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Humber Gate Waste Treatment Facility



Humber Resources Group Ltd

EP Application Supporting Information

Document approval

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1 Introduction

Humber Resources Group Ltd (HRG) is applying to the Environment Agency (EA) under the Environmental Permitting Regulations (EPRs) for an Environmental Permit (EP) to operate a thermal waste treatment facility, to be known as the Humber Gate Waste Treatment Facility (the Facility). The Facility will have a throughput capacity of 29,500 tonnes per annum. The Facility will comprise of a waste reception area, designated waste storage areas, feed system, tank farm, counter-current rotary kiln, a vertical post-combustion chamber, wastewater treatment, multi-stage flue gas treatment, and drainage systems. The Facility will be located at Humber Gate, Grimsby, DN31 2TT.

This document and its appendices contain the supporting information for the application for an Environmental Permit (EP) for the Facility. They should be read in conjunction with the formal application forms. An overview of the activities to be undertaken at the Facility is provided in section 1.3. Further information and detail on each component at the Facility is provided in Section 2. Section 3 provides a summary of the management system associated with the operation of the Facility.

1.1 The Applicant

HRG is a subsidiary of GRG Waste UK, a group of waste management organisations that are a UK market leader in specialist waste. GRG Waste UK provide services in collection, treatment, recycling and disposal of both specialist and non-specialist waste. HRG has been set up as a special purpose vehicle (SPV) for the delivery and operation of the Facility.

HRG is registered in England (Company Number: 15746661) and has a registered address of Romsey, Hampshire, SO51 0PG.

1.2 The Site

The site address is Humber Gate, Energy Park Way, Grimsby, DN31 2TT. The grid reference for the centre of the Site is TA 23648 12869. The Site will be located on approximately 24 acres of land, which is located within a wider industrial estate (the Estate). The site is approximately 350m southwest of the Humber Estuary and 4.5km to the northwest of the town of Grimsby. The nearest residential properties are located approximately 1.86km southwest of the Facility.

A site location plan and installation boundary drawing are presented in Appendix A.

1.3 The Activities

The Facility will consist of a combination of Schedule 1 installation activities (as defined in the Environmental Permitting Regulations) (EPR) and directly associated activities. The activities to be undertaken at the site include the following:

- thermal waste treatment plant, including the processing of specialist waste which is delivered to the Facility via road;
- treatment of flue gases generated from the combustion of the waste fuels;
- production of bottom ash material that will be transferred off-site to a licensed waste disposal/recovery facility;
- generation of an air pollution control residue (APCr) that will be transferred off-site to a licensed waste disposal/recovery facility;
- the repackaging of specialist wastes prior to incineration; and

- blending of wastes prior to incineration onsite.

The Schedule 1 activities (as defined in the Environmental Permitting Regulations), and the Directly Associated Activities (DAA's) which will be undertaken at the Facility are listed in Table 1.

Table 1: Scheduled and directly associated activities

Type of Activity	Schedule 1 Activity	Description of Activity
Energy from waste	Section 5.1A(1)(a) - incineration of hazardous wastes requiring high temperature incineration.	The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day.
Directly Associated Activities		
Directly Associated Activities		The receipt, storage and handling of hazardous waste prior to incineration.
		Blending of hazardous waste for incineration.
		The handling, storage and transfer of raw materials and residues for transfer off-site.
		Energy recovery via a steam boiler, steam turbine and generator producing electricity.
		Cleaning of nominally empty containers including washing clinical bins
		Standby electrical generation to provide electrical power to the plant in the event of an interruption in the supply.

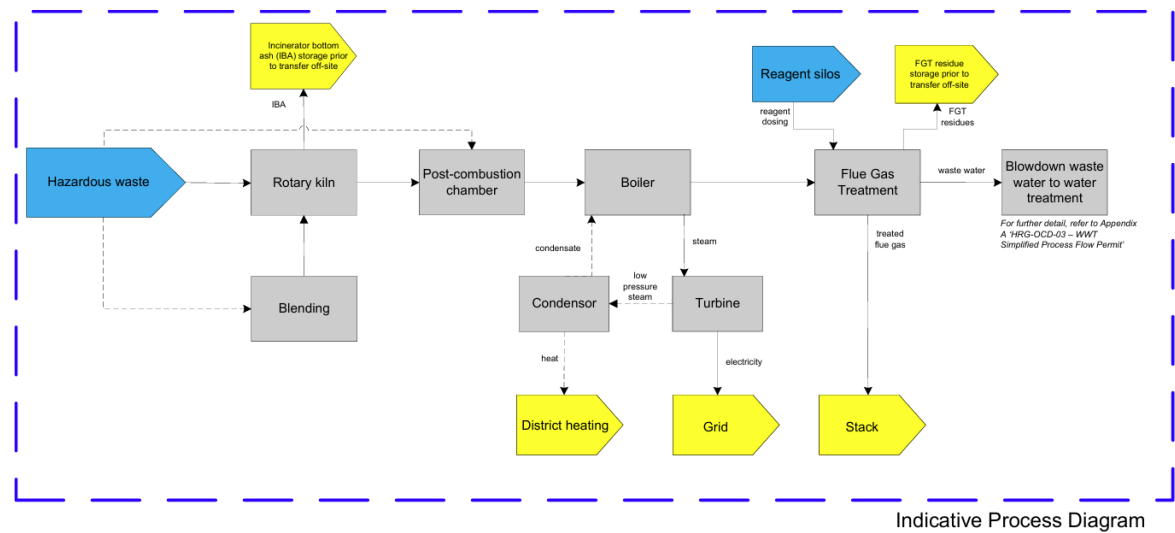
2 The Facility

The site is split into two plots of land (referred to as Plot I and Plot C), refer to the Installation Boundary drawing in Appendix A.

Plot I contains the main site offices and visitor centre, welfare facilities, weighbridge, staff parking and gatehouse.

Plot C contains the main activities associated with the Facility, being the thermal treatment of incoming waste. The waste thermal treatment process will be based around process areas comprising the following facilities among others: waste reception and waste storage area; various waste feeding systems; counter-current rotary kiln furnace; high temperature secondary combustion zone; a steam turbine; dry and wet flue gas treatment (FGT) systems with the treated flue gases being monitored prior to release to atmosphere via a dedicated 47m stack. Refer to Figure 1 for an indicative process diagram, and Appendix A for a full-sized version of the drawing.

Figure 1: Indicative Process Diagram



Allowing for the maximum capacity of the Facility and an NCV of 17.8 MJ/kg, the boiler will have a thermal capacity of approximately 17.8MWth.

2.1 Raw materials

The Facility will receive deliveries of consumables by road, including:

- sodium bicarbonate;
- urea solution (40%);
- powdered activated carbon (PAC);
- sodium hydroxide (32%);
- auxiliary fuel;
- sulphuric acid;
- TMT 15; and
- other boiler water treatment chemicals.

The Facility will receive a small amount of the following consumables for water treatment:

- lime; and

- granulated activated carbon.

2.1.1 Types and amounts of raw materials

The main raw materials anticipated to be stored at the Facility are presented in Table 2. The quantities and storage capacities should be considered indicative prior to completion of detailed design of the Facility. Information on the potential environmental impact of the raw materials is included in Table 3.

Table 2: Types and amounts of primary raw materials

Schedule 1 Activity	Material	Estimated storage capacity	Estimated annual consumption (tpa)	Description
Section 5.1 Part A (1) (a)	Urea	30 tonnes	809	40% urea solution
	Powdered activated carbon	10 tonnes	83	Powdered activated carbon (PAC)
	Sodium hydroxide	30 tonnes	1033	32% sodium hydroxide solution
	Sodium bicarbonate	100 tonnes	3130	
	Fuel oil (Kerosene)	30 tonnes	195	Low sulphur oil

Table 3: Primary raw materials and their effect on the environment

Product	Chemical Composition	Estimated annual consumption (tpa)	Relative impact (%)			Impact Potential
			Air	Land	Water	
Urea solution (for SNCR)	NH ₃ (aq)	809	100	0	0	Low impact
Powdered activated carbon	C	73	0	100	0	Low impact
Sodium hydroxide	NaOH	1033	0	0	100	Low impact
Sodium bicarbonate	NaHCO ₃	3130	0	100	0	Low impact
Fuel oil (kerosene)	-	195	100	0	0	Low impact

Sodium bicarbonate is used to react with acid gases in the dry flue gas treatment (DFGT) process. The sodium bicarbonate will be stored in a silo on site. Delivery of the reagent will be via tanker, with pneumatic offloading by means of an on-board truck compressor into the silo. Displaced air will be vented to the atmosphere through a fabric filter located on top of the silo. The sodium bicarbonate will then be transported pneumatically to be injected into the flue gas stream.

PAC will be used for the absorption of volatile heavy metals, volatile organic compounds and dioxins and will be added with the sodium hydroxide in the DFGT process. The PAC will be delivered by road and stored in sealed big bags. A dosing tank/silo will be installed, with a top inlet flange for top loading. A lifting structure with electrical hoist will enable lifting of the bags to the top of the dosing silo, so that the big bags can be discharged directly into the silo via the top inlet flange.

An SNCR reagent, urea solution, is used for NO_x reduction through SNCR. Urea reacts with nitrogen oxides to form nitrogen, carbon dioxide and water vapour. The urea will be stored in a designated area which is provided with suitable secondary containment. The urea solution (40%) will be delivered via road and stored in a dedicated urea storage tank. An IBC of ammonia solution may also be stored on-site in the event that additional NO_x abatement dosing is required.

All liquid chemicals will be stored in controlled areas, with secondary containment facilities for hazardous materials having a volume of 110% of the stored capacity and impermeable to the chemicals stored within them.

Silos will be fitted with high level alarms and the level regularly monitored. The top of the silos will be equipped with a vent fitted with a fabric filter. Cleaning of the filter will be done automatically with compressed air after the filling operation. Filters will be inspected regularly for leaks.

High quality boiler feedwater will be supplied in the form of return condensate from the air-cooled condenser and from an onsite water treatment plant (refer to section 2.5). Boiler treatment chemicals will be present in small quantities on site, stored in suitable storage facilities.

Various other materials may be used in small quantities (<5 tonnes per annum) for the operation and maintenance of the Facility. These could include, but not be limited to, the following:

1. hydraulic oils and silicone-based oils;
2. isolation media within electrical switchgear;
3. refrigerant gases for the air conditioning plant;
4. glycol/antifreeze for cooling;
5. oxyacetylene, TIG, MIG welding gases;
6. CO₂ / firefighting foam agents; and
7. ignition, test and calibration gases.

These will be supplied to standard specifications offered by main suppliers. All chemicals will be handled in accordance with COSHH Regulations as part of quality assurance procedures and full product data sheets will be available on-site.

Periodic reviews of all materials used will be made in the light of new products and developments. Any significant change of material, where it may have an impact on the environment, will not be made without firstly assessing the impact and seeking approval from the EA.

HRG will maintain a detailed inventory of raw materials used on-site and ensure that procedures are implemented for the regular review of the development in new raw materials.

2.1.1.1 Auxiliary fuel

As stated in Article 50 (3) of the Industrial Emissions Directive:

“The auxiliary burner shall not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil as defined in Article 2(2) of Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels (1) OJ L 121, 11.5.1999, p. 13., liquefied gas or natural gas.”

Therefore, as identified by the requirements of IED the only ‘available’ fuels that can be used for auxiliary firing are:

1. liquefied petroleum gas (LPG);
2. fuel oil/gas oil; or
3. natural gas.

Auxiliary burner firing on a well-managed thermal waste treatment facility is only required intermittently, i.e. during start-up, shutdown and when the temperature in the combustion chamber falls to 850°C.

LPG is a flammable mixture of hydrocarbon gases. It is a readily available product and can be used for auxiliary firing. As LPG turns gaseous under ambient temperature and pressure, it is required to be stored in purpose-built pressure vessels. If there was a fire within the site, there would be a significant explosion risk from the combustion of flammable gases stored under pressure. Considering the proximity of the site to other industrial facilities, LPG is not considered to be a suitable auxiliary fuel for the Facility due to the potential risk of explosion and associated off-site implications.

Natural gas can be used for auxiliary firing and is safer to handle than LPG. However, as stated previously, auxiliary firing will only be required intermittently. Auxiliary firing on natural gas requires large volumes of gas which would be needed to be supplied from a gas main within a reasonable distance from the Facility. Due to the costs associated with securing a sufficient gas supply for auxiliary firing purposes, and minimal consumption at all other times, the use of natural gas is not considered to represent BAT for the Facility.

A low sulphur fuel oil supply tank can be easily installed at the Facility. Whilst it is acknowledged that fuel oil is classed as flammable, it does not pose the same type of safety risks as those associated with the storage of LPG. The combustion of fuel oil will lead to some emissions of sulphur dioxide, but these emissions can be minimised as far as reasonably practicable through the use of low sulphur fuel oil. The proposed auxiliary fuel at this Facility is kerosene, which has less than 0.1% sulphur content and so classified as a low sulphur fuel oil.

Taking the above into consideration, low sulphur fuel oil is considered to represent BAT for auxiliary firing at the Facility. As such, kerosene will be routinely used.

2.1.2 Reagent unloading and storage

All chemicals will be stored in an appropriate manner incorporating the use of suitable secondary and other measures (for example, acid and alkali resistant coatings) to ensure appropriate containment and tertiary abatement measures. This may include areas of hardstanding with kerbed containment, to prevent any potential spills from causing pollution of the ground/groundwater and/or surface water. The potential for accidents, and associated environmental impacts, is therefore limited.

All storage facilities for chemicals will be designed in accordance with recognised industry good practice to prevent pollution CIRIA Guidance titled ‘*Containment systems for the prevention of pollution*’ (Ref: C736F), and the following EA guidance:

- prevent pollution if you’re a business;

- report an environmental incident;
- store oil and any oil storage regulations;
- work on or near water and manage water on land.

Deliveries of all chemicals will be unloaded and transferred to suitable storage facilities. Areas and facilities for the storage of chemicals and liquid specialist materials will be situated within secondary containment, such as bunds. Secondary containment facilities will have capacity to contain whichever is the greater of 110% of the tank capacity or 25% of the total volume of materials being stored, in case of failure of the storage systems.

Tanker off-loading of chemicals will take place within areas where the drainage is contained with the appropriate capacity to contain a spill during delivery. All of plot I is impermeable concrete and surrounded by tertiary containment – refer to Appendix A. This includes measures such as areas of impermeable surface with falls to a gully and/or sump/local interceptor. All sumps/local interceptors pump directly to Area 1 of the lagoon prior to treatment in Building 2 for reuse within the wet scrubber. Refer to section 2.5 for further information.

A number of spill procedures will be in place for identified potential spillage events. This will include the provision of suitable equipment such as spill kits to deal with any incidents. Staff will receive training in the use of such kits. Under all circumstances, priority will be given to the potential environmental and health impacts of spillages. Where appropriate, engineering controls will be employed to reduce the potential for or minimise the impact of spillages, such as bunded areas for above-ground fuel storage.

Any spillage that has the potential to cause environmental harm or to leave the Facility will be reported to the site management and recorded in accordance with installations inspection, audit and reporting procedures. The relevant regulatory authorities (Environment Agency / Health and Safety Executive) will be informed as specified as required in accordance with the Facility's documented management procedures should the spillage be significant.

In the event of a fire, contaminated water used for fighting fires will be contained through the use of an isolation valve to prevent discharge off-site. Additional storage will be available from site kerbing where appropriate and site lagoons can be used if required for storage of additional fire water.

2.2 Incoming waste management

2.2.1 Waste to be processed at the Facility

The Facility is designed to process a wide range of specialist waste which can be accepted in a range of packages, including wheeled bins, fibre board, plastic and steel drums, IBCs, boxes, bulk bags and gas cylinders. Liquid wastes will also be received in bulk tankers. The full list of EWC codes to be processed in the Facility are listed in Appendix K.

Checks will be made on the paperwork accompanying each delivery to ensure that only waste for which the plant has been designed will be accepted. If the checks identify that the waste is unacceptable, a dedicated quarantine area will be available for the storage of unacceptable waste prior to transfer off-site.

The size of the waste storage area will allow for adequate storage of waste, to ensure continuous operation through weekends and holiday periods, when deliveries will be reduced. It also provides capacity for shutdown periods, during which waste may be stored for a number of weeks.

2.2.2 Waste handling

2.2.2.1 Waste acceptance and pre-acceptance procedures

HRG has existing documented procedures for pre-acceptance and acceptance of wastes which has been implemented at its existing waste treatment facilities, which will be adapted to this Facility.

Procedures will be implemented on site for the review of incoming wastes at the gatehouse and for checking incoming wastes against the agreed specifications on a regular basis.

As according to the procedure, conforming packages are to be stored in designated storage areas by their hazard type. Waste will be recorded on the stock inventory with the associated complete laboratory analysis linked to each package. The waste acceptance procedures include further details on the wastes to be accepted for thermal treatment, including contaminants that make the waste hazardous and calorific value of the wastes.

Sampling of specialist wastes will be taken periodically and tested to verify conformity with the Facility's waste specifications, in accordance with EA Guidance titled, '*Sector Guidance Note S5.06: recovery and disposal of hazardous and non-hazardous waste*'.

Clinical wastes will not be subject to pre-treatment prior to incineration.

2.2.2.2 Receiving waste

Receiving waste will be in line with the Chemical Waste Appropriate Measures (refer to section 2.10.3) and the indicative BAT requirements of the following Environment Agency guidance:

- Healthcare waste: appropriate measures for permitted facilities;
- Sector Guidance Note S5.01: Incineration of waste: additional guidance; and
- Sector Guidance Note S5.06: recovery and disposal of hazardous and non-hazardous waste;

As such, the following measures will be implemented at the Facility:

- A high standard of housekeeping will be maintained in all areas and suitable equipment will be provided and maintained to clean up spilled materials.
- A waste tracking system will be implemented, using a barcode (or equivalent) system to provide traceability of the receipt and treatment / storage status of consignments.
- An on-site laboratory will be established (Building 20), enabling the analysis of samples of wastes that are to be sent for high temperature incineration or transfer off-site.
- Vehicles will be loaded and unloaded in designated areas provided with impermeable hard standing. These areas will have appropriate falls to local collection sumps to isolate any spillages.
- All wastes will be stored in bays equipped with 3m high fire walls where required or within individual segregated clad buildings. Only chemically compatible wastes will be stored in the same storage bays. Each storage will drain to a self-contained drainage system with local collection sump for isolation and cleaning of any spillages or leaks.
- Waste stock levels will be assessed daily, to ensure that there is sufficient storage capacity available to receive consignments on forthcoming days. All waste packages will be clearly labelled, providing details of the waste contents and the associated hazards. If not shown on the label, consignment details will be available from the waste tracking system.
- Wastes will be inspected on arrival, with a range of on-site verification checks being completed. These will include visual inspections, odour checks (where safe to do so), the use of chemical

test strips, compatibility testing and the use of both portable and fixed analytical equipment in onsite laboratory.

- Delivery and reception of waste will be controlled by a management system that will identify all risks associated with the reception of waste and shall comply with all legislative requirements, including statutory documentation.
- Incoming waste will be:
 - delivered in enclosed bins/vehicles/tankers;
 - unloaded or sampled at the relevant waste reception or sampling area pending inspection or laboratory analysis being completed; and
 - stored in enclosed, secure areas situated on areas of impermeable surface with sealed drainage, with regular monitoring of storage areas undertaken to check for pests, litter, odour, leaks or spillages.
- Design of equipment, buildings and handling procedures will ensure that litter does not disperse across the Site.
- Waste is only unloaded or stored within covered areas within buildings or under designated canopies.
- Waste acceptance procedures will be implemented to ensure that any wastes which are identified as being unsuitable for thermal treatment are placed in a designated quarantine area pending removal.
- Waste with a higher risk of causing any odour, litter or pest problems, and the date of arrival/duration of storage of the waste, will be identified and prioritised.
- Refrigeration will be provided for wastes that are required as per the appropriate measures.
- Further inspections will be undertaken by the plant operatives during bin tipping/waste unloading.
- Procedures and management systems for the delivery and reception of waste will be developed in accordance with Article 5 of the Waste Incineration Directive.
- In the event that waste is received at the Facility, but is not able to be processed, it will be transferred to a suitably licenced waste management facility for processing.
- Fire-fighting measures will be designed in consultation with the Local Fire Officers, with particular attention paid to waste reception and storage areas.

2.2.3 Waste blending

Suitable liquids and pumpable slurries will be mixed and blended within the tank farms prior to incineration.

Blending will be undertaken as according to the 'Waste Mixing and Blending' procedure. The procedure is in accordance with:

- Compatibility Testing Guidance for Bulking Operations in the Waste Treatment Industry – EA/HSE;
- EPA Chemical Waste Compatibility Chart; and
- internal documents such as the compatibility testing lab procedure and site compatibility matrix.

As per the waste pre-acceptance and acceptance procedure, incoming waste will be sampled in the on-site laboratory. Packaged waste liquids/slurries that are to be blended will be analysed and

checked for conformity by site chemists. Every drum will be sampled, or a composite sample for when the material is the same.

All tankers will be core sampled and compatibility tested prior to offloading into any storage tank.

The on-site chemists will determine which wastes are suitable and safe for blending. The first step will be a desk-based assessment to assess pH, odour, flammability, toxicity, and potential for exothermic reactions, gas generation, and polymerisation. If the waste passes the desk-based assessment, compatibility testing will be undertaken, following the EA/HSE joint guidance for Compatibility Testing Guidance for Bulking Operations in the Waste Treatment Industry.

Process chemists will produce a provisional blend list to assess any potential blends for incompatibilities. As according to the site's compatibility matrix, the assessment will assess for pH, odour, possible reactions or incompatibilities that may produce an exothermic reaction or gas generation.

Once the compatibility assessment is passed and signed off by the laboratory, tankers can be unloaded the packaged waste tank farms. Bulking/mixing can then commence.

Blends that fail the compatibility assessment will not be bulked. Non-conformant components of the blend can be isolated and tankered offsite to a suitably licensed waste disposal facility. As such, the competent on-site chemists can issue for blends to be re-worked so that they are compatible.

2.2.4 Waste Minimisation (minimising the use of raw materials)

A number of specific techniques will be employed to minimise the generation of residues, focusing on the following:

1. dioxin & furan reformation;
2. furnace conditions;
3. flue gas treatment control; and
4. waste management.

All of these techniques meet the Indicative BAT requirements from EPR5.01 and the waste Incineration BREF.

2.2.4.1 Dioxin & Furan reformation

As identified within EPR5.01 and the Waste Incineration BREF, there are a number of BAT design considerations required for the boilers. The boilers will be designed to minimise the formation of dioxins and furans as follows.

- Slow rates of combustion gas cooling would be avoided via boiler design to ensure the residence time would be minimised in the critical cooling section, to minimise the potential for de-novo formation of dioxins and furans.
- The gas residence time in the critical temperature range would be minimised by ensuring high gas velocities exist in these sections. The residence time and temperature profile of flue gas would be considered during the detailed design phase to ensure that dioxin formation would be minimised throughout the process.
- PAC will be injected to enhance the capture of dioxins as well as heavy metals.
- The boiler will be designed to ensure that the steam/metal heat transfer surface is a minimum temperature where the flue gas is in the de novo synthesis temperature range. It is HRG's understanding that this temperature is typically around 170°C, subject to other reaction considerations.

- Computational Fluidised Dynamics (CFD) will be applied to the design, where considered appropriate, to ensure gas velocities are in a range that negates the formation of stagnant pockets / low velocities.
- Minimising the volume in the critical cooling sections will ensure high gas velocities.
- Boundary layers of slow-moving gas along boiler surfaces would be prevented via design and a regular maintenance schedule to remove build-up of any deposits that may have occurred.

Taking the above into consideration, it is understood that the Facility will meet the requirements as detailed in EPR5.01.

2.2.4.2 Furnace conditions

A speed controlled induced draft fan will be used to draw the flue gas through the combustion chamber and boiler. The speed of the ID fan is controlled in such a way that the pressure in the primary combustion rotary kiln is maintained at an accurate negative pressure relative to atmosphere, preventing any flue gas discharge from the overall combustion process.

The stationary zone links the solid waste feed system to the rotary kiln and serves as a flue gas connection between the kiln and the post combustion chamber. In the stationary zone, two processes take place.

- Drying and pyrolysis of the solid waste introduced via the guillotine door. As the primary combustion air and the combustion gas flows through the kiln in counter current to the waste stream, the primary air is heated by the exiting ash and achieves its maximum temperature - and minimum oxygen concentration - at the inlet side of the rotating kiln and stationary zone, i.e. at the point where the waste is introduced.
- First phase of post combustion. The stationary part of the kiln is a critical component regarding maintenance and operational reliability, due to the combination of high flue gas temperatures, cold and possibly moist waste supply and moving action of the ram feeder and rotary kiln. Specific design measures are taken here to improve system reliability.

The combustible gases produced by the pyrolysis and partial combustion of the waste in the primary combustion chamber will be mixed with secondary air introduced at the front of the kiln and burn out completely in the post combustion chambers. The temperature of the flue gases will be in the range of 1100°C to 1200°C, for a minimum 2-seconds residence time. As the flue gases exit the stationary zone of the primary combustion, high calorific liquid and gases wastes will be injected into the flue gas stream as it exits the stationary zone of the primary combustion to further raise the flue gas temperature before it passes the secondary combustion section.

Furnace conditions will be optimised in order to minimise the quantity of residues arising for further disposal. Burnout in the furnace will either reduce the Total Organic Carbon (TOC) content of the bottom ash to less than 3%, or Loss on Ignition (LOI) of the bottom ash to less than 5%, by optimising waste feed rate and combustion air flows.

2.3 Flue gas treatment systems

The Facility will include a two-stage acid gas abatement system:

- dry scrubber (refer to section 2.3.1), using sodium bicarbonate as a reagent and bag filters to filter out the reacted reagent; and
- wet scrubber (refer to section 2.3.2), using sodium hydroxide.

There will also be activated carbon dosing and use of bag filters to remove particulates.

The cleaned flue gas from the flue gas treatment systems will be monitored and discharged to atmosphere via a 47m stack.

This two-stage flue gas treatment system is designed to ensure that the flue gases are suitably cleaned prior to release to atmosphere and comply with the requirements of the Waste Incineration BREF.

Close control of the flue gas treatment system will minimise the use of reagents and hence minimise the APCr produced.

2.3.1 Primary Flue Gas Treatment – Dry

After the energy recovery stage, the flue gas passes through a secondary flue gas cooling section where the temperature is controlled between 160°C and 200°C using ambient air as a cooling media, prior to treatment in the dry flue gas treatment system. The dry flue gas treatment systems consist of:

- dry acid gas scrubbing system, which utilises sodium bicarbonate as a reagent, to remove the majority of the acidic components in the flue gas;
- PAC dosing to abate emissions of volatiles, including dioxins & furans, heavy metals and VOCs; and
- bag filters are used to remove fly ash from the flue gas stream, including the above reagents, thus minimising emissions of dust/particulates.

The sodium bicarbonate dosing rate is controlled via the plant automation system, monitoring the actual dosing rate of additives (caustic) to the wet scrubber. Recirculation of sodium bicarbonate will not be included due to the high acid content of the flue gases. Therefore, sodium bicarbonate will be dosed on a once through basis.

Sodium bicarbonate and PAC will be injected into the flue gases upstream of the fabric filter in order to abate acidic gases, heavy metals and any remaining dioxins and furans. The sodium bicarbonate will abate the emission of acidic components, including hydrogen fluoride, hydrogen chloride and sulphur dioxide.

Following the injection of sodium bicarbonate and PAC, the flue gas will then pass through the fabric filters, which will remove the particulates and reaction products, collectively known as Air Pollution Control residues (APCr). The APCr will be collected in big bags. The dosing rate for the acid gas reagent will be controlled by the upstream acid gas pollutant concentration measurements and proportioned to the volumetric flow rate of the flue gases.

Sodium bicarbonate usage within the primary acid gas dry scrubbing system will be minimised by trimming reagent dosing to accurately match the acid load using fast response upstream acid gas monitoring. The plant preventative maintenance regime will include regular checks and calibration of the reagent dosing system to ensure optimum operation. Back-up feed systems will be provided to ensure no interruption in the dosing system. The bag filter is designed to build up a filter cake of unreacted acid gas reagent, which acts as a buffer during any minor interruptions in dosing.

The PAC and sodium bicarbonate dosing systems will be independently controlled.

2.3.2 Secondary Flue Gas Treatment – Wet

Following treatment of the flue gases within the dry flue gas treatment system, the flue gases will pass to the wet flue gas treatment system. The wet flue gas treatment system will be utilised to ensure compliance with the BAT-AELs for acid gases.

The wet flue gas treatment system consists of a two-stage wet scrubber utilising sodium hydroxide as the reagent. The secondary flue gas treatment system includes a bypass system which may be utilised in an absence of water to run the wet scrubber in extreme drought events.

The secondary flue gas treatment systems will consist of the following:

- a venturi type scrubber, with adjustable removal efficiency; and
- a column type scrubber, with integrated mist eliminator package.

The sodium hydroxide dosing rate will be controlled via a pH measurement in the scrubber liquid circuit to optimise the abatement of the wet scrubber, whilst minimising the consumption of the reagent but optimum amount of additive.

The nominal outlet temperature of the flue gas leaving the wet scrubber will be in the range of 50 – 70°C, with the flue gas fully saturated with water vapour.

Due to the nature of the waste which will be processed at the Facility, the secondary wet acid gas scrubbing system is required to polish the flue gases to ensure compliance with the BAT-AELs for all acid gases.

2.3.3 Flue gas treatment control – NO_x

The Facility will include a Selective Non-catalytic Reduction (SNCR) system using urea solution as a reagent.

The SNCR system will require the injection of a SNCR reagent (urea) into the duct between the secondary combustion chamber and the boiler via a number of nozzles. The location of the nozzles will be determined using CFD modelling. The optimal adjustment of the SNCR reagent injection and steady operation of the combustion process are crucial for maximising NO_x reduction through the SNCR system. These will be ensured by the following measures:

- integrated combustion control system including an automatic adjustment to the quality of the waste incinerated; and
- consistent oxygen and temperature profiles in the secondary combustion chamber by means of the swirl created by secondary air injection.

