

WASTE STREAM	9A83	Miscellaneous Contaminated Items
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SITE Berkeley

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	= 0.1		
Future arisings:				
Total future arisings:		0.0		
Total waste volume:		0.1		

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

Comment on arising rates: -

Additional information on quantities: Station operation ceased in March 1989. Accumulation of waste in this stream was in 1988. There will be no further arisings of this waste stream.

Uncertainty factors on volumes:

Stock (upper):	x 1.10	Arisings (upper):	x -
Stock (lower):	x 0.90	Arisings (lower):	x -

WASTE SOURCE Miscellaneous contaminated items from Berkeley Power Station.

PHYSICAL CHARACTERISTICS

General description: The waste comprises miscellaneous items from the Berkeley Power Station, including graphite pieces, splitter material, tacky rags, broken tools and dusts. The waste is containerised in 5 litre and 0.5 litre paint tins. The tins will form part of this waste stream also. There are no large items that may require special handling.

Changes since waste generated: -

Bulk density (t/m³): = 0.64

Comment on density: Calculated from total mass and volume of this waste.

CHEMICAL COMPOSITION

General description and components (%wt): The waste is expected to be mild steel (the cans), graphite material, plastics and dusts. Fission products, actinides and other activation products will be present as contaminants.

Chemical state: Neutral

Sheet metal proportion / thickness: A small proportion of the metal will be the sheet metal (thickness probably about 1mm) of the cans containing the waste.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	NE	-	
Other ferrous metals.....	~ 50.0	-	
Iron.....		-	
Aluminium.....	= 0	-	
Beryllium.....	0	-	
Cobalt.....		-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....		-	
Titanium.....		-	
Uranium.....		-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	NE	"Other" metals have not been assessed.	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	= 0	-	
Paper, cotton.....	= 0	-	
Wood.....	= 0	-	
Halogenated plastics.....	= 0	-	
Total non-halogenated plastics.....	~ 15.0	-	
Condensation polymers.....	= 0	-	
Others.....	= 15.0	-	
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.....	TR	-	

Other materials (%wt):

	(%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.....	= 0	-	
Graphite.....	~ 20.0	-	
Desiccants/Catalysts.....		-	
Asbestos.....	= 0	-	
Non/low friable.....		-	
Moderately friable.....		-	
Highly friable.....		-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	TR	-	
Powder/Ash.....	~ 15.0	-	

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

Inorganic anions (%wt):

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

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.....		-
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 / 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.....		Organic complexing agents may be present in trace quantities.
Total complexing agents.....	TR	-

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:

This stream is to be co-packaged with 9A63, 9A64, 9A84, 9A33, 9A34, 9A35, 9A41, 9A42, 9A43, 9A49, 9A50, 9A51, 9A54, 9A55, 9A56, 9A74. Packages are assigned to 9A33, 9A34, 9A74.

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: The radioactivity may have arisen both from activation and contamination while the material was used in the reactor area. Although this waste was originally classified as LLW, (since the activity is below the upper limit for LLW), it will be processed as ILW and so has been declared as ILW for this inventory.

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

Measurement of radioactivities: The specific activities were derived by estimation based upon available information.

Chemical form of radionuclides: H-3: Tritium may be present as water, in the form of other inorganic compounds or organic compounds, or as tritium gas incorporated in metal.
 C-14: Chemical form of carbon 14 has not been determined but may be graphite.
 Cl-36: The chemical form of chlorine 36 in these wastes is not known.
 Se-79: -
 Tc-99: -
 I-129: -
 Ra: -
 Th: -
 U: Chemical form of uranium isotopes has not been determined but may be uranium oxides.
 Np: -
 Pu: Chemical form of plutonium isotopes has not been determined but may be plutonium oxides.

WASTE STREAM		9A83		Miscellaneous Contaminated Items					
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	1.09E-03	C C 2			Gd 153		8		
Be 10					Ho 163		8		
C 14	9.99E-06	C C 2			Ho 166m		8		
Na 22					Tm 170		8		
Al 26					Tm 171		8		
Cl 36	7.00E-07	C C 2			Lu 174		8		
Ar 39					Lu 176		8		
Ar 42					Hf 178n		8		
K 40					Hf 182		8		
Ca 41					Pt 193		8		
Mn 53					Tl 204		8		
Mn 54					Pb 205		8		
Fe 55	9.22E-06	C C 2			Pb 210		8		
Co 60	4.69E-05	C C 2			Bi 208		8		
Ni 59	1.00E-06	C C 2			Bi 210m		8		
Ni 63	7.93E-05	C C 2			Po 210		8		
Zn 65					Ra 223		8		
Se 79	1.21E-08	C C 2			Ra 225		8		
Kr 81					Ra 226		8		
Kr 85					Ra 228		8		
Rb 87					Ac 227		8		
Sr 90	4.55E-03	C C 2			Th 227		8		
Zr 93	6.00E-07	C C 2			Th 228		8		
Nb 91					Th 229		8		
Nb 92					Th 230		8		
Nb 93m	4.09E-07	C C 2			Th 232		8		
Nb 94					Th 234	3.00E-07	C C 2		
Mo 93					Pa 231		8		
Tc 97					Pa 233	4.19E-08	C C 2		
Tc 99	3.00E-06	C C 2			U 232		8		
Ru 106					U 233		8		
Pd 107					U 234	3.11E-07	C C 2		
Ag 108m	< 2.93E-06	C 3			U 235	7.00E-09	C C 2		
Ag 110m					U 236	4.01E-08	C C 2		
Cd 109					U 238	3.00E-07	C C 2		
Cd 113m					Np 237	4.19E-08	C C 2		
Sn 119m					Pu 236		8		
Sn 121m					Pu 238	1.73E-04	C C 2		
Sn 123					Pu 239	1.00E-04	C C 2		
Sn 126	4.35E-08	C C 2			Pu 240	2.00E-04	C C 2		
Sb 125					Pu 241	1.27E-03	C C 2		
Sb 126	< 6.09E-09	C 3			Pu 242	1.00E-07	C C 2		
Te 125m					Am 241	3.49E-04	C C 2		
Te 127m					Am 242m	8.24E-07	C C 2		
I 129	6.00E-09	C C 2			Am 243	3.00E-07	C C 2		
Cs 134	9.51E-09	C C 2			Cm 242	6.80E-07	C C 2		
Cs 135	1.00E-07	C C 2			Cm 243	1.98E-07	C C 2		
Cs 137	4.62E-03	C C 2			Cm 244	1.50E-06	C C 2		
Ba 133					Cm 245		8		
La 137					Cm 246		8		
La 138					Cm 248		8		
Ce 144					Cf 249		8		
Pm 145					Cf 250		8		
Pm 147	4.28E-07	C C 2			Cf 251		8		
Sm 147					Cf 252		8		
Sm 151	2.60E-05	C C 2			Unsp a				
Eu 152	1.19E-07	C C 2			Unsp b/g				
Eu 154	1.18E-05	C C 2			Total a	8.25E-04	*	0	*
Eu 155	5.44E-07	C C 2			Total b/g	1.17E-02	*	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