SITE	Calder Hall			
SITE OWNER	Nuclear Decommissi	oning Aut	hority	
WASTE CUSTODIAN	Sellafield Limited			
WASTE TYPE	LLW			
Is the waste subject to Scottish Policy:	No			
WASTE VOLUMES			Reported	
Stocks:	At 1.4.2022		~10.0 m ³	
Future arisings -	1.4.2022 - 31.3.2023 1.4.2023 - 31.3.2024 1.4.2024 - 31.3.2025 1.4.2025 - 31.3.2035	·	0 m ³ ~0 m ³ ~0 m ³ ~5.0 m ³	
Total future arisings:			5.0 m ³	
Total waste volume:			15.0 m ³	
Comment on volumes:	Arisings are as a res operations ceased. A decommissioning pro the site were cleared pipework. A figure of Removal of the rema Reactor 4 blower hou some of the future ar devices fitted to store	ult of char Although n ogresses a I but a sma approxim ining blow uses is be risings. S age tanks.	acterising oils remaining on the Calder H o future arisings are anticipated, more and and building contents are characterised. all quantity of oil may reside within the sy ately 5 m3 has been taken as remaining ver oil is not currently however specific of ing assessed and the date may be accel till some uncertainty over exact volumes Volumes are best estimate, probably ac	Hall site after risings may occur a The main tanks on ystem and low lying within the systems earance of the erated accelerating as no measuring courate to 10%.
Uncertainty factors on volumes:	Stock (upper): x 1 Stock (lower): x 0	.1).9	Arisings (upper) x Arisings (lower) x	1.1 0.9
WASTE SOURCE	Calder Hall blower lu	bricating of	bil from within controlled areas and active	e areas.
PHYSICAL CHARACTERIS	STICS			
General description:	The waste originates cleaning solvent. No of via SETP.	as severa items requ	al types of lubricating oil, some containin uire special handling. Water will be sepa	g water and rated and disposed
Physical components (%vol):	Oil (99%), solvent (<	1%).		
Sealed sources:	The waste does not o	contain se	aled sources.	
Bulk density (t/m ³):	~0.9			
Comment on density:	A value of 0.9 t/m ³ ha	as been as	ssumed.	
CHEMICAL COMPOSITION	N			
General description and components (%wt):	Oil (99%), solvent (<	1%).		
Chemical state:	-			
Chemical form of radionuclides:	H-3: As H2O. C-14: As oil.			
Metals and alloys (%wt):	-			
		(%wt)	Type(s) / Grade(s) with proportions	% of total C14 activity
Stainless steel		TR		,
Other ferrous me	etals	TR		
Iron				
Aluminium		TR		
Beryllium		NE		

Cobalt	0
Copper	TR
Lead	TR
Magnox/Magnesium	NE
Nickel	
Titanium	
Uranium	NE
Zinc	TR
Zircaloy/Zirconium	NE
Other metals	0

Organics (%wt):

The waste is oil and solvent. None present.

	(%wt)	Type(s) and comment	% of total C14 activity
Total cellulosics	0		
Paper, cotton	0		
Wood	0		
Halogenated plastics	0		
Total non-halogenated plastics	0		
Condensation polymers	0		
Others	0		
Organic ion exchange materials	0		
Total rubber	0		
Halogenated rubber	0		
Non-halogenated rubber	0		
Hydrocarbons	NE		
Oil or grease	NE	Oil quantified under "Free non- aqueous liquids".	
Fuel			
Asphalt/Tarmac (cont.coal tar)			
Asphalt/Tarmac (no coal tar)			
Bitumen			
Others			
Other organics	NE		
Other materials (%wt): -			
	(%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			
Glass/Ceramics			

0

Graphite.....

Desiccants/Catalysts	
Asbestos	0
Non/low friable	
Moderately friable	
Highly friable	
Free aqueous liquids	0
Free non-aqueous liquids	~99.0
Powder/Ash	0

Inorganic anions (%wt): Chlorides, sulphates, phosphates and sulphides will be present at trace levels (<0.01%). Others may also be present in trace amounts.

	(%wt)	Type(s) and comment
Fluoride	TR	
Chloride	TR	
lodide	TR	
Cyanide	TR	
Carbonate	TR	
Nitrate	TR	
Nitrite	TR	
Phosphate	TR	
Sulphate	TR	
Sulphide	TR	

Materials of interest for Oil is a flammable material and is controlled by COSHH regulations. waste acceptance criteria:

	(/0 001)
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
Higher activity particles	
Soluble solids as bulk chemical compounds	

(%wt) Type(s) and comment

Hazardous substances / Present at low concentrations (<0.001%) as additives. Oils (99%), solvents (<1%). 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..... Boron (in Boral)..... Boron (non-Boral)..... Cadmium..... Caesium..... Selenium..... Chromium..... Molybdenum..... Thallium..... Tin..... Vanadium..... Mercury compounds..... Others..... Electronic Electrical Equipment (EEE) EEE Type 1..... EEE Type 2..... EEE Type 3.....

