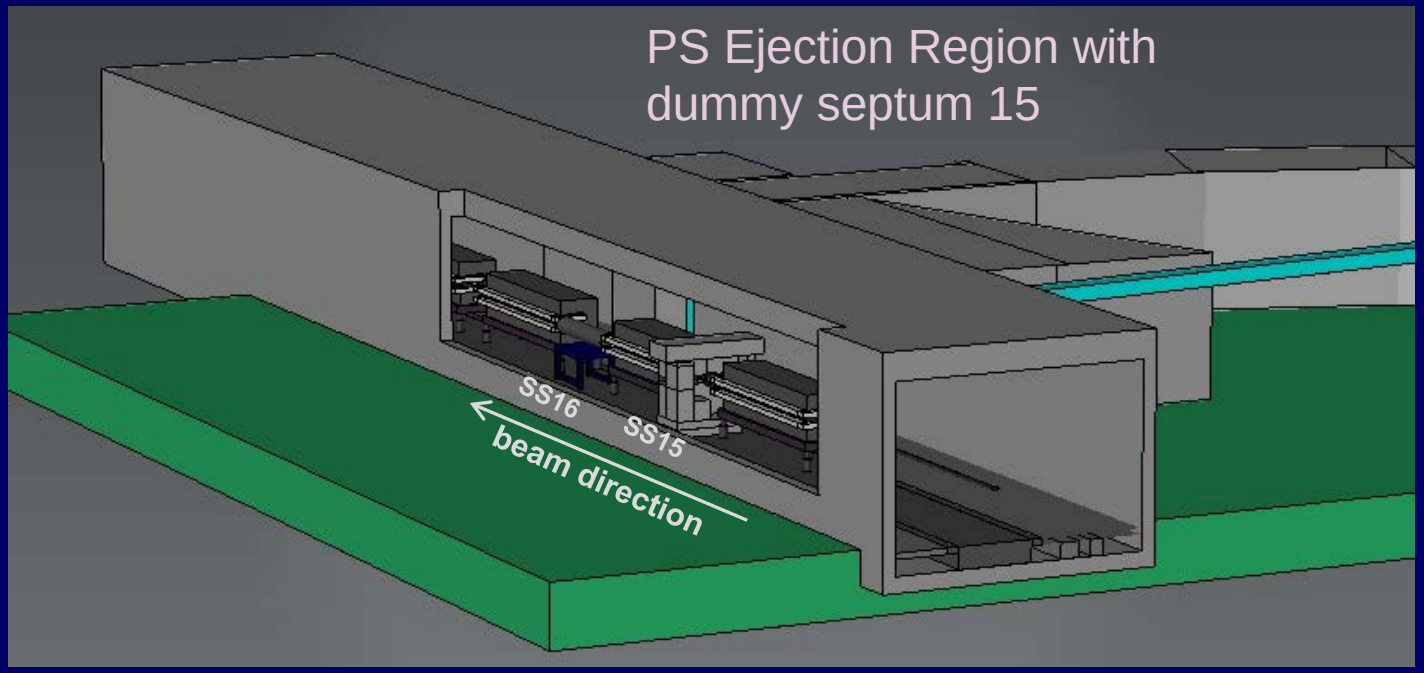
Local Shielding around the Dummy Septum15