2.3.3.1 Waste management

The arrangements for the management of residues produced by the installation are presented in section 2.12. In particular, bottom ash from the combustion process and APCr from the flue gas treatment system will be transferred, stored and disposed of separately, i.e. there will be no mixing of these residues.

The procedures for handling of wastes generated by the Facility will be in accordance with the Indicative BAT requirements in EPR5.01 and the Waste Incineration BREF, refer to section 2.2.2.

2.3.3.2 Waste charging

The Facility will comply with the indicative BAT requirements for fuel charging outlined in the Waste Incineration Sector Guidance Note; the Waste Incineration BREF and the specific requirements of the IED.

- The combustion control and feeding system will be fully in line with the requirements of the IED. The conditions within the furnace will be continually monitored to ensure that optimal conditions are maintained and that the emission limits are complied with. Auxiliary burners will be installed and will be used to maintain the temperature in the combustion chamber.

- The waste charging and feeding systems will be interlocked with furnace conditions so that charging cannot take place when the temperatures drop below 1,100°C, both during start-up and if the temperature falls below 1,100°C during operation, or if air flows are inadequate.
- The Facility will be designed to ensure a residence time of 2 seconds at 1,100°C for gases in the secondary combustion chamber.
- It is anticipated that oxygen levels would be maintained at approximately 6% volume at the final combustion stage to ensure the destruction of organic species - this will be confirmed during detailed design and commissioning of the combustion process.
- The waste charging and feeding systems will also be interlocked with the continuous emissions monitoring system to prevent waste charging if the emissions to atmosphere are in excess of an emission limit value.
- Following the feed of waste onto the waste feed system the waste is moved mechanically by means of rams from the feed end, to push the waste into the rotary kiln.
- The backward flow of combustion gases and the premature ignition of waste will be prevented by ensuring that the furnace is maintained under negative pressure.
- Between the lift charging door and the primary chamber of the kiln is a refractory lined tunnel which prevents any waste being drawn up into the loader hopper.
- In a breakdown scenario, operations will be reduced or closed down as soon as practicable until normal operations can be restored.

The waste feed rate to the furnace will be controlled by the combustion control system. If there is an intermediate waste feed-stop, requiring the auxiliary burners to operate to maintain the operation of the Facility without entering shutdown, the flue gas treatment systems will remain in operation.

2.4 Bin/Empty container washing

In accordance with EA guidance EPR 5.07, empty clinical waste bins will be washed and disinfected within the HTTT Building 12. IBC/Drums/Smaller Containers once emptied will be washed within Building 35 using specialist container washing equipment and water. Residues from the washing process will be collected and then blended for incineration as low calorific value liquids. Containers then will be tested for reuse or resized or crushed for recycling elsewhere within the GRG group once decontaminated. Empty containers will then be moved to a clean storage area ready for collection and reuse.

The following 'appropriate measures' will apply with regard to the cleaning of storage areas and containers:

- the use of a suitable surface material in storage areas to enable effective and regular cleaning and disinfection of surfaces;
- the checking of any re-useable mobile rigid containers (such as bins) and regular cleaning and disinfection of the containers once waste has been removed;
- the inspection of waste transport containers prior to each reuse to ensure their integrity, cleanliness and ability to meet the requirements for the Carriage of Dangerous Goods;
- demonstration that the cleaning and disinfection measures described above are capable of removing contamination and achieving disinfection across a broad spectrum of microorganisms, and capable of either not producing or containing emissions of pathogens or chemical agents; and

- containment of wash waters within an impermeable area, with appropriate incineration through the plant.

For operational reasons, empty, unwashed bins may be transferred to a suitably permitted facility to be cleaned and disinfected if required.

2.5 Water use and drainage

The water system has been designed with two key objectives:

- minimal process water discharge; and
- minimal consumption of potable water.

Under normal operation, the Facility will consume approximately 7 m³/hr, with the principal consumer of water being the wet scrubber.

The Facility will have separate surface and process water systems.

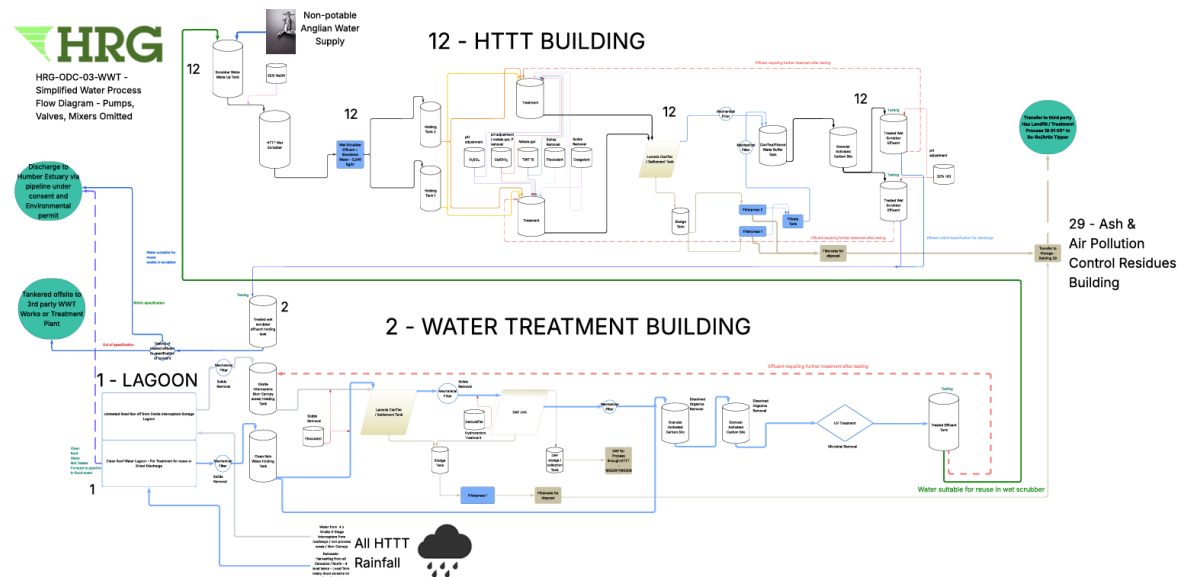
There is an on-site attenuation lagoon to allow for the reuse/bulk holding of water prior to treatment. The lagoon will be split into two areas, as so:

- Area 1 – for the storage of untreated road runoff from onsite interceptors.
- Area 2 – for the storage of clean roof water.

The lagoon will have an overall capacity of 3,125m³.

Figure 2 is the overall flow diagram of the various water processes. Refer to Appendix A for a full-sized version of the diagram.

Figure 2: Water Processes Flow Diagram



2.5.1 Surface water

The surfacing within vehicle movement and waste processing/handling areas will be impermeable cast in-situ concrete of a minimum of 250mm thickness - the thickness will increase in waste processing areas.

The management of surface water at the Facility will be as follows:

- Plot C has no waste storage or processing on it, just being an office building, weighbridge and gatehouse. The surface water runoff will drain to a local interceptor and then directed via fixed pipework and pumping systems to the wastewater treatment plant in Building 2. The collected water will then be used to produce wet scrubber make-up water.
- Plot I is used for all waste storage and processing activities. All storage or process areas (excluding tank farms) are covered. This includes canopy areas between storage buildings. Water streams from Plot I are processed as detailed below.

Surface water run-off from covered/roofed areas is clean water and will be collected and controlled as follows:

- Water from all roofs and canopies around the site is captured and stored in local rainwater tanks. These are fitted with rotary screens and local sumps to remove organic matter. The water is then pumped from the local tank to Area 2 of the lagoon.

Surface water runoff in non-covered areas will be collected and controlled as follows:

- Run-off from all roadways and areas not covered by canopies will pass through local three stage interceptors and then pumped into Area 1 of the attenuation lagoon. Plot I is split into 4 areas (each corner) where rainfalls falls to a low point and local collection sump.
- No waste handling/processing will be undertaken outside of canopied bunded areas; therefore, minimising the risk of chemical contamination. However, vehicles pass through these areas so there is expected to be some hydrocarbons present within this water.
- The three stage interceptors are pumped from the third stage directly into Area 1 of the lagoon. This is controlled with level gauges and a HMI panel so the lagoon cannot be overfilled.
- The lagoon is designed in accordance with CIRIA guidance and designed to prevent any possible contamination from any residual hydrocarbons in the material.

The water collected in both Area 1 and Area 2 of the lagoon will be diverted for treatment in a WWT plant within Building 2. The treated water will be held in a holding tanking for testing in the onsite laboratory. This will be used to generate wet scrubber make up water (within Building 12) if after testing it is determined the treated water is within specification.

If the water does not pass the laboratory testing it will be re-treated within the Building 2 water treatment process.

2.5.2 Process effluent

The initial treatment step for wet scrubber effluent is undertaken in a dedicated wastewater treatment (WWT) plant within Building 12 (where the effluent is produced). The site is expected to produce approximately 3 tonnes per hour whilst operating of wet scrubber water requiring treatment.

Treatment within Building 12 includes a variety of filtration, precipitation, coagulation, absorption, neutralisation and flocculation techniques to remove contaminants (refer to Figure 1).

The contaminants are concentrated in a sludge and then passed through a filter press to produce a solid waste filter cake. The filter cake is stored in Building 29 (refer to Site Layout Plan) with all other WWT treatment residues. The filter cake is tested in the onsite lab prior to offsite disposal.

Treated effluent is held in a holding tanking for testing in the onsite lab. If the effluent does not pass the laboratory testing it will be retreated within the Building 12 WWT treatment process. If after testing the treated effluent is within emission limits of the EP, it will be transferred to a holding tank within Building 2.

Once in the holding tank within Building 2, a second set of laboratory tests will be undertaken to determine if it can be discharged to the Humber Estuary under consent, or if it has to be transferred off-site to a suitably licensed facility.

2.5.3 Washdown water

There will be no leachate from any storage areas, as all storage areas are under cover (excluding the tank farm bunds). All waste storage and processing areas are under cover or within buildings so minimal contaminated rainwater will be produced during operations.

The drainage from waste handling and reception areas will be designed so that the run-off/washdown from these areas is diverted to and collected in a sump. Therefore, in the event of a spill/incident any spillages will collect in a sump and be redirected for incineration.

2.5.4 Domestic effluent

There are no readily accessible public sewers within the vicinity of the site. Therefore, a package treatment plant will be installed on-site to treat domestic effluents from the office building (plot C). A separate EP application will be submitted for the treatment and discharge of domestic effluents.

2.6 Emissions

2.6.1 Point source emissions to air

The cleaned flue gas from the Facility will be monitored for pollutants and discharged to atmosphere via a stack that is 47m from the 2m development platform.

The source of point source emissions to air from the Facility are presented in Table 4.

Table 4: Proposed emission points

Emission Point Reference	Source
A1	HTI Stack
A2	Emergency diesel generator

The full list of proposed emission limits for atmospheric emissions from the Facility is shown in Table 5.

Table 5: Proposed air emission limit values (ELVs) – Facility

Parameter	Units	Half Hour Average	10-minute average	Daily Average	Periodic Limit
Emission Point A1					
Particulate matter	mg/Nm ³	30		5	
VOCs as Total Organic Carbon (TOC)	mg/Nm ³	20		10	
Hydrogen chloride	mg/Nm ³	60		6	
Carbon monoxide	mg/Nm ³		150	50	
Sulphur dioxide	mg/Nm ³	90		30	

Parameter	Units	Half Hour Average	10-minute average	Daily Average	Periodic Limit
Oxides of nitrogen (NO and NO ₂ expressed as NO ₂)	mg/Nm ³	200		120	
Ammonia				10	
Hydrogen fluoride	mg/Nm ³				1
Cadmium & thallium and their compounds (total)	mg/Nm ³				0.02
Mercury and its compounds	mg/Nm ³				0.02
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	mg/Nm ³				0.3
Benzo(a)pyrene (PaHs)	µg/Nm ³				0.04
Dioxins & furans	ng I-TEQ/Nm ³				0.04
Dioxins & furans and dioxin-like PCBs	ng WHO-TEQ/Nm ³				0.06

*All expressed at 11% oxygen in dry flue gas at standard temperature and pressure.
Averaging period for carbon monoxide is 95% of all 10-minute averages in any 24-hour period.*

2.6.2 Fugitive emissions to air

In addition to the point source emissions to air, potentially there will be fugitive emissions to air from refilling of raw material storage facilities, such as tanks, bags and silos. Where appropriate, these will be vented to the tanker during any tank refilling.

The reagent silos will be filled by bulk tanker and offloaded pneumatically, with displaced air vented to the atmosphere through a fabric filter located on top of the silo. Any filter residues will be returned to the silo. Cleaning of the filter will be done automatically with compressed air after filling, with the filter regularly inspected for leaks.

PAC will be delivered by road in bags/tanker and stored in a designated storage area/silo.

All waste handling activities will be undertaken within enclosed buildings or under the canopy; and therefore, will minimise fugitive emissions of dust from the Facility. All waste will be delivered to the Facility in waste containers/receptacles and/or enclosed waste delivery vehicles.

2.6.2.1 Waste handling and storage

Waste reception and handling will be undertaken in the covered waste reception area (Building 26) and within enclosed storage areas, which will prevent the release of litter and dusts. A summary of the waste storage and handling arrangements are provided in section 3.1.1.4.

Suitable procedures, equipment and disinfectants will be in place to deal with any spillages that may occur, with staff made aware of the location of equipment/disinfectants and trained in their use.

Primary combustion air will be drawn from the waste storage area to maintain negative pressure in the building and fed into the primary combustion chamber.

Regular cleaning and good housekeeping of the waste reception and storage areas minimise the potential for the release of any litter and dusts.

2.6.2.2 Silos

All silos (sodium bicarbonate and PAC) containing solid or powdered materials will be fitted with bag filter protection to prevent the uncontrolled release to dusts during refilling. Maintenance procedures will be developed for routine inspection and testing of the bag filters.

2.6.3 Point source emissions to water

Overall, the Facility is designed to minimise the volumes of effluent requiring discharge off-site. Under normal operating conditions, wastewater will be generated from the following processes:

- reject water from the water treatment plant;
- process effluent (e.g. boiler blowdown);
- blowdown from the wet scrubber; and
- effluent generated through washing and maintenance procedures.

Surface water run-off from building roofs and areas of hardstanding will be collected in the surface water drainage system or local collection tanks for roof water run-off. Run-off from hardstanding will be directed to Area 1 of the lagoon from local interceptors, and surface water run-off from building roofs will be directed to Area 2 of the lagoon from local tanks. Surface water drainage systems will all drain or be pumped into the onsite lagoon to enable the reuse of the water in the wet scrubber. Therefore, surface water will be kept separate from process effluents.

In a flood event, the uncontaminated roof water from Area 2 of the lagoon will be discharged to the estuary, if required.

Effluents from washing containers will be incinerated, refer to section 2.4.

Only treated wet scrubber effluent that cannot be reused will be routinely discharged to estuary. The scrubber effluent will only be discharged to estuary if the effluent passes laboratory testing determines it is within the EP concentration limits, otherwise the effluent will be transferred to a suitably licensed waste management facility.

Discharge to water will comply with the BAT-AELS for 'direct emissions to water' stated in the Waste Incineration BREF (refer to Table 6).

Table 6: BAT-AELS for direct emissions to water

Parameter	BAT-AEL (µg/l)
Antimony	900
Arsenic	50
Cadmium	30
Chromium	100
Copper	150
Lead	60
Mercury	10
Nickel	150
Sulphate	1,000,000

Parameter	BAT-AEL ($\mu\text{g/l}$)
Thallium	30
Zinc	500

An assessment of the environmental impact on emissions to water from the discharge of treated effluent is presented in Appendix I. The assessment confirms that the impact of emissions to water will generally achieve compliance within less than 5m of the outfall throughout the tidal cycle. In addition to compliance with the BAT-AELs, it is proposed that an Improvement Condition is included in the EP which requires HRG to undertake analysis of the treated effluent generated to confirm that it is in accordance with the emission parameters utilised within the water quality assessment.

The discharge to the Humber Estuary is via an existing pipeline within the Estate that combines effluent from other industrial facilities within the Estate, refer to the Emission Points drawing presented in Appendix A. The emissions point for emissions to water from the Facility is located at the point of discharge into the shared pipeline within the Estate.

2.6.4 Point source emissions to sewer

There are no accessible trade effluent sewerage systems within the Estate. Therefore, there are no point source emissions to sewer from the Facility.

2.6.5 Noise

A noise assessment for the Facility is presented in Appendix C. The impact of noise from the Installation is considered in the noise assessment contained in Appendix C of the Application Pack. The assessment indicates a negligible and therefore not significant impact in accordance with to BS 4142 for the residential and ecological receptors.

2.6.6 Odour

The storage and handling of incoming waste has a limited potential to give rise to odour. All wastes which are delivered to the Facility will be delivered in enclosed containers and stored within the containers prior to processing. The Facility will not be processing wastes which will inherently have a high putrescible content. Therefore, the risk of odours being generated by the wastes being processed at the Facility is considered to be low.

The Facility will be designed in accordance with the requirements of Environment Agency Guidance Note H4: Odour and will include controls to minimise odour during normal and abnormal operation. Incoming waste will be managed to prevent fugitive emissions of odour.

Waste handling and storage will be undertaken in an enclosed building (refer to Appendix A). Waste will be stored in secure, closed containers, prior to loading onto the feeder and being transferred to the furnace. The containers will only be opened when being directly fed into the waste hopper. This minimises the potential for any release of dusts, litter or odour. Primary air for the combustion process is taken from within the main building, creating negative pressure and minimising emissions of odour from the Facility.

When the Facility is not in operation, the incoming wastes will be stored in the enclosed containers to prevent the escape of potential odours. When it is practicable to do so, it will be transferred to a suitably licenced waste management facility.

2.7 Monitoring

Sampling and analysis of all pollutants will be carried out to CEN or equivalent standards (e.g. ISO, national, or international standards) and in accordance with the Environment Agency's MCERTS scheme. This ensures the provision of data of an equivalent scientific quality and compliance with the requirements of the EP in relation to emissions monitoring.

Where appropriate, methods and standards used for monitoring of emissions will be in compliance with EPR5.01 and the IED. In particular, CEMS equipment will be certified to the MCERTS standard.

The Facility will also be equipped with modern monitoring and data logging devices to enable checks to be made of process efficiency.

The purpose of monitoring has three main objectives:

1. To provide the information necessary for efficient and safe plant operation;
2. To warn the operator if any emissions deviate from predefined ranges; and
3. To provide records of emissions and events for the purposes of demonstrating regulatory compliance.

2.7.1 Monitoring emissions to air

The cleaned flue gases will be monitored for pollutants and discharged to atmosphere via the stack.

The following parameters for the emissions from the Facility will be monitored and recorded continuously using a Continuous Emissions Monitoring System (CEMS):

- Carbon monoxide;
- Hydrogen chloride;
- Sulphur dioxide;
- Nitrogen oxides;
- Ammonia;
- Volatile organic compounds (VOCs);
- Particulates; and
- Mercury.

In addition, the oxygen content, water vapour content, temperature, flow rate and pressure of the flue gases will be monitored so that the emission concentrations can be reported at the reference conditions required by the Industrial Emissions Directive (IED).

Once operational, in addition to the CEMS system, emissions to air from the Facility will be subject to periodic surveillance tests by independent testing company's at frequencies to be agreed with the EA.

In addition to the CEMS system, the following emissions from the Facility will also be monitored by means of periodic spot sampling at frequencies agreed with the Environment Agency:

- Group 3 Heavy Metals [antimony (Sb), arsenic (As), lead (Pb); Chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni), Vanadium (V)];
- Cadmium (Cd) and thallium (Tl);
- Mercury (Hg);
- Hydrogen fluoride;
- Benzo(a)pyrene (PaHs);

- Dioxins and furans; and
- Dioxin like PCBs.

The methods and standards used for emissions monitoring will be in compliance with guidance note EPR5.01 and the IED. In particular, the CEMS equipment will be certified to the MCERTS standard.

Sampling and analysis of all pollutants including dioxins and furans will be carried out to CEN or equivalent standards (e.g. ISO, national, or international standards). This ensures the provision of data of an equivalent scientific quality.

The frequency of periodic measurements will comply with the emission limits within the EP as a minimum. The flue gas sampling techniques and the sampling platform will comply with Environment Agency Technical Guidance Notes M1 and M2.

All monitoring results shall be recorded, processed and presented in such a way as to enable the EA to verify compliance with the operating conditions and the regulatory emission limit values within the EP.

Periodic monitoring will be undertaken by MCERTS accredited stack monitoring organisations.

2.7.1.1 Reliability

IED Annex VI Part 8 allows a valid daily average to be obtained only if no more than 5 half-hourly averages during the day are discarded due to malfunction or maintenance of the continuous measurement system. IED Annex VI Part 8 also requires that no more than 10 daily averages are discarded per year. These reliability requirements will be met primarily by selecting MCERTS certified equipment.

Calibration of the CEMS will be carried out at regular intervals as recommended by the manufacturer and by the requirements of BS EN14181 and the BS EN 15267-3. Regular servicing and maintenance will be carried out under a service contract with the equipment supplier. The CEMs will be supplied with remote access to allow service engineers to provide remote diagnostics.

Should a problem with the CEMS occur, the plant would shut down until the relevant maintenance and repairs have been carried out.

2.7.1.2 Start-up and shut-down

In accordance with the Environment Agency's draft Guidance for '*Deriving start-up and shut-down definitions for waste incinerators and co-incinerators*', the start-up and shutdown conditions have been defined. The pre-start-up conditions and start-up complete conditions are presented within Table 7 and Table 8; and the commencement of shutdown and shutdown complete conditions are presented within Table 9 and Table 10.

Table 7: Pre-start-up and beginning of start-up

	Criteria
Before the support burners can be lit, the adjacent criteria must be met:	<ul style="list-style-type: none"> • CEMS are operational • System check performed; starting position of equipment is checked, if needed adjusted and acknowledged • If feedback on all items is according to preconditions set auto start-up is carried out; equipment is started in pre-programmed sequence. Feedback is given via electronic 'mimic board' to advise on status. As one of the items in this sequence ID fan to reach and control a preset pressure, primary and secondary burners are started
Before waste feed begins, the adjacent criteria must be met:	<ul style="list-style-type: none"> • The dosing systems for the dry scrubber system is in operation and the bag filters have been coated with a sufficient quantity of lime and active carbon • Wet scrubber system is in operation including scrubber water ancillaries e.g., pH correction etc. • Support burners have been lit and the ID fan and air supply fans are in operation
Waste feed begins when:	<ul style="list-style-type: none"> • All of the above criteria have been met • Secondary combustion chamber operating temperature is minimum 1100°C

Table 8: Start-up sequencing is complete – normal operation commences

	Criteria
Start-up finishes and normal operating conditions commence when all of the following are true: Once normal operating conditions have commenced, permit ELVs apply	<p>All earlier criteria mentioned under start up etc. are still met</p> <ul style="list-style-type: none"> • Secondary combustion chamber temperature is above 1100°C • Start-up burners are in operation to prevent decrease of combustion temperatures below the values described. Gradual reduction to in burner operation over 60mins at which point they are turned off • Pressure in post combustor is maintained to ensure sufficient oxygen needed for the thermal treatment process • Oxygen content is < 15%

Table 9: Beginning of shutdown – normal operation ends

	Criteria
<p>Normal operating conditions cease and shut-down begins when all of the adjacent criteria are true:</p> <p>Once normal operating conditions have ceased, permit ELVs no longer apply</p>	<ul style="list-style-type: none"> • Waste feed has ceased • Shutdown sequence initiated (an automatic pre-programmed sequence is activated from the control room) • Burners operational • Oxygen content > 15% • 90 mins have elapsed since waste feed ceased

Table 10: End of shutdown

	Criteria
<p>Shut-down ends when:</p>	<p>Preprogrammed sequence has ended, this sequence is as follows:</p> <ul style="list-style-type: none"> • All waste within the primary and secondary combustion chambers has been burnt out • Burners are switched off • When preset primary temperature reaches 200 degrees, auto shutdown of the remaining process is triggered; among other systems wet and dry scrubbing systems and ID fan stops

2.7.2 Monitoring emissions to water

Periodic monitoring of emissions to water will be completed monthly to demonstrate compliance with the emission limits presented in the EP. In addition, a flow meter will be provided to undertake continuous monitoring of the temperature and flow rate of the treated effluent prior to discharge into the drainage system for the Estate.

2.7.3 Monitoring of process variables

The Facility will be controlled from a dedicated Control Room. A modern control system, incorporating the latest advances in control and instrumentation technology, will be utilised to control operations, optimising the process relative to efficient heat release, good burn-out and minimum particle carry-over. The system will control and/or monitor the main features of the plant operation including, but not limited to the following:

- combustion air;
- fuel feed rate;
- SNCR system;
- flue gas oxygen concentration at the boiler exit;
- flue gas composition at the stack;
- combustion process;
- boiler feed pumps and feedwater control;

- steam flow at the boiler outlet;
- steam outlet temperature and pressure;
- boiler drum level control; and
- flue gas control.

The response times for instrumentation and control devices will be designed to be fast enough to ensure efficient control.

The following process variables have particular potential to influence emissions:

- fuel throughput will be recorded to enable comparison with the design throughput. As a minimum, daily and annual throughput will be recorded;
- combustion temperature will be monitored at a suitable position to demonstrate compliance with the requirement for a temperature of at least 1,100°C;
- the differential pressure across the bag filters will be measured, in order to optimise the performance of the cleaning system and to detect bag failures; and
- the concentration of hydrogen chloride in the flue gases upstream of the flue gas treatment system will be measured in order to optimise the performance of the emissions abatement equipment.

Water use will be monitored and recorded regularly at various points throughout the process to help highlight any abnormal usage. This will be achieved by monitoring the incoming water supplies and the boiler water makeup. There will be a sampling point to enable process effluent discharged from the Facility to be sampled prior to discharge. This will enable the effluent to be sampled to demonstrate compliance with any requirements stated in the EP.

In addition, electricity and auxiliary fuel consumption will be monitored to highlight any abnormal usage.

2.7.3.1 Validation of combustion conditions

The Facility will be designed to ensure a residence time of 2 seconds at 1,100°C for gases in the in the secondary combustion chamber. This criterion will be demonstrated using Computational Fluid Dynamic (CFD) modelling during the design stage and confirmed by the recognized measurements and methodologies during commissioning in accordance with EPR5.01 and WRc guidance Note, titled '*Review of BAT for New Waste Incineration Issues: Part 2 Validation of Combustion Conditions*'.

It will also be demonstrated during commissioning that the Facility can achieve complete combustion by measuring concentrations of carbon monoxide, VOCs and dioxins in the flue gases and TOC of the bottom ash.

During the operational phase, the temperature at the 2-seconds residence time point will be monitored to ensure that it remains at 1,100°C. The location of the temperature probes will be selected using the results of the CFD model. If it is not possible to locate the temperature probes at precisely the 2-seconds residence time point, then a correction factor will be applied to the measured temperature.

2.7.3.2 Measuring oxygen levels

The oxygen concentration at the boiler exit will be monitored and controlled to ensure that there is adequate oxygen for complete combustion of the combustible gases. The oxygen concentration at the boiler exit will be controlled by regulating the combustion airflows and the waste feed rate.

2.8 Technology selection (BAT)

This section presents qualitative and quantitative BAT assessments for the following:

- combustion technology;
- NO_x abatement;
- acid gas abatement;
- particulate matter abatement;
- steam condenser; and
- back-up diesel generator.

The quantitative assessments, where appropriate, draw on information and data obtained by Fichtner from a range of different projects using the technologies identified as representing BAT from an initial qualitative assessment.

2.8.1 Combustion technology

The waste treatment/energy recovery technology will be a rotary kiln. The kiln is a cylindrical structure that slowly rotates. The slight downward inclination of the kiln from the horizontal plane will move the waste from the feed inlet to the residue discharge. The rotary movement turns and mixes the waste to ensure that all of the waste is exposed to the combustion process.

The Waste Incineration BREF and the BREF for Large Combustion Plants identify a number of alternative technologies for the combustion of waste. The suitability of these technologies among others has been considered, as follows:

1. Rotary and oscillating kilns

Rotary kilns are used widely within the cement industry which uses a consistent fuel feedstock and they have been used widely within the healthcare sector in treating specialist wastes.

An oscillating kiln is used for the thermal treatment of municipal waste at only two currently known sites in England and some sites in France. The energy conversion efficiency in these systems is lower than that of other thermal treatment technologies due to the large areas of refractory lined combustion chamber. Careful attention needs to be paid to the seals between the rotating kiln and the end plates to prevent leakage of gases and unburnt waste. Tumbling of the waste may generate fine particles requiring secondary combustion and good particulate abatement.

2. Grate furnaces

Grates are the leading technology in the UK and Europe for the combustion of biomass and non-specialist waste (including waste). The moving grate comprises an inclined fixed and moving bars (or rollers) or a vibrating grate that will move the waste/waste from the feed inlet to the residue discharge. The grate movement turns and mixes the waste/waste along the surface of the grate to ensure that all waste is exposed to the combustion process.

Grate systems are designed for large quantities of municipal waste (including heterogeneous waste). Due to the throughput of the proposed Facility, a grate furnace would not be considered suitable for the proposed Facility and have not been considered any further.

3. Fixed hearth

These are best suited to low volumes of consistent waste whose combustion has a low pollution potential. Fixed hearth incinerators are often used for animal carcass thermal treatment, where the containment offered by the fixed hearth may help to ensure that unburned liquids such as

fat do not leak out. The design may have difficulty in meeting Waste Incineration Directive (WID) standards, due to the semi-batch nature of the waste travel on the grate and de-ashing operations. Taking this into consideration, these systems are not considered suitable for the proposed Facility and have not been considered any further.

4. Pulsed hearth

Pulsed hearth technology has been used for refuse-derived fuels, as well as other solid wastes. However, there have been difficulties in achieving reliable and effective burnout of the waste/waste and it is considered that the burnout criteria required by Article 50(1) of the IED would be difficult to achieve. Therefore, these systems are not considered practical and have not been considered any further for the Facility.

