

Waste Services Contract

**Waste Acceptance Criteria –
Supercompactable Waste
Treatment**

WSC-WAC-SUP – Draft Version 2.0 – January 2010



Waste Acceptance Criteria – Supercompactable Waste Treatment

Document Control

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Executive Summary

This document forms part of the Waste Services Contract between LLW Repository Ltd and its Customers. It provides the Waste Acceptance Criteria for supercompactable waste being consigned to LLW Repository Ltd for treatment, by high force compaction, prior to disposal at the Low Level Waste Repository including details of the physical, chemical, radiological, packaging and transportation requirements that waste must comply with to be accepted.

Along with the criteria for other waste services that make up the Waste Acceptance Criteria, this document details **what** waste can be consigned to LLW Repository Ltd for treatment and / or disposal. It should be read in conjunction with the Waste Acceptance Procedure, including the associated Processes, Guides and Forms, that detail **how** to consign waste to LLW Repository Ltd for treatment and /or disposal. A Process Overview Diagram (Reference: WSC-PRO-OVR) that provides a visual guide to the waste acceptance processes, and all other documents associated with LLW Repository Ltd's Waste Services, are available from our website: www.llwrsite.com

If you need any assistance or have any questions regarding this Waste Acceptance Criteria or LLW Repository Ltd's Waste Services, please contact the LLW Repository Ltd Customer Team by telephone: (01946) 722000 or by e-mail: customerteam@llwrsite.com

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1 Introduction

This document defines the *Waste Acceptance Criteria* for the supercompaction of low level waste by *LLW Repository Ltd*. This treatment service is available to reduce the volume of low level waste, by high force compaction, prior to disposal at the *Low Level Waste Repository*.

1.1 Scope

This Waste Acceptance Criteria (WAC) document represents the full requirements for the Packaging, Receipt, High Force Compaction, Grouting and Disposal of supercompactable low level radioactive waste. The criteria apply to each consignment of waste to LLW Repository Ltd.

1.2 Service Supplier

The Supercompactable Waste Treatment Service is provided by *Sellafield Ltd*, as a sub-contractor to LLW Repository Ltd, at the *Waste Monitoring and Compaction Facility (WAMAC)* at *Sellafield* in West Cumbria.

1.3 Process

Customers deliver supercompactable waste consignments to Sellafield for treatment. Following treatment at Sellafield, the supercompacted waste is re-packaged and transported to the Low Level Waste Repository for grouting and disposal by LLW Repository Ltd as *Secondary Waste*.

1.4 Waste Acceptance

For a *Waste Consignment* to be accepted by LLW Repository Ltd, it must satisfy the criteria detailed in this document and the Waste Acceptance Criteria Overview document (Reference: WSC-WAC-OVR). Waste will only be accepted from Customers in accordance with LLW Repository Ltd's Waste Acceptance Procedure. In addition, waste is accepted for treatment and disposal by LLW Repository Ltd based on the availability of sufficient volumetric and radiological capacity.

1.5 Variations

Variations to or waiver of the criteria defined in this document may be allowed but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd. In all cases, approval is required prior to waste being prepared for consignment.

1.6 Approval in Advance

Certain criteria defined in this document state that it is necessary to obtain an Approval in Advance from LLW Repository Ltd. This can be achieved by approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

1.7 Non-Compliant Waste

Any non-compliant wastes consigned to LLW Repository Ltd may require collection by the Customer in accordance with the relevant conditions in the Waste Services Contract.

1.8 Defined Terms

Defined terms within this document are highlighted in *italics* and their meanings are presented in the Glossary.

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2 Waste Acceptance Criteria

This section details the Waste Acceptance Criteria for LLW Repository Ltd's Supercompactable Waste Treatment Service. It is presented in four sections:

- S1 – Physical and Chemical Properties
- S2 – Radiological Properties
- S3 – Packaging and Transportation Requirements
- S4 – Service Specific Requirements

S1 Physical and Chemical Properties

S1.1 Waste Treatment and Segregation

Waste should not be consigned for *Supercompaction* if reasonably practicable measures could be adopted to segregate its constituent parts such that alternative waste treatment and / or disposal services could be used to reduce the final volume requiring disposal at the Low Level Waste Repository or to avoid disposal at the Low Level Waste Repository.

Waste consigned for treatment as *Supercompactable Waste* shall be wastes which if subjected to *Supercompaction*, and allowing for reassertion, could reasonably be expected to be reduced in volume by 30% or more. *Supercompactable Waste* should be segregated into the following types:

- Loose Supercompactable Waste
- Loose Shreddable Waste
- Loose Filter Waste
- Drummed Supercompactable Waste
- Drummed Reassertable Waste
- Drummed Non-Compactable Waste

The service specific requirements for each type of *Supercompactable Waste* are defined in S4.

S1.2 Acceptable Waste

Only solid radioactively contaminated or activated waste will be accepted for treatment and disposal at the Low Level Waste Repository.

Waste consigned for treatment and disposal must be compliant with the Low Level Waste Repository's Certificate of Authorisation issued under the Radioactive Substances Act 1993 by the Environment Agency (Reference: BZ2508). Compliance with the *Disposal Authorisation* can be achieved by complying with the requirements of this Waste Acceptance Criteria.

S1.3 Waste Preparation

Waste must have been treated or packaged in such a way as to render it, so far as is reasonably practicable, insoluble in water and not readily flammable.

