

Review of an Environmental Permit for an Installation subject to Chapter II of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2016 (as amended)

Decision document recording our decision-making process following review of a permit

The Permit number is: EPR/VP3535CL
The Operator is: Renewi UK Services Limited
The Installation is: South Kirkby Waste Management Facility
This Variation Notice number is: EPR/VP3535CL/V006

What this document is about

Article 21(3) of the Industrial Emissions Directive (IED) requires the Environment Agency to review conditions in permits that it has issued and to ensure that the permit delivers compliance with relevant standards, within four years of the publication by the European Commission of updated decisions on BAT Conclusions.

We have reviewed the permit for this Installation against the revised BAT Conclusions for the Waste Treatment industry sector published on 10 August 2018 in the Official Journal of the European Union. In this decision document, we set out the reasoning for the consolidated variation notice that we have issued.

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the Installation. This review has been undertaken with reference to the decision made by the European Commission establishing Best Available Techniques (BAT) Conclusions (BATc) for Waste Treatment as detailed in document reference C(2018) 5070. It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as considering the review of the operating techniques used by the Operator for the operation of the plant and activities of the Installation, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue. Where this has not already been done, it also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and with other permits issued to Installations in this sector. Although the wording of some conditions has changed, while others have been deleted because of the new regulatory approach, it does not reduce the level of environmental

protection achieved by the Permit in any way. In this document, we therefore address only our determination of substantive issues relating to the new BAT Conclusions. We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future.

How this document is structured

1. Our decision
2. How we reached our decision
3. The legal framework
4. Annex 1 – Review of operating techniques within the Installation against the BAT Conclusions.
5. Annex 2 – Review and assessment of changes that are not part of the BAT Conclusions derived permit review
6. Annex 3 – Improvement Conditions

1 Our decision

We have decided to issue the Variation Notice to the Operator. This will allow the Operator to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice that updates the whole permit.

We consider that, in reaching our decision, we have taken into account all relevant considerations and legal requirements and that the varied permit will ensure that a high level of protection is provided for the environment and human health.

The Consolidated Variation Notice contains many conditions taken from our standard Environmental Permit template including the relevant annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the Notice, we have considered the techniques identified by the Operator for the operation of their Installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of “tailor-made” or Installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our decision

2.1 Requesting information to demonstrate compliance with BAT Conclusion techniques

We issued a Notice under Regulation 61(1) of the Environmental Permitting (England and Wales) Regulations 2016 (a Regulation 61 Notice) on 19 July 2019 requiring the Operator to provide information to demonstrate where the operation of their Installation currently meets, or how it will subsequently meet, the revised standards described in the relevant BAT Conclusions document.

The Notice required that where the revised standards are not currently met, the Operator should provide information that:

- Describes the techniques that will be implemented before 17 August 2022, which will then ensure that operations meet the revised standards, or
- justifies why standards will not be met by 17 August 2022, and confirmation of the date when the operation of those processes will cease within the Installation or an explanation of why the revised BAT standards are not applicable to those processes, or
- justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standards described in the BAT Conclusions.

Where the Operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT-AEL) described in the BAT Conclusions Document, the Regulation 61 Notice required that the Operator make a formal request for derogation from compliance with that BAT-AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request.

The Regulation 61 Notice response from the Operator was received on 18 January 2020.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 61 Notice response that appears to be confidential in relation to any party.

2.2 Review of our own information in respect to the capability of the Installation to meet revised standards included in the BAT Conclusions document

Based on our records and previous experience in the regulation of the Installation, we consider that the Operator will be able to comply with the techniques and standards described in the BAT Conclusions other than for those techniques and requirements described in BAT Conclusions 1, 2, 3, 6, 7, 8, 10, 12, 19, 20, 23, 34, 35 and 39. In relation to these BAT Conclusions, we do not fully agree with the Operator in respect of their current stated capability as recorded in their response to the Regulation 61 Notice. We have therefore included Improvement Conditions 1 to 7 in the Consolidated Variation Notice to ensure that the requirements of the BAT Conclusions are delivered before 17 August 2022.

2.3 Requests for further information during determination

There were no further requests for information during determination.

3 The legal framework

The Consolidated Variation Notice will be issued under Regulations 18 and 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *Installation* as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, in issuing the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

Annex 1: decision checklist regarding relevant BAT Conclusions

BAT Conclusions for the Waste Treatment sector, were published by the European Commission on 10 August 2018. There are 53 BAT Conclusions but not all of them will be relevant to the Installation. This annex provides a record of decisions made in relation to each relevant BAT Conclusion which are applicable to biowaste treatment Installations. This annex should be read in conjunction with the Consolidated Variation Notice.

The overall status of compliance with the BAT conclusion is indicated in the table as:

NA – Not Applicable

CC – Currently Compliant

FC – Compliant in the future (within 4 years of publication of BAT conclusions)

NC – Not Compliant

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
1	<p>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:</p> <ol style="list-style-type: none"> 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; 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: <ol style="list-style-type: none"> (a) structure and responsibility, (b) recruitment, training, awareness and competence, (c) communication, (d) employee involvement, (e) documentation, (f) effective process control, (g) maintenance programmes, 	FC	<p>The Operator confirmed that the Installation has an integrated Environmental Management System (EMS) which is accredited to ISO 14001:2015.</p> <p>The Operator confirmed that they will incorporate changes resulting from this BAT review into their management systems via a review of the Installation EMS, with each of the BAT 1 elements considered as part of the review. This proposed review, which will be formalised in the permit by means of an Improvement Condition (IC2) will ensure all of the necessary elements of BAT 1 will be included in the EMS within the BAT conclusions review timescales.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation will be future compliant with BATc 1. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>

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	<p>(h) emergency preparedness and response, (i) safeguarding compliance with environmental legislation;</p> <p>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, recruitment, training, awareness and competence, (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</p> <p>VI. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness;</p> <p>VII. following the development of cleaner technologies;</p>		

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	<p>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;</p> <p>IX. application of sectoral benchmarking on a regular basis;</p> <p>X. waste stream management (see BAT 2);</p> <p>XI. an inventory of waste water and waste gas streams (see BAT 3);</p> <p>XII. residues management plan (see description in Section 6.5);</p> <p>XIII. accident management plan (see description in Section 6.5);</p> <p>XIV. odour management plan (see BAT 12)</p> <p>XV. noise and vibration management plan (see BAT 17).</p>		
2	<p>In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques listed below:</p> <p>(a) Set up and implement waste characterisation and pre-acceptance procedures;</p> <p>(b) Set up and implement waste acceptance procedures;</p> <p>(c) Set up and implement a waste tracking system and inventory;</p>	FC	<p>The Operator confirmed that they currently employ the following techniques:</p> <p>(b) Set up and implement waste acceptance procedures – The in-vessel composting (IVC) activity processes source segregated green waste which is delivered to the composting building, and the</p>

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	<p>(d) Set up and implement an output quality management system;</p> <p>(e) Ensure waste segregation;</p> <p>(f) Ensure waste compatibility prior to mixing or blending of waste;</p> <p>(g) Sort incoming solid waste</p>		<p>anaerobic digestion (AD) activity processes organic material which has been separated in the residual waste reception hall prior to being processed in the on-site autoclave, or the organic fraction directly from the 'pre-sort' materials (PSM) recycling facility when the autoclave is not in operation.</p> <p>All wastes delivered to the site (excluding those received from householders) arrive in refuse collection vehicles (RCV's) which are required to report to the weighbridge facility and site control office, where Duty of Care documentation are checked. Following these checks, vehicles are directed to the appropriate operational area. Within each waste reception area at the site, designated personnel are responsible for liaising with the waste vehicle driver and plant operatives to ensure the waste received is transferred to and deposited in the correct storage area.</p> <p>Each load of waste is visually inspected by trained personnel immediately following discharge of waste in the relevant storage area. The discharged waste is manipulated with a loading shovel and visual inspection carried out at the relevant storage area to identify any non-conforming waste which is immediately</p>

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			<p>segregated and moved to a designated quarantine area for off-site disposal.</p> <p>IVC – The aforementioned acceptance checks are implemented to identify any potentially non-conforming waste which may cause mechanical damage to the shredder or inhibit the composting process. A mechanical shredder is then used to reduce the accepted waste to uniform sized particles, from where it is transferred to one of the IVC tunnels using a loading shovel. There are 8 first stage composting tunnels and 8 second stage composting tunnels.</p> <p>AD – Prior to the organic waste being treated in the autoclave, the waste is received and sorted within the Residual Waste Reception Hall, where all residual waste streams (including both Council contract waste and any third party waste) are received. The material at the reception hall is visually inspected by trained personnel and separated to remove the organic fraction of the waste to allow this to be diverted to the AD process. All organic material accepted at this stage is then conveyed from the reception walking floor to the autoclave hopper for processing as required. Following treatment in the autoclave, the ‘cooked’</p>

