Standard Operating Procedure **SOP003**

Title: **DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE**

Location: CBE Laboratories

1. PURPOSE

The intent of this SOP is to describe the procedure for the safe handling, segregation, storage, treatment and disposal of Healthcare Waste (historically known as Clinical Waste) defined under the Healthcare Waste Technical Memorandum (HTM07-01). This procedure also specifies the responsibilities of the user ('waste generator'), the person on routine housekeeping duty and the nominated Responsible Person for autoclave equipment maintenance.

This SOP should be read in conjunction with the (1) Section 5 of the CBE Code of Practice for work with biological agents and GMOs, (2) University policy and guidance on the safe transport of hazardous material, (3) HTM07-01 "Safe management of healthcare waste" and (4) the relevant risk assessments required by COSHH.

2. SCOPE

This SOP applies to all authorised CBE personnel within the Containment Level 2 (CL2) CBE laboratories, i(located in the Holywell Park) , that generate biological (healthcare) laboratory waste under the Healthcare Waste category definitions described in Section 2.1. This SOP covers procedures for the disposal of waste from human or animal healthcare and or related research according to Chapter 18 of the EWC categorization and includes; procedures for the treatment of laboratory waste prior to its removal and disposal, the assessment, segregation and packaging of laboratory waste into colour-coded waste streams, and the correct use of European Waste Catalogue (EWC) Codes.

In order to control the risks associated with handling and disposal of Healthcare Waste to the lowest levels practicable, on site and during transport, this SOP ensures that all waste likely to be contaminated with biological agents that pose little risk to man or the environment e.g. those classified as Hazard Group 1 and all waste likely to be contaminated with Class 1 GMOs or infectious Hazard Group 2 biological agents (Category B) is always rendered safe prior to its discharge. The criteria laid out in this SOP describe the minimum standards of treatment that must be applied to all Healthcare Waste produced by employees of the CBE. These standards are based on those requirements specified under law and official guidance from the Health Services Advisory Committee, Advisory Committee on Dangerous Pathogens and the Advisory Committee on Genetic Modification.

For the purposes of this SOP, the categories of waste that fall under the Healthcare Waste umbrella will therefore include the following:

1. Waste at no or low risk of contamination with infectious substances
2. Waste likely to be contaminated with biological agents that pose little risk to man or the environment e.g. those classified as Hazard Group 1

3. Waste likely to be contaminated with Class 1 GMOs or infectious Hazard Group 2 biological agents (Category B).
4. Waste likely to be contaminated with Cytotoxic or Cytostatic chemical substances.
5. Waste likely to be contaminated with chemicals that may release toxic substances at high temperatures or otherwise compromise autoclave integrity.
6. Waste electrical and electronic equipment (WEEE) known or suspected to be contaminated with infectious agents.

Important Restrictions:

1. The disposal of hazardous laboratory chemicals is dealt with via a separate route, covered elsewhere (SOP029, SOP039 and the Code of Practice for "Work with Chemical Carcinogens, Mutagens, Substances Toxic to Reproduction and Cytotoxins").

    1. This SOP does not cover arrangements for the disposal of (1) human tissue (body parts, organs) and the requirements of the Human Tissue Act; (2) animal body carcasses or recognizable parts; (3) GM Class 2, DEFRA Category 2 or higher, or Category A infectious substances.
    . Disposal of HTA waste is documented in *HTA-PR-SOP007 Disposal of HTA licensable material*.

2. No waste generated within the CBE Laboratories Unit shall be discharged as Domestic Waste.

3. For WEEE waste (e.g., electrical and electronic equipment from the containment level 2 laboratories), contact waste@lboro.ac.uk

3. REFERENCES

2. SOP006; Selection and Use of Disinfectants
3. SOP024/25; Use and Maintenance of Systec VX Autoclave.
4. SOP054: Use & Maintenance of Systec DX90 Autoclave
5. SOP050: Corrective Action Procedure
6. The Loughborough University Health & Safety Policy: Biological Safety.
7. Code of Practice for work with BAs and GMOs.
8. Code of practice & guidance note for work with chemical carcinogens, mutagens, Substances toxic to reproduction & cytotoxins.
9. COSHH for Virkon, IMS and Chemgene
10. Risk Assessments for work activity with BAs or GMOs
11. HTA-PR-SOP007 Disposal of HTA licensable material

4. SPECIAL NOTES: HEALTH & SAFETY

(i) Virkon dilutions have low toxicity and irritancy. However the powder form is an irritant (refer to COSHH) and should only be used on large liquid spills to limit the spread of contamination when a suitable face mask and gloves should be worn.

(ii) A fume cupboard should be used if preparing solutions from Virkon powder and suitable face protection, gloves and lab coat should be worn when preparing and using solutions

(iii) Virkon can generate sulphur dioxide when heated in an autoclave. Autoclaving must be avoided (CBE autoclaves are not externally exhausted).

(iv) All authorised personnel that handle, transfer, transport, treat or dispose of Healthcare waste must wear the appropriate personal protective equipment, as identified in the Risk assessments, such as: suitable gloves, lab coat, apron, safety glasses etc. to prevent exposure via routes such as skin contact or inhalation.

5. RESPONSIBILITES

5.1. All Authorised CBE Personnel ('the waste generator')

(i) Shall be familiar with the CBE Code of Practice for waste disposal (detailed in Section 5 of the Code) and be aware of their duty of care under the Environmental Protection Act to ensure that waste is managed properly and disposed of safely.

(ii) When planning work, shall take steps to eliminate or reduce the amount of hazardous wastes being generated by their procedures where reasonably practicable.

(iii) Shall comply with all information and instruction provided for segregating, decontaminating and disposing of waste.

(iv) Shall be fully aware of the nature of the waste they are handling and be familiar with the waste management arrangements detailed in this SOP.

(v) Shall ensure that they have received adequate instruction and training on the correct packaging, labelling and handling of waste, including:

- proper categorisation of waste
- proper labelling of bags and containers
- the safe disposal of sharps
- the use of disinfectants

- segregation criteria and procedures
- requirements for protective clothing and other personal protective equipment
- use and maintenance of the autoclaves
- emergency procedures following accidents or spillage.

(vi) Shall be familiar with the risk assessments and correct procedures, including contingency plans if things go wrong (e.g., the breaking open of a container, the failure of an autoclave).

(vii) Shall report accidents involving personal injury, incidents involving near misses, incidents relating to spillages or breakages and non-adherence or deviations to working procedures (e.g., wrongly packaged or labelled containers) to the Laboratory Manager/Quality Manager or DSO.

(viii) Shall ensure that all hazardous waste is 'made safe, as soon as is practicable and storage of hazardous waste within the CBE is minimised or eliminated.

(ix) Shall NOT autoclave hazardous waste outside of normal working hours.

5.2 . The Housekeeping Function (applies to the person on duty)

(i) Shall inspect the waste storage bins and holding areas in the waste cage in the autoclave room (H31) and initiate disposal procedures as required i.e. if bins are more than three-quarters full.

(ii) Shall inspect the temporary holding areas (e.g. yellow containers/wheelie bins inside the change rooms) and notify the 'waste generator' if collected hazardous waste has been held for more than 24 hrs.

5.3. The Responsible Person for the Autoclaves

(i) Shall inspect the autoclaves regularly to ensure that they are in good state of repair.

(ii) Shall inspect the autoclave log regularly to ensure that autoclaves are not being used outside normal working hours.

(iii) Shall inspect the autoclave maintenance logs regularly to ensure that monthly maintenance procedures have been completed and that annual calibration/service certificates are up to date.

(iv) Shall inspect the insurance coverage record for the autoclaves to ensure that coverage is up to date and maintained appropriately (i.e. through the University insurance agency).

6. EQUIPMENT AND MATERIALS

6.1. Sterilisation Equipment:

- Autoclave
- Virkon

6.2. Packaging of Waste:

- Transparent Autoclave bags and *holders*
- Translucent white bags for non-autoclavable waste and *holders*
- YELLOW and ORANGE bags for incineration in their *pedal bins*
- YELLOW/PURPLE/PURPLE bags for incineration
- Cable ties and label tags for bags
- Autoclavable YELLOW Sharps containers
- Non-Autoclavable YELLOW/PURPLE lidded sharps containers
- Non-Autoclavable YELLOW/PURPLE leak proof containers
- Boxes/Containers for broken glass
- Waste bins
- Rigid lidded boxes for autoclave bag transport
- Wheelie bins for YELLOW/ORANGE and PURPLE/YELLOW bag storage
- Metal cart

7. PROCEDURE

The pre-treatment, labelling, packaging and disposal of the waste is determined by both the form of the waste (e.g. liquid, solid etc.) and its composition (e.g. the likely contaminants). **Procedures for the treatment, segregation, packaging labelling and disposal of biological (healthcare) waste produced in CBE Laboratories are detailed in this section.**

A colour-coded segregation system is used to identify and segregate waste on the basis of waste classification and suitability of treatment/disposal options. The charts shown in Annexes I-IV identify the type of packaging, the packaging colour and the labelling required for each waste stream. The charts assume that the packaging meets the requirements of the Carriage Regulations (UN compliant) where appropriate.

ANNEX I: EWC coding for the types of healthcare waste

ANNEX II: Assessment of Hazardous Properties

ANNEX III: Segregation of Waste: ORANGE & YELLOW Waste Streams in CBE Laboratories

ANNEX IV: Classification, packaging and disposal of CBE Laboratory Healthcare Waste

ANNEX V: Specific definitions for the type of waste handled in CBE Laboratories.

ANNEX VI: Flow charts depicting the procedure for the disposal of Healthcare Waste types.

7.1. ORANGE STREAM LOW RISK SPECIAL WASTE

Applicable EWC Code 18 01 03* and/or 18 02 02* - if mixed waste streams then both codes should be used.

This stream includes defined source Healthcare Waste which is deemed to be infectious or potentially infectious waste (contains pathogens classified as Category B) and suitable for in situ heat sterilisation. This waste is therefore rendered safe prior to final disposal and should no longer be considered infectious or hazardous following in situ heat treatment. ORANGE stream waste is suitable for incineration.

For practical purposes ORANGE stream waste will also include any waste that is contaminated or potentially contaminated with biological agents that pose little risk to man or the environment e.g. those classified as Hazard Group 1. All ORANGE stream waste will be subject to in situ heat treatment, classified and consigned as infectious waste, given the code EWC 18 01 03* and/or 18 02 02*and will be subject to further treatment by incineration to achieve complete biological inactivation.

ORANGE Stream waste fulfils the criteria detailed below:

(1) Wastes known or reasonably suspected of being contaminated with Hazard Group 2 biological agents and/or Class 1 GMOs that have been pre-treated and made safe by autoclaving or chemical disinfection prior to leaving the premises for final disposal by incineration.

(2) Low risk wastes known or reasonably suspected of being contaminated with Hazard Group 1 biological agents that have been pre-treated and made safe by autoclaving or chemical disinfection prior to leaving the premises for final disposal by incineration.

7.1.1. Procedure for Treatment and Disposal of ORANGE Stream SOLID Waste

Waste may include microbiological, human or animal cell culture waste and general laboratory waste such as disposable contaminated plastic ware, e.g. empty plastic culture flasks, microtitre trays and petri dishes, agar plates, empty plastic tubes and microcentrifuge tubes, gloves, wrappers, empty glove boxes, absorbent tissues, etc.). For practical purposes, it may also include any low or no risk waste with EWC Codes 18 01 01,18 01 02, 18 01 04, 18 02 01, or 18 02 03 (refer to Annex I).

7.1.1.1. Pre-Treatment by Autoclaving

Title: DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE

Location: CBE Laboratories

Autoclaving (steam sterilization) is the preferred (and generally regarded as the most reliable) method of sterilizing this waste category. Depending on the volume of waste to be sterilized, it may be necessary to extend the duration of exposure to high temperature steam under pressure. Waste for autoclaving MUST be collected in autoclave bags for treatment using the following procedure:

1. Collect the solid waste (with the exception of sharps and any items soaked in ChemGene, IMS or virkon) in a clear autoclave bag(s).