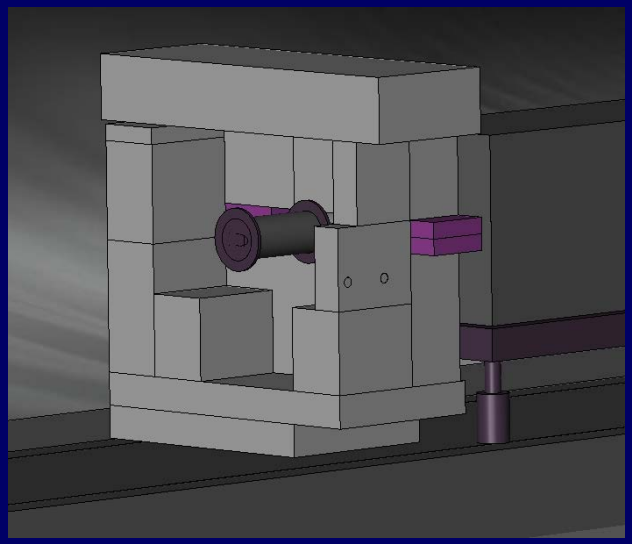
Sanja Damjanovic, DGS-RP

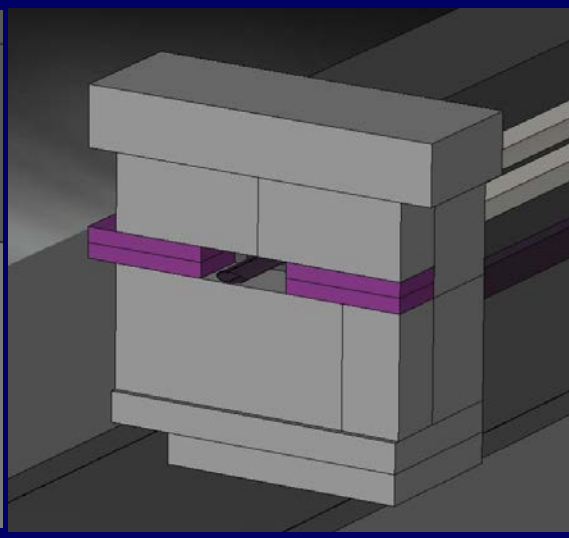
CERN, May 30, 2013

FLUKA Geometry of the Local Shielding in SS15 as of April 2013

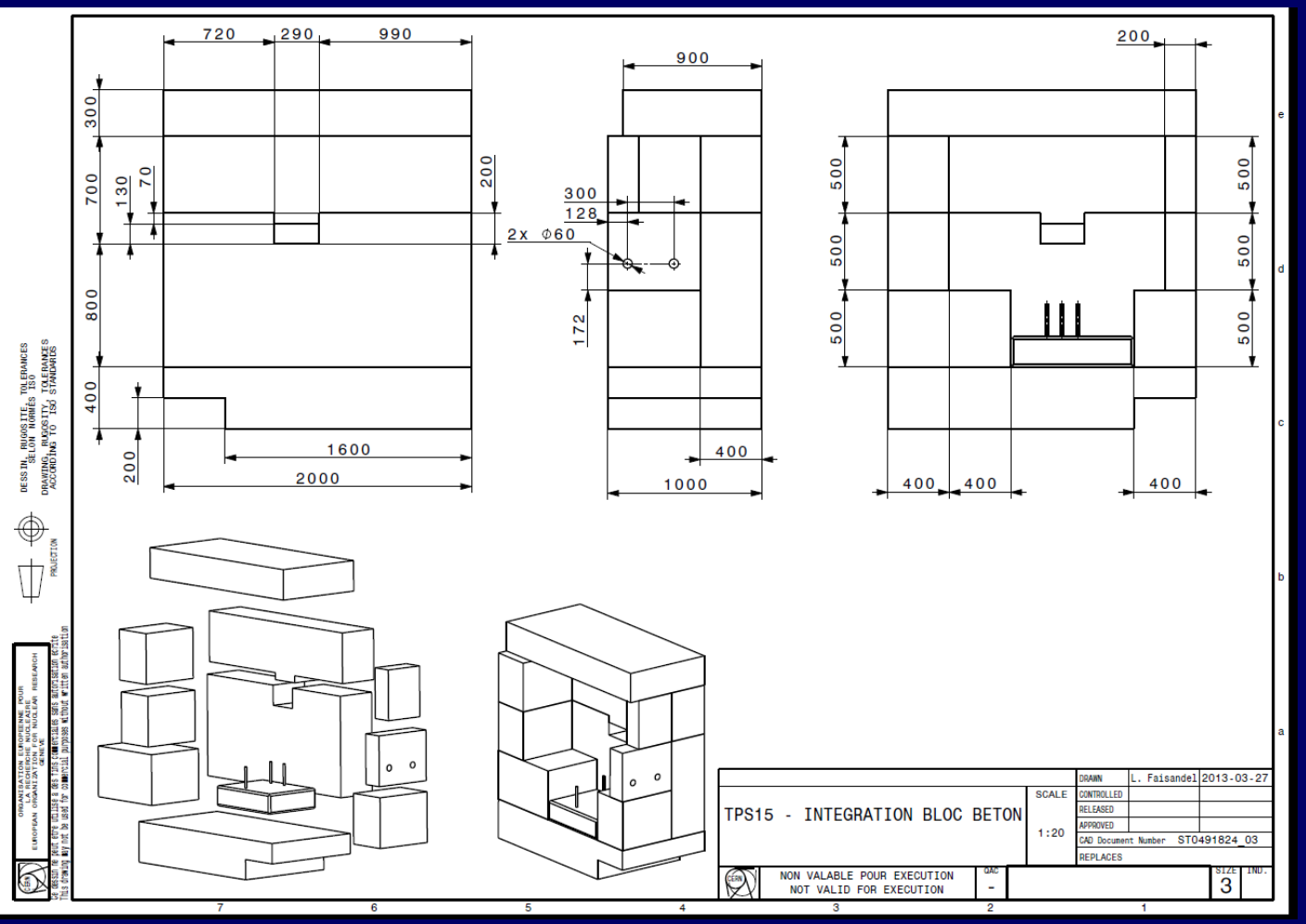


Soil, Stainless Steel, Marble, Aluminum, Concrete, Air