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			<p>organic fraction is unloaded onto a discharge conveyer and onwards into the AD system for treatment.</p> <p>(c) Set up and implement waste tracking system and inventory – IVC – The Operator confirmed that throughout the IVC process, effective records are maintained to track the progress of individual batches through the system to ensure good composting performance. However, the Operator did not expand on how the waste tracking system works, and how the total inventory of waste is monitored.</p> <p>AD – Insufficient information was provided to explain what waste and inventory tracking system is in place for the waste treated via the AD process.</p> <p>Further information is required to ascertain:</p> <ul style="list-style-type: none"> • What information is collected and monitored in the waste tracking system; • How individual batches/loads of waste are tracked through the treatment process;

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			<ul style="list-style-type: none"> • How the quantity of waste (inventory) is monitored to ensure the Installation operates within its permitted capacity. <p>(d) Set up and implement output quality management system – IVC – The Operator confirmed that the IVC process typically produces an agricultural/horticultural grade compost product. The site also produces PAS 100 compliant compost when the site has sufficient maturation pad space available to facilitate this.</p> <p>AD – The AD process produces a digestate and also biogas. The quality of the raw biogas produced is monitored continuously prior to being combusted in the combined heat and power (CHP) plant on-site.</p> <p>Insufficient information was provided to demonstrate that both the AD and IVC activities are compliant with this element of BAT 2. Further information is required to ascertain:</p> <ul style="list-style-type: none"> • What output quality management system is in place to ensure that the output of waste treatment is in line with expectations for both the AD and IVC processes;

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			<ul style="list-style-type: none"> • How the output quality management system is used to monitor and optimise the performance of the waste treatment (AD and IVC processes). <p>(e) Ensure waste segregation – The Operator confirmed that upon visual inspection and sorting of incoming wastes into separate treatment waste streams, any waste identified as non-confirming will be promptly segregated and placed in a designated quarantine area for off-site disposal.</p> <p>(f) Ensure waste compatibility prior to mixing or blending of waste – The Operator confirmed that raw materials and waste will be checked for compatibility with other substances with which they may come into contact with. Incompatible materials will be segregated. Furthermore, bulking and mixing of liquid wastes will only take place under the instruction from appropriately trained personnel.</p> <p>(g) Sort incoming solid waste – please refer to (b) above, which provides a summary of the visual inspection and manual separation of incoming solid waste which occurs prior to waste entering the relevant treatment process.</p>

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			<p>Although we are satisfied that a number of the elements in BAT 2 have been addressed by the Operator, there are certain aspects which were not sufficiently addressed:</p> <ul style="list-style-type: none"> • Set up and implement waste characterisation and pre-acceptance procedures; • Set up and implement waste tracking system and inventory; • Set up and implement output quality management system. <p>The Operator confirmed in their response that they will be undertaking internal audits of their procedures to verify compliance with BAT 2. We have included Improvement Condition 2 to ensure the Installation demonstrates full compliance with each of the relevant elements of BAT point 2.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation will be future compliant with BATc 2. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>

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3	<p>In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:</p> <p>(i) 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 waste water/waste gas treatment at source including their performances;</p> <p>(ii) information about the characteristics of the waste water streams, such as: (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);</p>	FC	<p>The Operator confirmed that releases from the Installation are documented in their current Aspects and Impacts register, however, this information is not currently maintained as an inventory, as required by BAT 3.</p> <p>The Operator confirmed that a standalone inventory will be prepared by September 2020 during the annual EMS review. Also, the Operator confirmed that the inventory review will include all the applicable features detailed in BAT 3 elements (i) to (iii).</p> <p>We have included Improvement Condition 2 to ensure the Installation demonstrates full compliance with each of the relevant elements of BAT point 3 for waste water and waste gas streams.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation will be future compliant with BATc 3. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>

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	<p>(c) data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52);</p> <p>(iii) information about the characteristics of the waste gas streams, such as:</p> <p>(a) average values and variability of flow and temperature;</p> <p>(b) average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs);</p> <p>(c) flammability, lower and higher explosive limits, reactivity;</p> <p>(d) presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapour, dust).</p>		
4	<p>In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below:</p> <p>(a) Optimised storage location;</p> <p>(b) Adequate storage capacity;</p> <p>(c) Safe storage operation;</p>	CC	<p>The Operator confirmed that the facility operates in compliance with the following elements of BAT 4:</p> <p>(a) Optimised storage location – The closest residential receptor is an educational training centre located approximately 20 metres west of the facility, with a number of residential receptors located approximately 300 metres south of the facility, with the predominant land use surrounding the site being</p>

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	(d) Separate area for storage and handling of packaged hazardous waste.		<p>agricultural and areas of open land. The AD and IVC processing equipment and buildings are already in place and existing.</p> <p>AD – Waste storage is located to minimise unnecessary handling of wastes from receipt of waste to the AD process. Organic material separated as a result of waste acceptance procedures is conveyed from the waste reception building (walking floor) to the adjacent autoclave building via a covered conveyor. The Operator confirmed the capacity of the autoclave is matched to the incoming feed from the 'pre-sort' material recycling facility (MRF), removing the need for storage of the organic feed prior to treatment. The organic waste is then charged from the input hopper into the autoclave using a hydraulic ram. Following the autoclave process, the waste is discharged from the autoclave onto another conveyer and transferred to the AD plant for feedstock conditioning and pasteurisation prior to entering the digestion tanks. The Operator confirmed the capacity of the AD process is matched to the autoclave output, therefore, there is no requirement for extended storage prior to anaerobic digestion of this material, with the material being conditioned to generate a slurry which is transferred from a buffer tank to one of three pasteurisation tanks prior to being pumped into one of the three AD process tanks. In summary, the material handling and transfer techniques in place help</p>

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			<p>minimise the need for extended storage of any waste prior to processing, minimise fugitive emissions by means of enclosing waste handling and processing and minimise unnecessary transfer/handling of waste.</p> <p>IVC – Waste storage and processing is arranged to minimise unnecessary handling of wastes from receipt of waste to composting. All of the storage and process activities for the IVC process are contained within a single building (the Composting building), ensuring that storage location and material handling are optimised. Green waste is received in the reception hall where it undergoes acceptance checks and shredding. The shredded green waste is then transferred to one of the Stage 1 composting vessels using a loading shovel, where it remains in a static pile for a set timescale prior to being removed, turned and then loaded into one of the Stage 2 composting vessels. After a two week period in the Stage 2 vessel, the composted material is removed from the vessel and transferred using a loading shovel to the final maturation area (also located within the Composting building) where it is typically kept for two weeks prior to being screened and loaded onto a bulk transporter for off-site transfer. Each of these processes and storage areas are located within a single contained building, and are arranged within the building to minimise unnecessary</p>

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			<p>handling and reducing transfer distances of the material moved throughout the process.</p> <p>(b) Adequate storage capacity – The Operator provided details on the maximum storage capacity (in tonnes and in m³) for both the IVC activity and the AD activity. This included storage capacities for main buildings and also storage tanks/containers.</p> <p>Liquid levels within all storage tanks are continuously monitored by pressure sensors which alert staff in the event of high levels being detected, with alarms sounded to allow necessary actions to be taken to prevent overfilling. This is also supported by regular visual monitoring checks by staff to detect any spillage/leakage. Visual checks are also undertaken on a daily basis for solid waste storage areas to ensure the maximum storage quantities are not exceeded and all waste is stored within the relevant bay.</p> <p>(c) Safe storage operation – The Operator provided a full inventory of plant and equipment used on-site, including a description of where this equipment is used in each treatment process. The Operator confirmed that all infrastructure and equipment is inspected on a regular basis</p>

