IAEA Nuclear Material Round Robin 2015

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DE LA RECHERCHE À L'INDUSTRIE

IAEA NUCLEAR MATERIAL ROUND ROBIN 2015

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www.cea.fr

CEA Cadarache : LARC

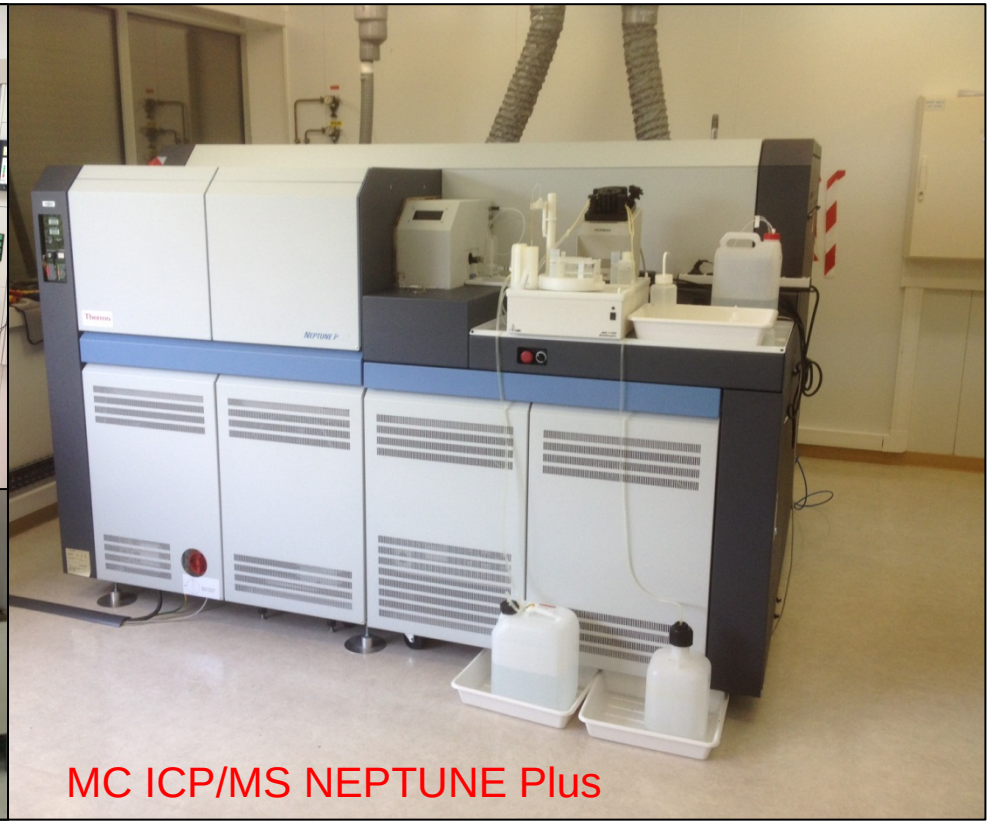
- One of the tenth CEA centers,
- Department of Nuclear Fuels :

Interest for uranium measurements

- In our building:

No glove boxes, no hotcells

Pu limitations : 1.3 10^4 Bq

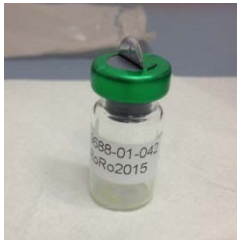


Sample receipt and treatment

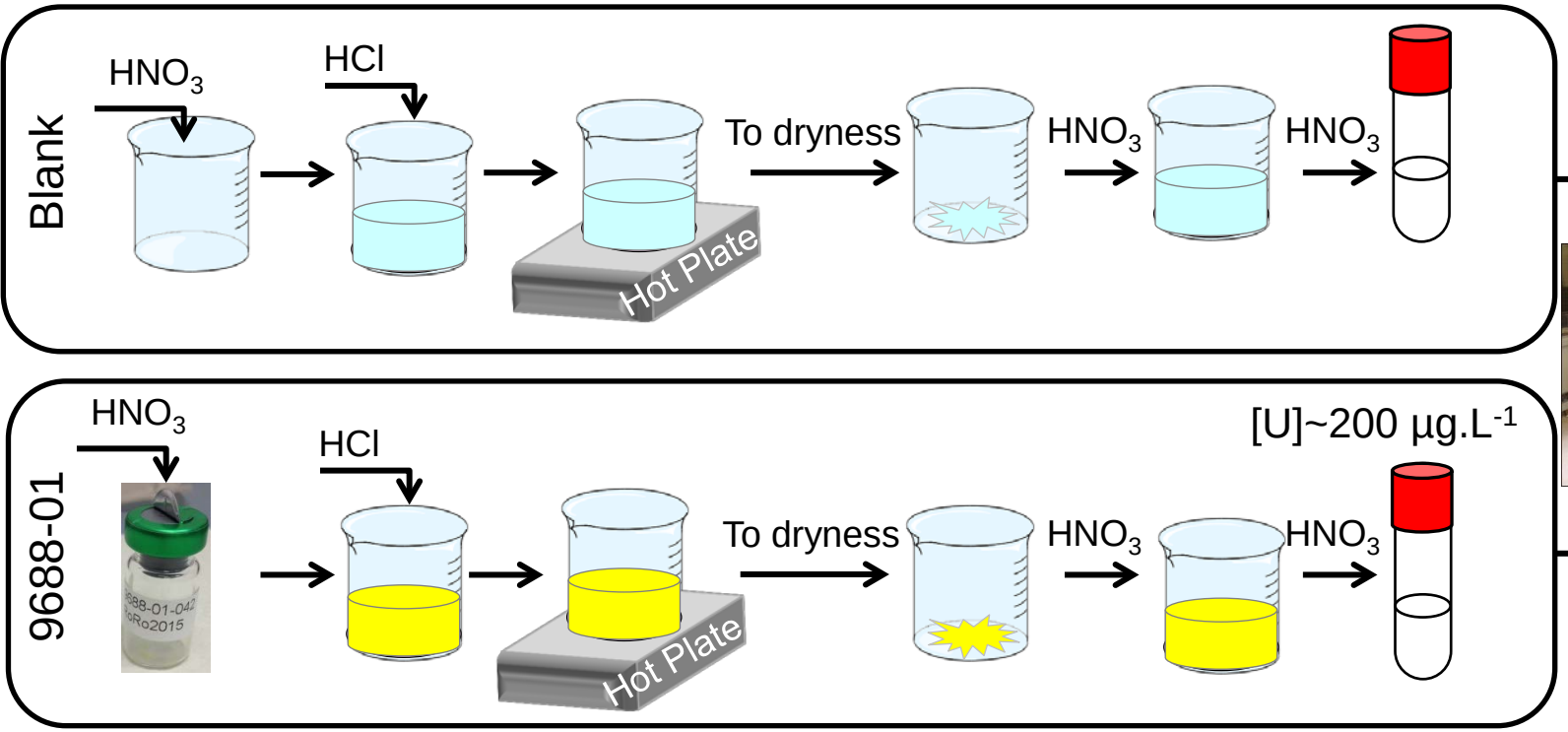
- Shipment

✗ Not allow to receive Pu and mixed U-Pu samples

✓ Reception of the uranium nitrate sample 9688-01 (23th january 2015)