S1.4 Non-Waste Materials

Where materials must be added to the waste, the Customer shall use reasonable means to limit the quantity of non-waste materials present in a *Waste Consignment*. It is not acceptable to purposely dilute waste or add shielding materials for the sole purpose of achieving compliance with the requirements of this Waste Acceptance Criteria.

S1.5 Reactive Metals and Materials

Waste shall not contain *Reactive Metals* and other materials which readily react either with water or air with the evolution of heat or flammable gases.

Customers shall use reasonable means to limit the accessible surface area of aluminium, zinc and magnesium within the waste and in any case, the total accessible surface area of these metals within a *Waste Consignment* must not exceed 10m². Painting or wrapping aluminium, zinc and magnesium wastes are acceptable methods to limit the accessible surface area.

S1.6 Explosive Materials

Waste shall not contain explosive materials.

S1.7 Liquids

Waste shall not contain any *Free Liquid* or liquids with flashpoint less than 21 °C absorbed on solid materials and in all instances, waste shall not release more than 1% of liquid by volume during *Supercompaction*.

Any non-aqueous content of any liquid in the waste shall be conditioned, using a method approved in advance by LLW Repository Ltd, so that the volume of liquid that will be released during *Supercompaction* does not exceed 0.05% of the volume of the waste.

S1.8 Strong Oxidising Agents

Waste shall not contain strong oxidising agents.

S1.9 Pressurised Gas Receptacles and Aerosols

Waste shall not contain pressurised gas receptacles and aerosols, as defined within The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007 (or as amended), unless treated, prepared or made safe by a method approved in advance by LLW Repository Ltd.

S1.10 Toxic Materials

Waste shall not contain materials which generate or are capable of generating toxic gases, vapours or fumes harmful to persons handling the waste.

S1.11 Chemical Complexing or Chelating Agents

Waste shall not contain chemical complexing or chelating agents.

S1.12 Ion Exchange Materials

Waste shall not contain *Ion Exchange Material*.

S1.13 Biological, Infectious and Pathogenic Materials

Waste shall not contain biological, pathogenic or infectious materials, as listed within Hazard Groups 2, 3 or 4 produced by The Advisory Committee on Dangerous Pathogens, unless treated so that no viable micro-organism(s) from Hazard Groups 2, 3 or 4 exist by a method approved in advance by LLW Repository Ltd.

S1.14 Putrescible Waste

Customers shall use reasonable means to limit the quantity of *Putrescible Materials* in the waste and in any case, the total weight within a *Waste Consignment* must not exceed 1% of the total weight of waste.

S1.15 Sharp Objects and Glass

Sharp objects and glass shall be contained within additional packaging or containment within a *Waste Package* such that they could reasonably be expected, based on previous performance, to remain contained during routine mechanical handling of the *Waste Package* and in the event of a rupture of the *Waste Package* during *Supercompaction*.

S1.16 Heavy Gauge Metal

Waste shall not contain heavy gauge metal, such as steelwork, or other items which could reasonably be expected to offer a significant and / or non-uniform axial resistance during *Supercompaction*.

S1.17 Dust and Powders

Waste capable of generating powder or dust shall be contained in a breathable polycotton sack such that air can escape through the fabric but the powder or dust is retained during *Supercompaction*.

S1.18 Hazardous Waste

The Hazardous Waste (England and Wales) Regulations 2005 (or as amended) apply to a limited amount of radioactive waste as most radioactive waste is subject to the provisions of the Radioactive Substances Act 1993 and is therefore outside the scope of the Hazardous Waste Regulations. However, to fulfil regulatory expectations in relation to disposals at the Low Level Waste Repository, waste containing hazardous waste may be accepted for treatment and disposal but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd. The Form must include details of the components that make the waste hazardous and the levels at which they are present.

Materials that are likely to, or actually, possesses one or more *Hazard Properties* shall be assessed and where present be excluded from the waste or made safe prior to any conditioning or mixing with other materials. For the material to be made safe the hazards or risks shall be removed or reduced, by a method approved in advance by LLW Repository Ltd, to such a level that a *Waste Consignment* no longer possesses that hazard or risk.

It is recognised that not all types of Hazardous Waste are relevant to disposals at the Low Level Waste Repository. Customers are therefore encouraged to consult with LLW Repository Ltd prior to the preparation of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV).

A Waste Consignment Variation Form (Reference: WSC-FOR-WCV) is not required for waste containing the hazardous components listed in Table 1 where the quantity is below the stated leaching limit value.

Table 1: Leaching Limit Values

Component	Symbol	Leaching Limit Value (mg/ kg dry substance)
Arsenic	As	0.5
Barium	Ba	20
Cadmium	Cd	0.04
Total Chromium	Cr total	0.5
Copper	Cu	2
Mercury	Hg	0.01
Molybdenum	Mo	0.5
Nickel	Ni	0.4
Lead	Pb	0.5
Antimony	Sb	0.06
Selenium	Se	0.1
Zinc	Zn	4
Chloride	C ⁻	800
Fluoride	F ⁻	10
Sulphate	SO ₄ ²⁻	1,000
Dissolved Organic Carbon	DOC	500

The Leaching Limit Value should be determined using the standard defined in EA NEN 7375:2004, Leaching Characteristics of Moulded or Monolithic Building and Waste Materials, Determination of Leaching of Inorganic Components with the Diffusion Test, 'The Tank Test', Version 1.0, April 2005 published by the Environment Agency. Alternative tests may be used but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

Conditioning processes may be used to ensure hazardous waste is below the Leaching Limit Value must but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

The actual quantity of all hazardous waste in a *Waste Consignment* must be recorded in the relevant section of the Waste Consignment Information Form (Reference: WSC-FOR-WCI).