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			<p>and maintained/repared as required. This is supported by visual checks on all plant and equipment at least once a week. Records of all visual and scheduled inspections and maintenance work are regularly reviewed and maintained.</p> <p>(d) Separate area for storage and handling of packaged hazardous waste - No packaged hazardous wastes are received for either the IVC or the AD treatment process, therefore, this point is considered not applicable.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 4.</p>
5	<p>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.</p> <p>Handling and transfer procedures aim to ensure that wastes are safely handled and transferred to the respective storage or treatment. They include the following elements:</p>	CC	<p>The Operator confirmed that the following techniques are employed at the Installation:</p> <ul style="list-style-type: none"> • Handling and transfer of waste are carried out by competent staff – All operational personnel are trained and familiar with procedures and requirements for activities they conduct on site, including waste handling and transfer activities. The initial visual

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	<ul style="list-style-type: none"> • handling and transfer of waste are carried out by competent staff; • handling and transfer of waste are duly documented, validated prior to execution and verified after execution; • measures are taken to prevent, detect and mitigate spills; • operation and design precautions are taken when mixing or blending wastes (e.g. vacuuming dusty/powdery wastes). <p>Handling and transfer procedures are risk-based considering the likelihood of accidents and incidents and their environmental impact.</p>		<p>inspection undertaken during waste acceptance checks is also carried out by trained personnel.</p> <ul style="list-style-type: none"> • Handling and transfer of waste are duly documented, validated prior to execution and verified after execution – The Operator confirmed that material transfers and movements are documented. It was also confirmed that throughout the composting process effective records are maintained to track the progress of individual batches of waste through the system. • Measures are taken to prevent, detect and mitigate spills – The site manager is responsible for ensuring cleaning up and reporting of any spillage is recorded. The Operator confirmed that all tanks containing potentially polluting substances are constructed so that any leaks or spillages are detected, with tanks being served by secondary containment bunds capable of containing 110% of the volume of the largest tank (as minimum). Tanks are inspected visually on a regular basis by trained staff to ensure continued integrity, as well as identifying any leaks or spillages. Spill kits for absorbing and containing minor spillages are maintained on site, with minor spillages being cleaned up immediately upon detection and the resultant materials placed in a

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			<p>container for off-site disposal. In the event of a major spillage, immediate action will be taken to contain the spillage and prevent any polluting liquids from entering surface water drains and unsurfaced ground.</p> <ul style="list-style-type: none"> • Operation and design precautions are taken when mixing or blending wastes - All waste processing, storage and transfer activities take place within fully enclosed buildings which reduce fugitive emissions from these activities. Prior to waste entering the composting vessels, waste feedstocks are shredded and blended to achieve C:N ratio of between 25:1 and 40:1. As above, these processes are undertaken within the composting building, thus managing the fugitive emissions associated with these activities. Due to the nature of the wastes accepted and handled within both the IVC and AD processes, the associated risks when mixing/blending wastes are limited. <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 5.</p>

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6	<p>For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water 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).</p>	<p>FC</p>	<p>This BAT point applies to both point source emissions to water listed in the permit, W1 and S1:</p> <p>W1 - Site water from hardstanding and roofed areas drain to an attenuation pond before being routed to a reed bed system. Previously, this direct discharge was listed in the permit as an uncontaminated point source emission, however, it has not been demonstrated that the discharge from this source is uncontaminated. We consider this point source as a relevant emission to water due to the possibility of this stream being contaminated. Consequently, we have adopted a precautionary approach and require the Operator to consider W1 in the inventory of waste water streams (to be addressed in response to BAT 3). The Operator is also required to address the elements of BAT 6 for this point source and demonstrate it is compliant with the relevant BAT-AELs for direct discharges to water (Table 6.1 of the BAT Conclusions).</p> <p>Therefore, for point source emission W1, we consider the Installation will be future compliant.</p> <p>S1 – The on-site effluent treatment plan (ETP) treats liquid waste streams from the IVC leachate and centrifuged AD liquor. The Operator holds a trade effluent discharge consent with Yorkshire</p>

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			<p>Water, and confirmed that parameters including waste water flow, pH, TDS and COD are monitored in order to ensure compliance with the trade effluent discharge consent. The Operator is required to consider S1 in the inventory of waste water streams (to be addressed in response to BAT 3). The Operator is also required to address the elements of BAT 6 for this point source and demonstrate it is compliant with the relevant BAT-AELs for indirect discharges to water (Table 6.2 of the BAT Conclusions).</p> <p>Therefore, for point source emission S1, we consider the Installation will be future compliant.</p> <p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 6. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>

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7	<p>BAT is to monitor emissions to water with at least the frequency given in BATc 7, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p>	<p>FC</p>	<p>This BAT point applies to both point source emissions to water listed in the permit, W1 and S1:</p> <p>W1 – This point source emission was previously listed in the permit with no ELVs. As detailed above (BAT 6) the permit has been updated to add the relevant BAT-AELs for direct discharges (Table 6.1 of the BAT Conclusions) and associated monitoring requirements (associated with BAT 20).</p> <p>S1 – This point source emission was previously listed in the permit with no ELVs. As detailed above (BAT 6) the permit has been updated to add the relevant BAT-AELs for indirect discharges (Table 6.2 of the BAT conclusions) and associated monitoring requirements (associated with BAT 20).</p> <p>The monitoring specified above will only apply when the substance concerned is identified as relevant in the waste water inventory in demonstration of compliance with BAT 3.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
			<p>We have included Improvement Condition 1 to ensure the Installation is compliant with the aforementioned ELVs by 17 August 2022, in accordance with BATc 20.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation will be future compliant with BATc 7. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>
8	<p>BAT is to monitor channelled emissions to air with at least the frequency given in BATc 8, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.</p>	FC	<p>BAT 8 is applicable to the following channelled emissions to air at the Installation:</p> <ul style="list-style-type: none"> • EP01 – Bag filter stack • EP02 – Composting plant (barrier 1 biofilter) • EP03 - Composting plant (barrier 2 biofilter) • EP04 – Reception hall (carbon filter) • EP05 – Pre-sort MRF (carbon filter) • EP08 – Autoclave plant (bio-scrubber and carbon polishing) • EP11 – AD plant (bio-scrubber and carbon polishing)

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			<p>The Operator acknowledged in their Regulation 61 response that the current permit monitoring requirements were not consistent with BAT 8. The Operator stated in their Regulation 61 response that monitoring of emissions to air at the Installation has been commissioned for total VOCs (TVOC), H₂S, NH₃ and odour, however, did not specify which point source emission to air this monitoring had been commissioned for.</p> <p>Previously, the only permitted monitoring requirement associated with odour management was for daily olfactory monitoring (detection at site boundary). The permit has been updated as part of this review to add ELVs and associated monitoring requirements for the following parameters, to implement the requirements of BAT 8 (associated with BAT 34) for each of the relevant channelled emissions:</p> <ul style="list-style-type: none"> - Odour concentration - Ammonia - Hydrogen sulphide - Total VOCs - Dust

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			<p>Please note, where a more frequent monitoring frequency was in place prior to this permit review, the more frequent monitoring frequency has been retained in the updated permit.</p> <p>We have included Improvement Condition 1 to ensure the Installation is compliant with the aforementioned ELVs by 17 August 2022, in accordance with BAT 34.</p> <p>Please note, we have also updated the monitoring requirements for the medium combustion plant point sources (EP06, EP07, EP09 and EP10) present at the Installation. For further information please refer to <i>Annex 2: Review and assessment of changes that are not part of the BAT Conclusions derived permit review.</i></p> <p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 8. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>
10	<p>BAT is to periodically monitor odour emissions.</p> <p>Odour emissions can be monitored using:</p>	FC	<p>The Operator acknowledged in their Regulation 61 response that the current permit monitoring requirements were not consistent with BAT 10.</p>

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	<ul style="list-style-type: none"> • EN standards (e.g. dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure); • when applying alternative methods for which no EN standards are available (e.g. estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality. <p>The monitoring frequency is determined in the odour management plan (see BAT 12).</p>		<p>As explained for BAT 8, the permit has been updated as part of this review to add monitoring requirements for odour, ammonia, hydrogen sulphide, dust and total VOCs concentration, to implement the requirements of BAT 8 (associated with BAT 34) for each of the relevant channelled emissions.</p> <p>In the original permit application, the Operator confirmed that odour abatement performance testing would be undertaken annually on all odour control plants in accordance with BS EN 13725, with the monitoring results compared to the plant design emission rates. The update to the permit to include odour emissions monitoring in line with BS EN 13725 will formalise this monitoring requirement in the permit. We have included Improvement Condition 2 to ensure the Installation is compliant with BAT 10 by 17 August 2022.</p> <p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 10. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
11	<p>BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year.</p> <p>Monitoring includes direct measurements, calculation or recording, e.g. using suitable meters or invoices. The monitoring is broken down at the most appropriate level (e.g. at process or plant/Installation level) and considers any significant changes in the plant/Installation.</p>	CC	<p>The Operator confirmed that the annual consumption of water, energy and raw materials is reported on annually, in accordance with their existing permit. This information is also recorded in the Installation's annual report and annual EMS review.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 11.</p>
12	<p>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:</p> <ul style="list-style-type: none"> • 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; 	FC	<p>The odour management plan (OMP) currently listed in the permit is in the process of being reviewed and updated by the Operator, and has been submitted to the Environment Agency (separate to this permit review) for review and approval.</p> <p>We have included Improvement Condition 2 to ensure the Installation's revised OMP is compliant with each of the elements BAT 12 by 17 August 2022.</p>

