Sizewell A SITE SITE OWNER **Nuclear Decommissioning Authority WASTE CUSTODIAN** Magnox Limited LLW **WASTE TYPE** Is the waste subject to No Scottish Policy: **WASTE VOLUMES** Reported At 1.4.2022..... Stocks: $0 \, \text{m}^3$ 1.4.2092 - 31.3.2095...... Future arisings -1287.0 m³ Total future arisings: 1287.0 m³ Total waste volume: 1287.0 m³ Comment on volumes: Waste volumes have been reassessed since publication of the 2007 Inventory. Final Dismantling & Site Clearance is assumed to commence in 2088 with reactor dismantling commencing in 2092 and lasting for three years. Volumes and radioactivity have been calculated for 85 years after reactor shutdown, i.e. 2091. Uncertainty factors on Stock (upper): Arisings (upper) x 1.2 volumes: Arisings (lower) x 0.8 Stock (lower): **WASTE SOURCE** Insulation materials from plant dismantling. PHYSICAL CHARACTERISTICS General description: Insulation materials. Insulating materials (100%). Physical components (%vol): Sealed sources: The waste does not contain sealed sources. Bulk density (t/m3): Comment on density: The density is of the waste as prepared for packaging. CHEMICAL COMPOSITION Insulation materials. General description and components (%wt): Neutral Chemical state: Chemical form of H-3: The chemical form of tritium has not been assessed. radionuclides: C-14: The chemical form of carbon 14 has not been assessed but may be graphite. CI-36: The chemical form of chlorine 36 has not been assessed. 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 plutonium content is insignificant. Metals and alloys (%wt): (%wt) Type(s) / Grade(s) with proportions % of total C14 activity Stainless steel..... Other ferrous metals..... Iron..... Aluminium..... Beryllium...... 0 Cobalt.....

Copper.....

	Lead	0		
	Magnox/Magnesium			
	Nickel			
	Titanium			
	Uranium			
	Zinc			
	Zircaloy/Zirconium			
	Other metals			
Organics	s (%wt): None expected. Ha	alogenated	rubbers are not expected.	
		(%wt)	Type(s) and comment	% of total C14
	Total cellulosics	0		activity
	Paper, cotton	0		
	Wood	0		
	Halogenated plastics			
	Total non-halogenated plastics	0		
	Condensation polymers			
	Others			
	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	0		
Other ma	aterials (%wt): Some graphite dus	st may be a	ssociated with reactor materials.	
	, ,	-		
		(%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	100.0	MMMF (Man Made Mineral Fibre) insulation materials	
	Graphite	TR		
	Desiccants/Catalysts			
	Asbestos	NE		

Non/low friable	NE	
Moderately friable	NE	
Highly friable	NE	
Free aqueous liquids	0	
Free non-aqueous liquids	0	
Powder/Ash	0	
Inorganic anions (%wt): Not fully assessed.		
	(%wt)	Type(s) and comment
Fluoride	NE	
Chloride	NE	
lodide	NE	
Cyanide	0	
Carbonate	NE	
Nitrate	NE	
Nitrite	NE	
Phosphate	NE	
Sulphate	NE	
Sulphide	NE	
		re or other non-radiological hazard have been identified. The tos has yet to be confirmed.
	(%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		
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 / Not expected, but if non hazardous pollutants:	any, prese	nt in trace quantities only.
	(%wt)	Type(s) and comment
Acrylamide	. ,	
Benzene		

Chlorinated so	olvents			
Formaldehyde				
Organometalli	cs			
Phenol				
Styrene				
Tri-butyl phosp	ohate			
Other organop	hosphates			
Vinyl chloride.				
Arsenic				
Barium				
Boron				
Boron (in Bo	oral)			
Boron (non-l	Boral)			
Cadmium				
Caesium				
Selenium				
Chromium				
Molybdenum				
Thallium				
Tin				
Vanadium				
Mercury comp	ounds			
Others				
Electronic Ele	ctrical 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 complexi	ing agents	TR		
Potential for the waste to contain discrete items:	No. In & of itself no LLWR.	ot a DI but	n/a as DI concept applies only	y to Disposal at

Potential for contain discrete items:

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		
Expected to be consigned to a Landfill Facility	100.0	1.0
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:

17 06 01*, 17 06 03*, 17 06 04

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

Disposal Route	Stream volume %				
Disposal Noute	2022/23		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: (Not applicable to this waste stream)

Container	Stream volume %	Waste loading m ³	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			

Other information:

Waste Planned for Disposal at the LLW Repository: (Not applicable to this waste stream)

Container voidage:

Waste Characterisation

Form (WCH):

Waste consigned for disposal to LLWR in year of generation:

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: Activation of the materials and impurities. There may be some contamination.