Local Shielding around the Dummy Septum - New Proposal May 2013

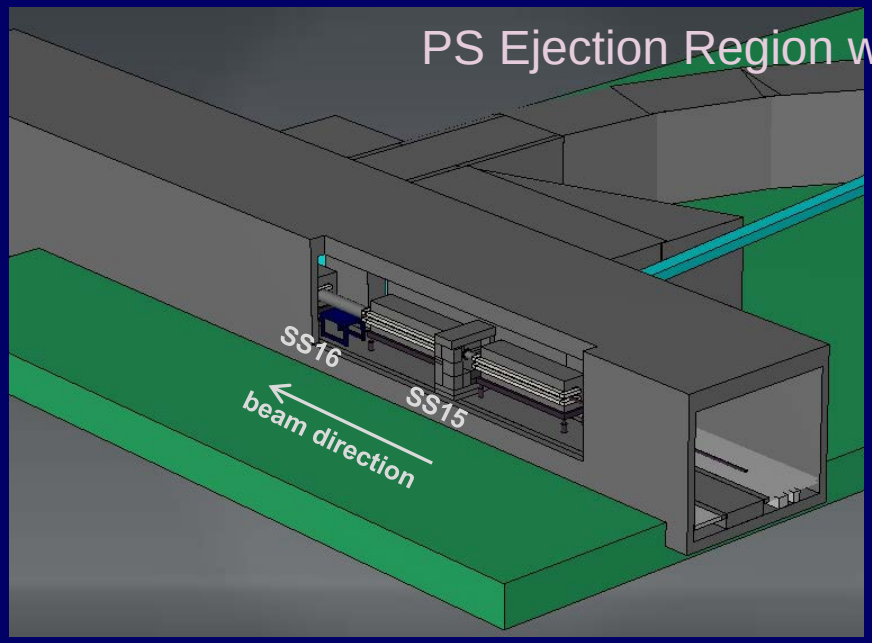


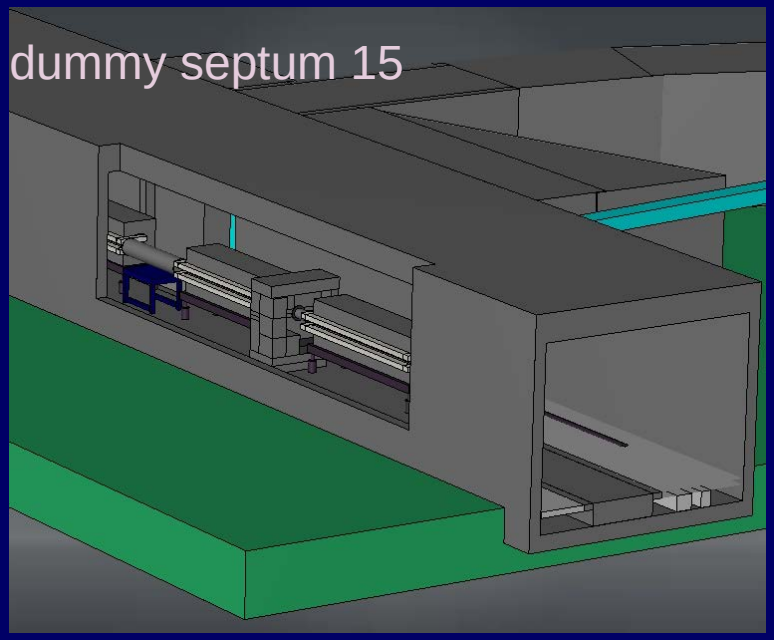
R.F. Ortega

- lateral dimension: 200 cm
- longitudinal dimension: 100 cm
- vertical dimension: 220 cm