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	<ul style="list-style-type: none"> 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. 		<p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 12. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>
13	<p>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:</p> <p>(a) Minimising residence times; (b) Using chemical treatment; (c) Optimising aerobic treatment</p>	CC	<p>The Operator confirmed that the site uses a combination of the following techniques:</p> <p>(b) Using chemical treatment; (c) Optimising aerobic treatment.</p> <p>The Operator confirmed that these techniques are applied to the AD and effluent treatment activities, with oxygen and FeCl₂ used to minimise H₂S concentrations associated with the AD process, and effluent treatment being optimised at the anoxic and aerobic stages of the membrane bioreactor (MBR) effluent treatment plant.</p> <p>BAT element (a) minimising residence times only applies to open systems. Therefore, this aspect is not applicable to the IVC and AD activities which are both closed treatment systems.</p>

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			<p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation is currently compliant with BATc 13.</p>
14	<p>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:</p> <p>(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</p>	CC	<p>The Operator confirmed that they use an appropriate combination of the following techniques:</p> <p>(a) Minimising the number of potential diffuse emission sources – Diffuse emission sources from both the AD and IVC activities are minimised by containing these activities (including waste reception, processing and handling) within fully enclosed buildings.</p> <p>The composting areas are completely enclosed and served with fast-acting doors installed and doors kept closed whenever possible to avoid nuisance emissions. The composting tunnels, waste reception hall and finished product storage areas are served by exhaust fans directed to biofilters. The Operator also confirmed that the AD tanks are fully contained, air-tight containers, with all off-gas directed to gas engines to be combusted.</p> <p>(c) Corrosion prevention – The CHP engines used at the Installation employ temperature control within the engine enclosure and</p>

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			<p>components to minimise corrosion. Also, a demineraliser is employed to maintain the quality of boiler feed water to minimise corrosion and fouling.</p> <p>(d) Containment, collection and treatment of diffuse emissions – please refer to BAT element (a) above.</p> <p>(f) Maintenance – The Operator confirmed in their original permit application that a preventative maintenance programme for all equipment would be implemented at the Installation, which follows the inspection and maintenance schedule recommended by the equipment manufacturer. This maintenance programme is reviewed annually to ensure any necessary changes are implemented. Records of all visual and scheduled inspection of any maintenance work will be regularly updated and maintained. An inventory of the items of plant and equipment on site was also provided.</p> <p>(g) Cleaning of waste treatment and storage areas – Hard surfaced areas, including process areas and access roads, are subject to a regular programme of cleaning. Daily visual checks of process areas</p>

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			<p>are undertaken to ensure that the floor is cleaned and any spillages are promptly cleaned up.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 14.</p>
15	<p>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:</p> <p>(a) Correct plant design; (b) Plant management</p>	CC	<p>The Operator confirmed that the single flare present on site serves the AD process and is operated only during non-routine operating scenarios. The Operator also confirmed that gas balancing and gas recovery are features incorporated into the design and operation of this plant.</p> <p>The flare system activation frequency is currently less than five hours per year which is equivalent to less than 0.1% of the Installation's operational hours. The Operator supplied flare activation data to validate this statement.</p>

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			<p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 15.</p>
16	<p>In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below:</p> <p>(a) Correct design of flaring devices; (b) Monitoring and recording as part of flare management</p>	CC	<p>The Operator confirmed that the Installation uses the following techniques consistent with BAT to reduce emissions to air from the existing flare operation:</p> <p>(a) Correct design of flaring device; (b) Monitoring and recording as part of flare management.</p> <p>The Operator confirmed that a range of operating parameters are recorded, including flow and temperature. Since the flare is existing and BAT element (a) is generally applicable to new flares, our review focused on compliance with BAT element (b).</p> <p>The existing permit requires the Operator to report the number of operating hours of the flare annually, and in the event that the flare has been operational for more than 10% of a year (equivalent to 876 hours), annual emissions testing and reporting of NOx, CO and TVOCs emissions are required by the permit. As outlined above for BAT 15, the flare system activation frequency is currently less than five</p>

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			<p>hours per year which is equivalent to less than 0.1 % of the Installation's operational hours.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 16.</p>
17	<p>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:</p> <ul style="list-style-type: none"> 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 	CC	<p>The Operator's original permit application included a H1 risk assessment for noise and vibration and also a noise impact assessment of the risk resulting from the Installation activities on nearby residential receptors, assessing the predicted noise levels in line with BS 4142. These assessments were reviewed at the permit application stage and it was concluded that the noise control techniques proposed were appropriate to minimise any impact from noise and vibration at nearby receptors. It was considered prudent to include an Improvement Condition in the bespoke permit which required the Operator to undertake noise modelling in order to validate the conclusions they had drawn in their application and ensure these were still valid following the commencement of operations on site. It was not considered necessary for the Installation to submit a Noise</p>

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	the sources and to implement prevention and /or reduction measures.		<p>Management Plan following the completion of this Improvement Condition.</p> <p>The permit also contains conditions that, should noise become an issue, requires the Operator to submit a Noise Management Plan.</p> <p>The applicability of BAT 17 is restricted to cases where a noise/vibration nuisance at sensitive receptors is expected and/or has been substantiated in the past. No noise incidents have been recorded, therefore, we do not consider BAT 17 to be applicable to this Installation at this moment in time.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 17.</p>
18	<p>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:</p> <p>(a) Appropriate location of equipment and buildings; (b) Operational measures; (c) Low noise-equipment;</p>	CC	<p>The Operator confirmed that they use a combination of the following techniques:</p> <p>(b) Operational measures – Waste storage and treatment buildings are constructed to attenuate noise from the site’s operation, with fast-acting doors installed and doors kept closed whenever possible. All</p>

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	(d) Noise and vibration equipment; (e) Noise attenuation		<p>site personnel are trained in the need to minimise site noise and are responsible for monitoring and reporting excessive noise when undertaking everyday duties.</p> <p>Records relating to the management and monitoring of noise are maintained, including inspections undertaken, noise problems experienced, complaints received and corrective actions taken and changes to operational procedures to prevent future occurrences.</p> <p>(c) Low noise-equipment – The Operator confirmed that quiet plant options are used wherever possible to ensure noise is kept to a minimum. Noise producing plant and equipment is maintained regularly to minimise the noise resulting from deterioration and inefficient operation. If any items of plant give rise to unacceptable noise levels, consideration is given to their replacement with quieter options.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 18.</p>

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19	<p>In order to optimise water consumption, to reduce the volume of waste water 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:</p> <ul style="list-style-type: none"> (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 	FC	<p>The Operator committed to reviewing the applicability of BATc 19 techniques (a) to (i) as part of the review of opportunities to improve the efficiency of water use required by permit condition 1.3.1(c). The Operator confirmed they will implement any applicable further techniques for water management prior to 17 August 2022 subject to Environment Agency agreement.</p> <p>We have included Improvement Condition 2 to ensure the Installation is future compliant with each of the elements of BATc 19 by 17 August 2022.</p> <p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 19. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>
20	<p>In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below:</p>	FC	<p><u>Discharge arising from on-site effluent treatment plant</u></p> <p>The Operator provided details in the original permit application on the techniques used to treat the waste water streams generated at the</p>