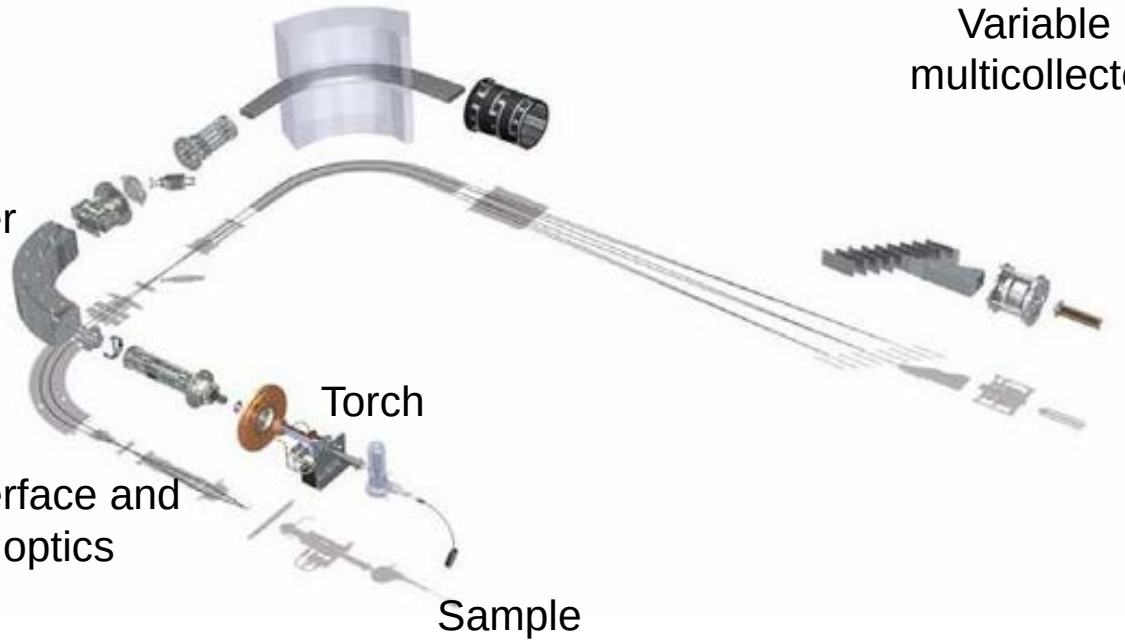


- Treatment



MC ICP/MS instrument

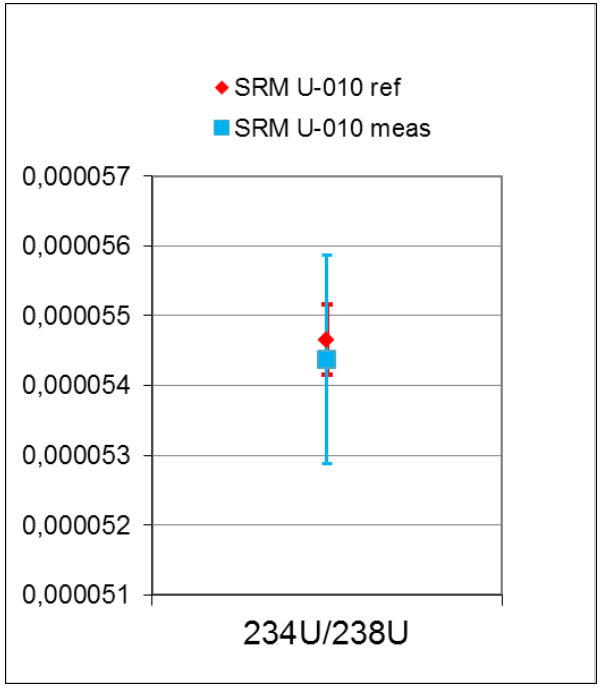
- Neptune schematics

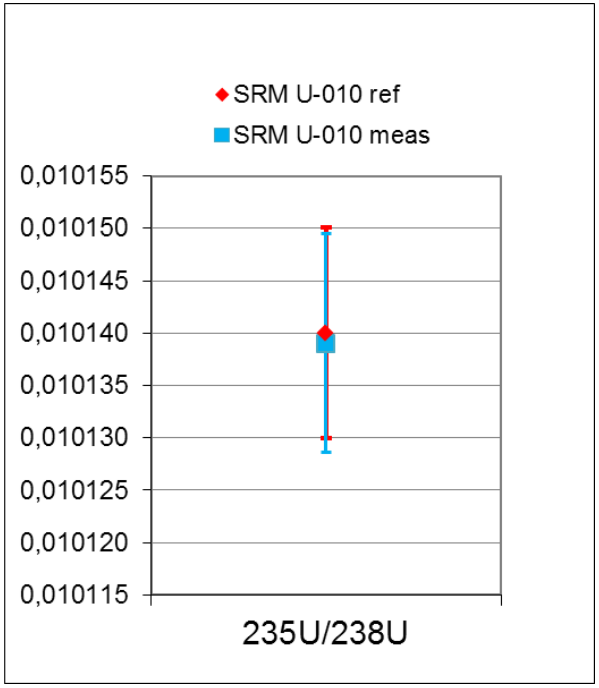


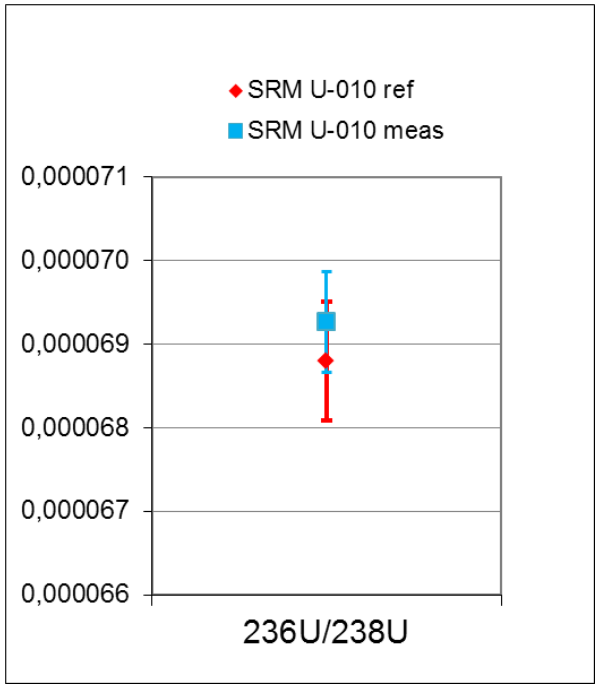
Cup configuration				
L3 (mobile)	L2 (mobile)	L1 (mobile)	C (fixed)	H1 (mobile)
^{234}U	^{235}U	^{236}U	^{238}U	$^{238}U^{1}H$

Isotopic ratios measurements

- Mass bias correction using the Sample standard bracketing (SSB) method