Complexing agents (%wt):

	(%wt)
EDTA	
DPTA	
NTA	
Polycarboxylic acids	
Other organic complexants	TR

EEE Type 4..... EEE Type 5.....

Yes

Total complexing agents..... TR

Type(s) and comment

Trace levels of organic complexing agents will be present as oil additives and stabilisers or as organic degradation products.

WASTE STREAM	2A30	Waste Oils
WASTE STREAM	ZAJU	waste Ons

No.

Potential for the waste to contain discrete items:

TREATMENT, PACKAGING AND DISPOSAL

Planned on-site / off-site treatment(s):	Treatment	On-site / Off site	Stream volume %
	Low force compaction Supercompaction (HFC) Incineration Solidification Decontamination Metal treatment Size reduction Decay storage Recyling / reuse Other / various		100.0
	None		
Comment on planned treatments:	It is expected that waste oil will be incinerated. An disposed of via SETP.	y water will be seן	parated off and

Disposal Routes:

Expected to be consigned to the LLW RepositoryExpected to be consigned to a Landfill FacilityExpected to be consigned to an On-Site Disposal FacilityExpected to be consigned to an Incineration FacilityExpected to be consigned to a Metal Treatment FacilityExpected to be consigned as Out of ScopeExpected to be recycled / reused	Disposal Route	Stream volume %	Disposal density t/m3
Disposal route not known	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	100.0	0.90

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 %		
	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: No

Baseline Management Route	Opportunity Management Route	Stream volume (%)	Estimated Date that Opportunity will be realised	Opportunity Confidence	Comment
-	-	-	-	-	-

Waste Packaging for Disposal: (Not applicable to this waste stream)

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			
2m box (no shielding)			
4m box (no shielding)			
Other			

Other information:

It is expected that waste oil will be incinerated. It will not be disposed of to the LLWR.

Waste Planned for Disposal at the LLW Repository: (Not applicable to this waste stream)

Container voidage:

Waste Characterisation Form (WCH):

Waste consigned for disposal to LLWR in year of generation:

Ion-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:	The main sources of activity are fission and activation products.
Uncertainty:	The uncertainty has been derived from the accuracy of the analysis results for the sample with the highest specific activity. All other samples have low specific activity by comparison.
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 specific activity data has been derived from a weighted average of the reported analytical results detailed in the characterisation documents for each of the waste oil storage locations.
Other information:	The only possible source of activity after burning is ash. Ash volumes will be negligible and activity levels are expected to be very low.

