

<b>WASTE STREAM</b>	<b>9E70</b>	<b>LLW Pond Skips</b>
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**SITE** Oldbury  
**SITE OWNER** Nuclear Decommissioning Authority  
**WASTE CUSTODIAN** Magnox Limited  
**WASTE TYPE** LLW

**WASTE VOLUMES**

		Reported
Stocks:	At 1.4.2019.....	153.2 m <sup>3</sup>
Total future arisings:		0 m <sup>3</sup>
Total waste volume:		153.2 m <sup>3</sup>

Comment on volumes: Volume is based on the skip size of 1.4m x 1m x 1m for long skips and 1.2m x 1m x 1m for standard skips. There are 112 Ponds skips in this waste stream: 94 long skips and 18 standard skips.

Uncertainty factors on volumes:	Stock (upper):	x 1.2	Arisings (upper)	x
	Stock (lower):	x 0.8	Arisings (lower)	x

**WASTE SOURCE** Skips are / were used for the movement and storage of materials within the pond. Contamination from pond operations and plant operation.

**PHYSICAL CHARACTERISTICS**

General description: 112 contaminated skips. 94 skips are approximately 1.4m x 1m x 1m in size and 18 skips are 1.2m x 1m x 1m in size.  
 Physical components (%vol): Pond skips are made of mild steel and are coated in UPC paint.  
 Sealed sources: -  
 Bulk density (t/m<sup>3</sup>): ~0.32  
 Comment on density: This has been calculated using the approximate weight of 0.42te and the average volume of the skips of 1.3m<sup>3</sup>.

**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. Steel ponds skips (95.5%), Pactec bags (4%), Portland cement powder (0.5%)

Chemical state: Neutral

Chemical form of radionuclides:  
 H-3: The tritium content is insignificant.  
 C-14: The carbon-14 content is in significant.  
 Se-79: The selenium content is insignificant.  
 Tc-99: The technetium content is insignificant.  
 Ra: The radium content is insignificant.  
 Th: The thorium content is insignificant.  
 U: The uranium content is insignificant.  
 Np: The neptunium content is insignificant.  
 Pu: The chemical form of plutonium isotopes may be plutonium oxides.

Metals and alloys (%wt): 112 skips are present, these are constructed from 3.2 mm 10 gauge steel plate.

Stainless steel.....	0	
Other ferrous metals.....	~95.5	Steel Pond Skip
Iron.....		
Aluminium.....	0	
Beryllium.....		
Cobalt.....		
Copper.....	0	
Lead.....	0	
Magnox/Magnesium.....	0	
Nickel.....		

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	Titanium.....	
	Uranium.....	
	Zinc..... 0	
	Zircaloy/Zirconium..... 0	
	Other metals..... 0	None.
Organics (%wt):	There may be organics in the UPC paint.	
	Total cellulose..... 0	
	Paper, cotton..... 0	
	Wood..... 0	
	Halogenated plastics ..... 0	
	Total non-halogenated plastics..... 4.0	
	Condensation polymers..... 0	
	Others..... 4.0	PacTec Bag
	Organic ion exchange materials.... 0	
	Total rubber..... 0	
	Halogenated rubber ..... 0	
	Non-halogenated rubber..... 0	
	Hydrocarbons.....	
	Oil or grease ..... 0	
	Fuel..... 0	
	Asphalt/Tarmac (cont.coal tar)... 0	
	Asphalt/Tarmac (no coal tar).... 0	
	Bitumen..... 0	
	Others..... 0	
	Other organics..... NE	
Other materials (%wt):	-	
	Inorganic ion exchange materials. 0	
	Inorganic sludges and flocs..... 0	
	Soil..... 0	
	Brick/Stone/Rubble.....	
	Cementitious material..... 0.50	Portland Cement Powder
	Sand.....	
	Glass/Ceramics..... 0	
	Graphite..... 0	
	Desiccants/Catalysts.....	
	Asbestos..... 0	
	Non/low friable.....	
	Moderately friable.....	
	Highly friable.....	
	Free aqueous liquids..... 0	
	Free non-aqueous liquids..... 0	
	Powder/Ash..... 0	
Inorganic anions (%wt):	Not expected to be present.	

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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.

Combustible metals.....	0
Low flash point liquids.....	0
Explosive materials.....	0
Phosphorus.....	0
Hydrides.....	0
Biological etc. materials.....	0
Biodegradable materials.....	
Putrescible wastes.....	0
Non-putrescible wastes.....	
Corrosive materials.....	0
Pyrophoric materials.....	0
Generating toxic gases.....	0
Reacting with water.....	0
Active particles.....	
Soluble solids as bulk chemical compounds.....	