- Materials : SRM U-050 used to correct instrumental bias
  SRM U-010 used to control the mass bias correction applied



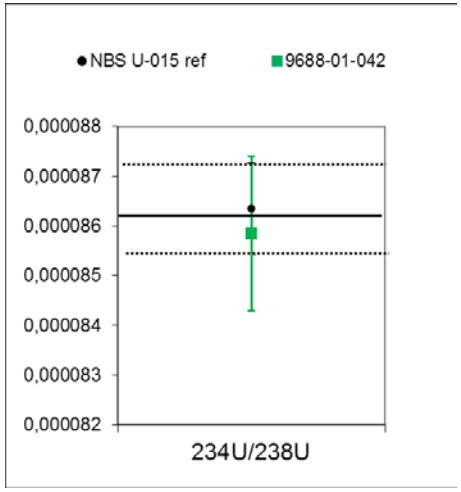


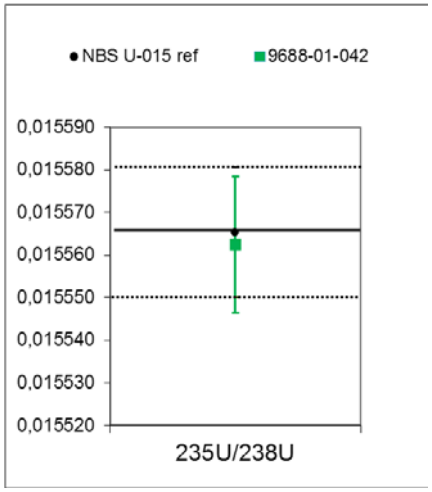


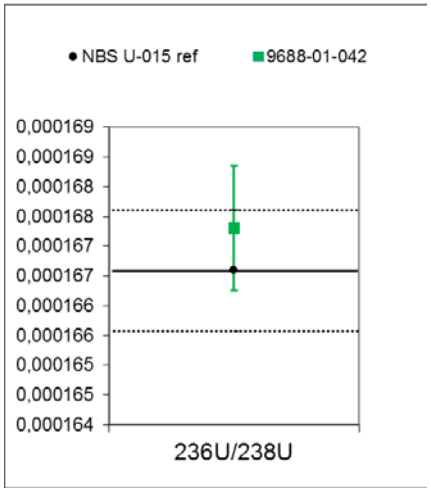
Results and comparison to NBS U-015

- Mean of the 3 measurements and associated uncertainties (given with a coverage factor equal to 2)
- Comparison with NBS U-015 uranium isotopic standard