   CAUTION: Only clear or translucent (not any other colour) autoclave bags must be used for sterilisation of hazardous/clinical solid waste so that "illegal" hazardous items within the bags can be easily detected (e.g. sharps). These bags must be specifically designed for this purpose and must be labelled with a biohazard signs and marked 'waste for autoclave sterilisation only'.

   CAUTION: DO NOT place sharps, such as microscope slides, sharps, recyclable glassware or plastic ware, in autoclave bags.

   CAUTION: Contaminated serological pipettes and pipette tips should not be placed in these bags unless they are packaged in such a way that prevents them from piercing the bag.

2. Once the autoclave bag is three quarters full and/or ready for sterilisation, tie the neck of the bag using autoclave tape, leaving a gap ~2 inches to allow steam penetration.

   CAUTION: DO NOT seal the bags airtight.

3. Label the bag with the originating room number, initials and date to allow traceability

4. Place the Autoclave bags containing the solid waste inside the designated YELLOW rigid, leak proof lidded container/wheelie bin (located in the Change Room or Laboratory).

5. If the autoclave is available - at the end of the work session or when the container/wheelie bin is full transfer to the autoclave room.

6. If the autoclave(s) is in use - continually check the availability. **NOTE:** The storage of hazardous waste in the CBE Laboratory Unit should be minimised.

7. If or when the autoclave is available, transfer YELLOW rigid, leak proof lidded container/wheelie bin to the autoclave room. Remove the autoclave bag(s) from the rigid container and load into the autoclave and start the sterilisation cycle using the validated procedures specified in SOP024, SOP025 or SOP054.

8. Surface decontaminate the YELLOW rigid container/wheelie bin (by spraying with alcohol and wiping) and return it to its designated storage area e.g. in the designated Change Room or Laboratory.

9. Once the sterilisation cycle is complete allow the autoclave bag to cool and verify that the sterilisation cycle was successful according to SOP024, SOP025 or SOP054.

   NOTE: The autoclaves in the CBE Laboratory Unit are fitted with chart recorders for recording run-time parameters. These should be checked and kept for each sterilisation run to ensure that the autoclave continues to perform satisfactorily. Also note that autoclave tape does not indicate that a load has been sterilised effectively but merely that the temperature of the tape became sufficient at some point during the run to invoke a colour change.

10. Remove the bag and transfer to the designated holding area or waste storage/collection area.

Specific Instruction for the CBE Laboratory Unit (refer to Process Map in Figure 1)

(i) Place the bag into the orange lidded pedal bin containing an ORANGE bag).

(ii) If the ORANGE bag in the pedal bin is three quarters full, carefully remove the ORANGE bag from the bin and seal with a cable tie. Replace with a new ORANGE bag.

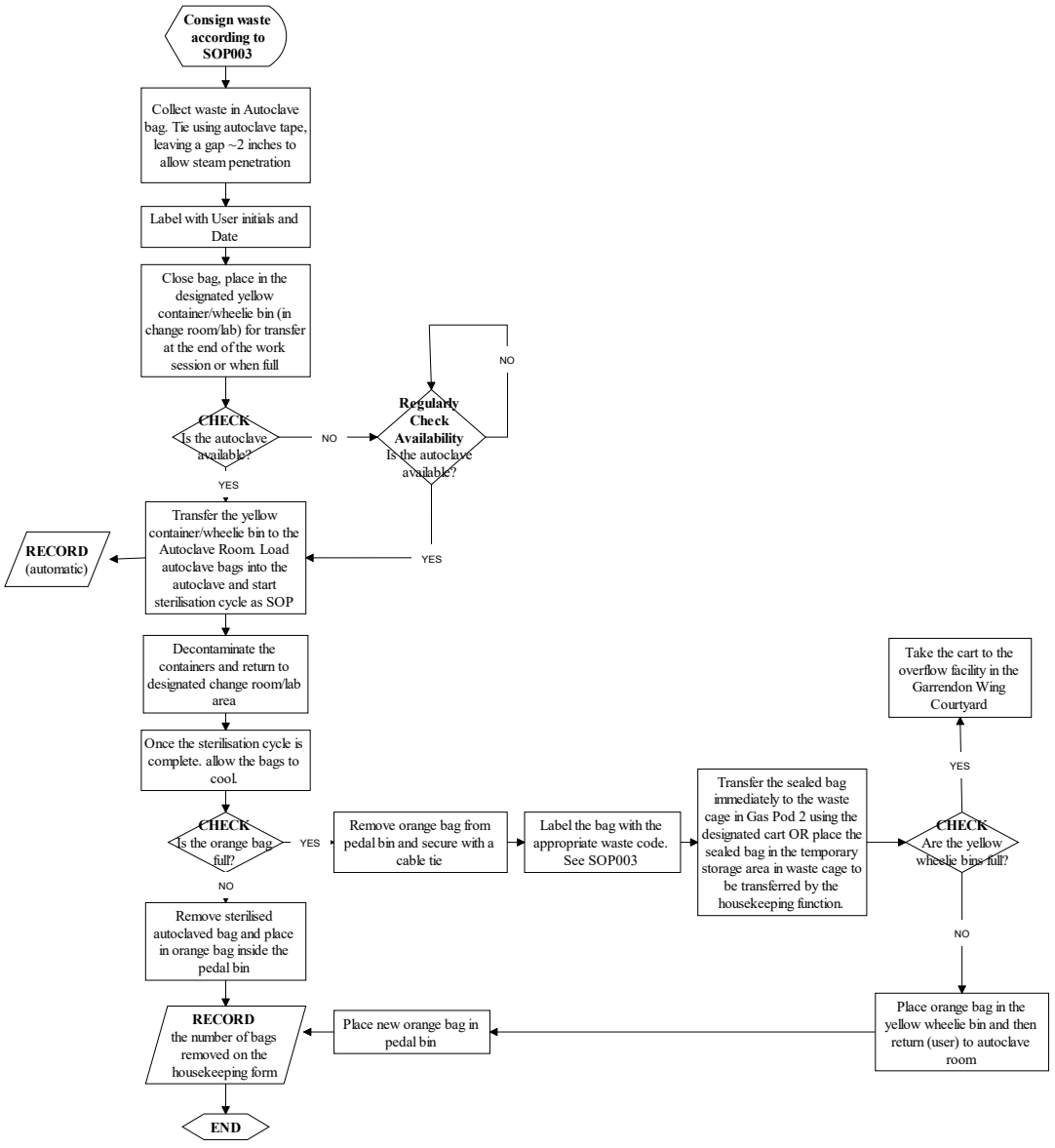
(iii) Label the ORANGE bag for disposal with a label & write on the date, Loughborough University & post code and place in the temporary storage area in the waste cage within the Autoclave Room to be transferred by the Housekeeping Function **OR** immediately transfer to the designated waste storage/collection area in Gas Pod 2 using the following procedure:

- Exit the Laboratory Unit after removing PPE and fetch the cart from the Gas Pod, returning via the fire escape into the unclassified corridor (you will need to acquire the keys from the key cabinet in the first change room to the fire escape door, gas Pod 2 and the waste bin cage within the Pod).
- Leave the cart in the corridor and return to the autoclave room. Put on PPE.
- Remove the ORANGE bag from the YELLOW bin in the autoclave room and place in the cart. Do not enter the corridors wearing PPE. Leave the cart in the unclassified corridor.
- Exit the Laboratory Unit after removing PPE and transfer the cart to the Gas Pod.
- Transfer the ORANGE bags from the cart to the appropriate YELLOW wheelie bin located in the cage.
- Return the cart to its designated holding area in the Pod.
- Return the keys to the key cabinet in the first change room

(iv) If the YELLOW wheelie bins in Gas Pod 2 are full, transfer the sealed ORANGE bag to the 'overflow' facility (yellow wheelie bins) located in the inner courtyard of Garandon Wing. This is done by taking

the cart around the building into Door H and High Bay GW to the door to the Courtyard. Note. The orange bags should not be brought into the CBE offices.

Figure 1. Flow chart - Disposal of Orange Stream Solid Stream Waste in the CBE Laboratory Unit



7.1.2. Procedure for the Treatment and Disposal of ORANGE Stream SHARPS Waste

This waste fulfils the criteria detailed below;

Items that could cause cuts or puncture wounds, including blunt and sharp needles, syringes with needles attached, scalpel and other blades, glass pasteur pipettes (short and long form), broken contaminated glassware, glass drug/chemical vials, surgical instruments and glass slides or any other item that may cause cuts or puncture wounds.

NOTE: Contaminated plastic serological pipettes (1, 5, 10 ml etc) and pipette tips, although not sharps, should be considered as such and disposed of in a suitable puncture proof container for sterilisation and/or incineration.

CAUTION: This Sharps waste MUST NOT include: (i) syringe bodies (in the absence of a needle); (ii) sharps containing a significant quantity of medicinal product such as un-discharged sharps, bottles, tubes, vials or ampoules, (iii) sharps contaminated or containing cytotoxic/cytostatic chemical substances (at greater or equal to threshold value) (iv) soft infectious waste or anatomical waste.

7.1.2.1. Pre-Treatment by Autoclaving

1. Place all sharps in Autoclavable ORANGE or YELLOW-lidded, UN-approved plastic puncture-proof and leak-proof sharps containers.

   CAUTION: DO NOT overfill sharps containers, use force or shake them to get an item into a sharps container.

   NOTE: Glass that cannot easily be placed in sharps containers. It should be treated to make it safe, ideally by autoclaving, before disposal down the broken glass disposal route. When using the autoclave, use Cycle 5 with a bucket to ensure that if the glass shatters, it does not spread out in the autoclave.

2. When the container is three-quarters full (or to the manufacturers mark) or whenever items do not fall freely into the container, seal the lid.

3. Transfer to the autoclave; by hand or using a rigid yellow lidded container.

   CAUTION: These sharps bins contain an absorbent gel to contain any residual liquid, however care should still be taken to ensure that minimal amounts of liquid remain in the waste and that sharps containers are sealed correctly.

4. If the autoclave is unavailable, place the sharps container inside a YELLOW rigid lidded container and leave in the designated holding area e.g. inside the waste cage of the CBE Laboratory Unit, until the autoclave is available.