Uncertainty: Only approximate estimates have been made of the total specific activities. The activities

quoted are those at the time of Final Dismantling & Site Clearance (85 years after Station

shutdown).

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:

The specific activity of the thermal insulation was assumed to be the same as Trawsfynydd.

Other information: The activities quoted are those at 85 years after reactor shutdown, i.e. in 2091. There may

be some contamination by Cs137.

Nuclicide			Mean radioac	tivity, TBq/m³			Mean radioactivity, TBq/m³			
H 3 Be 10 C 14 R 7-93E-05 C 2 H 01 66m Na 22 A1 26 A1 27 A1 29 A1 26 A1 26 A1 26 A1 26 A1 26 A1 27 A1 29 A1 26 A1 27 A1 20 A1 26 A1 27 A1 28 A1 28 A1 23 A1 24 A1 23 A1 23 A1 23 A1 24 A1 23 A1 24 A1 24 A1 23 A1 24 A1 24 A1 24 A1 24 A1 24 A1 28 A1 24 A1 24 A1 28 A1 24 A1 28 A1 24 A1 24 A1 28 A1 24 A1 24 A1 28 A1 24 A1 24 A1 24 A1 28 A1 24 A1	laliala	Waste at	Bands and	Future		Niccellata		Bands and	Future	Bands and
Be 10		1.4.2022	Code				1.4.2022	Code	arisings	Code
Na 22				4.11E-05						8
Na 22				7.005.05						8
A1 26				7.93E-05						8
C136				45.06						8
Ar 39 Ar 42 K 40 Ca 41 Mn 53 Mn 54 Fe 55 Co 80 Ni 59 Ni 63 3.03E-05 CC 2 Po 210 Se 79 Kr 81 Kr 85 R b 87 Sr 90 Sr										8 8
Ar 42	:			1.34⊑-00						8
K 40										8
Ca										8
Mn 53 Mn 64 Fe 55 Co 60 Ni 59 Ni 69 Ni 63 Zn 65 Se 79 Ni 61 Kr 85 Re 87 Sr 90 Nb 91 Nb 91 Nb 91 Nb 91 Nb 92 Nb 93 Nb 91 Nb 92 Ru 106 Pd 107 Ro 9 Ro 8 Ro 228 Ro 9 Ro 17 Ro 9 Ro 9 Ro 18 Ro 17 Ro 9 Ro 18 Ro 226 Ro 18 Ro 227 Ro 18 Ro 18 Ro 228 Ro 27 Ro 18 Ro 227 Ro 18 Ro 227 Ro 18 Ro 228 Ro 27 Ro 18 Ro 227 Ro 18 Ro 228 Ro 27 Ro 18 Ro 228 Ro 18 Ro 228 Ro 27 Ro 18 Ro 228 Ro 18 Ro 228 Ro 27 Ro 27 Ro 20 Ro 20 Ro 20 Ro 20 Ro 20 Ro 23 Ro 244 Ro 241 Ro 242 Ro 244 Ro 244 Ro 243 Ro 244 Ro 33 Ro 244 Ro 33 Ro 248 Ro 244 Ro 2				1.67E-05						8
Mn 54										8
Fe 55						Pb 205				8
Ni 59 Ni 63 Ni 63 Se 79 Kr 81 Kr 85 Se 79 Kr 81 Kr 85 Ro 87 Sr 90 Ro 87 Sr 90 Ro 87 Sr 90 Ro 87 Sr 90 Ro 87 Ro 87 Ro 87 Ro 90						Pb 210				8
Ni 63 Zn 65 Se 79 Re 223 Re 225 Re 225 Re 8 Re 225 Re 8 Re 226 Re 8 Re 226 Re 8 Re 227 Re 8 Re 228 Re 8 Re 228 Re 8 Re 227 Re 8 Re 228 Re 238 Re 228 Re 228 Re 238 Re 228 Re 228 Re 228	60			5.96E-08	CC 2	Bi 208				8