Weste at Bands and P12022 Future Code Future Rest Code Bands and Nuclete Future Waste at Bands and P12022 Future Bands and Code Bands and P12022 Future Bands and Code Bands and Code Future Bands and Code Bands and Code Future Bands and Code Bands and Code Future Code Bands and Bands and Future		Mean radioactivity, TBq/m ³				Mean radioactivity, TBq/m ³				
H3 -1.21E-00 AA 1 Ge103 Ge114 -1.21E-00 AA 1 He 1630 C14 -3.14E-08 AA 1 -3.14E-08 AA 1 He 1630 Na 22 -3.14E-08 AA 1 He 1630 He 1630 He 1630 He 1630 C136 -3.14E-08 AA 1 He 1630 He 1630 He 1630 He 1630 C138 -3.14E-08 AA 1 He 1630 He 11730 He 11740 He 1630 C330	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
Be 10 3.14E-08 AA 1 3.14E-08 AA 1 Ho 163 Na 22 3.14E-08 AA 1 Ho 163 Tim 170 C136 3.14E-08 AA 1 Ho 163 Hit 170 C136 3.14E-08 AA 1 Lin 174 Lin 174 C138 Hit 178 Hit 178 Hit 178 C334 AA 1 Hit 178 C44 Hit 178 Hit 178 Hit 178 C565 -1.09E-07 AA 1 Bi 208 Hit 178 Ni53 -3.01E-07 AA 1 Bi 208 Hit 182 Hit 182 Ni53 -3.01E-07 AA 1 Bi 208 Hit 182 Hit 182 Ni53 -3.01E-07 AA 1 Po 210 Ra 28 Hit 182 Ni53 -3.01E-07 AA 1 Po 210 Hit 182 Hit 182 Ni53 -3.01E-07 AA 1 Po 210 Hit 182 Hit 182 Ni54<	H 3	~1.21E-05	AA 1	~1.21E-05	AA 1	Gd 153				
C 14 -3.14E-08 AA 1 -3.14E-08 AA 1 Ho 108m ha 22 A 28 C 34 A 39 A 42 C 34 A 42 C 44 A 42 C 44 C 500 0.0E-07 AA 1 -108E-07 AA 1 - 1.08E-07 AA 1 - 2.01E-07 AA 1 - 3.01E-07 AA 1 - 4.020 - 6.65E-10 AA 1 - 4.65E-10 AA 1 - 4.	Be 10					Ho 163				
Ma 22 1111 10 1111 10 C1 36 1411 10 1111 10 C3 36 1111 10 1111 10 A 42 1111 10 1111 10 C4 40 1111 10 1111 10 C4 41 1111 10 1111 10 C4 41 1111 10 1110 10 C6 40 -5.77E-08 AA 1 F6 55 -1.06E-07 AA 1 C6 60 -5.77E-08 AA 1 S1200 -5.77E-08 AA 1 S1200 -5.77E-08 AA 1 S165 -5.77E-08 AA 1 Po 210 S17 -5.77E-08 AA 1 Po 201 S165 -5.77E-08 AA 1 Po 201 S1720 -5.77E-08 AA 1 <td>C 14</td> <td>~3.14E-08</td> <td>AA 1</td> <td>~3.14E-08</td> <td>AA 1</td> <td>Ho 166m</td> <td></td> <td></td> <td></td> <td></td>	C 14	~3.14E-08	AA 1	~3.14E-08	AA 1	Ho 166m				
A Δ30 A 1 -1.06E-07 A A 1 1174 Lu 174 A 42 A 1 -1.06E-07 A A 1 P1 103 H H I	Na 22					Tm 170 Tm 171				
Ar 32 Ar 42 Ar 44 Ar 42 Ar 44 Ar 44	AI 26 CI 36					111 171				
A+2 -1.00E-07 AA 1 -1.00E-07 AA 1 P1030 N633 -5.77E-08 AA 1 -1.00E-07 AA 1 Pb 205 Fe 55 -1.00E-07 AA 1 -5.77E-08 AA 1 Pb 205 N153 -3.01E-07 AA 1 -5.77E-08 AA 1 Pb 205 Se 79 -3.01E-07 AA 1 -3.01E-07 AA 4 Pb 205 Se 79 -3.01E-07 AA 1 -3.01E-07 AA 4 Pb 205 Se 79 -3.01E-07 AA 4 Pb 2010 -5.77E-08 AA 1 Se 79 Ra 225 -5.77E-08 AA 1 Po 2101 -5.77E-08 AA 1 Se 73 -5.77E-08 AA 1 -3.01E-07 AA 1 Pa 231 -5.77E-08 -6.7E Se 73 -5.77E-08 -6 Fa 228 -5.7E -7.23E -6.6E -6 Se 100 -6 Fa 228 -7.23E -7.23E -7.23E -6.6E -6 Se 103 -7.23E -7.23E -7.23E -6.6E 6 6 Se 1100 -7.23E -7	Ar 39					Lu 176				
