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Indaver Ireland Limited

IE Licence Review Application

Reference Document on the Best Available Techniques (BAT) Conclusions for Waste Treatment, August 2018

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1. Introduction

This report has been prepared for the purposes of Section 4.7 of an Industrial Emissions Licence (IE) Review application submitted by Indaver Ireland for their site at Carranstown, Duleek, County Meath. This report, which applies to IE Licence W0167-03, consists of a review of the licensed activities on site and the proposed activities to which the licence review relates in the context of any applicable Best Available Techniques (BAT).

The Industrial Emissions Directive 2010/75/EU (IED) and the European Union (Industrial Emissions) Regulations 2013 (SI 138 of 2013) define BAT, BAT Reference Document (BREF) and BAT Conclusions (BATC) as follows:

The Industrial Emissions Directive defines Best Available Techniques as follows: 'best available techniques' means the most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole: 'techniques' includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned; 'available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator; 'best' means most effective in achieving a high general level of protection of the environment as a whole;
The Industrial Emissions Directive definition of BAT Reference Document is as follows: "(11) 'BAT reference document' means a document, resulting from the exchange of information organised pursuant to Article 13, drawn up for defined activities and describing, in particular, applied techniques, present emissions and consumption levels, techniques considered for the determination of best available techniques as well as BAT conclusions and any emerging techniques, giving special consideration to the criteria listed in Annex III;" SI 138 of 2013 has a similar definition.
The Industrial Emissions Directive and SI 138 of 2013 have the same definition of BAT conclusions, as follows: 'BAT conclusions' means a document containing the parts of a BAT reference document laying down the conclusions on best available techniques, their description, information to assess their applicability, the emission levels associated with the best available techniques, associated monitoring, associated consumption levels and, where appropriate, relevant site remediation measures;

The Industrial Emissions Directive 2010/75/EU replaced seven existing directives including the Integrated Pollution Prevention and Control (IPPC) Directive (2008/1/EC).

- Historically, the BREF process for the IPPC Directive produced guidance documents that member states had to have regard to when permitting (licensing) installations.
- However, the IED has made BAT conclusions mandatory in the permitting process (Article 14(3) of the IED).

Where BAT conclusions are available for any new installations, they are expected to achieve the associated standard before commencement of operations.

For existing installations, the IED provides that where a Commission Implementing Decision on BAT conclusions is published, within four years (relating to the main activity of the installation), the Environmental Protection Agency (EPA) should undertake that 'all permit/licence conditions for the installation concerned are reconsidered, where necessary updated' and 'ensure compliance with the BAT'.

The European IPPC Bureau (EIPPCB) organises and co-ordinates the exchange of information between Member States and the industries concerned on Best Available Techniques (BAT), as set forth in Article 13 of the IED. The EIPPCB produces BAT reference documents (BREF) and BAT conclusions.

2. Activity

As per W0167-03, the facility is currently licensed to carry out the following activities as outlined in the First Schedule of the Environmental Protection Agency (EPA) Act 1992, as amended:

11.3: Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants –

(a) for non-hazardous waste with a capacity exceeding 3 tonnes per hour,

(b) for hazardous wate with a capacity exceeding 10 tonnes per day.

Following implementation of the proposed development, which includes an increase in the amount of waste being accepted at the facility and the construction of a hydrogen generation unit, two new activities as outlined in the First Schedule of the EPA Act 1992, as amended, will be carried out:

5.13 (a) The production of inorganic chemicals, such as gases, such as ammonia, chlorine or hydrogen chloride, fluorine, or hydrogen fluoride, carbon oxides, sulphur compounds, nitrogen oxides, hydrogen, sulphur dioxide, carbonyl chloride (production means the production on an industrial scale by chemical or biological processing);

11.6 Temporary storage of hazardous waste, (other than waste referred to in paragraph 11.5) pending any of the activities referred to in paragraph 11.2, 11.3, 11.5 or 11.7 with a total capacity exceeding 50 tonnes, other than temporary storage, pending collection, on the site where the waste is generated.

3. BAT/BREF Assessments

A review of the European Commission Integrated Pollution Prevention and Control *Reference Document on Best Available Techniques on Waste Treatment, August 2018* is presented in the table below.