5. Fluidised bed combustor

Fluidised beds are designed for the combustion of a relatively homogeneous fuel. Therefore, fluidised beds are appropriate for waste which has been pre-processed such as waste. However, the use of fluidised waste to treat waste and non-specialist in practice has resulted in significant operational problems which has led to significant downtime.

While fluidised bed combustion can lead to slightly lower NO_x generation, the injection of a NO_x reagent is still required to achieve the relevant emission limits.

Fluidised beds can have elevated emissions of nitrous oxide, a potent greenhouse gas. Some fluidised beds have been designed to minimise the formation of nitrous oxide.

6. Pyrolysis/Gasification

In pyrolysis, the waste/waste is heated in the absence of air, leading to the production of a syngas with a higher calorific value than from gasification. However, the process normally requires some form of external heat source, which may be from the combustion of part of the syngas.

Various suppliers are developing pyrolysis and gasification systems for the thermal treatment of waste fuels. However, the facilities which have been constructed have suffered issues with reliability and availability. Taking this into consideration, HRG does not consider pyrolysis and gasification systems to be a robust and proven technology for the treatment of waste. Therefore, these systems have not been considered any further.

A qualitative BAT assessment for a stepped hearth and a rotary kiln has been undertaken and is presented in Appendix F. As concluded in the BAT assessment:

- Stepped hearth systems are suitable for the thermal treatment of low volumes of specialist waste, particularly when residence time is controlled to achieve good waste burnout. However, the various complex moving parts may introduce a higher potential for mechanical failure.
- Rotary kilns enable the highest degree of flexibility, in terms of permitted waste types, and are better suited to processing the wastes types which will be processed at the Facility compared to stepped hearths. However, there can be difficulties with controlling primary air, the potential for slagging, higher PM emissions and the requirement for pre-treatment of waste. However, the technology provider for the Facility has extensive experience of designing plants to address these difficulties, and has mitigated against them within its design.

Taking the above into consideration, a rotary kiln system is considered to represent BAT for the thermal treatment of hazardous waste at the Facility.

2.8.2 NOx abatement systems

As stated within EPR5.01, there are three recognised technologies available for the abatement of emissions of NOx:

- Flue Gas Recirculation (FGR);
- Selective Non-Catalytic Reduction (SNCR); and
- Selective Catalytic Reduction (SCR).

1. FGR

Some combustion systems have been designed to operate with FGR and these suppliers can gain benefits of reduced NOx generation from the use of FGR. However, other suppliers of combustion systems have focused on reducing NOx generation through the control of primary and secondary air and the design of the combustion system, and these suppliers gain little if any benefit from the use of FGR. Even when FGR is implemented, additional NOx abatement is required to reduce NOx emissions to required levels under the IED and Waste Incineration BREF.

It can be confirmed that flue gas recirculation will be incorporated into the combustion process – an oxygen probe located in the flue will modulate the contribution of recirculated gases. The flue gas recirculation will reduce NOx formation as the recirculated gases will have a lower oxygen concentration and therefore lower flue-gas temperature.

2. SNCR

SNCR involves distributing a spray containing an aqueous SNCR reagent (urea solution) into the flue gas flow path at an appropriate location, typically the high temperature region of the boiler. The urea will react with the NOx formed in the combustion process to produce a combination of nitrogen, water and carbon dioxide. NOx levels are primarily controlled by monitoring the flow of combustion air.

Extensive dosing of reagent or low reaction temperatures can lead to ammonia slip, resulting in the formation of ammonia salts downstream in the flue gas path and discharge to atmosphere of unreacted ammonia. Ammonia slip may be controlled by employing systems to control the rate of reagent dosing to ensure that it is kept to a minimum.

SNCR is widely deployed across waste (including waste), biomass and coal power plants in the UK and Europe. It is proposed to use SNCR for the Facility to control NOx levels, in combination with controlling the combustion air through the combustion control system. Urea will be used as the reagent within the SNCR system.

3. SCR

In an SCR system the SCR reagent is injected into the flue gases immediately upstream of a reactor vessel containing layers of catalyst. The reaction is most efficient in the temperature range 200 to 350°C. The catalyst is expensive and to achieve a reasonable working life, it is necessary to install the SCR downstream of the flue gas treatment plant. This is because the flue gas treatment plant removes dust which would otherwise cause deterioration of the catalyst.

A quantitative BAT assessment of the available technologies has been undertaken and is presented in Appendix F, section 4. This assessment uses data obtained by Fichtner from a range of different projects using the technologies proposed in this application.

Table 11: BAT assessment – NO_x abatement

Parameter	Units	SNCR	SCR	SNCR + FGR
NO _x released after abatement	tpa	30	20	30
NO _x removed	tpa	60	70	50
Photochemical Ozone Creation Potential (POCP)	t ethylene-eq pa	-1,100	-800	-1,100
Global Warming Potential	t CO ₂ eq pa	100	200	100
Urea consumed	tpa	150	750	130
Total Annualised Cost	£ pa	£174,000	£426,000	£86,000
Average cost per tonne NO _x abated	£ p.t NO _x .	£2,900	£6,086	£1,720

As can be seen from the table above, applying SCR to the Facility:

1. increases the annualised costs by more than £252,000 per annum;
2. abates an additional 10 tonnes of NO_x per annum;
3. reduces the benefit of the facility in terms of the global warming potential by approximately 100 tonnes of CO₂;
4. reduces reagent consumption by approximately 600 tonnes per annum; and
5. costs 210% more per additional tonne of NO_x abated, compared to an SNCR system.

The additional costs associated with SCR are not considered to represent BAT for the Facility. On this basis, SNCR is considered to represent BAT.

Including FGR to the SNCR system to abate NO_x increases the cost per tonne of NO_x abated by nearly 59%, and has a small effect on the environmental impact of the Facility.

The proposed designs do not include FGR. Therefore, taking the above into consideration, the use of SNCR without FGR is considered to represent BAT for the abatement of NO_x within the Facility.

Also, as a secondary measure, catalytic bag filters will provide a polishing function to ensure that the emissions achieve the proposed emission limit for NO_x of 120mg/m³.

An additional dosing system for ammonia between the dry scrubber and the bag filters has been installed to allow for dosing of additional reagent (ammonia) which could be operated if it is identified during commissioning of the Facility that it is required to ensure compliance with the proposed emission limits.

The variations in the waste to be combusted will result in higher concentrations of NO_x within the boiler. The constraints in the design of the boiler – it is much smaller than a municipal waste incineration plant – also means it is not feasible to achieve a NO_x ELV of 100 mg/m³ without the implementation of Selective Catalytic Reduction (SCR).

Taking into consideration Table 11, the additional costs associated with SCR are not considered to represent BAT for the Facility. On this basis, SNCR and an emission limit of 120 mg/Nm³ is considered to represent BAT for the Facility.

2.8.3 Acid gas abatement system

There are currently three technologies widely available for acid gas treatment on similar plants in the UK.

1. Wet scrubbing, involving the mixing of the flue gases with an alkaline solution of sodium hydroxide or hydrated lime. This has a good abatement performance, but it consumes large quantities of water, produces large quantities of liquid effluent which require treatment and has high capital and operating costs. It is mainly used in the UK for specialist waste thermal treatment plants where high and varying levels of acid gases in the flue gases require the buffering capacity and additional abatement performance of a wet scrubbing system, such as the Facility.
2. Semi-dry, involving the injection of quick lime as a slurry into the flue gases in the form of a spray of fine droplets. The acid gases are absorbed into the aqueous phase on the surface of the droplets and react with the quick lime. The fine droplets evaporate as the flue gases pass through the system, cooling the gas. This means that less energy can be extracted from the flue gases in the boilers, making the steam cycle less efficient. The quick lime and reaction products are collected on a bag filter, where further reaction can take place.
3. Dry, involving the injection of lime or sodium bicarbonate into the flue gases as a powder. With lime systems, the reagent is typically collected on a bag filter to form a cake and most of the reaction between the acid gases and the reagent takes place as the flue gases pass through the filter cake. Using sodium bicarbonate, as is proposed for the Facility, results in decomposition of the sodium bicarbonate to carbonate, with the diffusion of carbon dioxide producing a highly porous, high surface area sodium bicarbonate which is very efficient at absorbing acid gases. The efficiency increases with higher flue gas temperatures, as is proposed at the Facility.

As explained in section 2.5, the Facility utilises a combination of wet and dry acid gas abatement systems for the abatement of acid gases. The primary acid gas abatement system is a dry system, with the wet system polishing the emissions to ensure compliance with the BAT AEL's for acid gases.

Dry and semi-dry systems can easily achieve the BAT-AEL emission limits required by the Waste Incineration BREF and operational records from plants in the UK and Europe have been demonstrated to achieve the proposed emission limits.

Therefore, the combined dry (primary abatement) and wet (secondary abatement) acid gas abatement systems are considered to represent BAT.

2.8.4 Particulate matter abatement

The Facility will use a multi-compartment fabric filter for the control of particulates. There are a number of alternative technologies available, but none offer the performance of the fabric filter. Fabric filters represent BAT for this type of thermal treatment plant for the following reasons.

- Fabric filters are a proven technology and are used in a wide range of applications. The use of fabric filters with multiple compartments, allows individual bag filters to be isolated in case of individual bag filter failure.
- Wet scrubbers are not capable of meeting the same emission limits as fabric filters.
- Electrostatic precipitators are also not capable of abating particulates to the same level as fabric filters. They could be used to reduce the particulate loading on the fabric filters and so increase the acid gas reaction efficiency and reduce lime residue production, but the benefit is marginal and would not justify the additional expenditure, the consequent increase in power consumption and significant increase in the carbon footprint of the Facility.

- Ceramic Filters have been used for some HTIs which operate with higher flue gas temperatures, but they are more prone to breakages than fabric filters.

Fabric filters are considered to represent BAT for the removal of particulates for the Facility.

The bag filter will not require a flue gas bypass station, as the bag filters will be preheated allowing start-up without a bypass, which is considered to represent BAT.

In addition, the wet scrubber will provide for the secondary abatement of particulates.

2.8.5 BAT Assessment for EDG

A standby diesel generator system will be present on-site to support safe shut down of the Facility in the event of an emergency shutdown.

The back-up electrical generator will provide a back-up supply of power to the Facility in the event of loss of grid connection requiring an emergency shutdown to be implemented. The control system for the generators will ensure that they only operate in the event that the grid connection is not available. Therefore, when considering the alternative combustion systems, the ability to being able to provide power in a short response period is fundamental in determining whether the alternatives represent BAT for the installation. A number of technologies are available and have been considered in more detail below.

(1) Turbines

Turbines can be used to supply electricity. However, they have delayed start-up periods which would not be suitable to satisfy the requirements of the Facility in the event of loss of grid connection.

Gas turbines are very expensive to install considering the limited hours of operation which it is anticipated that they will be required to operate for. Due to the delayed start-up periods and the costs associated with gas turbines, they are not considered to be suitable technology for this application.

(2) Electrical generator (engines)

Engines are typically used for the generation of electricity; however, heat can also be recovered from engines if heat is required. Engines have a fast response and very short start-up periods, which are required to provide the resilience of power supply required by the Facility in the event of loss of grid connection. Taking the above into consideration, engines are considered to represent BAT for the Facility.

(3) Boilers and heaters

This type of system is typically used to provide heat/steam and will not generate electricity. On this basis, boilers and heaters are not considered to represent BAT for the Facility.

(4) Co-generation using gas engines

These systems have a very high thermal efficiency. All of the energy in the fuel is recovered as far as reasonable practicable to generate heat and power. The Facility requires a back-up supply of electricity. On this basis, co-generation using gas engines is not considered to be a suitable technology for the requirements of the Facility as there is no requirement for a back-up heat supply.

(5) Combined cycle combustion

Whilst combined cycle combustion is an efficient way of recovering energy from the combustion of fuel and is widely applied in the UK and across Europe, typically they are used

for large combustion plants. Therefore, they are not considered to be a suitable source of standby power for the Facility in the event of loss of grid connection.

Taking the above into consideration, back-up electrical generators (engines) are the only available technology which is considered to represent BAT for provision of a standby source of electricity for the Facility in the event of loss of grid connection.

In a normal operating scenario, the back-up generator will only be required to operate for maintenance and testing purposes. On this basis, they will only operate for up to 50 hours per year. The likelihood of a loss of power (i.e. loss of grid connection) is low. However, in the unlikely event that there is a loss of grid connection, it is vital that there is a sufficient backup electrical power supply for critical systems to enable safe shutdown of the Facility.

2.9 Ancillary operations

A reverse osmosis water treatment plant will be installed, capable of treating the mains water to produce high quality water suitable for use as feed water for the boiler.

Water treatment chemicals will be stored within a suitably contained storage area. Water for firefighting will be supplied from a 1,633m³ on-site sprinkler tank (44 on the Site Layout Plan), with water delivered by diesel-driven firewater pumps. The water will be sourced from mains water and Area 2 of the on-site lagoon.

2.9.1 EDG Emission limit value exclusion

A standby diesel generator system will support safe shut down of the Facility in the event of an emergency shutdown.

The EU MCPD¹ states:

'In order to take account of certain specific circumstances where the application of emission limit values would lead to disproportionately high costs compared to the environmental benefits, Member States should be able to exempt medium combustion plants used in cases of emergency and operated during limited time periods from compliance with the emission limit values set out in this Directive.'

'Member States may exempt existing medium combustion plants which do not operate more than 500 operating hours per year, as a rolling average over a period of five years, from compliance with the emission limit values'

The purpose of back-up electrical generator is to provide backup electrical power to critical systems in the event of a loss of power, i.e. loss of grid connection, to enable safe shutdown of the Facility.

The EDG can be operated at a maximum of 500 hours per year, and a maximum of 50 hours testing per year.

As such, emission limit values do not apply to back-up electrical generators due to its usage in cases of emergency and operation during the limited time periods.

2.9.2 Monitoring requirements

The following monitoring requirements for point source emissions to air will apply to the additional emission point:

¹ Directive (EU) 2015/2193 <https://eur-lex.europa.eu/eli/dir/2015/2193/oj/eng>

- Parameter - Carbon monoxide
- Monitoring frequency - first measurement within 4 months of first operation, then every 1500 hours of operation or once every five years (whichever comes first).
- Monitoring standards/methods - in line with the '*Monitoring stack emissions: low risk MCPs and specified generators*' Guidance (16 February 2021).

2.9.3 Additional information

The MCPD Spreadsheet has been completed as per Question 2i of application form B2.5, refer to the Application Forms folder as part of the Application Pack. A summary of the information is as follows:

- The Facility is to have one stationary back-up generator.
- The aggregated net rated thermal input is 4.77 MWth.
- The primary fuel type will be Ultra-Low Sulphur Diesel (ULSD).
- There will be no secondary fuel type.
- The engines are to be United States Environment Protection Agency (US EPA) Tier 2 certified. As according to the EA's 'Emergency backup diesel engines on installations: best available techniques (BAT)' Guidance, the US EPA Tier 2 standards are acceptable proof of BAT plant.
- The engines are to be new and have not yet been operated.
- The Nomenclature of Economic Activity code is 35.11.

2.10 The Legislative Framework

The relevant legislative requirements which are applicable to the Facility are as follows:

- Industrial Emissions Directive (2010/75/EU);
- Waste Incineration BREF; and
- Chemical waste: appropriate measures for permitted facilities.

2.10.1 Specific requirements of the Industrial Emissions Directive (2010/75/EU)

This section presents information on how the Facility will comply with the waste incineration requirements of the Industrial Emissions Directive (IED).

Chapter IV of the IED includes 'Special Provisions for Waste Incineration Plants and Waste Co-incineration Plants'. Review of provisions for waste incineration as presented in the IED has identified that the following requirements could be applicable to the Facility:

- Article 46 – Control of Emissions;
- Article 47 – Breakdown;
- Article 48 – Monitoring of Emissions;
- Article 49 – Compliance with Emission Limit Values;
- Article 50 – Operating Conditions;
- Article 52 – Delivery & Reception of Waste;
- Article 53 – Residues; and
- Article 55 – Reporting & public information on waste incineration plants and waste co-incineration plants.

The following table identifies the relevant Articles of the IED and explains how the Facility will comply with them. Many of the articles in the IED impose requirements on regulatory bodies, in terms of the EP conditions which must be set, rather than on the operator. The table below only covers those requirements which the IED imposes on 'Operators' and either explains how this is achieved or refers to a section of the application where an explanation can be found.

Table 12: Summary table for IED compliance – Facility

Article	Requirement	How met or reference
15(3)	The competent authority shall set emission limit values that ensure that, under normal operating conditions, emissions do not exceed the emission levels associated with the best available techniques as laid down in the decisions on BAT conclusions referred to in Article 13(5) through either of the following.	Refer to section 2.5 and 2.10.2.
22(2)	<p>Where the activity involves the use, production or release of relevant hazardous substances and having regard to the possibility of soil and groundwater contamination at the site of the installation, the operator shall prepare and submit to the competent authority a baseline report before starting operation of an installation or before a permit for an installation is updated for the first time after 7 January 2013.</p> <p>The baseline report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for under paragraph 3.</p> <p>The baseline report shall contain at least the following information:</p> <p>(a) information on the present use and, where available, on past uses of the site;</p> <p>(b) where available, existing information on soil and groundwater measurements that reflect the state at the time the report is drawn up or, alternatively, new soil and groundwater measurements having regard to the possibility of soil and groundwater contamination by those hazardous substances to be used, produced or released by the installation concerned.</p> <p>Where information produced pursuant to other national or Union law fulfils the requirements of this paragraph that information may be included in, or attached to, the submitted baseline report.</p>	Refer to Appendix B - Site Condition Report.
44	<p>An application for a permit for a waste incineration plant or waste co-incineration plant shall include a description of the measures which are envisaged to guarantee that the following requirements are met:</p> <p>(a) the plant is designed, equipped and will be maintained and operated in such a manner that the requirements of this Chapter are met taking into account the categories of waste to be incinerated or co-incinerated;</p>	Refer to Appendix G which lists the categories of waste to be incinerated at the Facility.

Article	Requirement	How met or reference
	(b) the heat generated during the incineration and co-incineration process is recovered as far as practicable through the generation of heat, steam or power;	Refer to Appendix G – CHP assessment.
	(c) the residues will be minimised in their amount and harmfulness and recycled where appropriate;	Refer to Section 2.12 of the Supporting Information.
	(d) the disposal of the residues which cannot be prevented, reduced or recycled will be carried out in conformity with national and Union law.	Refer to Section 2.12 of the Supporting Information.
46 (1)	waste gases from waste incineration plants and waste co-incineration plants shall be discharged in a controlled way by means of a stack the height of which is calculated in such a way as to safeguard human health and the environment.	Refer to Appendix E – Air Quality Assessment.
46 (2)	Emissions into air from waste incineration plants and waste co-incineration plants shall not exceed the emission limit values set out in parts 3 and 4 of Annex VI or determined in accordance with Part 4 of that Annex.	Refer to Table 5.
46 (5)	waste incineration plant sites and waste co-incineration plant sites, including associated storage areas for waste, shall be designed and operated in such a way as to prevent the unauthorised and accidental release of any polluting substances into soil, surface water and groundwater. Storage capacity shall be provided for contaminated rainwater run-off from the waste incineration plant site or waste co-incineration plant site or for contaminated water arising from spillage or fire-fighting operations. The storage capacity shall be adequate to ensure that such waters can be tested and treated before discharge where necessary.	Refer to Appendix B – Site Condition Report, Appendix D – Environmental Risk Assessment.
46 (6)	Without prejudice to Article 50(4)(c), the waste incineration plant or waste co-incineration plant or individual furnaces being part of a waste incineration plant or waste co-incineration plant shall under no circumstances continue to incinerate waste for a period of more than 4 hours uninterrupted where emission limit values are exceeded. The cumulative duration of operation in such conditions over 1 year shall not exceed 60 hours. The time limit set out in the second subparagraph shall apply to those furnaces which are linked to one single waste gas cleaning device.	Refer to Appendix E – Abnormal Emissions Assessment.
47	In the case of a breakdown, the operator shall reduce or close down operations as soon as practicable until normal operations can be restored.	Refer to Section 2.9 of the Supporting Information.

Article	Requirement	How met or reference
48 (2)	The installation and functioning of the automated measuring systems shall be subject to control and to annual surveillance tests as set out in point 1 of Part 6 of Annex VI.	Refer to Section 2.7.1 of the Supporting Information.
48 (4)	All monitoring results shall be recorded, processed and presented in such a way as to enable the competent authority to verify compliance with the operating conditions and emission limit values which are included in the permit.	Refer to Section 2.6 of the Supporting Information.
49	The emission limit values for air and water shall be regarded as being complied with if the conditions described in Part 8 of Annex VI are fulfilled.	Under normal operation, there will be no emissions from flue gas treatment systems to water from the waste thermal treatment plant. Under abnormal operation, any process emissions to water will be released in accordance with limits set by the BAT-AELS for 'direct emissions to water'. Refer to Appendix A of the Environmental Risk Assessment (Appendix D) for the H1 Assessment results.
50 (1)	waste incineration plants shall be operated in such a way as to achieve a level of incineration such that the total organic carbon content of slag and bottom ashes is less than 3% or their loss on ignition is less than 5% of the dry weight of the material. If necessary, waste pre-treatment techniques shall be used.	Refer to Section 2.2.4.2 – TOC or LOI testing.
50 (2)	waste incineration plants shall be designed, equipped, built and operated in such a way that the gas resulting from the incineration of waste is raised, after the last injection of combustion air, in a controlled and homogeneous fashion and even under the most unfavourable conditions, to a temperature of at least 850oC for at least two seconds.	It is understood that this requirement is not applicable to specialist waste thermal treatment plants.
50 (3)	Each combustion chamber of a waste incineration plant shall be equipped with at least one auxiliary burner. This burner shall be switched on automatically when the temperature of the combustion gases after the last injection of combustion air falls below the temperatures set out in paragraph 2. It shall also be used during plant start-up and shut-down operations in order to ensure that those temperatures are maintained at all times during these operations and as long as unburned waste is in the combustion chamber. The auxiliary burner shall not be fed with fuels which can cause higher emissions than those resulting from the burning of gas oil as defined in Article 2(2) of Council Directive 1999/32/EC of	Refer to Sections 2.3.3.2 and 2.1.1.1 of the Supporting Information.

Article	Requirement	How met or reference
	26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels (OJ L 121, 11.5.1999, p. 13.), liquefied gas or natural gas.	
50 (4)	waste incineration plants and waste co-incineration plants shall operate an automatic system to prevent waste feed in the following situations: (a) at start-up, until the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) has been reached;	Refer to Section 2.3.3.2 of the Supporting Information.
	(b) whenever the temperature set out in paragraph 2 of this Article or the temperature specified in accordance with Article 51(1) is not maintained;	Refer to Section 2.3.3.2 of the Supporting Information.
	(c) whenever the continuous measurements show that any emission limit value is exceeded due to disturbances or failures of the waste gas cleaning devices.	Refer to Section 2.3.3.2 of the Supporting Information.
50 (5)	Any heat generated by waste incineration plants or waste co-incineration plants shall be recovered as far as practicable.	Refer to Appendix G – CHP assessment.
50 (6)	Infectious clinical waste shall be placed straight in the furnace, without first being mixed with other categories of waste and without direct handling.	This requirement will not apply as the Facility will not receive infectious clinical waste.
52 (1)	The operator of the waste incineration plant or waste co-incineration plant shall take all necessary precautions concerning the delivery and reception of waste in order to prevent or to limit as far as practicable the pollution of air, soil, surface water and groundwater as well as other negative effects on the environment, odours and noise, and direct risks to human health.	Refer to Section 2.2 and 2.6 of the Supporting Information and Appendix D.
52 (2)	The operator shall determine the mass of each type of waste, if possible according to the European Waste List established by Decision 2000/532/EC, prior to accepting the waste at the waste incineration plant or waste co-incineration plant.	Refer to section 2.2.2.1.
53 (1)	Residues shall be minimised in their amount and harmfulness. Residues shall be recycled, where appropriate, directly in the plant or outside.	Refer to Section 2.2.4 and 2.12.
53 (2)	Transport and intermediate storage of dry residues in the form of dust shall take place in such a way as to prevent dispersal of those residues in the environment.	Refer to Section 2.12.

Article	Requirement	How met or reference
53 (3)	Prior to determining the routes for the disposal or recycling of the residues, appropriate tests shall be carried out to establish the physical and chemical characteristics and the polluting potential of the residues. Those tests shall concern the total soluble fraction and heavy metals soluble fraction.	Refer to Section 2.12.

2.10.2 Requirements of the Final Waste Incineration BREF

The Final Waste incineration (WI) BREF BAT conclusions were published by the European IPPC Bureau in December 2019. New waste incineration plants are required to demonstrate that they meet the requirements of the BREF when applying for an EP. As such, the table below identifies the requirements of the Best Available Techniques (BAT) conclusions as set out in the BREF and explains how the Facility will comply with them.

Table 13: Summary table for WI BREF BAT conclusions compliance – Facility

#	BAT Conclusion	How met or reference
1	In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the features as listed in BAT 1 of the BREF.	GRG has an existing ISO: 14001 accredited EMS. This will be extended to include the operation of the Facility.
2	BAT is to determine either the gross electrical efficiency, the gross energy efficiency, or the combined boiler efficiency of the incineration plant as a whole or of all the relevant parts of the incineration plant.	In accordance with the EAs BREF Implementation Plan, new specialist waste thermal treatment facilities are required to achieve a boiler efficiency of 60-80%. As set out in section 2.11, the boiler will have an efficiency of >90%. Therefore, HRG understands that this is in accordance with the requirements of BAT 2. Further detail on the energy efficiency of the Facility is set out within section 2.11.
3	BAT is to monitor key process parameters relevant for emissions to air and water including those given in BAT 3 of the BREF.	As set out in section 2.7.2 of the Supporting Information, the process parameters for monitoring of emissions to air are as follows: <ul style="list-style-type: none"> • water vapour content • temperature; and • pressure.

