VIRIDOR WASTE MANAGEMENT

ARDLEY EFW PLANT

EP APPLICATION - NON TECHNICAL SUMMARY

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1 INTRODUCTION

1.1 The Application

Viridor Waste Management Ltd (Viridor) are intending to build an Energy from Waste (EfW) facility at their existing Ardley waste management facility. The plant would have the capacity to process 300,000 tonnes of residual Municipal Solid Waste (MSW) and Commercial and Industrial (C & I) waste per annum from Oxfordshire, and export 22.1 MW of electricity. This would be sufficient to provide power to around 22,000 people.

Before the EfW facility can operate, the applicant must be issued with an Environmental Permit (EP) by the Environment Agency. This document is a Non-Technical Summary of the information submitted in support of the EP application.

The main process involves the receipt, storage and combustion of municipal solid waste. In addition, the process includes use of waste heat boilers, electricity generation, emissions abatement equipment, onsite temporary storage of residues and all systems for controlling and monitoring combustion operations.

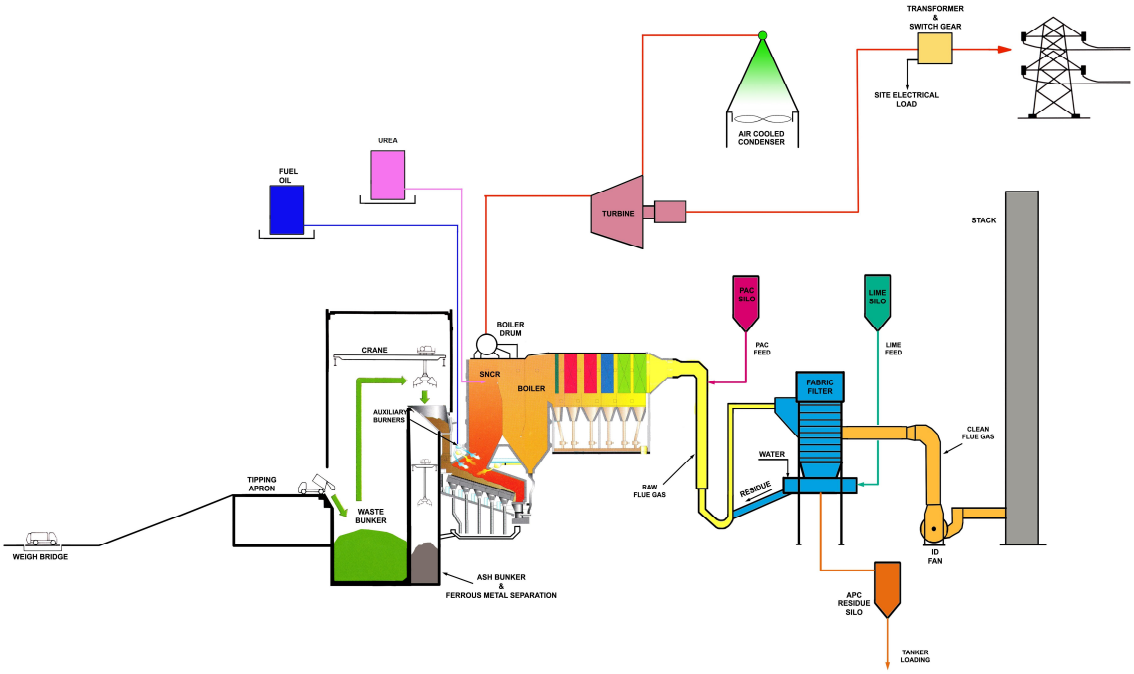
1.2 Overview of the Facility

The EfW facility will contain two combustion lines with a combined design capacity to process 38.4 tonnes per hour of residual municipal solid waste with a calorific value of 9.2 MJ/kg. The plant is expected to process approximately 300,000 tonnes per year, generating electricity and exporting around 22.1 MWe to the national grid.

In outline, the process would be as follows:

1) Residual Municipal Solid Waste, collected from households within Oxfordshire, would be delivered to the facility by road and unloaded into the waste bunker. The tipping hall would be an enclosed building.
2) The waste would be removed from the waste bunker by a crane and loaded into the feed chute for delivery to the combustion unit. This would be a mechanical moving grate design which ensures continuous mixing of the waste and leads to good combustion.
3) Residues from the combustion chamber will be quenched in a water bath to contain dust releases and provide a gas seal. Ferrous and non-ferrous metals will be recovered from the residues and the remaining ash will be treated and recycled to produce secondary aggregate by on site plant.
4) Emissions of nitrogen oxides would be controlled by the injection of urea into the combustion chamber.
5) Hot gases from the waste combustion would be passed through a boiler to raise steam. The steam will then be passed to a steam turbine to generate electricity for export to the National Grid, before being condensed in an air-cooled condenser and returned to the boiler.
6) The combustion gases would be cleaned in a flue gas treatment plant. This would include the injection of carbon, primarily to control dioxin emissions, the injection of lime, to control acid gas emissions, and the use of a fabric filter to remove dust.
7) The cleaned exhaust gases will be released to atmosphere via an 82 metre stack.

