FGC system uses 1,024 filter bags on each line and a third will be changed each year, i.e. 683 bags per year. The filter bags are expected to be considered to be hazardous waste and will be sent for incineration with energy recovery (if practicable). The composition of the “filter cake” remaining on the used filter bags is expected to be similar to the FGCr.

Other Wastes

There are a number of other minor waste streams related to the operation of the process and activities at the installation. These include: -

- Office wastes (e.g. paper, plastics, WEE & municipal etc.),
- Maintenance/engineering wastes (e.g. oils, metal, WEE etc.),
- Laboratory wastes (e.g. reagent/sample containers etc.).

These waste streams will be segregated at source as required by licenced waste broker/waste treatment facility to maximise reuse &, recycling etc. No contracts have yet been signed, however likely segregated streams are: -

1. Paper/cardboard etc,
2. Plastics,
3. Metals,
4. WEE,
5. Oils,
6. Municipal
7. Other small periodic or one offs.