#	BAT Conclusion	How met or reference
		<p>The oxygen content and flow rate of the flue gases will also be monitored. Temperature will be monitored in the combustion chamber.</p> <p>Where appropriate, process effluents would be contained and re-used in the process, as explained in section 2.5.2. Excess process effluents will be treated and discharged to the Humber Estuary in compliance with the BAT-AELS for 'direct emissions to water' stated in the Waste Incineration BREF.</p> <p>HRG can confirm that the Facility will include for monitoring of the key process parameters relevant for emissions to air in accordance with BAT 3.</p>
4	<p>BAT is to monitor channelled emissions to air with at least the frequency given in BAT 4 of the BREF and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p>	<p>It is anticipated that emissions to air will be monitored with the following frequency:</p> <p><u>Continuous Monitoring</u></p> <ul style="list-style-type: none"> • oxygen; • carbon monoxide; • hydrogen chloride; • sulphur dioxide; • nitrogen oxides; • ammonia; • volatile organic compounds (VOCs); • particulates; and • mercury. <p><u>Periodic Monitoring</u></p> <ul style="list-style-type: none"> • hydrogen fluoride; • group 3 heavy metals (Sb, As, Pb, Cr, Co, CU, Mn, Ni, V) – once every six months; • cadmium and thallium – once every six months; • mercury – once every six months; • nitrous oxide – once every year;

#	BAT Conclusion	How met or reference
		<ul style="list-style-type: none"> • dioxins and furans - once every six months (except long-term sampling of PCDD/F once every month); and • dioxin-like PCBs (once every six months for short-term sampling, once every month for long-term sampling). <p>As set out in section 2.7.1 of the Supporting Information, the methods and standards used for emissions monitoring will be in compliance with EPRS5.01 and the IED. In particular, the CEMS equipment will be certified to the MCERTS standard and will have certified ranges which are no greater than 1.5 times the relevant daily average emission limit. Sampling and analysis of all pollutants including dioxins and furans will be carried out to CEN or equivalent standards (e.g. ISO, national, or international standards). This ensures the provision of data of an equivalent scientific quality.</p> <p>HRG considers that the proposals for monitoring of emissions to air are in accordance with the requirements of BAT 4.</p>
5	<p>BAT is to appropriately monitor channelled emissions to air from the incineration plant during Other Than Normal Operating Conditions (OTNOC).</p>	<p>The EA’s BREF implementation plan states how monitoring of PCCD/F and dioxin-like PCB mass emissions during a planned start-up and shut-down should be carried out following the successful commissioning of the plant. It is also stated that the test should be repeated once every 3 years. However, it is acknowledged that monitoring of PCCD/F and dioxin-like PCB mass emissions should be done on ‘best endeavours’ basis, bearing in mind the challenges of coinciding a visit by the monitoring company with the exact time when the plant is starting up or shutting down. Specifically, the implementation document states that no plant will be required to start up or shut down specifically for the purposes of testing, and that where reasonable attempts to monitor fail due to the challenges described above, operators will be expected to attempt to repeat the exercise at the next available opportunity.</p> <p>Taking the above into consideration, HRG will apply a ‘best endeavours’ basis to the monitoring of PCCD/F and dioxin-like PCB mass emissions during start-up / shutdown periods. It is understood that this is in compliance with the requirements of BAT 5 and the EA’s implementation plan.</p>
6	<p>BAT is to monitor emissions to water from Flue Gas Cleaning (FGC) and/or bottom ash treatment with at least the frequencies set out in BAT 6 of the BREF and in</p>	<p>As explained in section 2.3.2, the Facility will utilise a wet flue gas treatment system for the abatement of acid gases.</p>

#	BAT Conclusion	How met or reference
	accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	The blowdown from the wet flue gas treatment system will be collected in a sump/tank and treated on-site for re-use. HRG will undertake monitoring of the effluent from the wet scrubber in accordance with the relevant EN standards.
7	BAT is to monitor the content of unburnt substances in slags and bottom ashes at the incineration plant with at least the frequency as given in BAT 7 of the BREF (at least once every 3 months) and in accordance with EN standards.	As explained in section 2.2.4.2, Total Organic Carbon (TOC) will be measured in the bottom ash to confirm that it is less than 3%, and/or Loss on Ignition (LOI) will be measured to confirm it is less than 5%. Measurements will be taken at least once every 3 months and will be in accordance with EN standards and would be taken at the adjacent IBA facility where the IBA will be stored. HRG considers that the proposals for monitoring of slags and bottom ashes are in accordance with the requirements of BAT 7.
8	For the incineration of hazardous waste containing POPs, BAT is to determine the POP content in the output streams (e.g. slags and bottom ashes, flue-gas, wastewater) after the commissioning of the incineration plant and after each change that may significantly affect the POP content in the output streams.	Due to the high temperatures required due to the nature of the waste proposed to be processed at the Facility, HRG is confident that any POPs within the waste will be fully destroyed. HRG would propose to demonstrate this through the commissioning of the Facility.
9	In order to improve the overall environmental performance of the incineration plant by waste stream management (see BAT 1), BAT is to use all of the techniques (a) to (c) as listed in BAT 9 of the BREF, and, where relevant, also techniques (d), (e) and (f).	As described in sections 2.2.1 and 2.2.2.2 of the Supporting Information, the Facility will employ the following techniques as required by BAT 9: <ul style="list-style-type: none"> • Determination of the types of waste that can be incinerated. The Facility will incinerate waste in accordance with the list of EWC waste codes that will be listed in the EP, and waste that falls into the range of calorific values in accordance with the design of the Facility. The list of EWC codes will characterise the physical state, general characteristics and specialist properties of the waste. • Implementation of waste acceptance procedures. The Facility will accept a mix of wastes delivered both directly to the site by waste producers and from other GRG facilities around the UK. HRG will develop acceptance procedures for wastes delivered to the Facility, in order to ensure that only the wastes which the Facility is permitted to receive are received at the Facility. Paperwork accompanying each delivery will be checked. Periodic inspections of the waste will be undertaken as part of the scope where practicable, prior to transfer into the bunker, to

#	BAT Conclusion	How met or reference
		<p>confirm that it complies with the specifications of the waste transfer note (WTN). Waste delivered in road vehicles will be inspected by the crane operator as it is tipped into the bunker and mixed.</p> <ul style="list-style-type: none"> • HRG will adapt and implement its existing waste pre-acceptance and acceptance procedures at the Facility. The waste acceptance procedures will identify the records required for wastes to be accepted at the Facility and where records associated with the waste should be retained in the document management system which will be employed at the Facility. • Waste acceptance procedures will be used to identify any unacceptable wastes which are not suitable for processing within the Facility and require quarantine and transfer off-site. • The Facility Chemists will develop blends of waste types which can be processed for specific periods of time to enable a blended approach to the waste feed. <p>HRG considers that the proposed arrangements for the receipt and segregation of waste complies with the requirements of BAT 9.</p>
10	In order to improve overall environmental performance of the bottom ash treatment plant, BAT is to set up and implement an output quality management system (see BAT 1).	Due to the hazardous nature of the bottom ash material that is produced, the material will be transferred off-site to a licensed waste disposal/recovery facility.
11	In order to improve the overall environmental performance of the incineration plant, BAT is to monitor the waste deliveries as part of the waste acceptance procedures (see BAT 9c) including, depending on the risk posed by the waste, the elements as listed in BAT 11 of the BREF.	<p>As described in section 2.2, and explained in relation to BAT 9 above, periodic monitoring of waste deliveries will be undertaken at the Facility. This will include the following elements in accordance with BAT 11.</p> <ul style="list-style-type: none"> • Weighing of the waste deliveries by use of a weighbridge at the entrance/exit of the Facility and individual items on pallet scales within the reception area. • Periodic visual inspection of the incoming waste when it is delivered to the Facility/received in the Waste Reception Area. • Periodic sampling of waste deliveries and analysis of key properties, such as calorific value and metal content, flash points, pH, halogen content. <ul style="list-style-type: none"> – Sampling will be undertaken when accepting a new waste stream at the Facility (e.g. from a new waste supplier), or to determine the NCV of waste sources accepted should the plant

#	BAT Conclusion	How met or reference
		<p>be operating outside the permitted range shown on the firing diagram. Periodic sampling of waste will also be undertaken for waste streams to ensure consistency in parameters.</p> <p>It is expected that waste sampling and characterisation would be carried out in accordance with BS EN 14899:2005 'Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a Sampling Plan', and will be consistent with any additional requirements imposed by the EP.</p>
12	<p>In order to reduce the environmental risks associated with the reception, handling and storage of waste, BAT is to use both of the following techniques:</p> <p>Use impermeable surfaces with an adequate drainage infrastructure; and</p> <p>Have adequate waste storage capacity.</p>	<p>The surfaces of the waste reception, handling and storage areas have been designed and will be constructed as impermeable structures. Adequate drainage infrastructure is installed in areas where waste will be received, handled and stored – these areas will have appropriate falls to the a local collection sump where liquids can be pumped out from and areas cleaned to. The integrity of areas of hardstanding will be periodically verified by visual inspection. Regular maintenance of the drainage systems will be undertaken.</p> <p>Adequate waste storage capacity will be available on site – the maximum waste storage capacity of the waste reception areas will not be exceeded. Along with use of the waste tracking system, the quantity of waste will be visually monitored against the maximum storage capacity. During periods of planned maintenance, quantities of waste within the waste reception will be run down where possible.</p> <p>HRG considers that the proposed arrangements for environmental risks associated with the reception, handling and storage of waste comply with the requirements of BAT 12.</p>
13	<p>In order to reduce the environmental risk associated with the storage and handling of clinical waste, BAT is to use a combination of the techniques as listed in BAT 13 of the BREF.</p>	<p>HRG will utilise the following measures to reduce the environmental risks associated with the storage and handling of clinical waste:</p> <ul style="list-style-type: none"> • automated or semiautomated waste handling - clinical wastes are fed into the furnace by an automated feeding system; • thermal treatment of non-reusable sealed containers – certain clinical wastes, such as sharps will be delivered in sealed and robust combustible containers that are never opened throughout storage and handling operations. • cleaning and disinfection of reusable containers - reusable clinical waste containers are cleaned and disinfected in a Bin Wash facility within Building 12.

#	BAT Conclusion	How met or reference
		HRG considers that the proposed arrangements for environmental risks associated with the storage and handling of clinical waste comply with the requirements of BAT 12.
14	In order to improve the overall environmental performance of the incineration of waste, to reduce the content of unburnt substances in slags and bottom ashes, and to reduce emissions to air from the incineration of waste, BAT is to use an appropriate combination of the techniques given below:	<p>An advanced control system, incorporating the latest advances in control and instrumentation technology, will be utilised at the Facility to control the combustion process, optimise the process relative to efficient heat release, to ensure good burn-out and minimum particle carry over. As described in Section 2.7.2 of the Supporting Information, the system will control and/or monitor the main features of the plant operation including, but not limited to the following:</p> <ul style="list-style-type: none"> • combustion air; • fuel feed rate; • SNCR system; • flue gas oxygen concentration at the boiler exit; • flue gas composition at the stack; • combustion process; • boiler feed pumps and feedwater control; • steam flow at the boiler outlet; • steam outlet temperature and pressure; • boiler drum level control; and • flue gas control. <p>Water, electricity and auxiliary fuel usage will also be monitored to highlight any abnormal usage. HRG considers that the proposed arrangements for ensuring the overall environmental performance of the thermal treatment of waste, to reduce the content of unburnt substances in slags and bottom ashes, and to reduce emissions to air from the thermal treatment of waste comply with the requirements of BAT 14.</p>
15	In order to improve the overall environmental performance of the incineration plant and to reduce emissions to air, BAT is to set up and implement procedures for the adjustment of the plant's settings e.g.	<p>The Facility will be controlled from a dedicated control room, with a control system to optimise the combustion process. The system will control and/or monitor the main features of the plant operation, as described in the response to BAT 14 above.</p> <p>Emissions to air will be reduced by the adjustment of the settings through the control system:</p>

#	BAT Conclusion	How met or reference
	through the advanced control system, as and when needed and practicable, based on the characterisation and control of the waste.	<ul style="list-style-type: none"> • the dose rate for urea solution within the SNCR system will be optimised and adjusted to minimise the ammonia slip; • sodium bicarbonate usage will be minimised by trimming reagent dosing to accurately match the acid load using fast response upstream acid gas monitoring; and • PAC dosing will be based on flue gas volume flow measurement. <p>HRG considers that the proposed control systems will ensure that the Facility is designed to allow for the adjustment of the plant's settings to comply with the requirements of BAT 15.</p>
16	In order to improve the overall environmental performance of the incineration plant and to reduce emissions to air, BAT is to set up and implement operational procedures (e.g. organisation of the supply chain, continuous rather than batch operation) to limit as far as practicable shutdown and start-up operations.	<p>The Facility will operate continuously, with planned shutdowns for maintenance limited as far as reasonably practicable.</p> <p>Waste will be kept at suitable level within the waste reception area to maintain operation during periods when waste is not delivered. Operational procedures will be developed to limit as far as practicable shutdown and start-up operations.</p> <p>HRG considers that the operation of the Facility will limit as far as practicable shutdown and start-up operations to comply with the requirements of BAT 16.</p>
17	In order to reduce emissions to air and, where relevant, to water from the incineration plant, BAT is to ensure that the FGC system and the wastewater treatment plant are appropriately designed (e.g. considering the maximum flow rate and pollutant concentration), operated within their design range, and maintained so as to ensure optimal availability.	<p>The flue gas treatment systems will be appropriately designed and operated within the design range. The flue gas treatment systems will be subject to regular maintenance through the implementation of documented management procedures.</p> <p>HRG considers that the design and operation of the flue gas treatment systems will ensure that emissions to air (and water where applicable) are reduced, and will ensure their optimal availability, to comply with the requirements of BAT 17.</p>
18	In order to reduce the frequency of the occurrence of OTNOC and to reduce emissions to air and, where relevant, to water from the incineration plant during OTNOC, BAT is to set up and implement a risk-based OTNOC management plan as part of the EMS that includes the elements as identified in BAT 18 of the BREF.	<p>HRG will develop an OTNOC based management plan which is in line with the EA's requirements and the elements outlined within the BREF. It is expected that this would be developed in accordance with a pre-operational condition in the EP.</p> <p>HRG considers that the incorporation of a risk-based OTNOC management plan will ensure the Facility's compliance with BAT 18.</p>
19	In order to increase resource efficiency of the incineration plant, BAT is to use a heat recovery boiler.	<p>The Facility will utilise a steam boiler to produce steam which is used to generate electricity. The Facility is designed with the provision to export heat to local users.</p>

#	BAT Conclusion	How met or reference
		HRG considers that the use of heat recovery boilers is in direct compliance with the requirements of BAT 19.
20	In order to increase energy efficiency of the incineration plant, BAT is to use an appropriate combination of techniques as listed in BAT 20 of the BREF.	<p>The Facility will utilise the following techniques to increase energy efficiency from its operation:</p> <ul style="list-style-type: none"> • minimise heat losses via the use of integral furnace boilers – heat will be recovered from the flue gases by means of steam boiler integral with the furnaces; • optimisation of the boiler design to improve heat transfer – the boilers will be designed to optimise the thermal cycle efficiency without prejudicing boiler tube life, having regard for the nature of the waste that is combusted; • cogeneration of heat and electricity – the Facility has been designed as a combined heat and power plant, refer to section 2.11, and could export heat to local users if suitable commercial agreements can be reached. <p>HRG considers that the techniques listed above will increase the energy efficiency of the plant and ensure that the ERF will comply with the requirements of BAT 20.</p>
21	In order to prevent or reduce diffuse emissions from the incineration plant, including odour emissions, BAT is to use the methods as stated in BAT 21 of the BREF.	<p>In accordance with the BREF, the ERF will employ the following measures to reduce odour emissions.</p> <ul style="list-style-type: none"> • Waste will be stored in the enclosed waste reception area. Air will be extracted from within the building to be used as combustion air for thermal treatment. • The operation of the Facility will not give rise to odorous liquid wastes. Therefore, the requirement to store liquid wastes in tanks under controlled pressure and duct the tank vents to the combustion air feed or other suitable abatement system will not apply to the ERF. • Odour will be controlled during shutdown periods by minimising the amount of waste in storage. Waste will be run-down prior to periods of planned maintenance. During periods of shutdown waste will be diverted to the adjacent waste transfer station. <p>The measures listed above to reduce odour emissions will ensure that the ERF will comply with the requirements of BAT 21.</p>
22	In order to prevent diffuse emissions of volatile compounds from the handling of gaseous and liquid wastes that are odorous and/or prone to releasing volatile	<p>Volatile liquids and compressed gases will be injected directly into the top section of the kiln/base of the secondary combustion chamber.</p> <p>HRG considers that this complies with the requirements of BAT 22.</p>

#	BAT Conclusion	How met or reference
	substances at incineration plants, BAT is to feed them to the furnace by direct feeding.	
23	In order to prevent or reduce diffuse dust emissions to air from the treatment of slags and bottom ashes, BAT is to include in the EMS the following diffuse dust emission management features:	Treatment of slags and ashes will not be undertaken at the Facility. Therefore, HRG understands that BAT 23 is not applicable.
24	In order to prevent or reduce diffuse dust emissions to air from the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques as given in BAT 24 of the BREF.	Treatment of slags and ashes will not be undertaken at the Facility. Therefore, HRG understands that BAT 24 is not applicable.
25	In order to reduce channelled emission to air of dust, metals and metalloids from the incineration of waste, BAT is to use one or a combination of the techniques as listed in BAT 25 of the BREF.	<p>In accordance with the BREF, the following techniques will be utilised at the ERF to reduce channelled emissions to air.</p> <ul style="list-style-type: none"> • Bag filters – to reduce particulate content of the flue gas. • Dry sorbent injection – adsorption of metals by injection of PAC in combination with injection of sodium bicarbonate to abate acid gases. • Wet scrubber – sodium hydroxide to abate acid gases, and water wash to abate emissions of particulates and heavy metals. <p>The concentrations of metals and metalloids will be monitored in accordance with the EP. It is considered by HRG that the techniques listed above to reduce channelled emissions to air will ensure that the ERF will comply with the requirements of BAT 25.</p>
26	In order to reduce channelled dust emissions to air from the enclosed treatment of slags and bottom ashes with extraction of air, BAT is to treat the extracted air with a bag filter.	Treatment of slags and ashes will not be undertaken as the Facility. Therefore, HRG understands that BAT 24 is not applicable.
27	In order to reduce channelled emissions of HCl, HF and SO ₂ to air from the incineration of waste, BAT is to use one or a combination of the techniques as listed in BAT 27 of the BREF.	<p>BAT 27 of the BREF states that BAT is to use one or a combination of the following techniques:</p> <ul style="list-style-type: none"> • wet scrubber; • semi-wet absorber;

#	BAT Conclusion	How met or reference
		<ul style="list-style-type: none"> • dry sorbent injection; • direct desulphurisation (only applicable to fluidised beds); and • boiler sorbent injection. <p>As explained within section 2.3, the Facility will utilise a two-stage flue gas treatment system which will utilise both wet and dry acid gas abatement systems, namely:</p> <ul style="list-style-type: none"> • dry sorbent injection, utilising sodium bicarbonate as the reagent; and • wet scrubber, utilising sodium hydroxide within the scrubber. <p>The two-stage system will be designed to ensure that the Facility will operate in accordance with the relevant ELVs, assumed to be the BAT-AELs, without the requirement for any additional abatement measures.</p> <p>HRG considers that the proposed that the two-stage flue gas treatment system is in accordance with the requirements of BAT 27.</p>
28	<p>In order to reduce channelled peak emissions of HCl, HF and SO₂ to air from the incineration of waste while limiting the consumption of reagents and the amount of residues generated from dry sorbent injection and semi-wet absorbers, BAT is to use optimised and automated reagent dosage, or both the previous technique and the recirculation of reagents.</p>	<p>In accordance with the BREF, the following techniques will be employed at the Facility to reduce peak emissions of HCl, HF and SO₂ whilst limiting reagent consumption and residue generation from dry sorbent injection.</p> <ul style="list-style-type: none"> • The concentration of hydrogen chloride in the flue gases upstream of the flue gas treatment system will be measured in order to optimise the performance of the emissions abatement equipment, including automated reagent dosage. • The concentrations of HCl, HF and SO₂ released from the ERF will comply with the relevant BAT-AELs. <p>The techniques listed above to reduce channelled peak emissions to air of acid gases will ensure that the Facility will comply with the requirements of BAT 28.</p>
29	<p>In order to reduce channelled NO_x emissions to air while limiting emissions of CO and N₂O from the incineration of waste, and the emissions of NH₃ from the use of SNCR and/or SCR, BAT is to use an appropriate combination of the techniques as listed in BAT 29 of the BREF.</p>	<p>The following elements have been incorporated into the design of the HTI:</p> <ul style="list-style-type: none"> • optimisation of the thermal treatment process via the use of a modern combustion control system and monitoring of process parameters (refer to the response to BAT 14); • an SNCR system; • catalytic bag filters; and

#	BAT Conclusion	How met or reference
		<ul style="list-style-type: none"> optimisation of the design and operation of the SNCR system (through CFD modelling to optimise the location and number of injection nozzles, and optimisation of reagent dosing to minimise ammonia slip). <p>The design elements listed above to reduce channelled NOx emissions to air (whilst limiting emissions of CO, N₂O and NH₃) will ensure that the Facility will comply with the requirements of BAT 29.</p> <p>As justified in section 2.8.2, flue gas recirculation is not currently proposed in the design of the Facility.</p>
30	<p>In order to reduce channelled emissions to air of organic compounds including PCDD/F and PCBs from the incineration of waste, BAT is to use techniques (a), (b), (c), (d), and one or a combination of techniques (e) to (i) given below to reduce channelled emissions to air of organic compounds:</p> <ol style="list-style-type: none"> Optimisation of the incineration process; Control of the waste feed; On-line and off-line boiler cleaning; Rapid flue-gas cooling; Dry sorbent injection; Fixed-or-moving bed adsorption; SCR; Catalytic filter bags; and Carbon sorbent in a wet scrubber. 	<p>The Facility will employ the following techniques to reduce channelled emission to air of organic compounds.</p> <ul style="list-style-type: none"> Optimisation of the combustion process – the boiler is designed to minimise the formation of dioxins and furans as follows: <ul style="list-style-type: none"> minimise residence time in critical cooling section to avoid slow rates of combustion gas cooling, minimising the potential for ‘de-novo’ formation of dioxins and furans; apply CFD modelling to the design where appropriate to ensure gas velocities are in a range that negates the formation of stagnant pockets/low velocities; minimise volume in critical cooling sections; prevent boundary layers of slow-moving gas along boiler surfaces via good design and regular maintenance; online and offline boiler cleaning through a regular maintenance schedule to reduce dust residence time and accumulation in the boiler, thus reducing PCDD/F formation in the boiler; and dry sorbent injection using PAC and sodium bicarbonate, in combination with bag filters. <p>The concentrations of dioxins and furans released from the Facility will comply with BREF limits. As described above, it can be confirmed that the Facility will use techniques (a) – (e) and (h), to reduce channelled emissions to air of organic compounds.</p>

#	BAT Conclusion	How met or reference
		<p>The techniques described above to reduce channelled emission to air of organic compounds will ensure that the ERF will comply with the requirements of BAT 30. Therefore, the HTI will meet the requirements of BAT 30 without the use of catalytic filter bags.</p>
31	<p>In order to reduce channelled mercury emissions to air (including mercury emission peaks) from the incineration of waste, BAT is to use one or a combination of the techniques as listed in BAT 31 of the BREF.</p>	<p>In accordance with the BREF, dry sorbent injection of PAC will be employed at the ERF in combination with a catalytic bag filter.</p> <p>It is considered by HRG that the use of these techniques will ensure that the Facility will comply with the requirements of BAT 31.</p>
32	<p>In order to prevent the contamination of uncontaminated water, to reduce emissions to water, and to increase resource efficiency, BAT is to segregate waste water streams and to treat them separately, depending on their characteristics.</p>	<p>There will be separate domestic effluents, process effluents and surface water drainage. Further information on the drainage arrangements is presented within section 2.5.</p> <p>An indicative water flow diagram depicting the segregation of different water streams for the Facility is presented in Appendix A.</p> <p>It is considered by HRG that the segregation and treatment of different wastewater streams, as described above, will ensure that the Facility will comply with the requirements of BAT 32.</p>
33	<p>In order to reduce water usage and to prevent or reduce the generation of wastewater from the incineration plant, BAT is to use one or a combination of the techniques as listed in BAT 33 of the BREF.</p>	<p>In accordance with the BREF, the following techniques will be utilised at the Facility to reduce water usage and prevent wastewater generation:</p> <ul style="list-style-type: none"> • use of a flue gas treatment system that does not generate wastewater – by utilising dry sorbent injection of sodium bicarbonate and PAC; • where practicable process effluents will be re-used within the process. Excess amounts of process effluent (such as the treated wet scrubber effluent) will require discharge; these will be tankered off-site for treatment at a suitably licensed waste management facility; and • all roof water and surface water from the Facility will be treated to use as wet scrubber make up water. <p>It is considered by HRG that the techniques listed above to reduce water usage and prevent/reduce the generation of wastewater will ensure that the Facility will comply with the requirements of BAT 33.</p> <p>Technique (d) of BAT 33 relates to dry bottom ash handling. As described and justified within the response to BAT 20(i) above, dry bottom ash handling is not considered to represent BAT for the site.</p>

#	BAT Conclusion	How met or reference
34	In order to reduce emissions to water from FGC and/or from the storage and treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques as listed in BAT 34 of the BREF, and to use secondary techniques as close as possible to the source in order to avoid dilution.	The proposed counter-current rotary kiln design does not require quenching of the bottom ash. Therefore, BAT 34 is not considered to be applicable to the Facility.
35	In order to increase resource efficiency, BAT is to handle and treat bottom ashes separately from FGC residues.	It can be confirmed that bottom ash and APCr will be handled and disposed of separately at the site. Therefore, the Facility will comply with the requirements of BAT 35.
36	In order to increase resource efficiency for the treatment of slags and bottom ashes, BAT is to use an appropriate combination of the techniques as listed in BAT 36 of the BREF, based on a risk assessment depending on the hazardous properties of the slags and bottom ashes.	There will be no treatment of bottom ash undertaken at the Facility. Therefore, the requirements of BAT 36 are not applicable.
37	In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to use one or a combination of the techniques as listed in BAT 37 of the BREF.	In accordance with the requirements of BAT 37, it can be confirmed that the following techniques will be employed at the site to prevent or reduce noise emissions. <ul style="list-style-type: none"> • Appropriate location of equipment and buildings – in accordance with normal industry practice, the technology provider will implement an efficient layout to result in relatively quiet operational noise levels. • Operational measures – regular inspection and maintenance of equipment will be undertaken. Doors to buildings will remain closed as far as is reasonably practicable. Waste deliveries will take place primarily during daytime hours. • Low-noise equipment – process equipment will be selected by the technology provider with, where appropriate, reduced noise levels. • Noise attenuation – plant rooms will have been acoustically designed for limiting noise emissions to acceptable levels for compliance with relevant workplace regulations. • Noise-control equipment/infrastructure – where appropriate, acoustic abatement measures will be installed on equipment and buildings.

#	BAT Conclusion	How met or reference
		<p>Refer to the Noise Assessment presented in Appendix C for further details on noise mitigation measures proposed for the site.</p> <p>The techniques listed above to reduce noise emissions and will ensure that the Facility will comply with the requirements of BAT 37.</p>

2.10.3 Requirements of the chemical waste appropriate measures

The 'Chemical waste: appropriate measures for permitting facilities' were published by the Environment Agency in November 2020. Facilities that treat or transfer chemical waste, which includes hazardous chemical wastes, must demonstrate that they meet the standards of the guidance when applying for an EP. As such, the table below identifies the requirements of the chemical waste appropriate measures and explains how the Facility will comply with them.

Table 14: Chemical Waste Appropriate Measures

Appropriate Measure	How met or reference
2 General management appropriate measures	
2.1 Management system The facility must have and follow an up-to-date written management system, as according to the appropriate measures.	The Facility will be operated in accordance with a documented environmental management system (EMS), refer to section 3.1.1.
2.2 Staff competence The facility must be operated by staff with appropriate training, qualifications and competence. Records of training, qualifications and relevant experience must be kept.	As a part of the Facility's EMS, all staff will be provided with appropriate training to ensure their competence, refer to section 3.1.2.
2.3 Accident management plan	An accident management plan will be developed prior to commencement of commissioning as part of the EMS for the Facility. This will be compliant with the relevant requirements of the appropriate measures.

Appropriate Measure	How met or reference
<p>The written management system must include an accident management plan, as according to the appropriate measures.</p>	
<p>2.4 Accident prevention measures The facility must make accident prevention measures, as according to the appropriate measures.</p>	<p>Segregating waste</p> <ol style="list-style-type: none"> 4. Waste is segregated by their hazardous properties. Storage areas will have a kerbed perimeter and separate drainage collection and all storage is on impermeable surfaces. 5. The storage location of any one waste material will be determine by its potential hazard(s) and each differing type is separate from the next. Each storage bay within the building will be self-contained and have a capacity relative to the quantity of packaged waste stored. Each storage bay within the building will include the following facilities: <ol style="list-style-type: none"> a. bunding; b. sloped bays towards the rear - the contours within the building will prevent any liquid escaping from the site; c. sealed fire walls to segregate the waste storage bays; and d. drain to a sump to collect the run-off/spills from within each storage bay. <p>Preventing accidental emissions</p> <ol style="list-style-type: none"> 6. The Facility will have separate process water and surface water systems. Storage areas are enclosed and designed away from the perimeter of the site to prevent spills over the sealed area and beyond the permit boundary. The storage bays will each contain a small sump in order to be able to capture run-off and provide the ability to remove any spillages within them. Any spills that are contained within the sump can be pumped out into storage tanks to allow testing to determine the appropriate disposal/recovery route off site. 7. Waste handling and waste storage areas are contained to prevent the controlled release of run-off and leachate. All spills will be cleaned up as soon as practicably possible. 8. Refer to BAT 32, 33 and 34 of section 2.10.2. Spillage procedures and kits are to be in place. Personnel are to be fully trained in spill response. <p>Security measures</p> <p>For points 9 and 10, all operational areas will be covered by CCTV which is recorded. The site is secure with fencing and gated access.</p>

Appropriate Measure	How met or reference
	<p>Fire prevention</p> <p>All fire prevention systems are to be designed, installed, and maintained by accredited specialist contractors and will comply with manufacturer recommendations and statutory guidance. The systems will be tested and serviced periodically in accordance with manufacturers guidance and site planned preventative maintenance regime. The site is designed in accordance with CIRIA 736. Secondary and tertiary containment for containment of fire water or contaminated effluents is designed in accordance with the Environment Agency Fire Prevention plan guidance.</p> <ol style="list-style-type: none"> 11. The fire safety strategy incorporates a suite of detection and suppression technologies tailored to the risk profile of each area at the Facility. The fire safety systems will be developed in line with relevant FM Global, NFPA, and UK HSE guidance. 12. All operational and storage buildings will be equipped with fire alarm points, detectors, and CCTV surveillance. Office and staff areas will have fire detection and alarm systems linked to the main fire safety system. Areas with combustible waste will include thermal imaging cameras for enhanced early detection. 13. Automatic sprinklers systems will cover combustible waste storage areas and main plant buildings. These will be supplied from a 1,633m³ on-site sprinkler tank (44 on Site Layout Plan, refer to Appendix A). Water will be delivered by diesel driven fire pumps. Additional supply from the rainwater section of the lagoon (1 on Site Layout Plan) is available if required. Deluge systems will cover high-risk bulk storage and tank farm areas. Non-water fire suppression systems (such as inert gas) will cover the main control room, electrical distribution rooms, and PLC enclosures. 14. The fire safety systems are tailored to the risk profile of each area at the Facility, sufficient provision of firewater will be provided accordingly. 15. Water from storage areas empties to a sump, which is separate from flammable waste storage areas. 16. As part of regular housekeeping procedures, the site will be regularly inspected and cleaned to prevent the build-up of loose combustible material. 17. The local fire and rescue service will be consulted on for the accident management and fire prevention plans. Water for firefighting will be supplied from a 1,633m³ on-site sprinkler tank (44 on the Site Layout Plan), with water delivered by diesel-driven firewater pumps. The water will be sourced from mains water and an Area 2 of the on-site lagoon (refer to Appendix A).The potential scenarios for the accidental release of chemicals/chemical wastes and associated control measures are presented in sections 4 and 5 of the Environmental Risk Assessment, Appendix C of the Application Pack.

Appropriate Measure	How met or reference
	<p>Other accident prevention measures</p> <p>18. At this stage of development, a DSEAR is not required. A DSEAR will be undertaken before construction commences.</p> <p>19. Storage tanks will be equipped with high level alarms and bund alarms, both audio and visual. Storage tanks will have all the outlet/inlet valves isolated with keys which can only be obtained from the site office.</p> <p>20. In accordance with the requirements of the appropriate measures:</p> <ul style="list-style-type: none"> a. All measurement and control devices required for an emergency are to be in accessible locations. Regular site checks ensure that they are operatable in an emergency. b. The IMS includes a Preventative Maintenance Schedule. c. Barriers and posts will be used to protect the plant from moving vehicles. d. Procedures will be implemented to avoid incidents due to poor communication between operating staff during shift changes and after maintenance or other engineering work. <p>Record keeping and procedures</p> <p>In accordance with the requirements of the appropriate measures, record keeping and procedures are in place.</p>
<p>2.5 Contingency plan and procedures</p> <p>The facility must implement a contingency plan, as according to the appropriate measures.</p>	<p>As per GRG's existing operational facilities, contingency plan and procedures will be developed and implemented in accordance with the requirements of the appropriate measures.</p>
<p>2.6 Facility decommissioning</p> <p>A decommissioning plan must be considered, implemented, and maintained. For existing facilities where potential risks are identified, a programme of design</p>	<p>A site closure plan will be developed for the Facility. Refer to section 3.2.</p>

Appropriate Measure	How met or reference
improvements must be implemented.	
3 Waste pre-acceptance, acceptance and tracking	
<p>3.1 Waste pre-acceptance Waste pre-acceptance procedures must be implemented, as according to the appropriate measures.</p>	<p>Point 4 is not relevant to the operation of the Facility, and has been excluded from this review.</p> <ol style="list-style-type: none"> 1. Waste pre-acceptance procedures are to be in place, refer to Section 2.2. 2. On receiving a waste producer/supplier query, and prior to waste acceptance, the information as listed in this appropriate measure will be obtained in writing or electronic form from the waste producer/supplier. 3. A team of technically competent and experienced members of staff will ensure all relevant information regarding hazards associated with the waste are obtained from the waste producer/supplier in the form of analysis, MSDS, or chemical composition. To confirm, a completed Pre-Acceptance Form must be submitted and then verified by another qualified personnel. Following, the enquiry is to be forwarded to a team of chemists who will check the assessment prior to waste collection. 5. From the Pre-Acceptance Form, if the waste producer/supplier and technically competent member of staff are unable to obtain sufficient levels of information to characterise the waste, then a representative sample will be taken and further analysis will be conducted. 6. HRG will develop waste pre-acceptance procedures which will identify where representative samples are required of the waste, to enable HRG to determine that the waste is acceptable to be received at the Facility. 7. At the quotation stage of waste acceptance, a Technical Assessor or technically competent and experienced staff member will assess the waste following its characterisation to ensure that there is a suitability for treatment or storage within permit conditions. Also, when a waste stream arrives at the Facility it will be logged into the reception area. Subsequently, a team of chemists will conduct further waste inspections prior to transferring the waste to the correct storage bay prior to processing. 9. Pre-acceptance records are kept for a minimum of 3 years. 10. Information required at pre-acceptance will be reassessed as per the appropriate measures.