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	<p>Preliminary and primary treatment, e.g. (a) Equalisation (b) Neutralisation (c) Physical separation, e.g. screens, sieves, grit separators, grease separators, oil-water separation or primary settlement tanks</p> <p>Physico-chemical treatment, e.g. (d) Adsorption (e) Distillation /rectification (f) Precipitation (g) Chemical oxidation (h) Chemical reduction (i) Evaporation (j) Ion exchange (k) Stripping</p> <p>Biological treatment, e.g. (l) Activated sludge process (m) Membrane bioreactor (n) Nitrification / denitrification when the treatment includes a biological treatment</p>	<p>FC BATc 20 - BAT-associated emission levels (BAT-AELs) for indirect discharges to a receiving water body.</p>	<p>facility. For waste water, the Installation employs a membrane bioreactor (MBR) system which includes the following:</p> <ul style="list-style-type: none"> • Balance and blending tank with inlet screen mounted above the tank with solids and debris discharging to a skip; • Pre-treatment for TSS/COD and NH₄ reduction; • Solids into a storage tank and then passed regularly to the downstream micro filter for separation and dewatering with the solids collected in a skip for disposal back into the AD plant; • Anoxic tank for alkalinity recovery and some oxygen recovery; • High rate nitrification reactors; • Final effluent Baleen micro filter to polish effluent and recycle sludge to the anoxic tank; • Chemical dosing for pH correction. <p>We are satisfied that the Installation employs a suitable combination of treatment techniques for the effluent treatment plant in line with the BAT criteria.</p> <p>The permit has been updated as part of this review to add ELVs (indirect discharges, BAT Table 6.2) and associated monitoring requirements for the discharge from the effluent treatment plant. For further details please refer to the summary provided in response to BATc 7.</p>

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	<p>Solids removal, e.g. (o) Coagulation and flocculation (p) Sedimentation (q) Filtration (e.g. sand filtration, microfiltration, ultrafiltration) (r) Flotation</p> <p>See also: Table 6.1: BAT-associated emission levels (BAT-AELs) for direct discharges to a receiving water body</p> <p>See also: Table 6.2: BAT-associated emission levels (BAT-AELs) for indirect discharges to a receiving water body</p>	<p>FC BATc 20 - BAT-associated emission levels (BAT-AELs) for direct discharges to a receiving water body</p>	<p><u>Discharge arising from potentially polluted surface water</u></p> <p>As explained above for BATc 6, it has not been demonstrated that the discharge from this source is uncontaminated. We consider this point source as a relevant emission to water due to the possibility of this stream being contaminated.</p> <p>Therefore, we have adopted a precautionary approach and require the Operator to consider W1 in the inventory of waste water streams (to be addressed in response to BATc 3). Consequently, we consider that the Installation will be future compliant with the requirements of BATc 20 and the associated BAT-AELs as outlined in Table 6.1 of the Waste Treatment BAT Conclusions.</p> <p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 20.</p> <p>Improvement condition 1 is incorporated into the permit which addresses BATc 20 Table 6.1 BAT-associated emission levels (BAT-AELs) for direct discharges and Table 6.2 BAT-AELs for indirect discharges to a receiving water body (see Annex 3).</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
21	<p>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):</p> <p>(a) Protection measures; (b) Management of incidental /accidental emissions; (c) Incident /accident registration and assessment system</p>	CC	<p>The Operator confirmed that BAT techniques (a)-(c) are in place at the facility. The Operator supplied an Accident Management Plan (AMP) with their original application which details actions the site will take to minimise the potential causes and consequences of accidents. The AMP covers the following (a) Protection measures:</p> <ul style="list-style-type: none"> • A list of substances that would harm the environment if they were to escape will be maintained; • Raw materials and waste will be checked for compatibility with other substances with which they may come into contact; • Raw materials, products and wastes will be stored to prevent their escape into the environment; • Where appropriate, barriers will be constructed to prevent vehicles from damaging equipment; • Primary and secondary containment will be provided to prevent the escape of potentially polluting materials; • Tanks for the containment of fuels will be fitted with level measurements to prevent overfilling; • Closed circuit television (CCTV) and site security to minimise the risk of unauthorised access; • Responsibilities for managing accidents will be clearly defined.

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			<ul style="list-style-type: none"> • Clear instructions on the appropriate equipment will be maintained to limit the consequences of an accident. <p>Additionally, this plan includes a review of hazards identified at the Installation, and corresponding risk reduction measures/techniques, which covers the following hazards:</p> <ul style="list-style-type: none"> • Unauthorised waste receipt and processing; • Plant failure; • Fire; • Explosion; • Asphyxiation and toxicity; • Loss of containment – spillage and leakage; • Security and vandalism; and • Flooding. <p>(b) Management of incidental/accident emissions – The Operator supplied a copy of the Installation’s Emergency, Disaster Recovery and Business Continuity Procedure which documents the procedures in place to manage accidents/incidents which result in environmental release of substances harmful to the environment.</p>

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			<p>With regards to how the environmental risk associated with firewater is controlled, the controls and procedures in place are documented in the Installation's Fire Prevention Plan (FPP). The Installation's FPP was recently reviewed and approved by the Environment Agency.</p> <p>(c) Incident /accident registration and assessment system – The Operator confirmed that a record of all incidents and near misses is maintained for the Installation.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 21.</p>
22	<p>In order to use materials efficiently, BAT is to substitute materials with waste.</p> <p>Waste is used instead of other materials for the treatment of wastes (e.g. waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders).</p>	NA	<p>The Operator confirmed that the current resource efficiency permit conditions comply with BAT and there are no immediately obvious opportunities to replace materials with waste. We agree that this BAT point is not currently applicable to the Installation.</p> <p><u>Environment Agency assessment</u> We are satisfied that BATc 22 is not applicable to this Installation.</p>

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23	<p>In order to use energy efficiently, BAT is to use both of the techniques given below:</p> <p>(a) Energy efficiency plan; (b) Energy balance record</p>	FC	<p>(a) Energy efficiency plan – The Operator confirmed that the Installation is currently compliant with the Energy Efficiency permit condition and that the Installation is also part of an Energy Saving Opportunities Scheme (ESOS), which helps identify opportunities to improve energy use/efficiency at the Installation.</p> <p>However, the Operator confirmed that these energy efficiency plans, including key performance indicators and planned improvements, are not consolidated into a single plan. To address this element of BATc 23, the Operator confirmed that a documented energy efficiency plan will be prepared and targets and objectives set and reviewed.</p> <p>(b) Energy efficiency – The Operator did not confirm that the Installation currently complies with this element of BATc 23. However the Operator confirmed that an energy balance for the Installation will be prepared to address this aspect.</p> <p>We have included Improvement Condition 2 to ensure BATc 23 is addressed by 17 August 2022.</p>