Table 1 - Review of European Commission Integrated Pollution Prevention and Control Reference Document on Best Available Techniques on Waste Treatment, August 2018

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
6.1 General BAT Conclusions			
6.1.1. Overall environmental performance			
BAT 1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features: I. commitment of the management, including senior management. II. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation; 17.8.2018 EN Official Journal of the European Union L 208/45 III. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment. IV. implementation of procedures paying particular attention to: a) structure and responsibility, b) recruitment, training, awareness, and competence, c) communication, d) employee involvement, e) documentation, f) effective process control, g) maintenance programmes, h) emergency preparedness and response, i) safeguarding compliance with environmental legislation. V. checking performance and taking corrective action, paying particular attention to: a) monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED installations – ROM), b) corrective and preventive action, c) maintenance of records, d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained.	Applicable Indaver's facilities in Ireland and elsewhere operate an environmental management system which is certified to ISO 14001. The existing facility implements an EMS which addresses all line items as outlined in the BAT conclusions. The existing facility and proposed development will operate to ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018	In place. The proposed development will be incorporated into the existing certified EMS.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	VI. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness. VII. following the development of cleaner technologies. VIII. consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life. IX. application of sectoral benchmarking on a regular basis. X. waste stream management (see BAT 2); XI. an inventory of wastewater and waste gas streams (see BAT 3); XII. residues management plan (see description in Section 6.5); XIII. accident management plan (see description in Section 6.5); XIV. odour management plan (see BAT 12); XV. noise and vibration management plan (see BAT 17).		
BAT 2	In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below. a) Set up and implement waste characterisation and pre-acceptance procedures. b) Set up and implement waste acceptance procedures. c) Set up and implement a waste tracking system and inventory. d) Set up and implement an output quality management system. e) Ensure waste segregation. f) Ensure waste compatibility prior to mixing or blending of waste. g) Sort incoming solid waste.	Applicable Waste acceptance and waste handling procedures are in place at Indaver. These documents demonstrate how wastes are profiled and characterised between the customer and Indaver. These documents are submitted as Attachment 4-3-5 of this licence application. The waste handling and waste acceptance procedures outline the controls that are in place for ensuring that the waste acceptance criteria for the installation are met in line with BAT conclusions. The existing facility and proposed development will operate to ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018	In place. The existing waste handling, waste acceptance and other procedures will be updated to incorporate the proposed development.
BAT 3	In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of wastewater and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features: 1. information about the characteristics of the waste to be treated and the waste treatment processes, including: a. simplified process flow sheets that show the origin of the emissions. b. descriptions of process-integrated techniques and wastewater/waste gas treatment at source including their performances. 2. Information about the characteristics of the wastewater streams, such as:	Applicable – there is one licensed main air emission point, flue stack emission from furnace. No process wastewater arises from onsite activities. Monitoring of air emissions is in compliance with The Industrial Emissions Directive 2010/75/EC which requires continuous monitoring of specific parameters and regular sampling of dioxins present in the flue gases prior to discharge from the stack to ensure compliance with emission limit values. The following parameters are continuously measured in the stack:	In place. The proposed development will tie in with the existing licensed main air emission point. There will be no new main air emission point from the proposed development.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	a. average values and variability of flow, pH, temperature, and conductivity. b. average concentration and load values of relevant substances and their variability (e.g., COD/TOC, nitrogen species, phosphorus, metals, priority substances/micropollutants). c. data on bio eliminability (e.g., BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g., inhibition of activated sludge)) (see BAT 52); 3. information about the characteristics of the waste gas streams, such as: a. average values and variability of flow and temperature. b. average concentration and load values of relevant substances and their variability (e.g., organic compounds, POPs such as PCBs); c. flammability, lower and higher explosive limits, reactivity. d. presence of other substances that may affect the waste gas treatment system or plant safety (e.g., oxygen, nitrogen, water vapour, dust).	• NOx • CO • SO2 • HCL • DUST • TOC There is biannual monitoring for Hydrogen Fluoride (HF) and heavy metals Cadmium (Cd) and Thallium (Tl) and their compounds, Mercury (Hg) and its compounds, Antimony (Sb), Arsenic (As), Lead (Pb), Chromium (Cr), Cobalt (Co), Copper (Cu), Manganese (Mn), Nickel (Ni), Vanadium (V) and their compounds. The plant does not use urea and the plant is not a fluidised bed incinerator. Nitrous Oxide (N_2O), PM_{10} and $PM_{2.5}$ will be monitored quarterly. There is a testing regime in place for PCDD/F Monitoring of stormwater emissions are carried out for Parameters pH, conductivity, and TOC.	
