Environment Agency decision document consisting of :

Part A – Environment Agency 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; and

Part B - Permitting decision, Operator normal variation application

Part A - Environment Agency 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

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

The Permit number is:	EPR/YP3404SE
The Operator is:	Medisort Limited
The Installation is:	Hillingdon Clinical Waste Incinerator
This Variation Notice number is:	EPR/YP3404SE/V003

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 of updated decisions on best available techniques (BAT) conclusions.

We have reviewed the permit for this installation against the revised BAT Conclusions for waste incineration published on 3rd December 2019. This is our decision document, which explains the reasoning for the consolidated variation notice that we are issuing. This review has been undertaken with reference to the decision made by the European Commission establishing best available techniques (BAT) conclusions (BAT conclusions) for incineration as detailed in document reference C(2019) 7987. 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.

It explains how we will ensure that the installation complies with the BAT conclusions by 3rd December 2023/upon recommissioning. 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 ensuring that the Installation complies with the BAT conclusions the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issued. 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 philosophy and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been removed 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 mainly our determination of substantive issues relating to the new BAT Conclusions.

Throughout this document we will use a number of expressions. These are as referred to in the glossary.

We try to explain our decision as accurately, comprehensively and plainly as possible. We would welcome any feedback as to how we might improve our decision documents in future. The use of technical terms and acronyms are inevitable in a document of this nature: we provide a glossary of acronyms near the front of the document, for ease of reference.

1 Glossary of acronyms used in this document

(Please note that this glossary is standard for our decision documents and therefore not all these acronyms are necessarily used in this document.)

APC	Air Pollution Control
BAT	Best Available Technique(s)
BAT-AEEL	BAT Associated Energy Efficiency Level
BAT-AEPL	BAT Associated environmental performance level
BAT-AEL	BAT Associated Emission Level
BATc	BAT conclusion
BREF	Best available techniques reference document
CEM	Continuous emissions monitor
CHP	Combined heat and power
CV	Calorific value
DAA	Directly associated activity – Additional activities necessary to be carried out to allow the principal activity to be carried out
ELV	Emission limit value derived under BAT or an emission limit value set out in IED
EMS	Environmental Management System
EPR	Environmental Permitting (England and Wales) Regulations 2016 (SI 2016 No. 1154)
EWC	European waste catalogue
FSA	Food Standards Agency
IC	Improvement Condition
IED	Industrial Emissions Directive (2010/75/EU)
NOx	Oxides of nitrogen (NO plus NO_2 expressed as NO_2)
PHE	Public Health England
SAC	Special Area of Conservation
SGN	Sector guidance note
TGN	Technical guidance note
TOC	Total Organic Carbon
WFD	Water Framework Directive (2000/60/EC)

2 Our decision

We have decided to issue the consolidated variation notice to the Operator. This will allow it to continue to operate the Installation, subject to the conditions in the consolidated variation notice.

We consider that, in reaching that 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 consider that those conditions are appropriate.

3 How we reached our decision

3.1 Requesting information to demonstrate compliance with BAT Conclusions for incineration plant

We issued a Notice under Regulation 61(1) of the Environmental Permitting (England and Wales) Regulations 2016 (a Regulation 61 Notice) on 10/12/2021 requiring the Operator to provide information to demonstrate how the operation of their installation currently meets, or will subsequently meet, the revised standards described in the incineration BAT Conclusions document. The Notice also required that where the revised standards are not currently met, the operator should provide information that:

- Describes the techniques that will be implemented before 3rd December 2023, which will then ensure that operations meet the revised standard, or
- Justifies why standards will not be met by 3rd December 2023, and confirmation of the date when the operation of those processes will cease within the installation or an explanation of why the revised BAT standard is not applicable to those processes, or
- Justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised standard 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 requested that the Operator make a formal request for derogation from compliance with that 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 28/07/2023.

We have not received any information in relation to the Regulation 61 Notice response that appears to be confidential in relation to any party.

3.2 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 regulatory activities with the facility we have no reason to consider that the operator will not be able to comply with the conditions that we include in the permit.

4 The legal framework

The consolidated variation notice will be issued under Regulation 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 the consolidated variation notice 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.

5 The key issues

The key issues arising during this permit review are:

- Ensuring the Installation complies with the BAT conclusions.
- Setting emission limits (including BAT-AELs) for emissions to air.
- The energy efficiency levels associated with the Best Available Techniques (BAT-AEELs).

5.1 Ensuring the Installation complies with the BAT conclusions

We have reviewed the operator's response to the Regulation 61 notice and we are satisfied that the Installation will meet the requirements of the BAT conclusions upon recommissioning. Further detail on our assessment is in Part A, Annex 1 of this decision document.

Based on our records and previous regulatory activities with the Installation we have no reason to consider that the operator will not be able to comply with the conditions that we have included in the permit.

5.2 Emissions to air and the emission limits applied to the plant

The consolidated permit includes new emission limits for emissions to air. These limits ensure that the installation will comply with the relevant BAT-AELs, as specified in the BAT conclusions, and the relevant limits from IED Annex VI.

A number of general principles were applied during the permit review, including those set out in the UK Waste Incineration BAT Conclusions Interpretation Document. These included:

- The upper value of the BAT-AELs ranges specified were used unless use of the tighter limit was justified.
- The principle of no backsliding where if existing limits in the permit were already tighter than the upper end of the BAT-AEL ranges, the existing permit limits were retained.
- Where a limit was specified in both IED Annex VI and the BAT Conclusions for a particular reference period, the tighter limit was applied and in the majority of cases this was from the BAT Conclusions.

We have set the emissions limit values at the top end of the BAT-AEL range in line with section 4.35 of Defra's Industrial Emissions Directive EPR Guidance on Part A installations which states: *Where the BAT AELs are expressed as a range, the ELV should be set on the basis of the top of the relevant BAT-AEL range – that is to say, at the highest associated emission level - unless the installation is demonstrably capable of compliance with a substantially lower*

ELV, based on the BAT proposed by the operator, or exceptional environmental considerations compel a tighter ELV.

We are satisfied that environmental considerations do not require tighter ELVs to be set, and the Operator has not proposed any lower ELVs, and so we have set the ELVs at the top end of the BAT-AEL ranges.

We have set improvement condition IC13 which requires the operator to assess options to reduce NO_X emissions below the top of the BAT AEL range.

5.3 Energy efficiency

The BAT conclusions specify an energy efficiency level associated with the best available techniques (BAT-AEEL). The BAT AEEL is based on gross electrical efficiency, gross energy efficiency or boiler efficiency depending on the type of plant.

The relevant BAT AEEL for this installation is boiler efficiency.

The operator stated that the boiler efficiency has been calculated using theoretical data. We have set improvement condition IC16 requiring the operator to recalculate the efficiency once real data is available, and assess opportunities to improve energy efficiency in the event that gross energy efficiency is below the BAT AEEL range.

5.4 Monitoring

The monitoring requirements for mercury and dioxins/furans are dependent on whether the waste has low a low and stable mercury content and whether emissions of dioxins are stable respectively. Improvement conditions IC14 and IC15 require the operator to submit information to enable us to set the correct monitoring.

6 Issues not directly relating to the BAT conclusions

6.1 Healthcare waste: appropriate measures for permitted facilities

The operator currently complies with all the waste pre-acceptance, acceptance and tracking appropriate measures given in the Healthcare waste: appropriate measures for permitted facilities guidance.

The operator currently complies with all the storage segregation and handling appropriate measures given in the Healthcare waste: appropriate measures for permitted facilities guidance.

6.2 Chemical waste appropriate measures for permitted facilities

We have set IC17 which requires the operator review techniques against the following sections of the *Chemical waste: appropriate measures for permitted facilities guidance* (Version published 18 November 2020):

- Waste pre-acceptance, acceptance and tracking appropriate measures
- Waste storage, segregation and handling appropriate measures

The operator must comply with this condition within 12 months of the issue of this variation.

6.3 Emissions to water or sewer

The operator stated that there is an emission to sewer. The discharge consists of waste liquids from the clinical waste process. Effluent is normally re-used but during periods of excess water there is a discharge to sewer. Discharge is infrequent and volumes are low at a maximum of 4.5 m^3/day.

Due to the nature of the discharge, infrequent occurrence and low volumes we are satisfied that the emission is not significant and no further assessment of risk is required.

6.4 Emergency release valve (ERV)

The plant has an ERV that is used in emergency situations. It is not used during start-up.

We have set improvements conditions IC19 to IC23 for the operator to review options to reduce its use and implement improvements if required.

Part A, Annex 1

Decision checklist regarding relevant BAT Conclusions

This annex provides a record of decisions made in relation to each relevant BAT Conclusion applicable to the installation.

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

NA - Not Applicable
FC – Future compliant
CC – Currently compliant/compliant upon recommissioning*
NC - Not Compliant

***Note**: **where the operator has referenced the BREF/BAT compliance date of 03/12/2023 in their Regulation 61 response, this means upon recommissioning post 03/12/2023.**

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
1	EMS	Improve overall performance via use of a compliant EMS.	The EMS meets the requirements of BAT 1 with the exception of the items listed and the EMS will be updated by 03/12/23 to ensure that it meets BAT 1. Medisort Ltd currently has 14001 and 9001; Medisort Ltd will be updating its EMS once the plant improvements have been completed. The elements not currently covered by the EMS are listed below: (xxi) for incineration plants and waste stream management (BAT 9). (xxii) for bottom ash treatment plants, output quality management (see BAT 10). (xxiii) a residues management plan including measures aiming to: (a) minimise the generation of residues. (b) optimise the reuse, regeneration, recycling of, and/or energy recovery from the residues. (c) ensure the proper disposal of residues. (xxiv) for incineration plants, an OTNOC management plan (see BAT 18). (xxv) for incineration plants, an accident management plan	CC [We consider point xxii and xxvi to be not applicable as bottom ash is not treated] Note: Preoperational condition PO1 has been included to ensure compliance with BAT1.

