WASTE STREAM	9D89	PWTP Fine Filters (LLW)

SITE Hinkley Point A

SITE OWNER Nuclear Decommissioning Authority

WASTE CUSTODIAN Nuclear Restoration Services Ltd (NRS)

WASTE TYPE LLW

WASTE VOLUMES

		Reported (m^3)
Stocks:	At 1.4.2025	0.5
Future arisings:	1.4.2025 - 31.3.2030	1.0
Total future arisings:		**1.0**
Total waste volume:		**1.5**

OR

Conditioned (m^3)	Packaged (m^3)

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

Comment on arising rates: -

Additional information on quantities: -

Uncertainty factors on volumes:

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

WASTE SOURCE Cartridge filter elements from filtration of process liquors.

PHYSICAL CHARACTERISTICS

General description: Cartridge filter elements ~85cm long, ~15cm OD and ~9.5cm ID. Construction material filter media is fibreglass held in a steel frame. Unused filter weight is ~2kg. Typical weight after use, including retaining water and radioactive particulate is ~5kg. Stored in mild steel drums.

Changes since waste generated: -

Bulk density (t/m^3): = 0.43

Comment on density: -

CHEMICAL COMPOSITION

General description and components (%wt): Metal (51%), Biodegradable (non-putrescibles) (32%), Rubber (1%), Other organic (2%), Others including glass fibre media (14%)

Chemical state: Neutral

Sheet metal proportion / thickness: 40% of the waste is 200 litre mild steel drums with a typical wall thickness of 1-2 mm.

Metals and alloys (%wt):

	(%wt)	Type(s) / Grades(s) with proportions	% of total C14 activity
Stainless steel……	= 24.8	Stainless steel (SS) component derived from filters themselves (estimated value represents roundup to nearest 10 kg assuming SS content of Stage 1 and Stage 2/3 filters is just over~2 kg and 1 kg, respectively)	
Other ferrous metals……	= 26.3	Mild steel derived from IP2 drum containers	
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 cellulosics	0	-	
Paper, cotton		-	
Wood	= 0	-	
Halogenated plastics	= 0	-	
Total non-halogenated plastics	0	-	
Condensation polymers		-	
Others	= 0	-	
Organic ion exchange materials	= 1.6	Allows for ~200 g ion exchange resin trapped within the 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):

	(%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	= 14.1	Allows for ~1.8 kg of 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		-	

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

Inorganic anions (%wt):

	(%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:

	(%wt)	Type(s) and comment
Combustible metals		-
Low flash point liquids		-
Explosive materials		-
Phosphorus		-
Hydrides		-
Biological etc. materials		-
Biodegradable materials	32.0	-
Putrescible wastes		-
Non-putrescible wastes	= 32.0	-
Corrosive materials		-
Pyrophoric materials		-
Generating toxic gases		-
Reacting with water		-
Higher activity particles		-
Soluble solids as bulk chemical compounds		-

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		-

Complexing agents (%wt): No

	(%wt)	Type(s) and comment
EDTA		-
DPTA		-
NTA		-
Polycarboxylic acids		-
Other organic complexants		-
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		
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		= 100.0

Comments 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.

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 (m^3)	Payload (m^3)	Number of packages	Estimated start date for packaging
1/2 Height IP-2 Disposal/Re-usable ISO (TC01/TC02)	100.0	10.0	18.3	1	-

Range in container waste loading: -

Other information on packaging and conditioning: -

Conditioned density (t/m^3): -
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)			
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	= 100.0	0.53	
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: -

Uncertainty: -

Measurement of radioactivities: -

Chemical form of radionuclides:

H-3: Most tritium is expected to be present as water.
C-14: The chemical form of carbon 14 may be graphite
Cl-36: -
Se-79: The selenium content is insignificant.
Tc-99: The technetium content is insignificant
I-129: -
Ra: The radium isotope content is insignificant.
Th: The thorium isotope content is insignificant.
U: Chemical form of uranium isotopes may be uranium oxides.
Np: The chemical form of neptunium has not been determined.
Pu: Chemical form of plutonium isotopes may be plutonium oxides.

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Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code	Nuclide	Mean radioactivity, TBq/m³ Waste at 1.4.2025	Bands and Code	Future Arisings	Bands and Code
H 3	9.02E-05	C C 2	9.02E-05	C C 2	Gd 153		8		8
Be 10		8		8	Ho 163		8		8
C 14	6.52E-05	C C 2	6.52E-05	C C 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	4.18E-07	C C 2	4.18E-07	C C 2	Pb 210		8		8
Co 60	1.88E-05	C C 2	1.88E-05	C C 2	Bi 208		8		8
Ni 59		8		8	Bi 210m		8		8
Ni 63	9.76E-05	C C 2	9.76E-05	C C 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	8.92E-04	C C 2	8.92E-04	C C 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	4.88E-07	C C 2	4.88E-07	C C 2	Th 234	5.75E-07	C C 2	5.75E-07	C C 2
Mo 93		8		8	Pa 231		8		8
Tc 97		8		8	Pa 233		8		8
Tc 99	1.60E-05	C C 2	1.60E-05	C C 2	U 232		8		8
Ru 106		8		8	U 233		8		8
Pd 107		8		8	U 234	5.07E-07	C C 2	5.07E-07	C C 2
Ag 108m		8		8	U 235	1.60E-08	C C 2	1.60E-08	C C 2
Ag 110m		8		8	U 236	6.07E-08	C C 2	6.07E-08	C C 2
Cd 109		8		8	U 238	5.75E-07	C C 2	5.75E-07	C C 2
Cd 113m		8		8	Np 237		8		8
Sn 119m		8		8	Pu 236		8		8
Sn 121m		8		8	Pu 238	1.18E-04	C C 2	1.18E-04	C C 2
Sn 123		8		8	Pu 239	1.55E-04	C C 2	1.55E-04	C C 2
Sn 126		8		8	Pu 240	1.55E-04	C C 2	1.55E-04	C C 2
Sb 125		8		8	Pu 241	2.27E-03	C C 2	2.27E-03	C C 2
Sb 126		8		8	Pu 242		8		8
Te 125m		8		8	Am 241	8.14E-04	C C 2	8.14E-04	C C 2
Te 127m		8		8	Am 242m		8		8
I 129		8		8	Am 243		8		8
Cs 134	9.37E-08	C C 2	9.37E-08	C C 2	Cm 242		8		8
Cs 135		8		8	Cm 243	1.07E-07	C C 2	1.07E-07	C C 2
Cs 137	1.37E-03	C C 2	1.37E-03	C C 2	Cm 244	6.64E-06	C C 2	6.64E-06	C C 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	4.39E-07	C C 2	4.39E-07	C C 2	Cf 251		8		8
Sm 147		8		8	Cf 252		8		8
Sm 151	2.73E-05	C C 2	2.73E-05	C C 2	Unsp a				
Eu 152	6.69E-07	C C 2	6.69E-07	C C 2	Unsp b/g				
Eu 154	3.06E-05	C C 2	3.06E-05	C C 2	**Total a**	**1.25E-03**	*	**1.25E-03**	*
Eu 155	3.84E-06	C C 2	3.84E-06	C C 2	**Total b/g**	**4.88E-03**	*	**4.88E-03**	*

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