



**WASTE STREAM****7A109****Decommissioning Waste from Reactors ILW**

	Uranium.....		
	Zinc.....		
	Zircaloy/Zirconium.....		
	Other metals.....	0.53	Cadmium.
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.	0.32	Inorganic ion exchange resin (reactor cooling circuit).
	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:

This waste contains beryllium (2.52% wt) and cadmium (0.53% wt).

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..... 0  
 Soluble solids as bulk chemical  
 compounds..... 0

Hazardous substances /  
 non hazardous pollutants:

This waste contains beryllium (2.52% wt) and cadmium (0.53% wt).

Acrylamide..... 0  
 Benzene..... NE  
 Chlorinated solvents..... 0  
 Formaldehyde..... 0  
 Organometallics..... 0  
 Phenol..... NE  
 Styrene..... 0  
 Tri-butyl phosphate..... NE  
 Other organophosphates..... 0  
 Vinyl chloride..... 0  
 Arsenic..... NE  
 Barium..... 0  
 Boron..... NE

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Cadmium..... P  
 Caesium..... 0  
 Selenium..... NE  
 Chromium..... NE  
 Molybdenum..... NE  
 Thallium..... 0  
 Tin..... NE  
 Vanadium..... NE  
 Mercury compounds..... 0  
 Others..... NE  
 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

No complexing agents are present.

**PACKAGING AND CONDITIONING**

Conditioning method: A conditioning and packaging regime has yet to be determined, development work continues. The waste will be stored in 3m<sup>3</sup> boxes, until a disposal route has been established.

Plant Name: -

Location: Unknown.

Plant startup date: Unknown.

Total capacity (m<sup>3</sup>/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m<sup>3</sup>/y incoming waste): -

Other information: -

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m <sup>3</sup> )	Payload (m <sup>3</sup> )	Number of packages
3m <sup>3</sup> box (round corners)	100.0	~5.4	~2.7	2

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Likely container type comment: A conditioning factor of 0.5 has been assumed.

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Not specified

Other information: -

Conditioned density (t/m<sup>3</sup>): ~2.0

Conditioned density comment: The conditioned density is an estimate which is subject to change.

Other information on conditioning: -

Opportunities for alternative disposal routing: Not yet determined

Treatment	Stream volume (%)	Comment
-	-	-

**RADIOACTIVITY**

Source: Neutron activation of metals in solid form.

Uncertainty: Future arising activity is based on current in-stock waste activities, this may not be accurate. In-stock gross alpha / gross beta activities are accurate, radionuclide breakdown may not be.

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: Activity was derived from historical data using gamma spectrometry.

Other information: -

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Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3					Gd 153				
Be 10				5	Ho 163				
C 14				5	Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
Cl 36				5	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41				5	Pt 193				
Mn 53					Tl 204				
Mn 54				5	Pb 205				
Fe 55				5	Pb 210				
Co 60	1.81E-01	CC 2	1.81E-01	CC 2	Bi 208				
Ni 59				5	Bi 210m				
Ni 63				5	Po 210				
Zn 65				5	Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226	3.60E-05	CC 2		5
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90					Th 227				
Zr 93				5	Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m				5	Th 232	3.60E-05	CC 2		5
Nb 94				5	Th 234				
Mo 93				5	Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106					U 233				
Pd 107					U 234				
Ag 108m				5	U 235				
Ag 110m					U 236				
Cd 109					U 238				
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238				
Sn 123					Pu 239				
Sn 126					Pu 240				
Sb 125					Pu 241				
Sb 126					Pu 242				
Te 125m					Am 241				
Te 127m					Am 242m				
I 129					Am 243				
Cs 134					Cm 242				
Cs 135					Cm 243				
Cs 137					Cm 244				
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					<b>Total a</b>	<b>7.20E-05</b>	<b>CC 2</b>	<b>0</b>	
Eu 155					<b>Total b/g</b>	<b>1.81E-01</b>	<b>CC 2</b>	<b>1.81E-01</b>	<b>CC 2</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