

WASTE STREAM	9F39	Fuel Skips
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SITE Sizewell 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.....	48.1 m ³
Total future arisings:		0 m ³
Total waste volume:		48.1 m ³

Comment on volumes: Fuel skips in the fuel storage pond became redundant when the reactors were defuelled and the fuel sent for reprocessing. As of November 2017, there were 107 short skips (137.9m3) and a further 37 long skips (54.8m3). 36 skips have been classified as ILW

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

WASTE SOURCE Fuel skips in the fuel storage pond became redundant when the reactors were defuelled and the fuel was sent for reprocessing.

PHYSICAL CHARACTERISTICS

General description: The waste is 36 contaminated fuel skips. 27 are short skips which are approximately 1.18 m x 1 m x 1.092 m in size. 9 are long skips which are approximately 1.357 m x 1 m x 1.092 m in size. Thickness of skip is 8.2mm.

Physical components (%vol): Pond skips are made of mild steel and are coated in UPC paint.

Sealed sources: The waste does not contain sealed sources.

Bulk density (t/m³): ~0.21

Comment on density: Density refers to envelope volume of skip. Density of skip material only would be close to that of steel.

CHEMICAL COMPOSITION

General description and components (%wt): -

Chemical state: Neutral

Chemical form of radionuclides: H-3: Content is insignificant.
 C-14: Content is insignificant.
 Se-79: Content is insignificant.
 Tc-99: Content is insignificant.
 Ra: Content is insignificant.
 Th: Content is insignificant.
 U: Content is insignificant.
 Np: Content is insignificant.
 Pu: Not determined but could be oxides.

Metals and alloys (%wt): -

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	0		
Other ferrous metals.....	~100.0		
Iron.....			
Aluminium.....	0		
Beryllium.....			
Cobalt.....			
Copper.....	0		

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Lead.....	0
Magnox/Magnesium.....	TR
Nickel.....	
Titanium.....	
Uranium.....	
Zinc.....	0
Zircaloy/Zirconium.....	0
Other metals.....	0

Organics (%wt): There may be organics in the paint layer.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics.....	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.....	NE		

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.....	0		
Desiccants/Catalysts.....			
Asbestos.....	0		

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Non/low friable.....

Moderately friable.....

Highly friable.....

Free aqueous liquids..... 0

Free non-aqueous liquids..... 0

Powder/Ash..... 0

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..... 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):

(%wt) Type(s) and comment

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

Potential for the waste to contain discrete items: Yes. Large Metal Items (LMIs)/"substantial" thickness items considered "durable" assumed DIs; Stainless items assumed DIs

PACKAGING AND CONDITIONING

Conditioning method: Waste has been size reduced underwater in the ponds and packaged into 25 baskets. The baseline states that these will be in turn be loaded into transport containers and sent to HPA for encapsulation into RCBs. A recent characterisation review has identified deficiencies. Therefore, further sampling and analysis is

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required and, subsequently the strategies will be reviewed.

Plant Name: -
 Location: Hinkley Point A
 Plant startup date: -
 Total capacity (m³/y incoming waste): -
 Target start date for packaging this stream: -
 Throughput for this stream (m³/y incoming waste): -

Other information: Waste will be co-disposed with Oldbury stream 9E61.

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
	6m ³ concrete box (SD)	100.0	6.016	5.8	8

Likely container type comment: It is assumed that there will be 3 baskets per 6m³ box along with one basket from Oldbury stream 9E61 (Waste will be co-disposed)

Range in container waste volume: -

Other information on containers: -

Likely conditioning matrix: Cement and PFA/OPC

Other information: -

Conditioned density (t/m³): -

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 pond operations and plant operation.

Uncertainty: -

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: Activities are based upon Sizewell skip coupon sampling and analysis in 2008.

Other information: -

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Fuel Skips

Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	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	4.22E-05	CC 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	1.55E-05	CC 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36	5.91E-07	CC 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	1.02E-06	CC 2			Pb 210		8		
Co 60	6.23E-06	CC 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	3.82E-06	CC 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	4.49E-02	CC 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	3.65E-08	CC 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99		8			U 232		8		
Ru 106	7.85E-09	CC 2			U 233		8		
Pd 107		8			U 234	4.76E-08	CC 2		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238	3.65E-08	CC 2		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	3.85E-05	CC 2		
Sn 123		8			Pu 239	3.37E-05	CC 2		
Sn 126		8			Pu 240	3.37E-05	CC 2		
Sb 125	1.76E-06	CC 2			Pu 241	1.69E-03	CC 2		
Sb 126		8			Pu 242		8		
Te 125m	4.41E-07	CC 2			Am 241	1.32E-04	CC 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	3.55E-06	CC 2			Cm 242		8		
Cs 135		8			Cm 243	2.16E-06	CC 2		
Cs 137	1.29E-02	CC 2			Cm 244	1.97E-06	CC 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	8.24E-06	CC 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	1.24E-05	CC 2			Other a				
Eu 152		8			Other b/g				
Eu 154	2.24E-05	CC 2			Total a	2.42E-04	CC 2	0	
Eu 155	7.55E-06	CC 2			Total b/g	5.96E-02	CC 2	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 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