SITE Hartlepool

SITE OWNER **EDFE NGL**

WASTE CUSTODIAN EDFE NGL

LLW **WASTE TYPE**

Is the waste subject to

Scottish Policy:

WASTE VOLUMES Reported

Nο

At 1.4.2022..... Stocks: 1.6 m³

4.8 m³ Future arisings -1.4.2022 - 31.3.2024...... 1.4.2024 - 31.3.2026...... 4.8 m³

> 24.0 m³ 1.4.2026 - 31.3.2036......

Total future arisings: 33.6 m³ Total waste volume: 35.2 m³

Comment on volumes: Waste volumes will be variable depending on station operating conditions.

Uncertainty factors on Stock (upper): x 1.25 Arisings (upper) x 1.75 volumes: Stock (lower): x 0.75 Arisings (lower) x 0.25

WASTE SOURCE Waste stream covers general solid LLW arisings from laundry that is too damaged or dirty

to reuse. The laundry is done off-site by a specialist contractor.

PHYSICAL CHARACTERISTICS

General description: The waste includes general soft trash waste including cloth, heavy duty plastic and rubber

waste. Solid waste consists of used personal protective clothing, such as gloves, shoes and coats. The site does undertake volume reduction by low force compaction and shredding, this is principally to incinerable waste. Any free liquids present will be removed

as far as practicable during the sorting process.

Metal (23%), biodegradable non-putrescibles (23%), plastics (38%), rubber (16%) Physical components (%wt):

The waste does not contain sealed sources. Sealed sources:

Bulk density (t/m³):

Comment on density: Waste density is an estimate based on average of current arisings.

CHEMICAL COMPOSITION

General description and components (%wt):

Mild steel (23%), biodegradable non-putrescibles (23%), plastics (38%), rubber (16%)

Chemical state: Neutral

Chemical form of H-3: Contamination be tritiated water

radionuclides: C-14: Activated Graphite

CI-36: Not Assessed Se-79: Not Assessed Tc-99: Not Assessed I-129: Not Assessed Ra: Not Assessed Th: Not Assessed U: Not Assessed Np: Not Assessed Pu: Not Assessed

Metals and alloys (%wt): This waste stream contains mild steel drums only, unlikely to contain sheet metal. ~23%

mild steel-drums

	(%wt)	Type(s) / Grade(s) with proportions	% of total C14
Stainless steel	NE		activity
Other ferrous metals	~23.0	Mild steel-drums	
Iron	NE		
Aluminium	NE		
Beryllium	NE		
Cobalt	NE		
Copper	NE		
Lead	NE		
Magnox/Magnesium	. NE		
Nickel	NE		
Titanium	NE		
Uranium	NE		
Zinc	NE		
Zircaloy/Zirconium	NE		
Other metals	NE		
Organics (%wt): The waste is known ~77% of total weigh		organic materials in the form of rubber ar	nd plastic. Organics
	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics	~23.0		activity
Paper, cotton	~23.0	biodegradable- non putrescibles	
Wood			
	NE		
Halogenated plastics	NE ∼7.0		
Halogenated plastics Total non-halogenated plastics			
	~7.0		
Total non-halogenated plastics	~7.0 ~31.0		
Total non-halogenated plastics Condensation polymers	~7.0 ~31.0 NE		
Total non-halogenated plastics Condensation polymers Others	~7.0 ~31.0 NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials	~7.0 ~31.0 NE NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber	~7.0 ~31.0 NE NE NE NE ~16.0		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber	~7.0 ~31.0 NE NE NE ~16.0 NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber	~7.0 ~31.0 NE NE NE ~16.0 NE	some items may be contaminated.	
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber Hydrocarbons	~7.0 ~31.0 NE NE NE ~16.0 NE NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber Hydrocarbons Oil or grease	~7.0 ~31.0 NE NE NE ~16.0 NE NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber Hydrocarbons Oil or grease	~7.0 ~31.0 NE NE NE ~16.0 NE NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber Hydrocarbons Oil or grease Fuel Asphalt/Tarmac (cont.coal tar)	~7.0 ~31.0 NE NE NE ~16.0 NE NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber Hydrocarbons Oil or grease Fuel Asphalt/Tarmac (cont.coal tar)	~7.0 ~31.0 NE NE NE ~16.0 NE NE NE		
Total non-halogenated plastics Condensation polymers Others Organic ion exchange materials Total rubber Halogenated rubber Non-halogenated rubber Hydrocarbons Oil or grease Fuel Asphalt/Tarmac (cont.coal tar) Asphalt/Tarmac (no coal tar) Bitumen	~7.0 ~31.0 NE NE NE ~16.0 NE NE NE		

