

Table 5b
²³⁵U Enrichment (NDA)

Method	Technique	Instrument*	Material	Grade	Shielding Material	Shielding Thickness mm	Uncertainty (% rel., k=1)		ITV (% rel., k=1)	Notes
							u(r)	u(s)	u(c)	
LRGS	T0	XMCN	UF ₆	DU	Fe	16.0	20.0	5.0	20.6	
			UF ₆	NU	Fe	16.0	10.0	3.0	10.4	
			UF ₆	LEU	Fe	12.5	5.0	2.0	5.4	
			UOX	NU	Fe	1.5	5.0	3.0	5.8	
			UOX	LEU	Fe	1.5	3.0	2.0	3.6	
	T2	XMCN	UO ₂	LEU	n/a	n/a	3.0	1.0	3.2	pellets, rods
	T1	HM-5	UF ₆	NU	Fe	16.0	13.0	3.0	13.3	
			UF ₆	LEU	Fe	12.5	6.0	3.0	6.7	
			UOX	NU	Fe	1.5	10.0	4.0	10.8	
MRGS	T1	XMCL	UF ₆	LEU	Fe	12.5	4.0	1.0	4.1	
			UOX	NU	Fe	1.5	4.0	1.0	4.1	
			UOX	LEU	Fe	1.5	3.0	1.0	3.2	
	T2	XMCL	UO ₂	NU	n/a	n/a	3.0	1.0	3.2	pellets, rods
			UO ₂	LEU	n/a	n/a	2.0	1.0	2.2	pellets, rods
	T1	XMCC	UF ₆	NU	Fe	16.0	10.0	2.0	10.2	
			UF ₆	LEU	Fe	12.5	3.0	2.0	3.6	
			UF ₆	HEU	Ni	6.5	1.5	1.5	2.1	
			UOX	DU	Fe	1.5	13.0	3.0	13.3	
			UOX	NU	Fe	1.5	4.0	2.0	4.5	
			UOX	LEU	Fe	1.5	2.0	2.0	2.8	
			UOX	HEU	Fe	1.5	1.5	1.0	1.8	
HRGS	T1	XMCG	UF ₆	DU	Fe	16.0	20.0	5.0	20.6	
			UF ₆	NU	Fe	16.0	10.0	2.0	10.2	
			UF ₆	LEU	Fe	12.5	5.0	2.0	5.4	
			UOX	LEU	Fe	1.5	3.0	2.0	3.6	
	T1	ECGS	UF ₆	VDU	Fe	16.0	20.0	3.0	20.2	
			UF ₆	DU	Fe	16.0	10.0	3.0	10.4	
			UF ₆	NU	Fe	16.0	6.0	1.0	6.1	
			UF ₆	LEU	Fe	12.5	2.5	1.0	2.7	
			UOX	DU	Fe	1.5	4.0	3.0	5.0	
			UOX	NU	Fe	1.5	3.0	1.0	3.2	
			UOX	LEU	Fe	1.5	2.0	1.0	2.2	
	T3-LE	XMCG	Arbitrary	DU	Fe	1.5	8.2	0.7	8.2	mU ≥ 100 g
			Arbitrary	NU	Fe	1.5	5.1	1.5	5.3	mU ≥ 100 g
			Arbitrary	LEU	Fe	1.5	3.0	1.0	3.2	mU ≥ 100 g
			Arbitrary	HEU	Fe	1.5	2.1	1.9	2.8	mU ≥ 100 g
	T3-HE	XMCG	Arbitrary	DU	Fe	10.0	6.1	1.1	6.2	mU ≥ 100 g
			Arbitrary	NU	Fe	10.0	5.8	0.5	5.8	mU ≥ 100 g
			Arbitrary	LEU	Fe	10.0	4.8	0.4	4.8	mU ≥ 100 g
			Arbitrary	HEU	Fe	10.0	3.1	0.8	3.2	mU ≥ 100 g

*click a hyperlink to open method's narrative

Uncertainty categories:

ITV: are presented in black font

Prospective Values: are presented in blue font

Assumptions:

- Only homogeneous material (no sampling error included)

Method categories:

LRGS	Low Resolution Gamma Spectrometry
MRGS	Medium Resolution Gamma Spectrometry
HRGS	High Resolution Gamma Spectrometry

Technique categories:

T0	Enrichment meter principle, absolute intensity of the 186 keV gamma-rays, infinite thickness geometry calibrated against reference material, using 2 ROI
T1	Enrichment meter principle, absolute intensity of the 186 keV gamma-rays, infinite thickness geometry calibrated against reference material, using NaI/GEM/GEM

T2	Fixed geometry measurement, absolute intensity of the 186 keV gamma-rays, calibrated against reference material of similar shape, physical form and chemical composition
T3	Peak ratio technique, intrinsic efficiency calibration, arbitrary sample geometry, radioactive equilibrium
LE	Low energy range analysis ($E < 270$ keV)
HE	High energy range analysis ($E > 120$ keV)

Instrument categories:

XMCG	HPGe detector (BE-1015 / GL1015) coupled to any MCA (InSpector-2000, MCA-527 etc.)
ECGS	Electrically cooled HPGe spectrometer (Micro-Detective, 50 mm x 30 mm, coaxial), collimator dia 50 mm
XMCC	CZT, ≥ 1500 mm ³ (all material grades), ≥ 500 mm ³ (HEU), coupled to any MCA, collimator dia 15 mm (CZT/1500) or 10 mm (CZT/500)
XMCL	LaBr3 detector, thickness ≥ 12.7 mm, diameter ≥ 50.8 mm, coupled to any MCA, collimator diameter = 44 mm

Uranium grade categories, ²³⁵U isotope mass fractions:

VDU	²³⁵ U range from 0.1 % to 0.2 %
DU	²³⁵ U range from 0.2 % to 0.6 %
NU	²³⁵ U nominal enrichment of 0.71 %
LEU	²³⁵ U range from 2 % to < 5 %
HEU	²³⁵ U range of > 20 %