

WASTE STREAM	2C20	Fuel Skips in Pond
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SITE Chapelcross

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025			
Future arisings:				
Total future arisings:				
Total waste volume:				

0.0

84.3

Number of waste packages in stock: At 1.4.2025..... - packages

Comment on arising rates: -

Additional information on quantities: 66 skips: volume calculated as 0.9906 x 1.1811 x 1.0922 x 66 = 84.34m³

Uncertainty factors on volumes: Stock (upper): x 1.20 Arisings (upper): x -
Stock (lower): x 0.80 Arisings (lower): x -

WASTE SOURCE Contamination from pond operations and plant operation.

PHYSICAL CHARACTERISTICS

General description: Skip dimensions are approximately 0.9906m x 1.1811m x 1.0922m.

Changes since waste generated: -

Bulk density (t/m³): = 0.28

Comment on density: This has been calculated using a weight of 0.1048 te and a volume of 0.374 m³ as for a Hinkley fuel skip.

CHEMICAL COMPOSITION

General description and components (%wt): Steel and small amount of UPC paint. Fission products, actinides and other activation products will be present as contaminants.

Chemical state: Neutral

Sheet metal proportion / thickness: Pond skips are constructed from 3.2 mm 10 gauge steel plate.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 0	-	
Other ferrous metals.....	~ 100.0	-	
Iron.....		-	
Aluminium.....	= 0	-	
Beryllium.....		-	
Cobalt.....		-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	= 0	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
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.....	NE	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	= 0	-	
Inorganic sludges and flocs.....	= 0	-	
Soil.....	= 0	-	
Brick/Stone/Rubble.....	= 0	-	
Cementitious material.....	= 0	-	
Sand.....		-	
Glass/Ceramics.....	= 0	-	
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	-	

COMPONENTS OF MATERIALS, WASTE PROPERTIES, MATERIALS NOT CONTRIBUTING TO MASS

Inorganic anions (%wt):

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

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
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.....		-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	= 0	-
Reacting with water.....	= 0	-
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....	0	-
Benzene.....		-
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.....		-

Complexing agents (%wt):

Not yet determined		
	(%wt)	Type(s) and comment
EDTA.....	NE	-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....		-

Physical components:

	Number	Type(s) and comment
Sources.....		-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....		-
EEE Type 2.....		-
EEE Type 3.....		-
EEE Type 4.....		-
EEE Type 5.....		-

TREATMENT, PACKAGING AND DISPOSAL

Planned on-site / off-site treatment(s):

Treatment	On-site / Off-site	Stream volume %
Size reduction Decay storage Low force compaction Supercompaction (HFC) Incineration Drying/dewatering/liquid separation Tie down/fixatives/strippable coating/painting application Decontamination Metal treatment Recycling / reuse Thermal treatment, including vitrification Encapsulation Polymer encapsulation Other physical treatment Other chemical treatment Containerisation Treatment not yet determined None	On-site	100.0

Comments on planned treatments:

-

Conditioning method:

Skips will be cut to fit into baskets and then loaded into CB prior to encapsulation.

Conditioning plants:

Plant Name	Location
CHX MILWEP	Chapelcross

Likely conditioning matrix:

Unknown

Further information on the conditioning matrix:

-

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	6 m³ concrete box (SD)	100.0	7.7	5.8	11	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m³): -

Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)	NE		
Expected to be Non-NSD HAW managed under Scottish Government's policy	NE		
Expected to be disposed to LLW Vaults NRS Dounreay			
Expected to be consigned to the Geological Disposal Facility			
Expected to be consigned to a Near Surface Disposal Facility			
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

Classification codes for waste expected to be consigned to a landfill facility:

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: Contamination from pond operations and plant operation.

Uncertainty: -

Measurement of radioactivities: Skip activities are based upon Hinkley Point A fuel skip calculations.

Chemical form of radionuclides:

- H-3: The tritium isotope content is insignificant.
- C-14: The carbon isotope content is insignificant.
- Cl-36: -
- Se-79: The selenium content is insignificant.
- Tc-99: The technetium content is insignificant.
- I-129: -
- Ra: The radium isotope content is insignificant.
- Th: The thorium isotope content is insignificant.
- U: The uranium isotope content is insignificant.
- Np: The neptunium content is insignificant.
- Pu: The chemical form of plutonium isotopes may be plutonium oxides.

WASTE STREAM		2C20		Fuel Skips in Pond					
Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code		Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3			8		Gd 153			8	
Be 10			8		Ho 163			8	
C 14			8		Ho 166m			8	
Na 22			8		Tm 170			8	
Al 26			8		Tm 171			8	
Cl 36			8		Lu 174			8	
Ar 39			8		Lu 176			8	
Ar 42			8		Hf 178n			8	
K 40			8		Hf 182			8	
Ca 41			8		Pt 193			8	
Mn 53			8		Tl 204			8	
Mn 54			8		Pb 205			8	
Fe 55			8		Pb 210			8	
Co 60	9.74E-07	C C	2		Bi 208			8	
Ni 59			8		Bi 210m			8	
Ni 63			8		Po 210			8	
Zn 65			8		Ra 223			8	
Se 79			8		Ra 225			8	
Kr 81			8		Ra 226			8	
Kr 85			8		Ra 228			8	
Rb 87			8		Ac 227			8	
Sr 90	6.98E-02	C C	2		Th 227			8	
Zr 93			8		Th 228			8	
Nb 91			8		Th 229			8	
Nb 92			8		Th 230			8	
Nb 93m			8		Th 232			8	
Nb 94			8		Th 234			8	
Mo 93			8		Pa 231			8	
Tc 97			8		Pa 233	3.01E-09	C C	2	
Tc 99			8		U 232			8	
Ru 106			8		U 233			8	
Pd 107			8		U 234	7.96E-09	C C	2	
Ag 108m			8		U 235			8	
Ag 110m			8		U 236			8	
Cd 109			8		U 238			8	
Cd 113m			8		Np 237	3.05E-09	C C	2	
Sn 119m			8		Pu 236			8	
Sn 121m			8		Pu 238	1.77E-04	C C	2	
Sn 123			8		Pu 239	2.00E-04	C C	2	
Sn 126			8		Pu 240	3.00E-04	C C	2	
Sb 125			8		Pu 241	2.43E-03	C C	2	
Sb 126			8		Pu 242			8	
Te 125m			8		Am 241	1.06E-03	C C	2	
Te 127m			8		Am 242m			8	
I 129			8		Am 243			8	
Cs 134			8		Cm 242			8	
Cs 135			8		Cm 243	7.08E-07	C C	2	
Cs 137	3.55E-02	C C	2		Cm 244	1.13E-05	C C	2	
Ba 133			8		Cm 245			8	
La 137			8		Cm 246			8	
La 138			8		Cm 248			8	
Ce 144			8		Cf 249			8	
Pm 145			8		Cf 250			8	
Pm 147			8		Cf 251			8	
Sm 147			8		Cf 252			8	
Sm 151			8		Unsp a				
Eu 152			8		Unsp b/g				
Eu 154	2.98E-05	C C	2		Total a	1.75E-03	*	0	*
Eu 155	2.35E-06	C C	2		Total b/g	1.08E-01	*	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 the 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
* Total calculated from the 114 declared radionuclides