



IAEA Nuclear Material Round Robin 2015

O. Vigneau, N. Arnal, C. Winkelmann

► To cite this version:

O. Vigneau, N. Arnal, C. Winkelmann. IAEA Nuclear Material Round Robin 2015. Technical meeting on nuclear material - Round Robin 2015, Oct 2015, Vienne, Austria. hal-02445733

HAL Id: hal-02445733

<https://cea.hal.science/hal-02445733>

Submitted on 20 Jan 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

DE LA RECHERCHE À L'INDUSTRIE



IAEA NUCLEAR MATERIAL ROUND ROBIN 2015

Olivier VIGNEAU, Nadège ARNAL,
Christophe WINKELMANN

DEN, DEC, SA3C

Laboratory of Radiochemical and Chemical Analyses
(LARC)

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 : $1.3 \cdot 10^4$ Bq



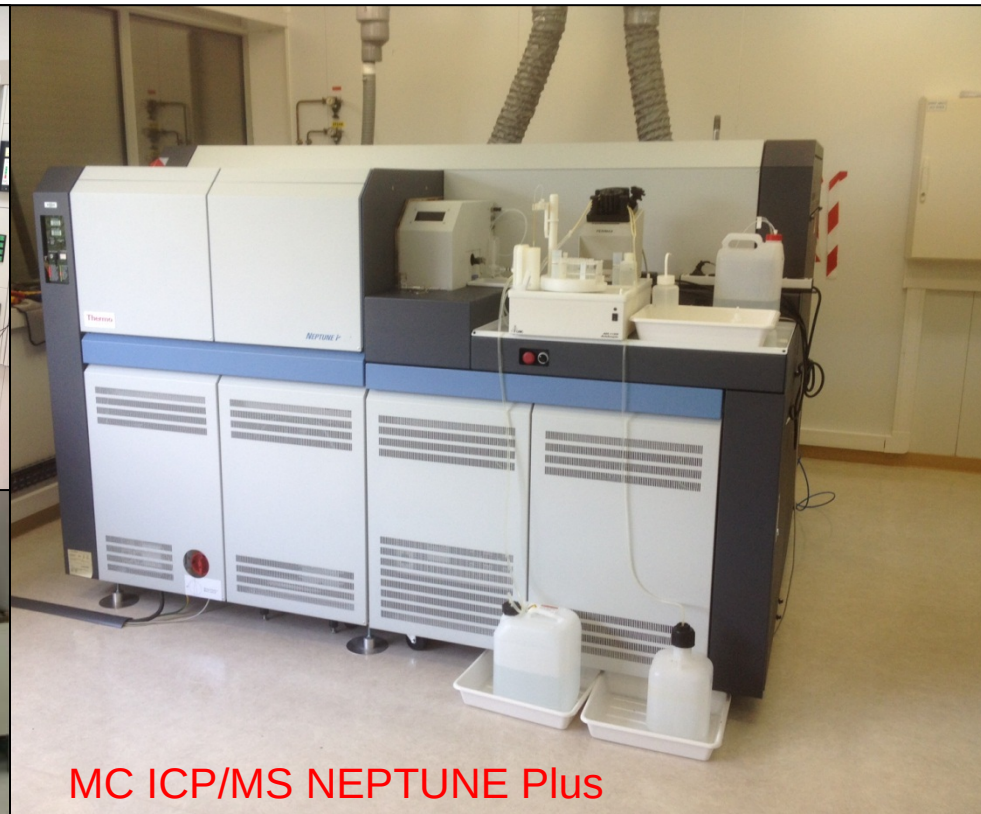
Cadarache



LC-ICP/MS PE Elan



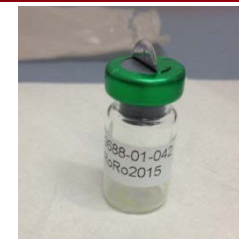
ICP/AES ActivaM Horiba



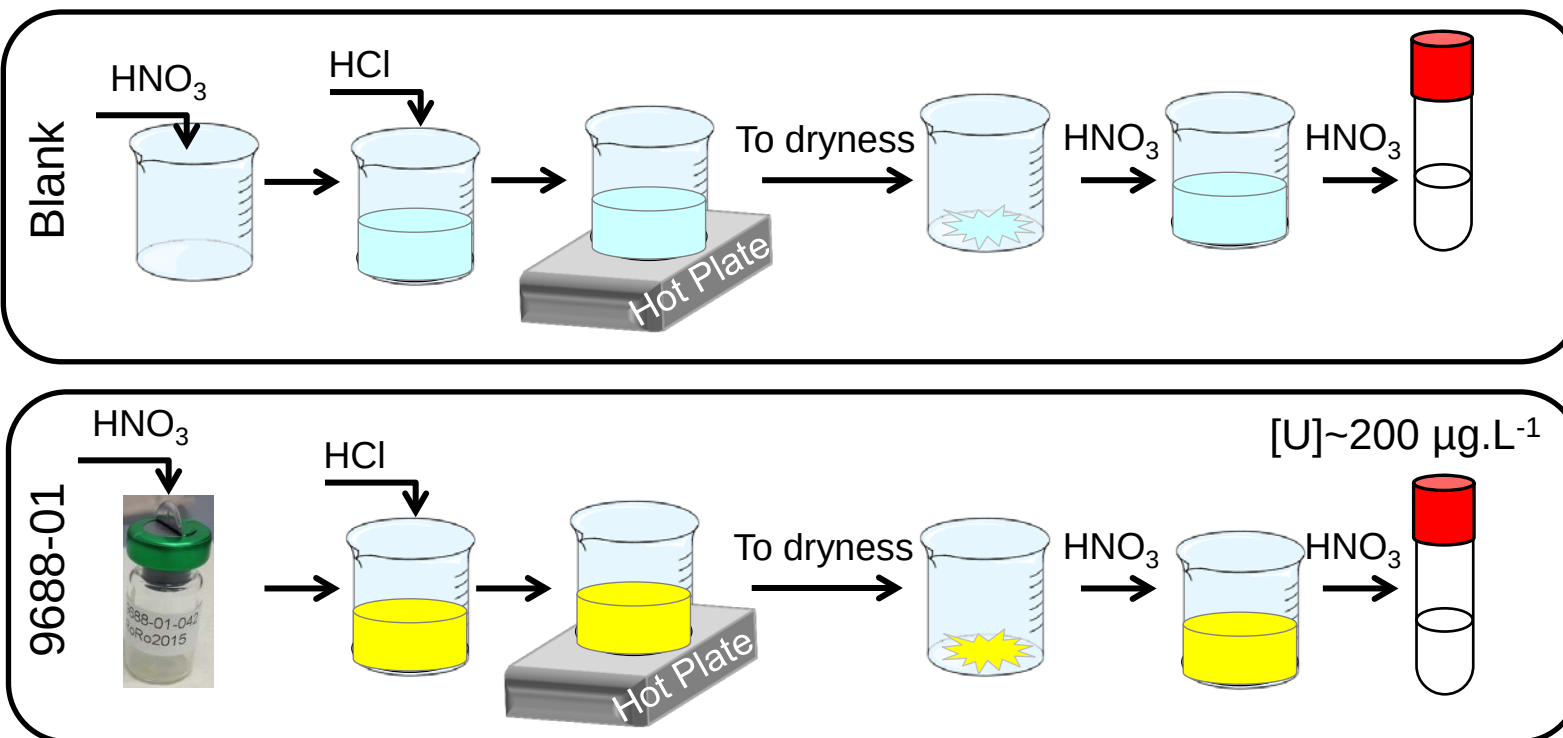
MC ICP/MS NEPTUNE Plus

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)