Se 79	59				8	Bi 210m				8
Se 79	63			3.03E-05	CC 2					8
Kr 81 Kr 85 Kr 85 Kr 86 Kr 86 Rb 87 Sr 90 Zr 93 Nb 91 Nb 92 Nb 93m Nb 94 1.71E-09 CC 2 Th 234 Mo 93 Tc 97 Tc 99 Ru 106 Rd 107 Ag 108m Ag 110m Cd 109 Cd 113m Sn 119m Sn 121m Sn 121m Sn 123 Sn 126 Sb 125 Sb 126 Te 125m Te 127m I 129 I 120 I 121 I 129 I 120 I 121 I 129 I 129 I 129 I 129 I 129 I 120 I 121 I 129 I 129 I 129 I 120 I 121 I 120 I 121 I 129 I 120 I 121 I 122 I 123 I 1	ı 65				8					8
Kr 85 8 Ra 228 Ac 227 Sr 90 8 Th 227 Tr 227 Tr 228 Ac 227 Tr 228 Th 229 Th 230 Th 229 Th 230 Th 234 Th 230 Th 234 Th 230 Th 234 Th 230 Th 234 Th 234 Th 234 Th 234 Th 232 Th 234 Th 236 Th 234 Th 236 Th 234 Th 236 Th 234 Th 236 Th 236 Th 234 Th 236 Th 234 Th 236 Th 234 Th 236 Th 236 Th 237 Th 236 Th	∍ 79				8					8
Rb 87 Sr 90 Zr 93 Nb 91 Nb 92 Nb 93m Nb 94 1.71E-09 CC 2 Th 234 Mo 93 Tc 97 Tc 99 Ru 106 Pd 107 Ag 108m Ag 110m Cd 109 Cd 109 Cd 113m Sn 121m Sn 123 Sn 126 Sb 125 Sb 126 Sb 125 Sb 126 Sb 125 Sb 126 Te 127m I 129 I 129 I 138 Cc 134 Cc 135 Cc 137 Ba 133 Cc 144 Pm 145 R	81				8					8
Sr 90 Zr 93 Nb 91 Nb 91 Nb 92 Nb 93m Nb 94 1.71E-09 CC 2 Pa 231 Tc 97 Tc 99 Ru 106 Pd 107 Ag 108m Ag 110m Cd 109 Cd 113m Sn 119m Sn 121m Sn 123 Sn 126 Sb 125 Sb 126 Sb 125 Sb 126 Te 127m Te					8					8
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Nb 91 Nb 92 Nb 93m Nb 94 Nb 93 Tc 97 Tc 99 Ru 106 Pd 107 Ag 108m Ag 110m Cd 109 Cd 113m Sn 119m Sn 121m Sn 123 Sn 126 Sb 126 Sb 126 Tc 125m Tc 127m Tc										8
Nb 92 Nb 93m Nb 94 1.71E-09 CC 2 Th 232 Th 234 Mo 93 1.36E-08 CC 2 Pa 231 Pa 233 Tc 97 Tc 99 Ru 106 Pd 107 Rg 108m Rg 110m Rd 109 Rd 113m Rd 113m Rd 12m Rn 12a Sn										8
Nb 93m Nb 94 Nb 94 Nb 93 Nb 94 Nb 94 Nb 93 Nb 94 Nb 94 Nb 93 Nb 94 Nb 93 Nb 9231 Nb 9232 Nb 106 Nb 1236 Nb 1236 Nb 1236 Nb 1236 Nb 1236 Nb 1236 Nb 124 Nb 9236 Nb 125 Nb 126 Nb 125 Nb 126 Nb 125 Nb 126 Nb 125 Nb 126 Nb 127 Nb 128 Nb 128 Nb 129										8 8
Nb 94										8
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Pd 107 8 U 234 Ag 108m 8 U 235 Ag 110m 8 U 236 Cd 109 8 U 238 Cd 113m 8 Np 237 Sn 119m 8 Pu 236 Sn 121m 6 Pu 238 Sn 123 8 Pu 239 Sn 126 8 Pu 240 Sb 125 8 Pu 241 Sb 126 8 Pu 242 Te 125m 8 Am 241 Te 127m 8 Am 242m I 1129 8 Am 243 Cs 134 8 Cm 242 Cs 135 6 Cm 244 Cs 137 8 Cm 245 Ba 133 2.98E-08 CC 2 Cm 245 La 137 8 Cm 246 La 138 Cm 248 Cm 249 Ce 144 Pm 145 8 Cf 250										8
