

<b>WASTE STREAM</b>	<b>9D64</b>	<b>Contaminated Gravel, Sand &amp; Resin</b>
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**SITE** Hinkley Point A  
**SITE OWNER** Nuclear Decommissioning Authority

**WASTE CUSTODIAN** Magnox Limited

**WASTE TYPE** ILW

Is the waste subject to Scottish Policy: No

**WASTE VOLUMES**

	Reported
Stocks: At 1.4.2022.....	6.6 m <sup>3</sup>
Total future arisings:	0 m <sup>3</sup>
Total waste volume:	6.6 m <sup>3</sup>

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

Uncertainty factors on volumes:	Stock (upper):	x 1.1	Arisings (upper)	x
	Stock (lower):	x 0.9	Arisings (lower)	x

**WASTE SOURCE** The waste results from scrapping of sand pressure filters from the sludge canning building.

**PHYSICAL CHARACTERISTICS**

General description: The waste is the gravel contents of scrapped sand pressure filters. There are no large items. Laterals likely to fail upon retrieval resulting in plastic within debris.

Physical components (%vol): Gravel 88%, sand 7%, resin 3%, plastic 2%. Fission products, actinides and other activation products will be present as contaminants.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m<sup>3</sup>): ~2.6

Comment on density: The density varies between 2.5 - 2.7 t/m<sup>3</sup>. This value needs to be reassessed.

**CHEMICAL COMPOSITION**

General description and components (%wt): Gravel 88%, sand 7%, resin 3%, plastic 2%. Fission products, actinides and other activation products will be present as contaminants.

Chemical state: Neutral

Chemical form of radionuclides:  
H-3: The chemical form of tritium has not been assessed.  
C-14: The chemical form of carbon 14 has not been assessed.  
Cl-36: The chemical form of chlorine 36 has not been assessed.  
Se-79: The chemical form of selenium has not been determined.  
Tc-99: The chemical form of technetium has not been determined.  
Ra: Radium isotopes content is insignificant.  
Th: The thorium isotope content is insignificant.  
U: The 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: The chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

Metals and alloys (%wt): Only traces of metals will be present if at all.

	(%wt)	Type(s) / Grade(s) with proportions		% of total C14 activity
Stainless steel.....	TR			
Other ferrous metals.....	TR			
Iron.....				
Aluminium.....	TR			
Beryllium.....	NE			
Cobalt.....				
Copper.....	TR			

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Lead.....	TR	
Magnox/Magnesium.....	TR	
Nickel.....		
Titanium.....		
Uranium.....		
Zinc.....	TR	
Zircaloy/Zirconium.....	TR	
Other metals.....	TR	Not fully assessed.

Organics (%wt):                      There may be traces of oils, grease and cellulosics. There may be traces of halogenated plastics and rubbers.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics.....	NE		
Paper, cotton.....	NE		
Wood.....	NE		
Halogenated plastics .....	NE		
Total non-halogenated plastics.....	~2.0		
Condensation polymers.....	NE		
Others.....	~2.0		
Organic ion exchange materials....	~3.0		
Total rubber.....	NE		
Halogenated rubber .....	NE		
Non-halogenated rubber.....	NE		
Hydrocarbons.....			
Oil or grease .....	NE		
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..	TR		
Inorganic sludges and flocs.....	0		
Soil.....	0		
Brick/Stone/Rubble.....	~88.0	gravel	
Cementitious material.....	0		
Sand.....	~7.0		
Glass/Ceramics.....	0		
Graphite.....	TR		
Desiccants/Catalysts.....			
Asbestos.....	0		

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Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids..... TR

Free non-aqueous liquids..... 0

Powder/Ash..... P

Inorganic anions (%wt): Not fully assessed.

(%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: No materials likely to pose a fire or other non-radiological hazard have been identified.

(%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: None expected

(%wt) Type(s) and comment

Acrylamide.....

Benzene.....

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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.....  
 Electronic Electrical Equipment (EEE)  
     EEE Type 1.....  
     EEE Type 2.....  
     EEE Type 3.....  
     EEE Type 4.....  
     EEE Type 5.....

Complexing agents (%wt): Yes

(%wt) Type(s) and comment

EDTA.....  
 DPTA.....  
 NTA.....  
 Polycarboxylic acids.....  
 Other organic complexants.....  
 Total complexing agents..... TR

Potential for the waste to contain discrete items: No. In & of itself not a DI; assumed not likely to contain any "rogue" items that could be.

**PACKAGING AND CONDITIONING**

Conditioning method: Cement encapsulation into 3m3 box using PCF external mixer

Plant Name: -

Location: Hinkley Point A Site

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Plant startup date: 2028  
 Total capacity (m<sup>3</sup>/y incoming waste): -  
 Target start date for packaging this stream: 2029  
 Throughput for this stream (m<sup>3</sup>/y incoming waste): -  
 Other information: -

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m <sup>3</sup> )	Payload (m <sup>3</sup> )	Number of packages
	3m <sup>3</sup> box (round corners)	100.0	1.32	2.9	5

Likely container type comment: -  
 Range in container waste volume: -  
 Other information on containers: -  
 Likely conditioning matrix: Not specified  
 Other information: -  
 Conditioned density (t/m<sup>3</sup>): -  
 Conditioned density comment: -  
 Other information on conditioning: -  
 Opportunities for alternative disposal routing: -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

### RADIOACTIVITY

Source: Contamination from the filtration of fuel pond water.  
 Uncertainty: The values quoted are indicative of the activities that might be expected.  
 Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.  
 Measurement of radioactivities: Specific activities have been estimated from available data.  
 Other information: Specific activity is a function of Station operating history.

**WASTE STREAM**

**9D64**

**Contaminated Gravel, Sand & Resin**

Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3	5.36E-04	DD 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	1.87E-04	DD 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	7.12E-05	DD 2			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	1.44E-04	DD 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	4.53E-04	DD 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	4.77E+00	DD 2			Th 227		8		
Zr 93		8			Th 228		8		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230	9.38E-09	DD 2		
Nb 93m		8			Th 232		8		
Nb 94		8			Th 234	7.21E-05	DD 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233	4.11E-07	DD 2		
Tc 99	1.05E-04	DD 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	9.95E-05	DD 2		
Ag 108m		8			U 235	2.88E-07	DD 2		
Ag 110m		8			U 236	1.51E-06	DD 2		
Cd 109		8			U 238	7.21E-05	DD 2		
Cd 113m		8			Np 237	4.15E-07	DD 2		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	1.58E-02	DD 2		
Sn 123		8			Pu 239	2.62E-02	DD 2		
Sn 126		8			Pu 240	3.47E-02	DD 2		
Sb 125		8			Pu 241	5.91E-02	DD 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	1.25E-01	DD 2		
Te 127m		8			Am 242m		8		
I 129	9.91E-06	DD 2			Am 243	1.31E-03	DD 2		
Cs 134	1.99E-04	DD 2			Cm 242		8		
Cs 135		8			Cm 243	4.26E-05	DD 2		
Cs 137	2.14E+00	DD 2			Cm 244	8.74E-04	DD 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		8			Other a				
Eu 152		8			Other b/g				
Eu 154	8.93E-03	DD 2			<b>Total a</b>	<b>2.04E-01</b>	<b>DD 2</b>	<b>0</b>	
Eu 155	8.14E-03	DD 2			<b>Total b/g</b>	<b>6.98E+00</b>	<b>DD 2</b>	<b>0</b>	

**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 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