

WASTE STREAM**9C02/C****PWTP Ion Exchange Material**

	Titanium.....	
	Uranium.....	
	Zinc.....	NE
	Zircaloy/Zirconium.....	NE
	Other metals.....	NE
Organics (%wt):	Ion exchange resins include Lewatit DN (68%) and Duolite (32%).	
	Total cellulose.....	0
	Paper, cotton.....	0
	Wood.....	0
	Halogenated plastics	0
	Total non-halogenated plastics.....	0
	Condensation polymers.....	0
	Others.....	0
	Organic ion exchange materials....	~100.0
	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.....	NE
Other materials (%wt):	-	
	Inorganic ion exchange materials.	NE
	Inorganic sludges and flocs.....	NE
	Soil.....	0
	Brick/Stone/Rubble.....	0
	Cementitious material.....	0
	Sand.....	
	Glass/Ceramics.....	0
	Graphite.....	0
	Desiccants/Catalysts.....	
	Asbestos.....	0
	Non/low friable.....	
	Moderately friable.....	
	Highly friable.....	
	Free aqueous liquids.....	0
	Free non-aqueous liquids.....	0
	Powder/Ash.....	0
Inorganic anions (%wt):	Not fully assessed.	

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Fluoride.....	NE
Chloride.....	NE
Iodide.....	NE
Cyanide.....	0
Carbonate.....	NE
Nitrate.....	NE
Nitrite.....	NE
Phosphate.....	NE
Sulphate.....	NE
Sulphide.....	NE

Materials of interest for
waste acceptance criteria:

No materials likely to pose a fire or other non-radiological hazard have been identified.

Combustible metals.....	0
Low flash point liquids.....	0
Explosive materials.....	0
Phosphorus.....	0
Hydrides.....	0
Biological etc. materials.....	0
Biodegradable materials.....	
Putrescible wastes.....	0
Non-putrescible wastes.....	
Corrosive materials.....	0
Pyrophoric materials.....	0
Generating toxic gases.....	0
Reacting with water.....	0
Active particles.....	
Soluble solids as bulk chemical compounds.....	

Hazardous substances /
non hazardous pollutants:

-	
Acrylamide.....	
Benzene.....	
Chlorinated solvents.....	
Formaldehyde.....	
Organometallics.....	
Phenol.....	
Styrene.....	
Tri-butyl phosphate.....	
Other organophosphates.....	
Vinyl chloride.....	
Arsenic.....	
Barium.....	
Boron.....	

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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):

EDTA.....
 DPTA.....
 NTA.....
 Polycarboxylic acids.....
 Other organic complexants.....
 Total complexing agents..... TR

PACKAGING AND CONDITIONING

Container type:	Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
	500 l RS drum (0mm Pb)	100.0	0.388	0.3875	45

Container type comment: -

Range in container waste volume: -

Other information on containers: -

Conditioned density (t/m³): -

Conditioned density comment: -

Other information on conditioning: -

RADIOACTIVITY

Source: Spent ion exchange resins arising from the treatment of pond water. Resins are used to remove caesium from fuel pond water. There will be contamination by other fission products, actinides and activation products.

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

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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:

-

Other information:

-

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Nuclide	Mean radioactivity, TBq/m ³				Nuclide	Mean radioactivity, TBq/m ³			
	Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code		Waste at 1.4.2019	Bands and Code	Future arisings	Bands and Code
H 3	5.02E-06	CC 2			Gd 153		8		
Be 10		8			Ho 163	1.06E-08	CC 2		
C 14	2.12E-06	CC 2			Ho 166m	3.27E-06	CC 2		
Na 22		8			Tm 170		8		
Al 26		8			Tm 171	8.98E-08	CC 2		
Cl 36	2.53E-09	CC 2			Lu 174	3.37E-09	CC 2		
Ar 39	4.37E-07	CC 2			Lu 176		8		
Ar 42		8			Hf 178n	6.57E-06	CC 2		
K 40		8			Hf 182		8		
Ca 41	1.11E-08	CC 2			Pt 193	5.16E-08	CC 2		
Mn 53		8			Tl 204	3.91E-06	CC 2		
Mn 54		8			Pb 205		8		
Fe 55	1.11E-06	CC 2			Pb 210		8		
Co 60	9.84E-06	BB 1			Bi 208		8		
Ni 59	3.8E-07	CC 2			Bi 210m		8		
Ni 63	1.17E-05	CC 2			Po 210		8		
Zn 65		8			Ra 223		8		
Se 79	1.1E-08	CC 2			Ra 225		8		
Kr 81	1.08E-09	CC 2			Ra 226		8		
Kr 85	6.99E-04	CC 2			Ra 228		8		
Rb 87		8			Ac 227		8		
Sr 90	9.1E-02	BB 1			Th 227		8		
Zr 93	5.41E-07	CC 2			Th 228	1.68E-09	CC 2		
Nb 91		8			Th 229		8		
Nb 92		8			Th 230		8		
Nb 93m	1.54E-06	CC 2			Th 232		8		
Nb 94	1.28E-07	CC 2			Th 234	3.17E-07	CC 2		
Mo 93	7.54E-09	CC 2			Pa 231		8		
Tc 97		8			Pa 233	3.29E-08	CC 2		
Tc 99	1.42E-06	CC 2			U 232	1.64E-09	CC 2		
Ru 106	1.51E-08	CC 2			U 233	3.17E-09	CC 2		
Pd 107	2.68E-08	CC 2			U 234	3.26E-07	CC 2		
Ag 108m	5.25E-08	CC 2			U 235	2.06E-08	CC 2		
Ag 110m		8			U 236	7.6E-08	CC 2		
Cd 109		8			U 238	3.17E-07	CC 2		
Cd 113m	2.06E-06	CC 2			Np 237	3.3E-08	CC 2		
Sn 119m		8			Pu 236		8		
Sn 121m	5.38E-06	CC 2			Pu 238	9.32E-05	BB 1		
Sn 123		8			Pu 239	7.62E-05	BB 1		
Sn 126	9.98E-08	CC 2			Pu 240	7.56E-05	BB 1		
Sb 125	1.03E-05	CC 2			Pu 241	3.84E-03	BB 1		
Sb 126	1.4E-08	CC 2			Pu 242	1.37E-07	CC 2		
Te 125m	2.58E-06	CC 2			Am 241	2.77E-04	BB 1		
Te 127m		8			Am 242m	8.86E-07	CC 2		
I 129	9.3E-09	CC 2			Am 243	2.58E-07	CC 2		
Cs 134	1.7E-03	BB 1			Cm 242	7.31E-07	CC 2		
Cs 135	2.14E-05	CC 2			Cm 243	2.71E-07	BB 1		
Cs 137	1.93E+00	CC 2			Cm 244	4.32E-06	BB 1		
Ba 133	1.94E-07	CC 2			Cm 245		8		
La 137		8			Cm 246		8		
La 138		8			Cm 248		8		
Ce 144		8			Cf 249		8		
Pm 145		8			Cf 250		8		
Pm 147	1.67E-04	CC 2			Cf 251		8		
Sm 147		8			Cf 252		8		
Sm 151	1.23E-04	CC 2			Other a				
Eu 152	2.53E-07	CC 2			Other b/g				
Eu 154	3.74E-05	BB 1			Total a	5.29E-04	CC 2	0	
Eu 155	2.3E-05	CC 2			Total b/g	2.03E+00	CC 2	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 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