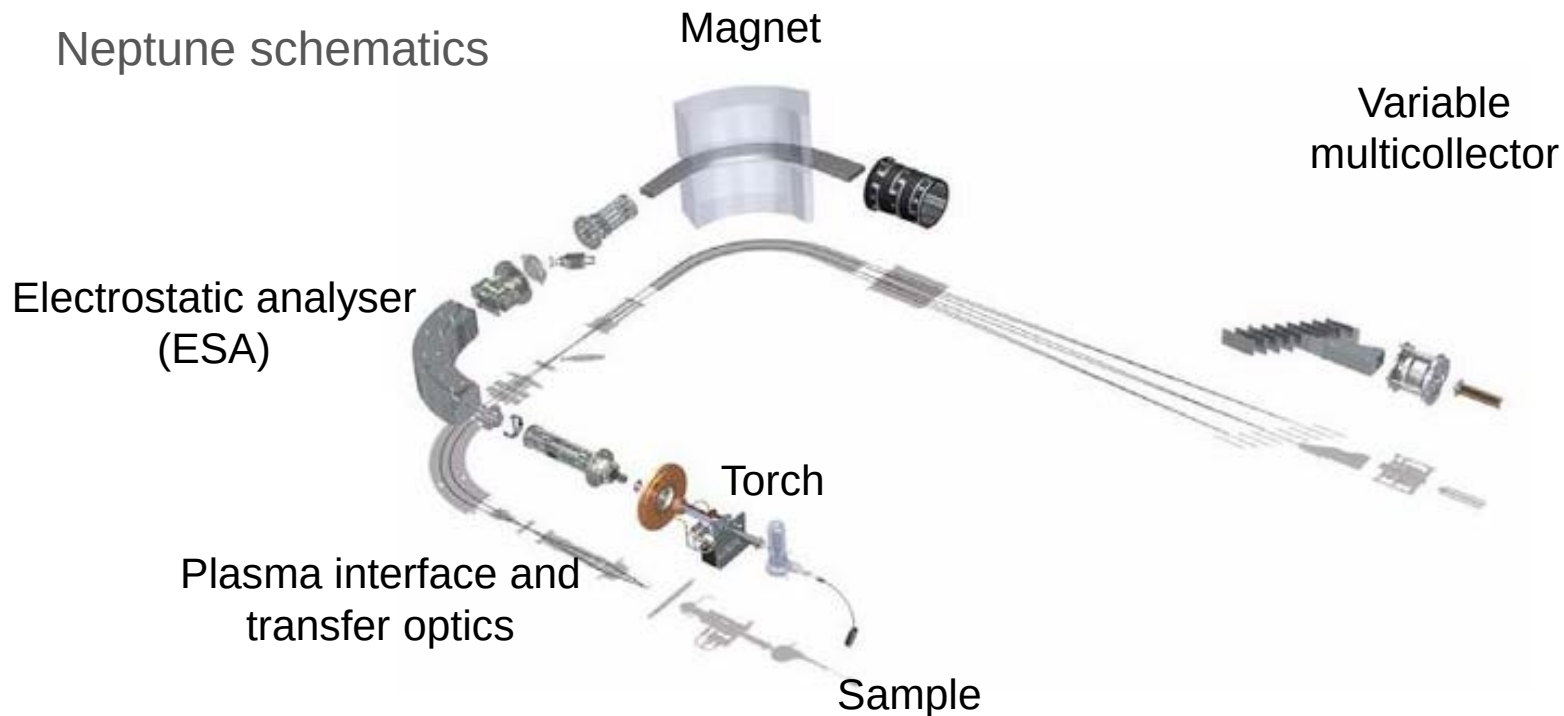


- Treatment



MC ICP/MS instrument

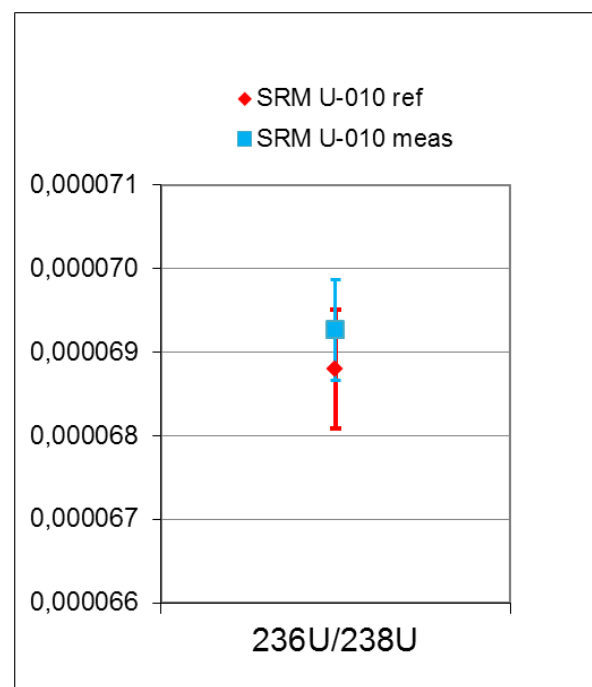
