Ucx targets at ISOLDE

Target and Ion Source Development (TISD)

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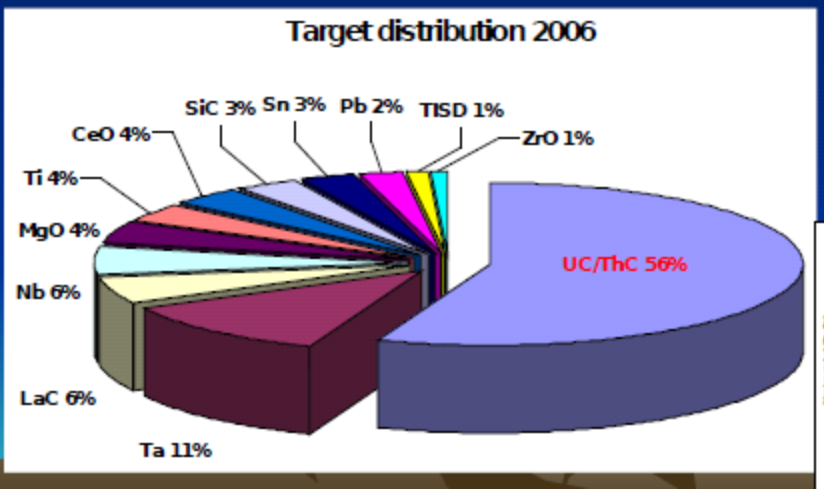
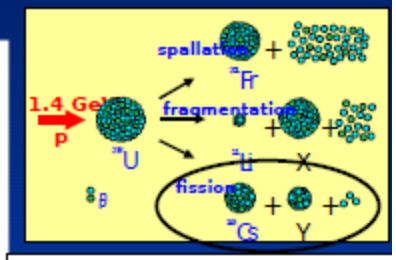
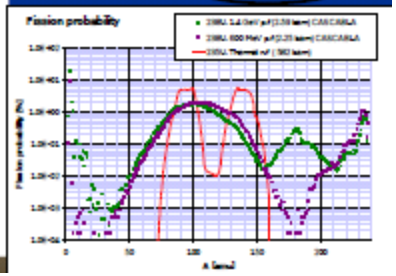
Production targets

- Actinide targets in 2006 (in2009)
  - 196 shifts (out of 350.5) **[56%]** (282,>60%)
  - 11 new units (12)

