

SECTION 7

Operating Techniques





OLIVE
Compliance

OPERATING TECHNIQUES

NTH SOLUTIONS LLP

UNIVERSITY OF NORTH TEES HOSPITAL

NORTH TEES AND HARTLEPOOL

NHS FOUNDATION TRUST

Osmotherley House

Stockton-on-Tees

TS19 8PE



North Tees and Hartlepool
NHS Foundation Trust

Olive Compliance Ltd

Planet House, , Northumbrian Way, Killingworth, NE12 6EH

Info@olivecompliance.com

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BASIS OF REPORT

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1.0 Introduction

The NHS clinical waste strategy sets a bold direction of travel for reforming the management of clinical waste, including specific actions for NHS estates teams:

- Ensuring 100% of NHS providers, including primary care managing agents, have fully trained waste managers to ensure waste is managed effectively and appropriately. The NHS is supporting this by establishing the first ever professional qualification in NHS waste management this year.
- Improving waste segregation and compliance by aiming for a 20-20-60 waste split – 20% incineration (yellow bag) waste, 20% infectious (orange bag) and 60% offensive waste.
- Making the management of waste contracts a priority for NHS trusts.
- Enabling NHS ownership and control of its own processing assets, including making use of innovative technologies to treat infectious waste on-site.

The NHS is one of the largest producers of waste in the country, and it is everyone's responsibility to segregate and dispose of waste in a safe, efficient and sustainable manner.

NTH Solutions LLP serves the University Hospital of North Tees – North Tees and Hartlepool NHS Foundation Trust (UHNT) who have invested in new technologies, plant and equipment to treat the clinical waste produced on site, with potential of treating clinical waste produced by partner Trusts in the most efficient manner by reducing carbon footprint, energy consumption and costs. The treatment process involves the maceration and microwave sterilisation of wastes suitable for alternative treatment technologies via Bertin 440 Sterilwave systems. The new treatment facility will be housed in the former boiler house located within the hospital grounds.

The former boiler house is located on the southern side of the hospital site and is composed of two distinct sections: a single-storey area built with a concrete frame and a cast-in-situ concrete roof, with a two-storey structure by means of a steel frame. The lower walls of the two-storey section are masonry up to around 3 meters, while the upper sections and roof are clad in metal.

The former boiler house has recently undergone significant internal modifications, to accommodate four Bertin 440 Sterilwave machines. The main section of the building, previously housing the boiler plant and equipment, has been stripped of these original installations. A partial refurbishment has prepared the space for a new role within the hospital's infrastructure. This refurbishment included filling in former service pits, laying a new floor screed, and installing associated drainage channels. These changes are designed to accommodate the new sterilisation units as part of the Hospital Trust's initiative to support an on-site waste sterilisation treatment scheme, for the safe processing and sterilisation of clinical waste.

NTH Solutions LLP (NTHS) have instructed Olive Compliance Limited (OCL) to prepare an application for a Bespoke Environmental Permit Application for their site at Osmotherley House, Stockton-on-Tees, TS19 8PE.

This document provides a summary of the key operational techniques and control measures that will be implemented at the site as a result of the proposed changes.

1.1 Report Structure

This report describes the operating techniques that are to be implemented at the facility to ensure compliance with the conditions of the Environmental Permit. The report has been drafted to satisfy the requirements of Environmental Agency (EA) Guidance¹ and is divided into the following Sections.

Section 1	Introduction
Section 2	Management
Section 3	Operations
Section 4	Emissions and Monitoring
Section 5	Information
Section 6	Closure

¹www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

2.0 Management

2.1 Management System

NTHS operate their own in-house management system which ensures that:

- the risks that the activities pose to the environment are identified
- the measures that are required to minimise the risks are identified
- the activities are managed in accordance with the management system
- performance against the management system is audited at regular intervals and
- the Environmental Permit is complied with

The management system is supplemented by this document which outlines the operating techniques at the site and demonstrates conformance with the requirements of relevant Environment Agency's guidance:

- Healthcare waste: appropriate measures for permitted facilities - Guidance
- Regulatory Guidance Note No.2: Understanding the meaning of regulated facility
- Non-hazardous and inert waste: appropriate measures for permitted facilities - Guidance
- RGN2 Appendices Note 5.3.4: Physico-chemical treatment - Regulatory Guidance Note No. 2 Understanding the meaning of regulated facility - Appendices 1 and 2
- Control and monitor emissions for your environmental permit - GOV.UK

NTHS are working towards ISO accreditation.

2.1.1 Management Structure and Responsibilities

The Operator/Site Manager is responsible for day-to-day operations and compliance with the Environmental Permit with support from the site Technical Competent Manager (TCM).

Whenever the site is open to receive or dispatch wastes, or will carry out any of the waste management operations, it will be supervised by at least one member of staff who is suitably trained and fully conversant with the requirements of the permit regarding:

- waste acceptance and control procedures
- operational controls
- maintenance
- record-keeping
- emergency action plans and
- notifications to the Environment Agency

2.1.2 Technical Competence and Training

The site will be managed by sufficient staff, competent to operate the site. The management system will deliver the following:

- all staff will have clearly defined roles and responsibilities
- records will be maintained of the skills required for each post
- records will be maintained of the training and relevant qualifications undertaken by staff to meet the requirement of each post and

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- operations will be governed by standard operating instructions

Operations at the site will be under the overall control of a technically competent person who holds the relevant Certificate of Technical Competence (COTC) under the Waste Management Industry Training and Advisory Board (WAMITAB) scheme.

Certificates are included within the application for the Technically Competent Manager.

An assessment of staff training needs will be carried out to identify the posts for which specific environmental awareness training is needed, and to determine the scope and level of such training.

The assessment of training needs will be reviewed on an annual basis. Refer to NTEES Env 120 (WTP) – Training Matrix.

Details of staff training procedures and recording are included within the management system.

The training programme will ensure that relevant staff are aware of the following:

- regulatory implications of the permit for the site and their specific work activity
- all potential environmental effects from operations under normal and abnormal circumstances
- the need to report deviations from the permit and
- prevention of accidental emissions and the action to be taken should accidental emissions occur

2.1.3 Site Security

Details of site security are included within the management system.

The site operates according to the hours stated below:

Monday to Friday:	07:00 – 17:00
Saturday-Sunday:	Closed
Bank/Public Holiday:	Closed

In order to prevent unauthorised access, a number of site security measures are in place at the site including:

- Secure gates which are locked when the site is not in use
- Fencing along the entire site boundary and
- CCTV coverage of all operational areas, with out of hours security monitoring

The site is located within the hospital grounds in which additional security measures are in place, with limited access to specific areas across the overall grounds, including the permitted operational site.

The site will be inspected at the commencement of each working day. Any defects or damage which compromises the integrity of the enclosure will be made secure by temporary repair as soon as is practicable. Permanent repairs will be affected as soon as practicable.

All inspections, any defects, damage or repairs will be recorded on the Site Inspection Form 1 and in the site diary.

2.1.4 Permit Surrender

To assist in permit surrender, records will be maintained to demonstrate how the land beneath the site has been protected at all times between the date of permit issue and the end of permit operations.

Records to be maintained will include:

- maintenance of site surfacing
- maintenance of drains and containment systems and
- actions taken to clean up incidents and spillages

2.1.5 Display of Environmental Permit

A copy of the Environmental Permit will be kept available for reference by all staff and contractors whose work may have an impact on the environment. All staff will be informed where the Environmental Permit is kept.

2.1.6 Managing Documentation and Records

Controls will be in place to ensure that all documents are issued, revised and maintained in a consistent approach.

The documents that will be included within the scope of the controls are as follows:

- policies
- responsibilities
- maintenance records
- procedures
- inspections and monitoring records
- results of reviews
- complaints and incident records and
- training records

Records will be made and kept up to date on a daily basis to reflect deliveries, on site treatment and dispatches. All records relating to waste acceptance will be maintained and kept readily available on site and kept for a minimum of 2 years after the waste has been removed off site.