FLUKA Geometry of the Local Shielding in SS15 as of May 2013

PS Ejection Region with dummy septum 15





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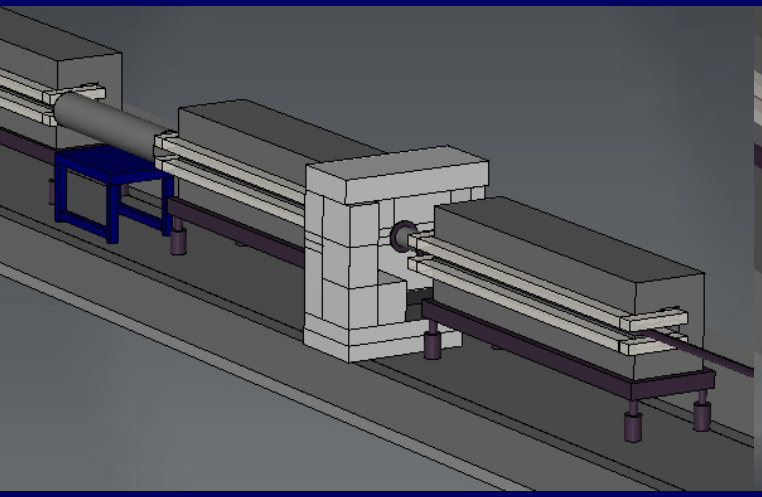
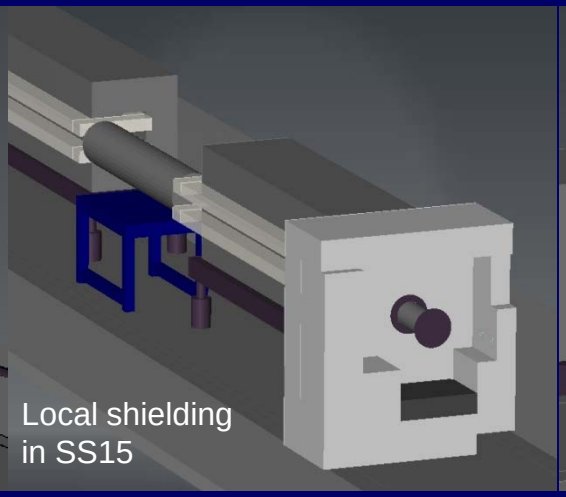
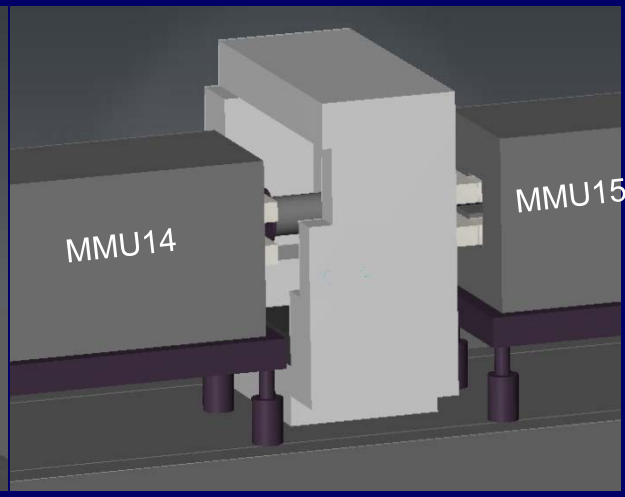
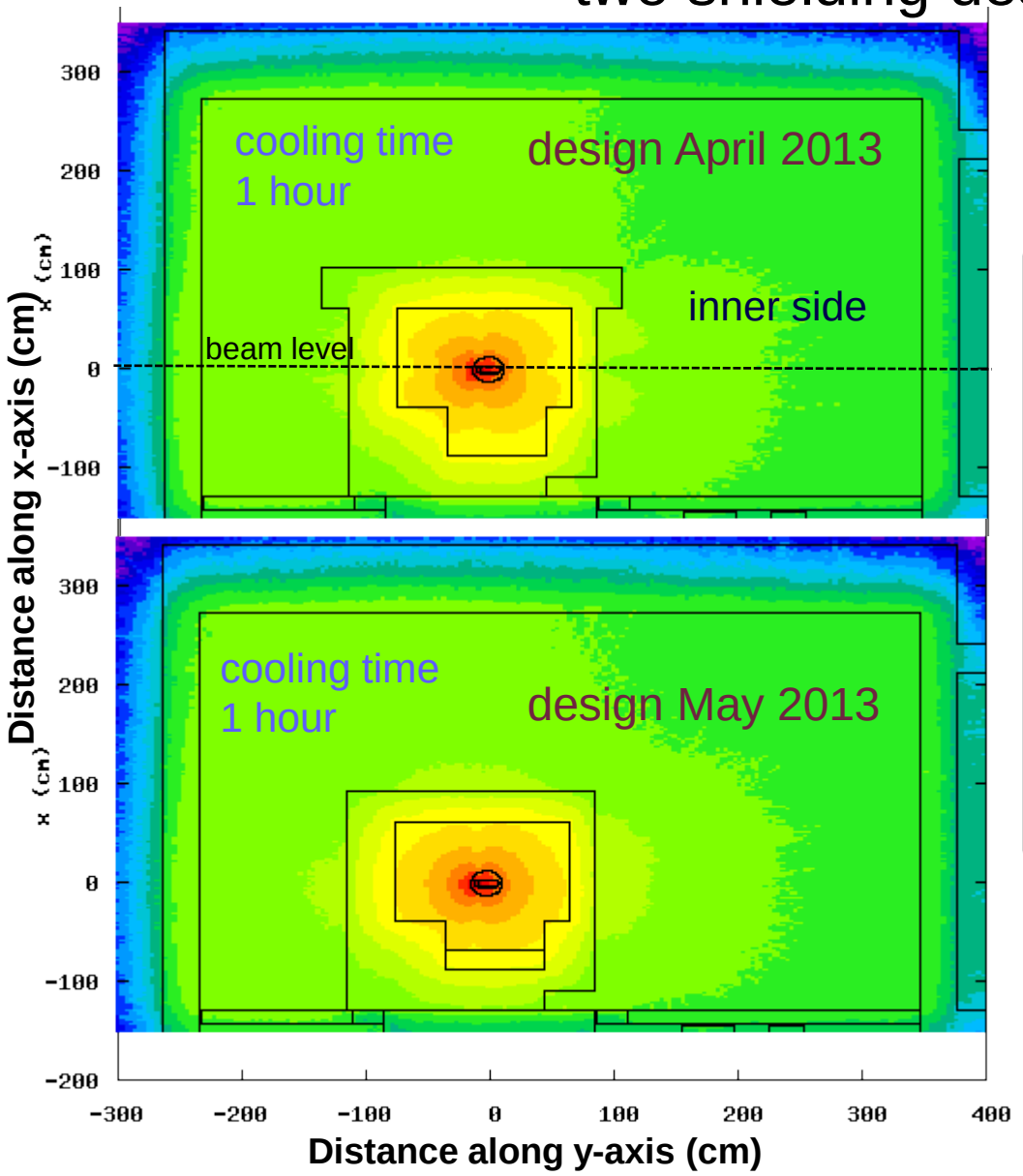
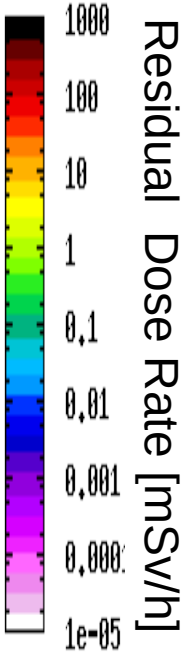