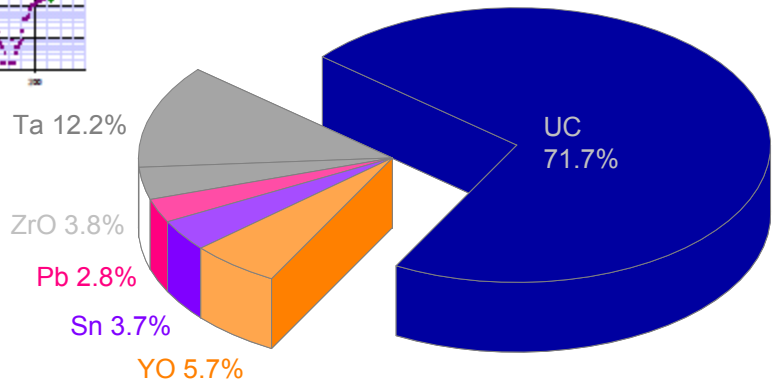






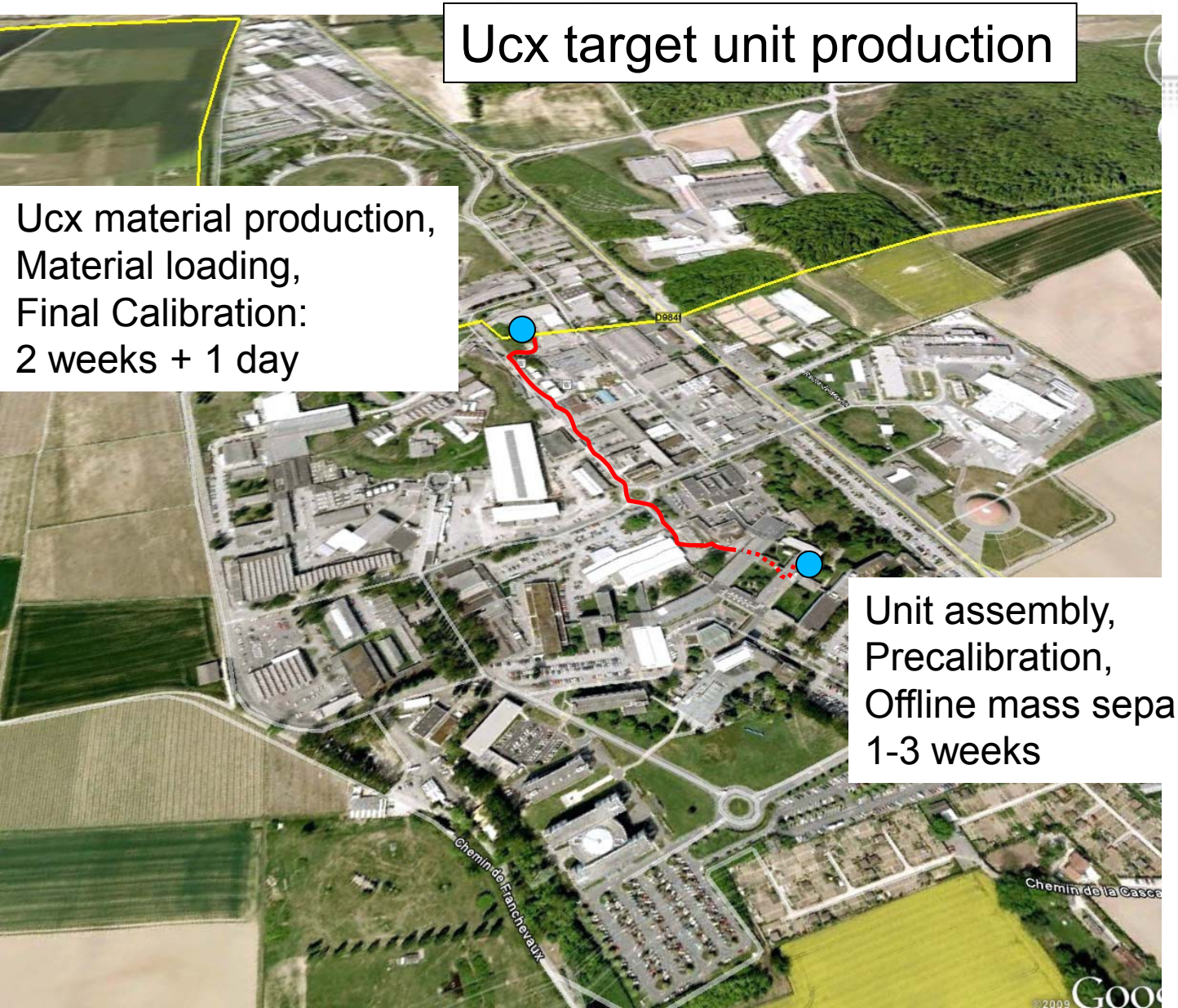
Actinide targets in 2010

- 244 shifts out of 350 → 72%
- 12 new and 2 old units



Ucx target unit production

Ucx material production,
Material loading,
Final Calibration:
2 weeks + 1 day



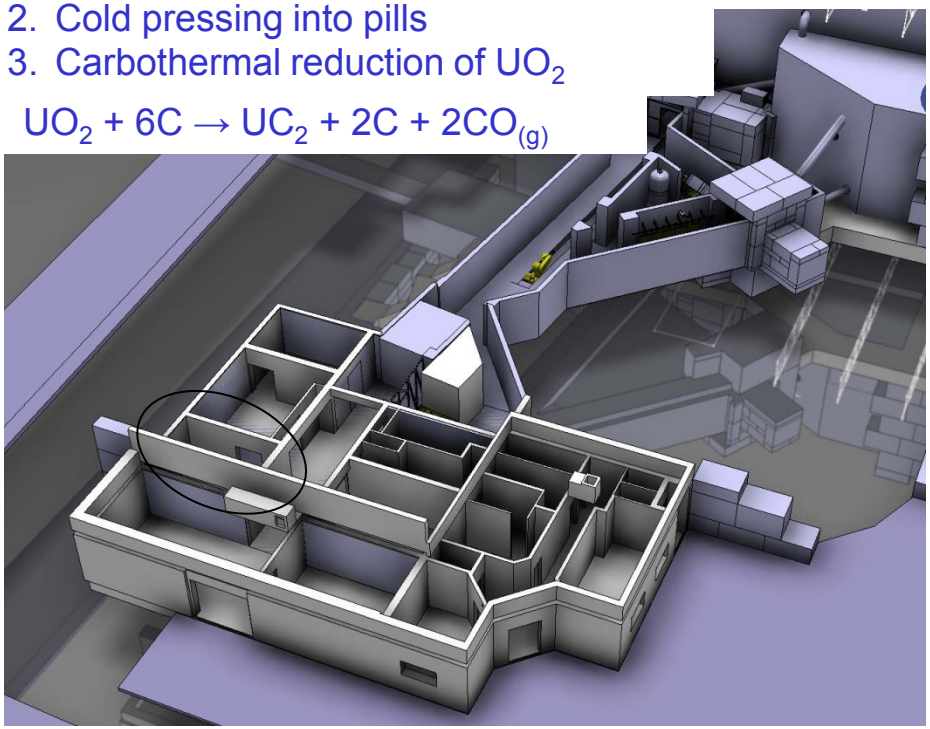
Unit assembly,
Precalibration,
Offline mass separator tests:
