Energy Recovery Facility
Newhurst, Leicester

Environmental Permit (EP) Variation Application
Residue Management Plan

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SLR Ref: 416.00034.00562/RMP

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1.0 INTRODUCTION

Biffa Waste Services Limited (Biffa) and Covanta Energy Limited (Covanta) signed a Memorandum of Understanding to jointly develop the Newhurst Energy Recovery Facility (ERF). Biffa has retained SLR Consulting to prepare a variation to the Environmental Permit (EP) for the ERF located near Shepshed in Leicestershire under the Environmental Permitting Regulations 2016 (as amended). The purpose of this variation application is to update the Permit to correlate with changes to the planning consent which were approved in 2015.

A significant environmental consideration of the plant is management of residues arising from the process. Appropriate options need to be considered to ensure that the best practicable environmental option is identified and implemented. This document provides a brief overview of the origins of each waste stream and the treatment options identified, as presented in Section 2.0. The summary and conclusions of the key issues for Biffa to consider when implementing the best practicable environmental options are provided in Section 3.0.

1.1 Procurement Process

At the time of submitting this EP variation application, Biffa and Covanta are in ongoing discussions with a number of technology providers. From the initial discussions, some of the technology providers have indicated that they would deliver the proposed capacity with a single stream facility, whereas other technology providers have indicated that they would propose a two-stream facility. Taking this into consideration, Biffa and Covanta are not able to state the number of streams which are being applied for at the time of submission of this application. It is proposed that a pre-operational condition is included within the EP which requires Biffa to confirm the number of streams to be included within the design of the ERF no later than two years prior to commencement of commissioning of the ERF.

1.2 Overview of the Variation Application

This variation application seeks to make the following changes to the EP:

- Option for either one or two incineration lines, with either option being contained within the building configuration approved under the planning permission (see Conceptual Site Layout and Environmental Permit Boundary Drawing);
- Option for either one or two flues (consistent with the number of incineration lines) housed within a single stack (in line with the 2015 planning permission);
- Increase in the total tonnage accepted from 300,000 tonnes per annum (tpa) to 350,000 tpa, in line with the 2015 planning consent and the increase in the design Net Calorific Value (NCV) of the waste incinerated at the facility from 10 MJ/kg to 10.5 MJ/kg;
- Options for NOx abatement reagent;
- General site layout changes (but no overall change to the ERF building footprint) including the provision of additional air cooling fans, in line with the 2015 planning consent;
- The removal of the previously permitted Incinerator Bottom Ash (IBA) storage cover, in line with the 2015 planning consent; and

- Amendment to the EP boundary to remove a small area of land to the east of the site to align with the land area leased by Biffa.

2.0 RESIDUE MANAGEMENT OPTIONS

2.1 Introduction

The residues arising from the plant will primarily be a function of the treatment process, with the largest volumes associated with ash and metal recovery. Although other waste streams will be generated at the installation, such as domestic waste and maintenance by-products, process by-products are the key residues generated and are the subject of this document. An estimation of the tonnages of these waste streams is provided in Table 2-1 and detailed information on the origins and key issues associated with each is provided in Sections 2.2 to 2.4.

Table 2-1 Waste Arisings

Waste source	Approximate Tonnes per Year
Incinerator Bottom Ash (IBA)	87,500
Air Pollution Control Residue (APCR)	10,500

In accordance with the requirements of the Industrial Emissions Directive (IED), Best Available Techniques (BAT) and the BREF Note on Incineration, the intermediate storage and transport of dry residues in the form of dust i.e. the boiler dust and dry residues from the treatment of combustion gases will take place in such a way so as to prevent as far as practicable emission to the environment. Intermediate storage will therefore take place within the Newhurst Quarry facility and will be within enclosed storage vessels and containers. All vehicles leaving the facility, transporting, dry residues will be enclosed or covered.