BAT 4	In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below. a) Optimised storage location b) Adequate storage capacity c) Safe storage operation d) Separate area for storage and handling of packaged hazardous waste	Applicable Waste storage location – Solid hazardous and non-hazardous wastes will be stored in the waste bunker within the main waste handling building. Solid waste is unloaded from trucks to the waste bunker from the tipping hall where two waste cranes mix the waste prior to feeding towards the waste hopper and feeding chute prior to introduction to the furnace. Aqueous waste is unloaded to the temporary storage tank on site and either pumped from the tank or directly from an incoming tanker for treatment in the furnace. This activity is also licensed by the EPA under W0167-03. Adequate storage capacity – the waste bunker has a maximum storage capacity of 7,111 tonnes. Waste quantities and flow through the process are carefully monitored and recorded by the Distributed Control System (DCS). Safe storage operation – Health and safety are an integral part of the facility's design. Hazard and	In place The proposed development will increase the total amount of waste accepted on site to 280,000tpa of which 25,000tpa can be hazardous waste and 30,000tpa of third-party boiler ash, flue gas cleaning residues and other similar residues which will be treated in the existing ash pre-treatment facility. As part of the proposed development the site will have sufficient capacity for the storage of waste on site through the construction of an aqueous waste tank farm and unloading area to increase the storage and processing capacity of aqueous bulk liquid wastes currently accepted at the facility.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
		operability studies have been carried out for the existing facility as part of the operational design phase in which hazards will be systematically identified and mitigation measures will be included. Indaver has a certified Occupational Health and Safety Management System in place (ISO 45001). Separate area for hazardous wastes – not required for solid wastes as all hazardous wastes accepted at the facility are discharged to the bunker, for feeding purposes and then incinerated. Aqueous wastes are stored separately in the aqueous waste tanks. Two tanks constructed as part of the proposed tank farm will be dedicated to the acceptance and storage of aqueous hazardous waste. Waste acceptance checks are performed at the acceptance to ensure that the waste delivered meets the required specifications. Additional controls for the acceptance of hazardous waste are included in the EPA licence for the facility.	
BAT 5	In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.	Applicable. All waste is handled in accordance with waste acceptance procedures on site. Waste is only accepted if it is planned and scheduled in the SAP system and in accordance with the requirements of the licence and in conformance with the sites waste acceptance criteria (WAC). All waste trucks entering the waste-to-energy facility will pass through a scanner to detect the presence of radioactivity. If detected, appropriate measures as specified in the procedure are completed, up to and including quarantining the load, and the appropriate authorities notified. All waste trucks are weighed on entrance to the site. Tankers of aqueous waste are sampled and analysed prior to offloading into the aqueous waste storage tank or direct injection. In some cases, the tanks may be analysed prior to acceptance to site.	In place.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
		Procedures are in place for handling all solid waste residues.	
6.1.2. Monitoring			
BAT 6	For relevant emissions to water as identified by the inventory of wastewater streams (see BAT 3), BAT is to monitor key process parameters (e.g., wastewater flow, pH, temperature, conductivity, BOD) at key locations (e.g., at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).	Not applicable. There are no emissions to sewer or process wastewater emissions arising from onsite activities. Wastewater arising from process activities is reused in the process or tankered offsite for treatment	N/A
BAT 7	BAT is to monitor emissions to water with at least the frequency given below (in the BREF document), 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.	Not applicable. There are no emissions to sewer or process wastewater emissions arising from onsite activities. Wastewater arising from process activities is reused in the process or tankered offsite for treatment	N/A
BAT 8	BAT is to monitor channelled emissions to air with at least the frequency given (in the BREF document), 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.	Applicable • NOx – in place • NH3 – will be in place. • N2O – not applicable, this plant does not use urea and the plant is not a fluidised bed incinerator. • CO – in place • SO2 – in place • HCl – in place • HF – in place • Dust – in place • Metals – Measured biannually. • Hg – demonstrated low and stable, periodic testing in place. • TVOC – TOC is measured continuously. • PBDD/F – Indaver do not accept brominated flame retardants and therefore this is not applicable. • PCDD/F – test regime in place • Benzo(a)pyrene – not currently tested	In place The proposed development will tie in with the existing licensed main air emission point. There will be no new main air emission point from the proposed development.
		Not Applicable No use of solvents onsite.	N/A