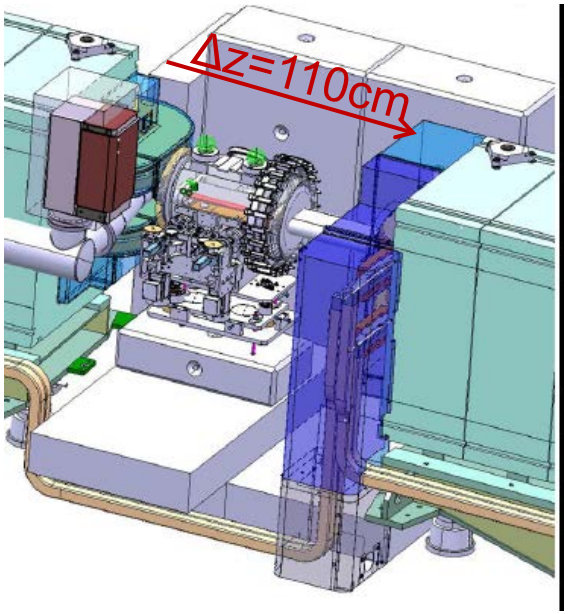


Residual Dose Rates with local shielding in SS15
- two shielding designs -





2-dim projections in x-y plane, averaged over Δz=110cm (-1190<z<-1080cm, middle of SS15) and over ±30 cm in x, around the beam level