i A 10 -1.00E-07 A A 1 -1.06E-07 A A 1 P193 -1.04 -1.06 -1.	Ar 42					Hf 178n				
Ca 41 Mn 53 Mn 54 N F193 T204 Pb 205 S <	K 40					Hf 182				
Mn 53 -1.09E-07 AA 1 -1.09E-07 AA 1 Pb 205 Fe 55 -1.09E-07 AA 1 -5.77E-08 AA 1 Bi 208 Ni 63 -3.01E-07 AA 1 -5.77E-08 AA 1 Bi 208 Ni 63 -3.01E-07 AA 1 -5.77E-08 AA 1 Bi 208 Se 79 -3.01E-07 AA 1 -3.01E-07 AA 1 Ra 223 Kr 81 5.77E-08 AA 1 Pa 201 Ra 223 Ra 225 Kr 85 5.77E-08 AA 1 Pa 225 Ra 226 Ra 226 Kr 85 5.77E-08 A 1 Pa 221 Ra 228 Ra 228 Kr 85 5.77E-08 A 1 Pa 223 Ra 228 Ra 228 Nb 91 5.78 A 1 Th 228 Th 228 Ra 228 Nb 93 5.79 7.99 A 1 Pa 233 -6.65E-10 AA 1 Nb 94 5.79 7.99 A	Ca 41					Pt 193				
Min Add 1.09E-07 AA 1 1.09E-07 AA 1 Pic 205 Co 80 -5.77E-08 AA 1 -5.77E-08 AA 1 Bi 210m Ni 53 -3.01E-07 AA 1 -3.01E-07 AA 1 Po 210 Se 79 -3.01E-07 AA 1 -3.01E-07 AA 1 Po 210 Se 79 -3.01E-07 AA 1 -3.01E-07 AA 1 Po 210 Se 79 -3.01E-07 AA 1 Po 210 Ra 223 Ra 225 Ra 225 Se 79 -5.77 -6 Th 227 Ra 225 Ra 226 Ra 228 Nb 91 -7.72 -7 -7.72 Po 201 Ra 229 Ra 229 Ra 229 Nb 93 -7.72 -7.72 Po 233 Po 233 Po 233 Po 233 Co 109 -7.7 -7.72 Po 236 -6 6 6 Ag 100m -7.72 -7.725 AA 1 Po 238 -6 6 Go 113m -7.995E-08 AA </td <td>Mn 53</td> <td></td> <td></td> <td></td> <td></td> <td>TI 204</td> <td></td> <td></td> <td></td> <td></td>	Mn 53					TI 204				
Pe 33 -1.03e-07 AA 1 -5.77E-08 AA 1 Bi 200 N163 -3.01E-07 AA 1 -5.77E-08 AA 1 P0 210 Ra 27.66 -3.01E-07 AA 1 -6.01E-07 AA 1 P0 210 Ra 23.01E-07 AA 1 -5.01E-07 AA 1 P0 210 Ra 23.01E-07 AA 1 -3.01E-07 AA 1 P0 210 Ra 22.8 Ra 22.5 Ra 1 P0 210 Ra 1 K185 Ra 7.8 Ra 22.8 Ra 22.8 Ra 1 K185 Ra 6 Ra 1 T.228 T.1.28 Ra 1 N b94 N 52 Th 229 Th 232 Th 234 Ra 6 6 Mb 33 Tc 397 Tu 234 P0 233 6 6 6 Ag 100m Au Tu 234 Fu 240 Fu 240 6 6 Sh 126 Sh 128	Mn 54	1 005 07	A A 4		A A 1	PD 205				
Schleud AA 1 -7.95E-08 AA	Fe 55	~1.09E-07		~1.09E-07		Bi 208				
Nic3 Zn 66 Se 79 -3.01E-07 AA 1 -3.01E-07 AA 1 P0 210 Ra 223 Ra 225 Ra 226 Ra 228 A 227 Ra 226 Ra 228 Ra 28 Ra 4 Ra 4 Ra 4 Ra 4 Ra 4 Ra 4 Ra 4 Ra 4	Ni 59	~3.77 E-00		~3.77 E-00		Bi 210m				
2ne5 Ra 223 Ra 226 Ra 226 Ra 226 Ra 226 Ra 226 Ra 226 Ra 228 Ra 21 Ra 228 Ra 21 Ra 21<	Ni 63	~3.01E-07	AA 1	~3.01E-07	AA 1	Po 210				
Se 79 Ra 225 Ra 226 Ra 228 Ra 24 <	Zn 65					Ra 223				
Kr 45 Ra 226 Ra 228 Ra 28 <	Se 79					Ra 225				
Kr 85 NB 22 NB 22 NB 22 ND 23 ND 23 ND 23 Nb 93 Th 229 Th 229 ND 23 ND 23 ND 23 Nb 94 Pa 233 Pa 233 ND 237 ND 232 ND 237 Pd 107 U 234 6 6 6 Ag 110m U 234 6 6 6 Ag 110m U 236 6 6 6 Ag 110m V 236 Pu 236 6 6 Sh 128 Pu 238 FPu 238 FPu 238 6 6 Sh 128 Pu 238 Pu 238 6 6 6 Sh 128 Pu 238 Pu 238 6 6 6 Sh 128 Pu 238 Pu 238 FPu 239 FU 244	Kr 81					Ra 226				