S1.18.1 Asbestos

Waste shall not contain asbestos. There are no exceptions to this condition.

S1.19 Hazardous Substances and Non-Hazardous Pollutants

The Groundwater (England and Wales) Regulations 2009 (or as amended) apply to disposals at the Low Level Waste Repository. The disposals of *Hazardous Substances* and *Non-Hazardous Pollutants* must therefore be controlled. Waste containing *Hazardous Substances* and *Non-Hazardous Pollutants* may be accepted for disposal but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) and *Suitable Supporting Justification* by LLW Repository Ltd.

S2 Radiological Properties

S2.1 Radioactive Contaminant

The waste within a *Waste Consignment* consigned for treatment and disposal to LLW Repository Ltd must consist of waste deemed to be contaminated and not the primary contaminant itself. The weight of the *Radioactive Contaminant* should not exceed 10% of the weight of the *Waste Consignment*. This limit may be exceeded but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) and *Suitable Supporting Justification* by LLW Repository Ltd.

S2.2 Radioactivity Limits

The *Activity* of any *Waste Consignment* consigned for disposal as low level waste at the Low Level Waste Repository shall not exceed the following values:

- 4GBq/t for all alpha-emitting radionuclides
- 12GBq/t for all other radionuclides

In accounting for *Activity* against these limits, the activity of *Decay Products* with half-lives of less than three months shall not be accounted for if they are present in amounts not exceeding those which could be present through the natural decay of radionuclides that are accounted for.

S2.3 Thorium

Waste shall not contain Th-232 in excess of 1MBq/t. This limit may be exceeded but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

S2.4 Fissile Radionuclides

Waste containing *Fissile Radionuclides* may be consigned for disposal but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

A Waste Consignment Variation Form (Reference: WSC-FOR-WCV) is not required for waste that meets the relevant requirements stated in S2.4.1 to S2.4.5. There are no exceptions for waste containing Cm-247.

S2.4.1 Uranium

Waste containing U-235 may be consigned provided that the *Waste Consignment* meets the following requirements:

- All the uranium present is either natural or depleted uranium, or
- The U-235 content of any *Waste Consignment* does not exceed 60g

S2.4.2 Plutonium

Waste containing plutonium may be consigned provided that the *Waste Consignment* meets the following requirements:

- Total Pu alpha (i.e. Pu-238 + Pu-239 + Pu-240 + Pu-242) does not exceed 0.1GBq/t
- Pu-241 complies with the Radioactivity Limits defined in S2.2.

Waste containing plutonium above these limits may be permitted, subject to safety assessment, but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

S2.4.3 Neptunium

Waste containing Np-237 may be consigned provided that the *Waste Consignment* does not contain more than 4GBq/t of Np-237.

S2.4.4 Americium

Waste containing Am-241, Am-242m and / or Am-243 may be consigned provided that the *Waste Consignment* does not contain more than 0.1GBq/t of each of these radionuclides.

S2.4.5 Other Fissile Radionuclides

Waste containing the *Fissile Radionuclides* listed in Table 2 may be consigned provided that the *Waste Consignment* does not contain more than the stated fissile limit, in MBq/t.

Table 2: Fissile Radionuclide Limits

Radionuclide	Fissile Limit (MBq/t)
Th-228	100
U-232*	1
U-233*	1
U-234*	0.01
U-236*	0.0001
Pa-231	0.1
Pa-232	100
Cm-243	100
Cm-244	100
Cm-245	1
Cm-246	1
Cf-249	1
Cf-250	10
Cf-251	1
Cf-252	1
Es-254	10

Notes:

* Control of these *Fissile Radionuclides* is only required where artificial means have been employed to enrich the uranium specifically in these radionuclides. Products of U-235 enrichment processes are covered by S2.4.1.

S2.5 Radiation

The maximum radiation level at any point on the external surface of the *Transport Container* shall not exceed 2mSv/h.

S2.6 Contamination

External non-fixed contamination levels on *Waste Packages* or the *Transport Container* at the time of consignment shall be as low as reasonably practicable and in any case not more than 0.4Bq/cm² for all alpha-emitting radionuclides and 4Bq/cm² for all other radionuclides averaged over an area of 300cm².

S2.7 Sealed Sources

Waste shall not contain closed sources, including sealed sources, laminated sources and/or homogeneous sources, as defined in The Radioactive Substances (Waste Closed Sources) Exemption Order 1963, or as amended.

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S3 Packaging and Transportation Requirements

S3.1 Approved Waste Packages

Waste for treatment and disposal may be consigned to LLW Repository Ltd in any of the *Waste Packages*, where approved for the relevant service, as detailed in Table 4.