2.2 Incinerator Bottom Ash (IBA)

The most significant residue associated with rMSW incineration is IBA, comprising siftings and fine ash falling through the combustion grate. IBA output is typically around 25% of the total tonnage into the plant.

The IBA will be transported from the boiler hall to the bottom ash storage area using enclosed conveyors. IBA will be transported to a separator (“bottom ash scalper”), which consists of a grid where coarse IBA will be separated and stored. The other part of the IBA will be transported further on belt conveyors to the bottom ash storage area. The IBA storage facility will allow sealed loading of the anticipated 87.5ktpa IBA produced by the plant. The entire ash handling system will be enclosed, thereby minimising fugitive dust emissions. Quarterly sampling of IBA will be carried out by measuring the total organic carbon in the residual ash to ensure effective burn out is being achieved.

Additionally, IBA may also be processed onsite in the IBA processing area on a “campaign” basis, using mobile plant as stock accumulates, to produce a secondary aggregate for the construction industry. Processing involves mechanical treatment and maturation to produce stabilised aggregate of several different product grades.

Mechanical treatment will be carried out under cover using mobile plant. Magnetic over-belt and eddy current separators will remove ferrous and non-ferrous metals respectively. Metals will be collected separately and sent off-site for recycling. Ash will be sorted into several different size fractions by mechanical Trommel screens. A small proportion of ash will be oversize and will be removed from site for disposal to a non-hazardous landfill. Remaining fractions will be transferred to the external stockpile area for maturation.

Equipment used for mechanical treatment will be powered from the ERF plant electricity supply.

Maturation involves exposure to air and water, achieved by stockpiling the classified material under cover. Carbon dioxide in air reduces both ash pH through carbonation reactions and metal solubility. Water is used to remove soluble metal salts, chlorides and sulphates. The maturation process lasts for several weeks and will take place in the external walled storage area. Maturation is required to stabilise ash to ensure leaching properties are acceptable for use as an aggregate.

IBA is currently regarded as non-hazardous waste. When subjected to further treatment to remove metals and grade by size, as above, it can then be used as a replacement for primary aggregates, such as sand and gravel. There are several IBA treatment plants in the UK and resulting inert material can be used in concrete and concrete block construction, replacing up to 50% of the aggregate traditionally used. IBA has also been used successfully in the sub-base and roadbase layers in road construction, after a process of hot asphalt stabilisation and mixing with cement or bitumen. The sub-base and roadbase layers refer to the intermediate layers of the road, below the final surface wearing course and above the lowest subgrade layer. In 2000, 42% of the 575,000 tonnes of IBA generated in the UK from MSW combustion was treated for further use.

It is Biffa's intention to recycle 100% of bottom ash as secondary aggregates. Biffa are currently exploring options to deliver this, including either on-site processing and recycling or by third party facilities in the region.

Biffa is currently in discussions with Bottom Ash recyclers, including Ballast Phoenix aggregates and construction companies such as Tarmac. Ballast Phoenix operates on a large scale and has extensive experience of operating large scale ash recycling facilities, producing high quality materials for future use.

2.3 Fly Ash, Boiler Ash and APCR

On line cleaning of the boiler results in ash, and this ash is transferred from the bottom of the boiler passes to the APC / fly ash silo. Boiler ash is generally considered to be the ash which drops out of the boiler in this fashion, whereas "fly ash" as its name suggests carries through the boiler and onto the bag filters. In summary, the fly-ash, boiler ash, and APC residues will be collected together and taken to hazardous landfill as all three can contain heavy metals.

The APC residues also include fly ash from combustion that is removed from the flue gases, together with the other contaminants, prior to release into the atmosphere. Fly ash consists mostly of carbon dust, along with some pollutants, organic compounds and heavy metals. These will be removed from the flue gases so that the emissions from the facility are clean prior to release, preventing pollution of the environment. Fly ash combined with spent reagent represents only about 3% by mass of the waste feedstock and will be disposed of by enclosed tanker at a designated hazardous waste landfill.

