

WASTE STREAM	9D89	PWTP Fine Filters (LLW)
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Copper.....
 Lead.....
 Magnox/Magnesium.....
 Nickel.....
 Titanium.....
 Uranium.....
 Zinc.....
 Zircaloy/Zirconium.....
 Other metals.....

Organics (%wt): Traces of resin fines may be present on the filters. Rubbers are expected in small quantities but it has not been determined if these are halogenated.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulose.....	0		
Paper, cotton.....			
Wood.....	0		
Halogenated plastics	0		
Total non-halogenated plastics.....	0		
Condensation polymers.....			
Others.....	0		
Organic ion exchange materials....	0.68	Upper bound. Allows for 1% of estimated weight of fine filters to be anion and cation resin trapped within filter assemblage on Stage 1 filters.	
Total rubber.....	~1.0		
Halogenated rubber	~1.0		
Non-halogenated rubber.....	NE		
Hydrocarbons.....			
Oil or grease			
Fuel.....			
Asphalt/Tarmac (cont.coal tar)...			
Asphalt/Tarmac (no coal tar)....			
Bitumen.....			
Others.....			
Other organics.....	0		

Other materials (%wt): Other materials may include fibreglass (~15% 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.....	~15.1	glass fibre - Allows for ~1.8 kg of	

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pleated glass fibre filter media on each Stage 2 or 3 filter

Graphite.....
 Desiccants/Catalysts.....
 Asbestos..... 0
 Non/low friable.....
 Moderately friable.....
 Highly friable.....
 Free aqueous liquids.....
 Free non-aqueous liquids.....
 Powder/Ash.....

Inorganic anions (%wt): Traces of salts from drying out of the held moisture will be present. Silicate will be present in the filter medium.

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

Materials of interest for waste acceptance criteria: No materials likely to pose a fire or other non-radiological hazard have been identified.

	(%wt)	Type(s) and comment
Combustible metals.....		
Low flash point liquids.....		
Explosive materials.....		
Phosphorus.....		
Hydrides.....		
Biological etc. materials.....		
Biodegradable materials.....	22.0	
Putrescible wastes.....		
Non-putrescible wastes.....	22.0	
Corrosive materials.....		
Pyrophoric materials.....		
Generating toxic gases.....		
Reacting with water.....		
Higher activity particles.....		
Soluble solids as bulk chemical compounds.....		

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Hazardous substances /
non hazardous pollutants: -

	(%wt)	Type(s) and comment
Acrylamide.....		
Benzene.....		
Chlorinated solvents.....		
Formaldehyde.....		
Organometallics.....		
Phenol.....		
Styrene.....		
Tri-butyl phosphate.....		
Other organophosphates.....		
Vinyl chloride.....		
Arsenic.....		
Barium.....		
Boron.....	0.23	
Boron (in Boral).....		
Boron (non-Boral).....	0.23	Conservative assessment of boron content in glass fibre media associated with Stage 2 and 3 filters.
Cadmium.....		
Caesium.....		
Selenium.....		
Chromium.....		
Molybdenum.....		
Thallium.....		
Tin.....		
Vanadium.....		
Mercury compounds.....		
Others.....		
Electronic Electrical Equipment (EEE)		
EEE Type 1.....		
EEE Type 2.....		
EEE Type 3.....		
EEE Type 4.....		
EEE Type 5.....		

Complexing agents (%wt): No

	(%wt)	Type(s) and comment
EDTA.....		
DPTA.....		
NTA.....		
Polycarboxylic acids.....		
Other organic complexants.....		

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Total complexing agents..... 0

Potential for the waste to contain discrete items: Yes. Stainless Steel so DI by definition

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off site	Stream volume %
Low force compaction Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recycling / reuse Other / various None		100.0

Comment on planned treatments:

It is proposed that fine filters will be removed from their storage drums and placed within HHISO containers for direct disposal to LLWR. It is not practicable for fine filters to be consigned via any of the available diversion routes offered by LLWR.

Disposal Routes:

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository Expected to be consigned to a Landfill Facility Expected to be consigned to an On-Site Disposal Facility Expected to be consigned to an Incineration Facility Expected to be consigned to a Metal Treatment Facility Expected to be consigned as Out of Scope Expected to be recycled / reused Disposal route not known	100.0	0.53

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

Upcoming (2022/23-2024/25) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2022/23	2023/24	2024/25
Expected to be consigned to the LLW Repository Expected to be consigned to a Landfill Facility Expected to be consigned to an On-Site Disposal Facility Expected to be consigned to an Incineration Facility Expected to be consigned to a Metal Treatment Facility Expected to be consigned as Out of Scope Expected to be recycled / reused Disposal route not known			

Opportunities for alternative disposal routing: -

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

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Waste Packaging for Disposal:

Container	Stream volume %	Waste loading m ³	Number of packages
1/3 Height IP-1 ISO 2/3 Height IP-2 ISO 1/2 Height WAMAC IP-2 ISO 1/2 Height IP-2 Disposal/Re-usable ISO 2m box (no shielding) 4m box (no shielding) Other	100.0	10	< 1

Other information: -

Waste Planned for Disposal at the LLW Repository:

Container voidage: -

Waste Characterisation Form (WCH): The waste meets the LLWR's Waste Acceptance Criteria (WAC).
The waste has a current WCH.
Inventory information is consistent with the current WCH.

