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Consulting Engineers Limited

Hillhouse IBA Facility

Fortis IBA Limited

Supporting Information

ENGINEERING CONSULTING

Document approval

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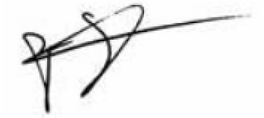
Checked by:	James Sturman		Principal Consultant	06/12/2024

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Non-Technical Summary

Fortis IBA Limited (Fortis IBA) is applying for an Environmental Permit (EP) to operate a facility for the processing and recovery of Incinerator Bottom Ash (IBA) (the Facility) at Little Thornton, Lancashire. The Facility will be designed to process up to 350,000 tonnes of non-hazardous IBA sourced from waste incineration facilities. The Facility will produce an Incinerator Bottom Ash Aggregate (IBAA) which can be used as a secondary aggregate for construction.

The IBA facility will consist of the following components:

- stockpiles shed which will be used for stockpiling the following;
  - unprocessed IBA; and
  - IBAA storage (for different grades of IBAA);
- IBA processing/treatment area (plant area);
- metal bays building;
- clean surface water storage tank; and
- process water storage tanks.

The environmental impact of the Facility has been assessed within the application, and it has been concluded that the Facility will not result in any significant environmental impacts.

Contents

1 Introduction

Fortis IBA Limited (Fortis IBA) is applying for an Environmental Permit (EP) to operate a facility for the processing and recovery of Incinerator Bottom Ash (IBA) (the Facility) at Little Thornton, Lancashire. The Facility will be designed to process up to 350,000 tonnes of non-hazardous IBA sourced from waste incineration facilities. The Facility will produce an Incinerator Bottom Ash Aggregate (IBAA) which can be used as a secondary aggregate for construction.

Section 1 of this document provides a brief overview of the application. Section 2 describes the proposed arrangements for the processing of IBA in further detail. Section 3 considers whether the proposals represent BAT and assesses compliance with relevant legislative requirements. Section 4 provides a summary of the management system associated with the operation of the IBA facility.

1.1 The Applicant

Fortis IBA is part of the Raymond Brown Group, and is a leader in the recycling and production of IBAA creating a quality secondary aggregate for use within the construction industry.

Fortis IBA has led the way in IBA processing and marketing for the last ten years, and currently operates four IBA processing plants at Ridham Dock, Ardley, A303 and Calvert.

In the past 20 years, Fortis IBA has recycled, processed and distributed over 1,000,000 tonnes of IBA Aggregate into the construction industry. In doing so, they have played an integral part in diverting over 4,000,000 tonnes of waste from landfill.

1.2 The Site

The Site will be located on approximately 8 acres of land at the Hillhouse Business Park, Thornton-Cleveleys, Lancashire, FY5 4QD, with an approximate national Grid Reference of SD 3496243415. This is approximately 2.7 km east of Cleveleys, 3.1 km southwest of Stalmine, 4.2 km south of Fleetwood and 8.1 km northeast of Blackpool.

Access to the Facility will be via South Road.

1.3 The Activities

The Facility will consist of a single Schedule 1 installation activity (as defined in the Environmental Permitting Regulations) (EPR) and directly associated activities. The Schedule 1 activity (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	Limits of specified activity
Installation	S5.4 A(1) (b) (iii)	R4: Recycling/reclamation of metals and metal compounds. R5: Recycling/reclamation of other inorganic materials.	From receipt of permitted waste through to treatment and recovery of by-products (incinerator bottom ash aggregate). Treatment of incinerator bottom ash in an enclosed

Type of Activity	Schedule 1 Activity	Description of Activity	Limits of specified activity
			building and a contained drainage system.
Directly associated activities			
DAA		Storage of waste	From receipt of waste to despatch off-site for recovery. Storage of incinerator bottom ash on impermeable surface with contained drainage system prior to treatment in enclosed building. Storage of processed incinerator bottom ash aggregate on impermeable surface with contained drainage system. Storage of ferrous/non-ferrous metals from treatment of incinerator bottom ash. Waste types as specified in Table 2.
		Raw material storage	From the receipt of raw materials to despatch for use within the Facility.
		Surface water collection and storage	From the collection of uncontaminated roof and site surface water from non-operational areas to re-use within the Facility.
		Process water collection and storage	From the collection of waste water produced at the Facility to re-use within the Facility or despatch off-site for recovery or disposal.

2 The Facility

2.1 Overview

The IBA facility will consist of the following components:

- stockpiles storage shed which will be used for stockpiling the following;
  - unprocessed IBA; and
  - IBAA storage (for different grades of IBAA);
- IBA processing/treatment building (plant area);
- metal bays storage shed;
- clean surface water storage tanks; and
- process water storage tanks.