APCR will be collected in the bag filters and will comprise a mixture of activated carbon and spent reagent, used to remove heavy metals, dioxins and acid gases present in the flue gases. APCR will be recirculated into the flue gases to optimise reagent consumption; excess material is transferred to a silo. The resulting waste will be listed in the European Waste Catalogue as an absolute entry[1], hence will be a hazardous waste. The hazardous

[1] 19 01 07* solid wastes from gas treatment

properties can relate to biological effects (e.g. C6 – toxic, C7 – carcinogenic, C14 - ecotoxic) due to the presence of alkali metal salts.

Currently there is no commercially viable recycling route in the UK, and these residues will be removed by enclosed tankers to designated hazardous waste landfill sites. However, Biffa will review this on a regular basis and will investigate the possibility of sending the hazardous residues off site for further treatment.

Biffa operates a Hazardous Waste Treatment Plant at its Wednesbury site near Birmingham. The plant is capable of treating fly ash and can offer a guaranteed disposal outlet for material produced under the Contract. Furthermore Biffa also have a hazardous waste landfill site at Meece in Staffordshire.

2.4 Residue Testing

As required by IED, BAT and the BREF Note on Incineration. Biffa will undertake appropriate sampling and testing of the residues to establish the physical and chemical composition of the residues prior to determining suitable routes for recycling or disposal. Testing of residues will be undertaken to ensure compliance with WAC at receiving landfills. A sampling and testing methodology will be agreed by Biffa with the Environment Agency prior to commencement of operations at the facility.

3.0 MINIMISATION OF RESIDUES

3.1 Introduction

In order to comply with the requirements of the IED, BAT and the BREF Note on Incineration, residues resulting from the operation of the incineration plant will be minimised in their amount and harmfulness. In accordance with IED, Biffa proposes to identify markets for use of the residues as permitted by current UK legislation.

3.2 Techniques for Minimising the Harmfulness and Quantity of Residues

Control of incoming wastes and process design will be key to minimising the quantity and harmfulness nature of waste residues. The installation will only handle non-hazardous wastes from known sources. Wastes will be inspected when received to identify and remove non permitted components as required. Wastes will then be homogenised in the waste bunker prior to discharge into the furnace. Consequently there will be a number of control measures in place to prevent harmful materials from entering the combustion chamber.

The process design will also be optimised to ensure an even spread of incoming wastes materials across the combustion grate and maximum burn-out of waste. The forward-acting moving grate system is specifically designed for these purposes and, in so doing, maximises the opportunity for combustion of waste and minimises the volume of unburnt material being discharged as IBA. As discussed in Section 2.3, APC residues and reagent raw materials will be minimised through recycling back into the flue gas treatment process to use up unspent reagent.

The Best Available Techniques and Operating Techniques Report (SLR Ref: 413.00034.00562/BATOT) submitted as part of this variation application (Section 5 of application) provides a detailed assessment of the techniques proposed to be implemented at the facility.

Biffa will implement a programme of house keeping procedures which include the provision of cleaning equipment on site in order to clean any ash spills which may occur during operation. Throughout the whole process, efforts will be made to reduce the release of dust, through a combination of enclosure of plant, preventative maintenance, monitoring and housekeeping.

In conclusion Biffa has identified the key residues arising from the plant and indicative quantities generated. The management options for each waste stream are well understood and preliminary discussions with potential recipients of the wastes for recycling are encouraging. Biffa is committed to continuing engagement with these companies and identifying practicable opportunities for outlets for other residues typically disposed of in landfill.

When operational, waste disposal routes will be regularly audited to ensure legal and contractual compliance. A resource efficiency and waste minimisation programme will also be established to ensure that reagent use is minimised and that new opportunities for reusing and recycling process by-products are identified and acted upon at the earliest opportunity.

4.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Biffa Waste Services Limited; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.