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			(xxvi) for bottom ash treatment plants, diffuse dust emissions management (see BAT 23). (xxviii) a noise management plan (see also BAT 37) where a noise nuisance at sensitive receptors is expected and/ or has been substantiated (see Section 2.4).	
2	Energy efficiency	Determine gross electrical efficiency, gross energy efficiency or boiler efficiency (depending on plant type).	Gross electrical efficiency (as the facility only exports heat) has been calculated using the methodology set out in the BREF. The gross energy efficiency is calculated to be 79.6%, which compares favourably with the benchmarks provided in the BREF (72-91% for existing plants). Performance tests will subsequently be carried out following recommissioning.	CC
3	Process Monitoring	Monitor key process parameters for emissions to air and water specified in the corresponding table.	Process monitoring will be carried out in line with BAT 3 requirements for the relevant parameters listed in the BREF following recommissioning. The process control system to be installed at the Facility includes for monitoring of the temperatures within the combustion chamber as well as flue gas flow, oxygen, temperature, pressure and water vapour content. This is in accordance with the requirements of BAT 3.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			There is no wet flue gas treatment undertaken at the Facility, and as proposed within the recent EP variation application, bottom ash treatment will not to be undertaken at LSEP. Therefore, monitoring requirements for wastewater from the FGC and IBA treatment are not relevant at the Facility.	
4	Air emissions monitoring	Monitor emissions to air with at least the frequency in the corresponding table and in accordance with the EN standards.	Monitoring will be carried out in line with BAT 4 requirements.	CC
	PBDD/F	Monitor emissions to air of brominated dioxins and furans periodically if waste streams are known to contain brominated flame retardants are burned	The following waste types could contain brominated flame retardants: mattresses and so PBDD/F monitoring will be carried out from 03/12/2023 / recommissioning.	CC
	PCDD/F	Monitor emissions to air of dioxins and furans using a continuous sampler unless emissions are sufficiently stable.	Attempts will be made to demonstrate via the PCCD/F Monitoring Protocol that emissions to air of PCDD/F are sufficiently stable and that a continuous sampler (long-term monitoring) is not required by 03/12/23 / recommissioning; if these are unsuccessful, continuous sampling will be installed as soon as reasonably practical.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
	Mercury	Monitor emissions to air of mercury using continuous monitoring if required.	Attempts will be made to demonstrate via the Mercury Monitoring Protocol that emissions to air of mercury are low and stable and that a continuous sampler is not required by 03/12/23/recommissioning; if these are unsuccessful, continuous monitoring will be installed as soon as reasonably practical. Data (2019) from the previous permit holder's records show mercury emissions at 0.022 mg/m3.	CC
5	OTNOC monitoring	Appropriately monitor emissions during OTNOC. Monitor PCCD/F and dioxin-like PCB mass emissions during a planned start-up and shut-down following the successful commissioning of the plant; already-operational plants must carry out this monitoring every 3 years; emissions profiles of continuously monitored pollutants must also be established following successful commissioning and for existing plants; consider further monitoring for plants that use abatement-system bypasses during start-up and/or shut-down.	Plant has been successfully commissioned, or is likely to be before 03/12/23. Emissions profiles of continuously monitored pollutants have been established during start-up and shut-down or will be established by 03/12/23. Monitoring of PCCD/F and dioxin-like PCB mass emissions during a planned start-up and shut-down will be carried within 3 years of 03/12/23. The plant is also fitted with an abatement bypass for start-up and the following monitoring is proposed during start-up. The continuous emissions monitoring system (CEMS) to be installed at the Facility will continue to monitor emissions to air of particulate matter (dust), TOC, HCl, CO, SO_2, NOx, NH_3, and N_2O during periods of OTNOC. In accordance with the requirements of the EA's BREF interpretation document, Medisort Ltd will endeavour to	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			undertake monitoring of PCCD/F and dioxin-like PCBs during a planned start-up and shutdown following successful commissioning of the plant, with the aim of repeating the test every 3 years thereafter. Monitoring would be done on a best endeavours basis, taking into consideration the challenges in coinciding a visit by the monitoring company with the exact time when the plant is starting up or shutting down. Should a monitoring attempt fail due to these challenges Medisort Ltd will endeavour to repeat the exercise at the next available opportunity.	
6	Water emissions monitoring	Monitor emissions from FGC and/or bottom ash treatment. Monitor to frequencies and standards in corresponding table.	NA – no emissions to water from FGC. No bottom ash treatment carried out on site.	NA
		Reduced monitoring frequency permitted if emissions can be shown to be sufficiently stable.	NA	NA

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
7	Ash monitoring	Monitor LOI or TOI content of bottom ash to the frequencies and standards in corresponding table .	Monitoring of TOC in accordance with permit.	CC
8	POP monitoring	For hazardous waste containing POPs, monitor POP content of waste streams (applicable to dedicated hazardous waste incinerators only). After commissioning and then after significant change that could affect POP content.	The Facility will process mattresses from the hospital which are classified as hazardous due to the risk of infection. In addition, the mattresses also have potential to contain small quantities of POP content. However, due to the minimal quantities expected at the Facility, the levels of POP content within the total incoming waste stream will not exceed limits as defined in Annex IV of regulation (EC) No. 580/2004. Therefore, the Facility will comply with the requirements of BAT. Necessary POP content determination will be carried out after recommissioning.	CC
9	Waste input controls	Pre-acceptance / acceptance procedures. Use all techniques (a) to (c) in corresponding table, and where relevant (d), (e) and (f).	BAT 9 of the BREF sets out techniques to improve environmental performance by waste stream management. The facility will comply with techniques (a), (b) and (c) of the BREF as follows: a) Determination of the types of waste that can be incinerated – The Facility will incinerate waste in accordance with the list of EWC codes within Table 2.2 of	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			the existing EP. The list of EWC codes characterises the physical state, general characteristics and hazardous properties of the waste. Medisort has established contractual arrangements in place with waste suppliers, including a clear waste specification. Periodic sampling and analysis of the waste may be undertaken to ensure waste received is compliant with the pre acceptance waste audit form prior to receiving waste from new suppliers. b) Set-up and implementation of waste characterisation and pre-acceptance procedures – Supplier pre-acceptance checks will be implemented at the Facility, with regular supplier audits undertaken to ensure that the waste supplied is in accordance with the waste supply agreements. Records of pre-acceptance checks and audits will be retained as part of the documented management system for Medisort. c) Set-up and implementation of waste acceptance procedures – A waste acceptance procedure will be implemented at the Facility. The waste acceptance procedure will set out the process for accepting waste onto site, including inspections of waste arriving to site, and the rejection criteria for non-compliant waste. Paperwork accompanying each delivery will be checked. Technique (d) relates to the implementation of a waste tracking system and inventory – Medisort utilises an in	

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			house database which monitors the volumes of waste stored on site and the time in which the waste is held at the Facility. This ensures stock levels are managed effectively. Technique (e) – waste segregation – All waste received on site will be stored in sealed storage bins until the point of incineration. Technique (f) - Verification of waste compatibility prior to the mixing or blending of hazardous wastes – not applicable. Medisort considers that the proposed arrangements described above for waste stream management satisfy the requirements of BAT 9.	
10	Bottom ash treatment	Quality output management system part of EMS where bottom ash treatment is carried out.	Bottom ash treatment will not be undertaken at the Facility. Therefore, the requirements of BAT 10 are not applicable.	NA
11	Waste delivery, storage and handling	Monitor waste deliveries in line with corresponding table, depending on the risk posed by the waste type.	Monitoring of waste deliveries will include the following elements in accordance with BAT 11: • Weighing of the waste deliveries by use of a weighbridge at the entrance/exit of the Facility or via the bin weighing platform. All waste will be booked into the facility via bespoke Meditrack software.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			• Periodic visual inspection of waste either where practicable when there is no risk to human health.	
		Radioactivity detection	The site is not permitted to accept radioactive waste. The Facility will not be required to undertake radioactivity detection tests as it is highly unlikely for any radioactive waste to be accepted at the site. The UK Regulators BATC Interpretation Document states that UK radioactive substances regulation is sufficiently robust to minimise the risk of radioactive material being inadvertently sent for incineration.	NA
12		Storage and handling. Use both techniques listed in corresponding table.	Both techniques will be employed at the Facility, as follows: • Waste reception, handling and storage areas have been designed and constructed as impermeable structures. Adequate drainage infrastructure is fitted to areas where receipt, handling and storage of waste takes place – these areas have appropriate falls to the process water drainage system. The integrity of areas of hardstanding will be periodically verified by visual inspection. Regular maintenance of the drainage systems will be undertaken in accordance with documented management procedures incorporated within the EMS. Therefore, it will prevent both the ingress and egress of water. These inspections	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			are likely to be planned during outage periods. Visual inspections are expected to be completed at least annually in accordance with outage periods, with full civil inspections completed on a periodic (assumed 5-yearly) basis. • The Facility incorporates an in-house database (Meditrack), that monitors and tracks all waste received at the Facility and allows for the management of incoming waste.	
13		Storage and handling of clinical waste. Combination of techniques listed in corresponding table.	Techniques (a), (b) and (c) will be implemented at the Facility, as outlined below: a) Automated or semi-automated waste handling – the waste handling and processing of waste will be fully automated. Bins will be manually loaded into the bin lift system and the control system will determine when the bins should be loaded into the combustion chamber by monitoring the combustion process. b) Incineration of non-reusable sealed containers – All wastes arriving to site will be stored in waste bins. Where the waste in those bins is contained within non-reusable sealed containers, these will be loaded into the combustion chamber for incineration. c) Cleaning and disinfection of reusable containers – All waste bins will be subsequently processed through a bin wash system which will utilise waste heat from the	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			incineration process to ensure adequate disinfection of each bin prior to leaving the Facility. Therefore, the Facility will comply with the requirements of BAT 13.	
14	Overall environment performance	Reduce unburnt substances in slags / bottom ash and reduce emissions. Use a combination of techniques listed in corresponding table	Techniques (a), (b) and (c) will be implemented at the Facility, as outlined below: a) Waste blending and mixing – The operator will select bins for loading based on the contents of the bins to provide a balanced blend. b) Use of an advanced control system – an Intelligent Combustion Control System (ICMS) is being installed to control the combustion process; optimise the process relative to efficient heat release; achieve good burn-out of the waste; and ensure minimum particle carry over. The ICMS will be supported by high-performance monitoring of emissions and process parameters. The ICMS will ensure that the combustion settings are adjusted based on the waste feed rate. The ICMS will control / monitor the main features of plant operation including, but not limited to, the following: – combustion air; – recirculated flue gas; – fuel feed rate; – combustion process; – boiler feed pumps and feedwater control;	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			– steam flow at the boiler outlets; – steam outlet temperature; – flue gas oxygen concentration at the boiler exits; – boiler drum level control; – flue gas control (including differential pressure across the ceramic filters); – flue gas composition at the stack; – heat export (if applicable); and – steam turbine exhaust pressure c) Optimisation of the incineration process – The distribution of primary and secondary combustion air will be optimised to improve the efficiency of the combustion process, with the volumes of air controlled by the ICMS. The feed rate for the primary combustion air will be optimised and improved through the continuous monitoring of process variables, including combustion air flow. Water, electricity and auxiliary fuel usage at the Facility will also be monitored to highlight any abnormal usage. TOC will be monitored periodically in the bottom ash in accordance with the requirements of the EP. Therefore, the Facility will comply with the requirements of BAT 14.	

