

WASTE STREAM	2X72	Oxide Transport Containers (Baskets and Stools)
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SITE Sellafield
SITE OWNER Nuclear Decommissioning Authority
WASTE CUSTODIAN Sellafield Limited
WASTE TYPE LLW; SPD1

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	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.

Stainless steel.....	~15.0	304L.
Other ferrous metals.....	0	
Iron.....		
Aluminium.....	~85.0	Includes 10% Boral.
Beryllium.....		
Cobalt.....	0	
Copper.....		
Lead.....	0	
Magnox/Magnesium.....	0	

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	Nickel.....	
	Titanium.....	
	Uranium.....	
	Zinc.....	0
	Zircaloy/Zirconium.....	0
	Other metals.....	0
Organics (%wt):	None anticipated to be present. None anticipated to be present.	
	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):	-	
	Inorganic ion exchange materials.	0
	Inorganic sludges and flocs.....	0
	Soil.....	0
	Brick/Stone/Rubble.....	0
	Cementitious material.....	0
	Sand.....	
	Glass/Ceramics.....	
	Graphite.....	0
	Desiccants/Catalysts.....	
	Asbestos.....	0
	Non/low friable.....	
	Moderately friable.....	
	Highly friable.....	
	Free aqueous liquids.....	0
	Free non-aqueous liquids.....	0
	Powder/Ash.....	0

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

Fluoride.....	0
Chloride.....	0
Iodide.....	0
Cyanide.....	
Carbonate.....	0
Nitrate.....	0
Nitrite.....	0
Phosphate.....	0
Sulphate.....	0
Sulphide.....	0

Materials of interest for waste acceptance criteria: None anticipated.

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
Active particles.....	
Soluble solids as bulk chemical compounds.....	

Hazardous substances / non hazardous pollutants: -

Acrylamide.....	
Benzene.....	
Chlorinated solvents.....	
Formaldehyde.....	
Organometallics.....	
Phenol.....	
Styrene.....	
Tri-butyl phosphate.....	
Other organophosphates.....	
Vinyl chloride.....	
Arsenic.....	
Barium.....	

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Boron.....
 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
 EDTA.....
 DPTA.....
 NTA.....
 Polycarboxylic acids.....
 Other organic complexants.....
 Total complexing agents..... 0

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.

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Disposal Route	Stream volume %
Expected to be consigned to the LLW Repository	5.0
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	95.0

Upcoming (2019/20-2021/22) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2019/20	2020/21	2021/22
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			

Waste Packaging for Disposal:

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.

Potential for the waste to contain discrete items:

None expected.

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: -

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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:	-

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Nuclide	Mean radioactivity, TBq/m ³			Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2019	Bands and Code	Future arisings		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	1.05E-05	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	1.47E-07	CC 2		Pb 205				
Fe 55	3.96E-05	CC 2		Pb 210				
Co 60	3.26E-04	CC 2		Bi 208				
Ni 59				Bi 210m				
Ni 63	1.88E-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	8.19E-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	6.57E-07	CC 2		
Sn 123				Pu 239	1.51E-07	CC 2		
Sn 126				Pu 240	2.12E-07	CC 2		
Sb 125				Pu 241	1.73E-05	CC 2		
Sb 126				Pu 242				
Te 125m				Am 241	4.73E-07	CC 2		
Te 127m				Am 242m				
I 129				Am 243				
Cs 134	3.80E-08	CC 2		Cm 242				
Cs 135				Cm 243				
Cs 137	4.73E-06	CC 2		Cm 244	4.50E-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	1.94E-06	CC 2		0
Eu 155				Total b/g	4.37E-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