5. If or when the autoclave is available, remove the sharps bin from the rigid container, apply Autoclave Tape across the corner of the bin (so that a successful sterilization cycle can be verified) and then load into the stainless steel autoclave bucket inside the autoclave

6. Start the sterilisation cycle using the validated procedures specified in SOP024, SOP025 or SOP054.

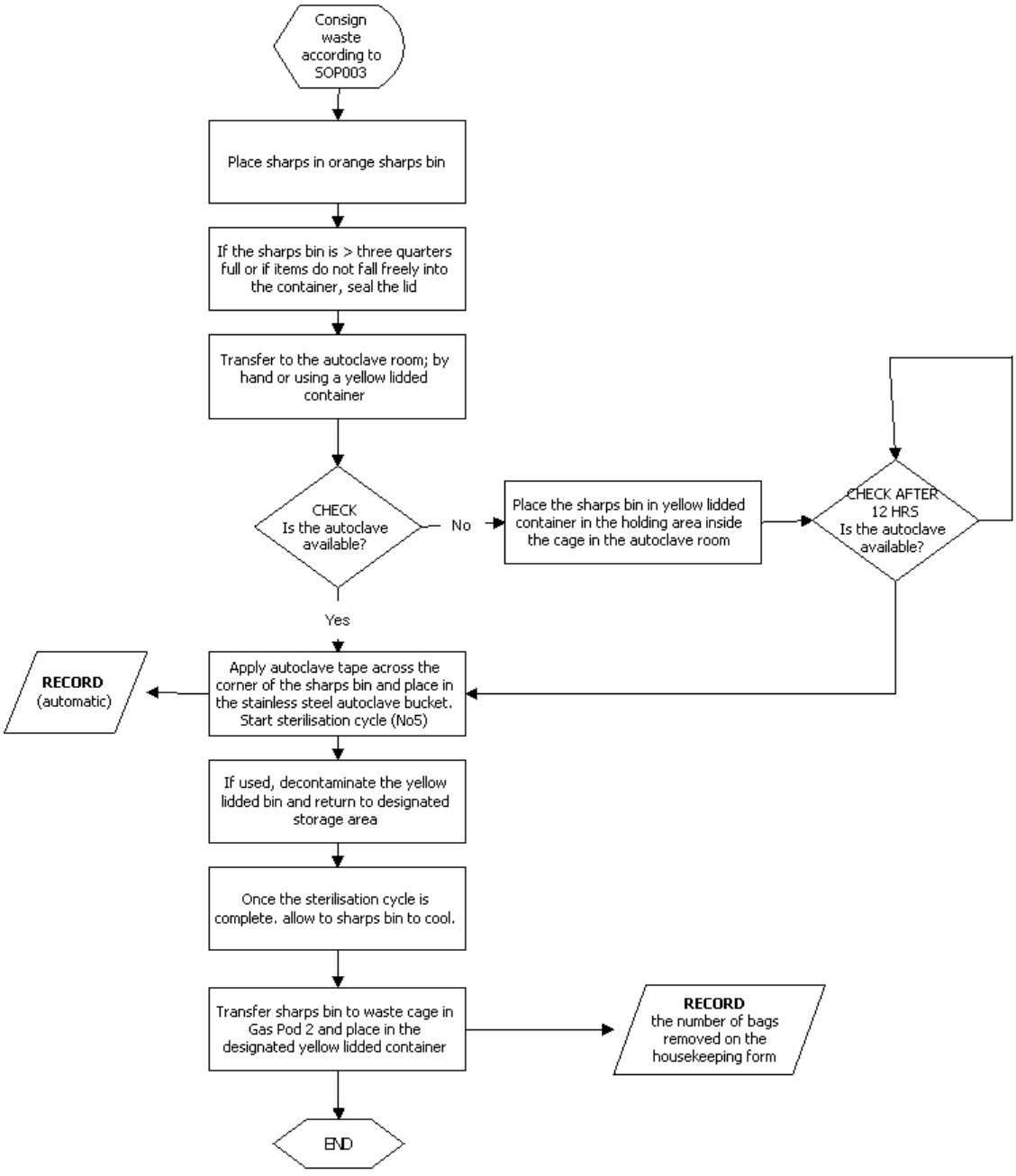
7. Once the sterilisation cycle is complete allow the sharps container to cool and verify that the sterilisation cycle was successful according to SOP024, SOP025 or SOP054.

   NOTE: The autoclaves in the CBE Laboratory unit are fitted with chart recorders for recording run-time parameters. These should be checked and kept for each sterilisation run to ensure that the autoclave continues to perform satisfactorily. Also note that autoclave tape does not indicate that a load has been sterilised effectively but merely that the temperature of the tape became sufficient at some point during the run to invoke a colour change.

8. Remove sharps container from the autoclave, and transfer to the designated waste storage/collection area (e.g. Gas Pod 2 in the CBE Laboratory Unit) and place in the designated yellow lidded container.

Specific Instructions for the disposal of orange stream sharps waste CBE Laboratory Unit are given in the Process Map in Figure 2

Figure 2. Flow chart - Disposal of Orange Stream Sharps Waste in the CBE Laboratory Unit



7.1.3. Procedures for the Treatment and Disposal of ORANGE Stream LIQUID Waste

This waste fulfils the criteria detailed below;

Liquid waste, including discarded liquid cultures, supernatants, culture media, generated in the CBE Laboratories that has been effectively decontaminated (disinfected or sterilised by validated means) can be classed as non-hazardous and/or inactivated GM waste. The University has trade effluent consent for this to be discarded to the drains with running water unless other hazards that are present (e.g. chemical, medicinal waste properties) dictate that further processing is required. Please refer to the SOP039, "Storage, Handling & Disposal of Chemical Waste" for disposal of these hazardous wastes.

CAUTION: The appropriate disposal route must be identified in the risk assessment. **If in doubt, consult DSO or BGMSA for advice**.

CAUTION: Liquid waste can contain particularly high concentrations of any agent present, can be difficult to contain and, in the event of spillage, can pose a heightened likelihood of leading to a significant exposure.

7.1.3.1. General Treatment of Orange Stream Liquid Waste by Autoclaving - **CBE Laboratory Unit ONLY**

IMPORTANT NOTE: The autoclave in the CBE Tissue Engineering Laboratory (T208B) located in the Wolfson School IS NOT Validated for the treatment of solid & liquid waste.

CAUTION: If other hazards are present (e.g. volatile or toxic chemicals), DO NOT AUTOCLAVE. Alternative processing may be required (see Annex II) – consult the Laboratory Manager and the DSO before proceeding.

1. Collect the liquid waste or solidified liquid waste in a rigid leak-proof container designed to withstand autoclaving temperatures.

2. Label the container with the originating room number, initials and date to allow traceability and transfer the container to the autoclave.

3. If the autoclave is unavailable, leave the lidded container in the designated area e.g. inside the holding area within the waste cage of the CBE Laboratory Unit, until the autoclave if available. Check within 12 hours for autoclave availability.

4. If or when the autoclave is available, place the container in an autoclavable bucket, deep tray or pan of sufficient capacity to contain all liquid in the event of vessel failure or breakage inside the autoclave chamber.

   CAUTION: To allow pressure equalization, DO NOT SEAL THE CONTAINER.

CAUTION: Bioreactors may need to be placed directly into the autoclave. Use extreme caution when handling autoclaved liquids since they are hot and may boil over.

5. Start the sterilisation cycle using the validated procedures specified in SOP024 or SOP025.

6. Once the sterilisation cycle is complete allow the container to cool and verify that the sterilisation cycle was successful according to SOP024 or SOP025.

7. Remove the container and transfer to originating laboratory for disposal to the drain with running water.

8. The liquid container should, where decontamination has been effective, be washed and preferably reused or recycled or disposed of as nonhazardous waste.

7.1.3.2. Preparation of Aspiration Bottles for Chemical Disinfection of Discarded/Spent medium

CAUTION: If other hazards are present (e.g. chemicals that are incompatible with virkon), alternative processing may be required (see Annex II)– consult the Laboratory Manager and the DSO before proceeding.

To ensure that the aspiration waste is treated for minimum 24hrs, every day the first user of each BSC will exchange the used aspiration bottle for a clean bottle (whether they are using the aspiration trap or not) by following the below procedure:

1. Dispose of the 24 hr virkon treated waste contained within the spare aspiration bottle (the one not attached to the pump) down the drain followed by copious amounts of running water.

2. Rinse this bottle.

3. Add 1 x 5g virkon tablet with 50ml of water for every 250ml expected waste – if in doubt start with 1 tablet as users throughout the day can add more if required.
4. Write the date & number of tablets added on the BSC log sheet as well as on the aspiration bottle.

5. Remove the current aspiration bottle attached to the pump, making sure to fit a lid and write the disposal date on this bottle (the following days date) and leave to treat for 24hrs (this will be disposed of by the first user the following morning when the procedure starts again).

6. Attached the clean/refreshed aspiration bottle to the pump.

7. Throughout the day each new user is responsible for making sure that there are enough virkon tablets in the aspiration bottle for the amount of waste contained within it – if more tablets are require

the user will add the desired amount of tablets and write the number added on the bottle and the log sheet.

CAUTION: All aspiration bottles MUST be refreshed daily, however DO NOT dispose of the waste on the same day it has been generated follow the above procedure to ensure the virkon is in contact with the liquid for 24 hrs.

7.1.3.4. Chemical Disinfection of General Laboratory Liquid Waste (i.e. non-aspirated waste generated outside of the BSC)

CAUTION: If other hazards are present (e.g. chemicals that are incompatible with virkon), alternative processing may be required (see Annex II)– consult the Laboratory Manager and the DSO before proceeding:

1. Carefully decant liquid waste into a capped plastic bottle containing 2% Virkon solution (w/v)

2. Allow to disinfect for 24 hours then discard liquid into the sink and flush with water.

7.1.3.5. Special Instructions for Chemical Disinfection of Cultures suspected to be contaminated by bacterial/fungal/yeast infection

CAUTION: If other hazards are present (e.g. toxic chemicals, chemicals that are incompatible with virkon), alternative processing may be required – consult the Laboratory Manager and the DSO before carrying out the following procedure:

As soon as the contamination is discovered, dispose of the contaminated cultures as follows:

1. Place contaminated vessels, **without opening**, into an autoclave bag

   CAUTION: Only clear or translucent (not any other colour) autoclave bags must be used for sterilisation of hazardous/clinical solid waste so that “illegal” hazardous items within the bags can be easily detected (e.g. sharps). These bags must be specifically designed for this purpose and must be labelled with a biohazard signs and marked ‘waste for autoclave sterilisation only’.

   NOTE: Lids on vessels must be loosened to reduce the risk of an explosion in the autoclave & care must be taken when removing the item from the autoclave after the cycle has finished.

2. Label the bag with the originating room number, initials and date to allow traceability

3. Place the autoclave bags containing the solid waste inside a YELLOW rigid, leak proof lidded container (collected from autoclave room).

4. If the autoclave is available - transfer the container to the autoclave room.

5. If the autoclave(s) is in use - continually check the availability. **NOTE:** Contaminated waste should be disposed of as a priority and should not be stored.

6. Remove the autoclave bag(s) from the rigid container and transfer to a bucket. Load the bucket containing the bag into the autoclave and start the sterilisation cycle using the validated procedures for liquid waste specified in SOP024, SOP025 or SOP054.

7. Surface decontaminate the YELLOW rigid container/wheelie bin (by spraying with alcohol and wiping) and return it to its designated storage area e.g. in the autoclave room.

8. Once the sterilisation cycle is complete allow the autoclave bag to cool and verify that the sterilisation cycle was successful according to SOP024, SOP025 or SOP054.

   NOTE: The autoclaves in the CBE Laboratory Unit are fitted with chart recorders for recording run-time parameters. These should be checked and kept for each sterilisation run to ensure that the autoclave continues to perform satisfactorily. Also note that autoclave tape does not indicate that a load has been sterilised effectively but merely that the temperature of the tape became sufficient at some point during the run to invoke a colour change.

9. Remove the bag and transfer to the large orange bag in the autoclave room.

10. Retrieve all liquid culture solutions that have been used to process the culture and carefully decant into a capped plastic bottle containing 2% Virkon solution (w/v) and allow to disinfect for 24 hours before discarding liquid into the sink and flush with water.

11. Inform the Laboratory Manager of contamination and initiate a CAPA (SOP050).

7.2 YELLOW STREAM HIGH RISK SPECIAL WASTE

Applicable EWC Code 18 01 03* and/or 18 02 02* - if mixed waste streams then both codes should be used.

This stream includes defined source segregated Healthcare Waste which is deemed to be infectious waste that has NOT been pre-treated to render it safe and specifically requires incineration to achieve complete biological and/or chemical inactivation. YELLOW-stream infectious waste is hazardous waste and is subject to the controls of the Hazardous Waste Regulations.

YELLOW Stream waste fulfils the criteria detailed below;

1) Solid non-sharp laboratory waste likely to contain Hazard Group 1 or Hazard Group 2 (Category B) biological agents and/ or GMOs that has NOT been pre-treated to render it safe for the following reason:

   (a) it contains or is contaminated with significant amounts of chemical materials (other than cytotoxic/cytostatic substances) that may release toxic substances at high temperatures or otherwise compromise autoclave function e.g. paper towels and tissues that have been soaked in ethanol or virkon etc.