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
		BAT-AEPL for TOC or LOI	Historic monitoring data shows compliance. Permit limits will apply.	CC
15		Control plant settings to reduce emissions to air. Use techniques such as an advanced control system.	As explained in BAT 14, the combustion process will be controlled and optimised through the ICMS. The ICMS will control and/or monitor the main features of the plant operation. Emissions to air of NOx and CO will be reduced by the adjustment of the plant's settings through the ICMS; acid gas reagent usage will be minimised by trimming reagent dosing based on the concentration within the flue gas; and activated carbon dosing will be based on flue gas volume flow measurement. Therefore, the Facility will comply with the requirements of BAT 15.	CC
16		Procedures to limit shutdown and start-up. Set up and implement procedures such as continuous rather than batch operation	Start-up and shutdown of the Facility have been minimised as follows: • Continuous feed system - The original design of the system has not been altered as a batch fed system. However, the ICMS is designed to facilitate a continuous batch feed to enable the combustion process to operate continuously. This method will allow the plant to call for waste at a set temperature and gas flow rate in combination with direct data from the CEMS unit to ensure emissions levels remain under control throughout	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			the combustion process and minimise shutdowns as far as reasonably practicable. This will also ensure that the operation of the auxiliary burners is minimised to maintain the required temperatures. • Maintenance approach – A weekly maintenance schedule on the pulsed hearth furnace will be implemented. This will ensure operation of the combustion process remains efficient within the design parameters. This will enable a detailed inspection of the ash trough including finger clean and maintenance of the secondary chambers to be undertaken, in addition to any other programmed preventative maintenance activities. • Securing waste supply - The operator will manage contracts with waste suppliers, including Hillingdon NHS Trust, to ensure that waste is available. Therefore, the Facility will comply with the requirements of BAT 16 The start-up and shut down procedure has yet to be determined, but due to having a constant supply of waste, start-up and shut down will be kept to a minimum and will only happen for an emergency situation and or planned maintenance. **Environment Agency Note: please see BAT 18 and PO1**	

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
17	Emission to air and water	Design of FGC system and waste water treatment plant. Appropriate design, operated in design range, maintained to ensure optimal availability.	Flue gas system is designed appropriately and is operated within those design parameters. • The FGC system has been designed to be operated in accordance with the design constraints of the combustion systems and the BAT-AELs. • Ceramic filters are designed to function in tandem with the ICMS to abate emissions of particulates from the combustion process. The resultant Air Pollution Control residue (APCr) - fly ash and spent reagents- will be stored in sealed drums or bulk bags prior to transfer off-site for disposal. • Sodium Bicarbonate is the proposed reagent for the abatement of acid gases due to the ability to operate the filters at high temperatures. Due to the proposed temperatures, it is unsuitable to utilise lime for the abatement of acid gases. Allowing the operation of increased temperature also provides optimal conditions for the abatement of acid gases. • The FGC system will be subject to regular maintenance in accordance with the preventative maintenance systems. Critical spares of equipment (such as spare ceramic elements) will be held on-site. The Facility will be equipped with four ceramic filter pods and will be able to operate with only three, giving some redundancy and spare capacity. The design and operation of the FGC	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			system will ensure that emissions to air are minimised, and will ensure optimal availability. Therefore, the Facility will comply with the requirements of BAT 17.	
18	OTNOC	Reduce frequency of OTNOC by setting up and implementing an OTNOC management plan.	An OTNOC Management Plan has not yet been developed . This will be developed following receipt of OTNOC specific guidance from UK Regulators. **Environment Agency note 18/12/2023:** **Draft OTNOC management plan templates have been circulated to operators on 21/11/2023. Auditing of these plans will commence from October 2024.**	FC
19	Energy efficiency	Increase efficiency by using a heat recovery boiler.	The Facility will transfer heat/energy from the waste gases to water via a tube shell boiler to produce steam which is then supplied to the hospital, displacing the use of natural gas to produce steam. Therefore, the Facility will comply with the requirements of BAT 19.	CC
20		Increase efficiency by using a combination of techniques listed in corresponding table.	Techniques b d and g are used as follows b) A reduction in the flue gas flow reduces the energy demand of the plant (e.g. for induced draft fans). It can be confirmed that the combustion process has been designed to optimise both primary and secondary combustion air distribution, to improve the efficiency of the	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			process. The volume of both primary and secondary air is regulated by a combustion control system. The feed of primary combustion air is optimised and improved through the continuous monitoring of process variables, including the combustion air flow. Optimising the combustion control system reduces the resulting flue gas flow rate by reducing air intake, hence lowering the oxygen content within the furnace and reducing the air output at the boiler exit. However, to ensure that the combustion process remains stable, it is important to maintain a balance between the air intake and the resulting flue gas flow rate. The provision of some excess oxygen is essential to ensure complete combustion and to cover any fuel spikes and avoid incomplete combustion, reducing the risk of any spikes in carbon monoxide emissions or unburned material in the ash. Flue gas recirculation (FGR) to the combustion chamber is not employed at the Facility.	
		BAT-AEEL is within the BAT – AEEL range	The gross energy efficiency has been calculated to be 79.6%. This compares favourably with the BAT-AEEL range for existing plants (72-91%). d) It can be confirmed that the boiler design at the Facility has been optimised to improve heat transfer. Offline boiler cleaning will be undertaken weekly to minimise fouling. g) The Facility has been designed to provide the full heat demand of Hillingdon Hospital. Additionally, further waste heat will be utilised to provide steam for the bin cleaning	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			process which further improves the efficiency of the Facility.	
21	Diffuse emissions to air	Prevent or reduce diffuse emissions (including odour) using the listed techniques.	In accordance with the BREF and the existing odour management plan, the Facility will employ the following measures to reduce odour emissions: • All waste that is received at the Facility will be received in locked containers. These containers remain locked during transport and unloading as per the procedures set out within E007.6, Wheeled bin procedure. All bins will also be visually inspected at the point of receipt. Waste shall be stored within the sealed bins until the point of incineration. Once waste has been tipped from the bins, they will be sanitised ready for storage and subsequent removal from site so shall prevent the release of odorous emissions arising. • An odour management plan is established at the Facility to ensure the correct storage, segregation, and handling of waste to minimise fugitive emissions of odour. The odour management plan also sets out procedures for daily olfactory monitoring at the Facility to identify any odours and the subsequent corrective action to take.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			Therefore, the Facility will comply with the requirements of BAT 21.	
22		Prevent diffuse emissions of VOCs from gaseous and liquid wastes by direct feed to furnace.	No gaseous or liquid wastes accepted.	NA
23		Prevent or reduce diffuse emissions to air from treatment of slags and bottom ashes by including listed measures in the EMS.	No bottom ash treatment is carried out.	NA
24		Prevent or reduce diffuse emissions to air from treatment of slags and bottom ashes. Use one or a combination of techniques in corresponding table	No bottom ash treatment is carried out.	NA

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
25	Channelled emissions to air	Reduce emissions of metals and metalloids from incineration of waste. Use one or a combination of techniques in corresponding table.	The facility will use ceramic filters for the particulate emissions from the flue gases. Dry sorbent injection will be used – the adsorption of metals by injection of activated carbon. The concentration of particulates, metals and metalloids will be monitored to demonstrate compliance with permit limits.	CC
		BAT-AELs for dust and metals	Plant can achieve the ELV.	CC
26		Reduce emissions of dust from treatment of slags and bottom ashes. Use a bag filter if treating air from treatment of IBA under sub-atmospheric conditions.	Bottom ash treatment is not carried out.	NA
		BAT-AEL for dust from IBA treatment. Applies if using a bag filter to treat air from treatment of IBA under sub-atmospheric conditions	Bottom ash treatment is not carried out.	NA