2.2 Deliveries to the Facility

All materials transferred into and out of the IBA facility are delivered by road within enclosed or covered vehicles to reduce dust emissions. The IBA will be deposited and stored in the stockpiles shed for maturation prior to processing.

2.2.1 Incoming waste

IBA is characterised as non-hazardous waste and typically comprises a combination of glass, aggregate, clinker and ash from the Energy from Waste (EfW) burning process. The waste types to be accepted at the Site are listed in Table 2.

Table 2: Proposed waste types

EWC code	Description (from WM3[1])	Comments
19 01 12	Bottom ash and slag other than those mentioned in 19 01 11.	Incinerator Bottom Ash
19 12 12	Other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11.	For Incinerator Bottom Ash Aggregate (IBAA) returned to site

The proposed throughputs are a maximum of 350,000 tonnes per annum.

2.2.2 Waste acceptance procedures

Fortis IBA has already implemented waste acceptance and pre-acceptance procedures at its existing facilities. Therefore, the procedures will be revised to ensure that they are applicable for the Facility. Examples of the procedures are provided in Appendix G.

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[1] EA (2021). *Guidance on the classification and assessment of waste (1st Edition v1.2.GB)*. Available at: https://assets.publishing.service.gov.uk/media/6152d0b78fa8f5610b9c222b/Waste_classification_technical_guidance_WM3.pdf [Last Accessed: 19 May 2024].

In accordance with the waste acceptance procedures, a record shall be kept of the types and quantities of waste delivered and removed from the Facility. These records will be retained on-site and available for inspection by Environment Agency officers for a minimum of 6 years. The records will be kept secure from loss, damage or deterioration. The records of waste accepted and removed from site will include the following information:

- time and date received or removed from site;
- vehicle registration and waste carrier details;
- producer’s name and address, SIC Code, and Waste Hierarchy declaration;
- description of the waste by EWC category and quantity in tonnes; and
- details of the onward site for wastes removed from site.

2.3 IBA Reception

The incoming IBA has an elevated moisture content (typically between 20% and 25%) on arrival as a result of the quenching process within the waste incineration process. If, when unloaded, the IBA is found to be unusually dusty, it will be dampened down to prevent dust generation from its storage.

2.3.1 Raw materials

The main raw materials anticipated to be stored at the Facility are presented in Table 3. The quantities and storage capacities should be considered indicative prior to completion of detailed design of the Facility.

Table 3: Types and amounts of primary raw materials

Material	Estimated storage capacity (tonnes)	Estimated annual consumption (tpa)	Description
Diesel	10	1,000	Stored within bunded tank
Stone aggregate	1,000	12,000	Stored on slab within stockpiles shed

2.3.2 Sampling and testing protocol

A sampling and testing protocol will be put in place to determine whether the incoming IBA is hazardous or non-hazardous. In accordance with the WRc Report UC 9390.05, the IBA received on site will need to be tested by the waste producer. Every two weeks, Fortis IBA will be informed of the results: when Fortis IBA receives confirmation that each stockpile of the IBA received is non-hazardous, it can proceed to processing. If the IBA is classed as hazardous, the stockpile of IBA will be segregated and quarantined. A quarantine area is located adjacent to the stockpiles shed (refer to Appendix A).

Any IBA which is required to be quarantined will be managed in accordance with a quarantine procedure. The quarantine procedure will be based on Fortis's existing quarantine procedures for its operational IBA processing facilities.

A visual check will be conducted by the plant operator when the load is tipped. If unburnt waste is identified, the following actions will be taken:

- the load will be quarantined and the Technically Competent Manager (TMC) will be informed;
- a photograph will be taken of the load and sent to the waste producer;
- records of the loss on ignition (LOI) or Total Organic Carbon (TOC) test results will be requested from the EfW operator;
- a non-conformance will be raised.

Due to the two-week period between sampling and receipt of the results, the storage of IBA will be undertaken in recorded batch stockpiles. Therefore, in the unlikely event of a test result returning showing that the IBA is hazardous, this will allow for the easy identification of the batch and its removal to a suitably permitted facility for disposal or recovery.

IBA will not be transferred for processing, until the test results showing that it is not hazardous has not been received. On this basis, Fortis IBA will not knowingly accept any hazardous IBA at the Facility.

Refer to Appendix G for an example ESA sampling protocol.

2.3.3 IBA storage

Imported material will be tipped in the stockpiles shed and subsequently stacked in windrows using an excavator. IBA is then stored in this form for six to eight weeks to allow hydration and carbonation reactions to occur. These reactions take up the high moisture level and also result in a reduction of pH levels.

The maturation process is exothermic and results in stockpiles heating up to about 70^{o}C. During dry weather, water will be sprayed over the stockpiles to promote the ageing process, as well as to mitigate against any potential dust emissions.