   (b) as an emergency measure in response to autoclave failure (Consult Laboratory Manager and BGMSA).

(2) For practical purposes, non-contaminated solid waste such as empty glove boxes, secondary packaging material, hand wash towels or clean plastic ware may also be consigned as non-autoclavable waste and classified as YELLOW stream waste.

This waste may include solid waste such as microbiological, human or animal cell culture waste and general laboratory waste such as disposable plastic ware e.g. empty plastic culture flasks, microtitre trays and petri dishes, empty plastic tubes and micro centrifuge tubes, gloves, wrappers, absorbent tissues, etc.).

This waste MUST be collected in YELLOW bags for disposal by INCINERATION ONLY using the following procedure:

1. Collect the solid waste in the yellow-lidded bins containing the translucent white non-autoclavable bags.

   CAUTION: DO NOT place sharps, such as microscope slides, sharps, recyclable glassware or plastic ware in the red lidded bin.

   CAUTION: Contaminated serological pipettes and pipette tips should not be placed in these bags unless they are packaged in such a way that prevents them from piercing the bag.

2. When waste bag is three quarters full remove the bag, seal with cable tie, place inside a YELLOW rigid, leak proof lidded container and transfer to the designated holding area or waste storage/collection area.

Special Instruction for the CBE Laboratory Unit (refer to Process Map in Figure 3)

(i) Place the bag into the large pedal bin containing a YELLOW waste bag in the autoclave room.

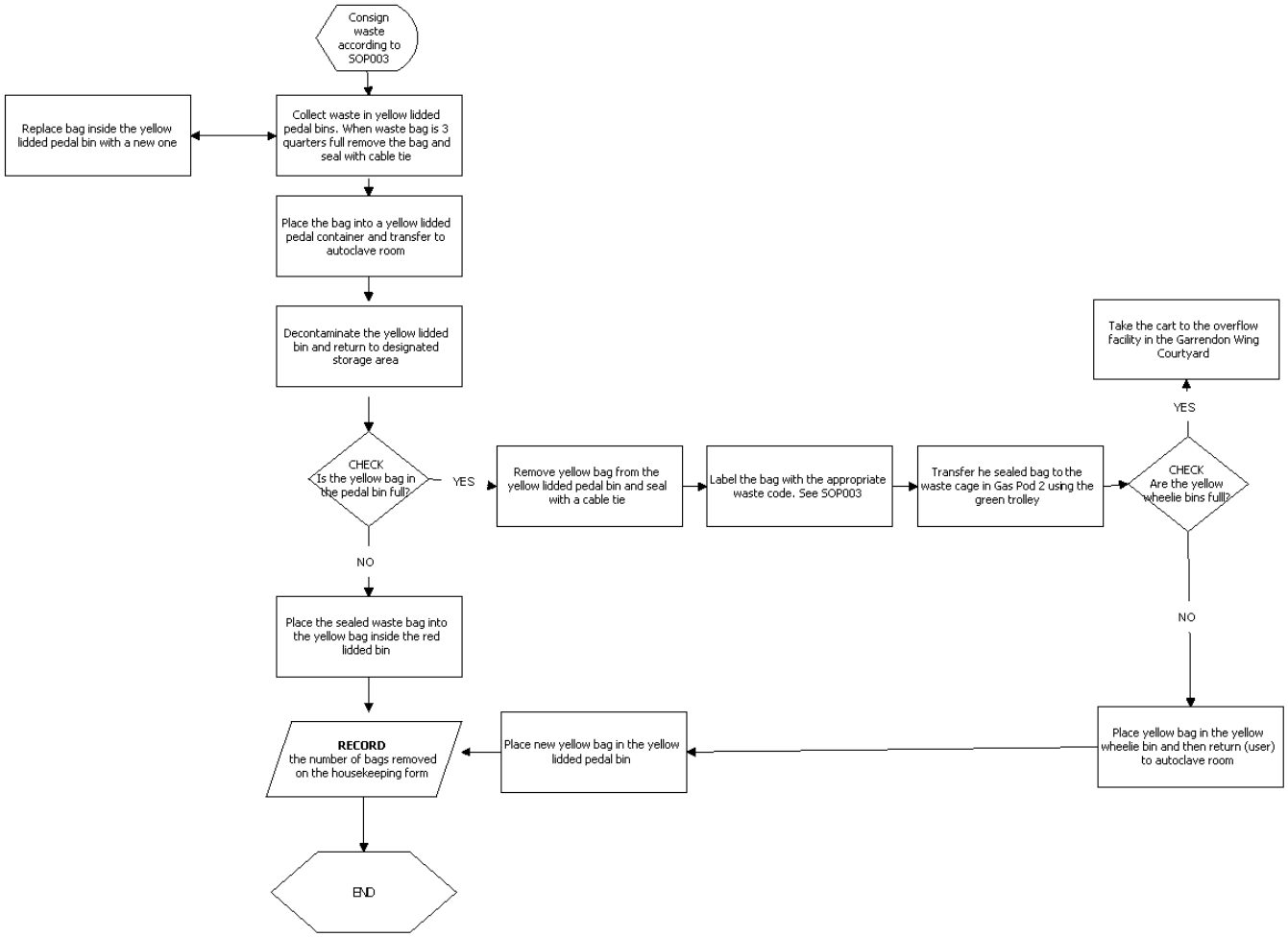
(ii) Surface decontaminate the YELLOW rigid container and return to its designated storage area in the waste cage.

(iii) If the YELLOW bag in the pedal bin is three quarters full, carefully remove the YELLOW bag from the pedal bin and seal with a cable tie. Place a new YELLOW bag in the pedal bin. Ensure that the YELLOW bag is labelled with label & write on date, post code & Loughborough University and transfer to the waste storage/collection area (Gas Pod 2) using the following procedure:

- Exit the Laboratory Unit after removing PPE and fetch the cart from the Gas Pod, returning via the fire escape into the unclassified corridor (you will need to acquire the keys from the key cabinet in the first change room to the fire escape door, gas Pod 2 and the waste bin cage within the Pod).
- Leave the cart in the corridor and return to the autoclave room. Put on PPE.
- Place the YELLOW bag in the cart. Do not enter the corridors wearing PPE. Leave the cart in the unclassified corridor.
- Exit the Laboratory Unit after removing PPE and transfer the cart to the Gas Pod.
- Transfer the YELLOW bags from the cart into the appropriate YELLOW wheelie bin located in the cage.
- Return the cart to its designated holding area in the Pod.
- Return the keys to the key cabinet in the first change room

(iv) If the YELLOW wheelie bin is full, transfer the sealed YELLOW bag to the 'overflow' facility (four yellow wheelie bins) located in the inner courtyard of Garandon Wing. This is done by taking the cart around the building into Door H and High Bay GW to the door to the Courtyard. Note. The orange bags should not be brought into the CBE offices.

Figure 3. Flow chart - Disposal of Yellow Stream Solid Waste in the CBE Laboratory Unit



7.3 PURPLE/YELLOW STREAM HIGH RISK SPECIAL WASTE

Applicable EWC Codes 18 01 03* and 18 01 08* and/or, 18 02 02* and 18 02 07* - if this is a mixed waste stream and all relevant codes should normally be used.

This stream includes defined source segregated Healthcare Waste which requires disposal by specialist incineration and includes wastes containing or contaminated with cytotoxic or cytostatic chemical substances. This waste may also be deemed to be infectious waste that has not been pre-treated to render it safe and specifically requires incineration to achieve complete biological and/or chemical inactivation.

PURPLE/YELLOW-stream infectious waste is hazardous waste and is subject to the controls of the Hazardous Waste Regulations.

PURPLE/YELLOW Stream Waste includes:

(1.) Wastes known or reasonably suspected of being contaminated with Hazard Group 2 biological agents and/or Class 1 GMOs that also contain cytotoxic/cytostatic substances.

(2) Wastes known or reasonably suspected of being contaminated with Hazard Group 1 biological agents and that also contain cytotoxic/cytostatic substances.

(3) Residue, non-infectious cytotoxic or cytostatic product (liquid or solid)

NOTE: Trypan Blue is a known carcinogen & therefore should be disposed of through the cytotoxic waste route. Refer to SOP029.

7.3.1. Procedure for the Disposal of PURPLE/YELLOW Stream SOLID Waste

This waste may include solid waste such as microbiological, human or animal cell culture waste and general laboratory waste such as disposable plastic ware e.g. empty plastic culture flasks, microtitre trays and petri dishes, empty plastic tubes and micro centrifuge tubes, gloves, wrappers, absorbent tissues, etc.).

NOTE: Please note the design of the bags may differ between yellow/purple and purple.

NOTE: Vials containing residue of non-infected cytotoxic or cytostatic product should be disposed of down the chemical disposal route. Consult the DSO for advice.

This waste MUST be collected in PURPLE/YELLOW Striped bags for disposal by incineration using the following procedure:

1. Collect all contaminated solid waste (with the exception of sharps) generated from the work activity directly into PURPLE/YELLOW bag(s) placed inside a YELLOW rigid container i.e. to contain potential leakage of residual liquid.

NOTE: There are no specific bins provided for PURPLE/YELLOW coded waste within the CBE Laboratories.

CAUTION: DO NOT place sharps, such as microscope slides, sharps, recyclable glassware or plastic ware in these bags.

CAUTION: Contaminated serological pipettes and pipette tips should not be placed in these bags unless they are packaged in such a way that prevents them from piercing the bag.

2. Once the work activity is complete or the bag is three quarter full, seal the PURPLE/YELLOW solid waste bag with a cable tie.

3. Label the bag with the EWC code 18 01 03* and 18 01 08* and/or 18 02 02* and 18 01 07* and transfer to the designated waste storage/collection area.

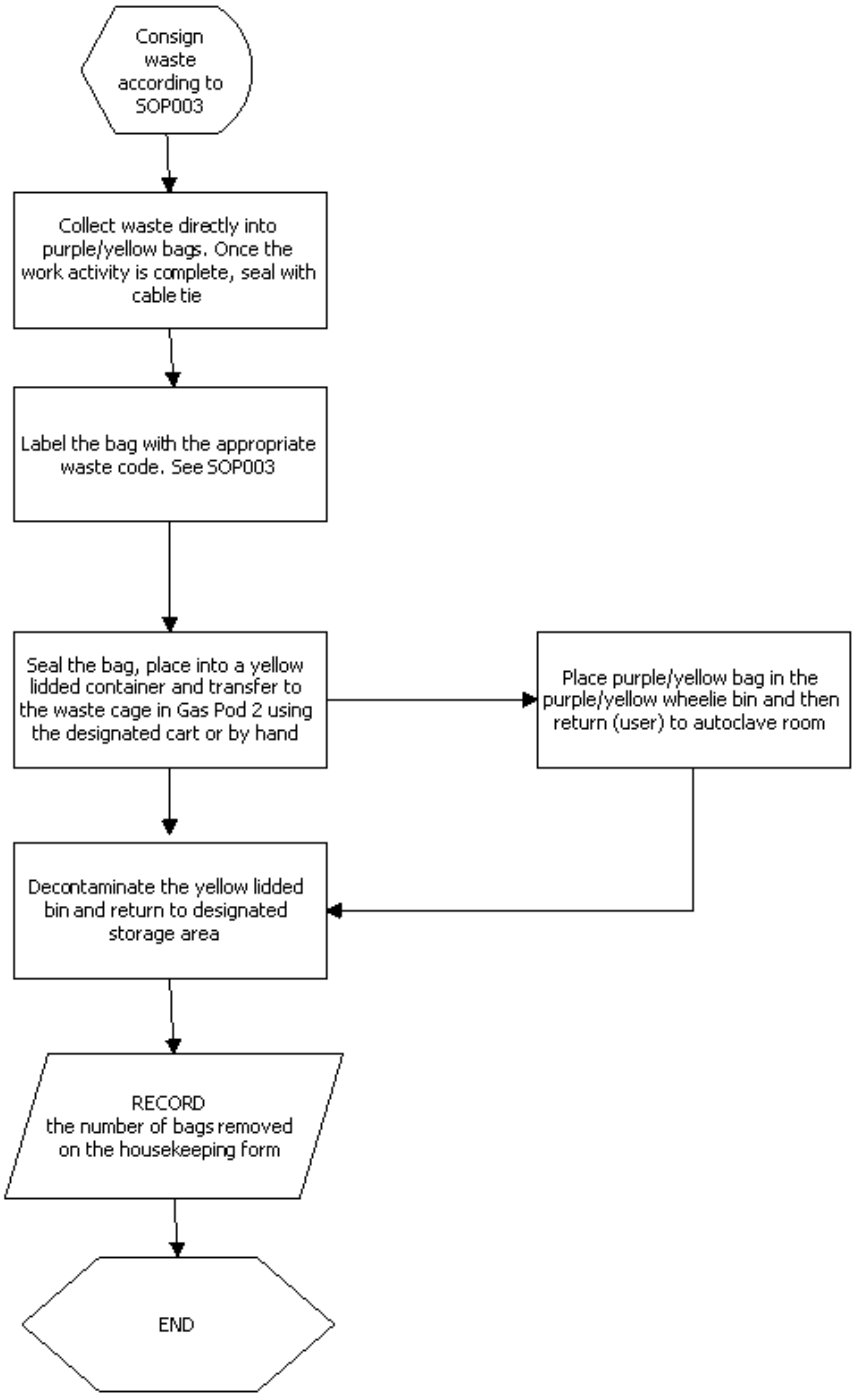
Special Instruction for the CBE Laboratory Unit (refer to Process Map in Figure 4)

