

WASTE STREAM	9C13	Magnox Dissolution Plant LLW
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SITE Dungeness A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

	Reported (m ³)	OR	Conditioned (m ³)	Packaged (m ³)
Stocks:	At 1.4.2025	= 37.1		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		37.1		

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

Comment on arising rates: -

Additional information on quantities: The quoted volumes do not take into account possible volume reduction by supercompaction.

Uncertainty factors on volumes:

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

WASTE SOURCE Trash from the Magnox dissolution plant.

PHYSICAL CHARACTERISTICS

General description: Metal components, soil/rubble, plastic, rubber, small quantities wood and glass, traces of magnesium carbonate sludge, fine filter cartridges (polypropylene) and drums containing the waste. There are no large items.

Changes since waste generated: -

Bulk density (t/m³): = 0.35

Comment on density: Density based on typical weight of 200 litre drum.

CHEMICAL COMPOSITION

General description and components (%wt): The waste comprises metal components, soil/rubble, plastic, rubber, small quantities of wood and glass, traces of magnesium carbonate sludge, fine filter cartridges (polypropylene). Magnesium carbonate is also present in trace quantities. Plastic/rubber (~36% wt), soil/rubble (~20% wt), metal waste (~8% wt) and drums (~29% wt) and Others (~7%). The others comprise wood, soft organic, glass, asbestos/MMMF and polypropylene filter cartridges (~4% wt),

Chemical state: Neutral

Sheet metal proportion / thickness: Metal thickness may vary from 1 mm to 10 mm.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	NE	Nickel and chromium in trace or zero quantities apart from any as constituents of stainless steel.	
Other ferrous metals.....	~ 37.0	-	
Iron.....	-	-	
Aluminium.....	TR	-	
Beryllium.....	= 0	-	
Cobalt.....	-	-	
Copper.....	TR	-	
Lead.....	TR	-	
Magnox/Magnesium.....	TR	-	
Nickel.....	-	-	
Titanium.....	-	-	
Uranium.....	= 0	-	
Zinc.....	TR	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	NE	-	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	= 2.0	-	
Paper, cotton.....	~ 1.0	-	
Wood.....	~ 1.0	-	
Halogenated plastics.....	~ 30.0	PVC	
Total non-halogenated plastics.....	~ 5.0	-	
Condensation polymers.....	= 0	-	
Others.....	~ 5.0	-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	NE	-	
Halogenated rubber.....	NE	-	
Non-halogenated rubber.....	NE	-	
Hydrocarbons.....	-	-	
Oil or grease.....	-	-	
Fuel.....	-	-	
Asphalt/Tarmac (cont.coal tar).....	-	-	
Asphalt/Tarmac (no coal tar).....	-	-	
Bitumen.....	-	-	
Others.....	-	-	
Other organics.....	TR	-	

Other materials (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials.....	= 0	-	
Inorganic sludges and flocs.....	= 0	-	
Soil.....	~ 1.0	-	
Brick/Stone/Rubble.....	~ 19.0	-	
Cementitious material.....	= 0	-	
Sand.....	-	-	
Glass/Ceramics.....	~ 1.0	-	
Graphite.....	NE	-	
Desiccants/Catalysts.....	-	-	
Asbestos.....	< 1.0	-	
Non/low friable.....	-	-	
Moderately friable.....	-	-	
Highly friable.....	< 1.0	-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	= 0	-	
Powder/Ash.....	= 0	-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	= 0	-
Chloride.....	TR	-
Iodide.....	= 0	-
Cyanide.....	= 0	-
Carbonate.....	TR	-
Nitrate.....	= 0	-
Nitrite.....	= 0	-
Phosphate.....	= 0	-
Sulphate.....	TR	-
Sulphide.....	= 0	-

Materials of interest for waste acceptance criteria:

	(%wt)	Type(s) and comment
Combustible metals.....	TR	-
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.....	TR	-
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):

Yes		
	(%wt)	Type(s) and comment
EDTA.....	TR	-
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	Off-site	= 23.0
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		= 77.0

Comments on planned treatments:

23% of this waste stream will be sent for Metal Recycle and 16% to Landfill as VLLW.

Conditioning method:

-

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
	1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	61.0	8.6	18.3	3	-

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	= 61.0	0.35	
Expected to be consigned to a Landfill Facility	= 16.0	0.35	
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	= 23.0	1.4	
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: 17 04 05, 17 05 03*, 17 05 04, 17 06 01*, 17 02 03

Opportunities for alternative disposal routing: No

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

RADIOACTIVITY

Source: The waste is contaminated with fission products, activation products and actinides.

Uncertainty: Specific activity is a function of Station operating history. The values are indicative of the activities that would be expected.

Measurement of radioactivities: The specific activities have been estimated from waste stream fingerprints.

Chemical form of radionuclides:

H-3: The chemical form of tritium has not been determined.

C-14: The chemical form of carbon 14 has not been determined but may be graphite.

Cl-36: The chemical form of chlorine 36 has not been determined but may be chloride.

Se-79: -

Tc-99: -

I-129: -

Ra: -

Th: -

U: The chemical form of uranium isotopes has not been determined but may be uranium oxides.

Np: -

Pu: The chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

WASTE STREAM 9C13 Magnox Dissolution Plant LLW									
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	3.67E-04	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	1.00E-05	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	8.70E-07	C C 2			Pb 210		8		
Co 60	7.69E-06	C C 2			Bi 208		8		
Ni 59		8			Bi 210m		8		
Ni 63	2.65E-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	3.92E-05	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	3.00E-07	C C 2		
Mo 93		8			Pa 231		8		
Tc 97		8			Pa 233		8		
Tc 99		8			U 232		8		
Ru 106		8			U 233		8		
Pd 107		8			U 234	2.00E-07	C C 2		
Ag 108m	2.93E-06	C C 2			U 235	1.00E-09	C C 2		
Ag 110m		8			U 236	5.00E-09	C C 2		
Cd 109		8			U 238	3.00E-07	C C 2		
Cd 113m		8			Np 237		8		
Sn 119m		8			Pu 236		8		
Sn 121m		8			Pu 238	2.61E-06	C C 2		
Sn 123		8			Pu 239	5.00E-06	C C 2		
Sn 126		8			Pu 240	6.99E-06	C C 2		
Sb 125	2.26E-09	C C 2			Pu 241	8.50E-05	C C 2		
Sb 126		8			Pu 242		8		
Te 125m		8			Am 241	2.33E-05	C C 2		
Te 127m		8			Am 242m		8		
I 129		8			Am 243		8		
Cs 134	5.17E-09	C C 2			Cm 242		8		
Cs 135		8			Cm 243	1.32E-08	C C 2		
Cs 137	6.64E-05	C C 2			Cm 244	2.02E-07	C C 2		
Ba 133	1.24E-07	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	8.22E-07	C C 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151		8			Unsp a				
Eu 152	8.01E-08	C C 2			Unsp b/g				
Eu 154	2.38E-07	C C 2			Total a	3.86E-05	*	0	*
Eu 155	2.39E-08	C C 2			Total b/g	8.86E-04	*	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