No B' Nu 227 Th 227 Th 228 Th 229 Th 229 Nb 93 Th 223 Th 223 Th 223 Th 230 Th 232 Nb 93 Th 232 Th 232 Th 232 Th 232 Th 232 Nb 93 Th 232 Th 232 Th 232 Th 232 Th 232 Nb 94 Th 232 Th 232 Th 232 Th 232 Th 232 Nb 94 Th 232 Th 232 Th 232 Th 232 Th 232 Nb 94 Th 232 Th 232 Th 232 Th 232 Th 232 Nb 94 Th 232 Th 232 Th 232 Th 232 Th 232 Ru 106 U 233 U 233 Th 232 Th 332	Kr 85					Ra 228				
Diado C Th 228 Th 228 Th 229 NN 91 Th 224 Th 230 Th 230 Nb 92 Nb 93m Th 234 Pa 231 Nb 93 Th 234 Pa 233 Th 234 Pa 233 To 37 Pa 233 To 37 Tc 97 U232 U233 Formore Pd 107 U234 Formore Formore Ag 108m U235 Formore Formore Ag 108m U235 Formore Formore Nb 106 U235 Formore Formore Pd 107 U236 Formore Formore Cd 113m Pu 238 Formore Formore Sh 126 Pu 238 Formore Fu 238 Sh 126 Fu 240 Fu 240 Formore Sh 126 Fu 241 Formore Fu 241 Sh 126 Fu 241 Formore Fu 241 Fu 125m Fu 241 Formore Fu 241 Fu 127m Fu 241 Formore Formore Sh 126 Fu 241 Formore F	RD 87 Sr 90		6		6	AC 227 Th 227				
Nb 91 Nb 92 Nb 92 Nb 93 Nb 93 Nb 94 Mo 93 Tc 97 Tc 99 Ru 106 Pa 231 Pa 231 Pa 231 Pa 231 Pa 231 Pa 231 Pa 233 U232 U232 U232 U232 U234 D4 6 U235 C 108m Ag 100m Ag 100m Ag 100m Ag 100m Ag 100m Ag 100m Sh 126 Sh	Zr 93		0		0	Th 228				
Nb 92 Nb 93 Th 230 Th 232 Nb 94 Th 234 Pa 231 Mo 93 Pa 231 Pa 231 Tc 97 U232 Pa 231 Ru 106 U232 0233 Pd 107 U234 6 Ag 108m U233 6 Ag 101 U234 6 Ag 108m U234 6 Ag 108m U234 6 Ag 108m U234 6 Ag 108m U236 6 Ag 108m U238 6 Cal 139 U238 6 Sh 125 Sh 126 Pu 236 Sh 126 Pu 231 Pu 236 Sh 126 Pu 240 Pu 241 Sh 126 Pu 240 Pu 241 Sh 126 Cm 243 Cm 243 Cs 134 Cm 244 Cm 244 Cs 134 Cm 244 Cm 244 Ch 249 Cm 246 Cm 246 Ch 249 Ch 249 Fu 4 Pm 147 Ch 265E-10 AA 1 Sh 151 <t< td=""><td>Nb 91</td><td></td><td></td><td></td><td></td><td>Th 229</td><td></td><td></td><td></td><td></td></t<>	Nb 91					Th 229				
Nb 93m Th 232 Nb 94 Th 234 Nb 94 Th 234 Nb 94 Th 234 Nb 94 Pa 231 Tc 97 Pa 233 Tc 97 U232 Ru 106 U233 Pd 107 U234 Ag 108m U235 Ag 109m U236 Ag 109 U238 Cal 13m Np 237 Sh 126 Np 237 Sh 126 Pu 238 Sh 126 Pu 239 Sh 126 Pu 240 Sh 126 Pu 239 Sh 126 Pu 240 Sh 126 Cm 244 Cs 137 Cm 244 Cs 134 Cm 244 Cs 134 Cm 244 Cs 134 Cm 245 Ci 250	Nb 92					Th 230				
Nb 94 Th 234 Pa 231 Pa 233 Pa 234 6 5 5 5 5 5 5 5 7 9 238 Pu 238 Pu 239 Pu 234 Pu 241 Pu 241 Pu 242 Pu 241 Pu 242 Pu 241 Pu 242 Pu 242 Pu 241 Pu 242 Pu 242 Pu 243 Cm 242 Cm 243 Cm 244 Cm 248 Ct 249 Fu 245 <td< td=""><td>Nb 93m</td><td></td><td></td><td></td><td></td><td>Th 232</td><td></td><td></td><td></td><td></td></td<>	Nb 93m					Th 232				
