SITE Sizewell A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Magnox Limited

WASTE TYPE LLW

Is the waste subject to

Scottish Policy:

No

**WASTE VOLUMES** 

Reported

Stocks: At 1.4.2022...... 93.6 m<sup>3</sup>

Total future arisings: 0 m<sup>3</sup>

Total waste volume: 93.6 m<sup>3</sup>

Comment on volumes: Fuel skips in the fuel storage pond have become redundant since the reactors were

defuelled and now all the fuel has been sent for reprocessing.

Uncertainty factors on volumes:

Stock (upper): x 1.1 Stock (lower): x 0.9 Arisings (upper)

Arisings (lower) x

WASTE SOURCE Fuel s

Fuel skips were used for the storage and transport of fuel elements. Now the reactors have

been defuelled and all the fuel sent off-site for reprocessing the fuel skips are redundant.

#### PHYSICAL CHARACTERISTICS

General description: The waste is 91 contaminated fuel skips. 74 of which are short skips which are

approximately 0.824 m x 1.18 m x 1.029 m. 17 are long skips which are approximately

1.357 m x 0.824 m x 1.029 m in size. Thickness of skip is 8.2 mm.

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): ~0.42

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):

Neutral

Chemical form of

Chemical state:

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

	Lead	0		
	Magnox/Magnesium	TR		
	Nickel			
	Titanium			
	Uranium			
	Zinc	0		
	Zircaloy/Zirconium	0		
	Other metals	0		
Organics (%	Swt): There may be orga	anics in the	paint layer.	
		(%wt)	Type(s) and comment	% of total C14
	Total cellulosics	0		activity
	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 mater	rials (%wt):			
		(%wt)	Type(s) and comment	% of total C14
		(70Wt)	Type(s) and comment	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	
	Free non-aqueous liquids	0	
	Powder/Ash	0	
Inorganic an	ions (%wt):		
		(%wt)	Type(s) and comment
	Fluoride	0	
	Chloride	0	
	lodide	0	
	Cyanide	0	
	Carbonate	0	
	Nitrate	0	
	Nitrite	0	
	Phosphate	0	
	Sulphate	0	
	Sulphide	0	
Materials of waste accep	interest for - otance 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		
	substances / None expected ous pollutants:		
		(%wt)	Type(s) and comment
	Acrylamide		
	Benzene		

Chlorinated solve	nts			
Formaldehyde				
Organometallics				
Phenol				
Styrene				
Tri-butyl phospha	te			
Other organophos	sphates			
Vinyl chloride				
Arsenic				
Barium				
Boron		0		
Boron (in Boral)	)			
Boron (non-Bor	al)			
Cadmium				
Caesium				
Selenium				
Chromium				
Molybdenum				
Thallium				
Tin				
Vanadium				
Mercury compour	nds			
Others				
Electronic Electri	cal 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 aci	ids			
Other organic con				
Total complexing	agents	NE		
Potential for the waste to contain discrete items:	Yes. Large Metal Ite "durable" assumed D		)/"substantial" thickness ite	ms considered

2022 Inventory

### 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		
Recyling / reuse		
Other / various		
None		100.0

Comment on planned treatments:

**Disposal Routes:** 

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	100.0	0.42
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		

Classification codes for waste expected to be consigned to a landfill facility:

# Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %				
Disposal Route	2022/23	2023/24	2024/25		
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					

# Opportunities for alternative disposal routing:

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

### **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	10

Other information: Waste is undergoing additional characterisation prior to new WCH being

submitted as a characterisation review identified deficiencies. Therefore, further sampling and analysis is required and, subsequently the strategies will be

reviewed.

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

Container voidage: -

Waste Characterisation

The waste meets the LLWR's Waste Acceptance Criteria (WAC).

The waste does not have a current WCH.

Waste consigned for disposal to LLWR in year of generation:

Form (WCH):

No. To be co-disposed with other waste as it arises to optimise container loading.

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**

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 and

subsequent full characterisation of skips in 2017.

Other information: -

#### **WASTE STREAM Fuel Skips in Pond** 9F46

	Mean radioactivity, TBq/m³				Mean radioactivity, TBq/m³				
N. P.L	Waste at	Bands and	Future	Bands and	NI PI	Waste at	Bands and	future	Bands and
Nuclide	1.4.2022	Code	arisings	Code	Nuclide	1.4.2022	Code	arisings	Code
H 3	4.30E-06	CC 1			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	9.19E-07	CC 1			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
CI 36	3.5E-08	CC 1			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 8			TI 204		8		
Mn 54	6.065.07				Pb 205				
Fe 55	6.86E-07	CC 1 CC 2			Pb 210 Bi 208		8		
Co 60 Ni 59	1.31E-06	8			Bi 210m		8		
	2 425 07								
Ni 63 Zn 65	2.42E-07	CC 1 8			Po 210 Ra 223		8		
Se 79		8			Ra 225 Ra 225		8		
Kr 81		8			Ra 225 Ra 226		8		
Kr 85		8			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	3.34E-03	CC 1			Th 227		8		
Zr 93	0.042 00	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		8		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99		8			U 232		8		
Ru 106	3.38E-07	CC 2			U 233		8		
Pd 107		8			U 234		8		
Ag 108m		8			U 235		8		
Ag 110m		8			U 236		8		
Cd 109		8			U 238		8		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	2.46E-06	CC 1		
Sn 123		8			Pu 239	2E-06	CC 1		
Sn 126		8			Pu 240	2.00E-06	CC 1		
Sb 125	1.18E-06	CC 2			Pu 241	1.59E-04	CC 1	1	
Sb 126		8			Pu 242		8		
Te 125m	2.96E-07	CC 2			Am 241	7.92E-06	CC 1		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	5.25E-06	CC 2			Cm 242		8		
Cs 135		8			Cm 243	1.79E-07	CC 1		
Cs 137	9.48E-04	CC 2			Cm 244	1.68E-07	CC 1	1	
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	0.4== 0=	8			Cf 250		8		
Pm 147	6.15E-06	CC 1			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	7.89E-07	CC 1			Other a				
Eu 152		8			Other b/g				
Eu 154	2.88E-06	CC 2			Total a	1.47E-05	CC 2		
Eu 155	1.79E-06	CC 2			Total b/g	4.48E-03	CC 2	0	
	Inner and Low				Code				

#### 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
- 8 Not expected to be present in significant quantity