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			<p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 23. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>
24	<p>In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging, as part of the residues management plan (see BAT 1).</p> <p>Packaging (drums, containers, IBCs, pallets, etc.) is reused for containing waste, when it is in good condition and sufficiently clean, depending on a compatibility check between the substances contained (in consecutive uses). If necessary, packaging is sent for appropriate treatment prior to reuse (e.g. reconditioning, cleaning).</p>	CC	<p>The Operator confirmed that packaging items resulting from the Installation's activities are reused and recycled where possible. Examples provided for the Installation include:</p> <ul style="list-style-type: none"> • Empty IBCs are collected by the supplier to allow them to be re-used; • Empty 25 litres chemical drums are collected by a third party for recycling; • Used lab chemical cuvettes are collected by the supplier for recycling. <p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation is currently compliant with BATc 24.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
33	<p>In order to reduce odour emissions and to improve the overall environmental performance, BAT is to select the waste input.</p> <p>The technique consists of carrying out the pre-acceptance, acceptance and sorting of the waste input (see BAT 2) so as to ensure the suitability of the waste input for the waste treatment, e.g. in terms of nutrient balance, moisture or toxic compounds which may reduce the biological activity.</p>	CC	<p>The Operator confirmed that only municipal solid waste (MSW), mixed dry recyclates and green waste is received and treated at the Installation.</p> <p>Please refer to the waste acceptance checks and sorting procedures summarised for both the IVC and AD waste inputs (BAT 2) that are in place to ensure that only suitable wastes are input into both processes.</p> <p>Additionally, as part of this permit review, we have reviewed and updated the permitted waste types for both the IVC and AD activity to ensure the waste types permitted are in accordance with the current permit templates for both activities, thus ensuring the waste types permitted are suitable for treatment in these processes.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 33.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
34	<p>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:</p> <ul style="list-style-type: none"> (a) Adsorption; (b) Biofilter; (c) Fabric filter; (d) Thermal oxidation; (e) Wet scrubbing <p>See also: Table 6.7: BAT-associated emission levels (BAT-AELs) for channelled NH₃, odour, dust and TVOC emissions to air from the biological treatment of waste.</p>	CC	<p>The Operator confirmed that the following techniques are employed at the Installation for the IVC and AD activities:</p> <p>(a) Adsorption – carbon filters serving the waste reception hall, autoclave emissions, and AD emissions (mixing tank and holding tank). Applicable point sources – EP04, EP05, EP08 and EP11.</p> <p>(b) Biofilter – separate biofilters serve each of the two composting stages of the IVC process. Applicable point sources – EP02 and EP03.</p> <p>(e) Wet scrubbing – separate bio-scrubbing abatement systems serve the autoclave and the AD process. Applicable point sources – EP08 and EP11.</p> <p>The Operator confirmed that the BAT-AEL for NH₃ could be complied with at the Installation based on historical monitoring data. However, the Operator stated that the performance of the two biofilters serving the composting vessels were not consistently compliant with the BAT-AEL range for odour concentration.</p> <p>The Operator is currently investigating the performance of the Installation through an Operator instigated continuous improvement programme. As part of this improvement programme, the Operator confirmed they will commission a BAT design review of the odour abatement systems serving the Installation, with proposals for any</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
		<p>FC (BATc 34, Table 6.7)</p>	<p>improvements to be submitted to the Environment Agency by 31 December 2020.</p> <p>The previous permit included daily olfactory monitoring for all waste treatment buildings, and also a condition which required the submission of an odour efficiency report for the biofilters serving the IVC process. However, there was no permitted requirements for NH₃, H₂S and quantitative odour monitoring and reporting of emissions to air. As part of this permit review, we have included the relevant ELVs and monitoring requirements (as per Table 6.7 of the BAT Conclusions).</p> <p>In summary, we are satisfied that the Installation employs a suitable combination of abatement techniques in line with the BAT criteria.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 34.</p> <p>Improvement condition (IC1) has been included in the permit to achieve compliance with the relevant BAT-AELs, as specified in Table 6.7 of the BAT Conclusions. The operator is required to complete the</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
			<p>improvement condition and demonstrate compliance with BAT-AEL by the compliance date, 17 August 2022.</p> <p>In addition to the BAT-AEL, we have inserted the requirement to monitor odour concentration, hydrogen sulphide and ammonia in Table S3.4 (process monitoring).</p> <p>As part of the Environment Agency approach to reduce emissions in the Biowaste Treatment sector, we have included the following improvement conditions:</p> <p><u>Improvement condition for the review of effectiveness of abatement plant</u></p> <p>Improvement condition 5 (IC5) requires the operator to review abatement plant on site, in order to determine whether existing measures have been effective and adequate to prevent and /or minimise emissions released to air. Where further improvements are identified, the operator is required to implement these measures.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
			<p><u>Improvement condition for the review of abatement plant design</u></p> <p>Improvement condition 6 (IC6) requires the operator to review the design of the site ventilation system and abatement plant in order to determine whether it is fit for purpose and effective in controlling odorous compounds in the air streams from site processes. Where further improvements are identified, the operator is required to implement these measures.</p>
35	<p>In order to reduce the generation of waste water and to reduce water usage, BAT is to use all of the techniques given below:</p> <p>(a) Segregation of water streams; (b) Water recirculation; (c) Minimisation of the generation of leachate</p>	FC	<p>The Operator confirmed that the Installation employs BAT techniques (a) to (c) to reduce wastewater where appropriate on-site and that the Installation reports on its resource use through annual report returns required by their previous permit.</p> <p>The Operator acknowledged that there may be opportunities for further improvement and confirmed that they will specifically include the requirements of BATc 35 into the annual resource efficiency review, and will forward the findings of this review onto the Environment Agency.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
			<p><u>Environment Agency assessment</u></p> <p>We are satisfied that the Installation will be future compliant with BATc 35. Improvement condition 2 has been included in the permit to achieve compliance (see Annex 3).</p>
36	<p>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.</p> <p>Monitoring and/or control of key waste and process parameters, including:</p> <ul style="list-style-type: none"> • waste input characteristics (e.g. C to N ratio, particle size); • temperature and moisture content at different points in the windrow; • aeration of the windrow (e.g. via the windrow turning frequency, O₂ and/or CO₂ concentration in the windrow, temperature of air streams in the case of forced aeration); • windrow porosity, height and width. 	CC	<p>The Operator confirmed that process parameters are controlled and recorded by the automated SCADA system. The following key parameters and process parameters are controlled:</p> <ul style="list-style-type: none"> • Waste input characteristics (e.g. C to N ratio, particle size) – The feedstock for the composting process are blended to achieve a C:N ratio of 25:1 to 40:1, and that particle size is controlled by means of a shredder which is used for size reduction and to create a more consistent bulked materials to input into the composting process. • Temperature and moisture content – Moisture testing (squeeze test) is undertaken prior to loading and blending of feedstock to ensure suitable for composting. Also, constant temperature and oxygen monitoring is undertaken within the composting vessels to inform any necessary adjustments to the aeration rates. Temperature, oxygen and moisture content are also monitored during the maturation phase;

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
			<ul style="list-style-type: none"> • Aeration of the windrow – Continuous oxygen monitoring (by means of oxygen probes in each vessel) is undertaken to inform the aeration rate required for each composting vessel. • Windrow porosity, height and width – Windrow porosity is controlled by maintaining a consistent particle size by means of waste shredding prior to input into the composting vessels. Windrow height and width are based on the dimensions of the composting vessels and marked storage areas. Composting tunnels are loaded with loading shovel from back to front ensuring an even fill level across the tunnel width and height. <p>The relevant monitoring requirements have also been specified in Table S3.4 (Process monitoring requirements) of the permit.</p> <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 36.</p>
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:	NA	The Operator stated in their response that they do not consider this BATc point to be applicable to the Installation activities they undertake.

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
	<p>(a) Use of semi permeable membrane covers; (b) Adaptation of operations to the meteorological conditions</p>		<p>(a) Use of semi permeable membrane covers – We agree that this is not applicable since the relevant waste treatment activities are undertaken within enclosed buildings;</p> <p>(b) Adaptation of operations to the meteorological conditions – As for (a), since all waste treatment activities are undertaken within enclosed buildings, this element of BATc 37 is not applicable to the Installation.</p> <p><u>Environment Agency assessment</u> We are satisfied that BATc 37 is not applicable to this Installation.</p>
38	<p>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.</p> <p>This includes monitoring and/or control of key waste and process parameters:</p> <ul style="list-style-type: none"> • pH and alkalinity of the digester feed; • digester operating temperature; • hydraulic and organic loading rates of the digester feed; 	CC	<p>The Operator confirmed that they operate in compliance with BATc 38 and that site operations are controlled and monitored by a Supervisory SCADA system which provides a range of control and monitoring functions that automate and monitor actions throughout the autoclave and AD plant.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
	<ul style="list-style-type: none"> • concentration of volatile fatty acids (VFA) and ammonia within the digester and digestate; • biogas quantity, composition (e.g. H₂S) and pressure; • liquid and foam levels in the digester. 		<p>The Operator provided information which confirmed the following key waste and process parameters are monitored using the SCADA system:</p> <ul style="list-style-type: none"> • pH and alkalinity of the digester feed; • Digester operating temperature; • Hydraulic and organic loading rates of the digester feed; • Concentration of volatile fatty acids (VFA) within the digester; • Biogas quantity, composition (methane and hydrogen sulphide) and pressure; • Liquid levels in the digester. <p><u>Environment Agency assessment</u> We are satisfied that the Installation is currently compliant with BATc 38.</p>
39	<p>In order to reduce emissions to air, BAT is to use both of the techniques given below:</p> <p>(a) Segregation of the waste gas streams; (b) Recirculation of waste gas</p>	FC	<p>This BATc is specifically for MBT Installations. The Operator stated that they did not consider BATc 39 to apply to the technology employed at the site, however, as the Installation undertakes MBT, we would expect this BATc to be addressed in greater detail.</p>

BAT Conclusion No	Summary of BAT Conclusion requirement for Waste Treatment	Status NA/ CC / FC / NC	Assessment of the Installation capability and any alternative techniques proposed by the Operator to demonstrate compliance with the BAT Conclusion requirement
			<p>The Operator did not provide sufficient explanation to justify that this BATc does not apply to the Installation, therefore, we have included Improvement Condition 2 to ensure that BATc 39 is fully addressed by the Operator.</p> <p><u>Environment Agency assessment</u> We are satisfied that the installation will be future compliant with BATc 39.</p>

Annex 2: Review and assessment of changes that are not part of the BAT Conclusions derived permit review

Existing Medium Combustion Plant

The Operator provided information on all combustion plant on site with respect to:

- Number of combustion plant (CHP engines, back-up generators, boilers);
- Size of combustion plant – rated thermal input (MWth);
- Date each combustion plant came into operation;
- Confirmation as to whether or not the combustion plant is subject to a capacity market agreement (2014 or 2015 auction) or whether or not a Feed-in Tariff preliminary accreditation application was received prior to 1 December 2016.