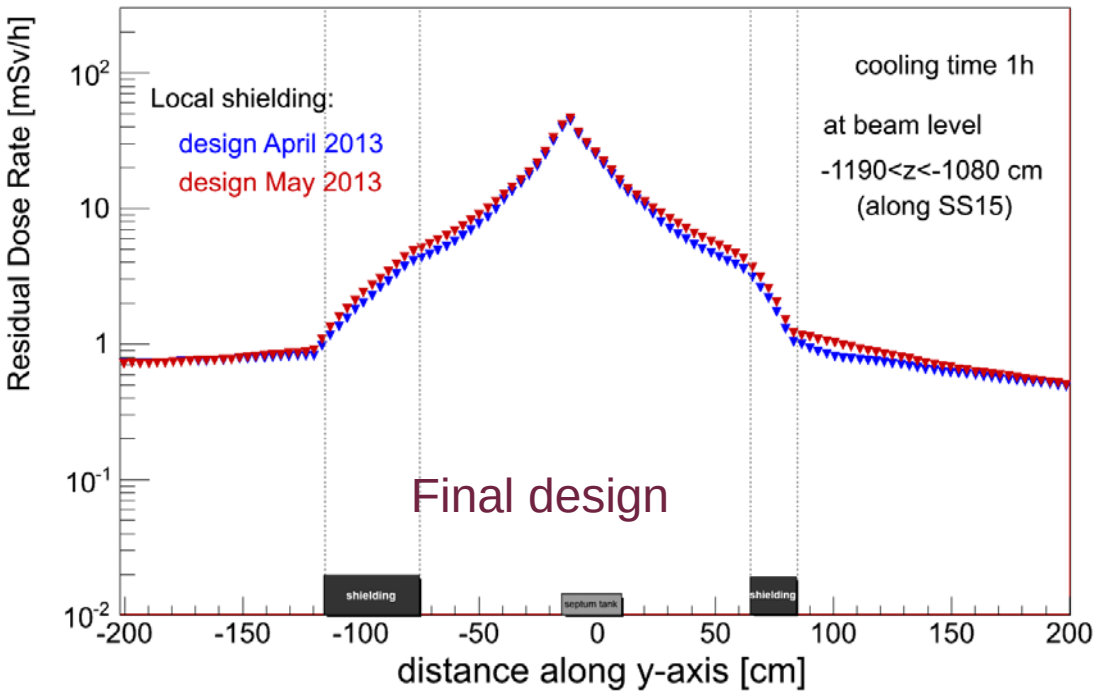


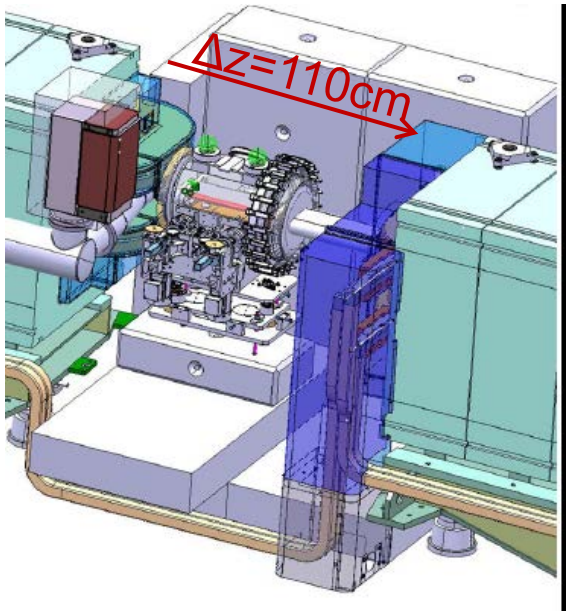
Comparing the color codes, the residual dose rates outside the local shielding similar for the two different shielding designs

z-beam direction, x-vertical, y-horizontal direction

Residual Dose Rates with local shielding in SS15
- two shielding designs -

1 dim projections along y (horizontal) at the beam level, averaged over Δz=110 cm (-1190<z<-1080cm, middle of SS15)