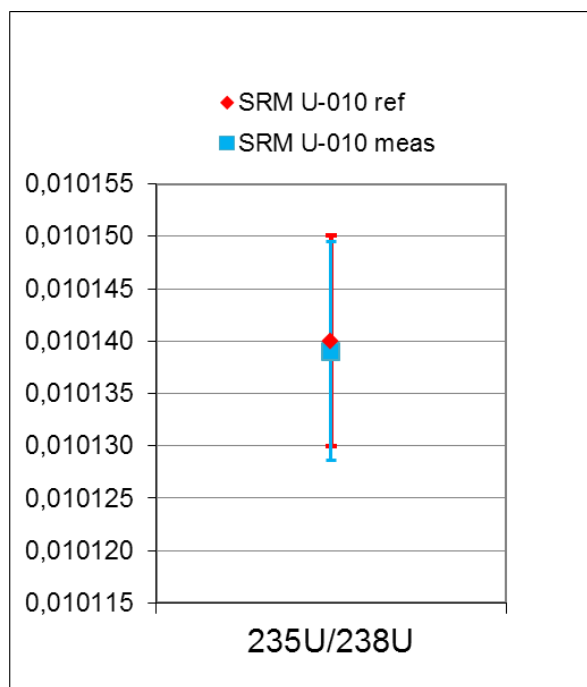
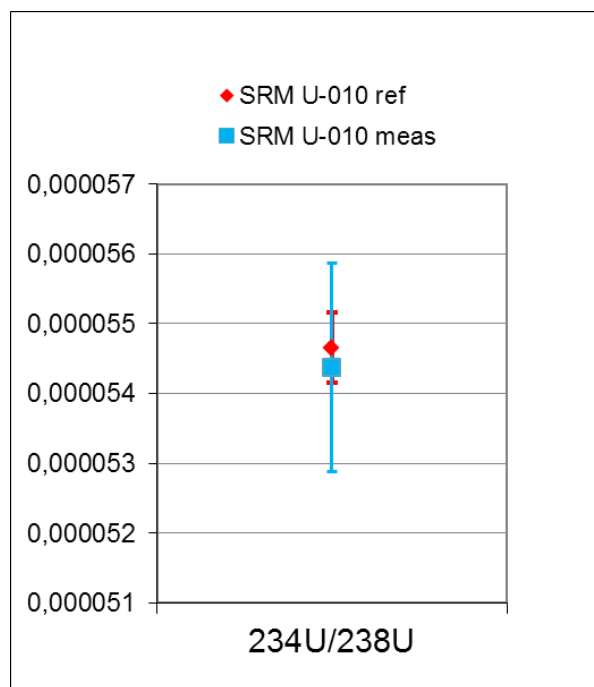
- Neptune schematics