Waste consigned for disposal to LLWR in year of generation: No. it is unclear at this time when the waste will be sent for disposal

Non-Containerised Waste for In-Vault Grouting: (Not applicable to this waste stream)

Stream volume (%): -

Waste stream variation: -

Bounding cuboidal volume:

Inaccessible voidage: -

Other information: -

RADIOACTIVITY

Source: -

Uncertainty: -

Definition of total alpha and total beta/gamma: Where totals are shown on the table of radionuclide activities they are the sums of the listed alpha or beta/gamma emitting radionuclides plus 'other alpha' or 'other beta/gamma'.

Measurement of radioactivities: Data taken from PROG/HPA/SIPA/0007 (Issue 2). Note, data for stocks derived by scaling measured Co-60 and Cs-137 activities in all the LLW filters derived from the segregation campaign to that for 9D72. Arisings assumed to be same as stocks given time elapsed since ceasing generation. Th-234 set equal to U-238 activity as assumed to be in secular equilibrium with parent.

Other information: -

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Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3	4.82E-05	CC 2	4.82E-05	CC 2	Gd 153		8		8
Be 10		8		8	Ho 163		8		8
C 14	2.95E-05	CC 2	2.95E-05	CC 2	Ho 166m		8		8
Na 22		8		8	Tm 170		8		8
Al 26		8		8	Tm 171		8		8
Cl 36		8		8	Lu 174		8		8
Ar 39		8		8	Lu 176		8		8
Ar 42		8		8	Hf 178n		8		8
K 40		8		8	Hf 182		8		8
Ca 41		8		8	Pt 193		8		8
Mn 53		8		8	Tl 204		8		8
Mn 54		8		8	Pb 205		8		8
Fe 55	<4.05E-07	C 3	<4.05E-07	C 3	Pb 210		8		8
Co 60	1.26E-05	CC 2	1.26E-05	CC 2	Bi 208		8		8
Ni 59		8		8	Bi 210m		8		8
Ni 63	4.5E-05	CC 2	4.5E-05	CC 2	Po 210		8		8
Zn 65		8		8	Ra 223		8		8
Se 79		8		8	Ra 225		8		8
Kr 81		8		8	Ra 226		8		8
Kr 85		8		8	Ra 228		8		8
Rb 87		8		8	Ac 227		8		8
Sr 90	2.55E-04	CC 2	2.55E-04	CC 2	Th 227		8		8
Zr 93		8		8	Th 228		8		8
Nb 91		8		8	Th 229		8		8
Nb 92		8		8	Th 230		8		8
Nb 93m		8		8	Th 232		8		8
Nb 94		8		8	Th 234	6.74E-08	CC 2	6.74E-08	CC 2
Mo 93		8		8	Pa 231		8		8
Tc 97		8		8	Pa 233		8		8
Tc 99	4.25E-06	CC 2	4.25E-06	CC 2	U 232		8		8
Ru 106		8		8	U 233		8		8
Pd 107		8		8	U 234	5.96E-08	CC 2	5.96E-08	CC 2
Ag 108m		8		8	U 235	1.8E-09	CC 2	1.8E-09	CC 2
Ag 110m		8		8	U 236	7.21E-09	CC 2	7.21E-09	CC 2
Cd 109		8		8	U 238	6.74E-08	CC 2	6.74E-08	CC 2
Cd 113m		8		8	Np 237		8		8
Sn 119m		8		8	Pu 236		8		8
Sn 121m		8		8	Pu 238	1.42E-05	CC 2	1.42E-05	CC 2
Sn 123		8		8	Pu 239	1.82E-05	CC 2	1.82E-05	CC 2
Sn 126		8		8	Pu 240	1.82E-05	CC 2	1.82E-05	CC 2
Sb 125		8		8	Pu 241	3.08E-04	CC 2	3.08E-04	CC 2
Sb 126		8		8	Pu 242		8		8
Te 125m		8		8	Am 241	9.47E-05	CC 2	9.47E-05	CC 2
Te 127m		8		8	Am 242m		8		8
I 129		8		8	Am 243		8		8
Cs 134	6.8E-08	CC 2	6.8E-08	CC 2	Cm 242		8	3.09E-10	CC 2
Cs 135		8		8	Cm 243	1.37E-08	CC 2	1.37E-08	CC 2
Cs 137	3.91E-04	CC 2	3.91E-04	CC 2	Cm 244	8.73E-07	CC 2	8.73E-07	CC 2
Ba 133		8		8	Cm 245		8		8
La 137		8		8	Cm 246		8		8
La 138		8		8	Cm 248		8		8
Ce 144		8		8	Cf 249		8		8
Pm 145		8		8	Cf 250		8		8
Pm 147	2.58E-07	CC 2	2.58E-07	CC 2	Cf 251		8		8
Sm 147		8		8	Cf 252		8		8
Sm 151	7.4E-06	CC 2	7.4E-06	CC 2	Other a				
Eu 152		8		8	Other b/g				
Eu 154	1.87E-05	CC 2	1.87E-05	CC 2	Total a	1.46E-04	CC 2	1.46E-04	CC 2
Eu 155	2.85E-06	CC 2	2.85E-06	CC 2	Total b/g	1.12E-03	CC 2	1.12E-03	CC 2

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 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