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 9	BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below. a) Measurement b) Emissions factors c) Mass Balance		
BAT 10	BAT is to periodically monitor odour emissions.	Applicable No major odour emissions anticipated. Facility is maintained under negative pressure to prevent odour. Odour is monitored on a weekly basis as per the IE licence. Odour management plan is in place for the existing facility when the incinerator is not operational.	In place
BAT 11	BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year.	Applicable All operational information on water, energy and raw materials consumption in the DCS is documented in the sustainability report).	In place
6.1.3. Emissions to air			
BAT 12	In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements: • a protocol containing actions and timelines. • a protocol for conducting odour monitoring as set out in BAT 10. • a protocol for response to identified odour incidents, e.g., complaints; • an odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures.	Applicable The waste bunker is maintained under negative pressure to prevent odour. An odour management plan has been implemented onsite and is reviewed as required.	In place. The proposed development will be monitored as per onsite measures (DCS)
BAT 13	In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below. a) Residence times b) Using chemical treatment	Applicable Indaver operate an Odour Management Plan which relies on a combination of minimisation, containment and treatment techniques which includes:	In place. The proposed development will be incorporated into the Odour Management Plan.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	c) Optimising aerobic treatment	Negative pressure in the bunker to prevent odour from escaping. Doors to tipping hall and exit points closed where possible; and Spraying of odour-masking or neutralising chemicals at the tipping hall door and bunker where appropriate.	
BAT 14	In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below. Depending on the risk posed by the waste in terms of diffuse emissions to air, BAT 14d is especially relevant. a) Minimising the number of potential diffuse emission sources b) Selection and use of high integrity equipment c) Corrosion prevention d) Containment, collection, and treatment of diffuse emissions e) Dampening f) Maintenance g) Cleaning of waste treatment and storage areas h) Leak detection and repair (LDAR) programme	Applicable Even though the plant is fully enclosed, Indaver operate a Fugitive Management Plan, which includes dust management measures which are a combination of containment techniques and operational procedures. Ash is delivered in enclosed tankers and offloaded to the silos pneumatically. Filtration systems on the silos will control dust emissions during the unloading operation. Particulates are transferred to/from the silos using enclosed conveyors within the process building. The silos containing boiler ash and flue gas cleaning residues are emptied using a specialised collection truck which will have an enclosed container. The bunker and tipping hall area is maintained under negative pressure. Bottom ash is managed using dampening. Bottom ash is discharged from incinerator into a water bath and then via a conveyor to the ash hall where it will be stored before being transferred to a collection truck using a front-end loader. All trucks leaving the facility will be securely covered to prevent any ash escaping.	In place. Existing dust management measures will be implemented for the proposed development.
BAT 15	BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g., start-ups, shutdowns) by using both of the techniques given below. a) Correct plant design b) Plant Management	Not applicable. No flaring	N/A
BAT 16	In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.	Not applicable. No flaring	N/A