(i) Transfer to the waste storage/collection area (Gas Pod 2) using the following procedure:

- Exit the Laboratory Unit after removing PPE and fetch the cart from the Gas Pod, returning via the fire escape into the unclassified corridor (you will need to acquire the keys from the key cabinet in the first change room to the fire escape door, gas Pod 2 and the waste bin cage within the Pod).
- Leave the cart in the corridor and return to the autoclave room. Put on PPE.
- Place the PURPLE/YELLOW bag in the cart. Do not enter the corridors wearing PPE. Leave the cart in the unclassified corridor.
- Exit the Laboratory Unit after removing PPE and transfer the cart to the Gas Pod.
- Transfer the PURPLE/YELLOW bags from the cart into the designated PURPLE/YELLOW wheelie bin located in the cage.
- Return the cart to its designated holding area in the Pod.
- Return the keys to the key cabinet in the first change room

(ii) Surface decontaminate the YELLOW rigid container and return to its designated storage area in the waste cage.

Figure 4. Flow chart - Disposal of Yellow/Purple Stream Solid Waste in the CBE Laboratory Unit



7.3.2 Procedure for the Disposal of PURPLE/YELLOW Stream SHARPS Waste

This waste fulfils the criteria detailed below;

Sharps that are known or suspected to be contaminated with significant amounts of cytotoxic/cytostatic chemical substances. Includes items that could cause cuts or puncture wounds, e.g. blunt and sharp needles, syringes with needles attached, scalpel and other blades, glass pasteur pipettes (short and long form), broken contaminated glassware, glass drug/chemical vials, surgical instruments and glass slides or any other item that may cause cuts or puncture wounds.

NOTE: Plastic pipettes (1, 5, 10 ml etc.) and pipette tips although not sharps should be considered as such and disposed of in a suitable puncture proof container.

This waste MUST be collected in PURPLE lidded YELLOW sharps containers for disposal by incineration ONLY using the following procedure:

1. Place all contaminated sharps in a designated UN-approved plastic puncture-proof and leak-proof PURPLE lidded YELLOW sharps container.

   CAUTION: DO NOT overfill sharps containers, use force or shake them to get an item into a sharps container.

   NOTE: Glass that cannot easily be placed in sharps containers. It should be treated to make it safe, ideally by autoclaving, before disposal down the broken glass disposal route.

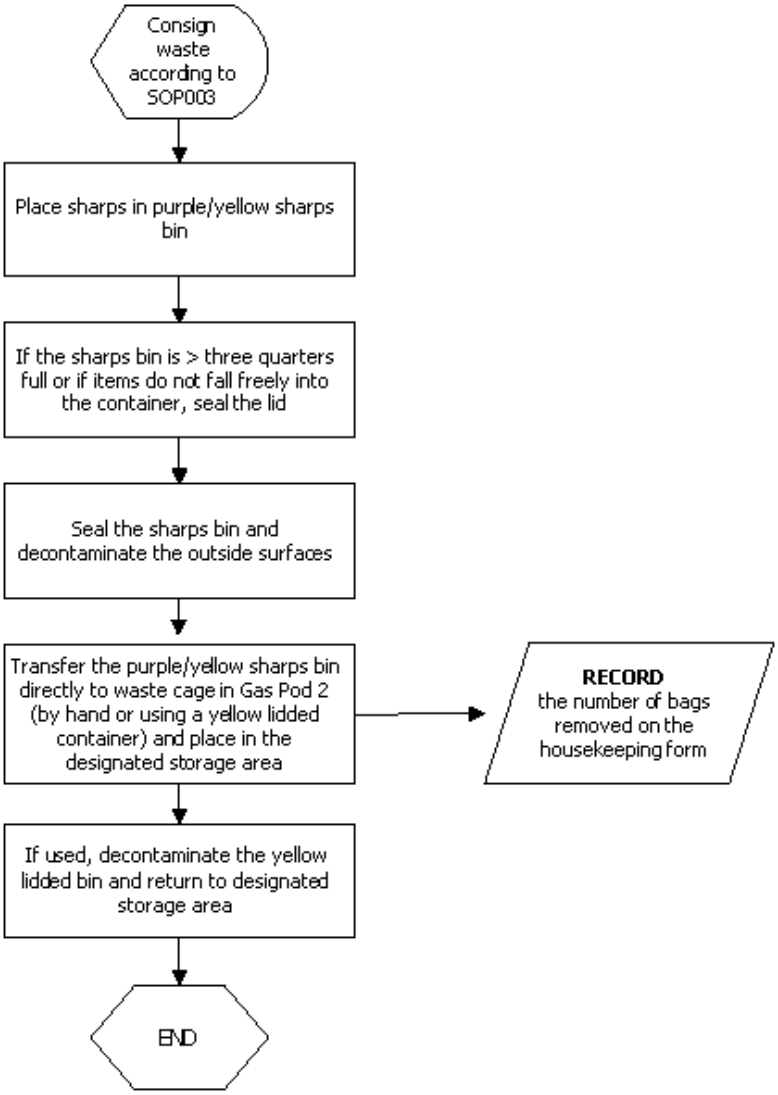
2. When the container is three-quarters full (or to the manufacturers mark) or whenever items do not fall freely into the container, seal the lid.

3. Decontaminate the outside surfaces of the sealed sharps bin and remove from the lab as soon as possible to gas pod 2, by hand or using a rigid yellow lidded container. The purple and yellow sharps bins should be placed in a designated clear box in gas pod 2, once this is full these should be transferred to the designated yellow lidded bin in the overflow waste facility in the Garendon Wing courtyard area.

   CAUTION: These sharps bins contain an absorbent gel to contain any residual liquid, however care should still be taken to ensure that minimal amounts of liquid remain in the waste and that sharps containers are sealed correctly.

Specific Instructions for the disposal of yellow/purple stream sharps waste CBE Laboratory Unit are given in the Process Map in Figure 5.

Figure 5. Flow chart - Disposal of Yellow/Purple Stream Sharps Waste in the CBE Laboratory Unit



7.3.3. Procedure for Disposal of PURPLE/YELLOW Stream LIQUID Waste

See Annex II for instructions on how to determine the appropriate disposal route.

If you are in any doubt, please contact the CBE DSO.

7.4. Treatment of Equipment for Disposal

Where practicable, equipment shall be decontaminated prior to disposal. Once decontaminated, infectious properties may be removed; however, the equipment may still contain hazardous properties, which will be subject to statutory waste management controls. Where disinfection is not practicable, the producer should contact the DSO who will establish the best practice packaging and treatment/disposal options.

Disposal of large electronic equipment will need to be in accordance with the Waste Electrical and Electronic Equipment Regulations and, if hazardous, the Hazardous Waste Regulations.

Where disinfection is practicable, use the following procedure:

(i) For 'bulky' items of equipment - swab with 1% Virkon solution (w/v).

(ii) Allow to disinfect for 10 minutes and then swab with 1:50 ChemGene followed by spray and wipe with 70% IMS.

(iii) For smaller, 'non-bulky' items - immerse in 1% Virkon solution (w/v) for 10 minutes.

(iv) Rinse with running water, dry and place in a YELLOW incineration bag for disposal.

(v) For most items surface decontamination with suitable disinfectant will be acceptable, however the following items will require fumigation or disinfecting prior to disposal:

- Biological safety cabinets
- Equipment used in association with hazardous BA's/GMO's that cannot be effectively disinfected

(vi) Inform the Laboratory Manager and contact the DSO for advice on disposal.

7.5. Emergency Procedures

Procedures for dealing with spillages should be considered in activity risk assessments, taking into account the size and potential components of the spill (e.g. micro-organisms, glass) in accordance with the local procedures; see SOP038 "Biological Spill Response".

7.5.1 Spillages / loss of containment from bags or bins

Any spillages or loss of containment form waste bags within laboratory areas MUST be dealt with immediately by whoever was in charge of the waste at the time of spillage.

Any accident, untoward incident or spillage must be reported to the Laboratory Manager as soon as possible. In the event of an injury from a sharp the Occupational Health staff in the University Health and Safety Unit should be contacted as soon as possible (refer to Section 7.5).

7.5.1.1 Spillage/loss of containment inside the CL2 CBE Laboratories

Areas should be washed down and disinfected immediately in the event of accidental spillage. Spillage kits comprising of disposable apron, latex gloves, spare bags, sharps container, disinfectant, disposable scoop and spatula are readily available.

(i) Identify the waste type. Identification should be possible by examination of the container. If the waste has already been autoclaved, the level of risk should be minimal.

(ii) Warn nearby persons to avoid contact. Ask another member of staff to remain at the site to reduce risk of accident.

(iii) Obtain spillage kit and if necessary a new sharps container

(iv) Put on disposable apron and gloves and visually examine waste for ‘sharps’ and using tongs, discard in new sharps container.

(v) Carefully slide one new YELLOW bag over the damaged or leaking bag.

(vi) Carefully shovel spilled waste into the YELLOW bag and seal securely.

(vii) Thoroughly clean and wipe the area with disinfectant

(viii) Place all used paper, disposable protective clothing, and equipment into the YELLOW bag and tie securely. Transfer to the designated waste storage/collection area.

(ix) Wash hands thoroughly

(x) Inform the Laboratory Manager of the incident and the action taken.

7.5.2.2 Spillages in a communal areas e.g. outside CL2 areas

(i) Non-authorised staff should not attempt to deal with the spillage themselves. The immediate area around the spillage should be temporarily cordoned off by any means possible e.g. by using chairs, trolleys or other barriers. If possible, have one person remain by the spillage to warn passers-by whilst a second can summon assistance.

(ii) If laboratory staff are present, the spillage should be dealt with in accordance with the procedure described in Section 7.4.1.1. refer to SOP038,”Biological Spill Response” for further

information. **NOTE:** If the waste has already been autoclaved, the level of risk should be minimal.