M0 93 FP 231 Tc 97 P2 233 Tc 97 U232 Ru 106 U233 Pd 107 U234 Ag 108m U235 Ag 108m U236 Ag 1010m U236 Cd 109 U238 Cd 103 Pu 238 Sh 121m Pu 238 Sh 125 Pu 238 Sh 126 Pu 238 Sh 126 Pu 239 Sh 126 Pu 241 Sh 126 Pu 241 Sh 126 Pu 241 Sh 126 Pu 242 Gs 137 -7.95E-08 AA 1 129 Cm 243 Cs 137 -7.95E-08 AA 1 Ch 138 Cm 243 Cm 243 Cm 243 Cm 243 Cm 246 Cm 248 Cf 250 Pm 147 Ff 250 Sm 151 Pm 147 Sm 151 Pm 147 Su 152 Pm 147 Sm 151 Pm 145 First First Cl 250 First	Nb 94					Th 234				
10 50 Tc 99 0 <td< td=""><td>MO 93 To 97</td><td></td><td></td><td></td><td></td><td>Pa 233</td><td></td><td></td><td></td><td></td></td<>	MO 93 To 97					Pa 233				
Ru 106 Pd 107 Pd 107 U 234 6 Ag 108m U 236 6 Ag 109 U 236 6 Cd 109 U 236 6 Cd 109 U 236 6 Cd 113m Np 237 6 Sn 121 Pu 236 6 Sn 121 Pu 236 8 Sn 123 Pu 236 8 Sh 125 Pu 236 8 Sh 125 Pu 230 Pu 230 Sh 126 Pu 241 Pu 241 Pu 241 Pu 242 -6.65E-10 AA 1 Sh 125 Am 241 -6.65E-10 AA 1 Sh 126 Pu 241 Pu 242 Sh 126 Pu 241 Pu 242 Sh 126 Cm 243 Cm 243 Cs 134 Cm 244 Cm 243 Cs 134 Cm 244 Cm 244 Cs 134 Cm 244 Cm 246 Ca 144 Cm 246 Cm 248 Ca 144 Cm 246 Cm 248 Ca 144 Cm 246 Cm 248 Ca 1	Tc 99					U 232				
Pd 107 Ag 108m 6 6 6 Ag 110m U236 6 6 6 Ag 110m U236 6 6 6 Cd 103 U238 6 6 6 Cd 113m Np 237 Pu 236 6 6 6 Sn 121m Pu 238 Pu 239 Pu 239 Pu 240 8 7 Sh 126 Sb 126 Pu 241 Pu 242 Am 241 -6.65E-10 AA 1 -6.65E-10 AA 1 1 Te 127m Am 241 Ca5 135 Cm 243 Cm 243 Cm 243 S S 1 -6.65E-10 AA 1 1 -6.65E-10 AA 1 1 Sa 133 Cm 243 Cm 243 Cm 243 S S 1 -6.65E-10 AA 1 1 -6.65E-10 AA 1 - - Am 247 - <td>Ru 106</td> <td></td> <td></td> <td></td> <td></td> <td>U 233</td> <td></td> <td></td> <td></td> <td></td>	Ru 106					U 233				
Ag 108m U 235 6 6 6 Ag 107m U 236 6 6 6 Cd 109 U 238 6 6 6 Cd 113m Np 237 6 9 6 6 Sn 119m Pu 236 Pu 239 7 7 7 7 Sn 123 Sn 126 Pu 239 Pu 240 7	Pd 107					U 234		6		6
Ag 110m 0 238 6 6 Cd 113m U 238 6 6 Sn 119m Np 237 Pu 236 1 Sn 121m Pu 236 Pu 238 6 6 Sn 121m Pu 236 Pu 238 1 1 Sn 123 Sn 123 Pu 239 Pu 240 1 1 Sh 126 Pu 241 Pu 241 Pu 241 1 -6.65E-10 AA 1 1 Te 127m Am 241 ~6.65E-10 AA 1 -6.65E-10 AA 1 1 129 Cs 134 Cm 243 Cm 243 Cm 243 1 -6.65E-10 AA 1 Sh 133 Cm 245 Cm 246 Cm 248 1 -7.95E-08 AA 1 Cm 245 1 -6.65E-10 AA 1 La 137 Ca 134 Cm 245 Cm 246 1 1 -6.65E-10 AA 1 1 La 138 Ce 144 Cf 249 Cm 246 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ag 108m					U 235		6		6
Cd 113m Np 237 0 <t< td=""><td>Ag 110m</td><td></td><td></td><td></td><td></td><td>U 236</td><td></td><td>6</td><td></td><td>6</td></t<>	Ag 110m					U 236		6		6
So 113m Pu 236 Sn 119m Pu 236 Sn 121 Pu 238 Sn 123 Pu 239 Sn 126 Pu 230 Sb 126 Pu 240 Te 125m Pu 242 Te 125m Am 241 -6.65E-10 AA 1 Te 125m Am 242 I129 Am 243 Cm 242 Cs 134 Cm 244 Cm 243 Cs 137 -7.95E-08 AA 1 Pin 147 Cm 248 Cm 248 Ce 144 Cf 250 Pm 145 Cf 250 Sm 151 Cf 252 Sm 151 Cf 252 Sm 151 Cf 252 Sm 151 Total b/g -1.27E-05 Eu 152 Total b/g -1.27E-05 AA 1	Cd 109 Cd 113m					0 230 Nn 237		0		0