2.1.7 Reporting Non-Compliance and Taking Corrective Action

Procedures as detailed in the EMS will ensure appropriate corrective action is taken in response to problems identified at the site. The procedure will ensure that non-conformances are reported, investigated and rectified, and that failures and weaknesses are prevented. The following aspects will be considered:

- actual or potential non-compliance
- system failure discovered at internal audit
- suppliers or sub-contractors breaking the agreed operating rules
- incidents, accidents, and emergencies
- malfunction, breakdown or failure of plant

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- other operational system failure and
- complaints.

The action taken in response to the non-conformance may include:

- obtaining additional information on the nature and extent of the non-conformance
- discussing and testing alternative solutions
- modifying procedures and responsibilities
- seeking approval for additional resources and training and
- contacting suppliers and contractors (as applicable)

2.1.8 Inspections and Legal Compliance

There are formalised internal inspection and auditing procedures to ensure the facility is audited at defined intervals and that the progress of corrective and preventative action is monitored.

Procedure NTEES Env 168 SOP (WTP) – Auditing outlines the auditing technique whilst the frequency and nature of the audits are outlined in the EMS.

2.1.9 Monitoring, Measuring and Reviewing Environmental Performance

A formalised management structure will review environmental performance, and ensure any necessary actions are taken.

2.1.10 Operational Control, Preventative Maintenance and Calibration

The management system will complement operational procedures so as to ensure effective control of site operations, the use of approved suppliers and contract services, the maintenance of operational equipment and the calibration of monitoring equipment.

All plant and equipment will be subject to a programme of planned preventative maintenance which will follow the inspection and maintenance schedule recommended by the manufacturer.

2.1.11 Design and Construction Quality Assurance

All relevant elements of the site (not already constructed) will be designed in accordance with recognised standards, methodologies and practices.

The design process will use a risk-based approach and will be appropriately documented using drawings, specifications and method statements where appropriate to provide an adequate audit trail.

A competent and suitably qualified person will supervise the construction activities.

2.2 Accident Management Plan

The NTHS recognises the importance of the prevention of accidents that may have environmental consequences and that it is crucial to limit those consequences.

An accident management plan will be implemented and maintained at the site to ensure the site and site staff are fully prepared for any such incidents. The accident management plan will be reviewed at least every four years or as soon as practicable after an incident, with changes made accordingly to minimise the risk of occurrence.

The following accident management plan describes the techniques that will be implemented to minimise the risks posed to the environment. Activities affecting the health and safety (H&S) of operatives, contractors and visitors will be separately managed in compliance with H&S Regulations and NTH Solutions LLP policies such as Ref. NTEES Env 150 Policy (WTP) – Local – Waste Plant Staff Compliance and Ref. NTEES Env 151 Policy (WTP) – Management of Contractors Policy.

2.2.1 Hazard Identification

The following accident hazards have been identified from the Environment Agency's Generic Risk Assessments:

- Unauthorised Waste Acceptance
- Flooding
- Arson and/or Vandalism
- Accidental Fire and
- Spillage of Liquids

The company will employ a number of measures to prevent the realisation of these hazards to the environment and human health.

The Accident Procedure NTEES Env 166 SOP (WTP) – Accident Management can be found within the EMS.

2.2.2 Unauthorised Waste

Acceptance of unauthorised materials has the potential to cause harm to the environment and human health for example the receipt of dusty wastes could impact the amenity of the site's neighbours. All wastes received at the site will be subject to inspection and checking against the declaration on the hazardous waste consignment note. In the event that unauthorised waste is delivered to the site, the waste will be segregated and stored in a designated quarantine area within the building prior to export from site to a suitably permitted facility for recovery or disposal.

The waste acceptance procedures, NTEES Env 218 SOP (WTP) – Waste Acceptance and NTEES Env 136 Form (WTP) – Waste Acceptance Checklist are included in the EMS.

2.2.3 Fire Prevention Plan

The risk of accidental combustion of the waste types accepted at the site is very low.

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- incompatible materials will not be accepted at the site
- the plant inspection schedule will include checks of electrical equipment within the site to ensure that any faults are identified and repaired
- fire extinguishers will be provided at designated locations
- smoking will not be permitted in the operational areas of the site
- working practices will ensure the assessment of fire hazards and training of employees in fire prevention, e.g. the use of fire extinguishers and emergency procedures and
- no wastes will be burned on the site and any fire at the site will be treated as an emergency

In the event of a major fire, the following action will be taken:

- the Operator/Site Manager and Fire and Rescue Service will be notified immediately and the Environment Agency as soon as practicable
- the burning area will be isolated, and attempts will be made to extinguish the fire utilising the onsite fire extinguishers if safe to do so and
- the site and buildings will be evacuated

The site has emergency fire procedures in place within the EMS supported by onsite measures such as traffic management plan, emergency contacts, fire extinguisher and hydrant location plans.

2.2.4 Loss of Containment

Loss of containment could lead to spillage and leakage of potentially contaminating liquids. To prevent loss of containment and minimise the risk and impact of releases the following measures will be implemented:

- *Containment system:* any facilities for the storage of oils, fuels or chemicals will be sited above ground on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound will be at least the equivalent to the capacity of the tank plus 10%. All filling points, vents and gauges will be located within the bund.
- *Storage tanks:* storage tanks will be constructed to the appropriate British Standard CIRIA
- *Inspection:* tanks will be inspected visually on a daily basis by the site staff to ensure the continued integrity of the tanks, and identify the requirement for any remedial action
- *Spill kits:* materials suitable for absorbing and containing minor spillages will be maintained on site; and
- *Monitoring techniques:* the site staff will undertake daily monitoring for evidence of spillage and leakage.

In the event of any potentially polluting leak or spillage occurring on site, the following action will be taken:

- Minor spillages will be cleaned up immediately, using sand or proprietary absorbent. The resultant materials will be placed into containers and will then be removed from site and disposed of at a suitably permitted facility. The incident will be logged in the site diary.
- Any dry wastes spilled on site will be collected and transported to the appropriate area of the site.
- In the event of a major spillage, which is causing or is likely to cause polluting emissions to the environment, immediate action will be taken to contain the spillage and prevent liquid from entering surface water or drains. The spillage will be cleared immediately and placed in containers for offsite disposal, and the Environment Agency will be informed.

The spillage procedure NTEES Env 226 SOP (WTP) – Spillage Response Procedure is included in the EMS.

2.2.5 Security and Vandalism

As detailed in Security Management the following security measures are in place:

- *Site perimeter*: the site benefits from being located within the Hospital grounds surrounded by buildings and palisade fencing/wall.
- *Security gates*: will be locked at all times when the facility is unattended, and the site gate will be locked when the site is not in use at the entrance of the site
- *Inspection*: gates, fencing extending around the site will be inspected regularly by the operations staff to identify deterioration and damage, and the need for any repairs
- *Maintenance and repair*: gates and fencing will be maintained and repaired to ensure their continued integrity. In the event that damage is sustained repairs will be made by the end of the working day. If this is not possible, suitable measures will be taken to prevent any unauthorised access to the site and permanent repairs will be affected as soon as practicable
- *Authorised access system*: all visitors to the site will be required to register in the visitor's book and sign out again on exit to minimise the risk of unauthorised visitors being present on site
- *Monitoring techniques*: operational procedures, including regular inspections will ensure continual monitoring of security provision at the site

In the event of a breach of security at the site, the cause will be investigated, and appropriate mitigation measures implemented. Records to be maintained include inspections and maintenance of security fencing, gates, breaches of security, investigations and actions taken.

2.2.6 Flooding

The site is not identified to be in a flood risk area. NTHS have addressed the potential risk of emergency flood in their EMS. Ref. NTEES Env 141 Plan (WTP) - Climate Change & Adverse Weather and in their procedure Ref. NTEES Env 178 SOP (WTP) – Emergency Flood Response.

