

WASTE STREAM	9C24	FED Magnox (lugs and splitters)
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SITE Dungeness A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE ILW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	1.0		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		1.0		

Number of waste packages in stock: At 1.4.2025..... - packages

Comment on arising rates: -

Additional information on quantities: -

Uncertainty factors on volumes:

Stock (upper):	x 1.20	Arisings (upper):	x -
Stock (lower):	x 0.80	Arisings (lower):	x -

WASTE SOURCE

FED found inside fuel skips in R1 & R2 ponds.
The waste consists of Magnox metal, swarf and sludge which may be contaminated by fission products and actinides. Components may weigh up to about 10g and be approximately 4 mm x 15 mm x 100 mm. There are no large items in the waste which will require special handling.

PHYSICAL CHARACTERISTICS

General description: FED Magnox

Changes since waste generated: -

Bulk density (t/m³): = 0.65

Comment on density: The bulk density of 0.65 t/m³ taken from an average of measured values.

CHEMICAL COMPOSITION

General description and components (%wt): Magnox metal, magnesium carbonate and magnesium hydroxide. Activation of trace components within the Magnox (>99% wt in total including impurities). Fission product and actinide contamination.

Chemical state: -

Sheet metal proportion / thickness: The waste is predominantly lugs, which will be typically 4 mm by 15 mm by 100 mm.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	-	-	
Other ferrous metals.....	-	-	
Iron.....	TR	-	
Aluminium.....	-	-	
Beryllium.....	TR	-	
Cobalt.....	-	-	
Copper.....	-	-	
Lead.....	-	-	
Magnox/Magnesium.....	> 99.0	AL 80 and MN 80 alloys, which have 0.8 wt% aluminium and manganese respectively. Impurities may include beryllium.	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	-	-	
Zinc.....	TR	-	
Zircaloy/Zirconium.....	-	-	
Other metals.....	-	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0	-	
Paper, cotton.....		-	
Wood.....		-	
Halogenated plastics.....		-	
Total non-halogenated plastics.....	0	-	
Condensation polymers.....		-	
Others.....		-	
Organic ion exchange materials.....		-	
Total rubber.....	0	-	
Halogenated rubber.....		-	
Non-halogenated rubber.....		-	
Hydrocarbons.....		-	
Oil or grease.....		-	
Fuel.....		-	
Asphalt/Tarmac (cont.coal tar).....		-	
Asphalt/Tarmac (no coal tar).....		-	
Bitumen.....		-	
Others.....		-	
Other organics.....		-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....		-	
Inorganic sludges and flocs.....		-	
Soil.....		-	
Brick/Stone/Rubble.....		-	
Cementitious material.....		-	
Sand.....		-	
Glass/Ceramics.....		-	
Graphite.....	TR	-	
Desiccants/Catalysts.....		-	
Asbestos.....	0	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....		-	
Free non-aqueous liquids.....		-	
Powder/Ash.....		-	

COMPONENTS OF MATERIALS, WASTE PROPERTIES, MATERIALS NOT CONTRIBUTING TO MASS

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....		-
Chloride.....		-
Iodide.....		-
Cyanide.....		-
Carbonate.....		-
Nitrate.....		-
Nitrite.....		-
Phosphate.....		-
Sulphate.....		-
Sulphide.....		-

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	> 99.0	-
Low flash point liquids.....		-
Explosive materials.....		-
Phosphorus.....		-
Hydrides.....		-
Biological etc. materials.....		-
Biodegradable materials.....	0	-
Putrescible wastes.....		-
Non-putrescible wastes.....		-
Corrosive materials.....		-
Pyrophoric materials.....		-
Generating toxic gases.....		-
Reacting with water.....	> 99.0	-
Higher activity particles.....		-
Soluble solids as bulk chemical compounds.....		-

Hazardous substances / non hazardous pollutants:

	(%wt)	Type(s) and comment
Acrylamide.....	0	-
Benzene.....		-
Chlorinated solvents.....		-
Formaldehyde.....		-
Organometallics.....		-
Phenol.....		-
Styrene.....		-
Tri-butyl phosphate.....		-
Other organophosphates.....		-
Vinyl chloride.....		-
Arsenic.....		-
Barium.....		-
Boron.....		-
Boron (in Boral).....		-
Boron (non-Boral).....		-
Cadmium.....		-
Caesium.....		-
Selenium.....		-
Chromium.....		-
Molybdenum.....		-
Thallium.....		-
Tin.....		-
Vanadium.....		-
Mercury compounds.....		-
Others.....		-

Complexing agents (%wt):

No		
	(%wt)	Type(s) and comment
EDTA.....		-
DPTA.....		-
NTA.....		-
Polycarboxylic acids.....		-
Other organic complexants.....		-
Total complexing agents.....		-