Appropriate Measure	How met or reference
	<p>11. Wastes will be inspected on arrival, with a range of on-site verification checks being completed. As part of the waste acceptance procedure, odour checks will be undertaken (where safe to do so). The waste will be rejected from site if it is considered that the wastes are already releasing, or have the potential to release:</p> <ul style="list-style-type: none"> – mercaptans or other VOCs – low molecular weight amines – acrylates – other similarly highly odorous materials <p>12. The roles and responsibilities of sales staff and technical staff are kept separate.</p> <p>13. Tankers arriving at the installation will have a sample taken from the top, bottom, or composite of the load prior to being unloaded. Waste will be inspected on arrival using chemical test strips and both portable and fixed analytical equipment. Also refer to point 3 of section 3.1.</p> <p>14. The Reception Chemist will sample liquid wastes by inserting a clear plastic dip-tube into the container of waste, remove a representative column of waste, and transfer it to a suitable container for inspection.</p> <p>16. For solid wastes the Reception will take a sample from the top of the container and from lower down when there is a suspicion that the top sample is unrepresentative.</p> <p>18. Analyses will be carried out by laboratories with EN ISO 17025 accreditation if required for validation.</p> <p>19. Wastes will be inspected on arrival, with a range on on-site verification checks being completed. These will include visual inspections, odour checks (where safe to do so), the use of chemical test strips and the use of both portable and fixed analytical equipment.</p>
<p>3.2 Waste acceptance Waste acceptance procedures must be implemented, as according to the appropriate measures.</p>	<p>1. Waste acceptance procedures are to be in place, refer to Section 2.2.2.1.</p> <p>2. In accordance with the requirements of the appropriate measures, the waste acceptance procedures will consider the following:</p> <ul style="list-style-type: none"> – the source, nature and age of the waste – the waste’s hazardous properties – potential risks to process safety, occupational safety and the environment (for example, from odour and other emissions)

Appropriate Measure	How met or reference
	<ul style="list-style-type: none"> – potential for self-heating, self-reactivity or reactivity to moisture or air – knowledge about the previous waste holder(s) <ol style="list-style-type: none"> 3. Other than in an emergency (i.e. taking waste from an emergency incident clean-up), the Facility will only accept pre-booked wastes onto site that have undergone the pre-acceptance procedure and are consistent with the pre-acceptance information. 4. A member of staff will ensure that there is enough capacity to accept the load. Furthermore, there will be a booking in record and a spreadsheet detailing the collections scheduled for each day in order to prepare for the expected loads. All third-party waste producer/suppliers are required to book their waste into site at least 24 hours prior to bringing the load to the installation. A daily record will be completed which records the space available in each bay. There is always a minimum of one qualified member of staff on site to receipt waste during operational hours. 5. Refer to point 19 of section 3.1. 6. All wastes receipted must be accompanied by a Waste Transfer Note or Consignment note detailing its physical and chemical composition, hazard characteristics and handling precautions and information specifying the original waste producer and process. A technically competent and experienced staff member will verify that the documentation matches the load with a chemist prior to acceptance. For third party waste producer/suppliers, a technically competent and experienced staff member will complete a <i>Waste Inspection Form</i> in consultation with a chemist. Wastes will be analysed within the onsite laboratory. 7. If the wastes fail to meet the acceptance criteria, then the <i>Waste Non-Conformance</i> procedure will be followed. Non-conformances will be recorded on an internal system and the waste will be quarantined. 8. On arrival to the Facility, vehicles are required to weigh in at the weighbridge. After unloading the vehicle, they are required to weigh out at the weighbridge for a net weight to be determined. The weight is recorded in a computerised waste tracking system. 9. Waste acceptance checks are carried out by technically competent and experienced staff members, alongside trained chemists. 10. The EWC Code List is submitted within this EP application – Appendix K.

Appropriate Measure	How met or reference
	<p>11. Manual handling of waste is minimised by waste handling vehicles. The installation has been designed to flow logically following receipt of the waste to reduce double handling of the waste. Waste will only be removed from the storage bays when suitable quantity has been collated for onward disposal or it is to be incinerated.</p> <p>12. Waste will be receipted into the reception area. This area will have impermeable hardstanding, a suitable sealed drainage system, with liquid run off capture by the sumps within each storage bay.</p> <p>13. The reception area (Building 26) is adjacent to the laboratory (Building 27), refer to the Site Layout Plan in Appendix A.</p> <p>Acceptance of containerised waste</p> <p>14. Waste will be receipted into the waste reception area where a qualified chemist will do a visual inspection and confirmatory checks on the waste immediately upon offloading. As per a <i>Sampling and Testing Procedure</i> chemists will carry out on-site verification tests to confirm the identity of the waste, the description of the waste, consistency with pre-acceptance information and proposed treatment method and compliance with the permit. Records are kept of any sampling carried out, for each load on site, along with the justification for the chosen tests.</p> <p>15. In the waste reception area, chemists will check all containers are clearly labelled, suitable for the waste and undamaged. Following inspection, any unsuitable containers will be moved to a quarantine area, with any unsafe drums being either over-drummed or transferred into suitable containers and a <i>Waste Non-Conformance Procedure</i> will be followed. The quarantine area is within the waste reception area.</p> <p>16. Loads will be inspected prior to the end of the day, as per the <i>Waste Acceptance Procedure</i>.</p> <p>17. Non-compliant containers will be moved to the dedicated quarantine area and appropriately labelled. The non-conformance and the location of the stored waste will be recorded.</p> <p>18. Quarantine storage is for a maximum of 5 days. As per GRG's existing facilities, quarantine procedures will be followed.</p> <p>19. Containers that hold laboratory smalls will be opened in the reception area within one working day of receipt to check that the contents remain undamaged, are compatible, and that the inventory is as expected. Laboratory smalls that need to be sorted will be moved to the dedicated repackaging area and repackaged as soon as practically possible.</p> <p>20. All containers will be marked with the following minimum information:</p> <ul style="list-style-type: none"> – A description of the waste providing its chemical identity and composition.

Appropriate Measure	How met or reference
	<ul style="list-style-type: none"> – Generic disposal routes (shows the location of storage). – Date of arrival on site (shows the duration of storage). – a unique identifier that allows any user to locate all information relating to the waste on the electronic system. – A hazard code or codes. <p>21. Refer to point 20 in section 3.2.</p> <p>22. The barcode, or equivalent, system used for labelling will have the hazardous property of the waste and the date of receipt of the container clearly visible.</p> <p>23. Waste is segregated by their hazardous properties in respective bays within the building. The storage location of any one waste material is determined by its potential hazard(s) and each differing type is separate from the next.</p> <p>Acceptance of bulk wastes</p> <p>24. Bulk loads will only be offloaded once they are verified as compliant. Verification testing is as per point 6 of section 3.2 and necessary compatibility testing completed on core samples.</p> <p>25. Liquid wastes which are delivered in tankers will only be accepted if they are accompanied by a declaration of the previous load so that potential for contamination of the incoming waste can be checked.</p> <p>26. Refer to point 13 of section 3.1.</p> <p>Acceptance sampling</p> <p>27. Refer to point 13, 14 and 16 for section 3.1.</p> <p>29. Samples are to be taken from every container.</p> <p>30. Sampling is undertaken by qualified staff.</p> <p>31. The <i>Sampling and Testing</i> procedures are designed to ensure that the sampling process does not increase the risk of incompatible substances coming into contact with one another.</p> <p>32. Spillage procedures and kits are to be in place. Personnel are to be fully trained in spill response.</p> <p>33. Records of the sampling regime, process and justification are recorded within HRG's computerised waste tracking system.</p>

Appropriate Measure	How met or reference
	<p>34. All samples are kept until disposal has been satisfactorily achieved at the final disposal point.</p> <p>35. As per GRG’s existing IMS, GRG has sampling and analysis procedures implemented at their other waste treatment sites. The sampling and analysis procedures will be edited to make them appropriate for the Facility and implemented accordingly.</p> <p>36. The sampling procedure will account for any relevant physico-chemical parameters.</p> <p>37. The <i>Sampling and Testing</i> procedure will account for bulk liquid, bulk solids, large and smaller containers/vessels, and laboratory smalls.</p> <p>38. Records are kept of any sampling carried out, for each load on site, along with the justification for the chosen tests.</p> <p>39. Waste is sampled in accordance with the standards as listed in the appropriate measure.</p> <p>Testing and analysis</p> <p>40. In accordance with the sampling and testing procedures which have been implemented at GRG’s operational facilities, waste will be tested according to the parameters determined at pre-acceptance. Results of sampling tests will be tracked in the computerised waste tracking system. Discrepancies will be noted and investigated.</p> <p>41. On-site laboratories will use suitably recognised test methods. Off-site laboratories will be independent and suitability accredited.</p>
<p>3.3 Waste tracking A waste tracking record system must be used, as according to the appropriate measures.</p>	<ol style="list-style-type: none"> 1. The tracking system will report waste quantities on site in appropriate units and a breakdown of waste quantities on-site for storage pending transfer, on-site treatment, and by hazard classification. The system will also indicate waste locations on a site plan, and compares on-site quantities to total permitted limits, and track on-site against permitted durations. 2. The waste tracking system will retain relevant information about the waste from pre-acceptance to removal offsite, as listed in the appropriate measures. The information will be accessible electronically. 3. The waste tracking system will retain all of the information as listed in the appropriate measures. 4. The tracking system will have the ability to report what is listed within the appropriate measures. 5. Back-up copies of computer records will be maintained off-site. 6. Acceptance records will be held for a minimum of 2 years after they have been treated or removed from site. Where required, some records will be kept for longer i.e. hazardous waste consignment notes.

Appropriate Measure	How met or reference
4 Waste Storage, segregation and handling	
<p>4.0 The facility must conduct waste storage, segregation and handling in line with the appropriate measures.</p>	<p>Point 18 is not relevant to the operation of the Facility, and has been excluded from this review.</p> <ol style="list-style-type: none"> 1. The installation has been designed to flow logically following receipt of the waste to minimise the requirement for double handling of the waste. The waste will only be removed from storage bays when a suitable quantity has been collated for onward disposal. Waste handling is carried out by competent staff using appropriate equipment. 2. There will be no sub-surface storage vessels/tanks. All of the site is bunded with sealed drainage. 3. The waste storage facilities have been designed in accordance with the following HSE standards: <ul style="list-style-type: none"> – HSG51 Storage of flammable liquids in containers – HSG71 Chemical warehousing: storage of packaged dangerous substances – HSG76 Warehousing and storage: a guide to health and safety – HSG140 Safe use and handling of flammable liquids – HSG176 Storage of flammable liquids in tanks – CS21 Storage and handling of organic peroxides 4. Every storage bay will have the following information displayed: <ul style="list-style-type: none"> – Bay maximum capacity – Bay capacity – Hazard categories <p>As per point 4 of section 3.2, systems are in place at the waste acceptance stage to allow regular monitoring of the quantity of stored waste on site against the allowed maximum capacities.</p> <ol style="list-style-type: none"> 5. All waste storage areas are clearly marked and signed to indicate the maximum quantity and hazardous properties of the wastes that can be stored there. 6. Storage area drainage infrastructure is designed in accordance with the appropriate measures. 7. The on-site attenuation lagoons will conform to C736 guidance.

Appropriate Measure	How met or reference
	<p>8. All storage bays are enclosed and designed to have suitable ventilation whether this is high level and/or low-level ventilation depends on the use and the chemicals that are being stored. Containerised wastes that are sensitive to air, light, heat moisture or extreme ambient temperatures are stored under cover protected from such ambient conditions.</p> <p>9. Due to the waste being stored in airtight enclosed bins or drums/IBCs, self-heating or ignition is considered highly unlikely. Therefore, there is little risk of hot loads being delivered to the Facility. All waste that will be accepted on site will undergo pre-acceptance checks and any temperature sensitive chemicals will be placed into controlled storage within two hours of receipt. Within sensitive storage areas and offloading areas there will be thermal imaging cameras that continuously monitor and alarm at critical temperatures and time periods. The vehicle offloading and reception areas will also be covered by thermal imaging cameras.</p> <p>10. All stored waste will be under cover. All storage bays are enclosed and designed to have suitable ventilation.</p> <p>11. Hazardous waste will not be stored in open-topped containers.</p> <p>12. Hazardous waste will not be stored or held on site in vehicles or vehicle trailers.</p> <p>13. The site will have leak detection systems and alarms and automatic fire suppression equipment.</p> <p>14. Refer to point 2 and 3 of section 2.4.</p> <p>15. All waste will be removed off site within 6 months of receipt.</p> <p>16. All stored containers will keep the labelling they had at acceptance. Damaged labels will be replaced with the same information.</p> <p>17. Containers will be stored and handled so that the label is easily visible and continues to be legible.</p> <p>19. Clean rainwater and clean cooling water is kept separate from wastes and waste waters.</p> <p>20. Refer to point 1 and 2 of section 2.4. The drainage system is sealed to prevent leaks and spillages contaminating other wastes.</p> <p>21. Each storage bay will have vehicle and pedestrian access that allows inspection on both sides of the bay and will only contain similar compatible wastes.</p>

Appropriate Measure	How met or reference
	<p>22. Full waste containers will be stacked no more than two standard pallet/IBC high and with a gap of at least 0.7m between rows of bulk containers or palletised wastes, ensuring that the contents are visible for inspection. Empty containers may be stacked three high as long as securely stacked or wrapped.</p> <p>In accordance with points 23 to 35, all waste containers, storage and handling methods and techniques (i.e. pallets) are to be stacked and handled as per the appropriate measures.</p> <p>36. Wash waters will be contained within an impermeable area, with appropriate containment and disposal by incineration onsite or disposal off-site, with the prevention of run-off entering external areas or surface water drains.</p> <p>37. Waste with a higher risk of causing any pest problems will be identified and prioritised for processing.</p> <p>38. There will be regular inspection of storage areas, containers and infrastructure.</p> <p>39. Forklift drivers will be trained to handle palletised goods.</p> <p>40. Activities that represent a clear fire risk will not be carried out within any storage area.</p> <p>Bulk storage</p> <p>41. Bulk storage systems will conform to the following CIRIA guidance: C535, C598 and C736 CIRIA.</p> <p>42. Tanks will not be used beyond their specified design life and will only be used for substances they were designed for. Tanks will be periodically examined and tested to ensure that the tanks meet the standards set out in EEMUA <i>Publication 231: The mechanical integrity of plant containing hazardous substances</i>.</p> <p>43. Bulk storage tanks and silos will be vented through suitable abatement.</p> <p>44. Bulk storage vessels will be stored on an impermeable surface with self-contained drainage.</p> <p>45. All liquid tanks will be bunded to C736 standard. The tanks are to be a part of regular visual inspections. Tanks will not be open topped or inter-connected.</p> <p>46. The liquids being put into the tanks will be filtered, removing any solid matter and these tanks will be storage tanks as opposed to treatment tanks keeping sludge to a minimum. Any sludge build up will be removed periodically.</p> <p>47. Tanks will be equipped with high level alarms and bund alarms, both audio and visual. They will also be fitted with robust level gauges that will be inspected when the tank is emptied. Tanks will be fitted with high level alarms to prevent overfilling</p>

Appropriate Measure	How met or reference
	<p>them; procedures will state that the bulk-storage tanks will have sufficient spare capacity to receive the waste destined for the tank.</p> <p>48. Vessels, tanks and secondary containment will all be closable via suitable valves.</p> <p>49. Overflow pipes will be directed to the secondary containment drainage system.</p> <p>50. In line with GRG's existing facilities, maintenance procedures will be employed that ensure suitably competent personnel examine tanks, pipework and fittings, as per the appropriate measures.</p> <p>51. GRG has existing procedures from other sites that ensure that loading, unloading and storage are safe, considering any associated risks. Procedures include:</p> <ul style="list-style-type: none"> – Waste Acceptance; and – Identification, Segregation, Transport and Storage of waste. <p>52. There will be no open topped tanks, containers, vessel or pits at the Facility.</p> <p>Transfer of waste into and from tankers</p> <p>53. All pipes, hoses, connections, couplings and transfer lines will be fit for purpose and resistant to the wastes being stored. A suitable pipework coding system will be used.</p> <p>54. Refer to point 9 and 10 of section 2.4.</p> <p>55. Refer to section 3.2.</p> <p>56. The loading and unloading procedure will be implemented. This includes the requirement that the loading and unloading of waste cannot occur unless all pipes, hoses, connections, couplings and transfer lines are confirmed to be suitably in place by the trained and competent personnel supervising the process.</p> <p>57. Unloading from/loading into tanks will be supervised by suitably trained and competent personnel.</p> <p>58. The following measures for couplings and spillage prevention control will be in place:</p> <ul style="list-style-type: none"> – Before use, any hoses including couplings will be visually inspected to ensure they are in fully working order. The securing clips that connect the hose to the connector must be also checked.

Appropriate Measure	How met or reference
	<ul style="list-style-type: none"> – The transferring pressure will be kept to minimum and only specific hoses are used that can accommodate the working pressures of the various pumps. – Any spills will be cleaned up as soon as practicably possible to prevent build up and degradation of the floor surface. – The tanker will be positioned to minimise the number of hoses used within the designated tanker offloading area, ideally limiting it to one. All connections will be checked and tightened appropriately. <p>59. The area around the tanks will be bunded and in emergency situations could accommodate a leaking vehicle, if required, should a seal fail on a road tanker.</p> <p>60. Wastes due to be transferred will comply with the <i>Carriage of Dangerous Goods</i> HSE Regulations when packaged and transported.</p> <p>61. The transfer of waste from a tanker to a drum, or vice versa, will take place in a dedicated area. Two trained and competent staff will perform the transfer as according to a procedure in line with the appropriate measure.</p> <p>62. Emergency procedures and local spillage procedures will be used. This includes actions to take in the event of a spillage. Areas around storage tanks will be bunded to prevent spills from leaving the permitted area. Any spills will be cleaned up as soon as practicably possible by trained personnel using spill kits available on-site. Any spillage within the Facility will be logged within the site diary. Spillages of more than 20 litres will be reported to the EA.</p> <p>63. Tankers will not be used as blending or reaction vessels.</p> <p>64. Prior to mixing, a compatibility test will be carried out following HRGs blending procedures. Any observable changes to temperature/odour or gases being produced will be recorded and investigated. Where necessary, an alternative disposal method will be identified. No acids or reactive chemicals are to be bulked; nor will tanker loads be accepted into bulk tanks. The latter waste is instead placed into IBCs and tested thoroughly prior to bulking.</p> <p>65. Rotary pumps are not to be used.</p> <p>66. There will be occasions when the installation will accept sludges, or slurries which will be pumped. The sludge will not be subject to any treatment but may be repacked or blended prior to incineration.</p> <p>67. Vapour balance lines are covered by a local exhaust ventilation (LEV) system.</p> <p>68. The site will operate drum rotators if required to decant powders. Safe operating procedures will be followed and utilised by trained and competent personnel.</p>

Appropriate Measure	How met or reference
	<p>69. As per GRG's existing sites, routine maintenance procedures will be followed.</p> <p>70. The waste tracking system that begins at the pre-acceptance stage is utilised to track the wastes up to processing/transfer off-site.</p> <p>Aerosol/Gas Storage</p> <p>71. Storage of aerosols on site will be in caged storage areas within a designated cage.</p> <p>72. Aerosol containers will be separated from other flammable wastes and potential sources of ignition.</p> <p>73. In the case of aerosol canisters held in containers which cannot collect and hold free liquids released from the canisters, suitable containment measures will be put in place.</p> <p>74. All containers that contain waste will be fitted with lids, which will remain securely closed when not being filled, emptied or internally inspected.</p> <p>75. Containers used to store canisters will not be overfilled.</p> <p>76. Cages used to store aerosol canister containers will be robust, fire resistant and of an appropriate mesh size.</p> <p>77. Aluminium canisters will be stored separately from steel canisters.</p> <p>Sorting, repackaging and bulking</p> <p>Point 82 is not relevant to this Facility, and have been excluded from this review. Point 78, 79 and 83 are covered by the Supporting Information.</p> <p>81. Where materials are bulked, only compatible materials will be bulked together.</p> <p>85. A dip pipe will be used to transfer wastes from containers into other storage vessels.</p> <p>86. All waste storage and processing activities take place within the building. An LEV system is in place to extract any vapours which are released from the repackaging and mixing activities.</p> <p>87. Containers will be moved via mechanical means.</p> <p>88. Containers of repackaged and/or mixed wastes will be labelled clearly so that the contents and origin are easily identifiable through the tracking system.</p>

Appropriate Measure	How met or reference
	<p>89. As per the <i>Sampling and Testing Procedures</i>, compatibility testing will be undertaken to ensure that bulked wastes will not react with each other.</p> <p>Laboratory smalls</p> <p>90. The preference is that laboratory smalls are sorted and segregated at the source, so as to avoid reopening/re-sorting containers.</p> <p>91. Labs small will not be processed anywhere other than in the Lab Small processing area, which has self-contained drainage.</p> <p>92. As per GRG's existing facilities, there are procedures for the segregation, sorting and repackaging of laboratory smalls which will also be implemented at the Facility.</p>
<p>5 Waste treatment</p> <p>5.1 General waste treatment The waste treatment process must be monitored and optimised. Emissions from the waste treatment process must be identified and appropriately controlled at the source.</p> <p>There must be accurate and up-to-date written details of: treatment activities, abatement, control equipment, characteristics of the waste to be treated, and the waste treatment process.</p> <p>There must be up-to-date written details of the measures to be taken during abnormal operating conditions to ensure that the Facility continues to comply with the permit conditions.</p>	<p>The <i>Waste Treatment</i> appropriate measures does not apply to this Facility as the chemical waste will only be processed via incineration.</p>

Appropriate Measure	How met or reference
5.2 Aerosol canister treatment	
5.3 Record keeping for all treatment residues You must record in the computerised waste tracking system: <ul style="list-style-type: none"> • that a waste has been treated; • what the treatment residues are and their weight; and • what end-of-waste products have been made and their weight. 	
6 Emissions control	
6.1 Point source emissions to air Point source emissions to air must be reduced, as according to the appropriate measures. An assessment of the fate and impact of the substances emitted to air must be made, as according to the EA's 'Risk assessments for your environmental permit' guidance.	<ol style="list-style-type: none"> 1. All waste bulking/processing activities that are likely to or have the high potential to create fugitive emissions will be undertaken within areas equipped with a LEV system to extract any vapours which are generated from the handling and transfer of the wastes. 2. The cleaned flue gas from the Facility will be monitored for pollutants. Refer to Section 2.7.1. 3. Refer to Appendix E of the Application Pack. 4. The Facility will utilise: <ul style="list-style-type: none"> – a primary dry flue gas treatment; and – a secondary wet flue gas treatment. <p>Refer to section 2.5.1 and 2.5.2 of the Supporting Information.</p> <ol style="list-style-type: none"> 5. Refer to Appendix E of the Application Pack. 6. As per HRG's existing sites, procedures will be implemented to ensure the flue gas treatment system is properly installed, operated, monitored, and maintained.

Appropriate Measure	How met or reference
	<p>7. The nominal outlet temperature of the flue gas leaving the wet scrubber will be in the range of 50 – 70°C, with the flue gas fully saturated with water vapour.</p>
<p>6.2 Fugitive emissions to air (including odour) Fugitive emissions to air (including dust, mud and litter, odour) must be prevented and minimised, as according to the appropriate measures.</p>	<p>An OMP and DMP is not required. Point 12, 15, 16, 17 18, and 19 is not relevant to this Facility, and have been excluded from this review.</p> <ol style="list-style-type: none"> 2. All waste handling activities will be undertaken within the enclosed building and therefore will minimise fugitive emissions of dust from the Facility. All waste will be delivered to the Facility in waste containers/receptacles and/or enclosed waste delivery vehicles. 3. High integrity components will be used. The flue gas treatment plant will be fully enclosed. 4. GRG’s waste pre-acceptance and acceptance procedures identifies and manages waste that could cause fugitive emissions to air. 5. The following measures are to be in place: <ul style="list-style-type: none"> – Waste will be stored in secure, closed containers, prior to loading onto the feeder and being transferred to the furnace. There will be no storage of waste outside. – Regular cleaning and good housekeeping of the waste reception and storage areas minimise the potential for the release of any litter and dusts. As per GRG’s existing sites, a housekeeping procedure will be implemented at the Facility. 6. There will be an appropriate preventative maintenance programme which covers all buildings, plant and equipment. This will allow for regular inspection and cleaning. 7. Cleaning and maintenance procedures will be in place. 8. Refer to point 7 of section 6.2. 9. Construction materials will be appropriately chosen to prevent the corrosion of plant and equipment. 10. Refer to section 2.8 of the Supporting Information. 13. The shredder plant and associated infrastructure will be fully enclosed and blanketed. 14. Wastes identified as having a higher risk of causing odour will be prioritised for processing.

Appropriate Measure	How met or reference
	15. Refer to section 2.6.6 of the Supporting Information.
<p>6.3 Emissions of noise and vibration</p> <p>Emissions of noise and vibration must be prevented and minimised, as according to the appropriate measures.</p>	Refer to section 2.6.5 of the Supporting Information.
<p>6.4 Point source emissions to water (including sewer)</p> <p>Point source emissions must be controlled, as according to the appropriate measures.</p>	<ol style="list-style-type: none"> 1. As a part of the Facility's inventory of emissions, main chemical constituents of point source emissions to water are identified. 2. Refer to the Environmental Risk Assessment (Appendix D of the Application Pack). 3. There will be no emissions of process effluent from the Facility discharged to water under 'normal operation'. Where practicable, process effluents from boiler blowdown and other processes will be re-used within the Facility. Waste waters from surplus boiler water and water treatment plant effluent will be recycled where possible. 4. Refer to section 2.5.2 of the Supporting Information. In the event there are excess process effluents generated, such as during periods of maintenance, it can potentially be a feedstock to produce wet scrubber water for reuse onsite, or discharged to the Humber Estuary. Treated effluent is tested in the onsite lab prior to discharge or potential reuse. 5. Refer to section 2.4 of the Supporting Information. Wash waters will be contained within an impermeable area to prevent run-off entering external areas or surface water drains.
<p>6.5 Fugitive emissions to land and water</p> <p>Fugitive emissions must be controlled, as according to the appropriate measures.</p>	There are no fugitive emissions to land and water. Therefore, this appropriate measure is not applicable.
<p>7 Emissions monitoring and limits</p>	
<p>7.1 Emissions to air</p> <p>Emissions to air must be</p>	As a part of the Facility's inventory of emissions, relevant characteristics of point source emissions to air will be identified, as according to the appropriate measures.

Appropriate Measure	How met or reference
monitored, as according to the appropriate measures.	
<p>7.2 Emissions to water and sewer Emissions to water and/or sewer must be monitored, as according to the appropriate measures.</p>	<p>There are no emissions to sewer.</p> <ol style="list-style-type: none"> 1. As a part of the Facility’s inventory of emissions, relevant characteristics of emissions to water will be identified, in accordance with the requirements of the appropriate measures. 2. For relevant emissions to water identified by the emissions inventory, key process parameters will be monitored at the point where the emission leaves the facility boundary.
<p>8 Process efficiency</p>	
<p>8.1 Energy efficiency As according to the appropriate measures, an energy efficiency plan and energy balance record must be created, implemented, and regularly reviewed and updated.</p> <p>Measures must be in place to avoid gross energy inefficiencies. Operating, maintenance and housekeeping measures must be in place.</p> <p>Additional efficiency measures should be implemented, as according to the ‘Energy efficiency standards for industrial plants to get environmental permits’ guidance.</p>	<p>In line with points 1-4, an energy efficiency plan and energy balance record will be developed for the installation following identifying significant energy usages at the installation. These will be reviewed and updated as a part of the Facility’s EMS.</p> <ol style="list-style-type: none"> 5. As per GRG’s existing sites, a housekeeping procedure will be implemented at the Facility. 6. The Facility has been designed to avoid gross energy inefficiencies, for example: <ul style="list-style-type: none"> – An energy efficiency plan will be built into the operation and maintenance procedures of the Facility ensuring maximum efficiency, practical, sustainable, safe and controllable processes. This plan will be reviewed regularly as part of the environmental management systems. – The boiler will operate with saturated steam. 7. Where relevant, the Facility is designed in accordance with the ‘Energy efficiency standards for industrial plants to get environmental permits’ guidance. <p>Refer to section 2.11 of the Supporting Information for additional information.</p>

Appropriate Measure	How met or reference
<p>8.2 Raw materials</p> <p>As according to the appropriate measures, raw materials must be listed alongside their properties, regularly reviewed, justified, and have quality assurance procedures.</p>	<ol style="list-style-type: none"> 1. As part of the EMS, HRG will maintain a list of raw materials and their properties. 2. The availability of alternative raw materials will be regularly reviewed. 3. The justification of the use of various raw materials is within the Supporting Information, refer to section 3.1.3. 4. As part of the EMS, HRG will have quality assurance procedures in place to control the content of raw materials.
<p>8.3 Water use</p> <p>As according to the appropriate measures, water consumption must be measured, optimised, reviewed, reused, and reduced where appropriate.</p>	<p>HRG measures, optimises, reviews, reuses, and reduces water consumption where relevant and as according to the appropriate measures. Refer to section 2.5 of the Supporting Information for additional information.</p>
<p>9 Waste minimisation, recovery and disposal</p>	
<p>9.0 You must have and implement a residues management plan, as according to the appropriate measures.</p>	<ol style="list-style-type: none"> 1. As part of the EMS, HRG will implement a residues management plan as according to the appropriate measures. 2. The priority is to treat waste. When waste is required to be transferred off-site for disposal, a detailed assessment will be conducted to identify the best environmental options for disposal. 3. As part of the EMS, HRG will regularly review options for recovering and disposing of waste produced at the facility.