Table 3: Approved Waste Packages

Transport Container Type	Column A (kg)	Column B (mm)	Column C (mm)	Column D (mm)	Column E (m ³)
Bags	100	800	N/A	1000	N/A
Wrapping	100	1000	N/A	2000	N/A
Drums	300	615	592	886	0.25

Notes:

Column A: shows the maximum gross weight, in kg, for each *Waste Package*

Column B: shows the maximum width, in mm, for each *Waste Package*

Column C: shows the minimum width, in mm, for each *Waste Package*

Column D: shows the maximum length, in mm, for each *Waste Package*

Column E: shows the *Package Volume* of each *Waste Package* type, in m³, which is used for the purposes of calculating the treatment and disposal charges, independent of the actual volume of waste in the container.

S3.1.1 Bags

Bags may be used to consign the following types of waste through the *Supercompactable Waste Treatment Service*:

- Loose Supercompactable Waste
- Loose Shreddable Waste
- Loose Filter Waste

All bagged waste must comply with the following specification:

- Waste shall be bagged in transparent polythene or PVC bags with the neck of the bag taped then folded and taped again for retention of the contents
- Bags shall be no greater than 800mm in any direction, so that they are able to pass freely through a hopper aperture of 1,000mm x 800mm
- No individual bag shall exceed 100kg
- Individual bags should not be totally filled with *Reassertable Waste* such as rubber boots, gloves etc. *Reassertable Waste* should be mixed with paper or cloth based material to reduce the likelihood of reassertion

S3.1.2 Wrapping

Wrapping may be used to consign the following types of waste through the *Supercompactable Waste Treatment Service*:

- Loose Shreddable Waste

All wrapped waste must comply with the following specification:

- Waste shall be wrapped in transparent polythene or PVC material and taped for retention of the contents

- Wrapped items shall be no greater than 1000mm wide or 2000mm long, so that they are able to pass freely through a hopper aperture of 1,000mm x 2,000mm
- No individual wrapped item shall exceed 100kg

S3.1.3 Drums

Drums may be used to consign the following types of waste through the *Supercompactable Waste Treatment Service*:

- Drummed Supercompactable Waste
- Drummed Reassertable Waste
- Drummed Non-Compactable Waste

All drummed waste must comply with the following specification:

- *Nominal Size*: 210litres
- *Material*: Mild Steel
- *Maximum Weight*: 300kg¹
- *Maximum External Drum Diameter*: 592mm to 615mm²
- *Maximum External Drum Height*: 886mm
- *Minimum Drum Wall Thickness*: 1mm
- *Lid Closure Mechanism*: Bolt Type³
- *Condition*: Drums to be in good condition and fit for purpose

Notes:

1. The total drum weight, including the drum itself and the waste contents, should not exceed 300kg. Any drum that does exceed 300kg must be clearly identified in the relevant section of the Waste Consignment Information Form (WSC-FOR-WCI).
2. The external drum diameter must be measured with the lid clamp fitted and tightened. It must include any protrusions, such as the lid closure bolt, to determine the absolute maximum diameter of the drum to ensure it will fit in the drum bolster in the *Supercompaction* facility.
3. The lid closure mechanism shall be of the bolt type and not a lever type. The drum lid on each drum shall be clamped in such a way that the closure makes contact with the drum wall and completely covers the drum rim. It shall be fastened such that the lid closure bolt has been firmly tightened but not reached its limit of travel when the drum is consigned for *Supercompaction*. No free movement of the lid and clamp by hand shall be possible.

S3.2 Other Waste Packages

Waste that cannot be readily consigned in one of the approved *Waste Packages*, as detailed in S3.1, may be acceptable for disposal in other containers but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) and *Suitable Supporting Justification* by LLW Repository Ltd.

S3.3 Waste Package Labelling

Each *Waste Package* in a *Waste Consignment* shall be labelled in such a way as to provide traceability back to the point of generation. Records of the individual *Waste Packages* shall be retained by the Customer for a period of not less than two years from *Delivery*.

Each *Waste Package* shall carry a unique identifier in the format NNNNNN/AAAAA where NNNNNN is a unique sequential *Waste Package* number provided by the Customer and AAAAA is the Customer Code specified by LLW Repository Ltd in the Waste Services

Contract. Drums shall have the unique identifier clearly displayed on the drum lid with a minimum character height of 24mm.

S3.4 Approved Transport Containers

Supercompactable Waste for treatment and disposal may be consigned to LLW Repository Ltd in any of the *Transport Containers*, where approved for the relevant service, as detailed in Table 4.

Table 4: Approved Transport Containers

Transport Container Type	Design Reference	Historic Reference	Column A (tonne)	Column B (tonne)	Column C (m ³)
Multi Use ISO Skip Transport Container	TC05	0075	17	6.5	7
Full Height ISO Transport Container	2912	N/A	20	N/A	N/A
Full Height ISO Transport Container	2031	N/A	20	N/A	N/A
Full Height ISO Transport Container	2033	N/A	20	N/A	N/A
Full Height ISO Transport Container	2044	N/A	25	N/A	N/A
Full Height ISO Transport Container	2896	N/A	25	N/A	N/A
Full Height ISO Transport Container	NC02/2005	N/A	24	N/A	N/A

Notes:

Column A: shows the maximum gross weight, in tonnes, for compliance with the Certificate of Approval for each container design. The maximum gross weight for any individual container is recorded in the Container Safety Convention (CSC) approval plate on each container and shall be checked before the container is filled with waste.