2.4 IBA Processing

A loading shovel feeds the IBA into a feed hopper and is transported by an overland covered conveyor to the IBA processing building. A material feeder regulates the flow rate of material entering the plant. A primary magnet recovers the large ferrous metals, which are subsequently transferred for recovery.

A series of overband and drum magnets recover mainly batteries and small ferrous metals which are present throughout the entire process, and are subsequently transferred for recovery.

Screens are used to sort the material into a minimum of three fractions based on particle size:

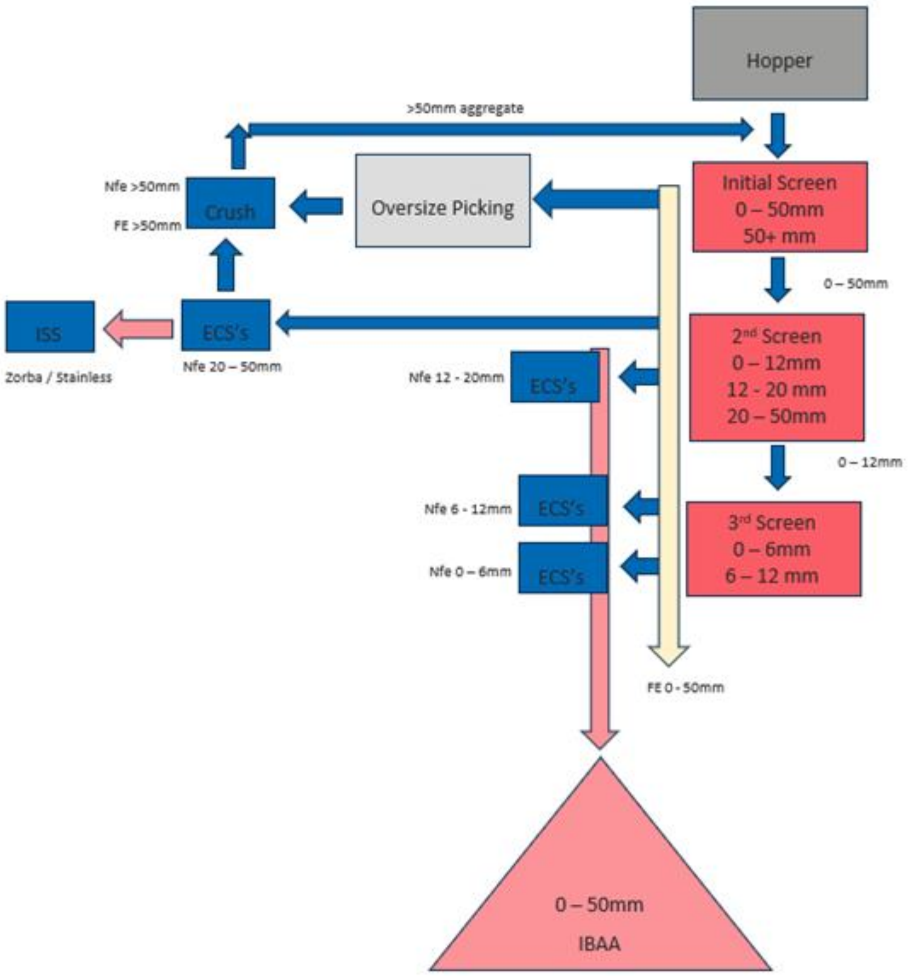
- fine (0-6 mm);
- medium (6-12 mm); and
- large (12-50 mm).

The three fractions are then passed over a series of eddy current separators and induction sorting machines to recover non-ferrous metals, which are subsequently transferred for recovery.

The remaining material is clinker, which is blended back into the IBAA. The different grades of material are blended back together to form the fully processed Fortis IBAA. This is marketed and sold successfully across the construction industry being exported from the Site by Heavy Goods Vehicles (HGVs).

An indicative process schematic for IBA processing is presented in Figure 1:

Figure 1: Process flow diagram



2.4.1 IBA import and IBAA export

IBA will be imported and IBAA will be exported from Site in sheeted HGVs. IBAA is marketed and sold successfully as a substitute for primary aggregate subbase in the construction industry.

2.5 Residue recovery and disposal

The main residue stream which will arise from the operation of the Facility is recycled metals.

As described in sections 3.2.1, the proposed waste recovery and disposal techniques for the residues generated by the Facility, will be in accordance with the indicative BAT requirements.

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, Fortis IBA will regularly review the options for the recovery and recycling of all residues generated by the Facility.

2.5.1 Metals

As discussed in section 2.4, ferrous and non-ferrous metals will be recovered within the IBA processing building. Recycled metals will be stored in bunkers within the metal bays, with an expected storage capacity of 2,500 tonnes. The Facility will recover approximately 35,000 tpa of ferrous and non-ferrous metals.