3.0 Operations

3.1 Process Description

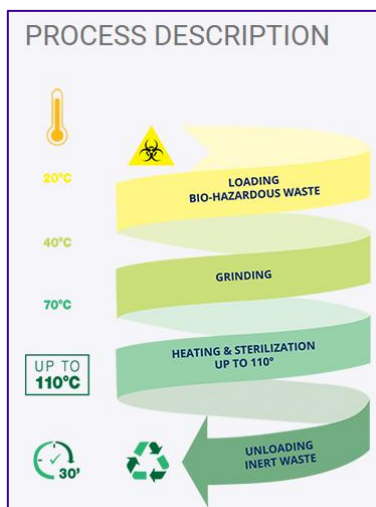
Wastes will be accepted in accordance with waste acceptance procedures set out below. Wastes accepted at the site for processing will undergo one or a number of the following checks prior to treatment on site.

- Pre-Acceptance
- Waste Acceptance
- Waste Carriers
- Waste Transfer Notes

The process involves the maceration and microwave sterilisation of wastes suitable for alternative treatment technologies via Bertin 440 Sterilwave systems.

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As it uses the microwave technology, Sterilwave is the easiest, most efficient and economical solution to manage medical waste onsite.

Waste management method	 Waste output			 Weight reduction	 Volume reduction	 Immediate installation No specific construction required	 Zero effluents No polluting emissions
	Dry	Stable	Sterilized				
STERILWAVE	✓	✓	✓	✓	✓	✓	✓

The best alternative to autoclave and incineration solutions – detailed comparison:

	 AUTOCLAVE	 INCINERATION	 STERILWAVE
Technology	Temperature under pressure over 130 °C Require a steam-powered generator	Incineration on specific location. Require special carrier (expensive)	Based on microwave technology, simple and efficient (heating at 100°-110°C) More efficient than Autoclave technology (confirmed by WHO)
Pressure / authorization Risk in case of error	Working under pressure (several bars of saturated steam); Specific authorization to work under pressure; Require many maintenance tasks; High risk in case of human error	NC	Ambient pressure Safe to operate and maintain Limited Risk in case of Human error
Integrated grinding system	Slow shredding <20 mm output size	No	Yes by rotate blade: 1500 RPM <10mm output size
Disinfection efficiency	from 5 log to 8 log10 (depending the brand model)	Complete destruction	Up to 8 log10 more than 6 log 10 for virus
Output Waste after treatment	Volume reduction up to 80%; Wet waste; Increase of the weight 20% due to water and steam	Complete destruction Ashes	Volume reduction up to 80% Dry Waste Weight reduction of 25% Easy to recycle
Operation cost	Cost for energy, water, spar parts and consumables	Cost for Energy, filters, maintenance	Lowest running cost for consumables, energy and maintenance
Environmental impact	Medium → Require important volume of water → Liquid effluents	Negative → Pollution → Special carrier of ashes always requested → POPs, Toxins	Positive → On-site waste treatment → No effluents → Volume and weight reduction of the treated waste → Only require electricity

Key benefits:

- Efficient microbial inactivation up to 8log10 (compliant with international standards).
- Safe: no irradiation risk, no pressure on the vessel, no chemicals

- Eco-friendly: 100% electric (No water, no liquid, circular economy possibilities).
- Adapted to any type of medical waste without specific segregation (plastics, sharps & needles, blood bags, textiles, anatomical waste etc.).
- Low operating cost and easy maintenance (Low energy consumption, low maintenance cost and low operating costs on the market).

Microwave treatment via four standalone Sterilwave machines – the sterilisation and shredding process will take place entirely enclosed (the Sterilwave machine is an enclosed unit) and the Sterilwave machines are located within the designated building, known as the Boiler House. Each Sterilwave machine is designed to minimise point source emissions to air, specifically the emission of bioaerosols, compounds with the potential to cause odour, and volatile organic compounds.

Each unit is fitted with HEPA filters to prevent the emissions of bio-aerosols during the process. HEPA filters are high efficiency filters that typically capture over 99.5% of all particulate pollution. They're made from either plastic (PP+PET) or fiberglass, and can capture particulates such as like viruses, bacteria, mould and PM2.5. Diffusion also means they are highly effective at also capturing nanoparticles. Once used, the filters are then replaced and the spent filters are transferred to a permitted treatment/disposal facility.

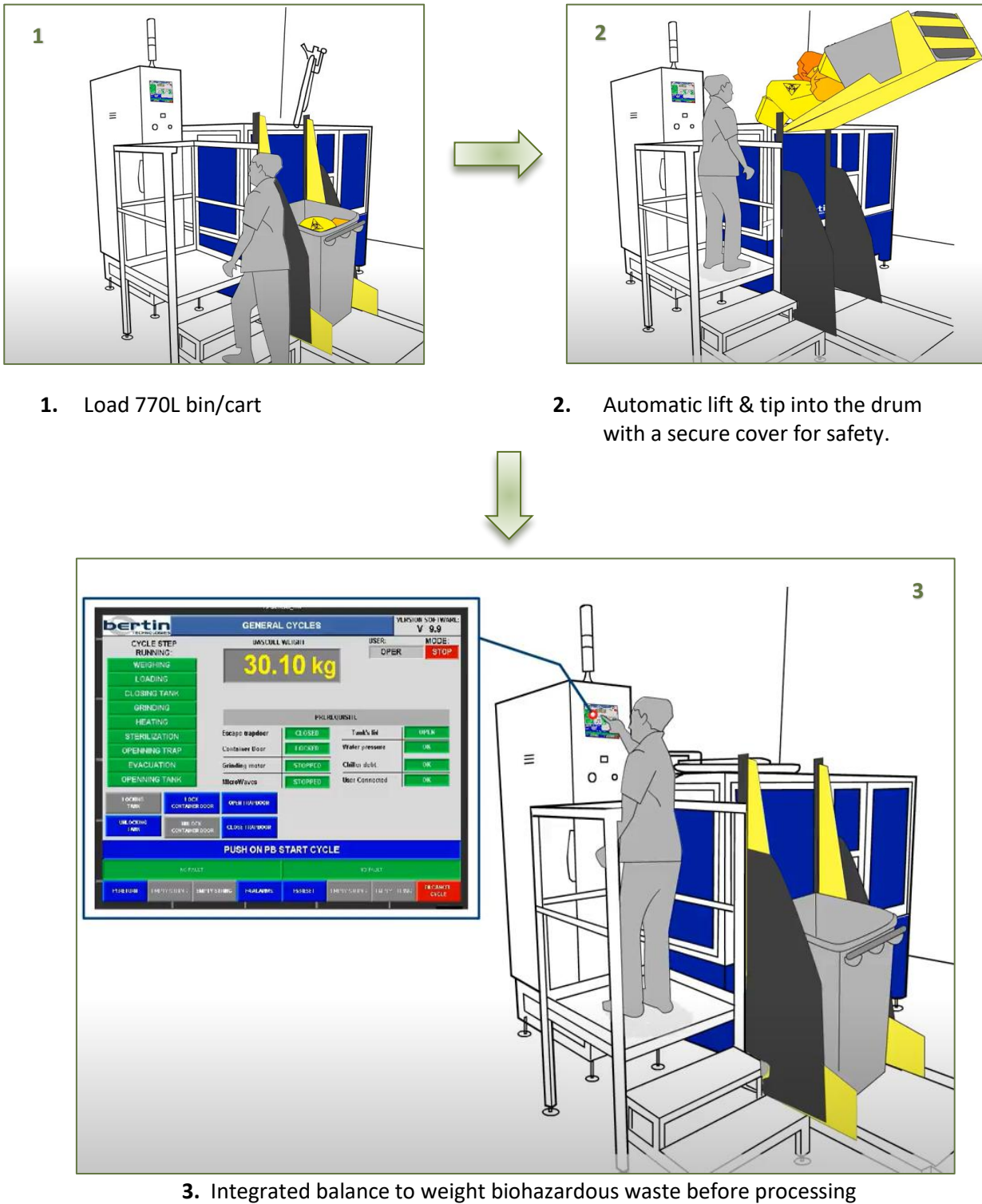
The treatment process begins with the shredding of a batch of clinical waste to break it up to a form that enables efficient microwave treatment to be applied. A 770-litre waste bin is loaded onto the Sterilwave machine where it is automatically tipped into the drum. The dirty bin is transferred to the bin wash area. The machine is locked where the shredding, heating and treatment process begins. Rotative blades begin shredding the waste where in this phase, heat typically builds up to a drum temperature of 80°C. The clinical waste is sterilised using dynamic force [heat] within the drum during the shredding phase to reach the required sterilisation parameters, then microwaving is 'auto introduced' to ensure compliant residence time and temperatures of 110°C are achieved. The end waste product is classified as EWC 19 12 10, a sterile Refuse Derived Fuel (RDF) with a CV of approximately 16MJ/KG.