1-3 weeks

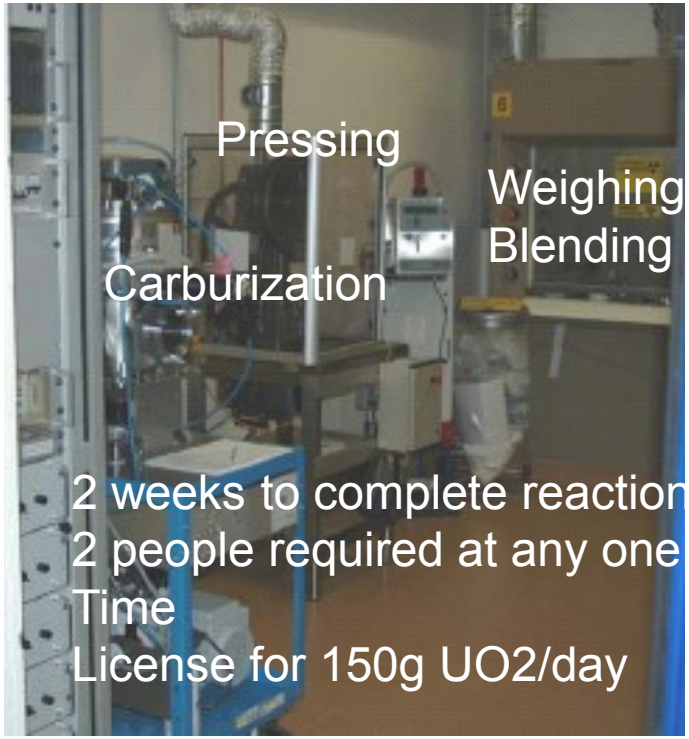
Ucx target Production

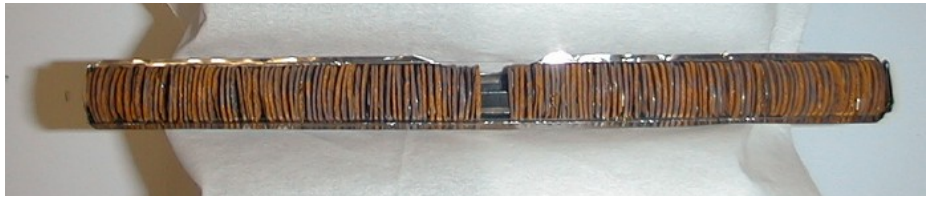
Production Process:

1. Blending UO_2 and carbon powder
2. Cold pressing into pills
3. Carbothermal reduction of UO_2

$UO_2 + 6C \rightarrow UC_2 + 2C + 2CO_{(g)}$







Present constraints

-Average 2 weeks to produce 1 UCx batch

-Preparatory phases (blending, unit prep.)