Physical components:

	Number	Type(s) and comment
Sources.....		-
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....		-
EEE Type 2.....		-
EEE Type 3.....		-
EEE Type 4.....		-
EEE Type 5.....		-

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off-site	Stream volume %
Size reduction		
Decay storage		
Low force compaction		
Supercompaction (HFC)		
Incineration		
Drying/dewatering/liquid separation		
Tie down/fixatives/strippable coating/painting application		
Decontamination		
Metal treatment		
Recycling / reuse		
Thermal treatment, including vitrification		
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		

Comments on planned treatments:

-

Conditioning method:

Likely to be co-disposed of with other MCI such as 9C38, 9C40, 9C41 or 9C43. As such no containers allocated to this stream. To be placed into DCIC and dried as necessary, due to small volume likely to be co-disposed of with other MCI such as 9C38, 9C40, 9C41 or 9C43.

Conditioning plants:

Plant Name	Location

Likely conditioning matrix:

-

Further information on the conditioning matrix:

-

Waste Packaging:

Likely container type:	Container	Waste packaged (vol%)	Waste loading (m³)	Payload (m³)	Number of packages	Estimated start date for packaging
	-	-	-	-	-	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m³): -

Conditioned density comment: -

Management Routes:

Disposal Route	Stream volume %	Raw density t/m³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)			
Expected to be Non-NSD HAW managed under Scottish Government's policy			
Expected to be disposed to LLW Vaults NRS Dounreay			
Expected to be consigned to the Geological Disposal Facility			
Expected to be consigned to a Near Surface Disposal Facility			
Expected to be consigned to the LLW Repository			
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site			
Expected to be managed by In-Situ Disposal			
Expected to be consigned to an Incineration Facility			
Expected to be consigned to a Metal Treatment Facility			
Expected to be Out of Scope			
Expected to be recycled / reused			
Disposal route not known			

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

Opportunities for alternative disposal routing: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Opportunity Confidence	Comment
-	-	-	-	-

RADIOACTIVITY

Source: -

Uncertainty: The source of the waste is the removal of lugs from fuel elements prior to dispatch of the elements to Sellafield. Activation of trace nuclides in the Magnox and contamination by fission products and actinides will be main sources of activity.

Measurement of radioactivities: The values quoted are derived from samples taken and analysed.

Chemical form of radionuclides: H-3: The tritium is expected to be present as surface contamination, possibly as water, but perhaps in the form of other inorganic or organic compounds.
 C-14: The carbon-14 will probably be present as graphite.
 Cl-36: -
 Se-79: -
 Tc-99: The chemical form of technetium has not been determined.
 I-129: -
 Ra: Chemical form of Uranium isotopes has not been determined but may be oxides.
 Th: -
 U: -
 Np: The chemical form of neptunium has not been determined.
 Pu: Chemical form of plutonium isotopes has not been determined but may be oxides.

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Nuclide	Mean radioactivity, TBq/m³				Nuclide	Mean radioactivity, TBq/m³			
	Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code		Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3	3.12E-03	C C 2			Gd 153		8		
Be 10		8			Ho 163		8		
C 14	4.00E-05	C C 2			Ho 166m		8		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171		8		
Cl 36	2.29E-07	C C 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			Ti 204		8		
Mn 54		8			Pb 205		8		
Fe 55	1.58E-05	C C 2			Pb 210		8		
Co 60	7.27E-05	C C 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	7.82E-04	C C 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	2.36E-04	C C 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	5.25E-08	C C 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99	2.07E-07	C C 2			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	6.80E-08	C C 2		
Ag 108m	5.05E-06	C C 2			U 235	3.63E-09	C C 2		
Ag 110m		8			U 236	3.65E-09	C C 2		
Cd 109		8			U 238	5.25E-08	C C 2		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	1.08E-04	C C 2		
Sn 123		8			Pu 239	1.00E-04	C C 2		
Sn 126		8			Pu 240	9.99E-05	C C 2		
Sb 125	4.96E-07	C C 2			Pu 241	3.63E-03	C C 2		
Sb 126		8			Pu 242		8		
Te 125m	1.24E-07	C C 2			Am 241	4.69E-04	C C 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	2.51E-07	C C 2			Cm 242		8		
Cs 135		8			Cm 243	1.25E-05	C C 2		
Cs 137	7.64E-04	C C 2			Cm 244	1.14E-05	C C 2		
Ba 133	1.15E-06	C C 2			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			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151		8			Unsp a				
Eu 152	6.61E-06	C C 2			Unsp b/g				
Eu 154	9.12E-05	C C 2			Total a	8.01E-04	*	0	*
Eu 155	1.87E-05	C C 2			Total b/g	8.79E-03	*	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 the 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
* Total calculated from the 114 declared radionuclides