2.6 Water management

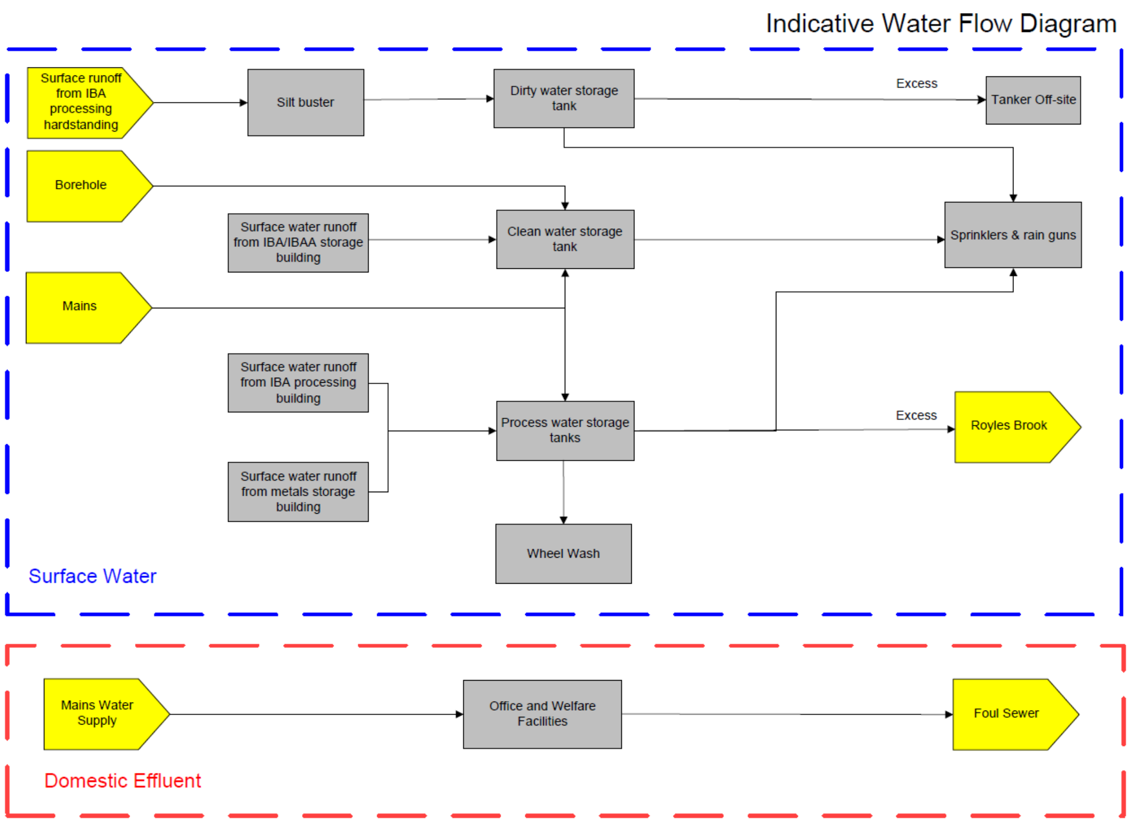
The Facility will utilise water for dust suppression, refer to section 2.6.4. To minimise the consumption of mains water, surface water run-off from areas of hard-standing and the roofs of the stockpiles shed, metal bays building, and IBA processing building will be harvested for dust suppression purposes.

When the clean surface water storage and process storage tanks are full, the excess water will be discharged to the existing surface water drainage system which ultimately discharges into Royles Brook. The indicative drainage layout is provided in Appendix A.

To prevent the formation of legionella within the water storage tanks, the harvested water will be treated with UV lamps and will be subject to periodic legionella testing.

An indicative water flow schematic is provided in Figure 2.

Figure 2: Indicative Water Flow Diagram



2.6.1 Stockpiles shed

Clean run-off from the roof of the stockpiles shed will be collected in the adjacent clean water storage surface tank. The clean water storage tank will have a storage capacity of approximately 4,000m^3 and will be a water retaining structure.

The vehicle movement area to the northeast of the stockpiles shed will be designed so with a fall into the building, so run-off from this area will drain into stockpiles shed where the run-off will be absorbed into the stockpiles.

The Facility will include a borehole to extract groundwater to supplement the harvested water for dust suppression purposes. This will be based on an extraction of less than 20m^3 per day; therefore, it will not require a separate permit. To ensure that there is always a supply of water for dust suppression, the main water supply will also be connected to the water storage tanks to provide water for dust suppression purposes.

2.6.2 Metal bays building

Clean run-off from the roof of the metal bays building will be collected in two separate process storage tanks within building. The overall tank capacity will be approximately 200m^3. The harvested water will supply harvested water to the wheel wash and feed washdown points.