The information is provided in the table(s) below:

CHP engines

1. Rated thermal input (MW) of the medium combustion plant.	2x 2.8 MWth each
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	Biogas fuelled combined heat and power (CHP) engines
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	Biogas
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	21 July 2016
5. Confirmation of capacity market agreement arising from 2014 or 2015 capacity auctions.	--
6. Confirmation of Feed-in Tariff preliminary accreditation application received by the Gas and Electric Markets Authority prior to 1 December 2016.	1 July 2017

Boilers

1. Rated thermal input (MW) of the medium combustion plant.	2x 1.24 MWth each
2. Type of the medium combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	Gas fuelled boiler
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	Natural gas or biogas
4. Date of the start of the operation of the medium combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	21 July 2016
5. Confirmation of capacity market agreement arising from 2014 or 2015 capacity auctions.	NA
6. Confirmation of Feed-in Tariff preliminary accreditation application received by the Gas and Electric Markets Authority prior to 1 December 2016.	NA

We have reviewed the information provided and we consider that the declared combustion plant qualify as “existing” medium combustion plant.

For existing MCP with a rated thermal input of less than or equal to 5 MW, the emission limit values set out in tables 1 and 3 of Part 1 of Annex II MCPD shall apply from 1 January 2030.

We have not amended any emission limit values for existing medium combustion plant as part of this permit review. We have added the sulphur dioxide emission limit for medium combustion plant, however this emission limit value applies from 1 January 2030, unless otherwise advised by the Environment Agency.

We have included improvement condition 7 in the permit which requires the operator to assess methane slip resulting from the combustion of biogas via the CHP engines. Following an assessment of the data, the Environment Agency shall consider whether or not emission limits for volatile organic compounds are applicable for this installation.

Bioaerosols monitoring requirements

The Operator provided information regarding bioaerosols monitoring in their response to the Regulation 61 Notice. We carried out an assessment of the site location and the distance of site processes from sensitive receptors as part of this determination.

There are no external site operational processes within 250 metres of a sensitive receptor. The site does not operate an open bed biofilter within 250 metres of a sensitive receptors.

Therefore, it was not necessary to include the bioaerosols monitoring requirements in the updated permit as part of this permit review.

Soil & groundwater risk assessment (baseline report)

The IED requires that the Operator of any IED Installation using, producing or releasing “relevant hazardous substances” (RHS) shall, having regarded the possibility that they might cause pollution of soil and groundwater, submit a “baseline report” with its permit application. The baseline report is an important reference document in the assessment of contamination that might arise during the operational lifetime of the regulated facility and at cessation of activities. It must enable a quantified comparison to be made between the baseline and the state of the site at surrender.

At the definitive cessation of activities, the Operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into account both the baseline conditions and the site’s current or approved future use. To do this, the Operator has to submit a surrender application to us, which we will not grant unless and until we are satisfied that these requirements have been met.

The Operator submitted a site condition report (*South Kirkby Waste Management Facility, Site Condition Report, SLR Ref - 412-01796-00031/SCR*, dated February 2012) during the original application received on 10 February 2012. The site condition

report included a report on the baseline conditions as required by Article 22. We reviewed that report and considered that it adequately described the condition of the soil and groundwater at that time.

The Operator submitted a summary report which referenced the site condition report and baseline report. We have reviewed the information and we consider that it adequately describes the condition of the soil and groundwater. Consequently, we are satisfied that the baseline condition has not changed.

Waste types

We have specified the permitted waste types, descriptions and quantities, which can be accepted at the regulated facility.

We are satisfied that the Operator can accept these wastes for the following reasons:

- they are suitable for the proposed activities
- the proposed infrastructure is appropriate
- the environmental risk assessment is acceptable.

The following waste codes (included in the previous permit) are not specified in our revised biowaste treatment permit templates. The operator confirmed in writing (correspondence dated 13 October 2020) that the following waste codes could be removed from the permit:

Relevant to the IVC activity:

- 17 02 01 - Wood
- 19 08 05 - Sludges from treatment of urban waste water
- 19 12 07 - Wood other than that mentioned in 19 12 06
- 20 01 38 - Wood other than that mentioned in 20 01 37

Relevant to the Anaerobic Digestion activity:

- 02 06 02 – Wastes from preserving agents
- 03 01 01 - Waste bark and wood – untreated only
- 03 01 05 - Sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04 – untreated wood only
- 03 03 02 - Green liquor sludge
- 03 03 08 - Paper and cardboard – not allowed if any non-biodegradable coating or preserving substance is present
- 03 03 10 - Fibre rejects and sludges i.e. paper pulp (de-inked only), paper fibre
- 03 03 11 - Sludges from on-site effluent treatment other than those mentioned in 03 03 10
- 04 01 01 - Fleshings and lime split wastes
- 04 01 05 - Tanning liquor free of chromium
- 04 01 07 – Sludges not containing chromium
- 19 02 10 - Glycerol not designated as hazardous i.e. excludes EWC code 19 02 08
- 19 05 01 - Non-composted fraction of municipal and similar wastes – acceptable only if derived solely from input types allowed by the AD Quality Protocol and remains segregated from, and uncontaminated by, any other waste type
- 19 05 02 - Non-composted fraction of animal and vegetable waste – acceptable only if derived solely from input types allowed by the AD Quality Protocol and remains segregated from, and uncontaminated by, any other waste type

- 19 05 03 - Off-specification compost – acceptable only if derived solely from input types allowed by the AD Quality Protocol and remains segregated from, and uncontaminated by, any other waste type
- 20 01 38 - Untreated wood where no non-biodegradable coating or preserving substance is present

The following waste codes (included in the previous permit) are not specified in our revised biowaste treatment permit templates. The operator confirmed in writing (correspondence dated 22 September 2020) that the following waste codes could be removed from the permit:

- 02 02 99 – Sludges from gelatine production
- 02 03 99 – Sludges from production of edible fats and oils, seasoning residues, molasses residues, residues from production of potato, corn or rice starch only
- 02 04 99 – Other wastes
- 02 07 99 – Spent grains, hops and whisky filter sheets/cloths, yeast and yeast-like residues, sludge from production process.

We made these decisions with respect to waste types in accordance with Framework Guidance Note – *Framework for assessing suitability of wastes going to anaerobic digestion, composting and biological treatment* (July 2013).

Secondary containment and storage infrastructure

Risk assessment for secondary containment and storage lagoons

We assessed secondary containment as part of the permit review. In the Regulation 61 Notice, we asked the Operator to:

- a) describe any secondary containment and whether it currently meets the relevant standard in the “Containment systems for the prevention of pollution (C736)” report, where the activity has above-ground storage or primary containment.
- b) describe how the construction of any storage lagoons meet CIRIA 736 report.
- c) explain why the current design and construction of the secondary containment is fit for purpose, and enable a baseline standard so as to establish a quantified comparison where it is concluded that secondary containment is not required or does not need to meet the standards in the C736 report.
- d) confirm if any storage lagoons on site are covered to prevent emission loss.
- e) confirm that the operational storage capacity on site provides a minimum of two months storage.

The Operator confirmed that:

- Details of the site secondary containment arrangements and application of CIRIA C736 standards were provided when the installation was originally permitted, and that they consider the containment arrangements are consistent with the level of risk posed by the installation activities;
- There are no storage lagoons at the installation other than for uncontaminated surface water;

- The Operator does not consider there to be any deviations from the applicable CIRIA C736 standards in the current containment arrangement.

Having reviewed the information provided by the Operator in the original bespoke permit application, we did not find any specific reference to the CIRIA C736 standards. The Operator did not provide a detailed risk assessment for the existing secondary containment as part of the Regulation 61 response.

The Operator did not provide any evidence to support the statement that the existing secondary containment meets the CIRIA 736 standards. We have therefore set Improvement Conditions in the permit to address this aspect of the permit review.