2.11 Energy efficiency

The Facility will utilise a waste heat recovery boiler which will generate saturated steam at 21 bar (a) and 215°C. The steam will be supplied to a single stage steam turbine generator set. Provision has been for heat export from the Facility; however, at this stage there are no agreements in place with heat users for the export of heat from the Facility. In accordance with the requirements of the EP, HRG will continue to investigate opportunities to export heat to local heat users and provide periodic updates to the EA on the investigations.

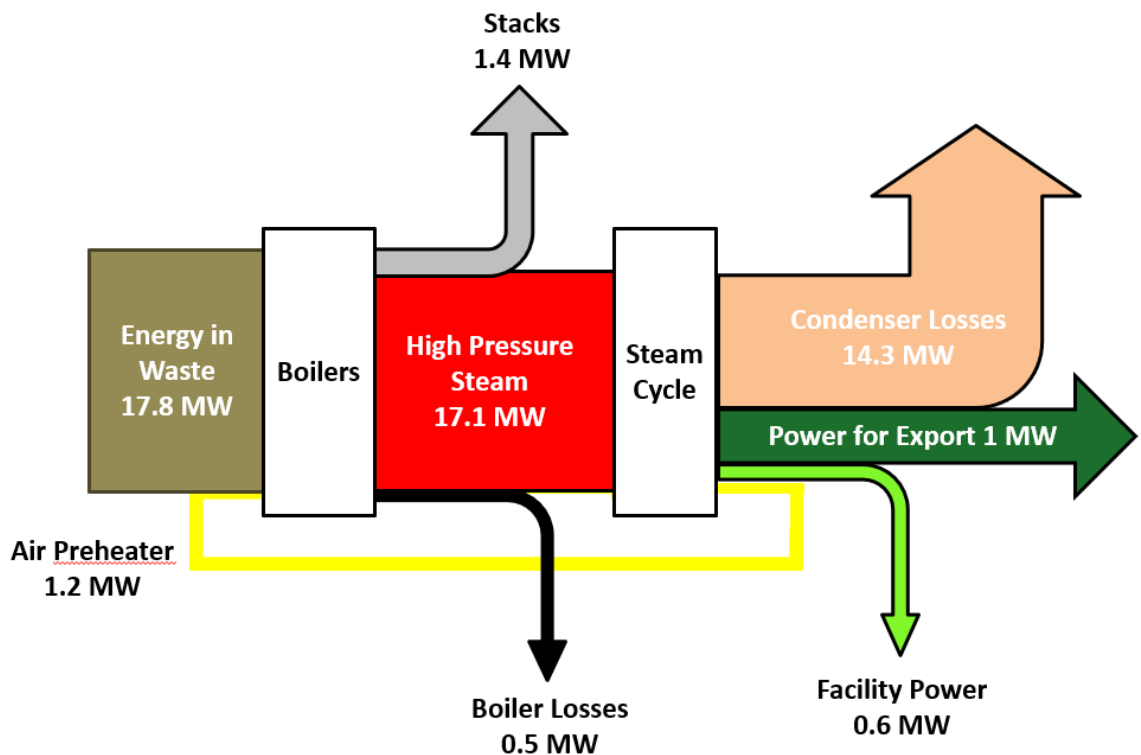
In case of failure of the electricity supply, an emergency diesel generator will be provided to safely shut down the Facility and to provide an emergency supply to the rest of the Facility.

In considering the energy efficiency of the Facility, due account has been taken of the requirements of DEFRA and EA guidance titled ‘Energy efficiency standards for industrial plants to get environmental permits’, dated February 2016.

2.11.1 Basic energy requirements

An indicative Sankey Diagram for the plant for the Facility is presented in Figure 3.

Figure 3: Indicative Sankey Diagram - No heat export case



Based on the nominal design capacity of the CHP Plant - No Heat Export

With regards to new specialist waste thermal treatment facilities, the EA’s Implementation Plan for the Waste Incineration BREF states:

New plants will be expected to meet the relevant BAT-AEELs under BAT 20 in the WI BATCs for boiler efficiency and to maximise plant efficiency through electricity generation and/or heat supply as far as practicable.

In this regard, based on the design as presented in the Sankey Diagram, the boiler efficiency has been calculated as approximately 90%, which compares favourably with the boiler efficiency requirements of 60-80%. In addition, as shown in the Sankey Diagram, the Facility will generate 1.6MWe with 1MW being exported to the Grid. On this basis, the Facility is considered to represent BAT for energy efficiency.

2.11.1.1 Energy consumption and thermal efficiency

The most significant energy consumers are anticipated to be the following:

- primary and secondary combustion air fans;
- Induced Draft fans;
- boiler feed water pumps;
- ACC fans;
- air compressors;
- waste handling and loading systems and residue conveying systems; and
- offices and ancillary rooms.

The Facility has been designed with careful attention being paid to all normal energy efficiency design features, such as high efficiency motors, high efficiency variable speed drives, high standards of cladding and insulation etc.

The Facility will also be designed to achieve a high thermal efficiency. In particular:

- unnecessary releases of steam and hot water will be avoided, to avoid the loss of boiler water treatment chemicals and the heat contained within the steam and water;
- provision will be made for heat to be exported to adjacent facilities;
- steady operation will be maintained where necessary by using auxiliary fuel firing; and
- boiler heat exchange surfaces will be cleaned on a regular basis to ensure efficient heat recovery.

Due consideration will be given to the recommendations given in the relevant Sector Guidance Notes.

2.11.1.2 Operating and maintenance procedures

An O&M manual and procedures will be developed for the Facility. The O&M manual and procedures will include for the following aspects.

1. Good maintenance and housekeeping techniques and regimes across the whole plant.
2. Plant Condition Monitoring will be carried out on a regular basis. This will ensure, amongst other things, that motors are operating efficiently, insulation and cladding are not damaged and that there are no significant leaks.
3. Operators will be trained in energy awareness and will be encouraged to identify opportunities for energy efficiency improvements.

Due consideration would be given to the recommendations given in the Environment Agency sector guidance on waste incineration, titled '*Incineration of waste (EPR5.01)*' and waste treatment activities '*Recovery and disposal of hazardous and non-hazardous waste (S5.06)*'.

2.11.1.3 Energy efficiency measures

An energy efficiency plan will be built into the operation and maintenance procedures of the Facility ensuring maximum efficiency, practical, sustainable, safe and controllable processes. This plan will be reviewed regularly as part of the environmental management systems.

During normal operation, procedures will be reviewed and amended, where necessary, to include improvements in efficiency as and when proven new equipment and operating techniques become available. These are assessed on the implementation cost compared with the anticipated benefits.

2.11.2 Further energy efficiency requirements

In accordance with the requirements of the IED, heat must be recovered as far as practicable. In order to demonstrate this, the following points should be noted.

1. Economisers are installed to recover flue gas heat, compatibly with the temperature requirements of the flue gas treatment system.
2. The boiler will operate with saturated steam.

The Facility will not be subject to a Climate Change Levy agreement.

2.12 Residue recovery and disposal

The main residue streams arising from the Facility are:

1. Incinerator bottom ash (IBA); and
2. Air Pollution Control residues (APCr).

As described below, the waste recovery and disposal techniques will be in accordance with the indicative BAT requirements.

Prior to the transfer of residues to any residues off-site, where appropriate, the residues will be tested in accordance with the requirements of Technical Guidance WM3: *Guidance on the classification and assessment of waste*.

Any residues which are to be transferred to landfill from the Facility 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 (Waste Hierarchy) of the Waste Framework Directive, which sets out the priorities for the prevention and management of waste, HRG will review the options for the recovery and recycling of all residues generated by the Facility.

2.12.1 Incinerator Bottom Ash

The three main residues resulting from the process will be bottom ash, metals and APCr.

Bottom ash is collected in the ash chamber underneath the rotary kiln. Ash falls by gravity into an ash discharge screw conveyor underneath the ash chamber. Larger items that would otherwise damage the ash this discharge conveyor is automatically filtered out by a screen and collected in a separate container inside the ash chamber. The remaining bottom ash is discharged automatically via a system with 4 number slide valves for automated and dust free discharge into the bottom ash skip. Ash which is collected in the boiler (boiler ash) will be mixed with ash which comes off from underneath the rotary kiln (bottom ash). Due to the nature of the waste being processed at the Facility the IBA generated will be transferred to landfill for disposal.

Metal is separated from the bottom ash discharge system using a permanent magnet in a dust tight drum separator.

APCr is collected in sealed Flexible Intermediate Bulk Containers (FIBCs or 'big-bags') following displacement from the bag filters and hoppers in the flue gas treatment process. The big bags will be stored in a transport container prior to transfer off-site to a suitably licenced waste management facility for disposal/recovery.

All ash handling activities are undertaken in enclosed buildings, with the ash maintained dry to prevent leachate from the ash.

2.12.2 Air Pollution Control residues

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

- 30-36% w/w sodium;
- 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 present in addition to traces of dioxins and the following heavy metals: zinc, lead, manganese, copper, chromium, cadmium, mercury, and arsenic.

APCr is classified as specialist (due to its elevated pH) in accordance with EA technical guidance '*WM3: Waste Classification – Guidance on the classification and assessment of waste*'.

To minimise fugitive dust emissions, APCr collected in big bags will be stored in a Building 29 prior to transfer off-site for disposal in a specialist landfill.

2.12.3 Summary

The expected quantities and properties of the main residue streams generated from the operation of the Facility are summarised in Table 13 below.

Table 15: Key residue streams from the Facility

Source/ Material	Properties of Residue	Storage location/ expected storage capacity	Estimated quantity of residue generated (tpa/year)	Disposal Route and Transport Method
IBA	Ash from underneath the rotary kiln mixed with any boiler ash. Due to the nature of the waste being incinerated, the bottom ash from the Facility requires disposal in landfill.	IBA will be stored in a covered roll-on-roll-off skip within Building 29 prior to disposal.	3,800	To be removed offsite in HGVs for disposal via landfill.
APCr	Ash from the flue gas treatment process, may contain some unreacted sodium bicarbonate. Hazardous waste requiring disposal in a specialist landfill.	Big bags stored in Building 29 prior to disposal.	3,038	Transfer in curtain-sided articulated vehicle to end disposal.

3 Additional information

3.1 Management

As defined in the Regulation 7 of the Environmental Permitting Regulations, the operator is 'the person who has control over the operation of a regulated facility'. HRG will directly manage the day-to-day operation of the different waste treatment processes.

GRG has existing management systems for their other Facilities which have been accredited to the ISO 14001 Environmental Management System Standard. The Facility will operate under a similar management system accredited to ISO 14001.

Section 3.1.1 below provides a general summary of the proposed site EMS in accordance with Environment Agency (EA) guidance '*Develop a management system: environmental permits*'.

In addition to the EMS, an operating and maintenance (O&M) manual(s) will be developed for the site. The O&M manual(s) will contain the key information required for the operation, maintenance and eventual decommissioning of the site over its lifetime. A summary of the key aspects to be included in the O&M manual is presented within section 2.11.1.2

3.1.1 Summary of EMS and management systems

3.1.1.1 Scope and structure

The scope of the ISO 14001 certification will cover the receipt, handling and combustion of waste and the transfer of residues off-site.

The scope of the ISO 14001 certification for the Facility will cover three key areas. These are:

- the design and development of the plant;
- the operation of the plant; and
- the processing of controlled waste.

Where applicable, documented procedures will detail specifically how each activity is to be controlled. These will be contained in an 'Environmental Procedures Manual' and identified related documents.

The site EMS will contain procedures for accident management that comply with the requirements set out in Agency guidance "How to comply with your Environmental Permit" EPR1.00. This will be in the form of an accident management plan that will be developed before the plant is commissioned.

3.1.1.2 General requirements

HRG will maintain the EMS in accordance with the ISO:14001 standard. Due to the stage of development, ISO certification is currently under development. Refer to Appendix H for an example of ISO certification for other GRG sites. The EMS objectives and scope will include the following requirements:

- identifying potential environmental impacts;
- documenting and implementing standard procedures to mitigate and control these impacts;
- determining a procedural hierarchy that considers the interaction of the relevant processes;

- ensuring adequate responsibility, authority and resources to management necessary to support the EMS;
- establishing performance indicators to measure the effectiveness of the procedures;
- monitoring, measuring and analysing the procedures for effectiveness; and
- implementing actions as required based on the results of auditing to ensure continual improvements of the processes.

3.1.1.3 Site plan(s)

Following completion of detailed design, the EMS will include for detailed plan(s) of the site which highlight where permitted activities are undertaken. The plan(s) will also show the location of the following, in accordance with EA guidance '*Develop a management system: environmental permits*':

- (a) buildings and any other main constructions such as security fences;
- (b) storage facilities for specialist materials (oil or fuel tanks), chemical stores, waste materials;
- (c) the location of items for use in accidents and emergencies, such as spill kits;
- (d) entrances and exits for use by emergency services;
- (e) any points designed to control pollution (e.g., containment facilities or penstock valves);
- (f) effluent or water discharge points;
- (g) areas vulnerable to pollution such as watercourses, adjacent industrial premises etc;
- (h) drainage facilities; and
- (i) utilities supplies (water, gas, electric) including stop taps, isolating valves, routes etc.

Preliminary site plans (including emissions points and installation boundary drawings) are presented within Appendix A.

3.1.1.4 Storage of waste and other residues/wastes

Upon completion of detailed design of the site, a waste/wastes/residues storage plan will be incorporated into the EMS, in accordance with the requirements of EA guidance '*Develop a management system: environmental permits*' and the '*Chemical waste: appropriate measures for permitted facilities*'. General information in relation to waste storage at the site is set out in Appendix .

Site and equipment maintenance plan

Upon completion of detailed design of the site, a site equipment and maintenance plan will be incorporated into the EMS, in accordance with the requirements of EA guidance '*Develop a management system: environmental permits*'. Preliminary information in relation to this plan is set out as follows:

- (a) Plant and machinery (including any mobile plant) will be maintained in accordance with the manufacturers or supplier's recommendations. A preventative maintenance regime will be in place at the site.
- (b) Records will be kept of any maintenance carried out on plant and machinery.

3.1.1.5 Personnel

HRG will ensure that sufficient numbers of staff, in various grades, are provided to manage, operate and maintain the plant on a continuous basis, seven days per week throughout the year.

It is anticipated that the key environmental management responsibilities will be allocated as described below:

1. The General Manager will be employed by HRG and will have overall responsibility for management of the Installation and compliance with the operating permit. The general manager will have extensive experience relevant to his responsibilities.
2. The Operations Managers will be employed by each O&M Contractor and will have day-to-day responsibility for the operation of the plant, to ensure that the plant is operated in accordance with the permit and that the environmental impact of the plant's operations is minimised. In this context, he or she will be responsible for designing and implementing operating procedures which incorporate environmental aspects.
3. The Maintenance Manager will be employed by each of the O&M Contractor and will be responsible for the management of maintenance activities, for maintenance planning and for ensuring that the plant continues to operate in accordance with its design.

3.1.1.6 Complaints

A documented complaints procedure will be developed to ensure that any complaints are recorded when received; and investigated to determine the root-cause of the complaint with suitable corrective actions implemented to prevent re-occurrence.

3.1.2 Competence, Training and Awareness

HRG aims to ensure that any persons performing tasks for it, or on its behalf, which have the potential to cause significant environmental impact, are competent on the basis of appropriate education and training or experience.

HRG will develop training procedures to make employees aware of:

- the importance of conformity with the environment policies and procedures and with the requirements of the EMS;
- potentially significant environmental aspects associated with their work;
- their roles and responsibilities in achieving conformity with the requirements of the EMS, including emergency preparedness and response requirements;
- the relevance and importance of their activities and how they contribute to the achievement of the environmental and quality objectives; and
- the potential consequences of the departure from specified procedures.

HRG will ensure that the operation of the Facility will comply with industry standards or codes of practice for training (e.g. WAMITAB or equivalent qualification), where they exist. The EMS will contain an archiving procedure to ensure all training is recorded and all associated records are retained.

3.1.2.1 Competence

Line Managers will identify the minimum competencies required for each role. These will then be applied to the recruitment process to ensure that key role responsibilities are satisfied. Particular attention will be paid to potential candidate's experience, qualifications, knowledge and skills.

3.1.2.2 Induction and Awareness

Staff induction programmes are location and job role specific and will include, as a minimum, the induction of:

- the Environmental Policy;
- the Health and Safety Policy and Procedures; and
- the EMS Awareness Training.

3.1.2.3 Training

Staff training will be completed during commissioning of the Facility and before the plant is operational. Line Managers will identify and monitor staff training needs as part of the appraisal system. The training needs of employees will be addressed using on-the-job training, mentoring, internal training and external training courses/events.

Training records will be maintained onsite. The operation of the Facility will comply with the relevant industry standards or codes of practice for training (e.g. WAMITAB or equivalent qualification), where they exist.

3.2 Closure

3.2.1 Introduction

The site is designed for an operational life of approximately 25 years. However, the operational lifetime of these type of facilities can be (and often is) extended. The actual operational lifetime is dependent on a number of factors including:

- (a) the level of planned and lifecycle maintenance;
- (b) the continued supply of waste; and
- (c) the development of alternative methods competing for the same waste fuels.

When the Facility has reached the end of its operational life, it may be adapted for an alternative use or demolished as part of a redevelopment scheme and cleared and left in a fit-for-use condition.

3.2.2 Site Closure Plan

At the end of the economic life of the plant, the development site and buildings may be redeveloped for extended use or returned to its current status. The responsibility for this may well rest with other parties if the Facility is sold. However, HRG recognises the need to ensure that the design, the operation and the maintenance procedures facilitate decommissioning in a safe manner without risk of pollution, contamination or excessive disturbance to noise, dust, odour, groundwater and surface watercourses.

HRG proposes to submit a site closure plan and submit to the EA for approval prior to the commencement of commissioning of the Facility.

The following is a summary of the measures to be considered within the closure plan to ensure the objective of safe and clean decommissioning.

3.2.2.1 General requirements

The general requirements associated with the implementation of the Site Closure Plan will include, but not be limited to, the following:

- (a) underground pipework to be avoided except for supply and discharge utilities such as towns water and gas supply;
- (b) safe removal of all chemical and specialist materials;
- (c) adequate provision for drainage, vessel cleaning and dismantling of pipework;
- (d) disassembly and containment procedures for insulation, materials handling equipment, material extraction equipment, fabric filters and other filtration equipment without significant leakage, spillage, release of dust or other specialist substance/s;
- (e) where practicable, the use of construction material which can be recovered (such as metals);
- (f) methodology for the removal/decommissioning of components and structures to minimise the exposure of noise, disturbance, dust and odours and for the protection of surface and groundwater; and
- (g) soil and groundwater sampling and testing of sensitive areas to ensure the minimum disturbance (sensitive areas to be selected with reference to the initial site report and any ongoing monitoring undertaken during operation of the installation).

3.2.2.2 Specific details

The specific details associated with implementation of the Site Closure Plan will include, but not be limited to, the following:

- (a) a list of recyclable materials/components and current potential outlet sources;
- (b) a list of materials/components not suitable for recycle and potential outlet sources;
- (c) a list of materials to go to landfill with current recognised analysis, where appropriate;
- (d) a list of all chemicals and specialist materials, location and current containment methods; and
- (e) A Bill of Materials detailing total known quantities of items throughout the site such as:
 - a. steelwork;
 - b. plastics;
 - c. cables;
 - d. concrete and civils materials;
 - e. oils;
 - f. chemicals;
 - g. consumables;
 - h. contained water and effluents; and
 - i. residues/wastes including IBA and APCr.

3.2.2.3 Disposal routes

Each of the items listed within the Bill of Materials will have a recognised or special route for disposal identified; e.g., landfill by a licensed contractor, disposal by high sided, fully sheeted road vehicle or for sale to a scrap metal dealer, disposal by skip/fully enclosed container, dealer to collect and disposal by container.

3.3 Improvement programme

HRG is committed to continual environmental improvement of the Facility, and is therefore proposing that a small number of improvement conditions be incorporated into the final EP. These have been set out below. It is understood that the proposed conditions are consistent with EPs which the EA has granted for other thermal treatment waste facilities in England.

3.3.1 Prior to commissioning

Prior to commencement of commissioning of the Facility, HRG will comply with the typical Pre-Operational Conditions which will be included for this type of installation, as follows.

- Submit a written report to the EA, on the details of the computational fluid dynamic (CFD) modelling used in the design of the secondary combustion chamber and boiler. The report will demonstrate whether the BAT design stage requirements, given in the sector EPR5.01, have been completed. In particular, the report will demonstrate whether the residence time and temperature requirements will be met.
- Submit a written report to the Environment Agency describing the performance and optimisation of the Selective Non-Catalytic Reduction (SNCR) system and combustion settings to minimise oxides of nitrogen (NOx) emissions. The report will also confirm and justify the selection of the reagent to be used within the SNCR system. This will include provision of procedures for the safe handling and management of the reagent.
- The report will include an assessment of the level of NOx and N₂O emissions that can be achieved under optimum operating conditions.
- Submit to the EA for approval a protocol for the sampling and testing of bottom ash for the purposes of assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved.
- Provide a written commissioning plan, including timelines for completion, for approval by the EA. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the EA in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.
- Prepare and submit a site closure plan.

3.3.2 Post commissioning

On completion of commissioning the Facility, HRG will comply with the typical Post-Commissioning Conditions which will be included for this type of installation, as follows:

- Carry out checks to verify the residence time, minimum temperature and oxygen content of the exhaust gases in the furnace whilst operating under the anticipated most unfavourable operating conditions. Results will be submitted to the EA.
- Provide a written proposal to the EA, for carrying out tests to determine the size distribution of the particulate matter in the exhaust gas emissions to air, identifying the fractions in the PM₁₀ and PM_{2.5} ranges from the Facility. The report will detail a timetable for undertaking the tests and producing a report on the results.
- Submit a written summary report to the EA to confirm by the results of calibration and verification testing that the performance of Continuous Emission Monitors for parameters as

specified in the EP will comply with the requirements of BS EN 14181, specifically the requirements of QAL1, QAL2 and QAL3.

- Submit a written report to the EA on the commissioning of the Facility. The report will summarise the environmental performance of the Facility as installed against the design parameters set out in the Application.

In addition, HRG would propose the following condition/requirements for the treated effluent:

- Following commissioning of the effluent treatment plant, HRG would propose to undertake detailed compositional analysis of the treated effluent to confirm that it is in accordance with the emission parameters utilised within the water quality assessment. HRG would propose to submit an updated water quality assessment to the Environment Agency based on the composition of treated effluent generated by the Facility.

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Appendices

A Plans & Drawings

B Site condition report

C Noise assessment

D Environmental risk assessment

E Air quality assessment

F BAT assessment

G CHP Assessment

H ISO Certification

I Water Quality Modelling Report

J Drainage Strategy

K EWC Codes

Table 16: EWC Codes

EWC Code	Description
1	WASTES RESULTING FROM EXPLORATION, MINING, QUARRYING, AND PHYSICAL AND CHEMICAL TREATMENT OF MINERALS
<i>01 01</i>	<i>wastes from mineral metalliferous excavation</i>
01 01 01	wastes from mineral metalliferous excavation
01 01 02	wastes from mineral non-metalliferous excavation
<i>01 03</i>	<i>wastes from physical and chemical processing of metalliferous minerals</i>
01 03 04	acid-generating tailings from processing of sulphide ore
01 03 05*	other tailings containing dangerous substances
01 03 07*	other wastes containing dangerous substances from physical and chemical processing of metalliferous minerals
01 03 08	dusty and powdery wastes other than those mentioned in 01 03 07 which require thermal treatment (e.g., due to contaminants being present or that are not suitable for disposal in a landfill)
01 03 09	red mud from alumina production other than the wastes mentioned in 01 03 07
<i>01 04</i>	<i>wastes from physical and chemical processing of non-metalliferous minerals</i>
01 04 07*	wastes containing dangerous substances from physical and chemical processing of non-metalliferous minerals
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
01 04 10	dusty and powdery wastes other than those mentioned in 01 04 07 which require thermal treatment (e.g., due to contaminants being present or that are not suitable for disposal in a landfill)
01 04 11	wastes from potash and rock salt processing other than those mentioned in 01 04 07 which require thermal treatment (e.g., due to contaminants being present or that are not suitable for disposal in a landfill)
01 04 12	tailings and other wastes from washing and cleaning of minerals other than those mentioned in 01 04 07 and 01 04 11
01 04 13	wastes from stone cutting and sawing other than those mentioned in 01 04 07
<i>01 05</i>	<i>drilling muds and other drilling wastes</i>
01 05 04	Freshwater drilling muds and wastes
01 05 05*	Oil-containing drilling muds and wastes
01 05 06*	drilling muds and other drilling wastes containing dangerous substances

EWC Code	Description
01 05 07	barite-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
01 05 08	chloride-containing drilling muds and wastes other than those mentioned in 01 05 05 and 01 05 06
2	WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING
<i>02 01</i>	<i>wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing</i>
02 01 01	sludges from washing and cleaning that are not suitable for processing in an alternative waste management facility due to contamination
02 01 02	animal-tissue waste which requires high temperature incineration
02 01 03	plant-tissue waste which requires high temperature incineration
02 01 04	waste plastics (except packaging) that are not suitable for processing in an alternative waste management facility due to contamination
02 01 06	animal faeces, urine and manure (including spoiled straw), effluent, collected separately and treated off-site which requires high temperature incineration
02 01 07	wastes from forestry which requires high temperature incineration
02 01 08*	agrochemical waste containing dangerous substances
02 01 09	agrochemical waste other than those mentioned in 02 01 08 which requires high temperature incineration
02 01 10	waste metal that is not suitable for processing in an alternative waste management facility due to contamination
<i>02 02</i>	<i>wastes from the preparation and processing of meat, fish and other foods of animal origin</i>
02 02 01	sludges from washing and cleaning that are not suitable for processing in an alternative waste management facility due to contamination
02 02 02	animal-tissue waste which requires high temperature incineration
02 02 03	materials unsuitable for consumption or processing that are not suitable for processing in an alternative waste management facility due to contamination
02 02 04	sludges from on-site effluent treatment that are not suitable for processing in an alternative waste management facility due to contamination
<i>02 03</i>	<i>wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve</i>

EWC Code	Description
	<i>production; yeast and yeast extract production, molasses preparation and fermentation</i>
02 03 01	sludges from washing, cleaning, peeling, centrifuging and separation that are not suitable for processing in an alternative waste management facility due to contamination
02 03 02	wastes from preserving agents that are not suitable for processing in an alternative waste management facility due to contamination
02 03 03	wastes from solvent extraction that are not suitable for processing in an alternative waste management facility due to contamination
02 03 04	materials unsuitable for consumption or processing that are not suitable for processing in an alternative waste management facility due to contamination
02 03 05	sludges from on-site effluent treatment that are not suitable for processing in an alternative waste management facility due to contamination
<i>02 04</i>	<i>wastes from sugar processing</i>
02 04 01	soil from cleaning and washing beet that are not suitable for processing in an alternative waste management facility due to contamination
02 04 02	off-specification calcium carbonate that is not suitable for processing in an alternative waste management facility due to contamination
02 04 03	sludges from on-site effluent treatment that are not suitable for processing in an alternative waste management facility due to contamination
<i>02 05</i>	<i>wastes from the dairy products industry</i>
02 05 01	materials unsuitable for consumption or processing which require high temperature incineration
02 05 02	sludges from on-site effluent treatment that are not suitable for processing in an alternative waste management facility due to contamination
<i>02 06</i>	<i>wastes from the baking and confectionery industry</i>
02 06 01	materials unsuitable for consumption or processing which require high temperature incineration
02 06 02	wastes from preserving agents that are not suitable for processing in an alternative waste management facility due to contamination
02 06 03	sludges from on-site effluent treatment that are not suitable for processing in an alternative waste management facility due to contamination
<i>02 07</i>	<i>wastes from the production of alcoholic and non-alcoholic beverages (except coffee, tea and cocoa)</i>

EWG Code	Description
02 07 01	wastes from washing, cleaning and mechanical reduction of raw materials that are not suitable for processing in an alternative waste management facility due to contamination
02 07 02	wastes from spirits distillation that are not suitable for processing in an alternative waste management facility due to contamination
02 07 03	wastes from chemical treatment that are not suitable for processing in an alternative waste management facility due to contamination
02 07 04	materials unsuitable for consumption or processing that are not suitable for processing in an alternative waste management facility due to contamination
02 07 05	sludges from on-site effluent treatment that are not suitable for processing in an alternative waste management facility due to contamination
3	WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD
<i>03 01</i>	<i>wastes from wood processing and the production of panels and furniture</i>
03 01 01	waste bark and cork that is not suitable for processing in an alternative waste management facility due to contamination
03 01 04*	sawdust, shavings, cuttings, wood, particle board and veneer containing dangerous substances
03 01 05	sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04 that are not suitable for processing in an alternative waste management facility due to contamination
<i>03 02</i>	<i>wastes from wood preservation</i>
03 02 01*	non-halogenated organic wood preservatives
03 02 02*	organochlorinated wood preservatives
03 02 03*	organometallic wood preservatives
03 02 04*	inorganic wood preservatives
03 02 05*	other wood preservatives containing dangerous substances
<i>03 03</i>	<i>wastes from pulp, paper and cardboard production and processing</i>
03 03 01	waste bark and wood that is not suitable for processing in an alternative waste management facility due to contamination
03 03 02	green liquor sludge (from recovery of cooking liquor) that is not suitable for processing in an alternative waste management facility due to contamination
03 03 05	de-inking sludges from paper recycling that are not suitable for processing in an alternative waste management facility due to contamination