	(%wt)	Type(s) and comment	% of total C14 activity
Inorganic ion exchange materials	0		
Inorganic sludges and flocs	0		
Soil	0		
Brick/Stone/Rubble	0		
Cementitious material	0		
Sand	0		
Glass/Ceramics	0		
Graphite	0		
Desiccants/Catalysts	0		
Asbestos	0		
Non/low friable			
Moderately friable			
Highly friable			
Free aqueous liquids	0		
Free non-aqueous liquids	0		
Powder/Ash	0		
Inorganic anions (%wt): Inorganic anions are	e likely to be	e present	
	(%wt)	Type(s) and comment	
Fluoride	NE		
Chloride	NE		
lodide	NE		
Cyanide	NE		
Carbonate	NE		
Nitrate	NE		
Nitrite	NE		
Phosphate	NE		
Sulphate	NE		
Sulphide	NE		
Materials of interest for waste acceptance criteria: Efforts are made to compaction.	remove any	hazardous materials from the waste during	sorting and
	(%wt)	Type(s) and comment	
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	~23.0	Biodegradable non-putrescible	

Corrosive materials	0	
Pyrophoric materials	0	
Generating toxic gases	0	
Reacting with water	0	
Higher activity particles	0	Not expected
Soluble solids as bulk chemical compounds	0	

Hazardous substances / non hazardous pollutants:

No hazardous materials are expected as efforts are made to remove all hazardous materials during sorting and compaction.

	(%wt)	Type(s) and comment
Acrylamide	NE	
Benzene	NE	
Chlorinated solvents	NE	
Formaldehyde	NE	
Organometallics	NE	
Phenol	NE	
Styrene	NE	
Tri-butyl phosphate	NE	
Other organophosphates	NE	
Vinyl chloride	NE	
Arsenic	NE	
Barium	NE	
Boron	NE	
Boron (in Boral)	NE	
Boron (non-Boral)	NE	
Cadmium	NE	
Caesium	NE	
Selenium	NE	
Chromium	NE	
Molybdenum	NE	
Thallium	NE	
Tin	NE	
Vanadium	NE	
Mercury compounds	0	
Others	NE	
Electronic Electrical Equipment (EEE)		
EEE Type 1	0	
EEE Type 2	0	
EEE Type 3	0	
EEE Type 4	0	
EEE Type 5	0	

Complexing agents (%wt): No

(%wt) Type(s) and comment

0

Potential for the waste to contain discrete items:

No.

Total complexing agents.....

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	~10.0
Incineration	Off-site	~90.0
Solidification		
Decontamination		
Metal treatment		
Size reduction		
Decay storage		
Recyling / reuse		
Other / various		
None		

Comment on planned treatments:

In line with the waste hierarchy, wastes will be treated preferentially by incineration, metal decontamination/melting, supercompaction, optimal packaging in HHISOs or immobilisation by encapsulation where necessary, prior to ultimate disposal at the LLW Repository. These treatments will be carried out off-site under contract with companies such as LLWR Ltd, Cyclife, Tradebe Inutec.

Disposal Routes:

Disposal Route	Stream volume %	Disposal density t/m3
Expected to be consigned to the LLW Repository	~10.0	
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	~90.0	
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		

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 %				
Disposal Noute	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 Opportunity Stream Date that Management Route Management Route volume (%) will be real	at Opportunity iity Confidence Comment
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Waste Packaging for Disposal:

Container	Stream volume %	Waste loading m³	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	10.0	~91.4	< 1

Other information: Waste loading is representative of the raw waste following further planned

treatments. Supercompaction assumed to reduce volume to 20% of original. Solidification assumed to increase volume to 300% of original. No treatment

results in the same volume.

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. Efforts are made to dispose of waste during year of arising, but this is dependent on rate of arising throughout the year. This is also dependent on

consignment of waste to third parties.

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: Contamination will be main source of activity.

Uncertainty: The total given in the WCH is pessimistic, but not considered overly conservative. The

waste for this stream is operational and on-going therefore the waste is variable.

Fingerprint has been based over the last three years, so there is uncertainty about future arisings. The data was scaled up to represent the lifetime of the WCH (multiplied by 5/2).

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 beta/gamma emitting radionuclides plus 'other beta/gamma' not listed on the

datasheet.

