

<b>WASTE STREAM</b>	<b>2D133</b>	<b>Plutonium Plants Initial/Interim Decommissioning: Stores (PCM)</b>
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**SITE** Sellafield

**SITE OWNER** Nuclear Decommissioning Authority

**WASTE CUSTODIAN** Sellafield Limited

**WASTE TYPE** ILW

Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2022.....	0 m <sup>3</sup>
Future arisings -	1.4.2022 - 31.3.2023.....	0 m <sup>3</sup>
	1.4.2023 - 31.3.2024.....	0 m <sup>3</sup>
	1.4.2024 - 31.3.2025.....	0 m <sup>3</sup>
	1.4.2025 - 31.3.2043.....	0 m <sup>3</sup>
	1.4.2043 - 31.3.2051.....	~546.3 m <sup>3</sup>
	1.4.2051 - 31.3.2120.....	~0 m <sup>3</sup>
Total future arisings:		546.3 m <sup>3</sup>
Total waste volume:		546.3 m <sup>3</sup>

Comment on volumes: Arisings are in line with current decommissioning programmes and strategy. Waste within this waste stream is generated from decommissioning projects which will commence at a future date. As a result of this, minimal characterisation of waste volumes and fingerprints has been carried out and hence there is a large uncertainty in the potential arisings. At this time this uncertainty is not quantified.

Uncertainty factors on volumes:	Stock (upper):	x	Arisings (upper)	x 3.0
	Stock (lower):	x	Arisings (lower)	x 0.7

**WASTE SOURCE** Dismantling of plutonium product stores and plutonium contaminated material stores.

**PHYSICAL CHARACTERISTICS**

General description: Unable to estimate the material breakdown at this stage as there is no data available.

Physical components (%vol): -

Sealed sources: -

Bulk density (t/m<sup>3</sup>): NE

Comment on density: -

**CHEMICAL COMPOSITION**

General description and components (%wt): Unable to estimate the material breakdown at this stage as there is no data available.

Chemical state: -

Chemical form of radionuclides: -

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....			
Other ferrous metals.....			
Iron.....			
Aluminium.....			
Beryllium.....			
Cobalt.....			
Copper.....			

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

Organics (%wt): -

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

Other materials (%wt): -

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

Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids.....

Free non-aqueous liquids.....

Powder/Ash.....

Inorganic anions (%wt): -

(%wt) Type(s) and comment

Fluoride.....

Chloride.....

Iodide.....

Cyanide.....

Carbonate.....

Nitrate.....

Nitrite.....

Phosphate.....

Sulphate.....

Sulphide.....

Materials of interest for waste acceptance criteria: -

(%wt) Type(s) and comment

Combustible metals.....

Low flash point liquids.....

Explosive materials.....

Phosphorus.....

Hydrides.....

Biological etc. materials.....

Biodegradable materials.....

Putrescible wastes.....

Non-putrescible wastes.....

Corrosive materials.....

Pyrophoric materials.....

Generating toxic gases.....

Reacting with water.....

Higher activity particles.....

Soluble solids as bulk chemical compounds.....

Hazardous substances / non hazardous pollutants: -

(%wt) Type(s) and comment

Acrylamide.....

Benzene.....

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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):

(%wt)      Type(s) and comment

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

Potential for the waste to contain discrete items:      Yes. Conditioned waste in sealed drums, medium sized identifiable plant and equipment.

**PACKAGING AND CONDITIONING**

Conditioning method:      The waste is assumed to leave decommissioning in 200 litre mild steel drums. Where possible these drums will be supercompacted. Pucks generated and any non compactable drums will be loaded into 500 litre product drums.

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Plant Name: Waste Treatment Complex (WTC) 2.  
 Location: -  
 Plant startup date: 2034  
 Total capacity (m<sup>3</sup>/y incoming waste): -  
 Target start date for packaging this stream: 2043  
 Throughput for this stream (m<sup>3</sup>/y incoming waste): -  
 Other information: Process for WTC 2 has not been agreed so container information assumes the same information as WTC1a.

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m <sup>3</sup> )	Payload (m <sup>3</sup> )	Number of packages
	500 l drum (basket for waste)	100.0	~0.239	~0.504	2286

Likely container type comment: Conditioning and packaging factors revised as currently 6 feed drums are compacted on average per product drum.  
 Range in container waste volume: Between 1 and 9 compacted 200l drums will be put into a 500l drum.  
 Other information on containers: Stainless Steel  
 Likely conditioning matrix: PFA/OPC  
 Other information: -  
 Conditioned density (t/m<sup>3</sup>): -  
 Conditioned density comment: The density of the conditioned product will range from 1.5 to 2.6 t/m<sup>3</sup> for drums.  
 Other information on conditioning: -  
 Opportunities for alternative disposal routing: Not yet determined

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

### RADIOACTIVITY

Source: -  
 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: Specific activity data has not been estimated at this stage as there is no data available.  
 Other information: -

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Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3				8	Gd 153				
Be 10				8	Ho 163				
C 14				8	Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36				8	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41				8	Pt 193				
Mn 53					Tl 204				
Mn 54				8	Pb 205				8
Fe 55				8	Pb 210				
Co 60				8	Bi 208				
Ni 59				8	Bi 210m				
Ni 63				8	Po 210				8
Zn 65				8	Ra 223				
Se 79				8	Ra 225				
Kr 81					Ra 226				8
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90				8	Th 227				
Zr 93				8	Th 228				
Nb 91					Th 229				8
Nb 92					Th 230				8
Nb 93m				8	Th 232				8
Nb 94				8	Th 234				
Mo 93				8	Pa 231				8
Tc 97					Pa 233				
Tc 99				8	U 232				
Ru 106				8	U 233				8
Pd 107				8	U 234				6
Ag 108m				8	U 235				6
Ag 110m					U 236				6
Cd 109					U 238				6
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m				8	Pu 238				6
Sn 123					Pu 239				6
Sn 126				8	Pu 240				6
Sb 125					Pu 241				6
Sb 126					Pu 242				6
Te 125m					Am 241				6
Te 127m					Am 242m				
I 129				8	Am 243				
Cs 134				8	Cm 242				
Cs 135				8	Cm 243				
Cs 137				8	Cm 244				
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144				8	Cf 249				
Pm 145					Cf 250				
Pm 147				8	Cf 251				
Sm 147					Cf 252				
Sm 151				8	Other a				
Eu 152				8	Other b/g				
Eu 154				8	<b>Total a</b>	<b>0</b>			<b>NE</b>
Eu 155				8	<b>Total b/g</b>	<b>0</b>			<b>NE</b>

**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