7.5.3 Medical Intervention

These procedures apply to laboratory workers or any personnel who may handle the waste downstream or come into incidental contact with it. Where an individual(s) have been exposed to incidents involving hazardous waste and this could result in an immediate or delayed health effect i.e. hazard exposure from face/eye splash, sharps injury or contact with non-intact skin, inform the Laboratory Manager/DSO and seek immediate medical attention:

A prompt response is extremely important following hazard exposure.

(i) Consult the appropriate risk assessments. These should contain possible adverse health effects and detail what immediate action should be taken.

(ii) For skin exposure – immediately flood the contaminated are with running water and wash area with soap and water.. Do not apply creams or lotions.

(iii) For splashes to face (mucous membranes of eyes, nose or mouth) – flush with eyewash for 15 minutes. In the event of biological hazard exposure to the eyes, flush the eyeball and inner eyelid with cold water for 15 minutes. Forcibly hold the eye open to wash thoroughly behind the eyelids; Contact local first aider to get medical attention promptly.

(iv) For sharps injury or broken skin -

- Wash the wound thoroughly with soap and water.
- Gently encourage bleeding but do not pressure the wound and risk forcing any contaminants further into the skin.
- Report the incident to the Laboratory Manager and DSO.
- If the sharp object is protruding from a bag or other container, remove it to a safe place and make a note of any identifying labels or tag numbers so that the origin of the waste and subsequently, the risk level can be determined.
- If the wound has been caused by a loose object such as a needle on the floor, retain the needle in a safe manner (e.g. pop it into a screw capped tube) until the origin has been determined. DO NOT WRAP THE NEEDLE IN A TISSUE OR TAKE IT LOOSE TO A&E.
- Contact Occupational Health as soon as possible. Submit an accident report to the University Health & Safety Department according to procedures described in Section 7.5.

(v) Biological Hazard Ingestion and Inhalation. Contact local first aider to get medical attention promptly.

(vi) Inform the Occupational Health Unit immediately in the event of any accident where exposure to a pathogen, genetically modified micro-organism or potentially infectious material may have occurred - it is important that the need for any prophylactic treatment or health surveillance be assessed on a case by case basis by medical personnel.

(vii) In the event of a serious injury requiring medical attention, individuals should attend the Accident and Emergency Department/Minor Injuries Unit of the local hospital.

(viii) If First Aid is required at the site of an incident, locate the nearest First Aider. Where a qualified first aider administers treatment and decides a referral to an A & E department or walk in centre is called for, but that the condition is not life threatening so an ambulance is not required, a First Aid Taxi Service is available.

(ix) Out of normal working hours, contact the Accident and Emergency Department/Minor Injuries Unit of the local hospital.

7.6. Reporting and Recording Accidental Release/Spillage

(i) Record all spills in the Spill Record Log. Report accidental release/spillage of BA's/GMO's to the Laboratory Manager and Area Safety Advisor (DSO or BGMSA, as appropriate) who will advise on the appropriate forms to complete.

(ii) In the event of any accident or incident where exposure to a pathogen or infectious material may have occurred, inform the University Health and Safety Department and the Occupational Health Unit immediately.

(iii) Report all accidents and instances of occupational ill health (illness reliably attributed to a work activity) to the University Health and Safety Department as soon as possible after the incident has occurred, so that the requirements of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations may be met. Any reporting required under these Regulations will be undertaken by the University Health and Safety Department. Use the online reporting system.

NOTE: No accident should be considered too trivial to report. Near misses that could have had serious consequences should also be reported. Details of the accident reporting system in the University are available on the Health and Safety Department website.

(iv) Forward copies of accident and near misses records involving potentially hazardous biological material to the University Biological Safety Officer

(v) Any serious injury will be investigated by the CBE Laboratory Management Committee (and potentially by the University Health & Safety Office). In the event of an investigation, you will be required to produce signed risk assessments, protocols and laboratory books within 24 hours of the incident being reported.

(vi) In the event of an Emergency First Aid incident dial 999 from the nearest telephone. Once you have spoken to the ambulance controller please inform University Security (see emergency contact displayed on the laboratory wall)

7.7. Notification of Accidents and Incidents involving Genetic Modification Activities

There is a requirement under the Genetically Modified Organisms (Contained Use) Regulations to immediately notify the Health and Safety Executive of any accident or incident involving a significant or unintended release of a genetically modified organism that presents an immediate or delayed hazard to either human health or safety or the environment. This requirement is in addition to any notification requirements under RIDDOR (the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995). Full details of the information required to be notified to the HSE regarding accidents are given in the Regulations. Guidance is available in the local CBE Code of Practice.

NOTE: Accidents involving micro-organisms used in Class 1 activities are unlikely to require notification.

It is the responsibility of the University Health and Safety Department to make notifications to the Health and Safety Executive of any accidents or incidents occurring within the University that require to be notified either under the Contained Use Regulations or RIDDOR. The CBE Laboratory Management Committee should not make any such notifications; instead they should contact the University Health and Safety Department as detailed below.

(i) In the event of any accident or incident involving the spillage or release of any genetically modified organisms or micro-organisms or where exposure to a genetically modified micro-organism may have occurred, immediately inform, preferably by telephone, the University Health and Safety Department and the Occupational Health Unit

(ii) Prepare a full accident record and forward to the University Health and Safety Department as soon as possible.

The University Health and Safety Department will decide whether any accident or incident requires notification to HSE, be it under the Contained Use Regulations or RIDDOR. The CBE Laboratory Management Committee does not need to make any decision on this.

7.8 Non-compliances/Deviations

On no account must Healthcare Waste be put into any container other than a sharps box, ORANGE, YELLOW or PURPLE/YELLOW bag or autoclave bag.

'Non-compliance' is a general term describing a situation whereby waste infiltrates the incorrect waste stream arising from deviations to local procedures. Examples would include:

- Healthcare Waste entering the 'domestic' black bag route and ending up at a council waste depot
- Apparently empty Healthcare Waste bags being discovered in the 'domestic' black bag waste system
- The discovery of non-Healthcare Waste in Healthcare waste bags whereby the waste has the potential to damage the machinery at alternative treatment plants or present an unacceptable risk to waste operatives e.g. pressurised containers such as aerosol canisters

Non-compliances discovered on site (e.g. a Healthcare waste bag found in a skip) must be reported to Facilities Management and the University Safety Department. If the bag has been tagged, a note should be made of the tag number - this will aid in tracing the bag back to the department of origin. Photographs are also a useful aid in tracing and for appending to the incident report.

Non-compliances discovered off site (e.g. at the waste disposal facility) will be notified to the University via any one of the tracking measures in place - the consignment note, cart barcode or individual University tags.

7.9. Disposal of untreated infectious waste and/or waste containing viable GMO's in the event of an Autoclave failure

This is not a routine method of disposal. The University Health & Safety Department must be consulted to arrange disposal of such material

8. DOCUMENTATION

NOTE: The autoclaves in the CBE Laboratory Unit are fitted with chart recorders for recording run-time parameters. These records are checked and retained for each sterilisation run to ensure that the autoclave continues to perform satisfactorily, in accordance with procedures described in SOP024 and SOP025.

ANNEX I: EWC coding for the types of Healthcare Waste

Healthcare waste is identified in the European Waste Catalogue (EWC) according to the codes listed in the table below. Wastes should be characterised at source and recorded on the risk assessment for the work generating the waste. Allocating the correct codes assists in assuring that the CBE provides the right information to the waste contractors to enable suitable segregation where necessary and to ensure that the necessary transport documentation is in place.

All packaging of CBE Laboratory Healthcare Waste MUST therefore be labelled with an appropriate European Waste Catalogue (EWC) code(s) before removal from the facility. The relevant EWC code for infectious waste is 18 01 03* and/or 18 02.02*. The relevant EWC code for medicinal waste is 18 01 08* and/or 18 02 07* - 'Cytotoxic and/or Cytostatic waste'.

18 01 XX Waste from natal care, diagnosis, treatment or prevention of disease in humans	
18 01 01	Sharps except 18 01 03*
18 01 02	Body parts and organs including blood bags and blood preserves (except 18 01 03*)
18 01 03*	**Waste whose collection and disposal is subject to special requirements in order to prevent infection *<red>***
18 01 04	Waste whose collection and disposal is not subject to special requirements in order to prevent infection, e.g. dressings, plaster casts, linen, disposable clothing
18 01 06*	**Chemicals consisting of dangerous substances *<blue>***
18 01 07	Chemicals other than those listed in 18 01 06*
18 01 08*	**Cytotoxic and cytostatic medicines *<red>***
18 01 09	Medicines other than those mentioned in 18 01 08*
18 01 10*	**Amalgam waste from dental care *<red>***

18 02 XX Waste from research, diagnosis, treatment or prevention of disease involving animals	
18 02 01	Sharps except 18 02 02*
18 02 02*	**Waste whose collection and disposal is subject to special requirements in order to prevent infection *<red>***
18 02 03	Waste whose collection and disposal is not subject to special requirements in order to prevent infection
18 02 05*	**Chemicals consisting of dangerous substances *<blue>***
18 02 06	Chemicals other than those listed in 18 02 05*
18 02 07*	**Cytotoxic and cytostatic medicines *<red>***
18 02 08	Medicines other than those mentioned in 18 02 07*

Key; *Hazardous waste list entries
Hazardous wastes can be absolute entries (in which case they are always hazardous – highlighted red) or mirror entries (which can be either hazardous or non-hazardous depending on their properties – highlighted blue).

ANNEX II: Classification and Assessment of Hazardous Properties

The CLP Regulation EC No 1272/2008 applies the United Nations' Globally Harmonised System (GHS) on the classification and labelling of chemicals (GHS) across all European Union countries, including the UK. This came into effect on June 1st 2015. [The University Health & Safety website provides more information on this change and how it impacts on the University community.]

As part of our waste duty of care under CLP the waste that the CBE produces must be classified. For most wastes, this requires the producer of the waste to identify if the waste has a hazardous property before it can be classified or described. The classification:

- must be worked out before the waste is removed, disposed of or recovered.
- must be included on waste documents and records
- determines the controls that apply to movement of the waste
- is needed to identify a suitably authorised waste management option

The following procedure is a general guide. It applies in most circumstances and must be used with the supporting appendices of the 'Waste Classification Guide (WM3), which is available on the CBE website. If unsure seek advice from the DSO or other competent person.

This guide provides details on how to perform the following steps:

Steps to **classify** the waste:

STEP 1: Check if the waste needs to be classified

STEP 2: Identify the code or codes that may apply to the waste

STEP 3: Identify the assessment needed to select the correct code(s)

Codes are divided into four types:

- wastes that are always hazardous, known as "absolute" hazardous entries
- wastes that are always non-hazardous, known as "absolute" non-hazardous entries, and
- wastes that may be hazardous or non-hazardous, known as "mirror hazardous" and "mirror non-hazardous entries".

Steps to **assess** the waste:

STEP 4: Determine the chemical composition of the waste

STEP 5: Identify if the substances in the waste are 'hazardous substances'
or
'Persistent Organic Pollutants'

STEP 6: Assess the hazardous properties of the waste; numbered HP1 to HP15

STEP 7: Assign the classification code and describe the hazardous properties.

Further guidance on the way chemical hazards are classified and communicated to users through the Global Harmonised System of Classification and Labelling of Chemicals (GHS) can be found in the **internal Guidance Note GN008 available on the CBE website.** This provides guidance to help CBE staff who purchase and use hazardous chemicals/chemical products and also those with responsibility for completing COSHH assessments to manage the transition to the new classification, labelling and packaging system.