Ag 108m 8 U 235 Ag 110m 8 U 236 Cd 109 8 U 238 Cd 113m 8 Np 237 Sn 119m 8 Pu 236 Sn 121m 6 Pu 238 Sn 123 8 Pu 239 Sn 126 8 Pu 240 Sb 125 8 Pu 241 Sb 126 8 Pu 242 Te 125m 8 Am 241 Te 127m 8 Am 242m 1 129 8 Am 243 Cs 134 8 Cm 242 Cs 135 6 Cm 242 Cs 137 6 Cm 243 Cs 137 6 Cm 244 Ba 133 2.98E-08 CC 2 Cm 245 La 137 8 Cm 246 La 138 6 Cm 248 Ce 144 8 Cf 249 Pm 145 8 Cf 250						U 234				8
Ag 110m 8 U 236 Cd 109 8 U 238 Cd 113m 8 Np 237 Sn 119m 8 Pu 236 Sn 121m 6 Pu 238 Sn 123 8 Pu 239 Sn 126 8 Pu 240 Sb 125 8 Pu 241 Sb 126 8 Pu 242 Te 125m 8 Am 241 Te 127m 8 Am 243 I 129 8 Am 243 Cs 134 8 Cm 242 Cs 135 8 Cm 243 Cs 137 6 Cm 244 Ba 133 2.98E-08 CC 2 Cm 245 La 137 8 Cm 246 La 138 Cm 248 Cf 249 Ce 144 Pm 145 8 Cf 250						U 235				8
Cd 109 8 U 238 Cd 113m 8 Np 237 Sn 119m 8 Pu 236 Sn 121m 6 Pu 238 Sn 123 8 Pu 239 Sn 126 8 Pu 240 Sb 125 8 Pu 241 Sb 126 8 Pu 242 Te 125m 8 Am 241 Te 127m 8 Am 243 I 129 8 Am 243 Cs 134 8 Cm 242 Cs 135 8 Cm 243 Cs 137 8 Cm 244 Ba 133 2.98E-08 CC 2 Cm 245 La 137 8 Cm 248 Ce 144 8 Cf 250 Pu 145 8 Cf 250					8	U 236				8
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Sn 121m	1113m				8	-				8
Sn 123 Sn 126 Sb 125 Sb 126 Te 125m Te 127m I 129 Cs 134 Cs 135 Cs 137 Ba 133 La 137 La 138 Ce 144 Pm 145 Sb 126 8	າ 119m				8					8
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Sb 125 8 Pu 241 Sb 126 8 Pu 242 Te 125m 8 Am 241 Te 127m 8 Am 242m I 129 8 Am 243 Cs 134 8 Cm 242 Cs 135 6 Cm 243 Cs 137 6 Cm 244 Ba 133 2.98E-08 CC 2 Cm 245 La 137 8 Cm 246 La 138 6 Cm 248 Ce 144 6 Cf 249 Pm 145 8 Cf 250										8
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La 138 8 Cm 248 Ce 144 8 Cf 249 Pm 145 8 Cf 250										8
Ce 144 Pm 145 8						Cm 248				8
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Sm 147 8 Cf 252					8					8
Sm 151 2.1E-06 CC 2 Other a	n 151			2.1E-06						
Eu 152 8.37E-06 CC 2 Other b/g						_			_	
Eu 154 1.33E-07 CC 2 Total a 0 0 1.00E 0.4				1.33E-07						00.0
Eu 155 8 Total b/g 0 1.80E-04 0	ı 155				8	i otai b/g	0	,	1.80E-04	CC 2

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

Bands quantify uncertainty in mean radioactivity.

Code

- 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