Measurement of radioactivities:

Estimated based on arisings and data in WCH. The total activity has been estimated by applying the fingerprint for the date of arisings. For consignments this will be decayed, but

the decay time will vary depending on the storage time for the waste.

The specific activity will vary at various times in the history of the plant. Other information:

WASTE STREAM Laundry LLW 3K26

	N	lean radioac	tivity, TBq/m³			Mean radioactivity, TBq/m³			
Nuclide	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code	Nuclide	Waste at 1.4.2022	Bands and Code	Future arisings	Bands and Code
H 3	1.34E-06	CC 2	1.34E-06	CC 2	Gd 153				
Be 10					Ho 163				
C 14	1.22E-07	CC 2	1.22E-07	CC 2	Ho 166m				
Na 22					Tm 170				
Al 26					Tm 171				
CI 36	1.25E-07	CC 2	1.25E-07	CC 2	Lu 174				
Ar 39					Lu 176				
Ar 42					Hf 178n				
K 40					Hf 182				
Ca 41					Pt 193				
Mn 53					TI 204				
Mn 54	6.58E-07	CC 2	6.58E-07	CC 2	Pb 205				
Fe 55	9.95E-06	CC 2	9.95E-06	CC 2	Pb 210				
Co 60	9.95E-07	CC 2	9.95E-07	CC 2	Bi 208				
Ni 59					Bi 210m				
Ni 63	1.09E-06	CC 2	1.09E-06	CC 2	Po 210				
Zn 65	2.46E-08	CC 2	2.46E-08	CC 2	Ra 223				
Se 79					Ra 225				
Kr 81					Ra 226				
Kr 85					Ra 228				
Rb 87					Ac 227				
Sr 90	8.46E-09	CC 2	8.46E-09	CC 2	Th 227				
Zr 93					Th 228				
Nb 91					Th 229				
Nb 92					Th 230				
Nb 93m					Th 232				
Nb 94	1.54E-09	CC 2	1.54E-09	CC 2	Th 234				
Mo 93					Pa 231				
Tc 97					Pa 233				
Tc 99					U 232				
Ru 106	5.05E-07	CC 2	5.05E-07	CC 2	U 233				
Pd 107					U 234				
Ag 108m	2.31E-09	CC 2	2.31E-09	CC 2	U 235 U 236				
Ag 110m	1.54E-09	CC 2	1.54E-09	CC 2	U 238				
Cd 109					Np 237				
Cd 113m					Pu 236				
Sn 119m					Pu 238				
Sn 121m					Pu 239				
Sn 123					Pu 240				
Sn 126					Pu 241	3.46E-07	CC 2	3.46E-07	CC 2
Sb 125	5.38E-09	CC 2	5.38E-09	CC 2	Pu 242	0.102 07	00 2	0.102 01	00 2
Sb 126					Am 241	7.69E-09	CC 2	7.69E-09	CC 2
Te 125m					Am 242m	7.002 00	00 2	11002 00	00 2
Te 127m					Am 243				
l 129	1 655 07	00 0	1 655 07	CC 2	Cm 242	2.31E-09	CC 2	2.31E-09	CC 2
Cs 134	1.65E-07	CC 2	1.65E-07	CC 2	Cm 243	0.2 00			
Cs 135	0.055.07	00 0	0.055.07	CC 2	Cm 244				
Cs 137	8.25E-07	CC 2 CC 2	8.25E-07	CC 2 CC 2	Cm 245				
Ba 133	2.31E-09	UU 2	2.31E-09	UU 2	Cm 246				
La 137					Cm 248				
La 138 Ce 144	2.46E-08	CC 2	2.46E-08	CC 2	Cf 249				
	2.40E-00	00 2	2.40E-08	00 2	Cf 250				
Pm 145	6 155 00	CC 2	6 155 00	CC 2	Cf 251				
Pm 147	6.15E-09	CC 2	6.15E-09	CC 2	Cf 252				
Sm 147					Other a				
Sm 151	4 60E 00	CC 2	4 60F 00	CC 2	Other b/g	2.77E-08	CC 2	2.77E-08	CC 2
Eu 152	4.62E-09	CC 2	4.62E-09		Total a	1E-08	CC 2	1E-08	CC 2
Eu 154	3.85E-09 7.69E-10	CC 2 CC 2	3.85E-09 7.69E-10	CC 2 CC 2	Total b/g	1.62E-05	CC 2	1.62E-05	CC 2
Eu 155	7.09E-10	00 2	7.09E-10	00 2				<u> </u>	

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