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
27		Reduce emissions of HCl, HF and SO_2 using one or a combination of techniques in corresponding table.	Technique c is used. BAT 27 states that BAT is to use one or a combination of the following techniques: • Wet scrubber; • Semi-wet absorber; • Dry sorbent injection; • Direct desulphurisation (only applicable to fluidised beds); and • Boiler sorbent injection. In a dry sorbent injection system, the reagent is injected into the flue gas stream within the flue gas treatment system, located after the boiler. In direct boiler sorbent injection, the reagent is injected directly into the flue gas stream within the boiler. This only achieves partial abatement of the acid gases and does not eliminate the need for additional flue gas cleaning stages. As justified within the original EP application, it is considered BAT for the Facility to utilise a dry system to abate acid gases. The dry system will be designed to ensure that the Facility will operate in accordance with the relevant ELVs, assumed to be the BAT-AELs, without the requirement for any additional abatement measures.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			Therefore, the Facility will comply with the requirements of BAT 27.	
28		Reduce peak emissions of HCl, HF and SO_2 and amount of residue produced, using technique (a) or both techniques in corresponding table.	Technique a is used. In accordance with BAT 28, the following techniques will be employed at the Facility to reduce peak emissions of HCl, HF and SO_2 whilst limiting reagent consumption and residue generation from dry sorbent injection: • The concentration of HCl and SO_2 in the flue gases is measured by the CEMS. The dosing rate for sodium bicarbonate will be controlled based on the measures concentration of HCl and SO_2 within the flue gas to maintain compliance with ELVs whilst avoiding excessive use of reagent. • The control systems are designed to ensure that concentrations of HCl, HF and SO_2 released from the Facility comply with the BAT-AELs. The reagents will not be recirculated because sodium bicarbonate can abate acid gases at a low stoichiometric ratio and so there will be low levels of unreacted reagent in the residues. Therefore, the Facility will comply with the requirements of BAT 28.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
		BAT-AELs for HCl, HF and SO_2	Plant can achieve the ELV	CC
29		Reduce emissions of NOx while limiting emissions of CO, N_2O and NH_3 using appropriate combination of techniques in corresponding table.	Technique a is used. The following elements have been incorporated into the design of the Facility: • Optimisation of the combustion process through the ICMS which will control the flow rates of primary and secondary combustion air to effectively oxidise organic compounds whilst minimising NOx formation. Process parameters will also be monitored to assist in the optimisation of the combustion process (refer to the response to BAT 14). Flue gas recirculation to the combustion chamber is not included in the design of the Facility. Therefore, the Facility will comply with the requirements of BAT 29.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
		BAT-AELs for NOx, CO and NH_3	The plant can achieve the ELV.	CC
30		Reduce emissions of organic compounds including PCDD/F and PCBs using techniques (a), (b), (c), (d) and one or a combination of techniques (e) to (i) in corresponding table	Techniques a, b, c, d and e are used. The boiler/combustion process is designed to minimise the formation of dioxins and furans and optimise the incineration process as follows: • Minimise the residence time in critical cooling section to avoid slow rates of combustion gas cooling, minimising the potential for 'de-novo' formation of dioxins and furans. Rapid flue gas cleaning occurs from temperatures above 400°C to below 250°C in order to reduce the potential for de novo synthesis of dioxins and furans. • Maintain the temperature within the furnace above 1100°C during combustion of hazardous waste, for a period of at last 2 seconds during operation to ensure sufficient destruction of dioxins and furans. Auxiliary burners will be used to maintain the temperature above 1100°C during the combustion of hazardous waste. The ICMS will continually monitor the furnace temperature, with interlocks preventing waste charging if the temperature drops below 1100°C. during combustion of hazardous waste.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			• Prevent boundary layers of slow-moving gas along boiler surfaces via good design and regular maintenance. • Offline boiler cleaning during the weekly shutdowns to reduce dust residence time and accumulation in the boiler, thus reducing PCDD/F formation within the boiler. • Dry sorbent injection using activated carbon in combination with a bag filter. As described above, it can be confirmed that the Facility will use techniques (a) – (d) and also technique (e), dry sorbent injection, to reduce channelled emissions to air of organic compounds. Therefore, the Facility will comply with the requirements of BAT 30. The Facility will not employ an SCR system, as the Facility is designed to achieve the BAT-AEL for NOx without any additional abatement techniques. The Facility will not use catalytic filter bags. It should be noted that catalytic filter bags are generally used as a replacement for other filter bags which may already absorb dioxins by the injection of activated carbon. As the Facility will not utilise bag filters for the abatement of particulates, utilising catalytic filter bags would require the installation of an additional abatement system. Therefore, they are not considered to represent BAT for the Facility. The techniques described above to reduce channelled	

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
			emission to air of organic compounds will ensure that the Facility will comply with the requirements of BAT 30. Therefore, the Facility will meet the requirements of BAT 30.	
		BAT-AELs for PCDD/F	The plant can achieve the ELV.	CC
31		Reduce mercury emissions using one or a combination of techniques in the corresponding table.	Technique b is used. In accordance with BAT 31, the dry sorbent injection of activated carbon in combination with a ceramic filter is considered to represent BAT. Therefore, the Facility will comply with the requirements of BAT 31.	CC
		BAT-AEL for mercury	The plant can meet the ELV.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
32	Emissions to water	Reduce contamination of uncontaminated water, reduce emissions to water and increase resource efficiency. Segregate waste water streams and treat them separately.	The measures listed under BAT 32 will be in place by 03/12/23 / recommissioning. Blow down water will be reused within the process such for quenching bottom ash. Excess process effluents which cannot be re-used will be discharged to sewer in accordance with the trade effluent discharge consent which is currently in place. Foul effluents from all domestic sources such as office buildings and the weighbridge will be discharged to foul sewer. Therefore, the Facility will comply with the requirements of BAT 32.	CC
33	Water usage	Reduce water usage, prevent waste water generation using one or a combination of techniques in the corresponding table	In accordance with BAT 33, the following techniques will be utilised at the Facility to reduce water usage and prevent wastewater generation: • Use of a flue gas treatment system that does not generate wastewater – by utilising dry sorbet injection of the acid gas abatement reagent and PAC. • Blowdown from the boiler will be re-used within the ash quench.	CC

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
34	Emissions to water	Reduce emissions to water from FGC and/or from storage and treatment of slags and bottom ashes using one or a combination of techniques in the corresponding table and use secondary techniques as close to source as possible.	Not applicable - no direct or indirect emissions to water from FGC or bottom ash treatment.	NA
		BAT-AELs	Not applicable - no direct or indirect emissions to water from FGC or bottom ash treatment.	NA
35	Resource efficiency	Resource efficiency. Handle and treat bottom ashes separately from FGC residues.	Bottom ashes are handled and treated separately from FGC residues.	CC
36		Resource efficiency for treatment of slags and bottom ashes. Use appropriate combination of techniques in corresponding table depending on hazardous properties of the slags and bottom ashes.	Bottom ash treatment is not carried out.	NA

BAT No.	Topic	Brief Description	Operator response	Complies with BAT? (NA, FC, NC)
37	Noise	Reduce noise emissions using one or a combination of techniques in the corresponding table.	Techniques (a), (b) (c), (d) and (e) are employed at the Facility. A noise survey previously been completed for the Facility during operation which indicated that that the noise levels attributable to the Facility are significantly below the background noise levels for all nearby noise sensitive receptors. This demonstrates that the combination of techniques used at the Facility is appropriate. (a) In accordance with normal industry practice, the technology provider will implement an efficient layout to result in relatively quiet operational noise levels. (b) Plant and equipment will be maintained regularly to minimise any noise resulting from equipment deterioration. Doors and windows of enclosed areas are kept closed except when in use. Waste deliveries will take place primarily during daytime hours. (c) The technology provider will optimise plant selection to reduce noise levels. (d) In relation to noise attenuation, plant rooms have been acoustically designed for limiting noise emissions to acceptable levels for compliance with relevant workplace regulations and relevant planning requirements. (e) Where appropriate, acoustic cladding will be used following assessment at the point of recommissioning.	CC

7 Review and assessment of derogation requests made by the operator in relation to BAT Conclusions which include an associated emission level (AEL) value

The IED enables a competent authority to allow derogations from BAT AELs stated in BAT Conclusions under specific circumstances as detailed under Article 15(4):

By way of derogation from paragraph 3, and without prejudice to Article 18, the competent authority may, in specific cases, set less strict emission limit values. Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits due to:

> *(a) the geographical location or the local environmental conditions of the installation concerned; or*
>
> *(b) the technical characteristics of the installation concerned.*

As part of their Regulation 61 Note response, the operator has not requested a derogation from compliance with any AEL values.

8 Summary checklist

Aspect considered	Decision
Receipt of application	
Confidential information	A claim for commercial or industrial confidentiality has not been made.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential. The decision was taken in accordance with our guidance on confidentiality.
Operating techniques	
General operating techniques	We have reviewed the techniques used by the operator where they are relevant to the BAT Conclusions and compared these with the relevant guidance notes. The permit conditions ensure compliance with the relevant BREF, BAT Conclusions. The ELVs deliver compliance with the BAT-AELs.
Permit conditions	
Updating permit conditions during consolidation	We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide at least the same level of protection as those in the previous permit and in some cases will provide a higher level of protection to those in the previous permit.
Changes to the permit conditions due to an Environment Agency initiated variation	We have varied the permit as stated in the variation notice.
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme. Please refer to the Key Issues section. We have also removed the completed improvement conditions from the permit.
Emission limits	We have decided that emission limits should be set for the parameters listed in the permit. These are described in the relevant BAT Conclusions. It is considered that the ELVs/equivalent parameters or technical measures described above will ensure that significant pollution of

Aspect considered	Decision
	the environment is prevented and a high level of protection for the environment is secured.
Monitoring	We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified. These are described in the relevant BAT Conclusions.
Operator competence	
Management system	There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.
Growth Duty	
Section 108 Deregulation Act 2015 – Growth duty	We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit. Paragraph 1.3 of the guidance says: "The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation." We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections. We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

Part B - Permitting decisions, Operator normal variation application

Decision document recording our decision-making process following a normal variation application

The Permit number is:	EPR/YP3404SE
The Operator is:	Medisort Limited
The Installation is:	Hillingdon Clinical Waste Incinerator
This Variation Notice number is:	EPR/YP3404SE/V004

We have decided to grant the normal variation for Hillingdon Clinical Waste Incinerator operated by Medisort Limited, EPR/YP3404SE/V004.

The permitted clinical waste incinerator has been operational for several decades. It has been inactive for waste treatment since July 2019 during an upgrading period, and is due for recommissioning late 2023/early 2024. The permit was transferred to Medisort Limited in May 2021. The permit was varied in March 2023 to vary and update the permit to modern conditions and add a clinical waste transfer station activity.

This normal variation is to update the permit to reflect improvements being made by the Operator to the design and operation of the installation. The improvements will also enable the installation to meet the requirements of the IED and Waste Incineration BREF/BAT conclusions, which include BAT-AELs. The BAT-AELs will result in more stringent emission limits for several substances. Following the upgrades the plant will undergo recommissioning.