Improvement Condition 3 requires the Operator to submit a site secondary containment plan within 12 months of the permit issue. The plan shall contain details of:

- the condition and extent of the site secondary containment and storage systems, where all polluting liquids and solids are being stored, treated, and/or handled;
- individual improvement measures necessary for the site secondary containment and storage systems to adhere to the standards detailed/referenced within CIRIA C736 (2014), or equivalent.
- timescales for implementation of the individual measures

Improvement Condition 3 requires the Operator to implement the secondary containment and storage plan within the timescales approved by the Environment Agency.

Primary Containment

We assessed primary containment as part of the permit review. This information was not requested in the Regulation 61 Notice issued to the Operator, however, it was considered prudent to address this aspect as part of the permit review process. In this instance, the required information relating to the review of primary containment infrastructure against CIRIA C535 was not previously submitted to the Environment Agency, nor was it included in the supporting documentation submitted by the Operator in their Regulation 61 response.

We have therefore set an Improvement Condition (IC4) in the permit to address this aspect of the permit review. See Improvement condition 4 in Annex 3 of this decision document.

Annex 3: Improvement Conditions

Based on the information in the Operator's Regulation 61 Notice response and our own records of the capability and performance of the installation at this site, we consider that we need to set Improvement Conditions so that the outcome of the techniques detailed in the BAT Conclusions are achieved by the installation. These Improvement Conditions are set out below – justifications for them are provided at the relevant section of the decision document (Annex 1 or Annex 2).

If the consolidated permit contains existing Improvement Conditions that are not yet complete or the opportunity has been taken to delete completed Improvement Conditions then the numbering in the table below will not be consecutive as these are only the Improvement Conditions arising from this permit variation.

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
Improvement condition for progress report to achieve BAT-AELs		
IC1	<p>The Operator shall submit, for approval by the Environment Agency, a report setting out progress to achieving the Best Available Techniques Conclusion Associated Emission Levels (BAT-AELs) where BAT is currently not achieved, but will be achieved before 17 August 2022. The report shall include, but not be limited to, the following:</p> <ol style="list-style-type: none"> 1) Current performance against the BAT-AELs. 2) Methodology for reaching the BAT-AELs. 3) Associated targets /timelines for reaching compliance by 17 August 2022. 4) Any alterations to the initial plan (in progress reports). <p>The report shall address the BAT Conclusions for Waste Treatment with respect to the following:</p> <ul style="list-style-type: none"> • BAT 20 Table 6.1 (compliance with BAT-AELs for direct discharges to a receiving water body) • BAT 20 Table 6.2 (compliance with BAT-AELs for indirect discharges to a receiving water body) • BAT 34 Table 6.7 (compliance with BAT-AELs for channelled NH₃, odour, dust and TVOC emissions to air from the biological treatment of waste) <p>Refer to BAT Conclusions for a full description of the BAT requirement.</p>	<p>Progress reports at six monthly intervals from date of permit issue:</p> <p>12/05/2021</p> <p>12/11/2021</p> <p>12/05/2022</p>

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
Improvement condition for progress report to achieve Narrative BAT		
IC2	<p>The Operator shall submit, for approval by Environment Agency, a report setting out progress to achieving the 'Narrative' BAT where BAT is currently not achieved, but will be achieved before 17 August 2022. The report shall include, but not be limited to, the following:</p> <ol style="list-style-type: none"> 1) Methodology for achieving BAT 2) Associated targets /timelines for reaching compliance by 17 August 2022 3) Any alterations to the initial plan (in progress reports). <p>The report shall address the BAT Conclusions for Waste Treatment with respect to BAT 1, 2, 3, 6, 7, 8, 10, 12, 19, 23, 35 and 39.</p>	<p>Progress reports at six monthly intervals from date of permit issue:</p> <p>12/05/2021 12/11/2021 12/05/2022</p>
Improvement condition for secondary containment		
IC3	<p>The operator shall submit a written 'secondary and tertiary containment plan' and shall obtain the Environment Agency's written approval to it. The plan shall contain the results of a review conducted, by a competent person, in accordance with the risk assessment methodology detailed within CIRIA C736 (2014) guidance, of the condition and extent of secondary and tertiary containment systems where all polluting liquids and solids are being stored, treated, and/or handled.</p> <p>The review shall consider, but not be limited to, the storage vessels, bunds, loading and unloading areas, transfer pipework/pumps, temporary storage areas, and liners underlying the site. The plan must contain dates for the implementation of individual improvement measures necessary for the secondary and tertiary containment systems to adhere to the standards detailed/referenced within CIRIA C736 (2014) guidance, or equivalent.</p> <p>The plan shall be implemented in accordance with the Environment Agency's written approval.</p>	<p>12/11/2021 or other date as agreed in writing with the Environment Agency</p>
Improvement condition for primary containment		
IC4	<p>The operator shall submit a written 'primary containment plan' and shall obtain the Environment Agency's written approval to it. The plan shall contain the results of a review conducted, by a competent person, and shall compare the design specification of primary containment systems where all polluting liquids and solids are being stored, treated, and/or</p>	<p>12/11/2021 or other date as agreed in writing with the Environment Agency</p>

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
	<p>handled against the design standards within CIRIA C535 guidance or equivalent.</p> <p>The review shall include:</p> <ul style="list-style-type: none"> • physical condition of all primary containment systems (storage and treatment vessels); • the suitability for providing primary containment when subjected to the dynamic and static loads caused by the vessels' contents; • any work required to ensure compliance with the standards set out in CIRIA C535 or equivalent; and • a preventative maintenance and inspection regime <p>The plan must contain dates for the implementation of individual improvement measures necessary for the primary containment to adhere to the standards detailed/referenced within CIRIA C535 guidance, or equivalent.</p> <p>The plan shall be implemented in accordance with the Environment Agency's written approval.</p>	
Improvement condition for review of effectiveness of abatement plant		
IC5	<p>The operator shall carry out a review of the abatement plant on site, in order to determine whether the measures have been effective and adequate to prevent and where not possible minimise emissions released to air including but not limited to odour and ammonia.</p> <p>The operator shall submit a written report to the Environment Agency following this review for assessment and approval.</p> <p>The report shall include but not limited to the following aspects:</p> <ul style="list-style-type: none"> • Full investigation and characterisation of the waste gas streams. • Abatement stack monitoring results (not limited to odour and ammonia) • Abatement process monitoring results (not limited to odour and ammonia) • Details of air quality quantitative impact assessment including modelling and a proposal for site-specific "action levels" (not limited to odour concentration, hydrogen sulphide and ammonia). 	12/11/2021 or other date as agreed in writing with the Environment Agency

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
	<ul style="list-style-type: none"> • Odour monitoring results at the site boundary • Records of odour complaints and odour related incidents • Recommendations for improvement including the replacement or upgrading the abatement plant • Timescales for implementation of improvements to the abatement plant <p>The operator shall implement the improvements in line with the timescales as approved by the Environment Agency.</p>	
Improvement condition for review of abatement plant design		
IC6	<p>The operator shall submit to the Environment Agency a written review report of the design details of the site ventilation system and abatement plant and obtain the Environment Agency's written approval to it.</p> <p>The report shall include but not limited to:</p> <ul style="list-style-type: none"> a) Ventilation design performance criteria for effective fugitive odorous emission control b) Design of the abatement systems that will ensure compliance with the odour condition 3.3. The report shall include a demonstration (whether by a detailed review of technical papers or by trial results) that all odorous chemical compounds and their loading rates expected in the relevant air streams have been considered in the design; and supporting evidence that the odorous compounds will be controlled and/or abated either by operating techniques or by the proposed abatement systems. c) Design alarms and triggers for each relevant scenario to alert the operator to the malfunction of both ventilation and abatement systems. The report should further list all relevant contingency mitigation actions to minimise risk of elevated odour pollution from the installation linked to each malfunction scenario and detail the actions to restore 	12/11/2021 or other date as agreed in writing with the Environment Agency

Table S1.3 Improvement programme requirements		
Reference	Requirement	Date
	<p>systems to normal operating conditions for effective odour control.</p> <p>Ventilation and abatement systems should be designed by suitably qualified named engineers who can supervise and sign-off on construction quality assurance.</p>	
Improvement condition for assessment of methane slip		
IC7	The operator shall establish the methane emissions in the exhaust gas from engines burning biogas and compare these to the manufacturer's specification and benchmark levels agreed in writing with the Environment Agency. The operator shall, as part of the methane leak detection and repair (LDAR) programme, develop proposals to assess the potential for methane slip and take corrective actions where emissions above the manufacturer's specification or appropriate benchmark levels are identified.	12/11/2021 or other date as agreed in writing with the Environment Agency