Column B: shows the maximum operational gross weight for the Multi Use ISO Skip, i.e. 6.5t, if the ISO Skip is to be collected by the WAMAC Skip Vehicle. The total weight of the waste and the ISO Skip can be increased if the ISO Skip can be collected by road trailer but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd

Column C: shows the *Package Volume* of each Transport Container type, in m³, which is used for the purposes of calculating the treatment charges, independent of the actual volume of waste in the container.

S3.4.1 Multi Use ISO Skip

The Multi Use ISO Skip may be used to consign the following types of waste through the *Supercompactable Waste Treatment Service*:

- Loose Supercompactable Waste
- Loose Shreddable Waste
- Loose Filter Waste

All waste consigned in the Multi Use ISO Skip must comply with the following specification:

- Customers must take reasonably practicable measures to ensure that waste can flow freely from the container when it is tipped at WAMAC, i.e. waste must not be so densely packed into the container that it could become jammed or wedged inside
- Customers are required to make all reasonable efforts to ensure that waste is distributed evenly throughout the ISO Skip to assist with container handling
- The total weight of the waste and the ISO Skip must not exceed 6.5t if the ISO Skip is to be collected by the WAMAC Skip Vehicle

- The total weight of the waste and the ISO Skip can be increased if the ISO Skip can be collected by road trailer but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd

S3.4.2 Full Height ISO Transport Container

Full Height ISO Transport Containers may be used to consign the following types of waste through the *Supercompactable Waste Treatment Service*:

- Loose Filter Waste
- Drummed Supercompactable Waste
- Drummed Reassertable Waste
- Drummed Non-Compactable Waste

Drums can be transported in a range of full height ISO containers including double door and single door design variants, as detailed in Table 4, subject to compliance with the IAEA Transport Regulations. In some cases, the *Transport Container* will be the IP-2 package. Where this is not the case, Customers must use drums that are IP-2 rated.

All waste consigned in a Full Height ISO Transport Container must comply with the following specification:

- Customers are required to make all reasonable efforts to ensure that waste is distributed evenly throughout the ISO Skip to assist with container handling
- Drums must be stacked so that they can be readily removed by *Mechanical Means*. For standard 210l drums, a maximum of 72 drums should be loaded in two vertically stacked layers within a Full Height ISO Transport Container

S3.5 Other Transport Containers

Waste that cannot be readily consigned in one of the approved *Transport Containers*, as detailed in S3.4, may be acceptable for disposal in other containers but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) and *Suitable Supporting Justification* by LLW Repository Ltd.

S3.6 Transport Container Venting

The *Transport Container* shall not be left un-vented for more than thirty days in advance of delivery to LLW Repository Ltd.

S3.7 Transport Regulations

Waste must be consigned for disposal in accordance with one of the following IAEA Transport Regulations classifications:

- Excepted Package
- Low Specific Activity material (LSA I, LSA II or LSA III)
- Surface Contaminated Object (SCO I or SCO II)

In addition, any *Waste Consignment* or *Transport Container* that does not, in its own right, comply with the requirements of the current transport regulations and requires additional shielding or an overpack to achieve compliance, may be accepted for disposal but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd.

S3.8 Part Loads

A *Waste Consignment* may not be consigned to LLW Repository Ltd if sent as a part-load with other materials that are not Low Level Waste on the same vehicle.

S3.9 Site Rules and Instructions

When delivering waste to LLW Repository Ltd for treatment, the Customer's representatives must observe the site rules and instructions at the *Service Supplier's* site.

S3.10 Transport Container Return

Where the *Transport Container* belongs to the Customer, LLW Repository Ltd, or its subcontractor, will unload the contents of the *Transport Container* and ensure that it is available for return, within the timescale agreed with the Customer, in as good a condition as it was when delivered.

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S4 Service Specific Requirements

This section details the service specific requirements for each type of *Supercompactable Waste* that may be consigned. Only those criteria that apply to the selected service must be complied with.

S4.1 Loose Supercompactable Waste

Loose Supercompactable Waste that is either bagged or wrapped may be consigned for treatment and disposal in an approved *Transport Container* in accordance with the following requirements:

- Waste items should be size reduced as far as reasonably practicable to enable the most efficient filling of the container
- *Loose Supercompactable Waste* may be mixed with *Loose Shreddable Waste* in the same *Transport Container*
- Small *Non-Compactable Items*, such as small tools, valves, pumps and motors, may be consigned for treatment and disposal with *Loose Supercompactable Waste* but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd. The Customer must ensure all items are drained of liquid. *Non-Compactable Items* should therefore be limited to 10% of any *Waste Consignment* and must be clearly identified with 'Non-Compactable Waste' tape. This tape is available on request through LLW Repository Ltd.