In summary, the variation covers:

- The installation of an automated combustion control system, (Intelligent Combustion Management System (ICMS)), to control and optimise the combustion process
- The installation of a twin pass boiler, replacing existing plant
- Changing the acid gas reagent from lime to sodium bicarbonate
- Replacing the bag filters with clay ceramic filters for particulates abatement
- Improvements to external hardstanding and surface water drainage systems
- Modifications to the bin wash system to utilise waste steam

We consider in reaching our decision that we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document provides a record of the decision-making process. It

- summarises the Key Issues in the Key Issues section
- summarises the decision making process in the decision considerations section to show how the main relevant factors have been taken into account
- summarises the engagement carried out.
- shows how we have considered the consultation responses.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit and the variation notice.

Key issues

Emissions to air

The variation states that the original flow rate from the incinerator stack has been revised from 11,200 to 10,587 Nm^3/h (at reference conditions). For the majority of pollutants the emission concentrations that the operator has used to base their air quality impacts on are reducing as a result of the implementation of the new BAT Conclusions; except for carbon monoxide, VOCs, HF, ammonia, PAHs and PCBs which have remained the same.

Data shown below is taken from the Applicants supporting information (reference document *Supporting information, Table 2, ref S3985-0321-0002JS2, 28th July 2023*). It shows the calculated difference in release rates (as a percentage change) when comparing the original flow rate and emission concentrations against the revised flow rate and emission concentrations.

Pollutant	Emission concentration (BAT-AEL) (in mg/Nm³ except where stated)		Release rate (in g/s except where stated)		
	Original	Upgraded design	Original	Upgraded design	% change

Oxides of nitrogen	200	180	0.622	0.529	- 14.93
Sulphur dioxide	50	40	0.156	0.118	- 24.38
Carbon monoxide	50	50	0.156	0.147	- 5.47
Dust	10	5	0.031	0.015	- 52.74
Hydrogen chloride	10	8	0.031	0.024	- 24.38
VOCs	10	10	0.031	0.029	- 5.47
Hydrogen fluoride	1	1	3.111	2.941 mg/s	- 5.47
Ammonia	10	10	0.031	0.029	- 5.47
Mercury	0.05	0.02	0.156 mg/s	0.059 mg/s	- 62.19
Cadmium and thallium	0.05	0.02	0.156 mg/s	0.056 mg/s	- 62.19
Other metals Note 1	0.5	0.3	1.556 mg/s	0.882mg/s	-43.28
Dioxins and furans	0.1 ng I-TEQ/Nm3	0.08 ng I-TEQ/NM3	0.235 ng I-TEQ/s	0.235 ng I-TEQ/s	- 24.38
PAHs Note 2	0.2 µg/Nm³	0.2 µg/Nm³	0.622 µg/s	0.588 µg/s	-5.47%
PCBs Note 3	5 µg/Nm³	5 µg/Nm³	0.016 mg/s	0.015 mg/s	-5.47%

Notes: All emissions are expressed at reference conditions of dry gas, 11% oxygen, 273.15K.

Note 1 Other metals consist of antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V).

Note 2 0.2 µg/m³ is the maximum recorded at a UK plant (2019 Waste Incineration BREF, Figure 8.121). This is assumed to be the emission concentration for the Facility.

Note 3 Table 3.8 of the 2006 Waste Incineration BREF states that the annual average total PCBs is less than 0.005 mg/Nm³ (dry, 11% oxygen, 273K). In lieu of other available operational data, this has been assumed to be the emission concentration for the Facility

The Applicant stated in their application that as the release rates show a reduction on existing for all pollutants, no significant environmental effects are anticipated due to emissions to air from the upgraded design, and no further air quality modelling was proposed.

However, as the efflux velocity is reducing in the upgraded design which may affect the original air quality dispersion model, we asked for further information from the Applicant to demonstrate that the change would not make a significant difference to the conclusions of the original air quality assessment.

The Applicant provided a further, more detailed risk assessment (reference document : *Medisort Ltd, Hillingdon CWI, Air Quality Technical Note, 22 September 2023*).

A methodology for risk assessment of point source emissions to air, is set out in our guidance 'Air emissions risk assessment for your environmental permit' on www.gov.uk and has the following steps:

- Describe emissions and receptors
- Calculate process contributions (PCs)
- Screen out insignificant emissions that do not warrant further investigation
- Decide if detailed air modelling is needed
- Assess emissions against relevant air quality standards
- Summarise the effects of emissions

The methodology uses a concept of "process contribution (PC)", which is the estimated concentration of emitted substances after dispersion into the receiving environmental media at the point where the magnitude of the concentration is greatest. The methodology provides a simple method of calculating PC primarily for screening purposes and for estimating process contributions where environmental consequences are relatively low. It is based on using dispersion factors. These factors assume worst case dispersion conditions with no allowance made for thermal or momentum plume rise and so the process contributions calculated are likely to be an overestimate of the actual maximum concentrations. More accurate calculation of process contributions can be achieved by mathematical dispersion models, which take into account relevant parameters of the release and surrounding conditions, including local meteorology.

Use of Air Dispersion Modelling

Air dispersion modelling enables the process contribution to be predicted at any environmental receptor that might be impacted by the plant.

Once short-term and long-term PCs have been calculated in this way, they are compared with Environmental Standards (ES) for air emissions. ES are described in our web guide 'Air emissions risk assessment for your environmental permit'.

Our web guide sets out the relevant ES as:

- Air Quality Standards Regulations 2010 Limit Values
- Air Quality Standards Regulations 2010 Target Values
- UK Air Quality Strategy Objectives
- Environmental Assessment Levels

Where a Limit Value exists, the relevant standard is the Limit Value. Where a Limit Value does not exist, target values, UK Air Quality Strategy (AQS) Objectives or Environmental Assessment Levels (EALs) are used. Our web guide sets out EALs which have been derived to provide a similar level of protection to human health and the environment as the limit values, target values and AQS objectives. In a very small number of cases, e.g. for emissions of lead, the AQS objective is more stringent that the Limit Value. In such cases, we use the AQS objective for our assessment.

Target values, AQS objectives and EALs do not have the same legal status as Limit Values, and there is no explicit requirement to impose stricter conditions than BAT in order to comply with them. However, they are a standard for harm and any significant contribution to a breach is likely to be unacceptable.

PCs are screened out as **Insignificant** if:

- the **long-term** PC is less than **1%** of the relevant ES; and
- the **short-term** PC is less than **10%** of the relevant ES.

The **long term** 1% PC insignificance threshold is based on the judgements that:

- It is unlikely that an emission at this level will make a significant contribution to air quality;
- The threshold provides a substantial safety margin to protect human health and the environment.

The **short term** 10% PC insignificance threshold is based on the judgements that:

- spatial and temporal conditions mean that short term process contributions are transient and limited in comparison with long term process contributions;
- the threshold provides a substantial safety margin to protect human health and the environment.

Where an emission is screened out in this way, we would normally consider the Applicant's proposals for the prevention and control of the emission to be BAT. That is because if the impact of the emission is already insignificant, it follows that any further reduction in this emission will also be insignificant.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.

For those pollutants which do not screen out as insignificant, we determine whether exceedances of the relevant ES are likely. Where an exceedance of an AAD limit value is identified, we may require the applicant to go beyond what would normally be considered BAT for the Installation or we may refuse the application if the applicant is unable to provide suitable proposals. Whether or not exceedances are considered likely, the application is subject to the requirement to operate in accordance with BAT.

This is not the end of the risk assessment, because we also take into account local factors (for example, particularly sensitive receptors nearby such as a SSSIs, SACs or SPAs). These additional factors may also lead us to include more stringent conditions than BAT.

Assessment of impact on air quality for the upgraded design

The Applicant has assessed the Installation's potential emissions to air against the relevant air quality standards, and the potential impact on human health. These assessments predict the potential effects on local air quality from the Installation's stack emissions using the air dispersion model software ADMS 6.0, which is a commonly used computer model for regulatory dispersion modelling.

The air impact assessment (reference document: *Medisort Ltd, Hillingdon CWI, Air Quality Technical Note, 22 September 2023*) and the dispersion modelling upon which they were based, employed the following assumptions:

- First, they assumed that the ELVs in the Permit would be the maximum permitted by Article 15(3), Article 46(2) and Annex VI of the IED. These substances are:
    - Oxides of nitrogen (NO_x), expressed as NO_2
    - Total dust
    - Carbon monoxide (CO)
    - Sulphur dioxide (SO_2)
    - Hydrogen chloride (HCl)
    - Hydrogen fluoride (HF)
    - Cadmium, mercury

  - Polychlorinated dibenzo-para-dioxins and polychlorinated dibenzo furans (referred to as dioxins and furans)
  - Gaseous and vaporous organic substances, using Volatile Organic Compounds (VOCs) as a proxy for Total Organic Carbon (TOC)
  - Ammonia (NH_3)

- Second, they assumed that the Installation operates continuously at the relevant long-term or short-term ELVs, i.e. the maximum permitted emission rate.
- Third, the model also considered emissions of pollutants not covered by Annex VI of IED, specifically, polycyclic aromatic hydrocarbons (PAH) and polychlorinated biphenyls (PCBs). Emission rates used in the modelling have been drawn from data in the Waste Incineration BREF.

We are in agreement with this approach. The assumptions underpinning the model are a reasonable worst-case.

The model predicted the maximum ground level concentration of the pollutants within the modelling domain (i.e. maximum on grid).

Results

The Applicant's modelling predictions for the revised design are summarised in the following sections.

The assessment looked at two scenarios:

1. The impact of the upgraded design (measured as the difference between existing contribution and revised contribution to Environmental Quality Standards); and
2. The maximum (on grid) predicted impact of the upgraded design.