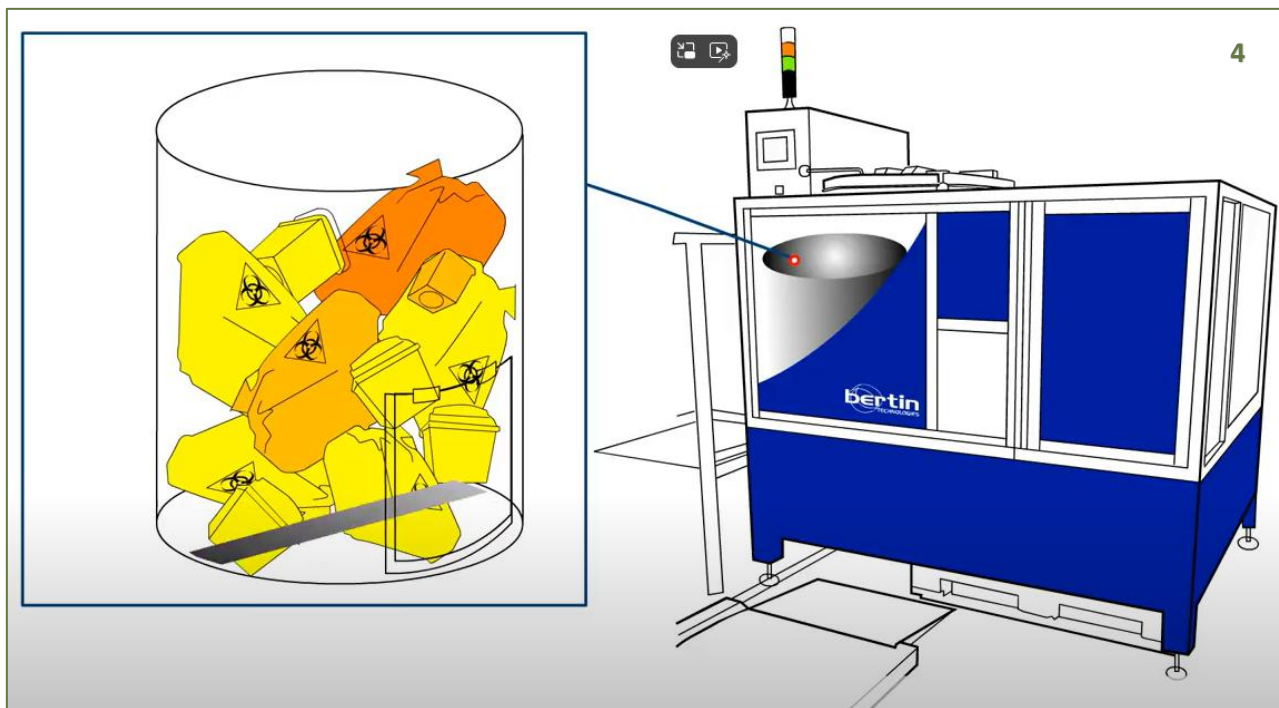
Shredding of wastes during the microwave treatment process minimises the potential for bio-aerosols emissions. The Sterilwave machines do not produce liquids requiring discharges. Each Sterilwave machine has an air extract system which fans air from the shredder/treatment chamber through a HEPA filter ducting pipe to the atmosphere via emission point A1 which also has a HEPA air filter, providing odour control.

The treatment process is displayed in eight stages in Diagram 1 below.