ANNEX III: ORANGE and YELLOW Stream waste Classification

Standard Operating Procedure **SOP003**

Title: DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE

Location: CBE Laboratories

ORANGE STREAM SPECIAL WASTE - Low risk healthcare waste for heat disinfection treatment				
This stream includes defined source segregated wastes, which are deemed to be infectious or potentially infectious and are suitable for Orange Stream heat disinfection pre-treatment and sunsequent incineration. (See Segregation Chart)				
WASTE DESCRIPTION	**EWC CODE(S)**	**EWC DESCRIPTION**	**EXAMPLES**	**COMMENTS**
Potentially infectious and known infectious waste which has been subject to in situ sterilisation by autoclave	18 01 03* 18 02 02*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Microbiological, human or animal cell culture waste containing Class 1 GMOs or Hazard Group 2 biological agents	This waste should be non hazardous following in situ heat treatment. For practical purpose this Orange stream waste will normally be mixed with other Orange stream wastes ie containing Hazard Group 1 agents. To avoid confusion this waste is classified and coinsigned as infectious waste and hence is given the code 18 01 03*
Waste likely to be contaminated with biological agents that pose little risk to man or the environmrent ie those classified as Hazard Group 1	For practical purpose classified as 18 01 03* or 18 02 02*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Microbiological, human or animal cell culture waste containing Hazard Group 1 biological agents	For practical purposes and to avoid confusion this waste is classified and consigned as infectious waste and subjected to in situ heat treatment (as above).
Waste at no, or low risk of contamination with infectious substances	18 01 01 18 01 02 18 01 04 18 02 01 18 02 03	See Annex I	Uncontaminated items suchs as empty glove boxes, packaging, hand wash towels or clean plasticware etc	This waste is non hazardous and in situ heat treatment is NOT required. For practical purpose this waste infectious waste and subjected to in situ heat treatment (as above). It can also be classified and consigned as infectious non autoclavable waste (yellow stream) and sent for incineration (as below)
Used Sharps NOT contaminated with cytotoxic and/or cytostatic products	18 01 01 18 01 03* 18 02 02*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Used discharged sharps	These codes apply to the majority of all sharps waste. All sharps used in the Containment Level 2 CBE Laboratory Unit should be classified as infectious or potentially infectious and will not be segraegated using the 18 01 01 code
PURPLE AND YELLOW STREAM SPECIAL WASTE - High risk healthcare waste for specialist incineration				
This stream includes source segregated wastes, which require disposal by specialist incineration and includes highly infectious,ethical/anatomical, cytotoxic and dangerous medicinal wastes, which includes waste defined as cytostatic in the SEPA hazardous waste guidance (WM2). (See Segregation Chart)				
Sharps contaminated with cytotoxic/cytostatic material	18 01 03* 18 01 08* 18 02 02* 18 02 07*	Cytotoxic and Cytostatic medicines	Used discharged sharps contaminated with cytotoxic/cytostatic substances. This is a mixed waste stream and all EWC Codes should be used	This is hazardoous waste and subject to segregation in yellow/purple colour coded containers for incineration.
Waste contaminated with cytotoxic/cytostatic material	18 01 03* 18 01 08* 18 02 02* 18 02 07*	Cytotoxic and Cytostatic medicines	Microbiological, human or animal cell culture waste contaminated with cytoxic/cytostatic substances.	This is hazardoous waste and subject to segregation in yellow/purple colour coded bags/containers for incineration. Threshold values should be used to determine the disposal route for liquid waste
Potentially infectious and known infectious waste which has NOT been subject to in situ sterilisation by autoclave	18 01 03* 18 02 02* 18 01 06* 18 02 05*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection. Chemical consisting of dangerous substances	Microbiological,human or cell culture infectious wastes which are not autoclavable ie solid non-sharp waste contaminated with chemicals that may release toxic substance at high temperature or otherwise compromise autoclave function eg Virkon, solvents etc	This waste is subject to segregation in yellow bags for incineration. For practical purposes this may include items of waste with no, or low risk of infection
Potentially infectious and known infectious waste which has NOT been subject to in situ sterilisation by autoclave	18 01 03* 18 02 02*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection.	Microbiological,human or cell culture infectious wastes which cannot be disposed of as Orange Stream waste because of autoclave failure	This waste should be autoclaved on site an disposed of down the Orange Stream route but in emergency cases such as autoclave failure the waste may need to be transported and segregated as yellow stream waste for incineration.

Standard Operating Procedure **SOP003**

Title: **DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE**

Location: CBE Laboratories

ANNEX IV: Classification, Packaging and Disposal of CBE Laboratory Biological (Healthcare) Waste

WASTE TYPE	EWC CODE	EWC DESCRIPTION	FORM OF WASTE	TREATMENT IN SITU	CONTAINER/COLOUR CODE	MINIMUM TREATMENT/DISPOSAL
Waste likely to be contaminated with Class 1 GMOs or Hazard Group 2 biological agents.	18 01 03* 18 02 02*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Solid	Autoclave	Orange Bags	Rendered Safe on site/Incineration
For practical purposes this will also include: Waste contaminated with biological agents that pose little risk to man or the environment ie thos classified as Hazard Group 1			Liquid	Virkon	To Drain	Rendered Safe on site
Waste at no, or low risk of contamination with infectious substances	18 01 01 18 01 02 18 01 04 18 02 01 18 02 03	See Annex I	Solid	None	Orange Bags	Incineration
Sharps waste (fully discharged) contaminated with wastes other than cytotoxic material	18 01 03* 18 02 02*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Solid	Autoclave	Yellow or Orange Sharps bins	Rendered Safe on site/Incineration
Waste contaminated with Cytotoxic/Cytostatic material	18 01 03* 18 01 08* 18 02 02* 18 02 07*	Cytotoxic and Cytostatic medicines	Solid	None	Yellow/Purple Stripe Bags	Incineration (1000C)
			Liquid (>/= 0.1%)	None	Yellow/Purple Stripe Rigid Containers***	Incineration (1000C)
			Liquid (< 0.1%)	Virkon*	To Drain	Rendered Safe on site
Sharps waste contaminated with cytotoxic material	18 01 03* 18 01 08* 18 02 02* 18 02 07*	Cytotoxic and Cytostatic medicines	Solid	None	Yellow/Purple Lid Sharps bins	Incineration (1000C)
Non-autoclavable waste (contaminated with chemicals other than cytotoxins)	18 01 03* 18 02 02* 18 01 06* 18 02 05*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Solid	Virkon*	Yellow Bags	Incineration
			Liqiud >/= Threshold	None	Chemical Route (consult DSO)	
			Liquid < Threshold	Virkon*	To Drain	Rendered Safe
Laboratory Equipment	18 01 03*	Wastes whose collection and disposal uis subject to special requirements in order to prevent infection	Solid	Autoclave/Virkon	Orange Bags	Rendered Safe on site/Incineration

ANNEX V: Specific definitions of Waste for CBE Laboratories

Liquid Waste

'Liquid' is defined as any waste that cannot be disposed as a solid and that does not meet the criteria for recognisable tissue. As liquid waste can present an overt risk due to spillage or entry to drainage systems, disposal protocols must be rigidly assessed to identify containment and pre-treatment requirements.

Liquids include:	Liquids do not include:
• Aspirated discard jar waste • Urine • Macerated tissue • Bioreactor, spinner flasks	• Liquids that have been immobilised through the use of absorption agents such as vermagel • Small volumes in sealed tubes Both of these can be disposed as solid waste

Solid Waste

'Solid' is defined in this context as clinical waste that does not meet the criteria of being either sharps or recognisable tissue.

Solids include:	Solids do not include:
• Disposable plastic ware • Paper towels • Disposable gloves • Disposable facemasks • Laboratory coats and gowns • Small numbers of sealed flasks / tubes containing small volumes of liquid	• Sharps • Glassware • Other non-hazardous laboratory ware such as packaging*, catalogues etc. * Note: packaging used for specified animal pathogens or other items requiring animal health licenses must be considered as solid clinical waste and must be treated in accordance with the license requirements

Sharps Waste

Sharps are defined in HTM07-01 ***Safe management of healthcare waste*** as any items that can cause cuts or puncture wounds. For the purposes of this SOP, items that do and do not fulfil the definition of sharps are given in the table below:

Sharps include:	Sharps do not include:
• Needles • Syringes with needles attached • Scalpels and other blades • Broken glass • Glass slides and cover slips • Glass Pasteur pipettes • Capillary tubes	• Syringe bodies (in the absence of a needle) • Whole (unbroken) glass bottles, ampoules or tubes • Disposable pipette tips (e.g. Gilson type) • Plastic pipettes **Note -** It is recommended however that disposable pipette tips although not sharps should be considered as such and disposed of in a suitable puncture proof container.

Tissue Waste

This is defined as anatomical tissue of human or animal origin that can be recognised as such, and any specimen from deceased human donors unless the material contains cells produced by cell division outside the human body.

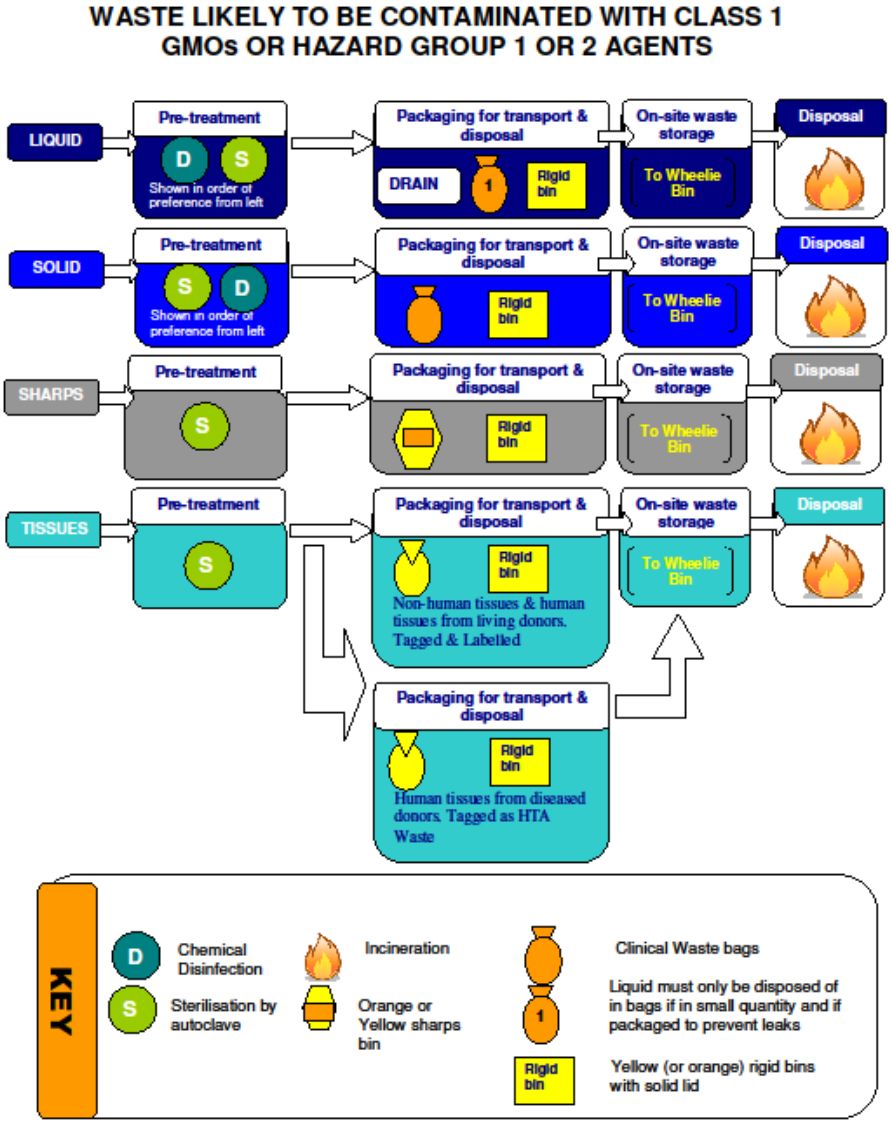
Tissue:	Not tissue:
• Recognisable body parts from living or deceased donors • Cadavers • Significant quantities of blood from living or deceased donors • Any specimen containing human cells from deceased donors unless the cells were produced by cell division outside the human body	• Sections of tissue that is not easily recognisable • Human cell culture material, the donor of which is deceased, but all the cells present originate from division outside the body. • Hair and nails

