IED Requirements

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 20Te/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.

Requirements

The requirements are referenced to the paragraph numbers in section 2 ('Key Issues') of S5.01 'Incineration of waste: additional guidance' (under the sub heading 'European legislation and your application for an EP Permit').

Requirement 35

The residues from the incineration plant are: -

- Bottom Ash/slags,
- Fly ash,
- FGCr.

Bottom Ash/Slags

The bottom ash/slags from arise from the end of the grate on each incineration line (Combustion Line 1 & Combustion Line 2) and are described as IBA.

The use of RDF helps minimise the quantity of no-combustible materials present in the waste incinerated thereby minimising the quantity of IBA produced.

The IBA is discharged from the grates via a wet quench (resulting in a cool dust free solid material) into a covered mechanical conveyor system and transferred to the single IBA bunker. The conveyor system and bunker are within closed buildings.

IBA is exported from the installation in closed road trailers. These are loaded within a closed building by crane (with automated fast acting roller doors interlocked to the crane).

The IBA is kept separate from all other residues, this material is sent to suitably regulated facilities for: -

1. Reuse,
2. Recycling,
3. Recovery,
4. Disposal (landfill).

The IBA is routinely sampled and suitably characterised (e.g. heavy metals fractions, physical and chemical properties etc.) prior to export. Sampling and monitoring will be undertaken in accordance with EA "Technical Guidance Note (Monitoring) M4" (Version 7, June 2016) commonly known as the "EA Ash Sampling Protocol."

The hierarchy above is then used to determine the destination of the IBA, ensuring maximum reuse (subject to suitable outlets) and minimising the quantity sent for disposal.

Further details of the system and measures used are included in the Non-Technical Description, Dust Emissions Management Plan & Emission Monitoring documents.

FGCr

The Flue Gas Cleaning residues (FGCr) arise from the multi compartment bag-filter unit on each incineration line (Combustion Line 1 & Combustion Line 2) and are described as FGCr.

The use of RDF helps minimise the concentrations and variability of polluting species within the waste burned. This combined with a reciprocating grate and advanced control system result in steady loading on the abatement plant allowing raw material usage (Hydrated lime and Powdered activated carbon) to be minimised while ensuring that emissions performance is maintained.

The FGC system incorporates an internal recycle of a proportion of the residues further reducing raw material usage.

Hydrated lime is used (rather than sodium bicarbonate) as this produces FGCr for which: -

- Greater outlets for reuse etc. (rather than disposal) are commercially available,
- Have significantly lower "leaching potential" thereby reducing the environmental risk/treatment requirements if sent for disposal.

The FGCr is discharged from the bag-filter via rotary valves onto enclosed mechanical conveyors and into a dense phase pneumatic conveying system. This transfers the FGCr (a warm dry granular/powdery material) to the FGCr silo which is vented to atmosphere via a bag-filter unit.

FGCr is exported from the installation in purpose designed closed powder road trailers. These are loaded by gravity from the base of the silo. The loading system incorporates a dust extraction system, which together with the trailer is back vented into the silo to prevent local spillage or emissions to air during loading activities.

The FGCr from each incineration line are kept separate (i.e. Incineration Line 1 to FGCr Silo 1 & Incineration Line 2 to FGCr Silo 2) to allow sensible silo size and capacity.

The FGCr are kept separate from all other residues, this material is sent to suitably regulated facilities for: -

1. Reuse,
2. Recycling,
3. Recovery,
4. Disposal.

The FGCr are routinely sampled and suitably characterised (e.g. heavy metals fractions, physical and chemical properties etc.) prior to export. Sampling and monitoring will be undertaken in accordance with EA "Technical Guidance Note (Monitoring) M4" (Version 7, June 2016) commonly known as the "EA Ash Sampling Protocol."

The hierarchy above is then used to determine the destination of the FGCr, ensuring maximum reuse (subject to suitable outlets) and minimising the quantity sent for disposal.

Further details of the system and measures used are included in the Non-Technical Description, Dust Emissions Management Plan & Emission Monitoring documents.

<u>Fly ash</u>

The Fly ash results from particles in the combustor flue gases being deposited on boiler surfaces, (and adjacent duct work), on each incineration line (Combustion Line 1 & Combustion Line 2) and are described as Fly ash.

The combustor and combustion control system are designed to ensure consistent combustion conditions, maximising burn out and minimising fine particle carryover into the boiler. The boiler is designed (using CFD) to minimise the potential for particle fallout or impingement on surfaces within the boiler. These minimise the quantity of Fly ash produced.

Fly ash is dislodged from internal surfaces suppliers "shower cleaning" system, pneumatic rapping systems and steam soot blowers. The Fly ash is discharged from the boiler hoppers via rotary valves into mechanical (screw and drag chain) conveyor systems. There are 2 systems, (1 for the boiler and 1 for the economiser) per line, each feeding dense phase pneumatic conveyor. This transfers the FGCr (a warm dry granular material) to a single FGCr silo (serving both combustors) which is vented to atmosphere via a bag-filter unit.

Fly ash is exported from the installation in purpose designed closed powder road trailers. These are loaded by gravity from the base of the silo. The loading system incorporates a dust extraction system, which together with the trailer is back vented into the silo to prevent local spillage or emissions to air during loading activities.

The Fly ash is routinely sampled and suitably characterised (e.g. heavy metals fractions, physical and chemical properties etc.) prior to export. Sampling and monitoring will be undertaken in accordance with EA "Technical Guidance Note (Monitoring) M4" (Version 7, June 2016) commonly known as the "EA Ash Sampling Protocol."

Fly ash is kept separate from all other residues, this material is sent to suitably regulated facilities for: -

1. Reuse,
2. Recycling,
3. Recovery,
4. Disposal.

The Fly ash is routinely sampled and suitably characterised (e.g. heavy metals fractions, physical and chemical properties etc.) prior to export. Sampling and monitoring will be undertaken in accordance with EA "Technical Guidance Note (Monitoring) M4" (Version 7, June 2016) commonly known as the "EA Ash Sampling Protocol."

The hierarchy above is used to determine the destination of the Fly ash, ensuring maximum reuse (subject to suitable outlets) and minimising the quantity sent for disposal.

Further details of the system and measures used are included in the Non-Technical Description, Dust Emissions Management Plan & Emission Monitoring documents.

Requirement 36

The incineration lines at the installation do not include pyrolysis or similar stage to convert organic content into elemental carbon.

The IBA produced is consistent with the requirements of IED and total organic carbon (TOC) monitoring is used to demonstrate effective burnout.

The IBA is routinely sampled and suitably characterised (including TOC) prior to export. Sampling and monitoring will be undertaken in accordance with EA "Technical Guidance Note (Monitoring) M4" (Version 7, June 2016) commonly known as the "EA Ash Sampling Protocol."