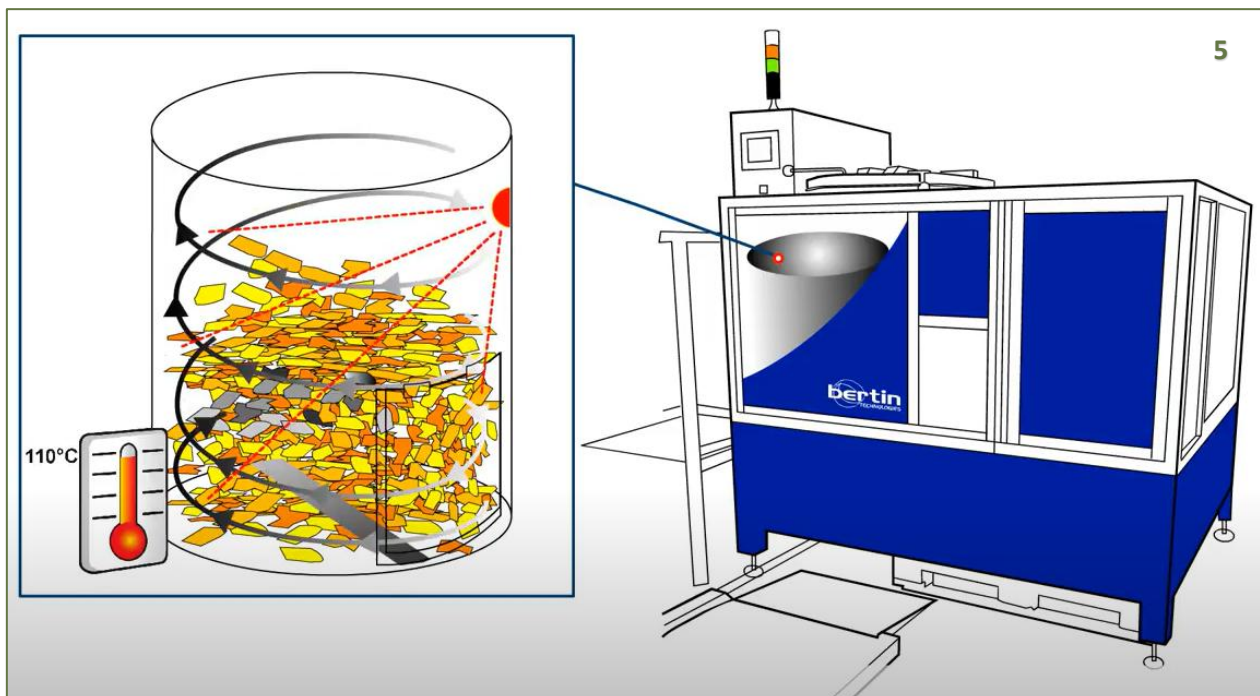
Diagram 1

Eight Staged Treatment Process



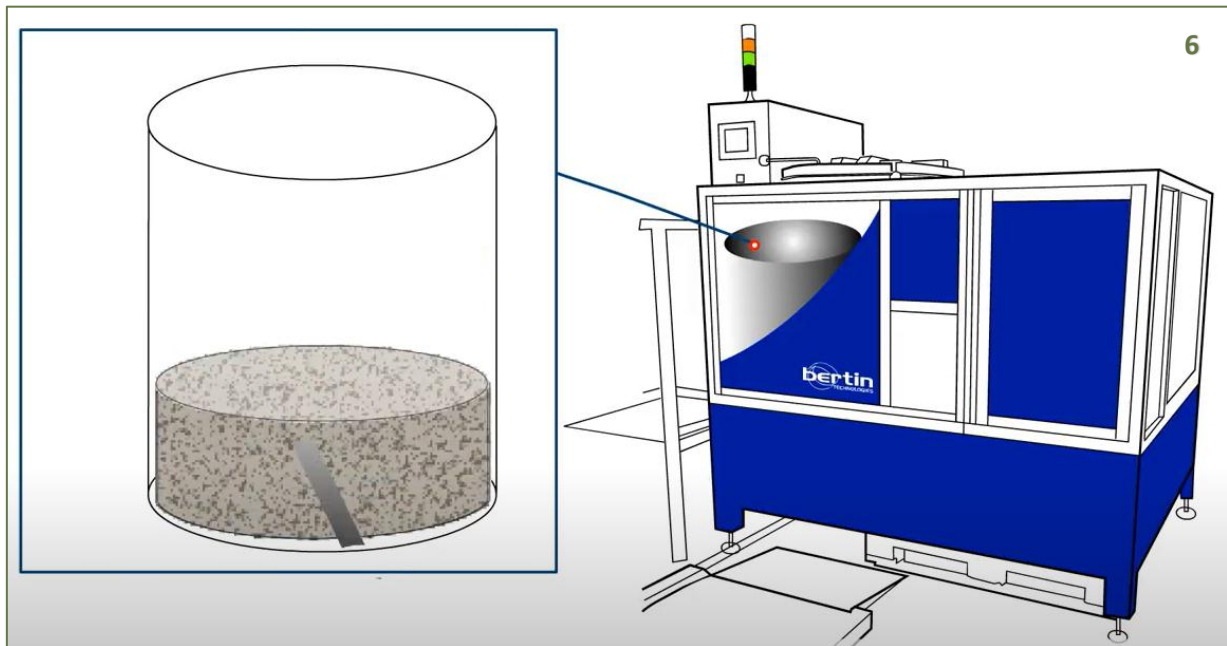


4. First step – waste shredding and grinding.

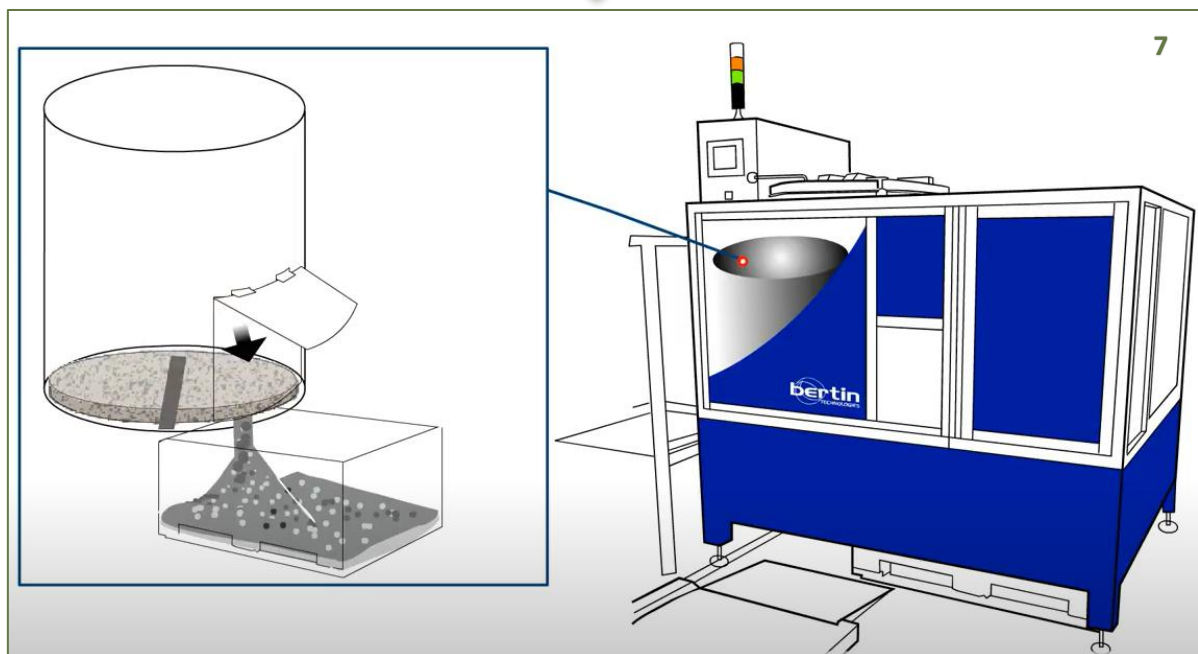


5. Second step – Microwave emission for disinfection process. Up to $110^{\circ}\text{C} \geq 8 \log 10$

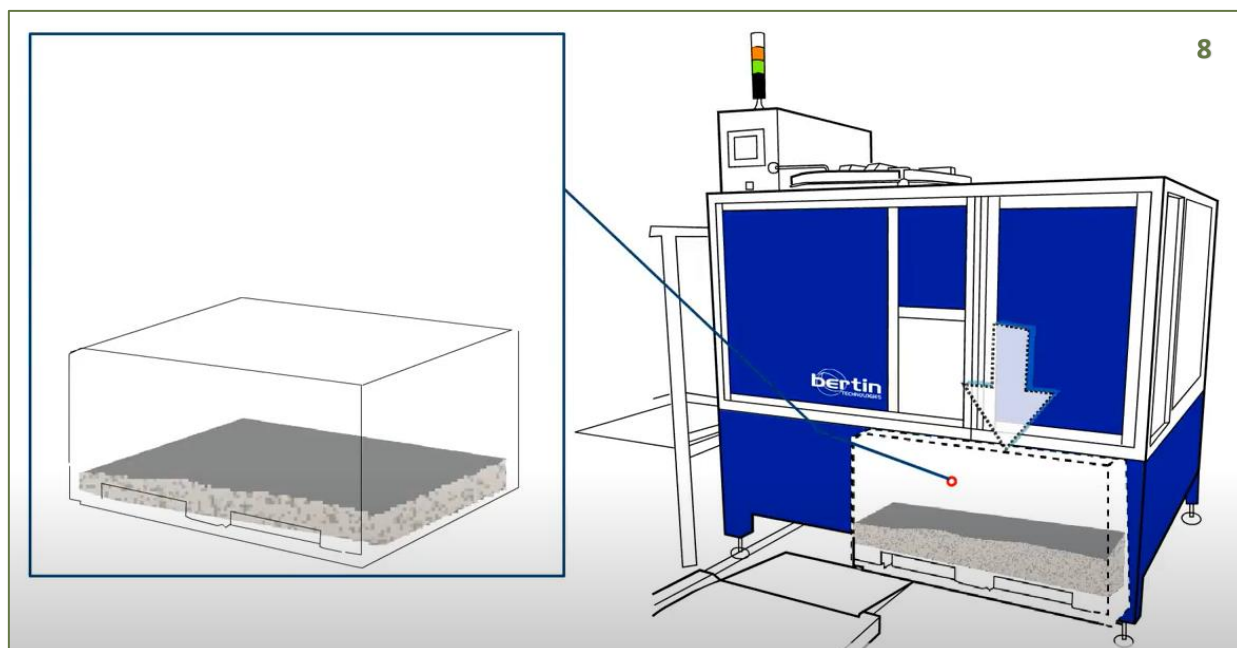




6. Bacterial inactivation up to 5log 10. Conform to NEX30-503 and STAAT level III



7. Disinfected waste is transferred into a container



8. Using a tank volume of 440L and an average of 36 minutes to process up to 70kg/hour to transform biohazardous waste into inert municipal waste, with an 80% volume reduction and 25% weight reduction.

3.2 Permitted Activities

The waste management activities carried out are described and limited to those within the site's bespoke permit. The activities are specified in Annex I and Annex II of the Waste Framework Directive 2008.

Treatment of both non-hazardous and hazardous clinical waste arising from the University Hospital of North Tees (where the activity is located) and the wider community.

Waste will be received and treated separately in Sterilwave units. All waste will be shredded inside the unit and hazardous loads will be disinfected by using microwaves. A floc classified as Refuse Derived Fuel (RDF) will be produced. The RDF will be stored within a 15-tonne compactor before being transported off site.

The facility will also house a purpose designed hot water wash to clean the bins before their return to the hospital or relevant providers.

3.2.1 Site Identification Board

A site identification board which is easily readable from outside the entrance during hours of daylight will be provided at or near the main site entrance.

The identification board will be inspected at least once per week. In the event of damage or defect that significantly affects the legibility of the board it will be repaired or replaced within a timescale agreed with the Environment Agency.

The board will display the following information:

- Site name and address

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- Permit holder
- Permit number(s)
- Emergency contact name and telephone number
- Environment Agency national telephone numbers; and
- Days and hours site is open to receive waste.

