

WASTE STREAM

2F21/C

Encapsulated Maintenance Scrap

Stainless steel.....	13.0	Grades 316L and 304.
Other ferrous metals.....	11.0	Tool steel, mild steel.
Iron.....		
Aluminium.....	0	
Beryllium.....	TR	
Cobalt.....	0	
Copper.....	0	
Lead.....	0	
Magnox/Magnesium.....	0	
Nickel.....	0	
Titanium.....		
Uranium.....	<0.01	
Zinc.....	0	
Zircaloy/Zirconium.....	TR	
Other metals.....	0	

Organics (%wt):

There are no organic materials present except for nylon and polyurethane or hydrogenated nitrile rubber (from grout pigs) in very small amounts in drums of encapsulated product. Hydrogenated nitrile rubber and /or polyurethane.

Total cellulosics.....	0
Paper, cotton.....	0
Wood.....	0
Halogenated plastics	TR
Total non-halogenated plastics.....	TR
Condensation polymers.....	TR
Others.....	0
Organic ion exchange materials....	0
Total rubber.....	TR
Halogenated rubber	0
Non-halogenated rubber.....	TR
Hydrocarbons.....	
Oil or grease	
Fuel.....	
Asphalt/Tarmac (cont.coal tar)...	
Asphalt/Tarmac (no coal tar)....	
Bitumen.....	
Others.....	
Other organics.....	0

Other materials (%wt):

Matrix grout makes approx 76% of immobilised package.	
Inorganic ion exchange materials.	0
Inorganic sludges and flocs.....	0
Soil.....	0
Brick/Stone/Rubble.....	0
Cementitious material.....	76.0

WASTE STREAM

2F21/C

Encapsulated Maintenance Scrap

	Sand.....	0	No sand is present in encapsulation grout.
	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):	Anions are mostly nitrates, others may be present.		
	Fluoride.....	NE	
	Chloride.....	NE	
	Iodide.....	NE	
	Cyanide.....	NE	
	Carbonate.....	NE	
	Nitrate.....	P	
	Nitrite.....	TR	
	Phosphate.....	NE	
	Sulphate.....	NE	
	Sulphide.....	NE	
Materials of interest for waste acceptance criteria:	Small quantities of Zircaloy fines will be present on some items, but will not constitute a hazard.		
	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	
	Active particles.....	P	Small fraction immobilised in grout.
	Soluble solids as bulk chemical compounds.....	P	Some calcium compounds from grout.

WASTE STREAM**2F21/C****Encapsulated Maintenance Scrap**Hazardous substances /
non hazardous pollutants:

Toxic metals are not expected to be present.

Acrylamide.....

Benzene..... 0

Chlorinated solvents.....

Formaldehyde.....

Organometallics.....

Phenol..... 0

Styrene.....

Tri-butyl phosphate..... 0

Other organophosphates.....

Vinyl chloride..... 0

Arsenic..... 0

Barium.....

Boron..... 0

Cadmium..... 0

Caesium.....

Selenium..... 0

Chromium..... P

Small amount present in
encapsulation grout OPC.

Molybdenum..... 0

Thallium.....

Tin..... P

Trace amount in encapsulation
grout OPC.

Vanadium..... 0

Mercury compounds.....

Others..... 0

Electronic Electrical Equipment (EEE)

EEE Type 1.....

EEE Type 2.....

EEE Type 3.....

EEE Type 4.....

EEE Type 5.....

Complexing agents (%wt):

No

EDTA.....

DPTA.....

NTA.....

Polycarboxylic acids.....

Other organic complexants..... 0

No complexing agents are
present.

Total complexing agents..... 0

PACKAGING AND CONDITIONING

WASTE STREAM	2F21/C	Encapsulated Maintenance Scrap
---------------------	---------------	---------------------------------------

Container type:	Container	Waste packaged (%vol)	Waste loading (m ³)	Payload (m ³)	Number of packages
	500 l drum	100.0	0.5	0.5	246

Container type comment: Conditioning factor is 1, packaging factor is 1.14.

