

WASTE STREAM	9D914	General Reactor LLW
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SITE Hinkley Point A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 0		
Future arisings:	1.4.2025 - 31.3.2041	1654.1		
Total future arisings:		1654.1		
Total waste volume:		1654.1		

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

Comment on arising rates: -

Additional information on quantities: Volumes reassessed and now include 180m3 scaffolding

Uncertainty factors on volumes:

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

WASTE SOURCE This stream is waste arising from care and maintenance preparations and procedures in the pile cap (PC)/reactor areas and gas circulator (GC) areas for both Reactor 1 and Reactor 2 (four areas)

PHYSICAL CHARACTERISTICS

General description: Waste consists of general solid waste items, redundant equipment such as tooling, scaffolding, shielding, insulation and pipework; and secondary wastes such as PPE. Secondary wastes include metal, plastic, rubber, rubble, cellulosic materials, asbestos, wood and the drums that contain the waste.

Changes since waste generated: -

Bulk density (t/m³): = 1.3

Comment on density: Density is based on typical weight of 200 litre drum.

CHEMICAL COMPOSITION

General description and components (%wt): The waste contains pipework, building rubble and trash and comprises metal, mainly steel, various plastics, glass and a small quantity of cellulose. Metal (including drums) (60%wt), rubble (1%wt), soil (1%wt), biodegradable non putrescibles (5%wt), plastics non-halogenated (6%wt), rubber (2%wt), wood (1%wt), other materials (24%wt). Other materials consist mainly of oils and greases (~24%wt), with some asbestos (0.16%wt)

Chemical state: Neutral

Sheet metal proportion / thickness: Any steel drums will have a wall thickness of about 1mm. Other metals may be several mm thick.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 35.7	Stainless steel components including pipework, containment structures and tooling etc	
Other ferrous metals.....	~ 24.6	Mild steel components including pipework, containment structures and tooling etc	
Iron.....	-	-	
Aluminium.....	-	-	
Beryllium.....	0	-	
Cobalt.....	-	-	
Copper.....	-	-	
Lead.....	-	-	
Magnox/Magnesium.....	-	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	-	-	
Zircaloy/Zirconium.....	-	-	
Other metals.....	= 0	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics.....	~ 1.0	-	
Paper, cotton.....	~ 0	-	
Wood.....	~ 1.0	-	
Halogenated plastics.....	-	-	
Total non-halogenated plastics.....	~ 6.0	Plastic components including sheeting, dura pipes and tooling etc	
Condensation polymers.....	~ 3.0	-	
Others.....	~ 3.0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	~ 2.0	-	
Halogenated rubber.....	~ 1.0	-	
Non-halogenated rubber.....	~ 1.0	-	
Hydrocarbons.....	~ 23.8	-	
Oil or grease.....	~ 23.8	Oils and greases removed from Lub Oil Pit deplant and equipment during decommissioning operations	
Fuel.....	-	-	
Asphalt/Tarmac (cont.coal tar).....	-	-	
Asphalt/Tarmac (no coal tar).....	-	-	
Bitumen.....	0	-	
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.....	~ 1.0	-	
Brick/Stone/Rubble.....	~ 1.0	-	
Cementitious material.....	-	Typically insulation - MMMF	
Sand.....	-		
Glass/Ceramics.....	0.04		
Graphite.....	TR	-	
Desiccants/Catalysts.....	-	Typically, low porosity, monolithic asbestos cement blocks and mouldings and asbestos cement sheeting, Chrysotile, amosite or crocidolite	
Asbestos.....	~ 0.12		
Non/low friable.....	~ 0.04		
Moderately friable.....	~ 0.04	Typically, ceiling tiles, insulating and asbestos cement sheeting, Chrysotile, amosite or crocidolite	
Highly friable.....	~ 0.04	"Typically asbestos cladding (e.g. pressed or sprayed cladding on pipework) and lagging Loose asbestos lagging or insulation, Chrysotile, amosite or crocidolite"	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	= 0	-	
Powder/Ash.....	-	-	

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.....	~ 5.0	-
Putrescible wastes.....		-
Non-putrescible wastes.....	~ 5.0	-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	= 0	-
Reacting with water.....	-	-
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):

No		
	(%wt)	Type(s) and comment
EDTA.....	= 0	-
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	Off-site	= 32.7
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		= 67.3

Comments on planned treatments:

67.32% to Landfill as VLLW.

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 (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
-	-	-	-	-	-

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)	= 67.3	1.3	
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			
Expected to be consigned to a Landfill Facility	= 32.7	0.40	
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:

17 04 07, 17 05 03*, 17 05 04, 17 06 01*, 17 02 03, 17 06 03*

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: Activation and contamination of materials. Activity estimates are as shown in the table.

Uncertainty: All wastes described by this waste stream are expected to be in the LLW category. The values quoted are indicative of the activities that are expected.

Measurement of radioactivities: The specific activities have been estimated from the equivalent operational waste stream with an allowance for decay to current date.

Chemical form of radionuclides:

- H-3: Tritium is present as surface contamination of waste by tritiated liquor.
- C-14: Contamination in the form of graphite dust.
- Cl-36: Chlorine 36 may be present as a contaminant of graphite dust.
- 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 content is insignificant.
- U: The uranium isotope content is insignificant.
- Np: The neptunium content is insignificant.
- Pu: The chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

WASTE STREAM 9D914 General Reactor LLW									
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			8.53E-05	C C 2	Gd 153				8
Be 10				8	Ho 163				8
C 14			1.08E-05	C C 2	Ho 166m				8
Na 22				8	Tm 170				8
Al 26				8	Tm 171				8
Cl 36			4.76E-06	C C 2	Lu 174				8
Ar 39				8	Lu 176				8
Ar 42			5.02E-04	C C 2	Hf 178n				8
K 40				8	Hf 182				8
Ca 41				8	Pt 193				8
Mn 53			5.92E-04	C C 2	Ti 204				8
Mn 54				8	Pb 205				8
Fe 55			5.80E-08	C C 2	Pb 210				8
Co 60			5.88E-07	C C 2	Bi 208				8
Ni 59				8	Bi 210m				8
Ni 63			6.15E-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			3.14E-08	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				8
Tc 99				8	U 232				8
Ru 106				8	U 233				8
Pd 107				8	U 234				8
Ag 108m				8	U 235				8
Ag 110m				8	U 236				8
Cd 109				8	U 238				8
Cd 113m				8	Np 237				8
Sn 119m				8	Pu 236				8
Sn 121m				8	Pu 238				8
Sn 123				8	Pu 239			1.15E-09	C C 2
Sn 126				8	Pu 240			1.17E-09	C C 2
Sb 125				8	Pu 241			1.39E-08	C C 2
Sb 126				8	Pu 242				8
Te 125m				8	Am 241			4.73E-09	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
Cs 137			8.70E-08	C C 2	Cm 244				8
Ba 133			3.08E-09	C C 2	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				8	Total a	0	*	7.05E-09	*
Eu 155				8	Total b/g	0	*	1.20E-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