

WASTE STREAM	9D54	Miscellaneous Activated Components from R2 pond
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SITE Hinkley Point A

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:				

Total future arisings: 0.0

Total waste volume: 0.9

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

Comment on arising rates: There will be no further arisings of this waste stream.

Additional information on quantities: -

Uncertainty factors on volumes:

Stock (upper):	x 1.10	Arisings (upper):	x -
Stock (lower):	x 0.80	Arisings (lower):	x -

WASTE SOURCE Transfers of miscellaneous activated components from R2 Pond into R2 Wet Vault. RCL dummy fuel elements, absorber bars and RCL cables. The MAC was size reduced for the transfer from the pond to the wet vault.

PHYSICAL CHARACTERISTICS

General description: 122 RCL dummy fuel elements as 244 halves, 10 absorber bars as 20 halves, 41 RCL cables as 576 segments. RCL dummy fuel elements are Magnox fuel cans without uranium used to make up the vacant element positions in the RCL (Replacement Continuous Lead). They were originally 990mm long and the main body has a diameter of 50mm with a maximum diameter of 92mm over the splitter vanes). They were cut in half as part of the transfer operation.

The absorber bars are irradiated mild steel tubes with the same dimensions as the RCL elements and a mass of approx. 3.5 kg. They were also cut in half as part of the transfer operation. The appearance of the bar is similar to that of a scaffold tube with lugs attached to the side. A graphite nose cone is attached to one end with a graphite location nose at the other.

The RCL cables are approx. 12m long x 10mm diameter stainless steel cables that supported the RCL stringer and included the thermocouple cable. These have been cut into approx. 450mm lengths.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.90

Comment on density: Preliminary estimate.

CHEMICAL COMPOSITION

General description and components (%wt): Magnox metal and mild steel.

Chemical state: Neutral

Sheet metal proportion / thickness: Magnox fuel can and dummy hollow mild steel element. RCL cables of stainless steel.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 10.0	RCL cables of stainless steel.	
Other ferrous metals.....	~ 30.0	Magnox fuel can and dummy hollow mild steel element.	
Iron.....		-	
Aluminium.....	= 0	-	
Beryllium.....		-	
Cobalt.....		-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	~ 60.0	-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	TR	-	
Other metals.....	= 0	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	= 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.....	TR	-	

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.....	TR	-	
Desiccants/Catalysts.....		-	
Asbestos.....	= 0	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....	P	-	
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.....	= 0	-
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.....	P	-
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.....	P	-
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.....	NE	-

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:

Dry using ATCS if required. ATCS subject to BAT.

Conditioning plants:

Plant Name	Location
HPA ATCS	Hinkley Point A

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
500 l RS drum (50mm Pb)	100.0	0.09	0.32	10	-

Range in container waste loading: RCL Dummy elements/Absorber bars CF = 2, Cables CF = 10.

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)	100.0		
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			
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: The waste will have been activated in the reactor and will have contamination by fission products and actinides from reactor and ponds. Activity is likely to be high.

Uncertainty: The values quoted are preliminary and only indicative of possible values.

Measurement of radioactivities: Values were derived from existing fuel element debris information. Activation of the stainless steel has only been approximated.

Chemical form of radionuclides: H-3: Most tritium is expected to be present as surface contamination, possibly as water but perhaps in the form of other inorganic compounds or organic compounds.
C-14: Carbon 14 will probably be present as graphite.
Cl-36: -
Se-79: The selenium content is insignificant.
Tc-99: The chemical form of technetium has not been determined.
I-129: -
Ra: The radium isotope content is insignificant.
Th: The thorium isotope content is insignificant.
U: The chemical form of uranium isotopes may be uranium oxides.
Np: The chemical form of neptunium has not been determined.
Pu: The chemical form of plutonium isotopes may be plutonium oxides.

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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	1.19E-01	C C 2			Gd 153		8		
Be 10	1.63E-06	C C 2			Ho 163		8		
C 14	4.88E-03	C C 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26	< 4.07E-06	C 3			Tm 171		8		
Cl 36	1.63E-03	C C 2			Lu 174		8		
Ar 39		8			Lu 176		8		
Ar 42		8			Hf 178n		8		
K 40		8			Hf 182		8		
Ca 41	< 1.63E-04	C 3			Pt 193		8		
Mn 53		8			Tl 204		8		
Mn 54	1.88E-08	C C 2			Pb 205		8		
Fe 55	< 7.49E-01	C 3			Pb 210		8		
Co 60	< 7.63E+00	C 3			Bi 208		8		
Ni 59	1.63E+00	C C 2			Bi 210m		8		
Ni 63	1.44E+02	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	2.71E-04	C C 2			Th 227		8		
Zr 93	6.51E-04	C C 2			Th 228		8		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m	6.69E-04	C C 2			Th 232		8		
Nb 94		8			Th 234	< 4.88E-07	C 3		
Mo 93	7.29E-04	C C 2			Pa 231		8		
Tc 97		8			Pa 233	< 6.78E-08	C 3		
Tc 99	1.63E-04	C C 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	5.06E-07	C C 2		
Ag 108m	3.16E-05	C C 2			U 235		8		
Ag 110m		8			U 236	6.52E-08	C C 2		
Cd 109		8			U 238	4.88E-07	C C 2		
Cd 113m	< 9.92E-04	C 3			Np 237	6.78E-08	C C 2		
Sn 119m		8			Pu 236		8		
Sn 121m	< 4.51E-03	C 3			Pu 238	2.82E-04	C C 2		
Sn 123		8			Pu 239	1.63E-04	C C 2		
Sn 126		8			Pu 240	3.25E-04	C C 2		
Sb 125	3.49E-05	C C 2			Pu 241	5.47E-03	C C 2		
Sb 126		8			Pu 242	1.63E-07	C C 2		
Te 125m	8.73E-06	C C 2			Am 241	5.63E-04	C C 2		
Te 127m		8			Am 242m	1.49E-06	C C 2		
I 129		8			Am 243	4.88E-07	C C 2		
Cs 134	1.93E-08	C C 2			Cm 242	1.23E-06	C C 2		
Cs 135		8			Cm 243	3.21E-07	C C 2		
Cs 137	3.77E-04	C C 2			Cm 244	3.28E-06	C C 2		
Ba 133	< 5.01E-04	C 3			Cm 245		8		
La 137	< 4.07E-05	C 3			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144		8			Cf 249		8		
Pm 145	1.76E-04	C C 2			Cf 250		8		
Pm 147	< 1.40E-03	C 3			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	7.08E-04	C C 2			Unsp a				
Eu 152	9.70E-03	C C 2			Unsp b/g	1.08E-07			
Eu 154	7.64E-02	C C 2			Total a	1.34E-03	*	0	*
Eu 155	6.34E-04	C C 2			Total b/g	1.54E+02	*	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