Residual dose rates the same for the two different shielding designs throughout

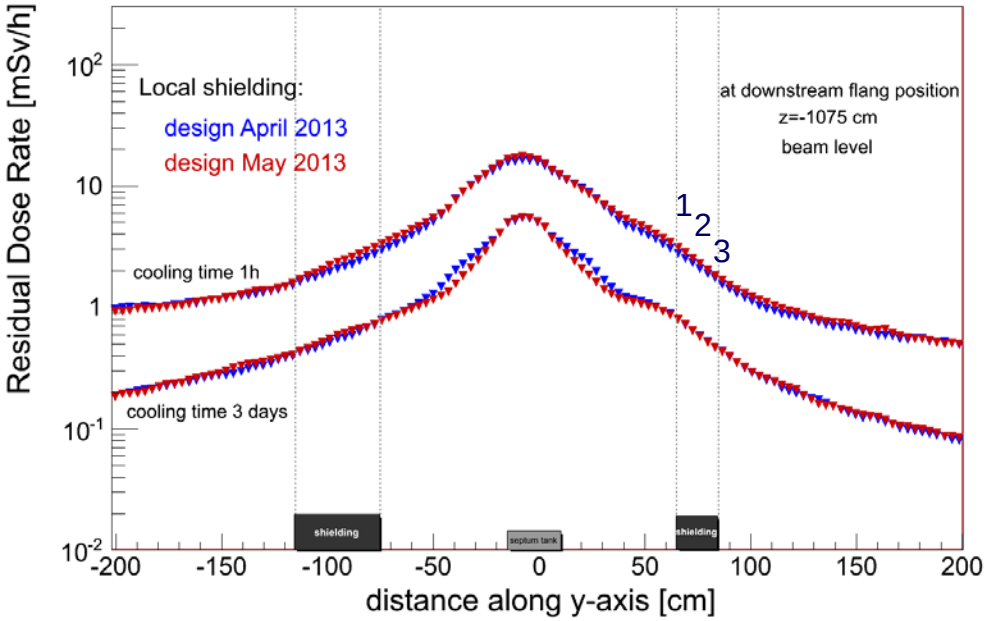
1 & 2, REPLACEMENT OF COMPLETE SYSTEM	Specialist	Time and distance	Comments
Venting of sector	TE-VSC	10 mins, remote intervention	
Dismantling of shielding	EN-HE-HH	1 hour, distance >1m	3 persons, 1h/person
Disconnection of upstream and downstream flanges	TE-VSC	5 mins, contact	2 persons, 2.5min/person
Disconnect cabling, compressed air, water cooling, etc	TE-ABT, BE-BI, TE-VSC	10 mins, distance -contact	2 persons, 2.5min/person 1 person (TE-VSC), 5min/person
Removal of tank assembly	TE-ABT, EN-HE-HH	10 mins, distance 1m 2 persons, 2min/person – contact, 8min/person - 1m	Includes removal of support locking mechanisms
Installation of spare	TE-ABT, EN-HE-HH	15 mins, contact	This spare is non radioactive 3 persons, 5min/person
Reconnection of flanges	TE-VSC	10-15 mins	2 persons, 7.5min/person
Reconnection of cables, air, and water cooling.	TE-ABT BE-BI TE-VSC	10 mins	3 persons, 10min/person
Leak test	TE-VSC	30 mins	1 person, 30min/person
Installation of shielding	EN-HE-HH	1 hour	3 persons, 1h/person
Testing			

as of November 2012

Updated information on intervention processes and duration required

Intervention - Disconnection of the downstream flange - results for the two shielding designs -

projections along y for the z positions of the downstream flange



Residual dose rates the same for the two different shielding designs

1 person (TE-VSC specialists) involved, time/person = 2.5 min, contact

examples
- cooling times 1h and 3 days

3 different y-options considered:

accumulated dose by the person:

cooling time 1h

1) 2.8mSv/h×2.5min = 0.11 mSv
2) 2.2mSv/h×2.5min = 0.09 mSv
3) 1.7mSv/h×2.5min = 0.07 mSv

cooling time 3d

1) 0.8mSv/h×2.5min = 0.03 mSv
2) 0.6mSv/h×2.5min = 0.025 mSv
3) 0.4mSv/h×2.5min = 0.017 mSv