The wheel wash will use recirculating water. A mains water supply will be included in the event that harvested rainwater is not available. Periodically, the water from the wheel wash will be transferred to the stockpiles shed to be absorbed into the stockpiles.

2.6.3 IBA processing building

Uncontaminated rainwater will be collected from the IBA processing roof and stored in the above ground tank to the northwest of the building, with an envisaged capacity of 400m^3. The uncontaminated water will be fed to adjacent pumps that will feed washdown points.

In the slab areas around the processing building, contaminated surface water runoff will drain to a wedge pit. Pumps will transfer the contents of the wedge pit into the adjacent process water storage tank. The water collected in the tank will be disposed of by pumping to the stockpiles shed where it will be sprayed onto the heaps. Due to issues of contamination, excess water will be instead disposed of via off-site tanker removal.

A mains supply will be put in to provide washdown and dust suppression water in the event that harvested rainwater is not available.

2.6.4 Domestic effluents

Domestic effluents will be discharged to foul sewer.

2.7 Dust management

The following measures have been incorporated into the design of the Facility to reduce fugitive emissions of dust:

- storage of IBA and IBAA is housed within a 3-sided building;
- IBA processing is within an enclosed building;
- the IBA and IBAA is dampened prior to dust generating activities;

- vehicles entering and exiting the site will pass over a wheel wash;
- the outdoor surface will be regularly cleaned;
- weather conditions are checked prior to undertaking activities with a potential for dust release; and
- the site has an impermeable surface (concrete) with a fully contained drainage system.

The Site Manager will ensure that the procedures in the Dust Management Plan (DMP) are adhered to, alongside ensuring that all members of staff are aware of the dust management procedures. All site personnel will be provided training on dust mitigation.

A detailed Dust Management Plan for the IBA facility is provided in Appendix D.

2.7.1 Rain guns and sprinklers

Rain guns and roof-mounted sprinklers are a comprehensive system of spray nozzles covering all loading, unloading and storage areas. Rain guns and sprinklers will be strategically located around the stockpiles shed to provide dust suppression. Sprinklers are to also be installed on the discharge conveyor for the IBAA stockpiles. A site layout plan showing the indicative locations of the rain guns and roof-mounted sprinklers is provided in Appendix A. The location of the rain guns and sprinklers will ensure an arc coverage of all IBA and IBAA storage areas/stockpiles.

2.7.2 Plant and equipment

The IBA processing will be undertaken within an enclosed building.

Processing equipment includes screens, conveyers, crushers, overband magnets, and hoppers. Loading will occur inside the stockpiles shed. The loading equipment includes two loading shovels and 360 excavators, alongside a mini digger, telehandler, trailer, and tractors for the movement of materials and containers on-site. Daily inspections will be undertaken as part of the daily checks and the plant and machinery will be cleaned by department-specific staff to remove residual dusts in response to the daily inspections.

All plant and equipment will be subject to a comprehensive maintenance regime.

2.7.3 Sweeping and dampening down systems

Fortis IBA can confirm the following.

- The site will have an impermeable surface (concrete) with a fully contained drainage system (refer to Figure 2 in section 2.4.1). The Site surfacing will allow easy cleaning and prevent wind-whipping.
- Areas where dust is likely to accumulate will be frequently cleaned.
- Areas of hardstanding/roadways will be cleaned with a road sweeper on a periodic basis – this will be undertaken more frequently during periods of dry weather.
- In dry conditions, material stored in the internal storage bays will be dampened prior to movement/handling.
- Weather conditions will be checked prior to undertaking activities with a potential for dust release. If the material is extremely dry, or the wind speed/direction could result in dust leaving the site, then operations will not proceed.
- The operator has access equipment and onsite spill kits to clean up after spillages of waste material on site.

2.7.4 Stockpile management

Based on Fortis IBA's other IBA facilities, a Stockpile Management Procedure has already been developed (refer to Appendix G). Amendments will be made to make it site specific.

2.8 Energy efficiency

The Facility will consume electricity for the operation of the IBA processing equipment. The most significant electrical energy consumers at the Facility are anticipated to be the following:

- conveyors;
- screens; and
- magnets.

Where practicable, the process equipment selected for the IBA processing, will utilise the most energy efficient technical solution.

2.8.1.1 Operating and maintenance procedures

Prior to commissioning, an Operations & Maintenance (O&M) manual will be developed for the Facility. The requirements of the O&M procedures will ensure as follows:

1. Good maintenance and housekeeping techniques and regimes across the Facility.
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.