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	a) Correct design of flaring devices b) Monitoring and recording as part of flare management		
6.1.4. Noise and vibrations			
BAT 17	In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements: I. a protocol containing appropriate actions and timelines; II. a protocol for conducting noise and vibration monitoring; III. a protocol for response to identified noise and vibration events, e.g., complaints; IV. a noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.	Applicable The EMS includes a protocol for undertaking noise monitoring in accordance with the requirements of the IE licence. Noise monitoring is undertaken annually at the Noise Sensitive Locations (NSLs). The EMS also includes a protocol for responding to complaints inclusive of noise or vibration (should they occur).	In place. The proposed development will operate within the noise emission limits as set out in IE W0167-03 and will be included in the annual noise monitoring surveys.
BAT 18	In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below. a) Appropriate location of equipment and buildings b) Operational measures c) Low-noise equipment d) Noise and vibration control equipment e) Noise attenuation	Applicable The majority of the noise generating equipment is housed internal to the main building. Practicable noise control measures are employed, and acoustic attenuators are employed where practical. To ensure compliance with the noise levels, as stated in the IE licence, annual noise monitoring surveys will continue to be carried out.	In place The following best practice measures will be applied to existing site and proposed development to ensure noise levels are controlled to the surrounding environment and to comply with the facilities IE licenced noise emission limits: Roller shutter doors within the new Bottom Ash Storage building will be maintained closed at all times, except for access/egress during activities. Vehicles parked at the truck parking bay will be required to switch engines off when parked on site. All new items of external plant will be limited to a sound pressure noise level of 82dB at 1m. Plant will be sited as far away from noise-sensitive locations as is practicable.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
			External plant items (pump, motors, fans) will be switched off when not required, particularly during night-time periods. The use of acoustic attenuators/ enclosures etc., will be employed to any items of external plant in order to ensure this limit value is complied with. Duct mounted attenuators will be installed on the atmosphere side of all air moving plant, where required. Splitter attenuators will be installed providing free ventilation to internal plant areas, where required. Anti-vibration mounts will be installed on all reciprocating plant, where required.
6.1.5. Emissions to water			
BAT 19	In order to optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below. a) Water management b) Water recirculation c) Impermeable surface d) Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels. e) Roofing of waste storage and treatment areas f) Segregation of water streams g) Adequate drainage infrastructure h) Design and maintenance provisions to allow detection and repair of leaks i) Appropriate buffer storage capacity	Applicable Management of stormwater / reducing emissions to water and soil. No generation of process wastewaters from the site operations. The facility is sealed with continuous concrete hard stand. Rainwater that falls on the site is channelled into an attenuation pond. It is analysed by an automated analyser at the inlet chamber for compliance with trigger levels for pH, conductivity and Total Organic Carbon (TOC) prior to entering the pond. Water that is outside of the trigger levels is redirected to an underground storage tank and can then be used in the process. The water is also analysed at the outlet of the pond before it is discharged from the site. No water can be discharged when the readings are outside the trigger levels. The system is monitored 24/7 at the Distributed Control System (DCS) by the operators. To prevent spills/ leaks from entering soil or groundwater during the delivery process, prior to	In place. The proposed development will tie in with the existing drainage system. The attenuation tanks have been sized to provide adequate buffer capacity. New bund area will be constructed for the aqueous waste storage tanks

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
		unloading, a diversion valve on the stormwater drainage system is activated which diverts the drainage from the surface drainage channel to a $2m^3$ holding tank. This ensures that during tanker unloading any spills/leaks are contained within the unloading area. Any contained spills of hazardous materials will be pumped out and either treated on site (trace contamination) or sent off-site to an appropriately licensed or permitted facility. Any leaks / spills within the process building are directed to an underground containment tank. Existing external chemical storage consists of a fuel tank (double skinned), an aqueous ammonia tank (double skinned), an aqueous waste tank (double skinned) and self-bunded chemstores. Bulk storage tanks are fitted with level monitoring and overfill protection. Aboveground pipes and bunds are regularly inspected. Integrity testing of bunds and underground pipes is carried out every 3 years in accordance with the IE licence conditions.	
BAT 20	In order to reduce emissions to water, BAT is to treat wastewater using an appropriate combination of the techniques given below. a) Equalisation b) Neutralisation c) Physical separation, e.g., screens, sieves, grit separators, grease separators, oil water separation or primary settlement tanks d) Adsorption e) Distillation/rectification f) Precipitation g) Chemical oxidation h) Chemical reduction i) Evaporation j) Ion exchange k) Stripping l) Activated sludge process.	Not applicable No process wastewater emission from site. Wastewater arising from process activities is reused in the process or tankered offsite for treatment.	N/A