3.2.2 Hours of Operation

Hours of operation for the receipt, treatment, disposal, and transfer of waste shall normally be:

Mon-Fri: 07:00-17:00

Weekend: Closed

Bank Holiday: Closed

3.2.3 Permitted Types and Quantities of Waste

The list of EWC waste types proposed for the new permit are as follows:

- 18 01 03* - wastes whose collection and disposal is subject to special requirements in order to prevent infection
- 18 01 04 - wastes whose collection and disposal is not subject to special requirements in order to prevent infection (for example dressings, plaster casts, linen, disposable clothing, diapers)
- 18 02 02* - wastes whose collection and disposal is subject to special requirements in order to prevent infection
- 18 02 03 – wastes whose collection and disposal is not subject to special requirements in order to prevent infection

The site proposes to accept 5000 tonnes of waste per annum.

3.3 Pre-Acceptance of Waste

NTHS have implemented waste pre-acceptance procedures to ensure a full description and composition of the waste is known before it arrives at the site and that the waste is technically and legally suitable for treatment on site. The procedures follow a risk-based approach, considering:

- the source and nature of the waste
- its hazardous properties
- potential risks to process safety, occupational safety and the environment e.g. odour
- knowledge about the previous waste holder(s) (in most cases the waste received will be produced by the Hospital)

NTHS will provide advice to the Hospital and external waste producers about segregating and packaging waste as referenced in the HTM 07 01². Consideration should be given to the waste type and the waste disposal or recovery route required.

If a customer query is received, the following information will be requested in writing:

- details including the address and contact information of the waste producer e.g. the Hospital department/ward, medical practice, healthcare centre etc.
- the specific source of the waste e.g. primary care, acute care, laboratory etc.
- details of the waste streams and types produced, including quantity, physical form, composition, properties, classification and description.

Before the waste arrives at the site, NTHS will request a representative waste pre-acceptance audit report from the waste producer.

The audit report must include the following general information:

- the name, address and contact details of the healthcare waste practice
- the type of practice, e.g. hospital, general practice
- dates for when the audit started and ended
- a description of the audit, the procedures employed, the auditors, their affiliation and their competence

The audit report must also:

- identify whether the correct waste type was present in the container or packaging when it was checked during the audit.
- a list (or diagram) of the different wards, departments, or functional areas that exist within the premises.
- a list which waste types are produced by each ward, department or area within the premises. waste types identified during the audit
- the waste's written description, type and classification, including List of Waste (LoW) codes
- the type and colour-coding of the container or packaging the waste is placed in
- how the packaging is labelled
- physical form and composition
- hazardous properties
- the segregation practices for wastes placed in storage areas and bulk containers or carts
- specific storage requirements, e.g. cold storage or freezing
- the contents of a representative number of each type of bulk container that were checked visually

² NHS England » Health Technical Memorandum 07-01: Safe and sustainable management of healthcare waste

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- discussions held with staff that establish the validity of the segregation and storage standards, and the observation and recording of actual practice
- the findings made for each waste stream, and where applicable, the changes made as a result of this or previous audits
- information on waste policies, staff training, internal audit regimes, and environmental management systems
- the estimated quantity of each waste expected to be delivered to the operator from the medical practice per year and in a typical load
- confirmation that waste does not contain a radioactive source or, when there is a risk of radioactive contamination, confirmation that the waste is not radioactive

NTH Solutions LLP will stringently follow the Pre-acceptance Procedure NTEES Env 220 SOP (WTP) – Waste Pre-Acceptance along with the EA guidance, Healthcare Waste: Appropriate Measures for Permitted Facilities Guidance (13/07/2020) and the Clinical waste: additional guidance - How to comply with your Environmental Permit (January 2011) to ensure compliance with pre-acceptance of waste measures are achieved.

3.4 Waste Acceptance

3.4.1 Load Inspection and Waste Control

NTHS have implemented waste acceptance procedures to check that the characteristics of the waste received matches the information obtained during the waste pre-acceptance stage. Following these procedures will confirm that the waste is as expected and it can be accepted on site. If it is not, it must be either accepted as a non-conforming waste and quarantined, or it must be rejected.

The procedures follow a risk-based approach, considering:

- the source, nature and age of the waste
- the waste's hazardous properties
- potential risks to process safety, occupational safety and the environment (for example, from odour and other emissions)
- knowledge about the previous waste holder(s)

Waste must be offloaded, manoeuvred and stored correctly in line with the procedures and suitable risk assessments in place.

There are certain risks associated with the reception and storage of waste. These include:

- **Moving vehicles** – Vehicles should only be off-loaded in designated areas. Ensure that PPE is worn at all times. Only competent persons should act as banksmen.
- **Working at height** – Only drivers should access the top floor of double deck vehicles. Ensure that PPE is worn at all times. Ensure that drivers are using tail lift gates, straps and flaps during off-loading. Ensure that gates are used when offloading onto plant mezzanine floors.

- **Manual handling** – Operatives should be trained in correct manual handling. Ensure that exceptionally heavy carts are reported and seek assistance to move them where required. Where loose waste handling is required, operatives should be trained in loose waste handling.
- **Needle stick injuries** – When handling loose waste the loose waste handling instructions must be adhered to. Ensure that PPE including needle stick gloves is worn.
- **Spillage or leak of waste** – Ensure that vehicles are checked for leaks or spillages, and that loose waste is handled carefully during transfer. Ensure that any spillages are cleaned up promptly in accordance with the spill response procedures.
- **Infection** – Wastes handled by the Company carry the risk of infection because they may contain dangerous pathogens, viruses or bacteria. Ensure that the appropriate PPE (e.g. gloves) are worn at all times and that hands are washed prior to eating, drinking, smoking and using the toilet.

Regardless of the type of delivery any evidence of leakage must be reported as an incident in accordance with the NTHS's Incident Reporting Procedure (Ref: NTEES Env 189 SOP (WTP) – Incident Reporting.

The following details must be recorded on the incident report:

- Carrier name and vehicle registration details
- The nature of the leak and the measures taken to control the leak.

Majority of wastes arriving to the treatment facility will be produced on site by the Hospital and are booked in prior to being transferred across. All vehicles arriving on site from external waste producers will be booked in prior to arrival. All waste loads will be agreed prior to arrival, where the load will be visually inspected upon collection, if possible, in order to confirm its description and composition against the transfer note and other accompanying documentation.

All wastes will be characterised during the pre-acceptance stage of the waste acceptance process, which will include the customer (waste producer) providing information such as a representative waste pre-acceptance audit report (which may include where a healthcare professional identifies through risk assessment that waste may be infectious) and a WM3 assessment, to ensure that the waste has been correctly classified and permitted for acceptance and treatment.

Before accepting the waste, a NTHS waste operative shall confirm that there is sufficient capacity on the site to accept the waste by either:

- For waste delivered loose, ensuring that there are sufficient empty carts available for the waste and that there is sufficient space within the designated storage area to store the carts once full; or
- For waste delivered in bins, ensuring that there is sufficient space within the designated storage area to store the bins; or
- For waste delivered in large vehicles, ensuring that there is space available within the facility yard to park and unload the carts/bins. Ref. NTEES Env 160 Risk Assessment (WTP) – Site Traffic Management.
- If there is insufficient capacity to accept the waste onto site the driver shall be asked to wait and the Operational Manager/TCM should be notified. The waste must only be offloaded once there is sufficient capacity available.
- If there is sufficient capacity available to accept the waste then a NTHS waste operative shall review the waste Duty of Care/Hazardous Waste Consignment note(s)) to ensure they have been completed in accordance with the regulations.

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The container labelling/barcode will be checked to confirm that the information relating to the waste producer, waste description, chemical identity, associated hazards and other carriage notion is correct.

Once received on site each individual waste cart/bin will be clearly identified with the following information:

- Date of arrival
- Relevant hazardous property code(s)
- The chemical identity /composition
- The unique reference number that allows identification through stock control and reference back to the Pre-acceptance and Acceptance records

The incoming verification sheet will show the location of each individual waste cart/bin as it is tracked through the system from acceptance to storage to treatment.