2.8.1.2 Energy efficiency measures

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

During normal operations, the Site will be operated as follows:

- the use of modern, high efficiency plant and motors;
- recovered or recycled water will be used where possible;
- low energy lighting will be installed at appropriate locations;
- buildings such as the Site office will be heated in an efficient manner;
- records of IBAA production and energy records will be assessed on a regular basis by the Environment Department to monitor the efficiency on site.

Procedures will be reviewed and amended 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.

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

3 BAT Assessment

3.1 Treatment techniques

There are three potential treatment techniques for IBA:

- Wet Treatment (washing);
- Thermal Treatment (vitrification); and
- Dry Treatment (air maturation).

Wet treatment systems use water to wash soluble salts from the IBA. Wet treatment systems produce large quantities of effluent which require treatment either on-site or offsite and subsequent discharge to water/sewer. There is no on-site water treatment facility; therefore, any effluent would require transport off-site to a suitably licensed recovery/disposal facility. Due to the large quantities of effluent produced by wet system these are not considered appropriate for the Facility.

Thermal treatment systems have high destruction efficiency of organics and immobilization of environmental harmful elements. However, the high temperature processing required for vitrification of the IBA has a very high energy cost. Bottom ash from the incineration of MSW is a very inhomogeneous product and the results of vitrification have been known to vary. Therefore, the slag received at the IBA facility can differ in composition and the subsequent level of immobilization of pollutants can vary. Due to the high energy costs and the potential for varying levels of immobilization of pollutants from the IBA, thermal treatment systems are not considered to represent BAT for the Facility.

The dry treatment of IBA uses small quantities of water and produces comparatively small quantities of effluent. The effluent can re-used on site, and when there is excess effluent this can be transported off-site to a suitably licensed recovery/disposal facility. The volume of effluent produced in a dry treatment system will be significantly smaller than a wet treatment system. The equipment used on dry treatment systems use significantly smaller quantities of power when compared to thermal treatment systems. Due to the small quantities of effluent and low power consumption associated with dry systems, they are considered to represent BAT.

In addition, there are very few IBA treatment facilities in the UK which employ either wet treatment or thermal treatment techniques, so Fortis IBA does not consider these techniques to be a proven technology. Fortis IBA currently operates a number of facilities in the UK which employ the use of dry treatment systems, including the existing facility.

Taking into consideration the above, Fortis IBA considers that dry treatment of IBA through air maturation represents BAT for the treatment of IBA at the Facility.

3.2 The Legislative Framework

3.2.1 Requirements of the Waste Incineration BREF

The Waste incineration (WI) BREF BAT conclusions were published by the European IPPC Bureau in December 2019. Waste incineration plants, and associated IBA treatment facilities are required to demonstrate that they meet the requirements of the BREF when applying for an EP. As such, Table 4 identifies the relevant requirements of the Best Available Techniques (BAT) conclusions as set out in the BREF and explains how the Facility will comply with them.

Table 4: 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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable. Notwithstanding this, IBA Fortis will develop and implement documented management systems covering the operation of the Facility, refer to section 4.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
3	BAT is to monitor key process parameters relevant for emissions to air and water including those given in BAT 3 of the BREF.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
4	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	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

#	BAT Conclusion	How met or reference
	international standards that ensure the provision of data of an equivalent scientific quality.	
5	BAT is to appropriately monitor channelled emissions to air from the incineration plant during Other Than Normal Operating Conditions (OTNOC).	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
6	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 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 Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

#	BAT Conclusion	How met or reference
	BREF, and, where relevant, also techniques (d), (e) and (f).	
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).	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
12	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: Use impermeable surfaces with an adequate drainage infrastructure; and Have adequate waste storage capacity.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
13	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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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:	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

#	BAT Conclusion	How met or reference
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. through the advanced control system, as and when needed and practicable, based on the characterisation and control of the waste.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

#	BAT Conclusion	How met or reference
19	In order to increase resource efficiency of the incineration plant, BAT is to use a heat recovery boiler.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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 substances at incineration plants, BAT is to feed them to the furnace by direct feeding.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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 diffuse dust emission management features as given in BAT 21 of the WI BREF.	The IBA facility will be operated in accordance with a Dust Management Plan which sets out the measures to mitigate emissions of dust (refer to Appendix D). As set out within the Dust Management Plan, the measures include the dampening of the stockpiles of IBA/IBAA to minimise the fugitive emissions from the IBA facility.
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.	Fortis IBA has incorporated the following techniques within the design and layout of the facility: • Enclose and cover equipment – all IBA processing will be undertaken within an enclosed IBA processing building. All IBA/IBAA storage will be undertaken within an enclosed stockpiles shed. • Use of water sprays – rain guns are located around the Site for dust suppression. It is a comprehensive system of spray nozzles and covers the loading, unloading, and storage