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	m) Membrane bioreactor n) Nitrification/denitrification when the treatment includes a biological treatment. o) Coagulation and flocculation p) Sedimentation q) Filtration (e.g., sand filtration, microfiltration, ultrafiltration) r) Flotation		
6.1.6. Emissions from accidents and incidents			
BAT 21	In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the techniques given below, as part of the accident management plan (see BAT 1). a) Protection measures b) Management of incidental/accidental emissions c) Incident/accident registration and assessment system	Applicable An Emergency Response Plan has been prepared for the existing facility which outlines the required actions to be undertaken in the event of a spill or leak. Spill response materials such as spill mats, absorbent materials, brushes, non-sparking shovels are located in designated locations in the plant and a dedicated Emergency Response Team are trained in their use. Fire prevention systems in place includes the following: • Dry deluge sprinkler system around the plant; • wet sprinkler system on burners; • hose reels, fire extinguishers and fixed fire hoses located throughout the plant; • fire hydrants located outside tipping hall; • water cannons and heat detection in bunker area. All accidents or incidents are recorded along with the required remedial actions and are reported to the EPA in accordance with the requirements of the IE licence.	In place. The Emergency Response Plan will be updated to include the proposed development.
6.1.7. Material efficiency			
BAT 22	In order to use materials efficiently, BAT is to substitute materials with waste.	Applicable	In place

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
		Wastewater arising from operational activities is reused in the process or tankered offsite for treatment. Flue gas cleaning residues are re-circulated into the flue gases to reduce the amount of lime required in the process. Boiler blowdown water is used to produce lime milk for use in the process for neutralisation.	
6.1.8. Energy efficiency			
BAT 23	In order to use energy efficiently, BAT is to use both of the techniques given below. a) Energy efficiency plan b) Energy balance record	Applicable An energy efficiency plan has been prepared for the facility and forms part of the facility's EMS. Attachment 9-1 Environmental Management Techniques details the energy efficient measures which have been implemented. The energy balance record (energy consumption and energy generation) is recorded by the facility's Distributed Control System (DCS).	In place The EMS will be updated to include the proposed development.
6.1.9. Reuse of packaging			
BAT 24	In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residuals management plan (see BAT 1).	Not applicable. No packaging waste generated in the process. Pallets from deliveries of waste and equipment etc are re-used on site or sent back to a pallet supplier.	N/A
6.2. BAT conclusions for the mechanical treatment of waste			
6.2.1. General BAT conclusions for the mechanical treatment of waste			
6.2.1.1. Emissions to Air			
BAT 25	In order to reduce emissions to air of dust, and of particulate-bound metals, PCDD/F and dioxin-like PCBs, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Cyclone b) Fabric filter c) Wet scrubbing d) Water injection into the shredder e) The associated monitoring is given in BAT 8.	Applicable Flue gas from the incinerator is treated using the following: Injection of ammonia solution or urea into the boiler (reduce NOx levels) also known as Selective Non-Catalytic Reduction (SNCR) Lime (for acid concentration correction) Activated carbon and clay (for removal of dioxins and furans, particulates, and heavy metals).	In place.

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
		Baghouse filter (mechanical removal of particulates) Total Dust will continue to be monitored as per the conditions and limits set out in IE W0167-03.	
6.2.2. BAT conclusions for the mechanical treatment in shredders of metal waste			
6.2.2.1. Overall Environmental Performance			
BAT 26	In order to improve the overall environmental performance, and to prevent emissions due to accidents and incidents, BAT is to use BAT 14g and all of the techniques given below: a) implementation of a detailed inspection procedure for baled waste before shredding b) removal of dangerous items from the waste input stream and their safe disposal (e.g., gas cylinders, non-depolluted EoLVs, non-depolluted WEEE, items contaminated with PCBs or mercury, radioactive items). c) treatment of containers only when accompanied by a declaration of cleanliness.	Not applicable No shredder	N/A
6.2.2.2. Deflagrations			
BAT 27	BAT 27. In order to prevent deflagrations and to reduce emissions when deflagrations occur, BAT is to use technique a. and one or both of the techniques b. and c. given below. a) Deflagration management plan b) Pressure relief dampers c) Pre-shredding	Not applicable No shredder	N/A
6.2.2.3. Energy Efficiency			
BAT 28	In order to use energy efficiently, BAT is to keep the shredder feed stable.	Not applicable No shredder	N/A
6.2.3. BAT conclusions for the treatment of WEEE containing VFCs and/or VHCs			
6.2.3.1. Emissions to Air			