S4.2 Loose Shreddable Waste

Loose Shreddable Waste that is loose, bagged or wrapped may be consigned for treatment and disposal in an approved *Transport Container* in accordance with the following requirements:

- Waste items should be size reduced as far as reasonably practicable to enable the most efficient filling of the container
- Waste that is suitable for shredding but for handling reasons has to be bagged must be clearly identified with 'WAMAC Shreddable' tape. This tape is available on request through LLW Repository Ltd.
- Customers shall ensure that only items suitable for shredding are identified with 'WAMAC Shreddable' identifier tape, *Loose Shreddable Waste* must not include items that would damage the shredder, including *Non-Compactable Items*
- *Loose Shreddable Waste* may be mixed with *Loose Supercompactable Waste* in the same *Transport Container*. However, Customers shall make all reasonable efforts to utilise the *Loose Supercompactable Waste* service for all waste items that do not require shredding

S4.3 Loose Filter Waste

Filters may be consigned for treatment and disposal with *Loose or Drummed Supercompactable Waste* in an approved *Transport Container* in accordance with the following requirements:

- Acceptable filter types are:
 - Vokes rectangular type – 600mm x 600mm x 300mm
 - Vokes cylindrical type – 510mm diameter x 610mm high
- Radiation levels on an individual filter must not exceed 0.1mSv/h gamma

- To minimise powder or dust arising under high force compaction, filters should be placed in a breathable poly cotton bag
- Boxed HEPA filters must be contained in a transparent bag with the neck of the bag taped then folded and taped again for retention of the contents
- Unboxed HEPA filters must be double bagged with the neck of the first transparent bag taped and contained within a second transparent bag with the neck of the second bag being taped then folded and taped again for retention of the contents
- If filters are not likely to generate powder or dust under *Supercompaction*, e.g. inlet filters, then the breathable poly cotton bag may not be required but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) by LLW Repository Ltd
- Any combination of rectangular and / or cylindrical filter types may be consigned in an approved *Transport Container*. Filters may also be consigned with other *Loose or Drummed Supercompactable Waste* in the same *Transport Container*. Each waste type, e.g. rectangular filters, circular filters or other waste, should be grouped together within the *Transport Container* to support waste handling and treatment operations
- The number of filters in a *Waste Consignment* must be recorded in the relevant section of the Waste Consignment Information Form (Reference: WSC-FOR-WCI)

S4.4 Drummed Supercompactable Waste

Drummed Supercompactable Waste may be consigned for treatment and disposal accordance with the following requirements:

- Any drums that exceed 300kg must be clearly identified on the Waste Consignment Information Form (WSC-FOR-WCI)

Individual Drums of supercompactable waste may be consigned for treatment in accordance with the following requirements:

- Each drum must be secured to a plastic pallet in a vertical orientation with the drum lid placed uppermost
- Only one drum may be consigned on each pallet
- Pallets shall be fit for purpose and shall not distort during routine handling
- Wooden pallets are not accepted
- Pallets must be retrievable from the delivery vehicle by *Mechanical Means*
- Any drums that exceed 300kg must be clearly identified on the Waste Consignment Information Form (WSC-FOR-WCI)

S4.5 Drummed Reassertable Waste

Reassertable Waste may be consigned for treatment and disposal in drums in accordance with the following requirements:

- The quantity of *Reassertable Waste* in each drum must not exceed 30% by volume
- Drums of *Reassertable Waste* shall be segregated into two weight bands:
 - Weight Band 1 – Total Drum Weight up to 100kg
 - Weight Band 2 – Total Drum Weight from 101kg up to 140kg
- Drums of reassertable waste shall be labelled Weight Band 1 or Weight Band 2 on the lid and the side of the drum
- The *Waste Consignment* may include up to 30% of Weight Band 2 drums

- The number of *Reassertable Waste* drums in a *Waste Consignment* must be recorded in the relevant section of the Waste Consignment Information Form (Reference: WSC-FOR-WCI).

S4.6 Drummed Non-Compactable Waste

Individual Drums of Non-Compactable Waste may be consigned for disposal through the Supercompactable Waste Treatment Service but only on approval of a Waste Consignment Variation Form (Reference: WSC-FOR-WCV) and *Suitable Supporting Justification* by LLW Repository Ltd. In addition, *Non-Compactable Waste* drums must be consigned in accordance with the following requirements:

- Each drum must be clearly marked as 'Non-Compactable' on the lid and the side of the drum with a minimum character height of 24mm
- Each drum must be secured to a plastic pallet in a vertical orientation with the drum lid placed uppermost
- Only one drum may be consigned on each pallet
- Pallets shall be fit for purpose and shall not distort during routine handling
- Wooden pallets are not accepted
- Pallets must be retrievable from the delivery vehicle by *Mechanical Means*
- Any drums that exceed 300kg must be clearly identified on the Waste Consignment Information Form (WSC-FOR-WCI)
- The number of *Non-Compactable Waste* drums in a *Waste Consignment* must be recorded in the relevant section of the Waste Consignment Information Form (Reference: WSC-FOR-WCI)

3 Glossary

Activity, expressed in Becquerels, means the number of spontaneous nuclear transformations occurring in a period of one second;

Complexing Agents means either chelating agents or monodentate organic ligands.

Consign, in the context of waste, means to transfer waste to LLW Repository Ltd for the purpose of treatment and disposal and **Consigned** has a corresponding meaning.

Decay Products means those radionuclides succeeding another radionuclide in the radioactive decay chain in which both, or all, occur.

Disposal Authorisation means the current Certificate of Authorisation for the Low Level Waste Repository (Reference: BZ2508) issued under the Radioactive Substances Act 1993 by the Environment Agency.

Drummed Supercompactable Waste means *Supercompactable Waste* that is consigned for treatment and disposal in drums in a *Transport Container*.

