

PHYSICAL CHARACTERISTICS

General description: The waste contains a variety of solvent and oils and mercury held in various locations. The waste is likely to contain small amounts of aqueous liquids. There are no large items in the waste.

Changes since waste generated: -

Bulk density (t/m³): = 0.97

Comment on density: Based on plant washing tank density. All solvents and oils assumed to have same density.

CHEMICAL COMPOSITION

General description and components (%wt): Chemicals (0.08%), Mercury (0.35%), Mild Steel (0.31%), Oil (1.12%), Plastic (0.31%), Reactive chemicals (0.36%), Rubber (0.01%), Sodium (TR), Solvent (97.22%), Sources (0.23%),

Chemical state: Neutral

Sheet metal proportion / thickness: This waste is unsuitable for further treatment. Therefore, the proportion of sheet metal has not been assessed.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel.....	= 0	-	
Other ferrous metals.....	= 0.31	Mild steel containers	
Iron.....	= 0	-	
Aluminium.....	= 0	-	
Beryllium.....	= 0	-	
Cobalt.....	= 0	-	
Copper.....	= 0	-	
Lead.....	= 0	-	
Magnox/Magnesium.....	= 0	-	
Nickel.....	= 0	-	
Titanium.....	= 0	-	
Uranium.....	P 0	-	
Zinc.....	= 0	-	
Zircaloy/Zirconium.....	= 0	-	
Other metals.....	= 0.58	Mercury	

Organics (%wt):

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	= 0	-	
Paper, cotton.....	= 0	-	
Wood.....	= 0	-	
Halogenated plastics.....	= 0.16	-	
Total non-halogenated plastics.....	= 0.16	-	
Condensation polymers.....		-	
Others.....		-	
Organic ion exchange materials.....	= 0	-	
Total rubber.....	= 0.01	-	
Halogenated rubber.....		-	
Non-halogenated rubber.....		-	
Hydrocarbons.....	= 1.1	-	
Oil or grease.....	= 1.1	-	
Fuel.....	NE	-	
Asphalt/Tarmac (cont.coal tar).....	= 0	-	
Asphalt/Tarmac (no coal tar).....	= 0	-	
Bitumen.....	= 0	-	
Others.....	NE	-	
Other organics.....	= 0	Chemicals; Reactive Chemicals; solvent; sources; other liquids	

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.....	= 0	-	
Glass/Ceramics.....	= 0	-	
Graphite.....	= 0	-	
Desiccants/Catalysts.....	= 0	-	
Asbestos.....	= 0	-	
Non/low friable.....	NE	-	
Moderately friable.....	NE	-	
Highly friable.....	NE	-	
Free aqueous liquids.....	= 0	-	
Free non-aqueous liquids.....	= 97.7	Solvent 97.22%; Chemicals 0.08, Reactive Chemicals 0.36%	
Powder/Ash.....	= 0	-	

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

Inorganic anions (%wt):

	(%wt)	Type(s) and comment
Fluoride.....	= 0	-
Chloride.....	NE	-
Iodide.....	NE	-
Cyanide.....	= 0	-
Carbonate.....	NE	-
Nitrate.....	NE	-
Nitrite.....	NE	-
Phosphate.....	= 0	-
Sulphate.....	= 0	-
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.....	NE	-
Generating toxic gases.....	NE	-
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.....	NE	-
Benzene.....	= 0	-
Chlorinated solvents.....	NE	-
Formaldehyde.....	NE	-
Organometallics.....	NE	-
Phenol.....	NE	-
Styrene.....	NE	-
Tri-butyl phosphate.....	NE	-
Other organophosphates.....	NE	-
Vinyl chloride.....	NE	-
Arsenic.....	= 0	-
Barium.....	NE	-
Boron.....	= 0	-
Boron (in Boral).....	NE	-
Boron (non-Boral).....	NE	-
Cadmium.....	= 0	-
Caesium.....	NE	-
Selenium.....	= 0	-
Chromium.....	= 0	-
Molybdenum.....	= 0	-
Thallium.....	NE	-
Tin.....	= 0	-
Vanadium.....	= 0	-
Mercury compounds.....	= 0.35	-
Others.....	NE	-

Complexing agents (%wt):

Not yet determined

	(%wt)	Type(s) and comment
EDTA.....	NE	-
DPTA.....	NE	-
NTA.....	NE	-
Polycarboxylic acids.....	NE	-
Other organic complexants.....	NE	The waste contains tributyl phosphate.
Total complexing agents.....	NE	-

Physical components:

	Number	Type(s) and comment
Sources.....	> 100	153 x sources : All LLW Liquid sources on site.
Electronic & Electrical Equipment (EEE)		-
EEE Type 1.....	0	-
EEE Type 2.....	0	-
EEE Type 3.....	0	-
EEE Type 4.....	0	-
EEE Type 5.....	0	-

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off-site	Stream volume %
Size reduction	Off-site	= 3.0
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	On-site	= 97.0
Encapsulation		
Polymer encapsulation		
Other physical treatment		
Other chemical treatment		
Containerisation		
Treatment not yet determined		
None		

Comments on planned treatments:

Solvents which are to be washed will produce ILW Aqueous fraction (5B360) and a LLW Solvent fraction (5B20). The aqueous fraction containing the higher activity will be processed through ADU Floc plant. The remaining "washed" solvent will be stabilised within Nochar, grouted in 200l drums, and disposed of to the LLW Disposal Facility. Current assumption is that Mercury will be processed in a dedicated Treatment Facility. Other contaminated oils and solvents will be disposed using off-site routes, mainly incineration.

