FICHTNER

Consulting Engineers Limited

Beddington ERF

Viridor South London Limited

Schedule 5 Response

ENGINEERING CONSULTING

Document approval

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Contents

1 Waste Management

1. **Demonstrate how each stage of the process is sufficiently sized/operated to manage the proposed increase in throughput. This needs to cover the following areas:**
   - **Vehicle movements onsite.**
   - **Tipping hall.**
   - **Bunker management, including how you will ensure a homogeneous mix entering the combustion chamber is achieved.**
   - **Waste management for wastes produced onsite from the incineration process.**
   - **Emissions abatement equipment.**

   The standard operating techniques and procedures implemented at the Facility will not change with the proposed increase in capacity. Notwithstanding this, as requested, a description of how each stage of the process is sufficiently sized/operated to manage the increased capacity is provided below.

   Onsite vehicle movements

   As described in the response to question 7, vehicle movements are not expected to increase significantly. Deliveries are scheduled prior to arrival at the site, reducing the risk of too many vehicles arriving at the same time. When a vehicle arrives at the site, the driver, vehicle and supplier is verified alongside documentation such as waste transfer notes, in accordance with Viridor's waste acceptance procedure. The small increase in vehicle movements associated will not affect the current arrangements for waste acceptance at the site and will be able to be accommodated under existing procedures.

   Tipping hall

   As described in the response to question 7, vehicle movements are not expected to significantly increase with the increase in capacity. The tipping hall is already designed to accommodate varying levels of waste deliveries as a result in fluctuations in supply and demand. As per standard practice, a 'buffer' has been built into the design of the tipping hall to accommodate minor increases in waste deliveries.

   Bunker management

   Additional throughput will be mixed, processed and managed through normal plant operations and fed faster through the boiler to maintain its necessary performance characteristics. Therefore, the quantity of waste stored within the bunker at any one time is not expected to change significantly. Notwithstanding this, the bunker has been designed with 'buffer' storage capacity to enable storage of increased waste quantities if required (e.g. over periods of maintenance or planned shutdown).

   Within the waste bunker, regular mixing of the waste using the grab cranes ensures that waste fed to the furnace is of an even consistency, which improves combustion. The mixing of waste within the bunker is standard practice at waste incineration plants in the UK. Mixing the waste with the crane enables waste from the base of the bunker to be brought to the surface, reducing the risk of anaerobic conditions developing and ensuring older waste does not remain 'buried' at the base of the bunker.

   Waste management for wastes produced onsite from the incineration process

   As described within the application, there is expected to be a small increase in the quantities of residues generated at the Facility (IBA, APCr) as a result in the increase in capacity. The only

material which is expected to increase daily vehicle movements is IBA, with the increased generation resulting in an additional 2 – 3 vehicle movements each day on average. These can be accommodated under existing waste and vehicle management procedures at the site, and arrangements will be made with the existing offtakers to transfer the additional IBA generated, as required.

Furthermore, the IBA storage facility has been sized with an allowed buffer to accommodate increased quantities of IBA if required, although the quantities stored are not expected to increase significantly as the frequency of IBA collections is expected to increase. It should be noted that the proposed increase in plant capacity will not result in any changes to the overall arrangements for the storage and handling of residues generated by the ERF.

Emissions abatement equipment

The emissions abatement equipment has been designed with an operational 'buffer' to allow for processing higher flow rates of flue gas. Typically, emissions abatement equipment is sized based on the theoretical maximum capacity of a facility, with a 'buffer' allowed for within the design to accommodate higher flue gas flow rates. It is acknowledged that the quantities consumed of emissions abatement reagents (such as lime, activated carbon and urea) will increase with the increased waste throughput. The dosing systems for these reagents have been designed with an operational 'buffer' to allow for higher dosing rates when the Facility is operating at the increased waste throughput.

2. **The Waste Acceptance Criteria should be provided as a standalone document and must include:**
   - **Your contingency plans if waste amasses onsite. This needs to cover both the incinerator and waste transfer station activities.**
   - **Your procedures for managing mirror coded wastes.**

   The updated Waste Acceptance Protocol is provided within Appendix A.

2 Operating techniques

3. Confirmation if any of the operating techniques listed in table S1.2 have been updated. If they have been updated, then provide an updated copy.

Viridor can confirm that the Operating Techniques for the ERF listed within Table S1.2 of the current permit will remain the same, with the exception of additional information provided in this variation application.