Fissile Radionuclides means any of the following radionuclides:

Th-228	Np-237	Pa-231	Cm-243	Cf-249
U-232	Pu-238	Pa-232	Cm-244	Cf-250
U-233	Pu-239	Am-241	Cm-245	Cf-251
U-234	Pu-240	Am-242m	Cm-246	Cf-252
U-235	Pu-241	Am-243	Cm-247	Es-254
U-236	Pu-242			

Free Liquid means any liquid which is present as a separate phase including liquid which is physically absorbed onto a solid matrix rather than chemically combined.

Hazard Properties means the following properties of waste which render them hazardous in accordance with the Hazardous Waste (England and Wales) Regulations 2005:

- H1 “Explosive”: substances and preparations which may explode under the effect of flame or which are more sensitive to shocks or friction than dinitrobenzene.
- H2 “Oxidising”: substances and preparations, which exhibit highly exothermic reactions when in contact with other substances, particularly flammable substances.
- H3-A “Highly Flammable”:
 - liquid substances and preparations having a flash point below 21oC (including extremely flammable liquids), or
 - substances and preparations which may become hot and finally catch fire in contact with air at ambient temperature without any application of energy, or
 - solid substances and preparations which may readily catch fire after brief contact with a source of ignition and which continue to burn or to be consumed after removal of the ignition source, or
 - gaseous substance and preparations which are flammable in air at normal temperature and pressure, or

- substances and preparations, which in contact with water or damp air evolve highly flammable gases in dangerous quantities.
- H3-B “Flammable”: liquid substances and preparations having a flash point equal to or greater than 21oC and less than or equal to 55oC.
- H4 “Irritant”: non-corrosive substances and preparations, which, through immediate, prolonged or repeated contact with the skin or mucous membrane, can cause inflammation.
- H5 “Harmful”: substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may involve limited health risks.
- H6 “Toxic”: substances and preparations (including very toxic substances and preparations) which, if they are inhaled or ingested or if they penetrate the skin, may involve serious, acute or chronic health risks and even death.
- H7 “Carcinogenic”: substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce cancer or increase its incidence.
- H8 “Corrosive”: substances and preparations, which may destroy living tissue on contact.
- H9 “Infectious”: substances containing viable microorganisms or their toxins, which are known or reliably believed to cause disease in man or other living organisms.
- H10 “Teratogenic”: substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce non-hereditary congenital malformations or increase their incidence.
- H11 “Mutagenic”: substances and preparations which, if they are inhaled or ingested or if they penetrate the skin, may induce hereditary genetic defects or increase their incidence.
- H12 Substances and preparations, which release toxic or very toxic gases in contact with water, air or an acid.
- H13 Substances and preparations capable by any means, after disposal, of yielding another substance, e.g. a leachate, which possesses any characteristics listed above.
- H14 “Ecotoxic”: substances and preparations, which present or may present immediate or delayed risks for one or more sectors of the environment.

Hazardous Substance(s) means any substance or group of substances that are toxic, persistent and liable to bioaccumulate. This includes the following when they are toxic, persistent and liable to bio-accumulate:

- organohalogen compounds and substances which may form such compounds in the aquatic environment
- organophosphorous compounds
- organotin compounds
- substances and preparations, or the breakdown products of such, which have been proved to possess carcinogenic or mutagenic properties or properties which may affect steroidogenic, thyroid, reproduction or other endocrine-related functions in or via the aquatic environment
- persistent hydrocarbons and persistent and bioaccumulable organic toxic substances
- cyanides

- metals (in particular cadmium and mercury) and their compounds
- arsenic and its compounds
- biocides and plant protection products

Individual Drums means drums of waste, either *Drummed Supercompactable Waste* or *Drummed Non-Compactable Waste*, that are consigned in small quantities, such as one or two drums per *Waste Consignment*, on a pallet rather than in a *Transport Container*. This service is intended for Customers who do not generate sufficient waste to fill a standard *Transport Container*.

Ion Exchange Material means any material, whether synthetic or naturally occurring, that has the capability of interchanging ions from one substance to another by means of a reversible chemical or physical process.

LLW Repository Ltd means the waste management company that holds the Site Licence to manage and operate the Low Level Waste Repository under contract to the owner of the site, the Nuclear Decommissioning Authority.

Loose Shreddable Waste means either bagged or wrapped *Supercompactable Waste* that is suitable for shredding prior to *Supercompaction*. It is consigned for treatment and disposal in a Multi Use ISO Skip rather than *Drummed Supercompactable Waste* which is consigned for treatment and disposal in drums in a *Transport Container*. Waste shall typically consist of: wood (scaffold boards, pallets, cable drums etc.) or thin-walled (2 to 3mm thick) metal items, not suitable or selected for treatment, such as aluminium scaffold tubes, empty 200 litre drums, small enclosures, office equipment and rolls of PVC type flooring material. For maximum effectiveness of the shredder, aluminium tubes, PVC flooring or similar items shall be bundled and taped into 150 to 200mm diameter bundles.

Loose Supercompactable Waste means either bagged or wrapped *Supercompactable Waste* that is consigned for treatment and disposal in a Multi Use ISO Skip rather than *Drummed Supercompactable Waste* which is consigned for treatment and disposal in drums in a *Transport Container*.