Hazardous substances / non hazardous pollutants:

Portland Cement Powder

Acrylamide.....	
Benzene.....	
Chlorinated solvents.....	
Formaldehyde.....	
Organometallics.....	
Phenol.....	
Styrene.....	
Tri-butyl phosphate.....	
Other organophosphates.....	
Vinyl chloride.....	
Arsenic.....	
Barium.....	
Boron.....	

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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):

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

**TREATMENT, PACKAGING AND DISPOSAL**

Planned on-site / off-site treatment(s):

Treatment	On-site / Off site	Stream volume %
Low force compaction		
Supercompaction (HFC)		
Incineration		
Solidification		
Decontamination		
Metal treatment		
Size reduction		
Decay storage		
Recycling / reuse		
Other / various		
None		100.0

Comment on planned treatments:

-

**WASTE STREAM****9E70****LLW Pond Skips****Disposal Routes:**

Disposal Route	Stream volume %
Expected to be consigned to the LLW Repository Expected to be consigned to a Landfill Facility Expected to be consigned to an On-Site Disposal Facility Expected to be consigned to an Incineration Facility Expected to be consigned to a Metal Treatment Facility Expected to be consigned as Out of Scope Expected to be recycled / reused Disposal route not known	100.0

**Upcoming (2019/20-2021/22) Waste Routing (if expected to change from above):**

Disposal Route	Stream volume %		
	2019/20	2020/21	2021/22
Expected to be consigned to the LLW Repository Expected to be consigned to a Landfill Facility Expected to be consigned to an On-Site Disposal Facility Expected to be consigned to an Incineration Facility Expected to be consigned to a Metal Treatment Facility Expected to be consigned as Out of Scope Expected to be recycled / reused Disposal route not known			

**Waste Packaging for Disposal:**

Container	Stream volume %	Waste loading m <sup>3</sup>	Number of packages
1/3 Height IP-1 ISO 2/3 Height IP-2 ISO 1/2 Height WAMAC IP-2 ISO 1/2 Height IP-2 Disposal/Re-usable ISO 2m box (no shielding) 4m box (no shielding) Other	100.0	10.97	14

Other information: -

**Waste Planned for Disposal at the LLW Repository:**

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).  
The waste has a current WCH.

Waste consigned for disposal to LLWR in year of generation: No.

Potential for the waste to contain discrete items: -

**Non-Containerised Waste for In-Vault Grouting:** (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

**RADIOACTIVITY**

**WASTE STREAM****9E70****LLW Pond Skips**

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 WCH - 1MXN-3OLD-0-WCH-L-4048 and decayed 2 years for RWI 2019
Other information:	-

**WASTE STREAM 9E70 LLW Pond Skips**

Nuclide	Mean radioactivity, TBq/m <sup>3</sup>				Nuclide	Mean radioactivity, TBq/m <sup>3</sup>			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	9.74E-06	CC 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	3.36E-06	CC 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	1.12E-08	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	1.5E-08	CC 2			Pb 205		8		
Fe 55	1.01E-06	CC 2			Pb 210		8		
Co 60	1.72E-06	CC 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	5.53E-07	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	1.51E-03	CC 2			Th 227		8		
Zr 93		8			Th 228	4.15E-09	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	1.65E-08	CC 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99	2.8E-07	CC 2			U 232	7.97E-09	CC 2		
Ru 106	4.25E-07	CC 2			U 233		8		
Pd 107		8			U 234	1.66E-08	CC 2		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238	1.65E-08	CC 2		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	9.38E-06	CC 2		
Sn 123		8			Pu 239	5.61E-06	CC 2		
Sn 126		8			Pu 240	7.01E-06	CC 2		
Sb 125	5.09E-07	CC 2			Pu 241	4.04E-04	CC 2		
Sb 126		8			Pu 242	5.33E-09	CC 2		
Te 125m	1.27E-07	CC 2			Am 241	5.11E-05	CC 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	1.57E-06	CC 2			Cm 242		8		
Cs 135		8			Cm 243	1.07E-08	CC 2		
Cs 137	6.27E-04	CC 2			Cm 244	2.59E-07	CC 2		
Ba 133		8			Cm 245		8		
La 137		8			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144	1.42E-07	CC 2			Cf 249		8		
Pm 145		8			Cf 250		8		
Pm 147	6.31E-06	CC 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	6.9E-06	CC 2			Other a				
Eu 152	9.39E-08	CC 2			Other b/g	1.91E-08	CC 2		
Eu 154	3.34E-06	CC 2			<b>Total a</b>	<b>7.34E-05</b>	<b>CC 2</b>	<b>0</b>	
Eu 155	1.26E-06	CC 2			<b>Total b/g</b>	<b>2.58E-03</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