4. Operating techniques for the waste transfer station, including the operation of the shredder. The shredder operating technique must include:

- **Details of the abatement techniques, such as dust spray bars.**
- **What waste codes will be processed through the shredder.**

As described within the application, apart from the addition of the handling and containment measures for clinical and hazardous wastes (described in section 4 of the Supporting Information to the application), the operating techniques associated with the WTS will not change. As such, section 4 of the supporting information should be included within the operating techniques, in addition to the operating techniques within Table 2.3 of the existing WTS permit, which are set out again for the avoidance of doubt:

1. *You will follow the Fire Prevention Plan approved by the Environment Agency.*
2. *Unless stored or treated outside as specified waste3:*
    a. *all bulking, transfer or treatment of non-hazardous waste shall be carried out inside a building;*
    b. *all non-hazardous waste shall be stored in a building or within a secure container.*
    c. *all non-hazardous waste shall be stored and treated on an impermeable surface with sealed drainage system.*
3. *Specified waste shall be stored and treated on hard standing or on an impermeable surface with sealed drainage system.*
4. *Asbestos waste shall be double bagged and stored within clearly identified, segregated, secure, lockable containers on an impermeable surface with sealed drainage system.*

With regards the shredder, as described within the application, the existing EP for the WTS already allows for the shredding of waste at the WTS. However, as part of the permit consolidation, it is proposed to incorporate an emissions point for emissions to air from the shredder.

The shredder will be located within the main WTS building, with emissions from the shredder released to atmosphere via duct which vents through the roof of the building. Emissions of particulates would be extracted via a particle filter, designed to meet the relevant EUROMOT standards (for nonroad diesel engines).

Dust spray bars will be fitted on each end of the feed hopper for the shredder to minimise fugitive emissions during shredding activities. The shredder will also employ a self-cleaning system, whereby cleaning will be done by a manually-operated switch.

An overband magnet will be installed on the conveyor to the shredder to recover ferrous metal from the shredded waste. Furthermore, an anti-jam system will be employed. There will also be an integrated system for injection of powder and foam with battery isolation and machine shutdown.

The following EWC codes will be processed through the shredder:

- 20 03 07 (bulky waste);
- 20 03 03 (a mixture of street cleaning waste and fly-tipped waste); and
- 20 01 39 (plastic waste too contaminated and difficult to recycle, whereby incineration delivers the best outcome in line with the waste hierarchy and avoids landfill disposal).

5. **Confirmation if the Fire Prevention Plans for the incinerator and waste transfer station have been consolidated. If they have, then the consolidated plan must be provided, if not, then the Fire Prevention Plan for the waste transfer station must be provided so that it can be added to the operating techniques table.**

   A copy of the Fire Prevention Plan for the WTS is provided in Appendix B.

3 Other information

6. Confirmation of how overpressure in the turbine is managed and what the emissions are when it is bypassed.

The steam turbine is an item of pressure equipment and protected from overpressure under the requirements of Pressure Equipment Safety Regulations. The overpressure protection is done at the piping between the boiler and steam turbine with pressure relief valve(s) (PRV). The PRV is an item of safety equipment and would typically be required to operate very infrequently, if ever.

The PRV opens when the steam pressure exceeds the PRV set pressure (typically the maximum allowable operating pressure of the boiler and steam turbine, in the order of 65-70 barg) and the steam is released to atmosphere via a silencer through a dedicated vent. The emitted medium is steam only, and the noise level is typically below 90 dB(A).The PRV is designed for the maximum steam generation capacity of the plant.

The turbine bypass is used for start-up, shut down and occasional electric export load reduction if load reduction is ever required from the grid. The steam turbine bypass station can also be in operation when the steam turbine is at fault/isolated and the plant is still burning waste. Apart from the noise, due to the pressure being released, there are no pollutants released to atmosphere when the turbine bypass in operation. Although the maximum sound pressure level measured not more than 1 metre is less than 120 dB(A) for turbine bypass, the turbine bypass is located inside the steam turbine hall to mitigate any noise impacts.

In addition to the above, is the start-up vent. The start-up vent is mainly used for start-up and vents steam to the atmosphere via a silencer - it can also be used to vent steam to reduce the pressure within the boiler before the PRV opens. This typically only occurs during commissioning, and is also a very infrequent event.

7. Demonstrate how you have assessed the risk of noise from the expected increase in vehicle movements onsite.

As described in the supporting information to the application, the maximum hourly waste throughput per line would increase from 19.83 tonnes per hour (100% point on firing diagram) to approximately 21.82 tonnes per hour (110% point on firing diagram). This equates to an hourly increase of approximately 2 tonnes per line per hour of waste, or 4 tonnes per hour total.