Wastes will only be accepted at the site if the description in the accompanying documentation is in accordance with the pre-acceptance documentation, the permit conditions and the onsite inspection confirms waste is consistent with the description provided.

3.4.2 Waste Rejection

Wastes will not be accepted unless the site is adequately resourced to receive the waste.

Should wastes be found not to conform during the initial visual inspection of the bins or of the accompanying documentation, the Operational Manager/Technically Competent Manager shall take the decision to reject the waste and follow the Waste Rejection Procedure Refer: NTEES Env 221 SOP (WTP) – Waste Rejection, which includes the following details:

- The quarantined containers shall be marked for rejection removed to a designated quarantine area as appropriate
- If the hazard labelling is incorrect, correct hazard labelling shall be affixed to the containers (and the threshold values for the site re-assessed for hazardous waste storage)
- The producer shall be advised of the reasons for rejection, including the non-conformance report and any supplementary documents e.g. photographs
- The waste producer shall be informed of the time frame in which materials are to be removed from our site

Records of non-compliant waste received at the site will include details on:

- the quantity
- characteristics
- origin
- delivery date and time and
- the identity of the producer and carrier

A record will be kept in a log of all rejected wastes and a note in the site diary, which shall be available for Environment Agency inspection.

The Environment Agency will be notified of significant non- conformance.

3.4.3 Means of Measurement

The quantity of waste accepted and dispatched from the facility will be measured by the size and volume of the bins holding the waste and weighed on the onsite scales, to record the volume of waste entering the site. All wastes entering the site will be recorded upon arrival and the waste removed from site for disposal for further recovery or reuse will also be recorded on exit.

3.5 Waste Storage

Maximum waste storage on site at any one time will be managed in accordance with the site's Site Layout & Process Plan (NTH Solutions LLP 003 Site Layout and Process Plan).

All incoming wastes are firstly stored in the external yard in lockable bins/containers before being transferred into the process building. The external storage area and internal flooring to the building benefits from a concrete impermeable surface.

3.6 Waste Treatment

The Sterilwave machines will safely process and sterilise the clinical waste streams accepted on site, using microwave technology. All waste treated by the Sterilwave system will become EWC 19 12 10 combustible waste (Refuse Derived Fuel – RDF). This waste is in the form of sterile floc material and can be tipped into a 15-tonne compactor unit for collection by a third-party waste contractor. The waste floc is unrecognisable as medical origin waste and can be designated as a Recycled Derived Fuel (RDF) with a Calorific Value (CV) of approximate 14MJ/KG. The intention is to ensure that the floc is used to feed energy from waste plants (such as cementation plants and specially adapted and licensed R1 plants) or in Biomass Plants in the UK. This waste, once processed and sterile, can also be taken to any permitted landfill or municipal waste incinerator.

3.6.1 Bin Wash

The facility will house a bin wash machine, with a wash chamber to accommodate 1 x 770 litre bin per cycle, with a maximum of 8 x bin washes per hour dependent on the degree and type of contamination. Each machine cycle consists of:

- Recirculated time variable hot water chemical wash at 50-60°C
- A powered hot water rinse operating at 85°C AND/OR a mains water rinse + sanitiser chemical additive

The machine operation is an automatic process which includes the following stages:

1. Operator wheels bin into position at load station and resets safety light curtain
2. Operator selects wash time and presses start cycle button
3. Bin will load into machine and door closes
4. Bin washed on EXTERNAL and INTERNAL surfaces
5. Bin rinsed with hot water AND/OR ambient chemical sanitised water
6. Door opens, and bin is unloaded from machine
7. Operator removes bin from the load station

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The operator will transfer the clean bin onto the 'drip/dry' area before being transferred to the clean bin storage area.

3.6.2 Plant and Equipment

All items of plant and equipment used on site will be maintained in accordance with manufacturer's recommendations.

4.0 EMISSIONS AND MONITORING

The site will be operated so that there will be no fugitive emissions to air, surface water, groundwater or land.

4.1 Surface Water and Groundwater

The site will accept permitted wastes only and will be operated to prevent fugitive emissions to surface water and groundwater.

4.1.2 Engineered Containment

All waste will be stored on an impermeable surface with a sealed drainage system.

4.1.2 Containment Bunding

No waste liquid materials will be accepted on site. All potentially polluting raw materials for example oils and fuels will be stored in containers provided with secondary containment. Containers and secondary containment will be impermeable, resistant to the stored materials and constructed to the appropriate British Standard.

Containers will be surrounded by a leakage containment bund capable of containing at least 110% of the volume of the largest container within the bund or 25% of the total container volume within the bund, whichever is the greater.

Bins and waste containers will be inspected visually on a daily basis by the site staff to ensure the continued integrity of the containment and identify the requirement for any remedial action.

4.2 Odour

No putrescible or readily degradable wastes will be accepted at the site. Due to the strict control of the waste that will be accepted at the site, odour is not expected to pose a significant risk. An Odour Management Plan has been included as part of this permit application. Odour management is regularly reviewed by the Environment Agency as part of permit arrangements.

The site has a number of measures in place to control odour, all of these are considered in relation to the operations that are undertaken at the Hospital on a daily basis. The site management plan procedures ensure

that good operational practices are employed. Management techniques, procedures, and odour control measures to minimise the potential for odour are detailed in the Odour Management Plan (NTEES Env 145 Plan (WTP) Odour Management).

4.3 Dust

No waste consisting solely or mainly of dusts, powders or loose fibres will be accepted at the site. Due to the types of waste accepted and the strict control of the waste that will be accepted at the site, dust is not expected to pose a significant risk.

In the event the generation of dust occurs during storage or treatment of wastes, this will be monitored and mitigation methods such as dampening will be employed to reduce the risk of fugitive dust emissions.

These wastes will not be stored longer than 48 hours unless otherwise agreed with the Environment Agency.

Daily site inspections will be carried out by site staff during the course of their normal working activities.

The procedure for managing complaints is detailed below.

Upon receiving a complaint initially, a site diary entry will be made, with a complaint report completed and discrepancy log will be completed by the Site Manager/TCM.

A record of the below will be made.

- Time
- Date
- Nature of complaint/description of the dust
- Duration of event
- Weather conditions
- Location – where dust was observed (e.g. site perimeter), receptor location
- Contact details of complaint if available
- Further monitoring and locations

Then a review of the below would be made.

- Site activities at the time of the report must be conducted (e.g. processing, increased vehicle movements, waste deliveries)
- Findings of external/receptor monitoring.
- Finding of any other external sources of dust (e.g. construction/development)
- CCTV system to view site operations.

As part of the Environmental Management System, a customer care and complaints procedure will be implemented. The customer care and complaints procedure apply to all complaints, feedback and requests made by third parties regarding the site's operational activities, environmental, health and safety performance or quality of service/product.

The management of dust emissions is detailed within the EMS.

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4.3.1 Permit Monitoring Requirements

NTHS will unless otherwise specified by the Environment Agency, undertake the monitoring specified in the tables found in Schedule 3 of the permit. Records of all monitoring required by the permit, including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys as well as any assessment or evaluation made on the basis of data obtained. The monitoring will be carried out by either an MCERTS certification or accreditation (as appropriate) contractor in accordance with EN standard EN 13725 (Odour), where available unless otherwise agreed with the Environment Agency.

Monitoring will be conducted in line with the relevant monitoring standards found Monitoring emissions to air, land and water (MCERTS) - GOV.UK.