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

Isotopic ratios measurements

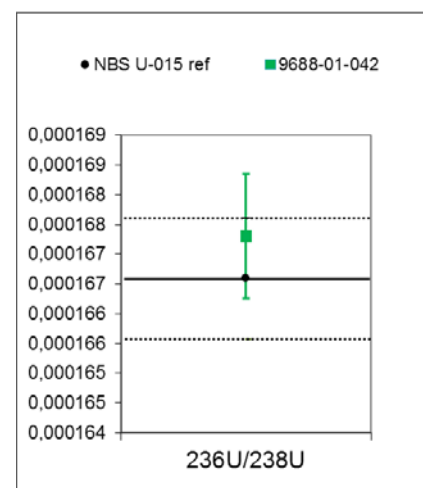
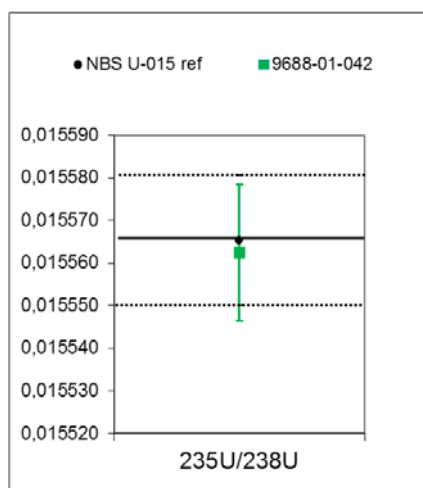
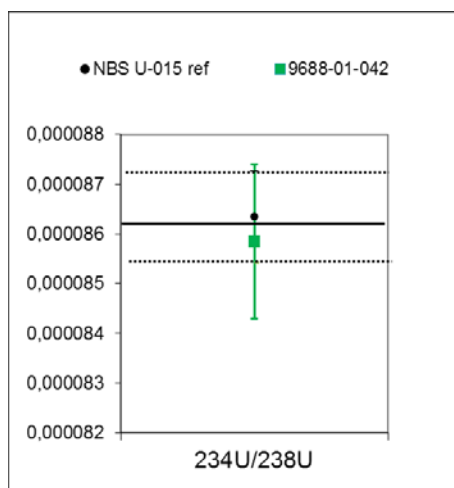
- Mass bias correction using the Sample standard bracketing (SSB) method
- Materials : SRM U-050 used to correct instrumental bias
SRM U-010 used to control the mass bias correction applied



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



Acknowledgments

- Nadège and Christophe for the analyses