Conditioning method:

Washed solvent will be stabilised within Nochar, grouted in 200l drums, and disposed of to the LLW Disposal Facility. Other contaminated oils and solvents will be disposed using off-site routes, mainly incineration.

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
Non IP-2 rated 1/2 Height ISO (DC02)	97.0	0.99	15.6	61	-

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/m ³	Start date
Expected to be consigned to a Near Site, Near Surface Disposal Facility (Scotland)	~ 97.0		
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	~ 3.0		
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: Not yet determined

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

RADIOACTIVITY

Source: The main source of the radioactivity is fission products and actinides associated with fuel reprocessing

Uncertainty: Specific activity is based on sample results from all IBCs contained within the LLW Oils store (now consigned off site). Oil and solvent arisings is also based on these samples. The accuracy of the arisings activity estimates is to within a factor of 10. Specific activity for this waste stream may be revised based on further characterisation studies.

Measurement of radioactivities: Arisings: using the same sample analysis (best available data)

Chemical form of radionuclides:

- H-3: Likely to be present as water.
- C-14: Likely to be present.
- Cl-36: Not known to be present.
- Se-79: -
- Tc-99: -
- I-129: Likely to be present.
- Ra: Not known to be present.
- Th: Not known to be present.
- U: Likely to be present
- Np: Likely to be present
- Pu: Likely to be present.

WASTE STREAM 5B20 Contaminated Solvent and Oils									
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			= 2.52E-10	C C 2	Gd 153				
Be 10					Ho 163				
C 14			= 4.82E-13	C C 2	Ho 166m			= 9.65E-17	C C 2
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					Ti 204				
Mn 54			= 9.24E-15	C C 2	Pb 205				
Fe 55			= 8.17E-13	C C 2	Pb 210			= 5.54E-14	C C 2
Co 60			= 5.83E-10	C C 2	Bi 208				
Ni 59			= 1.99E-15	C C 2	Bi 210m				
Ni 63			= 3.77E-12	C C 2	Po 210			= 5.05E-14	C C 2
Zn 65			= 3.05E-17	C C 2	Ra 223			= 2.73E-14	C C 2
Se 79					Ra 225			= 1.10E-15	C C 2
Kr 81					Ra 226			= 3.32E-13	C C 2
Kr 85			= 1.44E-15	C C 2	Ra 228			= 5.32E-11	C C 2
Rb 87					Ac 227			= 2.84E-14	C C 2
Sr 90			= 7.07E-06	C C 2	Th 227			= 2.73E-14	C C 2
Zr 93					Th 228			= 3.08E-10	C C 2
Nb 91					Th 229			= 1.11E-15	C C 2
Nb 92					Th 230			= 9.11E-12	C C 2
Nb 93m			= 8.65E-10	C C 2	Th 232			= 6.87E-11	C C 2
Nb 94			= 2.64E-15	C C 2	Th 234			= 6.65E-09	C C 2
Mo 93			= 8.88E-10	C C 2	Pa 231			= 3.16E-13	C C 2
Tc 97					Pa 233			= 4.75E-12	C C 2
Tc 99			= 1.86E-08	C C 2	U 232			= 2.91E-10	C C 2
Ru 106			= 5.62E-11	C C 2	U 233			= 1.95E-12	C C 2
Pd 107					U 234			= 1.65E-07	C C 2
Ag 108m			= 6.41E-13	C C 2	U 235			= 2.49E-09	C C 2
Ag 110m					U 236			= 1.60E-08	C C 2
Cd 109			= 2.77E-11	C C 2	U 238			= 6.65E-09	C C 2
Cd 113m			= 1.82E-17	C C 2	Np 237			= 4.84E-12	C C 2
Sn 119m					Pu 236				
Sn 121m			= 7.01E-12	C C 2	Pu 238			= 8.61E-06	C C 2
Sn 123					Pu 239			= 5.86E-07	C C 2
Sn 126					Pu 240			= 5.91E-07	C C 2
Sb 125			= 1.24E-09	C C 2	Pu 241			= 1.03E-05	C C 2
Sb 126					Pu 242			= 2.17E-13	C C 2
Te 125m			= 2.92E-10	C C 2	Am 241			= 2.53E-06	C C 2
Te 127m					Am 242m			= 1.14E-07	C C 2
I 129					Am 243			= 3.66E-09	C C 2
Cs 134			= 6.49E-10	C C 2	Cm 242			= 9.55E-08	C C 2
Cs 135					Cm 243			= 2.26E-08	C C 2
Cs 137			= 2.07E-05	C C 2	Cm 244			= 6.51E-08	C C 2
Ba 133			= 6.82E-12	C C 2	Cm 245				
La 137					Cm 246				
La 138					Cm 248				
Ce 144			= 3.20E-15	C C 2	Cf 249				
Pm 145					Cf 250				
Pm 147			= 7.88E-08	C C 2	Cf 251				
Sm 147			= 7.57E-18	C C 2	Cf 252				
Sm 151			= 1.12E-06	C C 2	Unsp a				
Eu 152			= 1.19E-09	C C 2	Unsp b/g				
Eu 154			= 2.37E-07	C C 2	Total a	0	*	1.27E-05	*
Eu 155			= 2.22E-07	C C 2	Total b/g	0	*	3.99E-05	*

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