#	BAT Conclusion	How met or reference
		areas. The design and location of the rain guns have been determined to ensure an arc coverage of all IBA and IBAA storage areas/stockpiles.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	There are no plans to install a dust extraction unit within the treatment system. Prior to transfer of the IBA to the IBA Facility, the EfWs where the IBA is generated will quench the IBA in a water bath. It is then loaded onto lorries and delivered to site, with a moisture content approximately between 22 to 24%. While the IBA is onsite, it is monitored in accordance with the requirements of the dust management plan. If required, the dust suppression system dampens down the site and the material stockpiles.
27	In order to reduce channelled emissions of HCl, HF and SO2 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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
28	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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
29	In order to reduce channelled NOx emissions to air while limiting emissions of CO and N_2O from the incineration of waste, and the emissions of NH_3 from the use of SNCR and/or SCR, BAT is to use an	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

#	BAT Conclusion	How met or reference
	appropriate combination of the techniques as listed in BAT 29 of the BREF.	
30	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: 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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
31	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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
32	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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

#	BAT Conclusion	How met or reference
33	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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.
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.	There are no emissions to water from the IBA facility. Therefore, this BATc is not applicable to the IBA facility.
35	In order to increase resource efficiency, BAT is to handle and treat bottom ashes separately from FGC residues.	The IBA facility will not receive RGC residues. Therefore, this BATc is not applicable to the IBA facility.
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.	As listed within BAT 34, the IBA facility will implement measures a, b, d, and e to increase the resource efficiency from the treatment process.
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.	The Facility is for the treatment of slags and bottom ashes; therefore, this BAT Conclusion is not applicable.

4 Management Systems

4.1.1 Introduction

Section 4.1.2 below provides a general summary of the proposed site EMS in accordance with Environment Agency (EA) guidance '*Develop a management system: environmental permits*'.

An operating and maintenance (O&M) manual(s) will be included within the EMS. 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 4.1.3.

4.1.2 Summary of EMS and management systems

4.1.2.1 Scope and structure

Fortis IBA has an ISO 14001:2015 EMS, which is certified for '*The processing and recovering of incinerated bottom ash'* (refer to Appendix F). Fortis IBA proposed to extend the scope of the EMS to include the Facility.

The scope of Fortis IBA's EMS will clarify the physical, functional, and organisational boundaries to which it applies. For the EMS's boundaries and applicability to be determined within the context of Fortis IBA, the following will be considered: the physical boundaries of the Facility's operations, the organisational sphere of control, and the influence considering the life cycle.

The scope of the management system will includes the operation of IBA processing facilities, as well as the site offices and separate administrative facilities.

4.1.2.2 General requirements

The scope of the EMS will include, but not be limited to, the following:

- an environmental policy;
- identification of potential environmental impacts;
- documented procedures to control operations that may have an adverse impact on the environment;
- ensuring adequate responsibility, authority and resources to management necessary to support the EMS;
- defined procedures for identifying, reviewing and prioritising items of plant and equipment for which preventative maintenance regimes are appropriate;
- establishing preventative maintenance programmes (and associated auditing) to cover all plant and equipment whose failure could lead to environmental impacts (including infrastructure such as pipework, drainage, bunds etc);
- documented procedures for monitoring relevant emissions or environmental impacts;
- 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.

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

Fortis will adapt and extend the scope of the current environmental policies for each company that make up the joint venture. The resulting environmental policy will act as a commitment to continual improvement of Fortis's operations including a commitment to comply with relevant legislation.

4.1.2.3 Site operations

The Facility will operate as an IBA processing facility, with the main activity being processing non-hazardous IBA sourced from waste incineration facilities to produce IBAA.

All permitted activities will take place within the Installation Boundary. The activities to be undertaken at the site are described in section 1.3.

Steps to be taken to prevent or minimise risks to the environment from each activity/process are set out within the Environmental Risk Assessment (refer to Appendix C). The environmental risks will be expanded on and incorporated into the final EMS document upon completion of detailed design.

4.1.2.4 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*':

1. buildings and any other main constructions such as security fences;
2. storage facilities for hazardous materials (oil or fuel tanks), chemical stores, waste materials;
3. the location of items for use in accidents and emergencies, such as spill kits;
4. entrances and exits for use by emergency services;
5. any points designed to control pollution (e.g., containment facilities or penstock valves);
6. effluent or water discharge points;
7. areas vulnerable to pollution such as watercourses, adjacent industrial premises etc;
8. drainage facilities; and
9. 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.

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*'.

4.1.2.5 Site and equipment maintenance plan

Upon completion of detailed design of the Facility, an 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:

1. Plant and machinery (including mobile plant) will be maintained in accordance with the manufacturers or supplier's recommendations. A preventative maintenance regime will be in place at the Facility.
2. Records will be kept of all maintenance which is undertaken on plant and machinery.

