WASTE STREAM	9D922	Sludge Canning Building Decommissioning LLW

SITE Hinkley Point A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

		Reported (m^3)
Stocks:	At 1.4.2025	= 0
Future arisings:	1.4.2025 - 31.3.2041	77.8
Total future arisings:		**77.8**
Total waste volume:		**77.8**

OR

Conditioned (m^3)	Packaged (m^3)

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

Comment on arising rates: -

Additional information on quantities: -

Uncertainty factors on volumes:

Stock (upper):	x -	Arisings (upper):	x 1.10
Stock (lower):	x -	Arisings (lower):	x 0.50

WASTE SOURCE Decommissioning of the Sludge Canning Building.

PHYSICAL CHARACTERISTICS

General description: The waste will consist of: staircases, handrails, supporting framework, floor plates, building fabrication, lead shielding panels, multiple pumps and transfer lines, a building sump, drum handling equipment, vent plant, a settling tank, sand pressure filter vessels and a compressed air system (list not exhaustive). All pumps and tanks are free from liquid/oil. The building is now largely redundant although some operational plant still remains and will remain in use for a few years. Asbestos is expected to be present in the wastestream at <0.2%wt. Additionally there may be HEPA filters, used in the building ventilation system to remove particulate, present in the waste, although they are likely to be disposed of via incineration.
Also included is the Fill House, a new facility designed to transfer ILW sludge wastes from their current vessels into mobile waste containers (DCIC's). This will include control equipment, retrieval lance and hose, and a vacuum unit.
Waste processing will produce secondary wastes in the form of contamination controlled area materials, PPE, RPE, soft wastes, and packaging.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.3

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Concrete/rubble (51% wt), metals (43% wt consisting: Aluminium (0.23%), Iron (22.74%), mild steel (5.95%), Stainless Steel (11.69%), zinc (1.43%), Lead (0.61%)), plastic (4% wt), other (2%).

Chemical state: Neutral

Sheet metal proportion / thickness: -

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel	~ 11.7	ST4 vessel, pipework, valves, pipe flanges, structural steelwork, floor plates, cladding, rails, stairs, lift shaft, retrieval lance, vacuum unit	
Other ferrous metals	~ 6.0	Mild steel - Sludge canning unit, SPF vessels	
Iron	~ 22.7	Pumps and DCIC	
Aluminium	~ 0.23	Sludge canning unit ancillary components	
Beryllium		-	
Cobalt		-	
Copper		-	
Lead	~ 0.61	shielding bricks	
Magnox/Magnesium		-	
Nickel		-	
Titanium		-	
Uranium		-	
Zinc	= 1.4	air vent system ducting	
Zircaloy/Zirconium		-	
Other metals		-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics	0	-	
Paper, cotton	0	-	
Wood		-	
Halogenated plastics	NE	-	
Total non-halogenated plastics	~ 4.4	plastic components	
Condensation polymers	~ 2.2	-	
Others	~ 2.2	-	
Organic ion exchange materials	= 0	-	
Total rubber	0	-	
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	= 0	-	
Inorganic sludges and flocs	= 0	-	
Soil		-	
Brick/Stone/Rubble	= 51.0	-	
Cementitious material		-	
Sand	= 0	-	
Glass/Ceramics		-	
Graphite	= 0	-	
Desiccants/Catalysts	= 0	-	
Asbestos	= 0.20	-	
Non/low friable	= 0	-	
Moderately friable	= 0.20	Pipework gaskets - mixture	
Highly friable	= 0	-	
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	NE	-
Chloride	NE	-
Iodide	NE	-
Cyanide	NE	-
Carbonate	NE	-
Nitrate	NE	-
Nitrite	NE	-
Phosphate	NE	-
Sulphate	NE	-
Sulphide	NE	-

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		-
Non-putrescible wastes		-
Corrosive materials	= 0	-
Pyrophoric materials	= 0	-
Generating toxic gases	= 0	-
Reacting with water	P	451m2: Galvanised metal may be present in the waste (estimated volume of 5.6m3 and surface area 451m2)
Higher activity particles		-
Soluble solids as bulk chemical compounds		-