The process is illustrated in the diagram overleaf:


TRANSFORMER & SWITCH GEAR
SITE ELECTRICAL LOAD
AIR COOLED CONDENSER
UREA
FUEL OIL
TURBINE
STACK
PAC SILO
LIME SILO
BOILER DRUM
CRANE
SNCR
BOILER
PAC FEED
LIME FEED
FABRIC FILTER
AUXILIARY BURNERS
WATER
CLEAN FLUE GAS
TIPPING APRON
WASTE BUNKER
RAW FLUE GAS
RESIDUE
ID FAN
WEIGH BRIDGE
ASH BUNKER & FERROUS METAL SEPARATION
APC RESIDUE SILO
TANKER LOADING

2 DETAILS OF PROPOSED FACILITY

2.1 Raw Materials

The principal raw materials used on the site will be:

- Dry urea
- Activated carbon
- Hydrated Lime
- Low sulphur gasoil

These materials will all be stored in suitable silos and tanks contained within bunds, in order to minimise the risk of contamination of surface water.

The plant will process up to 300,000 tonnes per annum of residual municipal solid waste. The residual MSW will be delivered from Oxfordshire in Refuse Collection Vehicles (RCVs) and from the County Waste Recycling centres by Heavy Goods Vehicles (HGVs). Commercial and Industrial waste will be delivered in HGVs operated by private waste firms.

2.2 Technology Selection

The processes have been designed against the background of a detailed assessment of the prevailing environmental conditions at the site location, in order that the objectives of the Waste Incineration Directive are met. Best Available Techniques will be employed at the plant to minimise its impact on the local environment.

In particular:

1) All waste and raw materials delivered to the facility, and any residues generated by the facility, will be handled and stored in a manner which avoids fugitive emissions.
2) A mechanical moving grate will be used to burn the waste. This is a well proven system which is used in hundreds of similar installations in Europe. The combustion chamber design will include fully adjustable combustion air controls and automatic auxiliary burners and achieve good ash burnout.
3) The plant will achieve a residence time of two seconds after the last injection of combustion air at a temperature of more than 850°C, as required by the Waste Incineration Directive. This ensures that combustion is complete and dioxins are destroyed.
4) The boiler will be designed to maximise energy recovery and minimise boiler deposits. Rapid cooling between 450°C and 250°C avoids the reformation of dioxins.
5) Dry urea will be injected into the combustion chamber in a Selective Non-Catalytic Reduction system (SNCR). This reduces emissions of nitrogen dioxide in an efficient manner while maximising energy recovery and eliminating the handling risks posed by ammonia.
6) Dry lime will be injected into the flue gases to remove acid gases. This will avoid the use of water and will maximise the recovery of heat from the flue gases, while efficiently removing the acid gases.
7) A multi-compartment fabric filter will be used to remove particulate matter.

2.3 Emissions

2.3.1 Emissions to Air

The only emissions to atmosphere will be released from the 82 metre high stack. These emissions will fully comply with the emission limits in the Waste Incineration Directive.

2.3.2 Emissions to Water

There will be no process water releases from the EfW facility. Waste water will be collected and reused in the bottom ash extraction system.

Surface water will be directed via oil interceptors to a sedimentation pond and then to an infiltration lagoon before being released to the local aquifer.

The treated water output from the package water treatment plant for office effluent will be discharged to the surface water ponds and ultimately to Gagle Brook. This will be subject to a discharge consent to be agreed by the Agency.

2.4 Monitoring

Continuous monitoring of particulates, hydrogen chloride, hydrogen fluoride, carbon monoxide, oxygen, nitrogen oxides, sulphur dioxide, volatile organic compounds and ammonia will be undertaken for the flue gases in the stack. Other pollutants will be monitored by spot measurements at regular intervals. The data will be recorded and operators will be alerted if emissions to air approach authorised limits. The results of the monitoring will be reported to the Environment Agency.

Solid residues generated by the plant will be sampled on a regular basis to assess bottom ash burnout and to monitor the levels of specified pollutants.