Sn 121m Pu 238 Pu 239 Sn 123 Pu 239 Sn 126 Pu 240 Sb 126 Pu 241 Sb 126 Pu 242 Te 125m Am 241 -6.65E-10 AA 1 Te 127m Am 241 -6.65E-10 AA 1 1129 Am 243 Cm 243 Cm 244 Cs 134 Cm 244 Cm 243 Cm 244 Cs 137 -7.95E-08 AA 1 Cm 244 Ba 133 Cm 244 Cm 248 Cm 248 Ce 144 Cf 250 Cm 248 Cf 250 Pm 147 Sm 151 Cf 252 Cf 251 Sm 151 Cf 252 Other a Other b/g Eu 152 Total b/g -1.27E-05 AA 1	Sn 119m					Pu 236				
Sn 123 Pu 239 Pu 240 Pu 240 Sb 125 Pu 241 Pu 241 Pu 242 Te 125m Pu 242 Am 241 -6.65E-10 AA 1 6.65E-10 AA 1 Te 127m Am 242 Am 243 6.65E-10 AA 1 6.65E-10 AA 1 Cs 134 Cm 243 Cm 243 Cm 243	Sn 121m					Pu 238				
Sn 126 Pu 240 Pu 241 Pu 241 Sb 125 Pu 241 Pu 242 Am 241 -6.65E-10 AA 1 -6.65E-10 AA 1 Te 125m Am 241 -6.65E-10 AA 1 -6.65E-10 AA 1 -6.65E-10 AA 1 Te 127m Am 243 Cm 242 Cm 243 Cm 243 - - - Cs 134 Cm 243 Cm 243 Cm 244 - - - - - Sb 125 Cm 243 Cm 244 Cm 245 - - - - - - Sc 137 -7.95E-08 AA 1 -7.95E-08 AA 1 Cm 244 - <	Sn 123					Pu 239				
Sb 125 Pu 241 Pu 242 Sb 126 Pu 242 Te 125m Am 241 -6.65E-10 AA 1 Te 127m Am 243 -6.65E-10 AA 1 1129 Am 243 Cm 243 -6.65E-10 AA 1 Cs 134 Cm 243 Cm 243 -6.65E-10 AA 1 Cs 137 -7.95E-08 AA 1 Cm 243 -6.65E-10 AA 1 Ba 133 -7.95E-08 AA 1 Cm 244 -6.65E-10 AA 1 La 137 -7.95E-08 AA 1 Cm 244 -6.65E-10 AA 1 La 137 Cf 249 Cm 248 Cf 249 -6.65E-10 AA 1 Pm 145 Cf 250 Cf 251	Sn 126					Pu 240				
Sb 126 FU 242 Am 241 ~6.65E-10 AA 1 ~6.65E-10 AA 1 Te 127m I129 Am 241 ~6.65E-10 AA 1 ~6.65E-10 AA 1 I129 Am 243 Cm 244 Cm 245 Cm 246 Cm 248 Cm 248 Cm 248 Cm 248 Cf 249 Cf 249 Cf 250 Cf 251 Cf 251 Cf 252 Cm 244 Cf 252 Cm 245 Cf 252 Cm 248 Cf 252 Cm 248 Cf 252 Cm 248 Cf 252 Cm 245 Cf 251 Cf 251 Cf 252 Cm 245 Cf 252 Cm 248 Cf 252 Cf 251 Cf 252 Cf 252 Cm 245 Cf 252 Cm 245 Cf 252 Cf 251 Cf 252 Cf 251 Cf 252 Cf 252 Cf 252 Cf 251 Cf 252 Cf 252 Cf 252 Cf 252 Cf 251 Cf 252 Cf 251 Cf 252 Cf 251 Cf 255	Sb 125					Pu 241				
Te 125m Am 247 P0.00E-10 AA 1 P0.00E-10 AA 1 Te 127m Am 242m Am 243 Am 243 Am 243 Am 243 Cs 134 Cm 243 Cm 242 Cm 243 Am 244 Am 245 Cs 137 ~7.95E-08 AA 1 ~7.95E-08 AA 1 Cm 244 Cm 245 Am 246 La 137 Ce 144 Cm 248 Cf 249 Cm 248 Am 245 Am 248 Ce 144 Cf 250 Cf 251 Cf 251 Am 1 Am 252 Am 245 Sm 147 Cf 250 Cf 251 Cf 251 Am 1 Am 1 Am 245 Sum 147 Cf 250 Cf 251 Cf 251 Cf 252 Am 1 Am 1 Sum 151 Ci 552 Other a Other b/g Am 1 -6.65E-10 AA 1 -6.65E-10 AA 1 Eu 152 Total b/g ~1.27E-05 AA 1 -1.27E-05 AA 1 -1.27E-05 AA 1	Sb 126					Pu 242 Am 241	- 6 65E-10	ΔΔ 1	- 6 65E-10	ΔΔ 1
