

WASTE STREAM	2D133	Plutonium Plants Initial/Interim Decommissioning: Stores (PCM)
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SITE Sellafield
SITE OWNER Nuclear Decommissioning Authority
WASTE CUSTODIAN Sellafield Limited
WASTE TYPE ILW

WASTE VOLUMES

		Reported
Stocks:	At 1.4.2019.....	0 m ³
Future arisings -	1.4.2019 - 31.3.2043.....	0 m ³
	1.4.2043 - 31.3.2051.....	546.3 m ³
	1.4.2051 - 31.3.2121.....	0 m ³
Total future arisings:		546.3 m ³
Total waste volume:		546.3 m ³

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/m³): 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): -

- Stainless steel.....
- Other ferrous metals.....
- Iron.....
- Aluminium.....
- Beryllium.....
- Cobalt.....
- Copper.....
- Lead.....
- Magnox/Magnesium.....
- Nickel.....
- Titanium.....
- Uranium.....
- Zinc.....

WASTE STREAM**2D133****Plutonium Plants Initial/Interim Decommissioning: Stores (PCM)**

	Zircaloy/Zirconium.....
	Other metals.....
Organics (%wt):	-
	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):	-
	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):	-

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

Materials of interest for
 waste acceptance criteria:

-
 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.....
 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.....
 Boron.....

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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):

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

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.

Plant Name: Waste Treatment Complex (WTC) 2.

Location: -

Plant startup date: 2034

Total capacity (m³/y incoming waste): -

Target start date for packaging this stream: 2043

Throughput for this stream (m³/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 ³)	Payload (m ³)	Number of packages
500 l drum (basket for waste)	100.0	~0.239	~0.504	2286

WASTE STREAM**2D133****Plutonium Plants Initial/Interim Decommissioning: Stores (PCM)**

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/m³): -

Conditioned density comment: The density of the conditioned product will range from 1.5 to 2.6 t/m³ for drums.

Other information on conditioning: -

Opportunities for alternative disposal routing: Not yet determined

Treatment	Stream volume (%)	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: -

WASTE STREAM 2D133 Plutonium Plants Initial/Interim Decommissioning: Stores (PCM)

Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	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	Total a	0			NE
Eu 155				8	Total b/g	0			NE

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