Range in container waste volume: Volume will be dependant on items in drum prior to conditioning, however, optimum packing fraction will be attempted in all cases.

Other information on containers: 500 litre 3mm stainless steel drums (1192mm x 800mm) fitted with a lid that contains a filter.

Conditioned density (t/m³): ~2.6

Conditioned density comment: -

Other information on conditioning: The waste is already conditioned.

RADIOACTIVITY

Source: The main source of activity is fuel dust contamination.

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: The activities are calculated.

Other information: Other alpha and other beta/gamma not specified.

WASTE STREAM

2F21/C

Encapsulated Maintenance Scrap

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		5	Gd 153				
Be 10					Ho 163				
C 14					Ho 166m				
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					Tl 204				
Mn 54					Pb 205				
Fe 55					Pb 210		5		
Co 60					Bi 208				
Ni 59					Bi 210m				
Ni 63					Po 210		5		
Zn 65					Ra 223		5		
Se 79		5		5	Ra 225		5		
Kr 81					Ra 226		5		
Kr 85					Ra 228		5		
Rb 87					Ac 227		5		
Sr 90	7.10E-02	CC 2	1.00E-01	CC 2	Th 227		5		
Zr 93		5		5	Th 228		5		
Nb 91					Th 229		5		
Nb 92					Th 230		5		5
Nb 93m		5		5	Th 232		5		
Nb 94		5		5	Th 234		5		
Mo 93					Pa 231				5
Tc 97					Pa 233	1.96E-08	CC 2		
Tc 99		5		5	U 232				
Ru 106	4.87E-05	CC 2	9.00E-04	CC 2	U 233		5		5
Pd 107		5		5	U 234	1.58E-07	CC 2		5
Ag 108m		5		5	U 235		5		5
Ag 110m					U 236	4.46E-10	CC 2		5
Cd 109					U 238		5		5
Cd 113m					Np 237	1.98E-08	CC 2		5
Sn 119m					Pu 236				
Sn 121m					Pu 238	3.55E-03	CC 2	4.00E-03	CC 2
Sn 123					Pu 239	8.00E-04	CC 2	8.00E-04	CC 2
Sn 126	1.00E-06	CC 2	1.00E-06	CC 2	Pu 240	1.00E-03	CC 2	1.00E-03	CC 2
Sb 125					Pu 241	5.18E-02	CC 2	1.00E-01	CC 2
Sb 126	1.40E-07	CC 2			Pu 242	3.00E-06	CC 2	3.00E-06	CC 2
Te 125m					Am 241	4.51E-03	CC 2	3.00E-03	CC 2
Te 127m					Am 242m	9.29E-06	CC 2	1.00E-05	CC 2
I 129		5		5	Am 243	2.00E-05	CC 2	2.00E-05	CC 2
Cs 134	7.97E-04	CC 2	8.00E-03	CC 2	Cm 242	7.71E-06	CC 2	1.00E-05	CC 2
Cs 135		5		5	Cm 243	1.44E-05	CC 2	2.00E-05	CC 2
Cs 137	1.44E-01	CC 2	2.00E-01	CC 2	Cm 244	5.85E-04	CC 2	1.00E-03	CC 2
Ba 133					Cm 245		5		5
La 137					Cm 246		5		5
La 138					Cm 248				
Ce 144		5		5	Cf 249				
Pm 145					Cf 250				
Pm 147	2.44E-03	CC 2	2.00E-02	CC 2	Cf 251				
Sm 147		5			Cf 252				
Sm 151		5		5	Other a	1.00E-03	CC 2	1.00E-03	CC 2
Eu 152	3.47E-06	CC 2	7.00E-06	CC 2	Other b/g				
Eu 154	2.16E-03	CC 2	6.00E-03	CC 2	Total a	1.15E-02	CC 2	1.09E-02	CC 2
Eu 155	6.53E-04	CC 2	3.00E-03	CC 2	Total b/g	2.73E-01	CC 2	4.38E-01	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