

WASTE STREAM	2N19	Waste from PCM Decommissioning (Mag 10 Railbay only)
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SITE LLW Repository

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Waste Services (NWS)

WASTE TYPE VLLW

WASTE VOLUMES

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

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

Comment on arising rates: All waste generated therefore no more arisings.

Additional information on quantities: -

Uncertainty factors on volumes: Stock (upper): x 1.30 Arisings (upper): x -
Stock (lower): x 0.70 Arisings (lower): x -

WASTE SOURCE

The wastestream comprises building materials/rubble and redundant equipment that became contaminated as part of the building's historical use as a Plutonium Contaminated Material storage facility. This wastestream includes a number of waste types that will arise during building demolition and remaining waste from decommissioning (decontamination and deplanting) operations. The waste includes:

- Concrete 'breaker' waste;
- Brick/concrete 'Dwarf Wall' waste;
- Concrete scabbling waste;
- Mild steel from the railway line;
- Degraded concrete/sludge.

PHYSICAL CHARACTERISTICS

General description: The wastestream comprises building materials/rubble and redundant equipment that became contaminated as part of the building's historical use as a Plutonium Contaminated Material storage facility. This wastestream includes a number of waste types that will arise during building demolition and remaining waste from decommissioning (decontamination and deplanting) operations. The waste includes:

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- Brick/concrete 'Dwarf Wall' waste;
- Concrete scabbling waste;
- Mild steel from the railway line;
- Degraded concrete/sludge.

Changes since waste generated: None.

Bulk density (t/m³): ~ 1.3

Comment on density: Bulk density is based on an estimate of the total waste mass divided by the total waste volume

CHEMICAL COMPOSITION

General description and components (%wt): Concrete/rubble 83%, Metal 15% and Plastics (halogenated) 2%

Chemical state: Alkali

Sheet metal proportion / thickness: Mild steel in the form of rail lines and drums (14.5%)

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	~ 14.5	- rail lines and drums.	
Other ferrous metals.....			
Iron.....			
Aluminium.....			
Beryllium.....			
Cobalt.....			
Copper.....			
Lead.....			
Magnox/Magnesium.....			
Nickel.....			
Titanium.....			
Uranium.....			
Zinc.....			
Zircaloy/Zirconium.....			
Other metals.....			

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulotics.....	~ 1.9	- PVC Bags and wrapping	
Paper, cotton.....			
Wood.....			
Halogenated plastics.....			
Total non-halogenated plastics.....			
Condensation polymers.....			
Others.....			
Organic ion exchange materials.....			
Total rubber.....			
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.....	~ 83.0		
Inorganic sludges and flocs.....			
Soil.....			
Brick/Stone/Rubble.....			
Cementitious material.....			
Sand.....			
Glass/Ceramics.....			
Graphite.....			
Desiccants/Catalysts.....			
Asbestos.....			
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.....	NE	
Chloride.....	NE	
Iodide.....	NE	
Cyanide.....	NE	
Carbonate.....	NE	
Nitrate.....	NE	
Nitrite.....	NE	
Phosphate.....	NE	
Sulphate.....	NE	
Sulphide.....	NE	

Materials of interest for waste acceptance 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.....	= 0	-
Corrosive materials.....	= 0	-
Pyrophoric materials.....	= 0	-
Generating toxic gases.....	= 0	-
Reacting with water.....	= 0	-
Higher activity particles.....	= 0	-
Soluble solids as bulk chemical compounds.....	= 0	-

Hazardous substances / non hazardous pollutants:

-

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

Complexing agents (%wt):

No

	(%wt)	Type(s) and comment
EDTA.....	= 0	-
DPTA.....	= 0	-
NTA.....	= 0	-
Polycarboxylic acids.....	= 0	-
Other organic complexants.....	= 0	-
Total complexing agents.....	= 0	-

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	= 5.0
Decay storage		
Low force compaction		
Supercompaction (HFC)		
Incineration		
Drying/dewatering/liquid separation	Off-site	= 5.0
Tie down/fixatives/strippable coating/painting application		
Decontamination		
Metal treatment		
Recycling / reuse		
Thermal treatment, including vitrification	Off-site	= 90.0
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		

Comments on planned treatments:

Waste has been segregated and will be sent to the appropriate facility for treatment and disposal.

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
-	-	-	-	-	-

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)	= 90.0	~ 1.3	2026
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	= 5.0	= 0.70	2025
Expected to be consigned to a Landfill Facility			
Expected to be disposed On-Site	= 5.0	= 1.1	2025
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: Waste has become contaminated through contact with PCM waste stored / processed in the buildings.

Uncertainty: Specific activities have been based on sample results for waste items or similar waste items or inferred from monitoring data where available, but the majority of the waste volume is still to be characterised. Specific activities by mass have been converted to specific activities by volume, so uncertainties in the volume estimates will also be carried over.

Measurement of radioactivities: A number of characterisation methods have been used including; sampling and hand held monitoring.

Chemical form of radionuclides: H-3: -
C-14: -
Cl-36: -
Se-79: -
Tc-99: -
I-129: -
Ra: -
Th: -
U: -
Np: -
Pu: -

WASTE STREAM		2N19		Waste from PCM Decommissioning (Mag 10 Railbay only)											
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	~ 2.91E-08	B B 3			Gd 153										
Be 10					Ho 163										
C 14					Ho 166m										
Na 22					Tm 170										
Al 26					Tm 171										
Cl 36					Lu 174										
Ar 39					Lu 176										
Ar 42					Hf 178n										
K 40					Hf 182										
Ca 41					Pt 193										
Mn 53					Tl 204										
Mn 54					Pb 205										
Fe 55					Pb 210										
Co 60					Bi 208										
Ni 59					Bi 210m										
Ni 63					Po 210										
Zn 65					Ra 223										
Se 79					Ra 225										
Kr 81					Ra 226										
Kr 85					Ra 228										
Rb 87	Ac 227														
Sr 90	Th 227														
Zr 93	Th 228														
Nb 91	Th 229														
Nb 92	Th 230														
Nb 93m	Th 232														
Nb 94	Th 234														
Mo 93	Pa 231														
Tc 97	Pa 233														
Tc 99	U 232														
Ru 106	U 233														
Pd 107	U 234							~ 1.28E-05	B B 2						
Ag 108m	U 235							~ 8.51E-07	B B 2						
Ag 110m	U 236														
Cd 109	U 238													~ 1.13E-05	B B 2
Cd 113m	Np 237														
Sn 119m	Pu 236														
Sn 121m	Pu 238													~ 9.48E-08	B B 2
Sn 123	Pu 239													~ 5.09E-06	B B 2
Sn 126	Pu 240													~ 3.83E-07	B B 2
Sb 125	Pu 241													~ 1.27E-06	B B 2
Sb 126	Pu 242														
Te 125m	Am 241	~ 1.44E-06	B B 2												
Te 127m	Am 242m														
I 129	Am 243														
Cs 134	Cm 242														
Cs 135	Cm 243														
Cs 137	Cm 244														
Ba 133	Cm 245														
La 137	Cm 246														
La 138	Cm 248														
Ce 144	Cf 249														
Pm 145	Cf 250														
Pm 147	Cf 251														
Sm 147	Cf 252														
Sm 151	Unsp a														
Eu 152	Unsp b/g														
Eu 154	Total a							3.20E-05	*	0	*				
Eu 155	Total b/g							6.48E-06	*	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