EWG Code	Description
03 03 07	mechanically separated rejects from pulping of waste paper and cardboard that are not suitable for processing in an alternative waste management facility due to contamination
03 03 08	wastes from sorting of paper and cardboard destined for recycling that are not suitable for processing in an alternative waste management facility due to contamination
03 03 09	lime mud waste that is not suitable for processing in an alternative waste management facility due to contamination
03 03 10	fibre rejects, fibre-, filler- and coating-sludges from mechanical separation that is not suitable for processing in an alternative waste management facility due to contamination
03 03 11	sludges from on-site effluent treatment other than those mentioned in 03 03 10 that are not suitable for processing in an alternative waste management facility due to contamination
4	WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES
<i>04 01</i>	<i>wastes from the leather and fur industry</i>
04 01 01	fleshings and lime split wastes that are not suitable for processing in an alternative waste management facility due to contamination
04 01 02	liming waste that is not suitable for processing in an alternative waste management facility due to contamination
04 01 03*	degreasing wastes containing solvents without a liquid phase
04 01 04	tanning liquor containing chromium that is not suitable for processing in an alternative waste management facility due to contamination
04 01 05	tanning liquor free of chromium that is not suitable for processing in an alternative waste management facility due to contamination
04 01 06	sludges, in particular from on-site effluent treatment containing chromium that are not suitable for processing in an alternative waste management facility due to contamination
04 01 07	sludges, in particular from on-site effluent treatment free of chromium that are not suitable for processing in an alternative waste management facility due to contamination
04 01 08	waste tanned leather (blue sheeting's, shavings, cuttings, buffing dust) containing chromium that is not suitable for processing in an alternative waste management facility due to contamination
04 01 09	wastes from dressing and finishing that is not suitable for processing in an alternative waste management facility due to contamination
<i>04 02</i>	<i>wastes from the textile industry</i>
04 02 09	wastes from composite materials (impregnated textile, elastomer, plastomer) that are not suitable for processing in an alternative waste management facility due to contamination

EWG Code	Description
04 02 10	organic matter from natural products (for example grease, wax) that is not suitable for processing in an alternative waste management facility due to contamination
04 02 14*	wastes from finishing containing organic solvents
04 02 15	wastes from finishing other than those mentioned in 04 02 14 that are not suitable for processing in an alternative waste management facility due to contamination
04 02 16*	dyestuffs and pigments containing dangerous substances
04 02 17	dyestuffs and pigments other than those mentioned in 04 02 16 that are not suitable for processing in an alternative waste management facility due to contamination
04 02 19*	sludges from on-site effluent treatment containing dangerous substances
04 02 20	Sludges from on-site effluent treatment other than those mentioned in 04 02 19 that are not suitable for processing in an alternative waste management facility due to contamination
04 02 21	wastes from unprocessed textile fibres that are not suitable for processing in an alternative waste management facility due to contamination
04 02 22	wastes from processed textile fibres that are not suitable for processing in an alternative waste management facility due to contamination
5	WASTES FROM PETROLEUM REFINING, NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL
<i>05 01</i>	<i>wastes from petroleum refining</i>
05 01 02*	desalter sludges
05 01 03*	tank bottom sludges
05 01 04*	acid alkyl sludges
05 01 05*	oil spills
05 01 06*	oily sludges from maintenance operations of the plant or equipment
05 01 07*	acid tars
05 01 08*	other tars
05 01 09*	sludges from on-site effluent treatment containing dangerous substances
05 01 10	Sludges from on-site effluent treatment other than those mentioned in 05 01 09 that are not suitable for processing in an alternative waste management facility due to contamination
05 01 11*	wastes from cleaning of wastes with bases
05 01 12*	oil containing acids
05 01 13	boiler feedwater sludges that are not suitable for processing in an alternative waste management facility due to contamination

EWG Code	Description
05 01 14	wastes from cooling columns that are not suitable for processing in an alternative waste management facility due to contamination
05 01 15*	spent filter clays
05 01 16	sulphur-containing wastes from petroleum desulphurisation
05 01 17	bitumen that requires high temperature incineration
<i>05 06</i>	<i>wastes from the pyrolytic treatment of coal</i>
05 06 01*	acid tars
05 06 03*	other tars
05 06 04	waste from cooling columns that are not suitable for processing in an alternative waste management facility due to contamination
05 07 01*	wastes containing mercury
05 07 02	wastes containing sulphur
6	WASTES FROM INORGANIC CHEMICAL PROCESSES
<i>06 01</i>	<i>wastes from the manufacture, formulation, supply and use (MFSU) of acids</i>
06 01 01*	sulphuric acid and sulphurous acid
06 01 02*	hydrochloric acid
06 01 03*	hydrofluoric acid
06 01 04*	phosphoric and phosphorous acid
06 01 05*	nitric acid and nitrous acid
06 01 06*	other acids
<i>06 02</i>	<i>wastes from the MFSU of bases</i>
06 02 01*	calcium hydroxide
06 02 03*	ammonium hydroxide
06 02 04*	sodium and potassium hydroxide
06 02 05*	other bases
<i>06 03</i>	<i>wastes from the MFSU of salts and their solutions and metallic oxides</i>
06 03 11*	solid salts and solutions containing cyanides
06 03 13*	solid salts and solutions containing heavy metals
06 03 14	solid salts and solutions other than those mentioned in 06 03 11 and 06 03 13
06 03 15*	metallic oxides containing heavy metals
06 03 16	metallic oxides other than those mentioned in 06 03 15
<i>06 04</i>	<i>metal-containing wastes other than those mentioned in 06 03</i>
06 04 03*	wastes containing arsenic
06 04 05*	wastes containing other heavy metals

EWC Code	Description
06 05	<i>Sludges from on-site effluent treatment</i>
06 05 02*	sludges from on-site effluent treatment containing dangerous substances
06 05 03	sludges from on-site effluent treatment other than those mentioned in 06 05 02 that are not suitable for processing in an alternative waste management facility due to contamination
06 06 02*	wastes containing hazardous sulphides
06 06 03	wastes containing sulphides other than those mentioned in 06 06 02
06 07	<i>wastes from the MFSU of halogens and halogen chemical processes</i>
06 07 02*	activated carbon from chlorine production
06 07 03*	barium sulphate sludge containing mercury
06 07 04*	solutions and acids, for example contact acid
06 08	<i>wastes from the MFSU of silicon and silicon derivatives</i>
06 08 02*	wastes containing chlorosilanes
06 09	<i>wastes from the MFSU of phosphorous chemicals and phosphorous chemical processes</i>
06 09 02	phosphorous slag
06 09 03*	calcium-based reaction wastes containing or contaminated with dangerous substances
06 09 04	calcium-based reaction wastes other than those mentioned in 06 09 03
06 10	<i>wastes from the MFSU of nitrogen chemicals, nitrogen chemical processes and fertiliser manufacture</i>
06 10 02*	wastes containing dangerous substances
06 11	<i>wastes from the manufacture of inorganic pigments and opacifiers</i>
06 11 01	calcium-based reaction wastes from titanium dioxide production
06 13	<i>wastes from inorganic chemical processes not otherwise specified</i>
06 13 01*	inorganic plant protection products, wood-preserving agents and other biocides.
06 13 02*	spent activated carbon (except 06 07 02)
06 13 03	carbon black
06 13 05*	soot
7	WASTES FROM ORGANIC CHEMICAL PROCESSES
07 01	<i>wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals</i>
07 01 01*	aqueous washing liquids and mother liquors

EWC Code	Description
07 01 03*	organic halogenated solvents, washing liquids and mother liquors
07 01 04*	other organic solvents, washing liquids and mother liquors
07 01 07*	halogenated still bottoms and reaction residues
07 01 08*	other still bottoms and reaction residues
07 01 09*	halogenated filter cakes and spent absorbents
07 01 10*	other filter cakes and spent absorbents
07 01 11*	sludges from on-site effluent treatment containing dangerous substances
07 01 12	sludges from on-site effluent treatment other than those mentioned in 07 01 11 that are not suitable for processing in an alternative waste management facility due to contamination
07 02	<i>wastes from the MFSU of plastics, synthetic rubber and man-made fibres</i>
07 02 01*	aqueous washing liquids and mother liquors
07 02 03*	organic halogenated solvents, washing liquids and mother liquors
07 02 04*	other organic solvents, washing liquids and mother liquors
07 02 07*	halogenated still bottoms and reaction residues
07 02 08*	other still bottoms and reaction residues
07 02 09*	halogenated filter cakes and spent absorbents
07 02 10*	other filter cakes and spent absorbents
07 02 11*	sludges from on-site effluent treatment containing dangerous substances
07 02 12	sludges from on-site effluent treatment other than those mentioned in 07 02 11 that are not suitable for processing in an alternative waste management facility due to contamination
07 02 13	waste plastic that is not suitable for processing in an alternative waste management facility due to contamination
07 02 14*	wastes from additives containing dangerous substances
07 02 15	wastes from additives other than those mentioned in 07 02 14 that are not suitable for processing in an alternative waste management facility due to contamination
07 02 16	wastes containing silicones that are not suitable for processing in an alternative waste management facility due to contamination
07 02 17	Waste containing silicones other than those mentioned in 07 02 16 that are not suitable for processing in an alternative waste management facility due to contamination
07 03	<i>wastes from the MFSU of organic dyes and pigments (except 06 11)</i>

EWC Code	Description
07 03 01*	aqueous washing liquids and mother liquors
07 03 03*	organic halogenated solvents, washing liquids and mother liquors
07 03 04*	other organic solvents, washing liquids and mother liquors
07 03 07*	halogenated still bottoms and reaction residues
07 03 08*	other still bottoms and reaction residues
07 03 09*	halogenated filter cakes and spent absorbents
07 03 10*	other filter cakes and spent absorbents
07 03 11*	sludges from on-site effluent treatment containing dangerous substances
07 03 12	sludges from on-site effluent treatment other than those mentioned in 07 03 11 that are not suitable for processing in an alternative waste management facility due to contamination
07 04	<i>wastes from the MFSU of organic plant protection products (except 02 01 08 and 02 01 09), wood preserving agents (except 03 02) and other biocides</i>
07 04 01*	aqueous washing liquids and mother liquors
07 04 03*	organic halogenated solvents, washing liquids and mother liquors
07 04 04*	other organic solvents, washing liquids and mother liquors
07 04 07*	halogenated still bottoms and reaction residues
07 04 08*	other still bottoms and reaction residues
07 04 09*	halogenated filter cakes and spent absorbents
07 04 10*	other filter cakes and spent absorbents
07 04 11*	sludges from on-site effluent treatment containing dangerous substances
07 04 13*	solid wastes containing dangerous substances
07 05	<i>wastes from the MFSU of pharmaceuticals</i>
07 05 01*	aqueous washing liquids and mother liquors
07 05 03*	organic halogenated solvents, washing liquids and mother liquors
07 05 04*	other organic solvents, washing liquids and mother liquors
07 05 07*	halogenated still bottoms and reaction residues
07 05 08*	other still bottoms and reaction residues
07 05 09*	halogenated filter cakes and spent absorbents
07 05 10*	other filter cakes and spent absorbents
07 05 11*	sludges from on-site effluent treatment containing dangerous substances

EWC Code	Description
07 05 12	sludges from on-site effluent treatment other than those mentioned in 07 05 11 that are not suitable for processing in an alternative waste management facility due to contamination
07 05 13*	solid wastes containing dangerous substances
07 05 14	solid wastes other than those mentioned in 07 05 13 that are not suitable for processing in an alternative waste management facility due to contamination
07 06	<i>wastes from the MFSU of fats, grease, soaps, detergents, disinfectants and cosmetics</i>
07 06 01*	aqueous washing liquids and mother liquors
07 06 03*	organic halogenated solvents, washing liquids and mother liquors
07 06 04*	other organic solvents, washing liquids and mother liquors
07 06 07*	halogenated still bottoms and reaction residues
07 06 08*	other still bottoms and reaction residues
07 06 09*	halogenated filter cakes and spent absorbents
07 06 10*	other filter cakes and spent absorbents
07 06 11*	sludges from on-site effluent treatment containing dangerous substances
07 06 12	sludges from on-site effluent treatment other than those mentioned in 07 06 11 that are not suitable for processing in an alternative waste management facility due to contamination
07 07	<i>wastes from the MFSU of fine chemicals and chemical products not otherwise specified</i>
07 07 01*	aqueous washing liquids and mother liquors
07 07 03*	organic halogenated solvents, washing liquids and mother liquors
07 07 04*	other organic solvents, washing liquids and mother liquors
07 07 07*	halogenated still bottoms and reaction residues
07 07 08*	other still bottoms and reaction residues
07 07 09*	halogenated filter cakes and spent absorbents
07 07 10*	other filter cakes and spent absorbents
07 07 11*	sludges from on-site effluent treatment containing dangerous substances
07 07 12	sludges from on-site effluent treatment other than those mentioned in 07 07 11 that are not suitable for processing in an alternative waste management facility due to contamination
8	WASTES FROM THE MANUFACTURE, FORMULATION, SUPPLY AND USE (MFSU) OF COATINGS (PAINTS, VARNISHES AND VITREOUS ENAMELS), ADHESIVES, SEALANTS AND PRINTING INKS

EWC Code	Description
<i>08 01</i>	<i>wastes from MFSU and removal of paint and varnish</i>
08 01 11*	waste paint and varnish containing organic solvents or other dangerous substances
08 01 12	waste paint and varnish other than those mentioned in 08 01 11 that are not suitable for processing in an alternative waste management facility due to contamination
08 01 13*	sludges from paint or varnish containing organic solvents or other dangerous substances
08 01 14	sludges from paint or varnish other than those mentioned in 08 01 13 that are not suitable for processing in an alternative waste management facility due to contamination
08 01 15*	aqueous sludges containing paint or varnish containing organic solvents or other dangerous substances
08 01 16	aqueous sludges containing paint or varnish other than those mentioned in 08 01 15 that are not suitable for processing in an alternative waste management facility due to contamination
08 01 17*	wastes from paint or varnish removal containing organic solvents or other dangerous substances
08 01 18	wastes from paint or varnish removal other than those mentioned in 08 01 17 that are not suitable for processing in an alternative waste management facility due to contamination
08 01 19*	aqueous suspensions containing paint or varnish containing organic solvents or other dangerous substances
08 01 20	aqueous suspensions containing paint or varnish other than those mentioned in 08 01 19 that are not suitable for processing in an alternative waste management facility due to contamination
08 01 21*	waste paint or varnish remover
<i>08 02</i>	<i>wastes from MFSU of other coatings (including ceramic materials)</i>
08 02 01	waste coating powders which require thermal treatment (e.g., due to contaminants being present or that are not suitable for disposal in a landfill)
08 02 02	aqueous sludges containing ceramic materials that are not suitable for processing in an alternative waste management facility due to contamination
08 02 03	aqueous suspensions containing ceramic materials that are not suitable for processing in an alternative waste management facility due to contamination
<i>08 03</i>	<i>wastes from MFSU of printing inks</i>
08 03 07	aqueous sludges containing ink that are not suitable for processing in an alternative waste management facility due to contamination

EWG Code	Description
08 03 08	aqueous liquid waste containing ink that requires high temperature incineration
08 03 12*	waste ink containing dangerous substances
08 03 13	waste ink other than those mentioned in 08 03 12 that requires high temperature incineration
08 03 14*	ink sludges containing dangerous substances
08 03 15	ink sludges other than those mentioned in 08 03 14 that are not suitable for processing in an alternative waste management facility due to contamination
08 03 16*	waste etching solutions
08 03 17*	waste printing toner containing dangerous substances
08 03 18	waste printing toner other than those mentioned in 08 03 17 that requires high temperature incineration
08 03 19*	disperse oil
<i>08 04</i>	<i>wastes from MFSU of adhesives and sealants (including waterproofing products)</i>
08 04 09*	waste adhesives and sealants containing organic solvents or other dangerous substances
08 04 10	waste adhesives and sealants other than those mentioned in 08 04 09 that are not suitable for processing in an alternative waste management facility due to contamination
08 04 11*	adhesive and sealant sludges containing organic solvents or other dangerous substances
08 04 12	adhesive and sealant sludges other than those mentioned in 08 04 11 that are not suitable for processing in an alternative waste management facility due to contamination
08 04 13*	aqueous sludges containing adhesives or sealants containing organic solvents or other dangerous substances
08 04 14	aqueous sludges containing adhesives or sealants other than those mentioned in 08 04 13 that are not suitable for processing in an alternative waste management facility due to contamination
08 04 15*	aqueous liquid waste containing adhesives or sealants containing organic solvents or other dangerous substances
08 04 16	aqueous liquid waste containing adhesives or sealants other than those mentioned in 08 04 15 that are not suitable for processing in an alternative waste management facility due to contamination
08 04 17*	rosin oil
08 05	wastes not otherwise specified in 08
08 05 01*	waste isocyanates
9	WASTES FROM THE PHOTOGRAPHIC INDUSTRY

EWC Code	Description
<i>09 01</i>	<i>wastes from the photographic industry</i>
09 01 01*	water-based developer and activator solutions
09 01 02*	water-based offset plate developer solutions
09 01 03*	solvent-based developer solutions
09 01 04*	fixer solutions
09 01 05*	bleach solutions and bleach fixer solutions
09 01 06*	wastes containing silver from on-site treatment of photographic wastes
09 01 07	photographic film and paper containing silver or silver compounds that requires high temperature incineration
09 01 08	photographic film and paper free of silver or silver compounds that requires high temperature incineration
09 01 10	single-use cameras without batteries that requires high temperature incineration
09 01 11*	single-use cameras containing batteries included in 16 06 01, 16 06 02 or 16 06 03
09 01 12	single-use cameras containing batteries other than those mentioned in 09 01 11 that requires high temperature incineration
09 01 13*	aqueous liquid waste from on-site reclamation of silver other than those mentioned in 09 01 06
10	WASTES FROM THERMAL PROCESSES
<i>10 01</i>	<i>wastes from power stations and other combustion plants (except 19)</i>
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
10 01 02	coal fly ash
10 01 03	fly ash from peat and untreated wood
10 01 04*	oil fly ash and boiler dust
10 01 05	calcium-based reaction wastes from flue-gas desulphurisation in solid form
10 01 07	calcium-based reaction wastes from flue-gas desulphurisation in sludge form
10 01 09*	sulphuric acid
10 01 13*	fly ash from emulsified hydrocarbons used as fuel
10 01 14*	bottom ash, slag and boiler dust from co-incineration containing dangerous substances
10 01 15	bottom ash, slag and boiler dust from co-incineration other than those mentioned in 10 01 14
10 01 16*	fly ash from co-incineration containing dangerous substances

EWC Code	Description
10 01 17	fly ash from co-incineration other than those mentioned in 10 01 16
10 01 18*	wastes from gas cleaning containing hazardous substances
10 01 19	wastes from gas cleaning other than those mentioned in 10 01 05, 10 01 07 and 10 01 18
10 01 20*	sludges from on-site effluent treatment containing dangerous substances
10 01 21	sludges from on-site effluent treatment other than those mentioned in 10 01 20 that are not suitable for processing in an alternative waste management facility due to contamination
10 01 22*	aqueous sludges from boiler cleansing containing dangerous substances
10 01 23	aqueous sludges from boiler cleansing other than those mentioned in 10 01 22 that are not suitable for processing in an alternative waste management facility due to contamination
10 01 24	sands from fluidised beds
10 01 25	wastes from fuel storage and preparation of coal-fired power plants
10 01 26	wastes from cooling-water treatment
10 02	<i>wastes from the iron and steel industry</i>
10 02 01	wastes from the processing of slag that are not suitable for processing in an alternative waste management facility due to contamination
10 02 02	unprocessed slag that is not suitable for processing in an alternative waste management facility due to contamination
10 02 07*	solid wastes from gas treatment containing dangerous substances
10 02 08	solid wastes from gas treatment other than those mentioned in 10 02 07
10 02 10	mill scales that are not suitable for processing in an alternative waste management facility due to contamination
10 02 11*	wastes from cooling-water treatment containing oil
10 02 12	wastes from cooling-water treatment other than those mentioned in 10 02 11 that are not suitable for processing in an alternative waste management facility due to contamination
10 02 13*	sludges and filter cakes from gas treatment containing dangerous substances
10 02 14	sludges and filter cakes from gas treatment other than those mentioned in 10 02 13 that are not suitable for processing in an alternative waste management facility due to contamination
10 02 15	other sludges and filter cakes that are not suitable for processing in an alternative waste management facility due to contamination

EWC Code	Description
10 03	<i>wastes from aluminium thermal metallurgy</i>
10 03 02	anode scraps
10 03 04*	primary production slags
10 03 05	waste alumina
10 03 08*	salt slags from secondary production
10 03 09*	black drosses from secondary production
10 03 15*	skimmings that are flammable or emit, upon contact with water, flammable gases in dangerous quantities
10 03 16	skimmings other than those mentioned in 10 03 15
10 03 17*	tar-containing wastes from anode manufacture
10 03 18	carbon-containing wastes from anode manufacture other than those mentioned in 10 03 17
10 03 19*	flue-gas dust containing dangerous substances
10 03 20	flue-gas dust other than those mentioned in 10 03 19
10 03 21*	other particulates and dust (including ball-mill dust) containing dangerous substances
10 03 22	other particulates and dust (including ball-mill dust) other than those mentioned in 10 03 21
10 03 23*	solid wastes from gas treatment containing dangerous substances
10 03 24	solid wastes from gas treatment other than those mentioned in 10 03 23
10 03 25*	sludges and filter cakes from gas treatment containing dangerous substances
10 03 26	sludges and filter cakes from gas treatment other than those mentioned in 10 03 25
10 03 27*	wastes from cooling-water treatment containing oil
10 03 28	wastes from cooling-water treatment other than those mentioned in 10 03 27
10 03 29*	wastes from treatment of salt slags and black drosses containing dangerous substances
10 03 30	wastes from treatment of salt slags and black drosses other than those mentioned in 10 03 29
10 04 01*	slags from primary and secondary production
10 04 02*	dross and skimmings from primary and secondary production
10 04 03*	calcium arsenate
10 04 04*	flue-gas dust
10 04 05*	other particulates and dust
10 04 06*	solid wastes from gas treatment
10 04 07*	sludges and filter cakes from gas treatment

EWC Code	Description
10 04 09*	wastes from cooling-water treatment containing oil
10 04 10	wastes from cooling-water treatment other than those mentioned in 10 04 09
10 05 01	slags from primary and secondary production
10 05 03*	flue-gas dust
10 05 04	other particulates and dust
10 05 05*	solid waste from gas treatment
10 05 06*	sludges and filter cakes from gas treatment
10 05 08*	wastes from cooling-water treatment containing oil
10 05 09	wastes from cooling-water treatment other than those mentioned in 10 05 08
10 05 10*	dross and skimmings that are flammable or emit, upon contact with water, flammable gases in hazardous quantities
10 05 11	dross and skimmings other than those mentioned in 10 05 10
10 06 01	slags from primary and secondary production
10 06 02	dross and skimmings from primary and secondary production
10 06 03*	flue-gas dust
10 06 04	other particulates and dust
10 06 06*	solid wastes from gas treatment
10 06 07*	sludges and filter cakes from gas treatment
10 06 09*	wastes from cooling-water treatment containing oil
10 06 10	wastes from cooling-water treatment other than those mentioned in 10 06 09
10 07 01	slags from primary and secondary production
10 07 02	dross and skimmings from primary and secondary production
10 07 03	solid wastes from gas treatment
10 07 04	other particulates and dust
10 07 05	sludges and filter cakes from gas treatment
10 07 07*	wastes from cooling-water treatment containing oil
10 07 08	wastes from cooling-water treatment other than those mentioned in 10 07 07
<i>10 08</i>	<i>wastes from other non-ferrous thermal metallurgy</i>
10 08 04	particulates and dust
10 08 08*	salt slag from primary and secondary production
10 08 09	other slags
10 08 10*	dross and skimmings that are flammable or emit, upon contact with water, flammable gases in hazardous quantities
10 08 11	dross and skimmings other than those mentioned in 10 08 10
10 08 12*	tar-containing wastes from anode manufacture

EWC Code	Description
10 08 13	carbon-containing wastes from anode manufacture other than those mentioned in 10 08 12
10 08 14	anode scrap
10 08 15*	flue-gas dust containing dangerous substances
10 08 16	flue-gas dust other than those mentioned in 10 08 15
10 08 17*	sludges and filter cakes from flue-gas treatment containing dangerous substances
10 08 18	sludges and filter cakes from flue-gas treatment other than those mentioned in 10 08 17 that are not suitable for processing in an alternative waste management facility due to contamination
10 08 19*	wastes from cooling-water treatment containing oil
10 08 20	wastes from cooling-water treatment other than those mentioned in 10 08 19 that are not suitable for processing in an alternative waste management facility due to contamination
<i>10 09</i>	<i>wastes from casting of ferrous pieces</i>
10 09 03	furnace slag
10 09 05*	casting cores and moulds which have not undergone pouring containing dangerous substances
10 09 06	casting cores and moulds which have not undergone pouring other than those mentioned in 10 09 05
10 09 07*	casting cores and moulds which have undergone pouring containing dangerous substances
10 09 08	casting cores and moulds which have undergone pouring other than those mentioned in 10 09 07
10 09 09*	flue-gas dust containing hazardous substances
10 09 10	flue-gas dust other than those mentioned in 10 09 09
10 09 11*	other particulates containing dangerous substances
10 09 12	other particulates other than those mentioned in 10 09 11
10 09 13*	waste binders containing dangerous substances
10 09 14	waste binders other than those mentioned in 10 09 13
10 09 15*	waste crack-indicating agent containing dangerous substances
10 09 16	waste crack-indicating agent other than those mentioned in 10 09 15 that are not suitable for processing in an alternative waste management facility due to contamination
<i>10 10</i>	<i>wastes from casting of non-ferrous pieces</i>
10 10 03	furnace slag
10 10 05*	casting cores and moulds which have not undergone pouring, containing dangerous substances
10 10 06	casting cores and moulds which have not undergone pouring, other than those mentioned in 10 10 05

EWC Code	Description
10 10 07*	casting cores and moulds which have undergone pouring, containing dangerous substances
10 10 08	casting cores and moulds which have undergone pouring, other than those mentioned in 10 10 07
10 10 09*	flue-gas dust containing dangerous substances
10 10 10	flue-gas dust other than those mentioned in 10 10 09
10 10 11*	other particulates containing dangerous substances
10 10 12	other particulates other than those mentioned in 10 10 11
10 10 13*	waste binders containing dangerous substances
10 10 14	waste binders other than those mentioned in 10 10 13
10 10 15*	waste crack-indicating agent containing dangerous substances
10 10 16	waste crack-indicating agent other than those mentioned in 10 10 15 that are not suitable for processing in an alternative waste management facility due to contamination
10 11	wastes from manufacture of glass and glass products
10 11 03	waste glass-based fibrous materials
10 11 05	particulates and dust
10 11 09*	waste preparation mixture before thermal processing, containing dangerous substances
10 11 10	waste preparation mixture before thermal processing, other than those mentioned in 10 11 09
10 11 11*	waste glass in small particles and glass powder containing heavy metals (for example from cathode ray tubes)
10 11 12	waste glass other than those mentioned in 10 11 11
10 11 13*	glass-polishing and -grinding sludge containing dangerous substances
10 11 14	glass-polishing and -grinding sludge other than those mentioned in 10 11 13
10 11 15*	solid wastes from flue-gas treatment containing dangerous substances
10 11 16	solid wastes from flue-gas treatment other than those mentioned in 10 11 15
10 11 17*	sludges and filter cakes from flue-gas treatment containing dangerous substances
10 11 18	sludges and filter cakes from flue-gas treatment other than those mentioned in 10 11 17
10 11 19*	solid wastes from on-site effluent treatment containing dangerous substances
10 11 20	solid wastes from on-site effluent treatment other than those mentioned in 10 11 19
10 12 01	waste preparation mixture before thermal processing

EWC Code	Description
10 12 03	particulates and dust
10 12 05	sludges and filter cakes from gas treatment
10 12 06	discarded moulds
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)
10 12 09*	solid wastes from gas treatment containing hazardous substances
10 12 10	solid wastes from gas treatment other than those mentioned in 10 12 09
10 12 11*	wastes from glazing containing heavy metals
10 12 12	wastes from glazing other than those mentioned in 10 12 11
10 12 13	sludge from on-site effluent treatment
10 13 01	waste preparation mixture before thermal processing
10 13 04	wastes from calcination and hydration of lime
10 13 06	particulates and dust (except 10 13 12 and 10 13 13)
10 13 07	sludges and filter cakes from gas treatment
10 13 11	wastes from cement-based composite materials other than those mentioned in 10 13 09 and 10 13 10
10 13 12*	solid wastes from gas treatment containing hazardous substances
10 13 13	solid wastes from gas treatment other than those mentioned in 10 13 12
10 13 14	waste concrete and concrete sludge
10 14 01*	waste from gas cleaning containing mercury
11	WASTES FROM CHEMICAL SURFACE TREATMENT AND COATING OF METALS AND OTHER MATERIALS; NON-FERROUS HYDRO-METALLURGY
<i>11 01</i>	wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphating, alkaline degreasing, anodising)
11 01 05*	pickling acids
11 01 06*	acids not otherwise specified
11 01 07*	pickling bases
11 01 08*	phosphatising sludges
11 01 09*	sludges and filter cakes containing dangerous substances
11 01 10	sludges and filter cakes other than those mentioned in 11 01 09 that are not suitable for processing in an alternative waste management facility due to contamination
11 01 11*	aqueous rinsing liquids containing dangerous substances