Waste is delivered to the site in a mixture of Refuse Collection Vehicles (RCVs) and larger articulated lorries (artics). If it is assumed that an RCV has an average payload of approximately 4 tonnes, there would only be up to 1 additional vehicle movement each hour associated with the ERF operating at the increased capacity. Furthermore, it should be noted that the ERF may not operate at the 110% point all the time, and that this will depend on the dynamic supply and demand of waste.

In addition to the above, it is acknowledged that raw material consumption and residue generation will increase slightly with the increase in capacity. Assuming an average payload of 20 tonnes, as can be seen from Table 1, the only material which is expected to increase daily vehicle movements is IBA, with the increased generation resulting in an additional 2 – 3 vehicle movements each day on average.

Table 1: Increase in vehicle movements associated with raw materials and residues

Raw material/ residue	Units	Existing consumption/ generation	New consumption/ generation	Annual increase in tonnage	Annual additional vehicle movements	Daily additional vehicle movements
Lime	tpa	3,500	4,300	800	40	0.1
Carbon	tpa	100	120	20	1	0.003
Urea	tpa	700	860	160	8	0.002
Fuel oil	tpa	2,000	2,000	0	0	0
IBA	tpa	69,000	85,000	16,000	800	2.2
APCr	tpa	9,100	11,200	2,100	105	0.3

Waste deliveries are only undertaken within daytime hours. The additional increase in vehicle movements is not considered to have a significant effect on existing noise levels which have previously been considered and found to be acceptable.

8. **Confirmation on what the expected process water consumption per annum will be.**

Table 2: Estimated increase in water consumption

	Water consumption (m^3 p.a.)	Corresponding waste tonnage
Original EP application	33,000	302,500
2022 operational data	47,289	333,751
Proposed capacity (based on scaling from original EP application)	41,700	382,286
Proposed capacity (based on scaling from operational data)	54,165	382,286

9. **An updated Site Condition Report to include the full site and its activities as the two permits are to be consolidated. This must follow the Environment Agency guidance: H5 Site Condition Report.**

An updated Site Condition Report is provide within Appendix C.

10. **Confirmation of what you would like the site name to be.**

The site name should be “Beddington ERF and WTS”.

4 Greenhouse Gas Assessment

11. An updated greenhouse gas assessment must be provided, with changes to the below calculations:

- **Confirmation of the total number of operational hours for the years 2021 and 2022. If these are dissimilar to those in the GHG assessment, then the GHG assessment will need to be updated, including the existing case.**

	Operational hours
2021	
Line 1	8,302
Line 2	8,273
Average	8,287.5
2022	
Line 1	8,494
Line 2	8,582
Average	8,538
Overall average	**8,413**

- **The total amount of power generated must take into account the number of operational hours of the turbine, not just the total number of operational hours.**

  In 2021, the operational hours of the turbine were 8,445 hours. In 2022, the operational hours of the turbine were 8,538 hours. The overall average operational hours of the turbine between 2021/2022 were therefore 8,492 hours.

  The Facility has been designed with a single turbine, which is able to operate at a reduced load when only a single line is operational (e.g. when the other line is undergoing maintenance). On this basis, the operational hours of the turbine are higher than the average operational hours across both lines.

  However, operational data on the amount of power generated across each year (MWh) is available. In 2021, the total electricity generation was 230,975 MWh, and in 2022, the total electricity generation was 248,247 MWh. This equates to an average electrical generation of 239,611 MWh. The total MWh generated takes into account operational availability of turbine.

  Assuming a parasitic load of 3MW and an availability of 8,492 hours, this equates to a net electrical export of approximately 214,135 MWh. This has been used in the updated greenhouse gas assessment for the 'existing design case'.

- **The same parasitic load (3MW) should be used in the existing case.**

  The greenhouse gas assessment has been updated to use the same parasitic load in both cases.

- **The carbon content of the waste and biogenic carbon content should be based on monitored data. The same figures should be used for the existing case.**

  Waste sampling data is available, however, only biomass content was analysed. Therefore, the greenhouse gas assessment has been updated to reflect the monitored value for biomass (biogenic) content, but the assumption for overall carbon content remains consistent with the previous assessment.

An updated Greenhouse Gas Assessment to reflect the points above is presented within Appendix D.

Appendices

A Updated Waste Acceptance Protocol

B WTS Fire Prevention Plan

C Updated Site Condition Report

D Updated GHG Assessment

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