

WASTE STREAM**2X72****Oxide Transport Containers (Baskets and Stools)**

SITE Sellafield
SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Sellafield Limited

WASTE TYPE LLW; SPD1

Is the waste subject to Scottish Policy: No

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2022.....	5.8 m ³
Total future arisings:		0 m ³
Total waste volume:		5.8 m ³

Comment on volumes: Assumes a medium term strategy for decommissioning the Baskets and Stools. The total number of Baskets is 6 and the total number of Support Stools is 283. The Baskets and Support Stools are currently stored undercover at Sellafield. The volume declared is the volume of the Baskets and Support Stools, however, it is planned to decontaminate and recycle the metal. If this is successful only small amounts of residues will arise for disposal. A study is currently being carried out to consider options for decommissioning the PNTL (Japanese owned flasks on the Sellafield site) which may influence the overall decommissioning strategy for the Baskets and Support Stools.

Uncertainty factors on volumes:	Stock (upper):	x 1.5	Arisings (upper)	x
	Stock (lower):	x 0.5	Arisings (lower)	x

WASTE SOURCE Transport of spent fuel from power stations to reprocessing plant means the TN flask baskets, stools & spacers become contaminated and require disposal when they become redundant.

PHYSICAL CHARACTERISTICS

General description: TN flask baskets, stools & spacers. No changes to the waste since it was generated are anticipated because the baskets are inside flasks which are presently held/stored dry and covered at Sellafield.

Physical components (%vol): TN flask baskets (95.7%), stools & spacers (4.3%).

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): 2.36

Comment on density: The density is based on the total mass divided by the total volume of the waste.

CHEMICAL COMPOSITION

General description and components (%wt): Stainless steel (15%), aluminium (75%), boronated material (10%) and trace quantities of CEGB System 6 epoxy paint.

Chemical state: Neutral

Chemical form of radionuclides: H-3: Tritiated water.
 C-14: Metal carbide.
 Ra: Metal oxide.
 Th: Metal oxide.
 Pu: Metal oxide.

Metals and alloys (%wt): Fully assembled units, Boral cast into aluminium casting. Stainless steel is supporting structure for aluminium sectors.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	~15.0	304L.	
Other ferrous metals.....	0		
Iron.....			
Aluminium.....	~85.0	Includes 10% Boral.	
Beryllium.....			

WASTE STREAM

2X72

Oxide Transport Containers (Baskets and Stools)

Cobalt.....	0
Copper.....	
Lead.....	0
Magnox/Magnesium.....	0
Nickel.....	
Titanium.....	
Uranium.....	
Zinc.....	0
Zircaloy/Zirconium.....	0
Other metals.....	0

Organics (%wt): None anticipated to be present. None anticipated to be present.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0		
Paper, cotton.....	0		
Wood.....	0		
Halogenated plastics	0		
Total non-halogenated plastics.....	0		
Condensation polymers.....	0		
Others.....	0		
Organic ion exchange materials....	0		
Total rubber.....	0		
Halogenated rubber	0		
Non-halogenated rubber.....	0		
Hydrocarbons.....			
Oil or grease			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....	0		

Other materials (%wt): -

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials..	0		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	0		
Cementitious material.....	0		
Sand.....			
Glass/Ceramics.....			
Graphite.....	0		

WASTE STREAM**2X72****Oxide Transport Containers (Baskets and Stools)**

Desiccants/Catalysts.....	
Asbestos.....	0
Non/low friable.....	
Moderately friable.....	
Highly friable.....	
Free aqueous liquids.....	0
Free non-aqueous liquids.....	0
Powder/Ash.....	0

Inorganic anions (%wt): Inorganic anions are unlikely to be present.

	(%wt)	Type(s) and comment
Fluoride.....	0	
Chloride.....	0	
Iodide.....	0	
Cyanide.....		
Carbonate.....	0	
Nitrate.....	0	
Nitrite.....	0	
Phosphate.....	0	
Sulphate.....	0	
Sulphide.....	0	

Materials of interest for None anticipated.
waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	0	
Low flash point liquids.....	0	
Explosive materials.....	0	
Phosphorus.....	0	
Hydrides.....	0	
Biological etc. materials.....	0	
Biodegradable materials.....	0	
Putrescible wastes.....	0	
Non-putrescible wastes.....	0	
Corrosive materials.....	0	
Pyrophoric materials.....	0	
Generating toxic gases.....	0	
Reacting with water.....	0	
Higher activity particles.....		
Soluble solids as bulk chemical compounds.....		

Hazardous substances /
non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide.....		
Benzene.....		
Chlorinated solvents.....		
Formaldehyde.....		
Organometallics.....		
Phenol.....		
Styrene.....		
Tri-butyl phosphate.....		
Other organophosphates.....		
Vinyl chloride.....		
Arsenic.....		
Barium.....		
Boron.....		
Boron (in Boral).....		
Boron (non-Boral).....		
Cadmium.....		
Caesium.....		
Selenium.....		
Chromium.....		
Molybdenum.....		
Thallium.....		
Tin.....		
Vanadium.....		
Mercury compounds.....		
Others.....		
Electronic Electrical Equipment (EEE)		
EEE Type 1.....		
EEE Type 2.....		
EEE Type 3.....		
EEE Type 4.....		
EEE Type 5.....		