4.1.2.6 Personnel

Fortis IBA 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:

- The **General Manager** will have overall responsibility for management of the site and compliance with the operating permit. The General Manager will have extensive experience relevant to their responsibilities.
- The **Operations Manager(s)** 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, they will be responsible for designing and implementing operating procedures which incorporate environmental aspects.
- The **Maintenance Manager** 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.

4.1.2.7 Competence, training and awareness

All persons undertaking work on behalf of Fortis IBA that affect or can affect our environmental performance, including our ability to fulfil compliance obligations, shall be competent based on training, education and experience as determined by the company. These requirements are applicable to employees and others working under its control, including contractors.

Competency requirements required to achieve the intended outcomes of the EMS, and applicable to each role, will be identified. Training records will be used to ensure competency needs are addressed. Progress is tracked on achieving competence and to enable communication of relevant information to interest parties.

4.1.2.8 Accident management

A detailed accident management plan will be developed as part of this site's EMS. This will draw upon the environmental risk assessment, refer to Appendix C.

4.1.2.9 Climate change and flood risk

As summarised in the Flood Risk and Drainage Assessment (refer to Appendix H):

> *The Environment Agency Flood Map for Planning indicates the site to be located in flood zone 3.*
>
> *The site is not at risk of flooding from the River Wyre (tidal) in a 0.5% AEP defended (overtopping) event plus climate change (2069 - 2051, 95P proxy); however, there is a residual risk of flooding from defence failure (breach). The modelled flood level at the site during a present day 0.5% AEP breach event is 6.22 m AOD, whilst the estimated flood level*

at the site during a 0.5% AEP breach event plus climate change (2051) is 6.42m AOD (70P) and 6.48 m AOD (95P).

The site is not at risk of flooding from Royles Brook in up to a 0.1% AEP event, albeit there may be a residual risk of flooding due to blockage of the inlet of the existing access crossing culvert adjacent to the site.

The site is assessed to be at a low risk of pluvial surface water flooding and groundwater flooding, and is not at risk of flooding from small watercourses, reservoirs, canals or other water impounding structures.

4.1.2.10 Keeping records

Records of results achieved and activities performed will be kept to allow Fortis IBA to confirm that the requirements of the EMS have been achieved.

For the effective management of key activities, Fortis IBA shall establish documented Operational Controls to describe how to carry out the activities and describe in appropriate detail how they are to be managed.

Documented informational shall be controlled by:

- Using a standard template that includes a unique title, reference number, date, revision, revision history and authority.
- Review and approval of documented information by individuals with sufficient capability and authority.
- Maintaining an effective distribution system.

4.1.2.11 Review of management systems

Fortis IBA will conduct a review of its EMS to evaluate the systems continuing suitability, adequacy, and effectiveness. Its review will cover the environmental aspects of the activities, products and services that are within the scope of the EMS. Monthly management meetings will be used as a supplementary review of aspects of the EMS, in addition to a full management review annually.

4.1.2.12 Contingency

Fortis IBA has an existing EMS which covers all existing Site operations, including contingency measures in the event of breakdowns, enforced shutdowns and / or any other changes to normal Site operations.

The EMS and associated documents will be reviewed and updated, where appropriate, to allow for the proposed changes to the IBA facility, where necessary.

4.1.2.13 Contact information for the public

A notice board will be displaced at (or near) the entrance for the Facility which tells the public key information about the site. This will include, but not be limited to, the following:

- the EP holder’s name;
- an emergency contact name and telephone number;
- a statement that the site is permitted by the Environment Agency;
- the EP number; and

- the Environment Agency telephone number 03708 506506 and the incident hotline 0800 807060.

4.1.2.14 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.

4.1.3 Operating and maintenance procedures

An operating and maintenance (O&M) manual(s) is to be included within the EMS. Operational controls shall be used for managing significant environmental aspects, ensuring fulfilment of compliance obligations, achieving environmental objectives, ensuring consistency with our environmental policy, avoiding or minimising adverse impacts to the environmental or adverse effects to the company and to maximise opportunities. The O&M procedures will include, but not be limited to the following aspects:

- comprehensive description of each component at the site including operating hours and design details;
- as-built drawings of the site;
- maintenance and service plans;
- staffing and staff responsibilities;
- waste acceptance and pre-acceptance procedures;
- waste storage and handling procedures;
- copies of any guaranties/warranties/certificates; and
- health and safety procedures.

Operational controls shall extend to external providers and outsourced processes that can affect the ability to fulfil Fortis IBA's compliance obligations.

Appendices

A Plans & Drawings

B Site Condition Report

C Environmental Risk Assessment

D Dust Management Plan

E Noise Assessment Plan

F ISO:14001 Certification

G Procedures

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