Low Level Waste means solid low level radioactive waste in accordance with the requirements specified in this Waste Acceptance Criteria document. It typically includes metals, soil, building rubble and organic materials, which arise principally as lightly contaminated miscellaneous scrap. Metals are mostly in the form of redundant equipment. Organic materials are mainly in the form of paper towels, clothing and laboratory equipment that have been used in areas where radioactive materials are used, such as hospitals, research establishments and the nuclear industry. Low Level Waste contains radioactive materials other than those acceptable for disposal with municipal and general commercial or industrial waste.

Low Level Waste Repository means the national low level radioactive waste disposal facility situated near the village of Drigg in West Cumbria.

Mechanical Means means the use of a Fork Lift Truck at WAMAC to remove drums from a *Transport Container* or delivery vehicle. Customers must ensure that drums can be removed by mechanical means. The WAMAC Fork Lift Truck has a blade width of 127mm and minimum blade centres of 711mm.

Non-Compactable Items means any item of waste that does not comply with the definition of *Supercompactable Waste*.

Non-Compactable Waste Drums means any drums consigned through the Supercompactable Waste Treatment Service that contain waste that does not comply with the definition of *Supercompactable Waste*.

Non-Hazardous Pollutant means any substance liable to cause pollution other than a *Hazardous Substance*.

Package Volume means the volume of the *Transport Container* that is used to calculate the treatment and disposal charge for the Supercompactable Waste Treatment Service irrespective of the volume of waste within the *Transport Container*.

Putrescible Materials means materials liable to be readily decomposed by micro-organisms, excluding wood and paper.

Radioactive Contaminant means the proportion of the radionuclides in the waste that give rise to it being radioactive. The proportion of radioactive contaminant in the waste is based on the weight of the radionuclide causing the radioactivity. For most *Low Level Waste* it would be expected that the weight of the radionuclides compared to the weight of the contaminated materials would be very small and certainly less than 10%. For this limit to be excessively exceeded would imply that the radionuclide itself is a significant proportion of the waste, rather than materials contaminated by it. Examples of this are radioactive ores, process streams, and purified product, e.g. depleted uranium.

Reactive Metals means those elements located in Group IA, first column, of the periodic table, (alkali metals) and those elements located in Group IIA, second column, of the periodic table (alkaline earth metals).

Reassertable Waste means waste materials which retain significant energy after compaction, with the result that rupture or explosion of the compacted puck is likely to occur once the supercompaction forces are removed. Examples of reassertable materials are rubber boots, gloves, plastic sheeting etc. Unless operational experience indicates otherwise, in loading waste of this type, the recommendation is that the quantity of reassertable material per drum should be limited to not more than 30% by volume.

Reassertion means the increase in volume of a supercompactable drum or box within a period of thirty minutes after release of the high force compaction pressure and containment following *Supercompaction*.

Secondary Waste means waste for disposal at the Low Level Waste Repository that arises from a treatment process completed by LLW Repository Ltd for a Customer under the Waste Services Contract.

Sellafield means Sellafield Ltd's Nuclear Licensed Site at Sellafield in West Cumbria.

Sellafield Ltd means the company that holds the Site Licence to manage and operate Sellafield under contract to the owner of the site, the Nuclear Decommissioning Authority.

Service Supplier means the sub-contractor that LLW Repository Ltd uses to deliver the Supercompactable Waste Treatment Service as defined in Section 1.2.

Suitable Supporting Justification means additional information that may be required to support an application to consign waste to LLW Repository Ltd or to seek a variation to the Waste Acceptance Criteria. The form of justification required will be dependent upon the nature of the issue to be considered. In some cases, the justification will be in the form of a Best Practicable Means (BPM) Assessment, a Best Practicable Environmental Option (BPEO) Assessment or a Best Available Technique (BAT) Assessment. Advice on the level of justification required should be sought from LLW Repository Ltd.

Supercompactable Waste means those wastes for which best practicable means are sufficient to render them into a form suitable for High Force Compaction and which if subject to High Force Compaction and allowing for *Reassertion* could reasonably be expected to be reduced in volume by 30% or more. *Supercompactable Waste* can typically consist of: paper, gloves, tape, sisalkraft, cloth, punctured and drained aerosol cans, small tool items (hammer heads, bolts, nuts etc) in small quantities, light gauge metal assemblies, small quantities of timber, plastic items, PPE, small quantities of glass (wrapped in tape and placed in a tin with the lid taped), electrical cables, electrical conduit, size reduced chairs and wastes of similar size and composition.

Supercompaction means the application of pressure of at least 20,000kN/m². *Supercompacted* has a corresponding meaning.

Transport Container means those containers, as defined in S3.4, that are approved for use to consign a *Waste Consignment* to LLW Repository Ltd for treatment.

Waste Acceptance Criteria means the requirements set out in this document and the Waste Acceptance Criteria Overview (Reference: WSC-WAC-OVR) and relevant Statutory Regulations applicable to the customer in respect of the transport, treatment and disposal of low level waste.

Waste Consignment means one *Transport Container* and its contents of waste and packaging with a maximum external volume of 40m³, received from a single Customer on one road or rail vehicle as specified in the Waste Consignment Information Form (Reference: WSC-FOR-WCI).

Waste Package means those packages, such as drums and bags, as defined in S3.4, that are approved for use to consign a *Supercompactable Waste* to LLW Repository Ltd for treatment.

Waste Monitoring and Compaction Facility (WAMAC) means the facility operated by *Sellafield Ltd* that undertakes the Supercompactable Waste Treatment Service.