-Constraints linked to Uranium material handling (class A lab, 2 people)

→ 12 Units production / physics year (ie 24 weeks) is still in force

Possible ways out

-Completion of the missing offline mass separator in Class A Lab.

-Development of a new Ucx material production process: ActILab (ENSAR), A. Gottberg.

-Prolongation of target lifetime (ActILab, HIE-ISOLDE).

Based on release seen at target
Change operations:
3 days direct irradiation
1.5 days on n-converter

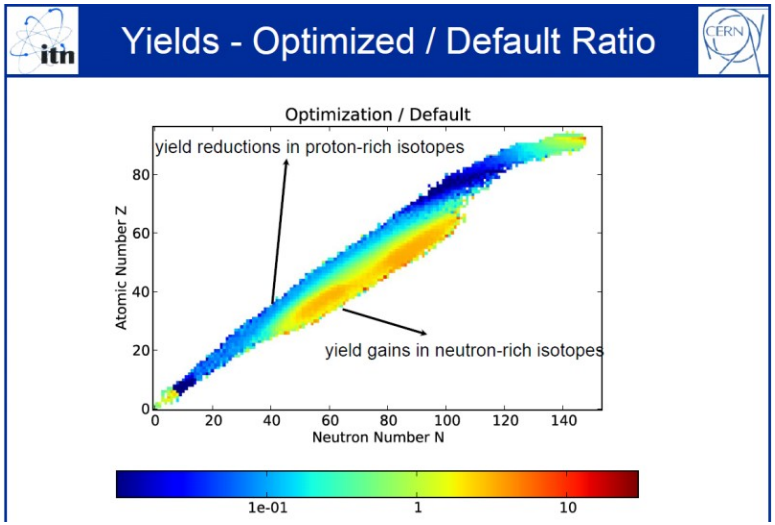
2011

ID		Target No.	Target type	Source	MM (A,B:same MM A/B:different MM)				
1		#459	empty	-	-	for FE7 tests; used c			
2		#442	Ti	W-LIST	Mg/Mg1000nAh/Rb	TISD - Mg RILIS & i			
3		#443	Ta	W	Sm,Dy/1000nAh Sm/Cs	!! change MM 1000nA			
4		#444	ZrO	W	Ga/Rb/Zn	look for existing un			
5		#445	ThCx	W	Tl/Au	checked: ThCx (			
6		#446	YO	VD5	leak<= 1e-6mbarL/s	no impur. Cl, Fe, etc			
7		#447	UC	Ta	Tl/Pb				
8		#448	Ta	W	Dy/1000nAh Dy/Cs				
9		#432	CaO	VD7	leak<= 1e-6mbarL/s	less than 10 pA 350I - 25% Ar ion. efficiency	GPS	Mon 5/30/11	Fri 6/10/11
10		#449	Sn	VD5	leak<= 1e-6mbarL/s	***VD3 dev. Canceled - keep normal MK3***	GPS	Mon 6/6/11	Fri 6/17/11
11		#450	Ta	GdB6	***Nd/Cs/Sm+Pr***	no chicane.	HRS	Mon 6/13/11	***Fri 6/24/11***
12		#451	UC	Ta	Ag/Cs/Na	***(container with vertical electr connections) - unit CANCELLED***	GPS	Tue 6/14/11	Mon 6/27/11
13		#460	pellets	W	1MM+return	demo unit - 1/2 cross section - 3D printed model scale 1:1	Control room	Mon 6/20/11	Fri 7/1/11
14						+ 1 VADIS on plexi support for demo	Control room	Fri 7/1/11	Fri 7/1/11
15		#452	UC	VD7	leak<= 1e-6mbarL/s	full TANTALUM VADIS proto in place of Mo !!	HRS	Mon 6/20/11	Fri 7/1/11
16		#453	UC	Re	Tl/Cs/Na	***Re foil in W cavity - container vertic. elect. Connections***	GPS	Wed 6/29/11	Tue 7/12/11
17		#454	UC	***W n qartz***	Cd/Cs	cold quartz. Same temp profile (& 128Cd/In yields) as UC362	HRS	Fri 7/8/11	***Thu 7/21/11***
18		#455	UC	W	Cd/Cs/Tl?	***back up 447? -full Re cavity ion source if possible***	GPS	Fri 7/15/11	Thu 7/28/11
19		#456	YO	VD7	leak<= 1e-6mbarL/s	for 72Kr Impurities Ge, As, etc/ 35% Kr eff.	HRS	Tue 7/26/11	Mon 8/8/11
20		#457	UC	Re	Na/Mn/Rb	tbd	GPS	Mon 8/1/11	Fri 8/12/11
21		#458	UC	W	leak 1e-4mbarL/s	for possible CF4, but no injection before confirmation !!	HRS	Thu 8/11/11	Wed 8/24/11