2.5 Management

Viridor demonstrates environmental and social responsibility by operating all facilities and services to the highest environmental, health and safety and professional standards. Viridor has developed and implemented a documented Business Management System (BMS) which combines Environmental, Quality and Occupational Health and Safety management procedures.

The company BMS applies to all operational facilities and is maintained to meet the requirements of the BS EN ISO 14001:2004 Environmental Management System Standard, the BS EN ISO 9001:2000 Quality Management System Standard and the BS OHSAS 18001:2007 Occupational Health and Safety Management System Standard.

Viridor will develop a management structure and a BMS accredited to ISO 14001, ISO 9001 and OHSAS 18001 for the Ardley EfW plant. The BMS is part of the facility's overall management system that establishes an organisational structure, responsibilities, practices, procedures and resources for achieving, reviewing and maintaining the company's commitment to environmental protection.

2.6 Residue Handling, Recovery and Disposal

The plant will produce two types of residue. Where possible and practical, these residues will be reused or recovered, in order to reduce the waste sent to landfill.

- **Bottom ash (75,600 tonnes per year)**

  This will be extracted from the bottom of the grate. It will be processed on site into an aggregate by size separation and a maturation process. Ferrous and non-ferrous metals will also be recovered from the bottom ash at the facility and recycled. Bottom ash from incineration plants 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. Viridor will recover bottom ash from the Ardley plant for use in this way, through partnerships with construction companies.

  It is expected that of the total 75,600 tonnes of bottom ash leaving the grate, 6,000 tonnes of metal will be removed for recycling and a further 62,100 tonnes will be recovered as aggregate and sold as product. The remaining 7,500 tonnes of unprocessed bottom ash will be sent to non-hazardous landfill since it cannot be treated or recovered.

- **Residue from the flue gas treatment system (10,800 tonnes per year).**

  The APC residues contain unreacted lime, which means that the residue is highly alkaline. If possible, the APC residues will be sent to an effluent treatment contractor, who will use the waste to neutralise acids and similar materials. If this is not possible, they will be sent to a secure landfill site for disposal as hazardous waste.

2.7 Energy

The facility will generate around 25.5 MW of electricity by conversion of heat recovered from the combustion process. After satisfying its own power needs the plant will export up to 22.1 MW of electricity to the local electricity network.

The facility will be designed to achieve a high thermal efficiency. This will be achieved by operating with high steam temperatures and pressures and by using a completely dry flue gas treatment system, which maximises the recovery of heat from the flue gases. The efficiency will be high enough to ensure that the facility will qualify as a Recovery operation under the proposed new Waste Framework Directive.

3 ENVIRONMENTAL IMPACT

3.1 Releases to air

All combustion processes produce emissions to atmosphere of a range of pollutants. Energy from Waste plants are regulated very tightly and the plant will be designed to achieve the strict emission limits specified in the Waste Incineration Directive. In addition, the impact of the plant's emissions has been assessed using recognised dispersion modelling techniques.

Air quality monitoring data from the local area was assessed, including the results of a survey specifically commissioned by Viridor, and it was concluded that current national and international air quality objectives and guidelines are not being breached.

The principal source of emissions from the facility will be the 82 metre stack. The flue gases released from this stack contain carbon dioxide, water vapour, oxides of nitrogen, sulphur dioxide, particulates, carbon monoxide, trace metals and organic compounds. The impact of these emissions on local air quality has been assessed, taking account of local terrain, local buildings and local weather conditions.

The modelling predicted that the emissions would not lead to any breaches of air quality standards and the plant's contribution to ground level concentrations is small compared with those standards.

Therefore, the impact of the plant on local air quality is predicted to be small.

3.2 Impact on Human Health

There is no evidence that a well managed modern waste management facility leads to adverse health impacts on the local population, and the UK Government have confirmed this position in the Waste Strategy for England 2007.

The potential exposure of the local population to emissions of dioxins and heavy metals, in particular, has been assessed. The maximum anticipated concentration of dioxin at sensitive receptors resulting from the deposition of particulates in emissions from the EfW facility is negligible and indicates an absence of health risk.

3.3 Impact on Sensitive Habitats

The proposed facility would be less than 1 km away from the Ardley Common and Quarry SSSI. Elements of a number of other protected sites can be found within 10 km of the proposed facility.

The impact of atmospheric emissions on these sensitive sites has been assessed and has been found to be insignificant.

3.4 Releases to water

There are no process releases to controlled waters from the development.

3.5 Noise

The impact of noise from the facility at the nearest residential populations to the proposed development has been assessed. The assessment demonstrated that the noise levels would comply with all relevant guidelines and so the impact of noise from the facility would be acceptable.