Table 1 – Change in impact between existing facility and upgraded facility – Operation at Daily ELVs

Pollutant	**ES**		**Existing Process Contribution (PC)**		**Upgraded design Process Contribution (PC)**		**Change in PC expressed as % change in ES contribution**
	µg/m³	**Reference period**	**µg/m3**	**% of EAL**	**µg/m³**	**% of EAL**	**%**
NO_2	40	Annual Mean	0.56	1.39	0.56	**1.40**	0.01
	200	99.79th %ile of 1-hour means	6.71	3.36	7.54	3.77	0.42
PM_{10}	40	Annual Mean	0.04	0.1	0.02	0.06	-0.04
$PM_{2.5}$	20	Annual Mean	0.11	0.23	0.06	0.13	-0.01
SO_2	266	99.9th %ile of 15-min means	6.36	2.39	6.33	2.38	-0.01
	350	99.73rd %ile of 1-hour means	4.42	1.26	4.36	1.25	-0.02
	125	99.18th %ile of 24-hour means	1.05	0.84	1.0	0.8	-0.04
HCl	750	1-hour average	2.17	0.29	2.29	0.31	0.02
HF	16	Monthly average	0.00	0.02	0.00	0.03	0.003
	160	1-hour average	0.22	0.14	0.29	0.18	0.04
CO	10000	Maximum daily running 8-hour mean	7.05	0.07	9.05	0.09	0.02
	30000	1-hour average	10.84	0.04	14.32	0.05	0.01
PAH	0.00025	Annual Mean	0.8 (pg/m³)	0.32	0.89 (pg/m³)	0.6	0.04

NH_3	180	Annual Mean	0.04	0.02	0.04	0.02	0.003
	2500	1-hour average	2.17	0.09	2.86	0.11	0.03
PCBs	0.2	Annual Mean	0.02 (ng/m^3)	0.01	0.02 (ng/m^3)	0.01	0.001
	6	1-hour average	1.08 (ng/m^3)	0.02	1.43 (ng/m^3)	0.02	0.01
VOCs (as benzene)	30	Daily mean	0.42	1.39	0.52	1.75	0.36
VOCs (as 1,3 – butadiene)	2.25	Annual mean	0.04	1.77	0.04	**1.98**	0.21
Mercury	250 (ng/m3)	Annual mean	0.2	0.08	0.09	0.04	-0.04
	7500 (ng/m3)	1-hour average	10.84	0.14	5.73	0.08	-0.07
Cadmium	5 (ng/m3)	Annual mean	0.2	3.98	0.09	**1.78**	-2.2
Dioxins	-	Annual mean	0.4	-	0.36	-	-

Table 2 – Change in impact between existing facility and upgraded design – operation at short-term ELVs

Pollutant	**ES**		**Existing Process Contribution (PC)**		**Upgraded design Process Contribution (PC)**		**Change in PC expressed as % change in ES contribution**
	$\mu g/m^3$	**Reference period**	**µg/m3**	**% of EAL**	**$\mu g/m^3$**	**% of EAL**	**%**
NO_2	200	99.79th %ile of 1-hour means	13.42	6.71	16.76	8.38	1.67
SO_2	266	99.9th %ile of 15-min means	25.45	9.57	31.65	**11.90**	2.33

	350	99.73rd %ile of 1-hour means	17.69	5.05	21.83	6.23	1.18
HCl	750	1-hour average	13.01	1.73	17.16	2.29	0.55
HF	160	1-hour average	0.22	0.14	0.29	0.18	0.04
CO	10000	Maximum daily running 8-hour mean	21.16	0.21	27.15	0.27	0.06
	30000	1-hour average	32.51	0.11	42.95	0.14	0.03

Scenario 1 – change in impact of upgraded design

The modelling predicted a change in impact as a percentage of ES to range from –2.2% to 0.42% for operation at daily ELVs, and 0.03 to 2.33% for operation at short term ELVs.

Any increases in impact are less than 1% of the long-term and 10% of the short-term ES. For some pollutants the impact decreases due to the reduction in emission limits, whereas for pollutants where the emission limit is unchanged or only slightly lower there is a slight increase in impact due to the reduction in flus gas efflux velocity.

Scenario 2 – maximum predicted impact of upgraded design

Screening out emissions

(i) which are insignificant

From the tables above the majority of emissions can be screened out as insignificant as the PC is < 1% of the long term ES and <10% of the short term ES.

Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

(ii) which are unlikely to give rise to significant pollution

From the tables above (PCs in **bold**) the following emissions did not screen out as insignificant:

- Nitrogen dioxide (annual mean)
- VOCs as 1,3-butadiene (annual mean)
- cadmium (annual mean)
- sulphur dioxide (15-minute mean)

These have been further assessed below.

In the second stage of assessment, if the following requirements are met the substance is unlikely to give rise to significant pollution:

- the short term PC is less than 20% of the short term environmental standards minus twice the long term background concentration
- the long term PEC is less than 70% of the long term environmental standards

For **annual mean nitrogen dioxide** the impact on air quality from NO_2 emissions has been assessed against the ES of 40 $\mu g/m^3$ as a long term annual average. The model assumes a 70% NO_X to NO_2 conversion for the long term assessment in line with Environment Agency guidance on the use of air dispersion modelling.

The Applicant calculated the PEC predicted by the model is 92% of the ES. Conservative background concentration figures were used, assuming that the baseline concentration is the maximum roadside concentration recorded in the vicinity of the Facility in the most recent 5 years of monitoring. The PEC of nitrogen dioxide is greater than 70% of the ES. However, even with conservative assumptions on background concentration and maximum values on grid, the PEC remains below the ES.

The above tables show that the maximum long term PC for annual mean nitrogen dioxide is greater than 1% of the ES and therefore cannot be screened out as insignificant. However, the modelling shows the emission is not expected to result in the ES being exceeded. We are satisfied that the installation's operation is unlikely to result in a breach in the ES.

The air quality assessment stated **annual mean VOCs** (as 1,3-butadiene) is not monitored locally so the mapped background concentrations published by Defra for the grid square containing the Facility have been used as the baseline concentration. The PEC is predicted to be 18% of the ES, which means it can be considered not significant.

The above tables show that the maximum long term PC for annual mean VOCs is greater than 1% of the ES and therefore cannot be screened out as insignificant. However, the long term PEC is less than 70% of the long term ES. We are satisfied that the installation is unlikely to result in a breach in the ES.

For **annual mean cadmium**, the impact is much lower than for the existing facility (the emission limit value decreasing from 0.05 mg/Nm^3 to 0.02 mg/Nm^3

equivalent to a 2.2% reduction as a percentage of the ES), so represents an improvement on existing and does require further assessment.

We are satisfied with the Applicants conclusion.

For **15-minute mean sulphur dioxide** the above tables show that short term (15 minute) sulphur dioxide PCs cannot be screened out as insignificant. The applicant calculated the headroom for 15-minute mean sulphur dioxide as the ES minus the short-term baseline concentration, which has been assumed to be twice the annual mean concentration. The headroom is 266 µg/m³ - 10.94 µg/m³ = 255.06 µg/m³. The short term PC, assuming operation at the short-term ELV during the worst-case weather conditions for dispersion, is 31.65 µg/m³, equivalent to 12.41% of the headroom. As this is less than 20% of the headroom, the impact is considered not significant.

The above tables show short term PC for (15 minute) SO_2 emissions is greater than 1% of the ES and therefore cannot be screened out as insignificant. However, the short term PC is less than 20% of the short term ES minus twice the long term background concentration. We are satisfied that the installation is unlikely to give rise to a breach in the ES.

Conclusion

The assessment confirms that the change in stack efflux velocity will not change the original conclusions on impact from the facility.

All emissions either screen out as insignificant or where they do not screen out as insignificant are considered unlikely to give rise to significant pollution. Therefore, we are satisfied that there are no emissions requiring further assessment.

The installation design and operation has been scrutinised to ensure BAT is being applied to prevent and minimise emissions of these substances. This assessment was carried out as part of the permit review of this permit which is detailed in Part A of this Decision Document. Therefore, we consider the Applicants proposals for preventing and minimising emissions to be BAT for the installation.

Note:

During determination, new Environmental Assessment Levels (EALs) were formally implemented for thirteen pollutants, including some metals. The values were updated on the GOV.UK risk assessment page on 20 November 2023, *Air emissions risk assessment for your environmental permit - GOV.UK (www.gov.uk)*. Some of the EALs are significantly lower than before, in particular for a number of metals.

We checked the applicants modelling against these new EALs and carried out our own screening checks. We are satisfied that the new EALs do not change the conclusions of our audit.

Assessment of health effects from the upgraded plant

Our assessment of health impacts is summarised below:

1. We have applied the relevant requirements of the environmental legislation in imposing the permit conditions, which have been updated as part of the permit review, discussed in Part A of this document. We are satisfied that compliance with these conditions will ensure protection of the environment and human health.

2. In carrying out air dispersion modelling as part of the environmental impact assessment and comparing the PC and PEC with the ES, the Applicant has effectively made a health risk assessment for many pollutants. The ES have been developed primarily to protect human health. The Applicant's assessment indicated that for all pollutants, either the process contributions (PCs) are insignificant, or the predicted environmental concentrations (PEC) are below the Environmental Standards (ES) for air at all human health receptors. The change in impact from existing plant to upgraded plant is insignificant.

3. We have assessed the health effects from the operation of this installation in relation to the above. We have reviewed the methodology employed by the Applicant to carry out the air quality assessment. We have audited the consultant's assessment and considered the validity of their assumptions and the model setup. We have conducted our own check modelling. As a result, we find that:

    - For all pollutants, either PCs screen out as insignificant or PECs are below the ES at relevant human health receptors.
    - The change in impact from existing to upgraded plant is not significant.

4. We agree with the conclusion reached by UKHSA that modern, well run and regulated municipal waste incinerators are not a significant risk to public health. While it is not possible to rule out adverse health effects from these incinerators completely, any potential effect for people living close by is likely to be very small.

We are therefore satisfied that the Applicant's conclusions presented above are reliable, the change in impact from existing plant to upgraded plant is insignificant, and we conclude that the potential emissions of pollutants are unlikely to have a significant impact on human health.

Decision considerations

Confidential information

A claim for commercial or industrial confidentiality has not been made.

The decision was taken in accordance with our guidance on confidentiality.

Identifying confidential information

We have not identified information provided as part of the application that we consider to be confidential.

The decision was taken in accordance with our guidance on confidentiality.

