

WASTE STREAM**2C925****Chapelcross Processing Plant Dismantling LLW**

	Magnox/Magnesium.....	0	
	Nickel.....		
	Titanium.....		
	Uranium.....		
	Zinc.....	0	
	Zircaloy/Zirconium.....	0	
	Other metals.....	0	
Organics (%wt):	-		
	Total cellulosics.....	7.0	
	Paper, cotton.....	0	
	Wood.....	7.0	
	Halogenated plastics	0	
	Total non-halogenated plastics.....	32.0	
	Condensation polymers.....	16.0	
	Others.....	16.0	
	Organic ion exchange materials....	0	
	Total rubber.....	33.0	
	Halogenated rubber	16.5	
	Non-halogenated rubber.....	16.5	
	Hydrocarbons.....		
	Oil or grease		
	Fuel.....		
	Asphalt/Tarmac (cont.coal tar)...		
	Asphalt/Tarmac (no coal tar)....		
	Bitumen.....		
	Others.....		
	Other organics.....	19.0	
Other materials (%wt):	-		
	Inorganic ion exchange materials.	0	
	Inorganic sludges and flocs.....	0	
	Soil.....	1.0	
	Brick/Stone/Rubble.....	0	
	Cementitious material.....	~1.0	
	Sand.....		
	Glass/Ceramics.....	1.0	Glass fibre sections of filters
	Graphite.....	0	
	Desiccants/Catalysts.....		
	Asbestos.....	0	
	Non/low friable.....		
	Moderately friable.....		
	Highly friable.....		
	Free aqueous liquids.....	0	
	Free non-aqueous liquids.....	0	

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	Powder/Ash.....	0
Inorganic anions (%wt):	-	
	Fluoride.....	NE
	Chloride.....	NE
	Iodide.....	NE
	Cyanide.....	NE
	Carbonate.....	NE
	Nitrate.....	NE
	Nitrite.....	NE
	Phosphate.....	NE
	Sulphate.....	NE
	Sulphide.....	NE
Materials of interest for waste acceptance criteria:	-	
	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:	None expected.	
	Acrylamide.....	
	Benzene.....	
	Chlorinated solvents.....	
	Formaldehyde.....	
	Organometallics.....	
	Phenol.....	
	Styrene.....	
	Tri-butyl phosphate.....	
	Other organophosphates.....	
	Vinyl chloride.....	
	Arsenic.....	

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Barium.....
 Boron.....
 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..... NE

TREATMENT, PACKAGING AND DISPOSAL

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

Treatment	On-site / Off site	Stream volume %
Low force compaction Supercompaction (HFC)	Off-site	25.0
Incineration Solidification		
Decontamination Metal treatment	Off-site	5.0
Size reduction Decay storage		
Recycling / reuse Other / various		
None		70.0

Comment on planned treatments:

It is expected that 50% of this waste stream will be sent to Landfill as VLLW.

WASTE STREAM**2C925****Chapelcross Processing Plant Dismantling LLW****Disposal Routes:**

Disposal Route	Stream volume %
Expected to be consigned to the LLW Repository	20.0
Expected to be consigned to a Landfill Facility	50.0
Expected to be consigned to an On-Site Disposal Facility	
Expected to be consigned to an Incineration Facility	25.0
Expected to be consigned to a Metal Treatment Facility	5.0
Expected to be consigned as Out of Scope	
Expected to be recycled / reused	
Disposal route not known	

Upcoming (2019/20-2021/22) Waste Routing (if expected to change from above):

Disposal Route	Stream volume %		
	2019/20	2020/21	2021/22
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			

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	~20.0	~10	54
2m box (no shielding)			
4m box (no shielding)			
Other			

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.

Waste consigned for disposal to LLWR in year of generation: -

Potential for the waste to contain discrete items: -

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

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Source:	Activation and contamination of materials.
Uncertainty:	Activity values are current best estimates. Specific activity is a function of operating history. The values are indicative of the activities that would be expected.
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:	Ref: WCH: 1MXN-1CHA-0-WCH-0-4200 decayed to stock reference date of 01/04/2019 (2 years) and start date of first arising (01/04/2023).
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	6.31E-03	CC 1	5.04E-03	CC 1	Gd 153		8		8
Be 10		8		8	Ho 163		8		8
C 14	1.13E-05	CC 1	1.13E-05	CC 1	Ho 166m		8		8
Na 22		8		8	Tm 170		8		8
Al 26		8		8	Tm 171		8		8
Cl 36	1.42E-09	CC 2	1.42E-09	CC 2	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	7.17E-06	CC 1	2.6E-06	CC 1	Pb 210		8		8
Co 60	3.63E-06	CC 2	2.15E-06	CC 2	Bi 208		8		8
Ni 59		8		8	Bi 210m		8		8
Ni 63	1.07E-05	CC 1	1.04E-05	CC 1	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	2.23E-07	CC 2	2.03E-07	CC 2	Th 227		8		8
Zr 93		8		8	Th 228	2.8E-08	CC 2	4.68E-08	CC 2
Nb 91		8		8	Th 229		8		8
Nb 92		8		8	Th 230	2.29E-07	CC 2	2.29E-07	CC 2
Nb 93m		8		8	Th 232		8		8
Nb 94		8		8	Th 234	6.06E-08	CC 2	6.06E-08	CC 2
Mo 93		8		8	Pa 231		8		8
Tc 97		8		8	Pa 233		8		8
Tc 99	1.52E-06	CC 1	1.52E-06	CC 1	U 232	5.38E-08	CC 2	5.17E-08	CC 2
Ru 106		8		8	U 233		8		8
Pd 107		8		8	U 234	3.14E-08	CC 2	3.14E-08	CC 2
Ag 108m		8		8	U 235	4E-09	CC 2	4E-09	CC 2
Ag 110m		8		8	U 236		8		8
Cd 109	1.7E-08	CC 2	1.91E-09	CC 2	U 238	6.06E-08	CC 2	6.06E-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	1.41E-08	CC 2	1.36E-08	CC 2
Sn 123		8		8	Pu 239	1.38E-09	CC 2	1.38E-09	CC 2
Sn 126		8		8	Pu 240	1.75E-09	CC 2	1.75E-09	CC 2
Sb 125	5.4E-09	CC 2	1.98E-09	CC 2	Pu 241	1.75E-06	CC 2	1.45E-06	CC 2
Sb 126		8		8	Pu 242		8		8
Te 125m	1.35E-09	CC 2		8	Am 241	3.95E-08	CC 2	4.94E-08	CC 2
Te 127m		8		8	Am 242m		8		8
I 129		8		8	Am 243		8		8
Cs 134	1.45E-09	CC 2		8	Cm 242		8		8
Cs 135		8		8	Cm 243		8		8
Cs 137	2.6E-06	CC 2	2.37E-06	CC 2	Cm 244		8		8
Ba 133	3.44E-09	CC 2	2.65E-09	CC 2	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	4.03E-07	CC 2	1.4E-07	CC 2	Cf 251		8		8
Sm 147		8		8	Cf 252		8		8
Sm 151	8.2E-09	CC 2	7.95E-09	CC 2	Other a				
Eu 152	1.64E-08	CC 2	1.34E-08	CC 2	Other b/g				
Eu 154	6.45E-09	CC 2	4.67E-09	CC 2	Total a	4.64E-07	CC 2	4.90E-07	CC 2
Eu 155	1.63E-08	CC 2	9.2E-09	CC 2	Total b/g	6.35E-03	CC 2	5.07E-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