Standard Operating Procedure **SOP003**

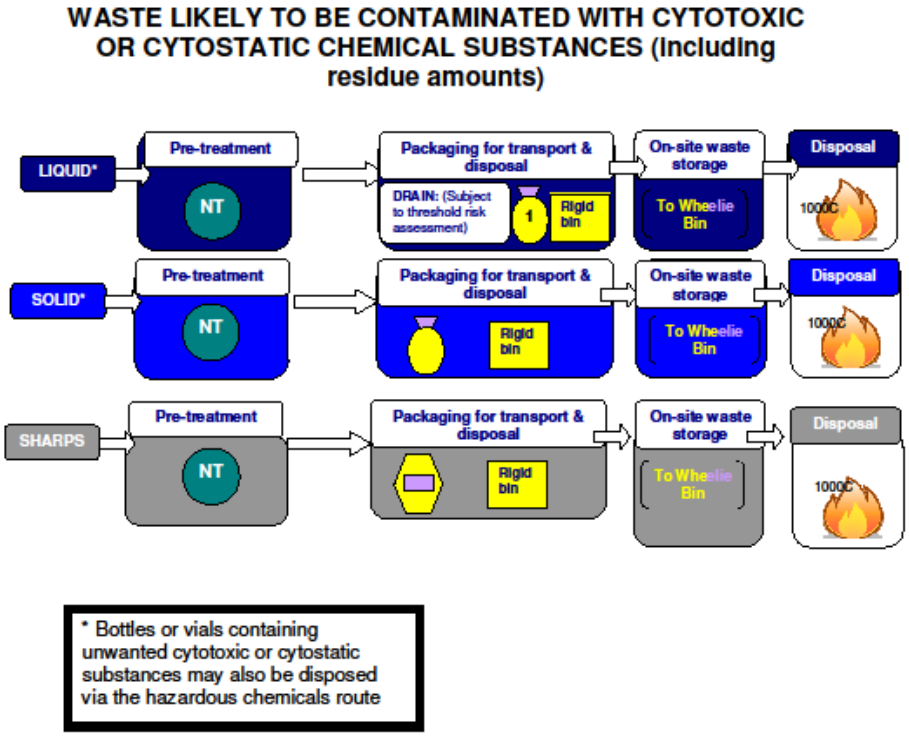
Title: **DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE**

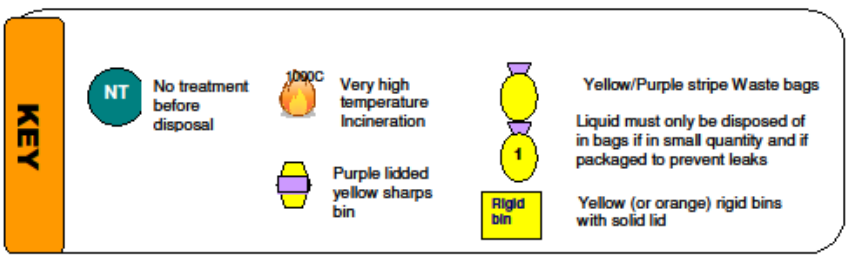
Location: CBE Laboratories

Annex VI: Poster 1 - Flow Chart depicting procedure for disposal of waste contaminated with Class 1 GMOs or Hazard Group 1 or Hazard Group 2 biological agents.



ANNEX VI: Poster 2 - Flow Chart depicting procedure for disposal of waste contaminated with cytotoxic or cytostatic chemical substances





Standard Operating Procedure **SOP003**

Title: **DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE**

Location: CBE Laboratories

SOP Version History

Version Reviewed	Dated Revised/ Reviewed	Revision Summary	New Version Number
001	Dec 2009 **Reviewed by Carolyn Kavanagh**	1) **3**. Added new policies to reference list. (Accident Policy, Environmental Policy, University Health & Safety Policy & provision of protective eyewear) 2) **4.2.2** Altered to say to discard gloves into a yellow lidded bin for autoclaving before transferring to gas pod instead of into a yellow sack. 3) **4.2.2** Added a note to say Safety glasses must be worn when using the autoclave. 4) **6(iv)** Altered to say safely packaged biological/clinical waste stored in the holding area will be collected by an external contractor at a time agreed with Department Safety Officer, Mr R. Temple instead of Mr Trevor Brown(Department of Chemistry) 5) **6(v)** Added a note to say safely packaged & documented chemical waste will be collected from the holding area, in Gas Pod 2, by the Department Safety Officer, Mr R Temple. He will ensure the correct disposal route for each chemical through the Department of Chemistry. All chemicals to be disposed of should have been accompanied by a Material Safety Data Sheet. 6) **7.2.1 (i)** Included a note to say that micro pipette tips should be placed into Autoclavable sharps containers in all BSC where possible 7)**7.2.1(iv**) Altered to say the transport of rigid containers to the autoclave '*should be'* done using an all-metal or similarly easily cleanable trolley 8)**7.2.1 (v)** Removed reference to locked waste cage in the autoclave room as it has been decided that this cage will no longer be locked. Justification: Laboratory access is to authorised staff only & therefore the waste cage is used for segregation of waste purposes only. The cage would be locked in certain circumstances for example if an external engineer needed to access the room. 9) **7.2.1 (x)** Altered to say If the yellow bin is three quarters full, carefully remove the bag from the bin, seal with a cable tie and transfer to the decontaminated waste storage area (Gas Pod) using the eurocart bin stored in the gas pod instead of transferring to wheelie bin in autoclave room and then transferring to gas pod using eurocart. 10**)7.2.1 (x**) Altered to say retrieve keys from key cabinet in first change room instead of retrieve from Laboratory Manager 11)**7.2.1 (x)** Changed to say remove yellow bag from yellow bin in autoclave room rather than wheelie bin. 12)**7.2.1 (x)** Removed the note regarding donning laboratory coat & gloves in the Gas Pod. Justification – All waste will be sterilized (autoclaving or disinfection) so risk is low.	**002**

		13)**7.2.1 (x)** Altered to say return keys to key cabinet in first change room instead of to Laboratory Manager. 14)**7.2.4 (iii)** Altered to say the sharps bin should be sealed & carried to the autoclave instead of using a trolley. Added a note to say **make sure the stainless steel bucket is used when autoclaving sharps containers.** 15)**7.2.4 (vi)** Altered to say that after autoclaving and cooling, place the sharps bins in the designated lidded container in Gas Pod 2 rather than in wheelie bin 16)**7.2.5.2 (i)** Updated preparation of aspiration bottles detailing daily disposal of waste and no. of tablets to be added, changes in accordance with procedural change order (copy located in CBE office) 17) **7.2.5.3 (i)** Altered to say before using the CompacT SelecT place 4 x 5g tablet of virkon into waste collection drum .	
002		This SOP has been revised following the replacement of the Health Services Advisory Committee's (1999) guidance document 'Safe disposal of clinical waste' with Healthcare Waste Technical Memorandum HTM07-01. This SOP has therefore been revised and updated to take into account the changes in legislation governing the management of waste, its storage, carriage, treatment and disposal, and health and safety. Key changes include: (1) the adoption of new methodology for identifying and classifying infectious and medicinal waste that complies with health and safety, transport and waste regulations. This approach will ensure that the CBE will comply with and go beyond the regulatory requirements; (2) a revised colour-coded best practice waste segregation and packaging system to aid the identification and segregation of waste; (3) the use of European Waste Catalogue (EWC) codes i.e. the clinical waste classification system using Groups A to E has been removed, as it no longer reflects appropriate segregation for treatment or disposal and does not easily equate to the use of European Waste Catalogue (EWC) Codes, which are now mandatory. Key changes contained in this document include guidance on: the definition and classification of infectious waste; the definition and classification of medicinal waste; a revised colour-coded best practice waste segregation and packaging system; the use of European Waste Catalogue (EWC) Codes; the classification of microbiological cultures for carriage and disposal. The use of the clinical waste classification system using Groups A to E has been removed, as it is felt that its continued use is inappropriate. The A to E classification system no longer reflects appropriate segregation for treatment or disposal, and does not easily equate to the use of European Waste Catalogue (EWC) codes, which are now mandatory for all waste transfer documentation.	**003**

		Note: The classification system used in the Advisory Committee on Dangerous Pathogens' (ACDP) 'Approved list of biological agents' (that is, of biological agents into hazard groups HG1–HG4) is not used for waste classification and transport, and therefore this has also been removed from this document.	
003	16.06.10 Reviewed by C. Kavanagh	**1)References** – Added the reference 'Code of practice & guidance note for work with chemical carcinogens, mutagens and Substances toxic to reproduction & cytotoxins **2) Section 7.1.1 (ix) & Section 7.2 (v)** – Added a note to say An 'overflow' facility of three yellow wheelie bins is available in the inner courtyard of Garandon Wing which should be used if the three wheelie bins in the waste cage in Gas Pod 2 become full. Waste bags (orange & yellow only) should be sealed, labelled with the correct EWC code & transported to these wheelie bins using the trolley. **3) Section 7.3** – Added a note to say Trypan Blue is a known carcinogen & therefore should be disposed of through the cytotoxic waste route. Refer to SOP029.	**004**
004	13/05/2011 P.Hourd	1. This SOP has been revised as part of continuous improvement programme for a lean QS. Explanatory detail has been removed from Sections 2 and 4. This is now included in Section 5 of the CBE COP, which shall be used to support training to this SOP. Process maps have been added to clarify critical steps in solid and sharps waste disposal procedures. No significant change to procedure 2. Also Revised to include the CBE Tissue Engineering Laboratory (T208B), located in the Wolfson School	**005**
005	07.11.2011	Revised following lean review, according to Change Note DCN005. Altered to reflect changes to collection of waste in orange stream waste route.	**006**
006	21.12.2011 V. Workman	1) **Section 7.1.3.5** Revised according to Change Note CRN008 Altered to reflect changes to the disposal of contaminated vessels.	**007**
007	07.10.2014 K. Glen	Section 7.1.3.2. Revised according to Change Note CRN016. Altered to reflect in the aspiration waste procedure	008
008	19.05.2015 K.Sikand	Annex II has been changed to reflect the change in regulations to CLP (EC) No.1272/2008	009
009	19th January 2016 C.Kavanagh	i)Removal of references to 70% IMS due to withdrawal of its use in the laboratory. ii)Addition of reference of 1:20 & 1:50 Chemgene solution where appropriate due to its implementation.(Replacing 70% IMS).	010
010	1st March 2016 Reviewed by C.Kavanagh	i)Addition of references of 70% IMS which has been re-introduced back into the laboratory for a 'rinsing stage' following the use of ChemGene (Chemgene can leave a residue)	011
011	21st June 2018. Reviewed by K.Sikand	This SOP does not cover arrangements for the disposal of (1) human tissue (body parts, organs) and the requirements of the Human Tissue Act has been removed. Also HTA-PR-SOP007	012

Standard Operating Procedure **SOP003**

Title: **DECONTAMINATION & DISPOSAL OF BIOLOGICAL (HEALTHCARE) WASTE**

Location: CBE Laboratories

		Disposal of HTA licensable material has been added to the list for additional reading.	
012	21st April 2020 by C.Kavanagh	Minor editorials i)Add note to say the design of the cytotoxic waste bag may differ . ii)Removal of 7.3.1 section about the waste from the Compact Select as we no longer have this equipment. iii)Added the shared.safety.lboro.ac.uk E-mail address. iv)Added a note about recording accidents using online system.	013
013	2nd June 2025	Minor Amendments only	013