Possible ways out

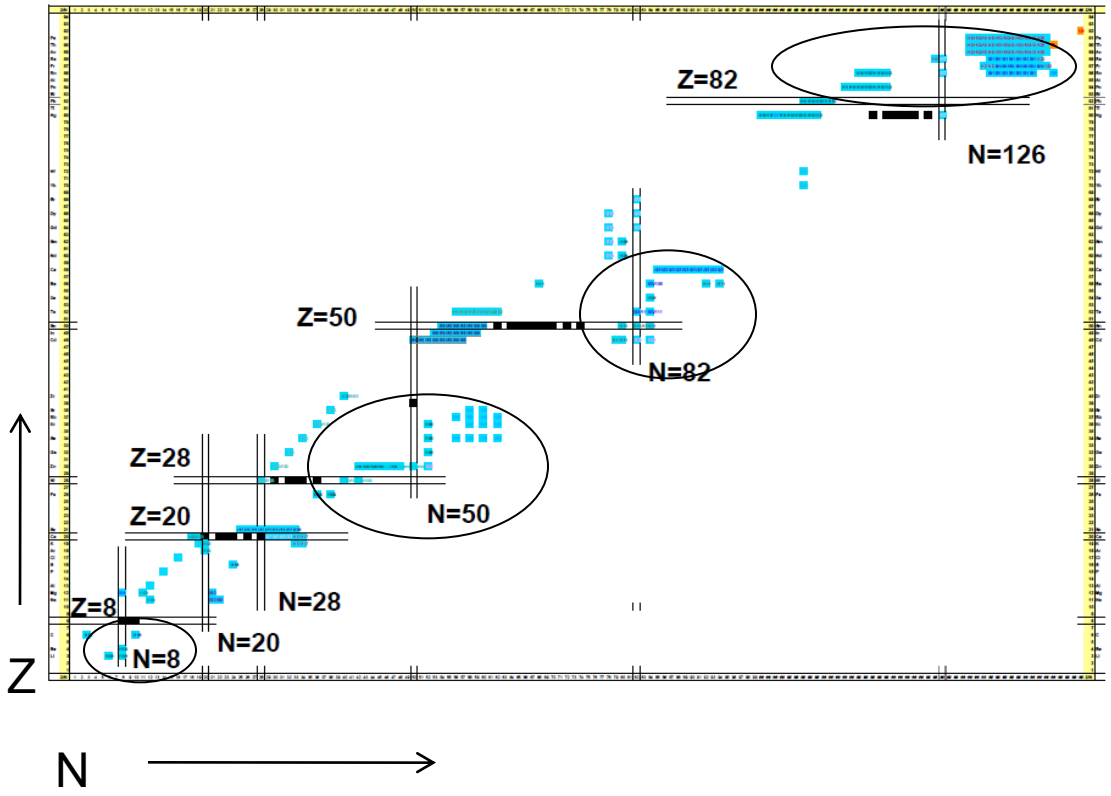
Look at releases more carefully, to reduce this period (strong indications this will be possible)

Development of n-converter for fission products



R. Luis

And the future



Beams requested within HIE-ISOLDE LoIs