Consultation

In accordance with the Environmental Permitting (England and Wales) Regulations (2016) we consult on some applications.

Our Public Participation Statement explains when and how we consult the public and organisations. As part of the consultation process, we publicise certain applications on GOV.UK. This is so the public and any other interested parties are aware of the application and can comment on it. We considered it appropriate to publicise the variation application in this case as the plant has remained inactive for waste treatment since July 2019 during the upgrading period (due for recommissioning late 2023/early 2024).

The comments and our responses are summarised in the consultation responses section.

Nature conservation, landscape, heritage and protected species and habitat designations

We have checked the location of the application to assess if it is within the screening distances we consider relevant for impacts on nature conservation, landscape, heritage and protected species and habitat designations. The application is within our screening distances for these designations.

The following habitats sites were considered:

The following Special Protection Areas (SPA) and Ramsar sites are located within 10 km of the Installation

- South West London Waterbodies Ramsar
- South West London Waterbodies SPA

There are no Sites of Special Scientific Interest (SSSI) within 2km of the Installation.

The following local wildlife sites are located within 2km of the Installation.

- Uxbridge and Hillingdon Cemeteries Local Wildlife Site (LWS)
- Home Covert, Lowdham Field and Pole Hill Open Space LWS
- River Pinn and Manor Farm Pastures LWS
- The Grove LWS
- Stockley Park Country Park LWS

Assessment of Impacts on South West London Waterbodies (SPA/Ramsar)

The site is approximately 7000 m to the south of the installation at the closet point. The designated site consists of a series of reservoirs and former gravel pits that support internally important numbers of wintering birds.

Oxides of nitrogen (NOx)

The environmental standards for NOx for protected conservation areas are:

- 30 µg/m^3 as an annual mean
- 200 µg/m^3 as a daily mean

The predicted long term PC is 0.56 µg/m^3. The predicted short term PC (emitting at short term ELV) is 16.76 µg/m^3 . As the PCs are less than 1% of the long term ES and 10% of the short term ES, emissions can be screened out as insignificant. NOx permitted emission limit from the plant is reducing to 180 mg/Nm^3.

We consider the impact from the upgrade can be considered insignificant.

Ammonia (NH_3)

The environmental standard for ammonia for protected conservation areas is 3 µg/m^3 as an annual mean (where lichens or bryophytes are not expected). Annual ammonia (PC 0.04 µg/m^3) is less than 1% of the ES so can be screened out as insignificant. The permit emission limit value is not changing.

We consider the impact from the upgrade can be considered insignificant.

Sulphur dioxide (SO_2)

The permitted emission limit for sulphur dioxide is reducing from 50 mg/Nm^3 to 40 mg/Nm^3 as a daily average.

We consider the impact from the upgrade can be considered insignificant.

Nutrient nitrogen deposition

APIS states that "*No comparable habitat with established critical load estimate available*" for South West London Waterbodies (SPA, Ramsar). Checks indicate that the condition of the site is in a 'favourable' condition. Permitted emissions of oxides of nitrogen are reducing and permitted ammonia emissions remain the same.

We consider the impact from the upgrade can be considered insignificant.

Acid deposition

The designated site consists of a series of reservoirs and former gravel pits that support internally important numbers of wintering birds (North Shoveler and Gadwell). For acid deposition APIS states that the species are not sensitive to acidity impact on their board habitat and checks indicate that the condition of the site is in a 'favourable' condition.

We consider the impact from the upgrade can be considered insignificant.

We are therefore satisfied that there will not be a significant impact on the South West London Waterbodies SPA and Ramsar.

Assessment of impact on Local Wildlife Sites

Conservation sites are protected in law by legislation which provides the highest level of protection for SACs and SPAs, and also for protection of protection for SSSIs. Finally, the Environment Act 1995 provides more generalised protection for flora and fauna rather than for specifically named conservation designations. It is under the Environment Act 1995 that we assess other sites (such as ancient woodlands, local wildlife sites and national and local nature reserves) which prevents us from permitting something that will result in significant pollution; and which offers levels of protection proportionate with other European and national legislation. However, it should not be assumed that because levels of protection are less stringent for these other sites, that they are not of considerable importance. Local sites link and support EU and national nature conservation sites together and hence help to maintain the UK's biodiversity resilience.

For SACs SPAs, Ramsars and SSSIs we consider the PC and the background levels in making an assessment of impact. In assessing the local nature sites under the Environment Act 1995 we look at the impact from the Installation alone to determine whether it would cause significant pollution. This is a proportionate approach, in line with the levels of protection offered by the conservation legislation to protect these other sites (which are generally more numerous than Natura 2000 or SSSIs) whilst ensuring that we do not restrict development.

Critical levels and loads are set to protect the most vulnerable habitat types. Thresholds change in accordance with the levels of protection afforded by the legislation. Therefore, the thresholds for SAC SPA and SSSI features are more stringent than those for local nature sites.

Therefore, we would generally conclude that the Installation is not causing significant pollution at these other sites if the PC is less than the relevant critical level or critical load, provided that the Applicant is using BAT to control emissions.

We have assessed the application and its potential to affect sites of nature conservation, landscape, heritage and protected species and habitat designations identified in the nature conservation screening report as part of the permitting process.

We consider that the application will not affect any site of nature conservation, landscape and heritage, and/or protected species or habitats identified.

We have not consulted Natural England.

The decision was taken in accordance with our guidance.

Environmental risk

We have reviewed the Operator's assessment of the environmental risk from the facility.

The Operator’s risk assessment is satisfactory.

The assessment shows that, applying the conservative criteria in our guidance on environmental risk assessment all emissions may be screened out as environmentally insignificant/not significant.

General operating techniques

The variation is proposing to change the reagent used in the acid gas abatement system.

The following reagents were considered by the operator as those available for the abatement of acid gases:

• Sodium Hydroxide (NaOH);

• Hydrated lime ($Ca(OH)_2$);

• Quicklime (CaO); and

• Sodium bicarbonate ($NaHCO_3$).

The only reagents which are suitable for a dry acid gas abatement system are hydrated lime and sodium bicarbonate, so only these reagents have been considered further in the BAT assessment.

There is no difference in the emissions to atmosphere from the two reagents. Both are able to achieve the same level of abatement and associated BAT-AELs for the abatement of acid gases.

The Photochemical Ozone Creation Potential (POCP) associated with the use of either reagent will be the same. Therefore, there is no difference between the two reagents.

Sodium bicarbonate has a higher optimum reaction temperature than lime, which means that slightly less heat is able to be recovered within the boiler. However, given that the Facility exports heat from the combustion process directly to the hospital, the overall reduction in energy available for export is very small. Therefore, it has been assumed that there is no impact on global warming potential from this very small difference. The reaction of hydrogen chloride and sulphur dioxide with sodium bicarbonate results in an emission of carbon dioxide whereas the reaction with lime does not.

Sodium bicarbonate ($NaHCO_3$) has better solid handling properties and a significantly lower stoichiometric ratio than hydrated lime ($Ca(OH)_2$). Furthermore, the health and safety considerations/controls associated with the handling of sodium bicarbonate are significantly less than those associated with the handling lime. $NaHCO_3$ and $Ca(OH)_2$ react with the acid gases to produce alkaline salts as the following equations illustrate:

$$NaHCO_3(solid) + HCl(\ gas\ ) \rightarrow NaCl(solid) + H_2O(\ gas) + CO_2(\ gas\ )$$

$$Ca\ (OH)_2\ (solid) + 2HCl\ (gas) \rightarrow CaCl_{\ 2\ (}solid) + 2H_2O\ (gas)$$

In order to promote the reactions above, excess quantities of sodium bicarbonate or lime will be required. The excess reagent is lost in the residue. The ratio between the quantity of reagent supplied and the minimum required for the reaction is called the “stoichiometric ratio”. For sodium bicarbonate, a stoichiometric ratio of 1.3 is required, whereas for lime, a stoichiometric ratio of around 1.8 is required. This initially appears to be economically advantageous for sodium bicarbonate in comparison to lime. However, due to the higher relative molecular weight, and the fewer molecules of acid gas reacting per molecule of $NaHCO_3$, the overall consumption of sodium bi-carbonate is actually 64% higher than $Ca(OH)_2$ on a mass basis. The reagent required to abate one kmol of hydrogen chloride was calculated as 109 kg of sodium bicarbonate and 67 kg of lime. Similarly, the reagent required to abate one kmol of sulphur dioxide was calculated as 218 kg of sodium bicarbonate and 133 kg of lime.

The stoichiometric ratio indicates that the amount of residue will be higher with the use of lime as a reagent. The residue production rate for abatement of one kmol of hydrogen chloride was calculated as 84 kg for sodium bicarbonate and 85 kg for lime.

The use of sodium bicarbonate has a number of advantages:

• Handling of sodium bicarbonate requires much less health and safety considerations/controls than handling of lime. Lime is a corrosive material and requires strict COSHH controls for handling and transfer.

• Sodium bicarbonate as a reagent will result in a smaller volume of residue being generated.

Taking the above into consideration, the use of sodium bicarbonate, when compared to lime, is considered to represent BAT for the abatement of acid gases.

The variation is also proposing to install ceramic-filters for the abatement of particulates.

The operators BAT assessment identified the following options for abatement of particulates:

- Ceramic filters
- Bag filters
- Electrostatic precipitators
- Wet scrubbers.

Ceramic filters are effective at abating emission of particulates and can achieve the BAT-AELs without any supplementary abatement techniques.

The typical operating range for bag filters is 80-200ºC. It is noted that bag filters are available which can operate at higher temperatures than this, but the availability of these is limited. The flue gases existing the boiler will be between 200ºC and 1200ºC. Therefore, due to the high flue gas temperatures, bag filters are not considered to represent BAT for the Facility.

Electrostatic precipitators are not capable of abating particulates to the BAT-AELs, and require supplementary techniques to abate particulates. Therefore, electrostatic precipitators are not considered to represent BAT for the Facility.

Wet scrubbing systems are typically utilised to provide the supplementary abatement of particulates and require supplementary techniques to abate particulates to achieve the BAT-AELs. Therefore, wet scrubbing systems are not considered to represent BAT for the Facility.

