

WASTE STREAM	9D40	FED Nimonic R2
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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 ~ 0.9			
Future arisings:				
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: -

Additional information on quantities: There could be up to about 140,000 springs in the vault.

Uncertainty factors on volumes:

Stock (upper):	x 1.10	Arisings (upper):	x -
Stock (lower):	x 0.90	Arisings (lower):	x -

WASTE SOURCE Nimonic springs are incorporated into Magnox fuel element top fittings and are removed during fuel element desplittering.

PHYSICAL CHARACTERISTICS

General description: Springs are about 33 mm long, 10 mm in diameter and weigh about 5 g. There are no large items present in the waste which may require special handling.

Changes since waste generated: -

Bulk density (t/m³): ~ 0.82

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Nimonic (~100%).

Chemical state: Neutral

Sheet metal proportion / thickness: Bulk metal items are not present in the waste.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 0	-	
Other ferrous metals.....	= 0	-	
Iron.....	-	-	
Aluminium.....	= 0	-	
Beryllium.....	0	-	
Cobalt.....	-	-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	= 100.0	Present as Nimonic alloy (type 80A).	
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.....	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.....	TR	-
Chloride.....	TR	-
Iodide.....	= 0	-
Cyanide.....	= 0	-
Carbonate.....	TR	-
Nitrate.....	TR	-
Nitrite.....	TR	-
Phosphate.....	TR	-
Sulphate.....	TR	-
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):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	TR	-
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:

Drying using ATCS if required.

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	0.06	0.32	14	-

Range in container waste loading: Waste loading has been set to 0.061m³ per container to generate 14 expected containers.

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: Nimonic springs originally incorporated into Magnox fuel element top end fittings and removed during fuel element desplittering. There will be activation products in the Nimonic and contamination by fission products and actinides.

Uncertainty: Specific activity is a function of Station operating history. The values quoted are indicative of the activities that might be expected.

Measurement of radioactivities: The Nimonic springs are expected to be of high activity. Induced activity has been calculated and fission product and actinide contamination levels have been based upon measurements of the activity of Magnox samples.

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

WASTE STREAM 9D40 FED Nimonic R2									
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	4.18E-02	C C 2			Gd 153		8		
Be 10		8			Ho 163	3.99E-08	C C 2		
C 14	2.46E-01	C C 2			Ho 166m	5.23E-05	C C 2		
Na 22		8			Tm 170		8		
Al 26	1.81E-04	C C 2			Tm 171	5.29E-09	C C 2		
Cl 36	3.99E-05	C C 2			Lu 174		8		
Ar 39		8			Lu 176		8		
Ar 42		8			Hf 178n		8		
K 40	1.24E-06	C C 2			Hf 182		8		
Ca 41	3.32E-07	C C 2			Pt 193		8		
Mn 53		8			Tl 204	4.97E-06	C C 2		
Mn 54		8			Pb 205		8		
Fe 55	2.52E-02	C C 2			Pb 210		8		
Co 60	2.31E+01	C C 2			Bi 208		8		
Ni 59	8.38E+00	C C 2			Bi 210m		8		
Ni 63	7.84E+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	2.90E-04	C C 2			Th 227		8		
Zr 93	2.10E-05	C C 2			Th 228	3.94E-09	C C 2		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m	1.80E-04	C C 2			Th 232		8		
Nb 94	2.36E-06	C C 2			Th 234	< 6.49E-08	C 3		
Mo 93	2.48E-07	C C 2			Pa 231		8		
Tc 97		8			Pa 233	2.50E-07	C C 2		
Tc 99	5.58E-08	C C 2			U 232	4.07E-09	C C 2		
Ru 106		8			U 233	1.55E-09	C C 2		
Pd 107		8			U 234	5.79E-08	C C 2		
Ag 108m	3.29E-06	C C 2			U 235	1.30E-09	C C 2		
Ag 110m		8			U 236	7.00E-09	C C 2		
Cd 109		8			U 238	6.49E-08	C C 2		
Cd 113m	2.88E-03	C C 2			Np 237	2.50E-07	C C 2		
Sn 119m		8			Pu 236		8		
Sn 121m	6.22E-06	C C 2			Pu 238	1.38E-05	C C 2		
Sn 123		8			Pu 239	2.01E-05	C C 2		
Sn 126		8			Pu 240	2.06E-05	C C 2		
Sb 125	3.54E-08	C C 2			Pu 241	2.25E-04	C C 2		
Sb 126		8			Pu 242	3.71E-08	C C 2		
Te 125m	8.88E-09	C C 2			Am 241	1.22E-04	C C 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	3.84E-08	C C 2			Cm 242		8		
Cs 135		8			Cm 243	9.41E-08	C C 2		
Cs 137	4.82E-05	C C 2			Cm 244	7.80E-07	C C 2		
Ba 133	1.07E-06	C C 2			Cm 245		8		
La 137	3.57E-09	C C 2			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144		8			Cf 249		8		
Pm 145	4.31E-07	C C 2			Cf 250		8		
Pm 147	4.91E-07	C C 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	8.05E-07	C C 2			Unsp a				
Eu 152	3.03E-06	C C 2			Unsp b/g				
Eu 154	2.93E-06	C C 2			Total a	1.78E-04	*	0	*
Eu 155	4.28E-07	C C 2			Total b/g	8.16E+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