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 29	In order to prevent or, where that is not practicable, to reduce emissions of organic compounds to air, BAT is to apply BAT 14d, BAT 14h and to use technique a. and one or both of the techniques b. and c. given below. a) Optimised removal and capture of refrigerants and oils b) Cryogenic condensation c) Adsorption d) The associated monitoring is given in BAT 8	Not Applicable.	N/A
6.2.3.2. Explosions			
BAT 30	In order to prevent emissions due to explosions when treating WEEE containing VFCs and/or VHCs, BAT is to use either of the techniques given below. a) Inert atmosphere b) Forced Ventilation	Not Applicable.	N/A
6.2.4. BAT conclusions for the mechanical treatment of waste with calorific value			
6.2.4.1. Emissions to Air			
BAT 31	In order to reduce emissions to air of organic compounds, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Adsorption b) Biofilter c) Thermal oxidation d) Wet scrubbing e) The associated monitoring is given in BAT 8.	Not applicable	N/A
6.2.5. BAT conclusions for the mechanical treatment of WEEE containing mercury			
6.2.5.1. Emissions to Air			
BAT 32	In order to reduce mercury emissions to air, BAT is to collect mercury emissions at source, to send them to abatement and to carry out adequate monitoring. The associated monitoring is given in BAT 8.	Not Applicable.	N/A
6.3. BAT conclusions for the biological treatment of waste			
6.3.1. General BAT conclusions for the biological treatment of waste			
6.3.1.1. Overall Environmental Performance			

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 33	In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.	Not applicable. No biological waste treatment	N/A
6.3.1.2. Emissions to Air			
BAT 34	In order to reduce channelled emissions to air of dust, organic compounds and odorous compounds, including H2S and NH3, BAT is to use one or a combination of the techniques given below. a) Adsorption b) Biofilter c) Fabric filter d) Thermal Oxidation e) Wet scrubbing f) The associated monitoring is given in BAT 8	Not applicable No biological waste treatment	N/A
6.3.1.3. Emissions to Water and Water Usage			
BAT 35	In order to reduce the generation of wastewater and to reduce water usage, BAT is to use all of the techniques given below. a) Segregation of water streams b) Water recirculation c) Minimisation of the generation of leachate	Not applicable. No biological waste treatment	N/A
6.3.2. BAT conclusions for the aerobic treatment of waste			
6.3.2.1. Overall Environmental Performance			
BAT 36	In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.	Not applicable No biological waste treatment	N/A
6.3.2.2. Odour and Diffuse Emissions to Air			
BAT 37	In order to reduce diffuse emissions to air of dust, odour and bioaerosols from open-air treatment steps, BAT is to use one or both of the techniques given below. a) Use of semipermeable membrane covers. b) Adaptation of operations to meteorological conditions	Not applicable No biological waste treatment	N/A
6.3.3. BAT conclusions for the anaerobic treatment of waste			

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
6.3.3.1. Emissions to Air			
BAT 38	In order to reduce emissions to air and to improve the overall environmental performance, BAT is to monitor and/or control the key waste and process parameters.	Not applicable No biological waste treatment	N/A
6.3.4. BAT conclusions for the mechanical biological treatment (MBT) of waste			
6.3.4.1. Emissions to Air			
BAT 39	In order to reduce emissions to air, BAT is to use both of the techniques given below. a) Segregation of waste streams b) Recirculation of waste gas	Not applicable No biological waste treatment	N/A
6.4. BAT conclusions for the physico-chemical treatment of waste			
6.4.1. BAT conclusions for the physico-chemical treatment of solid and/or pasty waste			
6.4.1.1. Overall Environmental Performance			
BAT 40	In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures (see BAT 2).	Applicable Waste input for pre-treatment plant (boiler ash and flue gas cleaning residues) is monitored under licence conditions	In place Acceptance of third-party ashes will be analysed and characterised prior to granting acceptance in the first instance and checked periodically thereafter for compliance.
6.4.1.2. Emissions to Air			
BAT 41	In order to reduce emissions of dust, organic compounds and NH3 to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Adsorption b) Biofilter c) Fabric filter d) Wet scrubbing The associated monitoring is given in BAT 8.	Applicable A water bath is used to avoid any dust emissions from the pre-treatment plant. Baghouse filter is in place. SNCR is in place	In place
6.4.2. BAT conclusions for the re-refining of waste oil			
6.4.2.1. Overall Environmental Performance			