Taking the above into consideration, the operator considered that ceramic filters are considered to represent BAT.

We have reviewed the techniques proposed by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.

The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.

Operating techniques for emissions that do not screen out as insignificant

Emissions of Nitrogen dioxide (annual mean), VOCs as 1,3-butadiene (annual mean), cadmium (annual mean) and sulphur dioxide (15-minute mean) cannot be screened out as insignificant but can be assessed as unlikely to give rise to significant pollution (see Key Issues section). We have assessed whether the proposed techniques are Best Available Techniques (BAT).

The proposed techniques/ emission levels for emissions that do not screen out as insignificant are in line with the techniques and benchmark levels contained in the technical guidance and we consider them to represent appropriate techniques for the facility. The permit conditions enable compliance with relevant BAT reference documents (BREFs) and BAT Conclusions, and Emission Limit Values (ELVs deliver compliance with BAT-Associated Emission Levels (AELs).

Operating techniques for emissions that screen out as insignificant

All emissions except those above have been screened out as insignificant (see Key Issues section), and so we agree that the applicant's proposed techniques are Best Available Techniques (BAT) for the installation.

We consider that the emission limits included in the installation permit reflect the BAT for the sector.

National Air Pollution Control Programme

We have considered the National Air Pollution Control Programme as required by the National Emissions Ceilings Regulations 2018. By setting emission limit values in line with technical guidance we are minimising emissions to air. This will aid the delivery of national air quality targets. We do not consider that we need to include any additional conditions in this permit.

Updating permit conditions during consolidation

We have updated permit conditions to those in the current generic permit template as part of permit consolidation. The conditions will provide the same level of protection as those in the previous permits.

Pre-operational conditions (PO)

Based on the information in the application, we consider that we need to include pre-operational conditions prior to recommissioning of the Installation. We are using these conditions to require the Operator to confirm that the details and measures proposed in the Application have been adopted or implemented prior to the operation of the Installation. The following pre-operational conditions have been included in the permit:

- PO1 - The Applicant has stated in the Application that they will have an Environmental Management System (EMS). PO1 requires the Operator to provide a summary of the EMS prior to commissioning of the plant and to make available all EMS documentation for inspection.
- PO2 – not used
- PO3 – One of the principal waste streams produced at the Installation is incinerator bottom ash (IBA). IBA will normally be classified as non-hazardous waste. However, IBA is classified on the European List of Wastes as a “mirror entry”, which means IBA is a hazardous waste if it possesses a hazardous property relating to the content of dangerous substances. Monitoring of IBA at the Installation will be carried out in accordance with the requirements of Article 53(3) of IED. (Classification of IBA for its subsequent use or disposal is controlled by other legislation and so is not duplicated within the Permit). In order to ensure that the IBA residues are adequately characterised, pre-operational condition PO3 requires the Operator to provide a written plan for approval detailing the IBA sampling protocols. Table S3.4 requires the Operator to carry out an ongoing programme of monitoring.
- PO4 – requires the Operator to submit a commissioning plan prior recommissioning including timelines for completion. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and reports to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning will be required to be carried out in accordance with the commissioning plan as approved by the Environment Agency.
- PO5 – not used

- PO6 – the Operator is required to submit a report on the design of the furnace and combustion chamber. The report shall explain how the furnace has been designed to comply with the residence time and temperature requirements as defined by Chapter IV and Annex VI of the IED whilst operating under normal load and the most unfavourable operating conditions (including minimum turn down and overload conditions), and that the design includes sufficient monitoring ports to support subsequent validation of these requirements during commissioning.
- PO7 – not used
- PO8 – prior to commissioning the Operator must submit a report specifying arrangements for continuous and periodic monitoring of emissions to air to comply with Environment Agency guidance notes M1, M2 and M20. The report shall include plant and equipment details, including accreditation to MCERTS; methods and standards for sampling and analysis and details of monitoring locations, access and working platforms.
- PO9 – prior to commissioning the Operator must submit a methodology (having regard to Technical Report P4-100/TR Part 2 Validation of Combustion Conditions) to verify the residence time, minimum temperature and oxygen content of the gases in the furnace whilst operating under normal load, minimum turn down and overload conditions.

Emission limits

No emission limits have been added, amended or deleted as a result of this variation (see decision document for V003 above)

Monitoring

Monitoring has not changed as a result of this variation (see decision document for V003 above)

Management system

We are not aware of any reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.

The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.

Growth duty

We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit variation.

Paragraph 1.3 of the guidance says:

“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”

We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.

We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.

Consultation Responses

The following summarises the responses to our notice on GOV.UK for the public, and the way in which we have considered these in the determination process.

Representations from individual members of the public and community organisations

i. Representations from Individual Members of the Public

A total of 2 responses were received from individual members of the public.

Brief summary of issues raised	Summary of action taken

Request for public meeting to discuss impact on local residents – concerns expressed that process has been secretive	The application and supporting documents were advertised on Citizen Space for public comments, although normal variations are not routinely advertised as we recognised local groups/members of the public may have concerns. The Applicant also organised local engagement.
Concerns over historic odours, noise and air pollution.	Permit condition 3.4 Odour is in place to control and regulate odour. The site has an existing Odour Management Plan. No increased odour risk from the variation is anticipated. Permit condition 3.5 Noise is in place to control and regulate noise. The site has an existing Noise Management Plan. No increased noise risk from the variation is anticipated.

ii. Representations from Community and other Organisations

One response was received from a local community group

Brief summary of issues raised	Summary of action taken
Request public consultation process	The application and supporting documents were advertised on Citizen Space for public comments, although normal variations are not routinely advertised as we recognised local groups/members of the public may have concerns. The Applicant also organised local engagement

Request public meeting with NHS and government officials and access to the site to see what is happening	The Applicant has organised local engagement.
The proposed incinerator puts local residents at risk	We are satisfied that there will not be a significant impact on human health due to the Installation. Key issues section of this decision document has further details. The standards that we have used to assess against are set to protect all members of the public.
The proposed incinerator puts wildlife at risk	Our assessment at ecological sites is described in the Nature Conservation section. We are satisfied that there will not be a significant impact from the change in emissions as a result of the variation.
The site was decommissioned a number of years ago and it is against government policy for it to be re-established. Current UK guidelines are aimed at lowering greenhouse gas emissions.	The site has an existing environmental permit, which has never been surrendered. The refurbishment allows the installation to meet the requirements of the IED and Waste Incineration BREF requirements and represents an improvement on existing. Heat recovery is also being used (for the adjoining hospital) to optimise efficiency.

Appendix 1: Pre-Operational Conditions

Based on the information on the Application, we consider that we do need to impose pre-operational conditions. These conditions are set out below and referred to, where applicable, in the text of the decision document. We are using these conditions to require the Operator to confirm that the details and measures proposed in the Application have been adopted or implemented prior to the recommissioning of the Installation.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO1	Prior to the commencement of commissioning, the Operator shall send a summary of the site Environment Management System (EMS) to the Environment Agency and obtain the Environment Agency's written approval to the EMS summary. The summary shall include a copy of the full other than normal operating conditions (OTNOC) management plan which shall be prepared in accordance with BAT 18 of the BAT conclusions and include: • a list of potential OTNOC situations that are considered to be abnormal operation under the definition in Schedule 6 of this permit. • a definition of start-up and shut-down conditions having regard to any Environment Agency guidance on start-up and shut-down. • any updates on the design of critical equipment to minimise OTNOC since the permit application. The Operator shall make available for inspection all documents and procedures which form part of the EMS. The EMS shall be developed in line with the requirements set out in Environment Agency web guide on developing a management system for environmental permits (found on www.gov.uk) and BAT 1 of the incineration BAT conclusions. The EMS shall include the approved OTNOC management plan. The documents and procedures set out in the EMS shall form the written management system referenced in condition 1.1.1 (a) of the permit.
PO2	Not used.
PO3	Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency, and obtain the Environment Agency's written approval to it, a protocol for the sampling and testing of incinerator bottom ash for the purposes of assessing its hazard status. Sampling and testing shall be carried out in accordance with the protocol as approved.
PO4	Prior to the commencement of commissioning, the Operator shall submit to the Environment Agency, and obtain the Environment Agency's written approval to it, a written commissioning plan, including timelines for completion, for approval by the Environment Agency. The commissioning plan shall include the expected emissions to the environment during the different stages of commissioning, the expected durations of commissioning activities and the actions to be taken to protect the environment and report to the Environment Agency in the event that actual emissions exceed expected emissions. Commissioning shall be carried out in accordance with the commissioning plan as approved.
PO5	Not used.

Table S1.4 Pre-operational measures	
Reference	**Pre-operational measures**
PO6	No later than one month after the final design of the furnace and combustion chamber, the operator shall submit a written report to the Environment Agency, and obtain the Environment Agency's written approval to it, of the details of the computational fluid dynamic (CFD) modelling. The report shall explain how the furnace has been designed to comply with the residence time and temperature requirements as defined by Chapter IV and Annex VI of the IED whilst operating under normal load and the most unfavourable operating conditions (including minimum turn down and overload conditions), and that the design includes sufficient monitoring ports to support subsequent validation of these requirements during commissioning.
PO7	Not used.
PO8	At least three months before (or other date agreed in writing with the Environment Agency) the commencement of commissioning, the Operator shall submit a written report to the Environment Agency, and obtain the Environment Agency's written approval to it, specifying arrangements for continuous and periodic monitoring of emissions to air to comply with Environment Agency guidance notes M1, M2 and M20. The report shall include the following: • Plant and equipment details, including accreditation to MCERTS • Methods and standards for sampling and analysis • Details of monitoring locations, access and working platforms
PO9	At least 3 months before the commencement of commissioning (or other date agreed in writing with the Environment Agency) the Operator shall submit, for approval by the Environment Agency, a methodology (having regard to Technical Report P4-100/TR Part 2 Validation of Combustion Conditions) to verify the residence time, minimum temperature and oxygen content of the gases in the furnace whilst operating under normal load, minimum turn down and overload conditions.