I 129 Am 243 Cs 134 Cm 242 Cs 135 Cm 243 Cs 137 -7.95E-08 AA 1 Ba 133 Cm 243 La 137 Cm 245 La 138 Cm 246 Ce 144 Cf 249 Pm 145 Cf 250 Pm 147 Cf 250 Sm 151 Cf 252 Sm 151 Other b/g Eu 152 Other b/g Eu 154 Total a Fu 155 AA 1	Te 125m Te 127m					Am 242m	~0.05⊑-10		~0.03E-10	
Cs 134 Cm 242 Cm 243 Cs 135 Cm 243 Cm 243 Cs 137 -7.95E-08 AA 1 ~7.95E-08 AA 1 Ba 133 Cm 243 Cm 244 Cm 245 La 137 Cm 248 Cm 248 Cm 248 Ce 144 Cm 248 Cf 249 Cf 250 Pm 145 Cf 250 Cf 251 Cf 251 Sm 147 Cf 252 Other a Other b/g Sm 151 Cm 154 Cher b/g Total a ~6.65E-10 AA 1 Eu 154 Fotal b/g ~1.27E-05 AA 1 ~1.27E-05 AA 1	I 129					Am 243				
Cs 135 -7.95E-08 AA 1 ~7.95E-08 AA 1 Cm 243 Ba 133 -7.95E-08 AA 1 Cm 244 Cm 245 La 137 Cm 243 Cm 245 Cm 246 La 138 Cm 244 Cm 248 Cf 249 Ce 144 Cf 249 Cf 250 Cf 250 Pm 145 Cf 251 Cf 252 Sm 147 Cf 252 Other a Sm 151 Other b/g Total a Eu 152 Total a -6.65E-10 AA 1 Eu 154 Total b/g -1.27E-05 AA 1	Cs 134					Cm 242				
Cs 137 ~7.95E-08 AA 1 ~7.95E-08 AA 1 Cm 244 Ba 133 Cm 245 Cm 246 Cm 248 Cm 248 La 138 Cm 244 Cm 248 Cf 249 Cf 249 Pm 145 Cf 250 Cf 251 Cf 251 Sm 147 Cf 252 Other a Other b/g Eu 152 Cu 154 Cu 154 Total a ~6.65E-10 AA 1 Eu 155 Cu 154 Cu 155 Cu 127E-05 AA 1 ~1.27E-05 AA 1	Cs 135					Cm 243				
Ba 133 Cm 245 La 137 Cm 246 La 138 Cm 248 Ce 144 Cf 249 Pm 145 Cf 250 Pm 147 Cf 251 Sm 147 Cf 252 Sm 151 Other a Eu 152 Other b/g Eu 154 Total a ~6.65E-10 AA 1 Fu 155 Total b/g ~1.27E-05 AA 1	Cs 137	~7.95E-08	AA 1	~7.95E-08	AA 1	Cm 244				
La 137 Cm 1240 La 138 Cm 248 Ce 144 Cf 249 Pm 145 Cf 250 Pm 147 Cf 251 Sm 147 Cf 252 Sm 151 Other a Eu 152 Other b/g Eu 154 Total a ~6.65E-10 AA 1 Eu 155 Total b/g ~1.27E-05 AA 1	Ba 133					Cm 245 Cm 246				
Ce 144 Cf 249 Pm 145 Cf 250 Pm 147 Cf 251 Sm 147 Cf 252 Sm 151 Other a Eu 152 Other b/g Eu 154 Total a ~6.65E-10 AA 1 Eu 155 Total b/g ~1.27E-05 AA 1	La 137					Cm 248				
Pm 145 Cf 250 Image: state of the s	Ce 144					Cf 249				
Pm 147 Cf 251 Sm 147 Cf 252 Sm 151 Other a Eu 152 Other b/g Eu 154 Total a ~6.65E-10 AA 1 Eu 155 Total b/g ~1.27E-05 AA 1 ~1.27E-05	Pm 145					Cf 250				
Sm 147 Cf 252 Sm 151 Other a Eu 152 Other b/g Eu 154 Total a ~6.65E-10 A A 1 Eu 155 Total b/g ~1.27E-05 A A 1 ~1.27E-05	Pm 147					Cf 251				
Sm 151 Other a Eu 152 Other b/g Eu 154 Total a Eu 155 Total b/g	Sm 147					Cf 252				
Eu 152 Other D/g Eu 154 Total a ~6.65E-10 A A 1 ~6.65E-10 A A 1 Eu 155 Total b/g ~1.27E-05 A A 1 ~1.27E-05 A A 1	Sm 151					Other a				
Eu 155 Total b/g ~1.27E-05 AA 1 ~1.27E-05 AA 1	Eu 152 Eu 154					Total a	~6 65E-10	ΔΔ 1	~6 65E-10	ΔΔ 1
	Eu 155					Total b/g	~1.27E-05	AA 1	~1.27E-05	AA 1

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