Complexing agents (%wt): No

	(%wt)	Type(s) and comment
EDTA.....		
DPTA.....		
NTA.....		
Polycarboxylic acids.....		
Other organic complexants.....		
Total complexing agents.....	0	

WASTE STREAM

2X72

Oxide Transport Containers (Baskets and Stools)

Potential for the waste to contain discrete items:

Yes. Waste itself could be a discrete item

TREATMENT, PACKAGING AND DISPOSAL

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recycling / reuse Other / various None		100.0

Comment on planned treatments:

The baskets are removed from a flask and pressure washed to remove loose surface contamination and allowed to air dry. Although the flasks are not dried to absolute dryness, the free water content should be effectively zero.

Disposal Routes:

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	5.0	2.4
Expected to be consigned to a Landfill Facility		
Expected to be consigned to an On-Site Disposal Facility		
Expected to be consigned to an Incineration Facility		
Expected to be consigned to a Metal Treatment Facility	95.0	2.4
Expected to be consigned as Out of Scope		
Expected to be recycled / reused		
Disposal route not known		

Classification codes for waste expected to be consigned to a landfill facility: -

Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be consigned to an On-Site Disposal Facility			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be consigned as Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

Opportunities for alternative disposal routing: -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

Waste Packaging for Disposal:

WASTE STREAM**2X72****Oxide Transport Containers (Baskets and Stools)**

Container	Stream volume %	Waste loading m ³	Number of packages
1/3 Height IP-1 ISO 2/3 Height IP-2 ISO 1/2 Height WAMAC IP-2 ISO 1/2 Height IP-2 Disposal/Re-usable ISO 2m box (no shielding) 4m box (no shielding) Other	5.0	10	< 1

Other information: -

Waste Planned for Disposal at the LLW Repository:

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).
The waste does not have a current WCH.
Inventory information is consistent with the current WCH.
The WCH is no longer valid. A revised WCH will be raised once the disposal route and timings are agreed.

Waste consigned for disposal to LLWR in year of generation: No.

Non-Containerised Waste for In-Vault Grouting: (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

RADIOACTIVITY

Source: Transfer of activity from fuel to transport container (basket), principally activation products.

Uncertainty: -

Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.

Measurement of radioactivities: Based on previous disposals of 10 TN Baskets.

Other information: -

WASTE STREAM

2X72

Oxide Transport Containers (Baskets and Stools)

Nuclide	Mean radioactivity, TBq/m ³		Future arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m ³		Future arisings	Bands and Code
	Waste at 1.4.2022	Bands and Code				Waste at 1.4.2022	Bands and Code		
H 3	8.86E-06	CC 2			Gd 153				
Be 10					Ho 163				
C 14	1.89E-05	CC 2			Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36					Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					Tl 204				
Mn 54	1.29E-08	CC 2			Pb 205				
Fe 55	1.85E-05	CC 2			Pb 210				
Co 60	2.20E-04	CC 2			Bi 208				
Ni 59					Bi 210m				
Ni 63	1.84E-05	CC 2			Po 210				
Zn 65					Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	7.62E-07	CC 2			Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94					Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106					U 233				
Pd 107					U 234				
Ag 108m					U 235				
Ag 110m					U 236				
Cd 109					U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238	6.42E-07	CC 2		
Sn 123					Pu 239	1.50E-07	CC 2		
Sn 126					Pu 240	2.12E-07	CC 2		
Sb 125					Pu 241	1.50E-05	CC 2		
Sb 126					Pu 242				
Te 125m					Am 241	5.48E-07	CC 2		
Te 127m					Am 242m				
I 129					Am 243				
Cs 134	1.39E-08	CC 2			Cm 242				
Cs 135					Cm 243				
Cs 137	4.41E-06	CC 2			Cm 244	4.01E-07	CC 2		
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144					Cf 249				
Pm 145					Cf 250				
Pm 147					Cf 251				
Sm 147					Cf 252				
Sm 151					Other a				
Eu 152					Other b/g				
Eu 154					Total a	1.95E-06	CC 2	0	
Eu 155					Total b/g	3.05E-04	CC 2	0	

Bands (Upper and Lower)

- A a factor of 1.5
- B a factor of 3
- C a factor of 10
- D a factor of 100
- E a factor of 1000

Note: Bands quantify uncertainty in mean radioactivity.

Code

- 1 Measured activity
- 2 Derived activity (best estimate)
- 3 Derived activity (upper limit)
- 4 Not present
- 5 Present but not significant
- 6 Likely to be present but not assessed
- 7 Present in significant quantities but not determined
- 8 Not expected to be present in significant quantity