Material		$^{234}U/^{238}U$	$^{235}U/^{238}U$	$^{236}U/^{238}U$
NBS U-015	Value	0.0000863	0.0155654	0.0001666
	Uncertaincy (k=2)	0.0000009	0.0000152	0.0000010
9688-01-042	Value	0.0000858	0.0155624	0.0001673
	Uncertaincy (k=2)	0.0000015	0.0000160	0.0000010

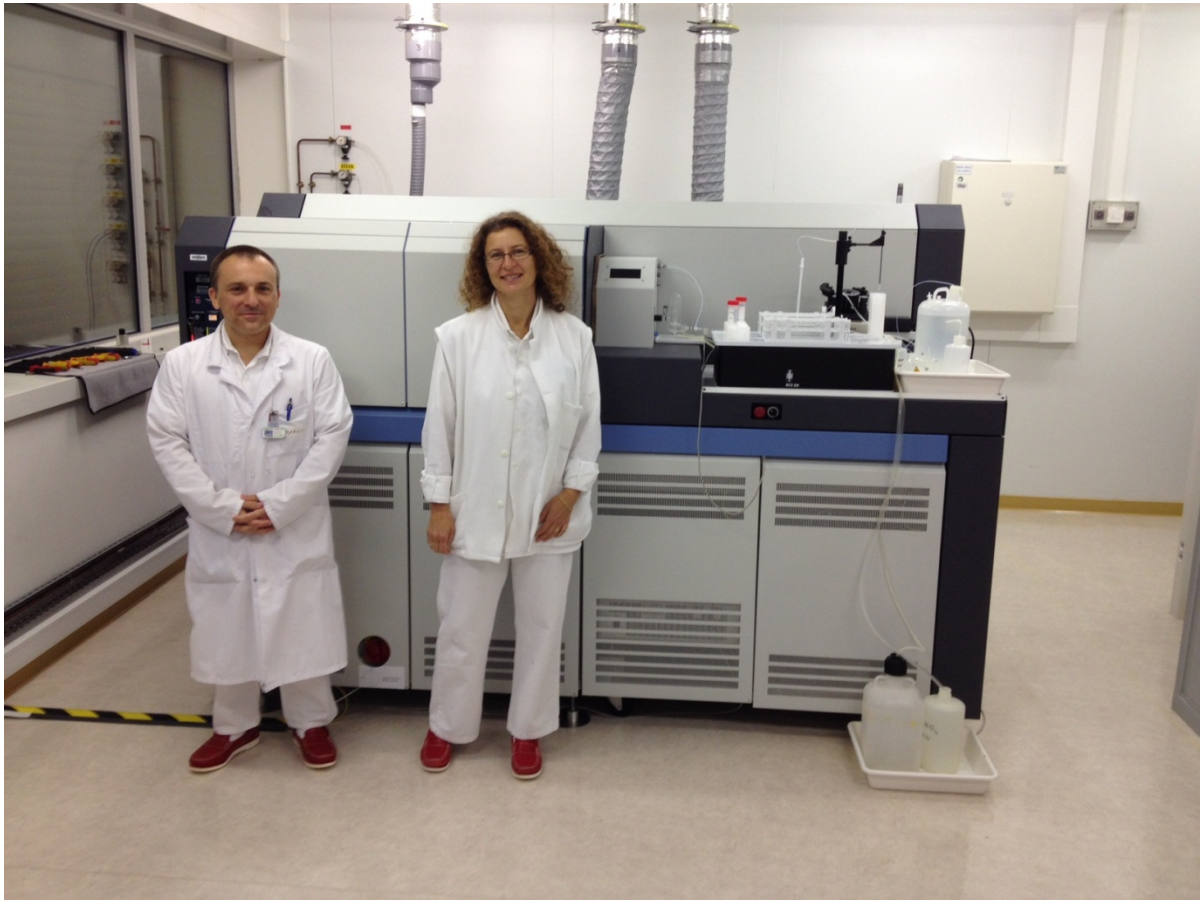






Acknowledgments

- Nadège and Christophe for the analyses



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