

<b>WASTE STREAM</b>	<b>9C44</b>	<b>Fuel Skips in Pond</b>
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**SITE** Dungeness 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.....	71.2 m <sup>3</sup>
Total future arisings:		0 m <sup>3</sup>
Total waste volume:		71.2 m <sup>3</sup>
Comment on volumes:	Volumes are based on the number of skips and their dimensions assuming 1.397m <sup>3</sup> per skip (51off).	
Uncertainty factors on volumes:	Stock (upper): x 1.2	Arisings (upper) x
	Stock (lower): x 0.8	Arisings (lower) x

**WASTE SOURCE** Contamination from pond and plant operations.

**PHYSICAL CHARACTERISTICS**

General description: 51 skips with a raw volume of 1.397m<sup>3</sup> each which give a total raw volume of 71.247m<sup>3</sup>. The waste is contaminated skips. Waste has been size reduced underwater and is currently located in 35 baskets.

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/m<sup>3</sup>): ~0.3

Comment on density: This has been calculated based on a skip weight of 425kg.

**CHEMICAL COMPOSITION**

General description and components (%wt): Steel and small amount of UPC paint. Fission products, actinides and other activation products will be present as contaminants.

Chemical state: Neutral

Chemical form of radionuclides: Pu: The chemical form of plutonium isotopes may be plutonium oxides.

Metals and alloys (%wt): The long skips present have dimensions of 1.357 m x 1 m x 1.029 m. and constructed from 3.2 mm 10 gauge steel plate. The short pond skips present have dimensions of 1.17 m x 0.47 m x 0.68 m.

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel.....	0		
Other ferrous metals.....	~99.0	Constructed from 3.2 mm 10 gauge steel plate.	
Iron.....			
Aluminium.....	0		
Beryllium.....			
Cobalt.....			
Copper.....	0		
Lead.....	0		
Magnox/Magnesium.....	0		
Nickel.....			
Titanium.....			

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Uranium.....  
 Zinc..... 0  
 Zircaloy/Zirconium..... 0  
 Other metals..... 0

Organics (%wt):                      The paint coating from the skip

	(%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.....	<1.0		

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		
Non/low friable.....			
Moderately friable.....			
Highly friable.....			
Free aqueous liquids.....	0		

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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: 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: -

(%wt) Type(s) and comment

Acrylamide.....

Benzene.....

Chlorinated solvents.....

Formaldehyde.....

Organometallics.....

Phenol.....

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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.

**PACKAGING AND CONDITIONING**

Conditioning method:      The baseline is that this waste has been size reduced at the site of origin into 35 baskets and will be transferred to Hinkley Point A for packaging and storage. A characterisation review has identified deficiencies. Therefore, further sampling and analysis is required and subsequently the strategies will be reviewed.

Plant Name:      -

Location:      Hinkley Point A

Plant startup date:      -

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Total capacity (m<sup>3</sup>/y incoming waste): -

Target start date for packaging this stream: -

Throughput for this stream (m<sup>3</sup>/y incoming waste): -

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

Likely container type:	Container	Waste packaged (%vol)	Waste loading (m <sup>3</sup> )	Payload (m <sup>3</sup> )	Number of packages
	6m <sup>3</sup> concrete box (SD)	100.0	5.94	5.8	12

Likely container type comment: It is assumed that there will be 3 baskets per 6m<sup>3</sup> 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: 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 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: Skip activities are based upon measurement of Hinkley Point A fuel skips.

Other information: -

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**9C44**

**Fuel Skips in Pond**

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	6.04E-05	CC 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	3.01E-05	CC 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	1.03E-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	1.70E-06	CC 2			Pb 210		8		
Co 60	6.52E-06	CC 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	5.72E-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	1.17E-02	CC 2			Th 227		8		
Zr 93		8			Th 228	6.97E-08	CC 2		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m		8			Th 232		8		
Nb 94		8			Th 234	1.55E-07	CC 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99	3.23E-06	CC 2			U 232	7.08E-08	CC 2		
Ru 106	2.96E-08	CC 2			U 233		8		
Pd 107		8			U 234	1.57E-07	CC 2		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238	1.55E-07	CC 2		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	8.21E-05	CC 2		
Sn 123		8			Pu 239	5.26E-05	CC 2		
Sn 126		8			Pu 240	6.46E-05	CC 2		
Sb 125	8.47E-07	CC 2			Pu 241	2.66E-03	CC 2		
Sb 126		8			Pu 242	5.17E-08	CC 2		
Te 125m	2.12E-07	CC 2			Am 241	5.00E-04	CC 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	1.43E-06	CC 2			Cm 242		8		
Cs 135		8			Cm 243	8.37E-08	CC 2		
Cs 137	4.92E-03	CC 2			Cm 244	1.85E-06	CC 2		
Ba 133		8			Cm 245		8		
La 137		8			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144	2.26E-09	CC 2			Cf 249		8		
Pm 145		8			Cf 250		8		
Pm 147	9.10E-06	CC 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	5.99E-05	CC 2			Other a				
Eu 152	6.02E-07	CC 2			Other b/g		CC 2		
Eu 154	1.73E-05	CC 2			<b>Total a</b>	<b>7.02E-04</b>	<b>CC 2</b>		<b>0</b>
Eu 155	3.95E-06	CC 2			<b>Total b/g</b>	<b>1.95E-02</b>	<b>CC 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