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 42	In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures (see BAT 2).	Not applicable	N/A
BAT 43	In order to reduce the quantity of waste sent for disposal, BAT is to use one or both of the techniques given below. a) Material Recovery b) Energy Recovery	Not applicable	N/A
6.4.2.2. Emissions to Air			
BAT 44	In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Adsorption b) Thermal Oxidation c) Wet scrubbing The associated monitoring is given in BAT 8	Not applicable	N/A
6.4.3. BAT conclusions for the physico-chemical treatment of waste with calorific value			
6.4.3.1. Emissions to Air			
BAT 45	In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Adsorption b) Cryogenic condensation c) Thermal Oxidation d) Wet scrubbing The associated monitoring is given in BAT 8	Not applicable	N/A
6.4.4. BAT conclusions for the regeneration of spent solvents			
6.4.4.1. Overall Environmental Performance			
BAT 46	In order to improve the overall environmental performance of the regeneration of spent solvents, BAT is to use one or both of the techniques given below. a) Material Recovery b) Energy Recovery	Not applicable	N/A
6.4.4.2. Emissions to Air			

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 47	In order to reduce emissions of organic compounds to air, BAT is to apply BAT 14d and to use a combination of the techniques given below. a) Recirculation of process off-gases in a steam boiler b) Adsorption c) Thermal oxidation d) Condensation or cryogenic condensation e) Wet scrubbing f) The BAT-AEL set in BAT 44 applies. The associated monitoring is given in BAT 8	Not applicable	N/A
6.4.6. BAT conclusions for the thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil			
6.4.6.1. Overall Environmental Performance			
BAT 48	In order to improve the overall environmental performance of the thermal treatment of spent activated carbon, waste catalysts and excavated contaminated soil, BAT is to use all of the techniques given below. a) Heat recovery from the furnace off-gas b) Indirectly fired furnace c) Process-integrated techniques to reduce emissions to air	Not applicable.	N/A
BAT 49	In order to reduce emissions of HCl, HF, dust and organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Cyclone b) Electrostatic precipitator (ESP) c) Fabric filter d) Wet scrubbing e) Adsorption f) Condensation g) Thermal oxidation (1) The associated monitoring is given in BAT 8.	Not applicable	N/A
6.4.7. BAT conclusions for the water washing of excavated contaminated soil			
6.4.7.1. Emissions to Air			
BAT 50	In order to reduce emissions of dust and organic compounds to air from the storage, handling, and washing steps, BAT is to apply BAT 14d and to use one or a combination of the techniques given below.	Not applicable	N/A

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
	a) Adsorption b) Fabric Filter c) Wet Scrubbing The associated monitoring is given in BAT 8.		
6.4.8. BAT conclusions for the decontamination of equipment containing PCBs			
6.4.8.1. Overall Environmental Performance			
BAT 51	In order to improve the overall environmental performance and to reduce channelled emissions of PCBs and organic compounds to air, BAT is to use all of the techniques given below. a) Coating of the storage and treatment areas b) Implementation of staff access rules to prevent dispersion of contamination. c) Optimised equipment cleaning and drainage d) Control and monitoring of emissions to air e) Disposal of waste treatment residues f) Recovery of solvent when solvent washing is used. g) The associated monitoring is given in BAT 8.	Not applicable	N/A
6.5. BAT Conclusions for the treatment of water-based liquid waste			
6.5.1. Overall environmental performance			
BAT 52	In order to improve the overall environmental performance, BAT is to monitor the waste input as part of the waste pre-acceptance and acceptance procedures (see BAT 2).	Applicable Tankers of aqueous waste are sampled and analysed prior to offloading into the aqueous waste storage tank or direct injection.	In place
6.5.2. Emissions to air			
BAT 53	In order to reduce emissions of HCl, NH3 and organic compounds to air, BAT is to apply BAT 14d and to use one or a combination of the techniques given below. a) Adsorption b) Biofilter c) Thermal Oxidation d) Wet scrubbing The associated monitoring is given in BAT 8.	Applicable Aqueous wastes are added into the furnace and are incinerated. Flue gas from the incinerator is treated using the following: Injection of ammonia solution or urea into the boiler (reduce NOx levels) also known as Selective Non-Catalytic Reduction (SNCR) Lime (for acid concentration correction)	In place

Best Available Techniques (BAT)		Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
		Activated carbon and clay (for removal of dioxins and furans, particulates, and heavy metals). Baghouse filter (mechanical removal of particulates)	