

WASTE STREAM	9D50	Ion Siv Unit Cartridges
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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:	= 0.3			
Total future arisings:	0.0			
Total waste volume:	0.3			

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

Comment on arising rates: -

Additional information on quantities: Each IONSIV cartridge has a volume of 0.053 m3. There are six of these in total = 0.32m3.

Uncertainty factors on volumes: Stock (upper): x 1.10 Arisings (upper): x -
Stock (lower): x 0.90 Arisings (lower): x -

WASTE SOURCE IONSIV cartridges produced as a result of filtration of cooling pond water.

PHYSICAL CHARACTERISTICS

General description: Spent Ionsiv Cartridges formed part of the Submersible Caesium Removal Unit. The size of the cartridges will not influence the choice of treatment process or disposal container. 6 Ionsiv Cartridges are now being held in individual vented storage containers (a vented drum). The drums containing the Cartridges have been relocated from the Main R1 Pond to the R1 Magnox Vault.

Changes since waste generated: -

Bulk density (t/m³): ~ 1.2

Comment on density: The density of 1.2 t/m3 assumes that each cartridge will contain 10 kg of water, giving a total mass of 66.2 kg for each cartridge.

CHEMICAL COMPOSITION

General description and components (%wt): The waste is spent IONSIV cartridges, which are composed principally of a stainless steel hollow cylinder containing IONSIV material. IONSIV ion exchange material (~53%), stainless steel (~32%), water (~15%) and EPDM seal material (<1%). IONSIV is a crystalline silicotitanate. (EPDM is ethylene diene terpolymer).

Chemical state: Neutral

Sheet metal proportion / thickness: The stainless steel forms a hollow cylinder with dimensions: internal diameter 122mm, external diameter 296mm and height 640mm.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 32.0	The stainless steel is SS316L; nickel and chromium will be major constituents of the stainless steel cartridge housing.	
Other ferrous metals.....	NE	-	
Iron.....		-	
Aluminium.....	NE	-	
Beryllium.....	TR	-	
Cobalt.....		-	
Copper.....	NE	-	
Lead.....	NE	-	
Magnox/Magnesium.....	NE	-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	NE	-	
Zircaloy/Zirconium.....	NE	-	
Other metals.....	NE	Only the stainless steel content of the waste has been assessed.	

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.....	< 1.0	-	
Halogenated rubber.....	= 0	-	
Non-halogenated rubber.....	< 1.0	-	
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.....	~ 53.0	IONSIV is a crystalline silicotitanate.	
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.....	~ 15.0	-	
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.....	= 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:

Dry using ATCS if required. ATCS subject to BAT.

Conditioning plants:

Plant Name	Location
HPA ATCS	Hinkley Point A

Likely conditioning matrix:

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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 (0mm Pb)	100.0	0.16	0.49	2	-

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)	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: Spent cartridges from the submersible caesium removal unit, used for the removal of caesium isotopes from cooling pond water. Contamination by fission products, actinides and activation products.

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: -

Chemical form of radionuclides:

- H-3: Any tritium is likely to be present as water.
- C-14: The carbon 14 content is insignificant.
- Cl-36: The chlorine 36 content is insignificant.
- Se-79: The selenium content is insignificant.
- Tc-99: The technetium content is insignificant.
- I-129: The iodine 129 content is insignificant.
- 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.

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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	4.04E-05	B B 2			Gd 153		8		
Be 10					Ho 163		8		
C 14	4.53E-05	B B 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36					Lu 174		8		
Ar 39					Lu 176		8		
Ar 42					Hf 178n		8		
K 40					Hf 182		8		
Ca 41					Pt 193		8		
Mn 53					Tl 204		8		
Mn 54					Pb 205		8		
Fe 55	4.35E-07	B B 2			Pb 210		8		
Co 60	9.40E-06	B B 2			Bi 208		8		
Ni 59					Bi 210m		8		
Ni 63	1.12E-04	B B 2			Po 210		8		
Zn 65					Ra 223		8		
Se 79	3.59E-08	B B 2			Ra 225		8		
Kr 81					Ra 226		8		
Kr 85	1.99E-04	B B 2			Ra 228		8		
Rb 87					Ac 227		8		
Sr 90	4.23E-01	B B 2			Th 227		8		
Zr 93	1.97E-07	B B 2			Th 228	1.03E-07	B B 2		
Nb 91					Th 229		8		
Nb 92					Th 230		8		
Nb 93m	1.34E-07	B B 2			Th 232		8		
Nb 94					Th 234	2.11E-06	C C 2		
Mo 93					Pa 231		8		
Tc 97					Pa 233	3.99E-08	B B 2		
Tc 99	1.73E-05	B B 2			U 232	1.01E-07	B B 2		
Ru 106					U 233		8		
Pd 107	9.25E-09	B B 2			U 234	1.78E-06	C C 2		
Ag 108m					U 235	5.63E-08	C C 2		
Ag 110m					U 236	2.03E-07	B B 2		
Cd 109					U 238	2.11E-06	C C 2		
Cd 113m	6.16E-07	B B 2			Np 237	4.01E-08	B B 2		
Sn 119m					Pu 236		8		
Sn 121m	1.95E-06	B B 2			Pu 238	8.05E-04	B B 2		
Sn 123					Pu 239	1.19E-03	B B 2		
Sn 126	7.20E-08	B B 2			Pu 240	1.21E-03	B B 2		
Sb 125	1.83E-06	B B 2			Pu 241	1.00E-02	B B 2		
Sb 126	1.01E-08	B B 2			Pu 242	4.72E-08	B B 2		
Te 125m	4.58E-07	B B 2			Am 241	6.26E-03	B B 2		
Te 127m					Am 242m	4.54E-07	B B 2		
I 129	3.24E-09	B B 2			Am 243	8.95E-08	B B 2		
Cs 134	1.23E-02	B B 2			Cm 242	3.75E-07	B B 2		
Cs 135	9.16E-08	B B 2			Cm 243	2.61E-06	B B 2		
Cs 137	4.04E+00	B B 2			Cm 244	3.47E-05	B B 2		
Ba 133					Cm 245		8		
La 137					Cm 246		8		
La 138					Cm 248		8		
Ce 144					Cf 249		8		
Pm 145					Cf 250		8		
Pm 147					Cf 251		8		
Sm 147					Cf 252		8		
Sm 151	7.95E-05	B B 2			Unsp a				
Eu 152	5.05E-07	B B 2			Unsp b/g				
Eu 154	2.91E-05	B B 2			Total a	9.51E-03	*	0	*
Eu 155	7.97E-06	B B 2			Total b/g	4.49E+00	*	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