4.4 Noise

Waste treatment operations will only be carried out during operational hours and within the specified building. All equipment will be maintained and operated in accordance with manufacturer's guidance and will be maintained in good working order. Due to the type of waste treatment activities carried out on the site it is not anticipated that noise will become a problem, however, the site will be operated so as to minimise noise emissions. Measures that will be taken at the site include:

- locating plant away from noise-sensitive receptors where possible.
- the avoidance of dropping materials from height.
- switching plant off when not in use.
- the imposition of a speed limit for vehicles delivering waste to the site. The site has 10mph Speed Limit This will reduce noise associated with high engine speeds.
- the training of all personnel in the need to minimise site noise and will be responsible for monitoring and reporting excessive noise when carrying out their everyday roles.
- regularly maintaining site plant and machinery to minimise noise resulting from inefficient operation of pumps, generators and engines.
- in the event that reversing alarms are found to give rise to complaints, alternative alarms or technology will be investigated.
- the regular maintenance of site surfaces to prevent the development of potholes will significantly reduce the noise generated particularly by empty vehicles exiting the site.
- consideration will be given to the fitting of noise suppression kits on items of plant and equipment; and
- all plant will be maintained in accordance with manufacturer's recommendations to minimise noise emissions.

Any complaint received will be logged in the site diary. The Operational Site Manager will investigate the complaint and will take action to identify the source of the noise and implement remedial measures where appropriate.

The measures employed at the site to minimise the emission of noise will be regularly reviewed by the Site Manager and additional measures will be employed where required.

The management of noise emissions is detailed further within the EMS.

4.5 Pests

Due to the nature of the wastes proposed to be accepted at the site, it is not anticipated that pests will pose a risk at the facility.

The facility will be inspected by both site management and operatives for infestations of pests, vermin and insects on a routine basis.

A specialist pest control contractor will be deployed if required.

The management of pests is further detailed within the EMS.

4.6 Litter

Due to the nature of the waste to be accepted on site, it is not anticipated that litter will pose a serious risk. However, the boundary of the site and the surrounding vicinity will be regularly checked, if any litter is observed a member of staff will carry out a litter pick as soon as practicable. The site is located within the Hospital grounds and benefits from a perimeter fence which will limit the potential for litter to escape off-site.

It will be the responsibility of the site staff to monitor the site for any signs of escaping materials either from within the site or from vehicles delivering or removing materials to and from the site.

Inspections will be carried out on a daily basis and recorded on the Daily Site Inspection form (NTEES Env 124 Form (WTP) – Daily Weekly Monthly Checklist) as well as a record maintained within the site diary.

The management of litter is detailed further within the EMS.

4.7 Mud and Debris

It is not expected that mud and debris will pose a serious risk, due to the type of waste to be accepted and treated on site. Wastes accepted on site are bagged and contained within bins/containers. The site is located within the Hospital grounds that benefits from concrete and tarmacadam surfacing, which is fully drained and maintained.

It will be the responsibility of the site staff to monitor the site for any signs of mud or debris materials either from within the site or from vehicles delivering or removing materials to and from the site onto public areas or highways:

- site surfaces will be maintained free of mud or detritus build up.
- all operational areas will be subject to monitoring by staff throughout the working day.
- all vehicles leaving operational areas will, before leaving the site be checked to ensure that they are clear of loose waste and that any materials being exported from the site are secure.

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In the event that mud, debris or waste arising from the site is deposited onto public areas outside the site, the following remedial measures will be implemented:

- the affected public areas outside the site will be cleaned; and
- traffic will be isolated from sources of mud and debris within the site to prevent further tracking of mud and debris, and measures will be taken to clear any such sources as soon as practicable.

4.7.2 Monitoring

The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring and any other actions specified in the permit.

The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

4.8 Resource efficiency

Benefits from using onsite microwave treatment process gives:

- Reduction in waste weight by 25% and volume by 80%
- 70% reduction in the offsite transport of clinical waste
- A reduction in the Hospital's carbon footprint due to reduced transport

The Sterilwave equipment only uses max torque/current. Each machine uses a max of 10kwh per cycle and each machine usually runs from its own locally situated isolator switch before it goes back to the MCB panel. The MCB panel a 300amp total supply ac supply for a '4 machine setup' or a 200amp supply for a 2-x unit setup, with a dedicated bin wash machine and pumped water delivery manifold system delivering 2000 litre/hour at 4 bar. As there are only a max of two machines out of 4 at the beginning of a cycle (70 amps) with the other 2 at either stop or finishing a cycle (20 amps) the 300amp supply will never be exceeded.

Foul sewer delivery is minimal with approximately 2500 litres being discharged over 16hrs per day; this comes from normal wash down and the bin washer. The water is supplied by mains standard and is used for subsidising recycle bin washer top up, cooling sprayers used by each machine during the microwaving period to ensure maximum waste temperatures do not exceed 119° C or drop below 102° C in that essential 20 minutes sterilisation period.

Water flow rate needs to be 60litres/minute minimum to the plant facility at 4 bar.

Electricity Each machine needs a 415v/3phase/ 70amp supply for the first 5 mins of each 35-minute cycle then drops to between 40 - 20 amps for the remainder.

NTHS carries out routine annual audits Ref. NTEES Env 168 SOP (WTP) – Auditing, to review the onsite resource efficiency focussing on energy usage, water usage, waste produced on site and raw materials usage. Monitoring and auditing provides basis for KPI & target setting Ref. NTEES Env 214 SOP (WTP) – Target & Objective Setting to strive for continuous improvements in line with their Environmental Policy NTEES Env 149 Policy (WTP) – Environmental Policy.

5.0 INFORMATION

All relevant notifications and submissions to the Environment Agency regarding the site will be made in writing and will quote the permit reference number and the name of the permit holder.

Records will be maintained for at least 3 years, however in the case of off-site environmental effects, and matters which affect the condition of land and groundwater the records shall be kept until permit surrender. Duty of Care records will be kept for a minimum of 2 years with hazardous consignment notes retained for 3 years or the lifetime of the permit.

5.1 Reporting and Notifications

5.1.1 Changes in Technically Competent Persons

The Environment Agency will be informed in writing of any changes in the technically competent management of the site and the name of any incoming person, together with evidence that such person has the required technical competence.

5.1.2 Waste Types and Quantities

A summary report of waste types and quantities accepted and removed from the site for each quarter, will be submitted to the Environment Agency within 1 month of the end of the quarter unless otherwise required by the permit conditions.

5.1.3 Relevant Convictions

The Environment Agency will be notified of the following events:

- The company or directors being convicted of any relevant offence; and
- any appeal against a conviction for a relevant offence and the results of such an appeal.

5.1.4 Notification of Change of Operator's or Holder's Details

The Environment Agency will be notified of the following:

- any change in the operator's trading name, registered name or registered office address; and
- any steps taken with a view to the company going into administration, entering into a company voluntary arrangement or being wound up.

5.1.5 Adverse Effects

The Agency will be notified without delay following the detection of the following:

- any malfunction, breakdown or failure of equipment or techniques.
- any accident.
- fugitive emissions which have caused, is causing or may cause significant pollution; and

- any significant adverse environmental and/or health effect.

5.1.6 Reporting

The operator shall send reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

A report or reports on the performance of the activities over the previous year ('the annual report') shall be submitted to the Environment Agency by 31st January each year or such other date as may be agreed in writing by the Agency. The report(s) shall include as a minimum:

- (a) a review of the results of the monitoring and assessment carried out in accordance with this permit against the relevant assumptions, parameters and results in the risk assessments submitted in relation to this activity and any agreed amendments thereto. The review will include written descriptions of the improvements made to operational performance during the year, action plans developed and planned improvements for the coming year.
- (b) Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:
 - in respect of the parameters and emission point(s) specified in Schedule 4, table S4.1.
 - for the reporting periods specified in Schedule 4, table S4.1 and using the forms specified in Schedule 4, table S4.2 or other reporting format as agreed in writing with the Environment Agency; and
 - giving the information from such results and assessments as may be required by the forms specified in those tables.
- (c) Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

5.1.7 Notifications

In the event:

- a) that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately.
 - inform the Environment Agency.
 - take the measures necessary to limit the environmental consequences of such an incident or accident, and
 - take the measures necessary to prevent further possible incidents or accidents.
- b) of a breach of any permit condition the operator must immediately
 - inform the Environment Agency, and
 - take the measures necessary to ensure that compliance is restored within the shortest possible time.

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- c) of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

6.0 Closure

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

This report is for the exclusive use of the NTH Solutions LLP, University Hospital of North Tees – North Tees and Hartlepool NHS Foundation Trust no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Olive Compliance Ltd.

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