WASTE STREAM 2S310 AGR Examination Caves ILW

SITE	Windscale
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 m³
Future arisings -	1.4.2022 - 31.3.2023.....	0 m³
	1.4.2023 - 31.3.2024.....	0 m³
	1.4.2024 - 31.3.2025.....	0 m³
	1.4.2025 - 31.3.2042.....	~20.0 m³
	1.4.2042 - 31.3.2052.....	~20.0 m³
Total future arisings:		40.0 m³
Total waste volume:		40.0 m³

Comment on volumes: At this time the schedule for material arisings is being assessed. The two periods relate to the broad periods of work within the facility rather than the specific ILW generating tasks.

Uncertainty factors on volumes:

Stock (upper):	x	Arisings (upper)	x 1.5
Stock (lower):	x	Arisings (lower)	x 0.5

WASTE SOURCE Decommissioning of Post Irradiation Examination Facility.

PHYSICAL CHARACTERISTICS

General description: Redundant cave equipment, ventilation plant, ducting, drains, cave concrete/steelwork. No large items are expected.

Physical components (%vol): Carousel storage facility, caves, ventilation plant, drains and redundant cave equipment.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~1.5

Comment on density: The bulk density is in the range 1-2 t/m³.

CHEMICAL COMPOSITION

General description and components (%wt): Metals (58%), building materials (consisting of concrete and soil/rubble) (40%), miscellaneous soft waste (consisting of rubber, plastics and wood) (2%).

Chemical state: Neutral

Chemical form of radionuclides: -

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	P		
Other ferrous metals.....	<58.0		
Iron.....			
Aluminium.....	NE		
Beryllium.....			
Cobalt.....	NE		
Copper.....	NE		
Lead.....	NE		
Magnox/Magnesium.....	NE		

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Nickel	NE
Titanium	
Uranium	P
Zinc	NE
Zircaloy/Zirconium	NE
Other metals	NE

Organics (%wt): The waste contains plastics, rubber and wood (<2%). Ion exchange materials are not expected to be present. Halogenated plastic is most likely PVC.

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

Other materials (%wt): Sludges are not expected to be present. If found in drains, they will be immobilised.

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials	0		
Inorganic sludges and flocs	NE		
Soil	0		
Brick/Stone/Rubble	0		
Cementitious material	~40.0		
Sand			
Glass/Ceramics	0		
Graphite	0		
Desiccants/Catalysts			
Asbestos	P		
Non/low friable			
Moderately friable			

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Highly friable.....	
Free aqueous liquids.....	0
Free non-aqueous liquids.....	0
Powder/Ash.....	NE

Inorganic anions (%wt): Anions only present as constituents of cement.

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

Materials of interest for waste acceptance criteria: Powder may be present, e.g. from concrete scabbling. Other hazardous materials not expected to be present, but unconfirmed.

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

Hazardous substances / non hazardous pollutants: Lead may be present in small quantities, but in bulk form will not make the waste special.

	(%wt)	Type(s) and comment
Acrylamide.....		
Benzene.....	NE	
Chlorinated solvents.....		
Formaldehyde.....		

Organometallics.....	
Phenol.....	NE
Styrene.....	
Tri-butyl phosphate.....	NE
Other organophosphates.....	
Vinyl chloride.....	NE
Arsenic.....	NE
Barium.....	
Boron.....	NE
Boron (in Boral).....	
Boron (non-Boral).....	
Cadmium.....	NE
Caesium.....	
Selenium.....	NE
Chromium.....	NE
Molybdenum.....	NE
Thallium.....	
Tin.....	NE
Vanadium.....	NE
Mercury compounds.....	
Others.....	NE
Electronic Electrical Equipment (EEE)	
EEE Type 1.....	
EEE Type 2.....	
EEE Type 3.....	
EEE Type 4.....	
EEE Type 5.....	

Complexing agents (%wt): Not yet determined

	(%wt)	Type(s) and comment
EDTA.....		
DPTA.....		
NTA.....		
Polycarboxylic acids…….		
Other organic complexants.....		Unlikely to be present in significant quantities.
Total complexing agents.....	NE	

Potential for the waste to contain discrete items: Yes. Tools and steel fabrications may be present in this waste stream.

PACKAGING AND CONDITIONING

Conditioning method: -

Plant Name: Not yet identified.

Location: Sellafield.

Plant startup date: -

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Total capacity (m^3/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m^3/y incoming waste): -

Other information: -

Likely container type:

Container	Waste packaged (%vol)	Waste loading (m^3)	Payload (m^3)	Number of packages
Not specified	100.0	NE	NE	NE

Likely container type comment: -

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Cement

Other information: -

Conditioned density (t/m^3): NE

Conditioned density comment: -

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: The principal sources of radioactivity are fission products (e.g. Cs-137) with smaller contributions from activation products (e.g. Co-60).

Uncertainty: -

Definition of total alpha and total beta/gamma: Activity data maximum of previous waste streams 5F02/7 (B52 Soft Waste) and 5F02/9 (B52 Hard Waste).

Measurement of radioactivities: -

Other information: No total activity data are available. Nuclides present identified from fuel type and previous inventory which relates to steel cladding.

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Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	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					Gd 153				
Be 10					Ho 163				
C 14					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				6	Pb 205				
Fe 55					Pb 210				
Co 60				6	Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210				
Zn 65					Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90				6	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				6	U 233				6
Pd 107					U 234				6
Ag 108m					U 235				6
Ag 110m					U 236				6
Cd 109					U 238				6
Cd 113m					Np 237				
Sn 119m					Pu 236				
Sn 121m					Pu 238				6
Sn 123					Pu 239				6
Sn 126					Pu 240				6
Sb 125					Pu 241				6
Sb 126					Pu 242				
Te 125m					Am 241				6
Te 127m					Am 242m				6
I 129					Am 243				6
Cs 134				6	Cm 242				6
Cs 135					Cm 243				6
Cs 137				6	Cm 244				6
Ba 133					Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144				6	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				6	**Total a**	**0**		**NE**	
Eu 155				6	**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