Schedule of Accreditation

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United Kingdom Accreditation Service

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United Kingdom National Nuclear Laboratory

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Testing performed by the Organisation at the locations specified

Locations covered by the organisation and their relevant activities

Laboratory locations:

Location details		Activity	Location code
Address Measurement & Analysis A709, Preston Laboratory Westinghouse Springfields Fuels Ltd Lea Town Lancashire PR4 0XJ	**Local contact** Miss Laura Mcvittie Tel: +44 (0)1772 963902 E-Mail: laura.mcvittie@uknnl.com Website: www.uknnl.com	**Testing:** Radiochemical Chemical Physical	A
Address Measurement & Analysis B170, Central Laboratory Sellafield Seascale Cumbria CA20 1PG	**Local contact** Miss Laura Mcvittie Tel: +44 (0)1772 963902 E-Mail: laura.mcvittie@uknnl.com Website: www.uknnl.com	**Testing:** Radiochemical	B

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES	<u>Radiochemical Testing</u>	Documented in house methods:	
Intermediate and low level waste samples (resins, swabs/filters, graphite, sludges and concretes, aqueous samples/pond waters)	Tritium (^{3}H) (Total) and Carbon-14	WRC SOP 0150 for sample/source preparation by combustion furnace WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting	A
Intermediate and low level waste samples (resins, filters, metals, oils, sludges and concretes, aqueous samples)	Sample dissolution and preparation	WRC SOP 0459 for dissolution and preparation of resins, filters, metals, oils, sludges and concretes into dissolution liquors and aqueous solutions for subsequent radiochemical determinations, by way of acid leaching and digestion, ashing, fusion	A
Dissolution liquor and aqueous samples	Screening for:		
	Total alpha activity (relative to ^{241}Am)	WRC SOP 0403 for sample/source preparation WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting	A
	Total beta activity - low energy		A
	X-ray and beta emitting nuclides (<20keV) (relative to ^{55}Fe and ^{3}H)		A
	Total beta activity - high energy beta emitting nuclides (relative to ^{90}Sr, ^{137}Cs and ^{60}Co)		A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES (cont'd)	<u>Radiochemical Testing</u> (cont'd)	Documented in house methods:	
Dissolution liquor and aqueous samples	Quantitative analysis: Gamma emitting radio-nuclides (energy range: 59 keV - 1836 keV)	WRC SOP 0401 for operation of the gamma spectrometers WRC SOP 0408 for calibration of the gamma spectrometers	A
	Plutonium isotopes: $^{239+240}$Pu, ^{238}Pu Americium isotopes: ^{241}Am Curium isotopes: $^{243/244}$Cm, ^{242}Cm	WRC SOP 0409 for sample/source preparation WRC SOP 0313 for alpha spectrometry	A
	Uranium isotopes: ^{238}U, $^{236/235}$U, ^{234}U	WRC SOP 0414 for sample/source preparation WRC SOP 0313 for alpha spectrometry	A
	Plutonium isotopes: ^{241}Pu	WRC SOP 0415 for sample/source preparation WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting	A
	Strontium isotopes: ^{90}Sr	WRC SOP 0305 for sample/source preparation WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting	A
	Nickel isotopes: ^{63}Ni	WRC SOP 0406 for sample/source preparation WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting WRC SOP 1002 for ICP-OES	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES (cont'd)	<u>Radiochemical Testing</u> (cont'd)	Documented in house methods:	
Dissolution liquor and aqueous samples (cont'd)	Quantitative analysis (cont'd):		
	Promethium isotopes: ^{147}Pm	WRC SOP 407 for sample/source preparation WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting WRC SOP 1002 for ICP -OES	A
	Tritium (^{3}H)	WRC SOP 0207 (aqueous only) WRC SOP 0511, 0512, 0115, 0513 for liquid scintillation counting	A
Waste and Process Waters (containing no suspended solids)	Gross alpha activity (relative to ^{241}Am)	IMS-I-500-02560 using Silicon diode alpha detector	B
	Gross beta activity (relative to $^{90}Sr/^{90}Y$)	IMS-I-500-02560 using Geiger counter beta Detector with connected scaler	B

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES (cont'd)	<u>Chemical Testing</u>	Documented in house method:	
Aqueous samples (acidic solutions, waste waters, uranic solutions)	Elemental determination for: Aluminium - Al Antimony - Sb Arsenic - As Barium - Ba Boron - B Beryllium - Be Cadmium - Cd Calcium - Ca Cerium - Ce Chromium - Cr Cobalt - Co Copper - Cu Caesium - Cs Dysprosium - Dy Europium - Eu Iron - Fe Gadolinium - Gd Gold - Au Hafnium - Hf Lanthanum - La Lead - Pb Lithium - Li Magnesium - Mg Manganese - Mn Mercury - Hg Molybdenum - Mo Neodymium - Nd Nickel - Ni Palladium - Pd Phosphorus - P Potassium - K Praseodymium – Pr Rhenium - Re Rhodium - Rh Rubidium - Rb Ruthenium - Ru Samarium - Sm Selenium - Se	WRC SOP 1003 by ICP-MS	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES (cont'd)	<u>Chemical Testing</u>	Documented in house method:	
Aqueous samples (acidic solutions, waste waters, uranic solutions) (cont'd)	Elemental determination for: Silicon - Si Silver - Ag Sodium - Na Strontium - Sr Tantalum - Ta Technetium - Tc Tellurium - Te Thallium - Tl Thorium - Th Tin - Sn Titanium - Ti Tungsten - W Vanadium - V Yttrium - Y Zinc - Zn Zirconium - Zr	WRC SOP 1003 by ICP-MS (cont'd)	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES (cont'd)	Chemical Testing (cont'd)	Documented in house method:	
Aqueous samples (acidic solutions, waste waters, uranic solutions) (cont'd)	Uranium - U (Total), ^{235}U and ^{238}U Uranium isotopic abundance ($^{235}U/^{238}U$ ratio)	WRC SOP 1003 by ICP-MS	A
Acidic Samples and Dissolution liquors (including fused samples) Range: µg/L to g/100 ml	Elemental determination for: Aluminium - Al Antimony - Sb Arsenic - As Barium - Ba Boron - B Beryllium - Be Cadmium - Cd Calcium - Ca Chromium - Cr Cobalt - Co Copper - Cu Dysprosium - Dy Europium - Eu Iron - Fe Gadolinium - Gd Lead - Pb Lithium - Li Magnesium - Mg Manganese - Mn Molybdenum - Mo Neodymium - Nd Nickel - Ni Potassium - K Rubidium - Rb Samarium - Sm Silicon - Si Silver - Ag Sodium - Na Strontium - Sr Sulphur - S Thallium - Tl Thorium - Th	WRC SOP 1002 by ICP-OES	A

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used	Location Code
CLEARANCE / DECOMMISIONING / WASTE SAMPLES (cont'd)	<u>Chemical Testing</u> (cont'd)	Documented in house method:	
Acidic Samples and Dissolution liquors (including fused samples) Range: µg/L to g/100 ml (cont'd)	Elemental determination for: (cont'd) Tin - Sn Titanium - Ti Uranium - U Vanadium - V Zinc - Zn Zirconium - Zr	WRC SOP 1002 by ICP-OES	A
CLEARANCE / DECOMMISIONING / WASTE SAMPLES	<u>Physical Testing</u>		
Dry uranic / non-uranic solid samples	Absolute (skeletal) volume and density	WRC SOP 2000 by gas pycnometry	A
END			