EWG Code	Description
11 01 12	aqueous rinsing liquids other than those mentioned in 11 01 11 that are not suitable for processing in an alternative waste management facility due to contamination
11 01 13*	degreasing wastes containing dangerous substances
11 01 14	degreasing wastes other than those mentioned in 11 01 13 that requires high temperature incineration
11 01 15*	eluate and sludges from membrane systems or ion exchange systems containing dangerous substances
11 01 16*	saturated or spent ion exchange resins
<i>11 02</i>	<i>wastes from non-ferrous hydrometallurgical processes</i>
11 02 02*	sludges from zinc hydrometallurgy (including jarosite, goethite)
11 02 03	wastes from the production of anodes for aqueous electrolytical processes that are not suitable for processing in an alternative waste management facility due to contamination
11 02 05*	wastes from copper hydrometallurgical processes containing dangerous substances
11 02 06	wastes from copper hydrometallurgical processes other than those mentioned in 11 02 05 that are not suitable for processing in an alternative waste management facility due to contamination
11 02 07*	other wastes containing dangerous substances
<i>11 03</i>	<i>sludges and solids from tempering processes</i>
11 03 01*	wastes containing cyanide
11 03 02*	other wastes
11 05 01	hard zinc
11 05 02	zinc ash
11 05 03*	solid wastes from gas treatment
11 05 04*	spent flux
12	WASTES FROM SHAPING AND PHYSICAL AND MECHANICAL SURFACE TREATMENT OF METALS AND PLASTICS
<i>12 01</i>	<i>wastes from shaping and physical and mechanical surface treatment of metals and plastics</i>
12 01 01	ferrous metal filings and turnings that are not suitable for processing in an alternative waste management facility due to contamination
12 01 02	ferrous metal dust and particles that are not suitable for processing in an alternative waste management facility due to contamination
12 01 03	non-ferrous metal filings and turnings that are not suitable for processing in an alternative waste management facility due to contamination

EWG Code	Description
12 01 04	non-ferrous metal dust and particles that are not suitable for processing in an alternative waste management facility due to contamination
12 01 05	plastics shavings and turnings that are not suitable for processing in an alternative waste management facility due to contamination
12 01 06*	mineral-based machining oils containing halogens (except emulsions and solutions)
12 01 07*	mineral-based machining oils free of halogens (except emulsions and solutions)
12 01 08*	machining emulsions and solutions containing halogens
12 01 09*	machining emulsions and solutions free of halogens
12 01 10*	synthetic machining oils
12 01 12*	spent waxes and fats
12 01 13	welding wastes that are not suitable for processing in an alternative waste management facility due to contamination
12 01 14*	machining sludges containing dangerous substances
12 01 15	machining sludges other than those mentioned in 12 01 14 that are not suitable for processing in an alternative waste management facility due to contamination
12 01 16*	waste blasting material containing dangerous substances
12 01 17	waste blasting material other than those mentioned in 12 01 16 that is not suitable for processing in an alternative waste management facility due to contamination
12 01 18*	metal sludge (grinding, honing and lapping sludge) containing oil
12 01 19*	readily biodegradable machining oil
12 01 20*	spent grinding bodies and grinding materials containing dangerous substances
12 01 21	spent grinding bodies and grinding materials other than those mentioned in 12 01 20 that are not suitable for processing in an alternative waste management facility due to contamination
12 03	<i>wastes from water and steam degreasing processes (except 11)</i>
12 03 01*	aqueous washing liquids
12 03 02*	steam degreasing wastes
13	OIL WASTES AND WASTES OF LIQUID WASTES (except edible oils, and those in chapters 05, 12 and 19)
13 01	<i>waste hydraulic oils</i>
13 01 01*	hydraulic oils, containing PCBs (1)
13 01 04*	chlorinated emulsions
13 01 05*	non-chlorinated emulsions
13 01 09*	mineral-based chlorinated hydraulic oils

EWC Code	Description
13 01 10*	mineral based non-chlorinated hydraulic oils
13 01 11*	synthetic hydraulic oils
13 01 12*	readily biodegradable hydraulic oils
13 01 13*	other hydraulic oils
<i>13 02</i>	<i>waste engine, gear and lubricating oils</i>
13 02 04*	mineral-based chlorinated engine, gear and lubricating oils
13 02 05*	mineral-based non-chlorinated engine, gear and lubricating oils
13 02 06*	synthetic engine, gear and lubricating oils
13 02 07*	readily biodegradable engine, gear and lubricating oils
13 02 08*	other engine, gear and lubricating oils
<i>13 03</i>	<i>waste insulating and heat transmission oils</i>
13 03 01*	insulating or heat transmission oils containing PCBs
13 03 06*	mineral-based chlorinated insulating and heat transmission oils other than those mentioned in 13 03 01
13 03 07*	mineral-based non-chlorinated insulating and heat transmission oils
13 03 08*	synthetic insulating and heat transmission oils
13 03 09*	readily biodegradable insulating and heat transmission oils
13 03 10*	other insulating and heat transmission oils
<i>13 04</i>	<i>bilge oils</i>
13 04 01*	bilge oils from inland navigation
13 04 02*	bilge oils from jetty sewers
13 04 03*	bilge oils from other navigation
<i>13 05</i>	<i>oil/water separator contents</i>
13 05 01*	solids from grit chambers and oil/water separators
13 05 02*	sludges from oil/water separators
13 05 03*	interceptor sludges
13 05 06*	oil from oil/water separators
13 05 07*	oily water from oil/water separators
13 05 08*	mixtures of wastes from grit chambers and oil/water separators
<i>13 07</i>	<i>wastes of liquid wastes</i>
13 07 01*	waste oil and diesel
13 07 02*	petrol
13 07 03*	other wastes (including mixtures)
<i>13 08</i>	<i>oil wastes not otherwise specified</i>
13 08 01*	desalter sludges or emulsions
13 08 02*	other emulsions

EWG Code	Description
14	WASTE ORGANIC SOLVENTS, REFRIGERANTS AND PROPELLANTS (except 07 and 08)
<i>14 06</i>	<i>waste organic solvents, refrigerants and foam/aerosol propellants</i>
14 06 01*	chlorofluorocarbons, HCFC, HFC
14 06 02*	other halogenated solvents and solvent mixtures
14 06 03*	other solvents and solvent mixtures
14 06 04*	sludges or solid wastes containing halogenated solvents
14 06 05*	sludges or solid wastes containing other solvents
15	WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED
<i>15 01</i>	<i>packaging (including separately collected municipal packaging waste)</i>
15 01 01	paper and cardboard packaging
15 01 02	plastic packaging
15 01 03	wooden packaging
15 01 04	metallic packaging
15 01 05	composite packaging
15 01 06	mixed packaging
15 01 07	glass packaging
15 01 09	textile packaging
15 01 10*	packaging containing residues of or contaminated by dangerous substances
<i>15 02</i>	<i>absorbents, filter materials, wiping cloths and protective clothing</i>
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02 that are not suitable for processing in an alternative waste management facility due to contamination
16	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
<i>16 01</i>	<i>end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)</i>
16 01 03	end-of-life tyres that are not suitable for processing in an alternative waste management facility due to contamination
16 01 04*	end-of-life vehicles

EWC Code	Description
16 01 06	end-of-life vehicles, containing neither liquids nor other hazardous components
16 01 07*	oil filters
16 01 08*	components containing mercury
16 01 09*	components containing PCBs
16 01 10*	explosive components (for example air bags)
16 01 12	brake pads other than those mentioned in 16 01 11 that are not suitable for processing in an alternative waste management facility due to contamination
16 01 13*	brake fluids
16 01 14*	antifreeze fluids containing dangerous substances
16 01 15	antifreeze fluids other than those mentioned in 16 01 14 that are not suitable for processing in an alternative waste management facility due to contamination
16 01 16	tanks for liquefied gas
16 01 17	ferrous metal that is not suitable for processing in an alternative waste management facility due to contamination
16 01 18	non-ferrous metal that is not suitable for processing in an alternative waste management facility due to contamination
16 01 19	plastic that is not suitable for processing in an alternative waste management facility due to contamination
16 01 20	glass that is not suitable for processing in an alternative waste management facility due to contamination
16 01 21*	hazardous components other than those mentioned in 16 01 07 to 16 01 11 and 16 01 13 and 16 01 14
16 01 22	components not otherwise specified that is not suitable for processing in an alternative waste management facility due to contamination
16 02	<i>wastes from electrical and electronic equipment</i>
16 02 09*	transformers and capacitors containing PCBs
16 02 10*	discarded equipment containing or contaminated by PCBs other than those mentioned in 16 02 09
16 02 11*	discarded equipment containing chlorofluorocarbons, HCFC, HFC
16 02 13*	discarded equipment containing hazardous components (2) other than those mentioned in 16 02 09 to 16 02 12
16 02 14	discarded equipment other than those mentioned in 16 02 09 to 16 02 13 that is not suitable for processing in an alternative waste management facility due to contamination
16 02 15*	hazardous components removed from discarded equipment
16 02 16	components removed from discarded equipment other than those mentioned in 16 02 15 that are not suitable for processing

EWC Code	Description
	in an alternative waste management facility due to contamination
<i>16 03</i>	<i>off-specification batches and unused products</i>
16 03 03*	inorganic wastes containing dangerous substances
16 03 04	inorganic wastes other than those mentioned in 16 03 03 that are not suitable for processing in an alternative waste management facility due to contamination
16 03 05*	organic wastes containing dangerous substances
16 03 06	organic wastes other than those mentioned in 16 03 05 that are not suitable for processing in an alternative waste management facility due to contamination
<i>16 05</i>	<i>gases in pressure containers and discarded chemicals</i>
16 05 04*	gases in pressure containers (including halons) containing dangerous substances
16 05 05	gases in pressure containers other than those mentioned in 16 05 04 that require high temperature incineration
16 05 06*	laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals
16 05 07*	discarded inorganic chemicals consisting of or containing dangerous substances
16 05 08*	discarded organic chemicals consisting of or containing dangerous substances
16 05 09	discarded chemicals other than those mentioned in 16 05 06, 16 05 07 or 16 05 08 that are not suitable for processing in an alternative waste management facility due to contamination
<i>16 06</i>	<i>batteries and accumulators</i>
16 06 01*	lead batteries
16 06 02*	Ni-Cd batteries
16 06 04	alkaline batteries (except 16 06 03) which require high temperature incineration
16 06 05	other batteries and accumulators which require high temperature incineration
16 06 06*	separately collected electrolyte from batteries and accumulators
<i>16 07</i>	<i>wastes from transport tank, storage tank and barrel cleaning (except 05 and 13)</i>
16 07 08*	wastes containing oil
16 07 09*	wastes containing other dangerous substances
<i>16 08</i>	<i>spent catalysts</i>
16 08 01	spent catalysts containing gold, silver, rhenium, rhodium, palladium, iridium or platinum (except 16 08 07) that are not suitable for processing in an alternative waste management facility due to contamination

EWC Code	Description
16 08 02*	spent catalysts containing dangerous transition metals (3) or dangerous transition metal compounds
16 08 03	spent catalysts containing transition metals or transition metal compounds not otherwise specified that are not suitable for processing in an alternative waste management facility due to contamination
16 08 04	spent fluid catalytic cracking catalysts (except 16 08 07) that are not suitable for processing in an alternative waste management facility due to contamination
16 08 05*	spent catalysts containing phosphoric acid
16 08 06*	spent liquids used as catalysts
16 08 07*	spent catalysts contaminated with dangerous substances
<i>16 09</i>	<i>oxidising substances</i>
16 09 01*	permanganates, for example potassium permanganate
16 09 02*	chromates, for example potassium chromate, potassium or sodium dichromate
16 09 03*	peroxides, for example hydrogen peroxide
16 09 04*	oxidising substances, not otherwise specified
<i>16 10</i>	<i>aqueous liquid wastes destined for off-site treatment</i>
16 10 01*	aqueous liquid wastes containing dangerous substances
16 10 02	aqueous liquid wastes other than those mentioned in 16 10 01 that are not suitable for processing in an alternative waste management facility due to contamination
16 10 03*	aqueous concentrates containing dangerous substances
16 10 04	aqueous concentrates other than those mentioned in 16 10 03 that are not suitable for processing in an alternative waste management facility due to contamination
<i>16 11</i>	<i>waste linings and refractories</i>
16 11 01*	carbon-based linings and refractories from metallurgical processes containing dangerous substances
16 11 02	carbon-based linings and refractories from metallurgical processes others than those mentioned in 16 11 01, that are not suitable for processing in an alternative waste management facility due to contamination
16 11 03*	other linings and refractories from metallurgical processes containing dangerous substances
16 11 04	other linings and refractories from metallurgical processes other than those mentioned in 16 11 03 that are not suitable for processing in an alternative waste management facility due to contamination
16 11 05*	linings and refractories from non-metallurgical processes containing dangerous substances

EWC Code	Description
16 11 06	linings and refractories from non-metallurgical processes others than those mentioned in 16 11 05
17	CONSTRUCTION AND DEMOLITION WASTES (INCLUDING EXCAVATED SOIL FROM CONTAMINATED SITES)
<i>17 01</i>	<i>concrete, bricks, tiles and ceramics</i>
17 01 01	concrete that are not suitable for processing in an alternative waste management facility due to contamination
17 01 02	bricks that are not suitable for processing in an alternative waste management facility due to contamination
17 01 03	tiles and ceramics that are not suitable for processing in an alternative waste management facility due to contamination
17 01 06*	mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing dangerous substances
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 that are not suitable for processing in an alternative waste management facility due to contamination
<i>17 02</i>	<i>wood, glass and plastic</i>
17 02 01	wood that is not suitable for processing in an alternative waste management facility due to contamination
17 02 02	glass that is not suitable for processing in an alternative waste management facility due to contamination
17 02 03	plastic that is not suitable for processing in an alternative waste management facility due to contamination
17 02 04*	glass, plastic and wood containing or contaminated with dangerous substances
<i>17 03</i>	<i>bituminous mixtures, coal tar and tarred products</i>
17 03 01*	bituminous mixtures containing coal tar
17 03 02	bituminous mixtures other than those mentioned in 17 03 01 which require high temperature incineration
17 03 03*	coal tar and tarred products
<i>17 04</i>	<i>metals (including their alloys)</i>
17 04 01	copper, bronze, brass that is not suitable for processing in an alternative waste management facility due to contamination
17 04 02	aluminium that is not suitable for processing in an alternative waste management facility due to contamination
17 04 03	lead that is not suitable for processing in an alternative waste management facility due to contamination
17 04 04	zinc that is not suitable for processing in an alternative waste management facility due to contamination
17 04 05	iron and steel that are not suitable for processing in an alternative waste management facility due to contamination

EW Code	Description
17 04 06	tin that is not suitable for processing in an alternative waste management facility due to contamination
17 04 07	mixed metals that are not suitable for processing in an alternative waste management facility due to contamination
17 04 09*	metal waste contaminated with dangerous substances
17 04 10*	cables containing oil, coal tar and other dangerous substances which require high temperature incineration
17 04 11	cables other than those mentioned in 17 04 10 that are not suitable for processing in an alternative waste management facility due to contamination
<i>17 05</i>	<i>soil (including excavated soil from contaminated sites), stones and dredging spoil</i>
17 05 03*	soil and stones containing dangerous substances
17 05 04	soil and stones other than those mentioned in 17 05 03 that are not suitable for processing in an alternative waste management facility due to contamination
17 05 05*	dredging spoil containing dangerous substances
17 05 06	dredging spoil other than those mentioned in 17 05 05 that is not suitable for processing in an alternative waste management facility due to contamination
17 05 07*	track ballast containing dangerous substances
17 05 08	track ballast other than those mentioned in 17 05 07 that is not suitable for processing in an alternative waste management facility due to contamination
<i>17 06</i>	<i>insulation materials and asbestos-containing construction materials</i>
17 06 03*	other insulation materials consisting of or containing dangerous substances
17 06 04	insulation materials other than those mentioned in 17 06 01 and 17 06 03 that are not suitable for processing in an alternative waste management facility due to contamination
<i>17 08</i>	<i>gypsum-based construction material</i>
17 08 01*	gypsum-based construction materials contaminated with dangerous substances
17 08 02	gypsum-based construction materials other than those mentioned in 17 08 01 that are not suitable for processing in an alternative waste management facility due to contamination
<i>17 09</i>	<i>other construction and demolition wastes</i>
17 09 02*	construction and demolition wastes containing PCB (for example PCB-containing sealants, PCB-containing resin-based floorings, PCB-containing sealed glazing units, PCB-containing capacitors)
17 09 03*	other construction and demolition wastes (including mixed wastes) containing dangerous substances

EWC Code	Description
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03 that are not suitable for processing in an alternative waste management facility due to contamination
18	WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)
<i>18 01</i>	<i>wastes from natal care, diagnosis, treatment or prevention of disease in humans</i>
18 01 01	sharps (except 18 01 03)
18 01 02	body parts and organs including blood bags and blood preserves (except 18 01 03)
18 01 03*	wastes whose collection and disposal is subject to special requirements in order to prevent infection
18 01 04	wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
18 01 06*	chemicals consisting of or containing dangerous substances
18 01 07	chemicals other than those mentioned in 18 01 06
18 01 08*	cytotoxic and cytostatic medicines
18 01 09	medicines other than those mentioned in 18 01 08
18 01 10*	amalgam waste from dental care
<i>18 02</i>	<i>wastes from research, diagnosis, treatment or prevention of disease involving animals</i>
18 02 01	sharps (except 18 02 02)
18 02 02*	wastes whose collection and disposal is subject to special requirements in order to prevent infection
18 02 03	wastes whose collection and disposal is not subject to special requirements in order to prevent infection
18 02 05*	chemicals consisting of or containing dangerous substances
18 02 06	chemicals other than those mentioned in 18 02 05
18 02 07*	cytotoxic and cytostatic medicines
18 02 08	medicines other than those mentioned in 18 02 07
19	WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND WATER FOR INDUSTRIAL USE
<i>19 01</i>	<i>wastes from incineration or pyrolysis of waste</i>
19 01 02	ferrous materials removed from bottom ash
19 01 05*	filter cake from gas treatment

EWG Code	Description
19 01 06*	aqueous liquid wastes from gas treatment and other aqueous liquid wastes
19 01 07*	solid wastes from gas treatment
19 01 10*	spent activated carbon from flue-gas treatment
19 01 11*	bottom ash and slag containing dangerous substances
19 01 12	bottom ash and slag other than those mentioned in 19 01 11 which require thermal treatment (e.g. due to contaminants being present or that are not suitable for disposal in a landfill)
19 01 13*	fly ash containing dangerous substances
19 01 14	fly ash other than those mentioned in 19 01 13 which require thermal treatment (e.g. due to contaminants being present or that are not suitable for disposal in a landfill)
19 01 15*	boiler dust containing dangerous substances
19 01 16	boiler dust other than those mentioned in 19 01 15 which require thermal treatment (e.g. due to contaminants being present or that are not suitable for disposal in a landfill)
19 01 17*	pyrolysis wastes containing dangerous substances
19 01 18	pyrolysis wastes other than those mentioned in 19 01 17 which require thermal treatment (e.g. due to contaminants being present or that are not suitable for disposal in a landfill)
19 01 19	sands from fluidised beds which require thermal treatment (e.g. due to contaminants being present or that are not suitable for disposal in a landfill)
19 02	<i>wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)</i>
19 02 03	premixed wastes composed only of non-hazardous wastes that are not suitable for processing in an alternative waste management facility due to contamination
19 02 04*	premixed wastes composed of at least one hazardous waste
19 02 05*	sludges from physico/chemical treatment containing dangerous substances
19 02 06	sludges from physico/chemical treatment other than those mentioned in 19 02 05 that are not suitable for processing in an alternative waste management facility due to contamination
19 02 07*	oil and concentrates from separation
19 02 08*	liquid combustible wastes containing dangerous substances
19 02 09*	solid combustible wastes containing dangerous substances
19 02 10	combustible wastes other than those mentioned in 19 02 08 and 19 02 09 that are not suitable for processing in an alternative waste management facility due to contamination
19 02 11*	other wastes containing dangerous substances
19 03	<i>stabilised/solidified wastes (4)</i>

EWC Code	Description
19 03 04*	wastes marked as hazardous, partly (5) stabilised
19 03 05	stabilised wastes other than those mentioned in 19 03 04 that are not suitable for processing in an alternative waste management facility due to contamination
19 03 06*	wastes marked as hazardous, solidified
19 03 07	solidified wastes other than those mentioned in 19 03 06 that are not suitable for processing in an alternative waste management facility due to contamination
<i>19 04 01</i>	<i>vitrified waste and wastes from vitrification</i>
19 04 02*	fly ash and other flue-gas treatment wastes
19 04 03*	non-vitrified solid phase
19 04 04	aqueous liquid wastes from vitrified waste tempering that are not suitable for processing in an alternative waste management facility due to contamination
<i>19 05</i>	<i>wastes from aerobic treatment of solid wastes</i>
19 05 01	non-composted fraction of municipal and similar wastes that is not suitable for processing in an alternative waste management facility due to contamination
19 05 02	non-composted fraction of animal and vegetable waste that is not suitable for processing in an alternative waste management facility due to contamination
19 05 03	off-specification compost that is not suitable for processing in an alternative waste management facility due to contamination
<i>19 06</i>	<i>wastes from anaerobic treatment of waste</i>
19 06 03	liquor from anaerobic treatment of municipal waste that is not suitable for processing in an alternative waste management facility due to contamination
19 06 04	digestate from anaerobic treatment of municipal waste that is not suitable for processing in an alternative waste management facility due to contamination
19 06 05	liquor from anaerobic treatment of animal and vegetable waste that is not suitable for processing in an alternative waste management facility due to contamination
19 06 06	digestate from anaerobic treatment of animal and vegetable waste that is not suitable for processing in an alternative waste management facility due to contamination
<i>19 07</i>	<i>landfill leachate</i>
19 07 02*	landfill leachate containing dangerous substances
19 07 03	landfill leachate other than those mentioned in 19 07 02 that is not suitable for processing in an alternative waste management facility due to contamination
<i>19 08</i>	<i>wastes from waste water treatment plants not otherwise specified</i>

EWC Code	Description
19 08 01	screenings that are not suitable for processing in an alternative waste management facility due to contamination
19 08 02	waste from desanding that is not suitable for processing in an alternative waste management facility due to contamination
19 08 05	sludges from treatment of urban waste water that are not suitable for processing in an alternative waste management facility due to contamination
19 08 06*	saturated or spent ion exchange resins
19 08 07*	solutions and sludges from regeneration of ion exchangers
19 08 08*	membrane system waste containing heavy metals
19 08 09*	grease and oil mixture from oil/water separation containing edible oil and fats
19 08 10*	grease and oil mixture from oil/water separation other than those mentioned in 19 08 09
19 08 11*	sludges containing dangerous substances from biological treatment of industrial wastewater
19 08 12	sludges from biological treatment of industrial wastewater other than those mentioned in 19 08 11 that are not suitable for processing in an alternative waste management facility due to contamination
19 08 13*	sludges containing dangerous substances from other treatment of industrial wastewater
19 08 14	sludges from other treatment of industrial wastewater other than those mentioned in 19 08 13 that are not suitable for processing in an alternative waste management facility due to contamination
19 09	<i>wastes from the preparation of water intended for human consumption or water for industrial use</i>
19 09 01	solid waste from primary filtration and screenings that is not suitable for processing in an alternative waste management facility due to contamination
19 09 02	sludges from water clarification that are not suitable for processing in an alternative waste management facility due to contamination
19 09 03	sludges from decarbonation that are not suitable for processing in an alternative waste management facility due to contamination
19 09 04	spent activated carbon that is not suitable for processing in an alternative waste management facility due to contamination
19 09 05	saturated or spent ion exchange resins that are not suitable for processing in an alternative waste management facility due to contamination

EWG Code	Description
19 09 06	solutions and sludges from regeneration of ion exchangers that are not suitable for processing in an alternative waste management facility due to contamination
<i>19 10</i>	<i>wastes from shredding of metal-containing wastes</i>
19 10 01	iron and steel waste that is not suitable for processing in an alternative waste management facility due to contamination
19 10 02	non-ferrous waste that is not suitable for processing in an alternative waste management facility due to contamination
19 10 03*	fluff-light fraction and dust containing dangerous substances
19 10 04	fluff-light fraction and dust other than those mentioned in 19 10 03 which require thermal treatment (e.g. due to contaminants being present or that are not suitable for disposal in a landfill)
19 10 05*	other fractions containing dangerous substances
19 10 06	other fractions other than those mentioned in 19 10 05
<i>19 11</i>	<i>wastes from oil regeneration</i>
19 11 01*	spent filter clays
19 11 02*	acid tars
19 11 03*	aqueous liquid wastes
19 11 04*	wastes from cleaning of waste with bases
19 11 05*	sludges from on-site effluent treatment containing dangerous substances
19 11 06	sludges from on-site effluent treatment other than those mentioned in 19 11 05 that are not suitable for processing in an alternative waste management facility due to contamination
19 11 07*	wastes from flue-gas cleaning
<i>19 12</i>	<i>wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified</i>
19 12 01	paper and cardboard that is not suitable for processing in an alternative waste management facility due to contamination
19 12 02	ferrous metal that is not suitable for processing in an alternative waste management facility due to contamination
19 12 03	non-ferrous metal that is not suitable for processing in an alternative waste management facility due to contamination
19 12 04	plastic and rubber that is not suitable for processing in an alternative waste management facility due to contamination
19 12 05	glass that is not suitable for processing in an alternative waste management facility due to contamination
19 12 06*	wood containing dangerous substances
19 12 07	wood other than that mentioned in 19 12 06 that is not suitable for processing in an alternative waste management facility due to contamination

EWC Code	Description
19 12 08	textiles that are not suitable for processing in an alternative waste management facility due to contamination
19 12 09	minerals (for example sand, stones) that are not suitable for processing in an alternative waste management facility due to contamination
19 12 10	combustible waste (refuse derived waste) that is not suitable for processing in an alternative waste management facility due to contamination
19 12 11*	other wastes (including mixtures of materials) from mechanical treatment of waste containing dangerous substances
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 that are not suitable for processing in an alternative waste management facility due to contamination
<i>19 13</i>	<i>wastes from soil and groundwater remediation</i>
19 13 01*	solid wastes from soil remediation containing dangerous substances
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01 that are not suitable for processing in an alternative waste management facility due to contamination
19 13 03*	sludges from soil remediation containing dangerous substances
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03 that are not suitable for processing in an alternative waste management facility due to contamination
19 13 05*	sludges from groundwater remediation containing dangerous substances
19 13 06	sludges from groundwater remediation other than those mentioned in 19 13 05 that are not suitable for processing in an alternative waste management facility due to contamination
19 13 07*	aqueous liquid wastes and aqueous concentrates from groundwater remediation containing dangerous substances
19 13 08	aqueous liquid wastes and aqueous concentrates from groundwater remediation other than those mentioned in 19 13 07 that are not suitable for processing in an alternative waste management facility due to contamination
20	MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS
<i>20 01</i>	<i>separately collected fractions (except 15 01)</i>
20 01 01	paper and cardboard that is not suitable for processing in an alternative waste management facility due to contamination
20 01 02	glass that is not suitable for processing in an alternative waste management facility due to contamination

EWC Code	Description
20 01 08	biodegradable kitchen and canteen waste that is not suitable for processing in an alternative waste management facility due to contamination
20 01 10	clothes that are not suitable for processing in an alternative waste management facility due to contamination
20 01 11	textiles that are not suitable for processing in an alternative waste management facility due to contamination
20 01 13*	solvents
20 01 14*	acids
20 01 15*	alkalines
20 01 17*	photochemicals
20 01 19*	pesticides
20 01 21*	fluorescent tubes and other mercury-containing waste
20 01 23*	discarded equipment containing chlorofluorocarbons
20 01 25	edible oil and fat that is not suitable for processing in an alternative waste management facility due to contamination
20 01 26*	oil and fat other than those mentioned in 20 01 25
20 01 27*	paint, inks, adhesives and resins containing dangerous substances
20 01 28	paint, inks, adhesives and resins other than those mentioned in 20 01 27 that are not suitable for processing in an alternative waste management facility due to contamination
20 01 29*	detergents containing dangerous substances
20 01 30	detergents other than those mentioned in 20 01 29 that are not suitable for processing in an alternative waste management facility due to contamination
20 01 31*	cytotoxic and cytostatic medicines
20 01 32	medicines other than those mentioned in 20 01 31
20 01 33*	batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries
20 01 34	batteries and accumulators other than those mentioned in 20 01 33 that are not suitable for processing in an alternative waste management facility due to contamination
20 01 35*	discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components (6)
20 01 36	discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35 that are not suitable for processing in an alternative waste management facility due to contamination
20 01 37*	wood containing dangerous substances

EWC Code	Description
20 01 38	wood other than that mentioned in 20 01 37 that is not suitable for processing in an alternative waste management facility due to contamination
20 01 39	plastics that are not suitable for processing in an alternative waste management facility due to contamination
20 01 40	metals that are not suitable for processing in an alternative waste management facility due to contamination
20 01 41	wastes from chimney sweeping that are not suitable for processing in an alternative waste management facility due to contamination
<i>20 02</i>	<i>garden and park waste (including cemetery waste)</i>
20 02 01	biodegradable waste that are not suitable for processing in an alternative waste management facility due to contamination
20 02 02	soil and stones that are not suitable for processing in an alternative waste management facility due to contamination
20 02 03	other non-biodegradable wastes that are not suitable for processing in an alternative waste management facility due to contamination
<i>20 03</i>	<i>other municipal wastes</i>
20 03 01	mixed municipal waste that is not suitable for processing in an alternative waste management facility due to contamination
20 03 02	waste from markets that is not suitable for processing in an alternative waste management facility due to contamination
20 03 03	street-cleaning residues that are not suitable for processing in an alternative waste management facility due to contamination
20 03 04	septic tank sludge that is not suitable for processing in an alternative waste management facility due to contamination
20 03 06	waste from sewage cleaning that is not suitable for processing in an alternative waste management facility due to contamination
20 03 07	bulky waste that is not suitable for processing in an alternative waste management facility due to contamination

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