Hazardous substances / non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide		-
Benzene		-
Chlorinated solvents		-
Formaldehyde		-
Organometallics		-
Phenol		-
Styrene		-
Tri-butyl phosphate		-
Other organophosphates		-
Vinyl chloride		-
Arsenic		-
Barium		-
Boron	0	-
Boron (in Boral)		-
Boron (non-Boral)		-
Cadmium		-
Caesium		-
Selenium		-
Chromium		-
Molybdenum		-
Thallium		-
Tin		-
Vanadium		-
Mercury compounds		-
Others	~ 2.0	-

Complexing agents (%wt): Yes

	(%wt)	Type(s) and comment
EDTA		-
DPTA		-
NTA		-
Polycarboxylic acids		-
Other organic complexants		-
Total complexing agents	TR	-

Physical components:

	Number	Type(s) and comment
Sources		-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1		-
EEE Type 2	P	-
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	On-site	~ 7.4
Supercompaction (HFC)	Off-site	~ 7.4
Incineration	Off-site	~ 10.4
Drying/dewatering/liquid separation		
Tie down/fixatives/strippable coating/painting application		
Decontamination		
Metal treatment	Off-site	~ 0.3
Recycling / reuse		
Thermal treatment, including vitrification		
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		= 81.9

Comments on planned treatments: 0.25% of the waste will potentially go for Metal Melt with 31.44% to Landfill.

Conditioning method: -

Conditioning plants:

Plant Name	Location

Likely conditioning matrix: -

Further information on the conditioning matrix: -

Waste Packaging:

Likely container type:

Container	Waste packaged (vol%)	Waste loading (m^3)	Payload (m^3)	Number of packages	Estimated start date for packaging
1/2 Height WAMAC IP-2 ISO (TC08)	7.4	43.2	18.8	1	-
1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	50.4	10.0	18.3	4	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m^3): ~ 1.3
Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m^3	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)			
Expected to be Non-NSD HAW managed under Scottish Government's policy			
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	~ 57.9	1.3	
Expected to be consigned to a Landfill Facility	~ 31.4	1.3	
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility	~ 10.4	0.40	
Expected to be consigned to a Metal Treatment Facility	~ 0.3	1.4	
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: 17 01 01, 17 04 07, 17 02 03

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: The Sludge Canning Building was built to process radioactive sludge from the ponds. Contamination of steel pipework, vessels, surfaces and concrete structure. Activity is derived from activation products, fission products and fuel contamination.

Uncertainty: The values quoted were derived by measurement and calculation using plant items in the building, and are indicative of the activities that are expected.

Measurement of radioactivities: -

Chemical form of radionuclides:

H-3: -
C-14: -
Cl-36: -
Se-79: -
Tc-99: -
I-129: -
Ra: -
Th: -
U: -
Np: -
Pu: -

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Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3			2.19E-06	C C 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			7.80E-06	C C 2	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			2.08E-07	C C 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			3.36E-06	C C 2	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			1.52E-03	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			4.86E-07	C C 2
Mo 93				8	Pa 231				8
Tc 97				8	Pa 233			2.03E-09	C C 2
Tc 99			8.42E-06	C C 2	U 232				8
Ru 106				8	U 233				8
Pd 107				8	U 234			6.91E-07	C C 2
Ag 108m				8	U 235			2.11E-08	C C 2
Ag 110m				8	U 236				8
Cd 109				8	U 238			4.86E-07	C C 2
Cd 113m				8	Np 237			2.14E-09	C C 2
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238			2.29E-04	C C 2
Sn 123				8	Pu 239			5.16E-04	C C 2
Sn 126				8	Pu 240			5.15E-04	C C 2
Sb 125				8	Pu 241			4.17E-03	C C 2
Sb 126				8	Pu 242				8
Te 125m				8	Am 241			3.31E-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			8.89E-07	C C 2
Cs 137			6.00E-04	C C 2	Cm 244			1.28E-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			2.29E-04	C C 2	Unsp a				
Eu 152				8	Unsp b/g				
Eu 154			1.60E-05	C C 2	**Total a**	**0**	*	**4.58E-03**	*
Eu 155			7.37E-07	C C 2	**Total b/g**	**0**	*	**6.55E-03**	*

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