2018: Radio protection

Angelo Maggiora's material

Angelo Maggiora

2018: shield optimization

- Goal: decrease radiation dose in the environment around 888.
  Request by radio protection group: decrease dose by 30% in 2018.
- 10^9 π^-/spill, SPS SC 33.6s.

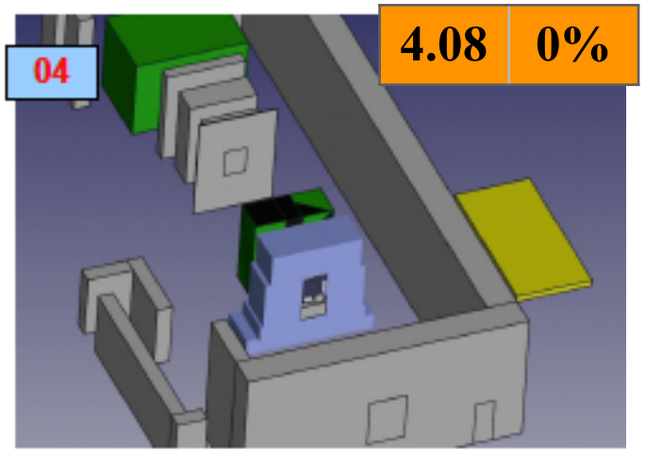
1.) Decrease the beam intensity

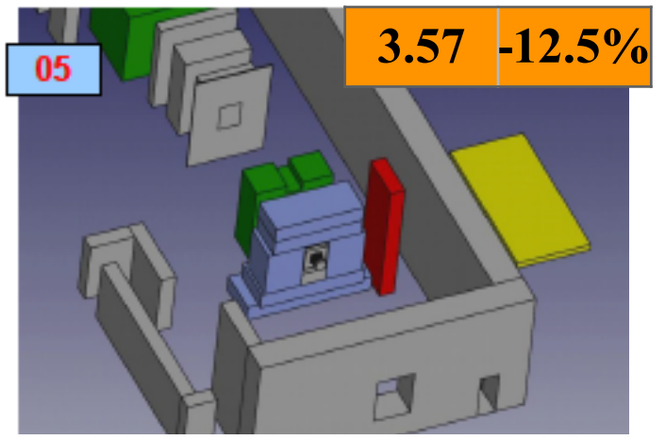
Mean dose in control room (μSv/	Dose reduction

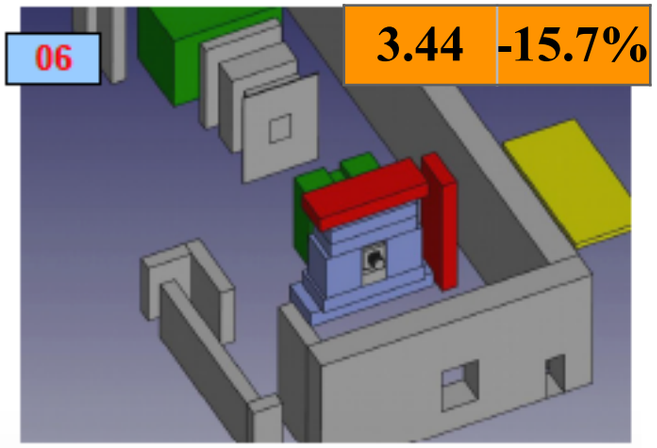
2.) Increase the thickness of concrete around the absorber or

3.) Replace the concrete with borated polyethylene or

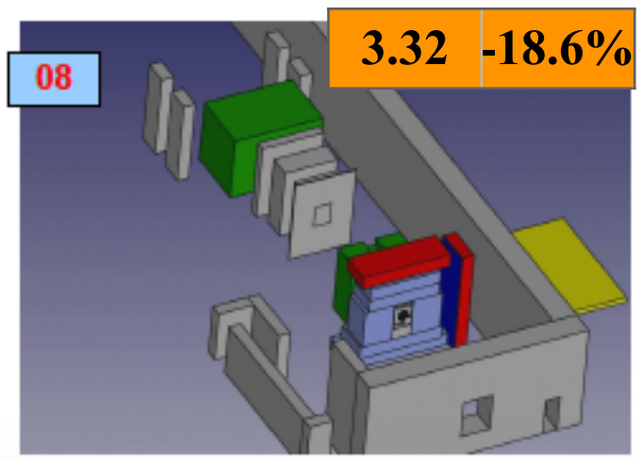
4.) Use a combination of polyethylene and concrete

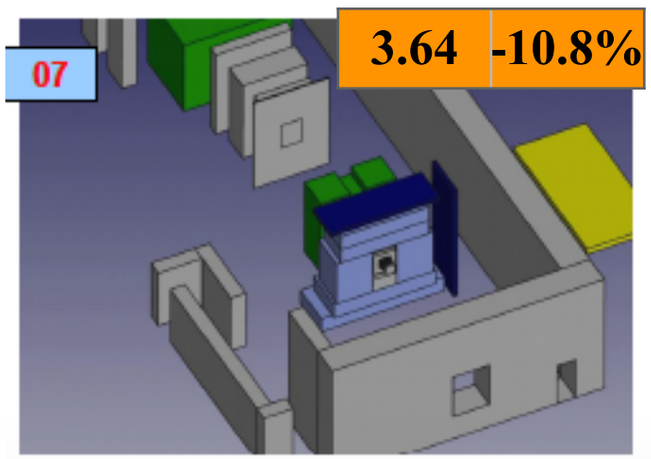






Final-04	configuration of 2015 run
Final-05	Final-04 + 80cm of concrete blocks on the Saleve side only
Final-06	Final-06 + 80cm of concrete blocks on top
Final-07	Final-06 but with 20cm of borated polyethylene (5%) instead of concrete
Final-08	Final-06 + 10cm of polyethylene on the concrete side blocks





2018: shield optimization, results

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configuration	Mean dose in control room (μSv/h)	Dose Reduction	note
Final-04	4,08	0%	configuration of 2015 run
Final-05	3,57	-12.5%	Final-04 + 80cm of concrete blocks on the Saleve side only
Final-06	3,44	-15.7%	Final-06 + 80cm of concrete blocks on top
Final-07	3,64	-10.8%	Final-06 but with 20cm of borated polyethylene (5%) instead of concrete
Final-08	3,32	-18,6%	Final-06 + 10cm of polyethylene on the concrete side blocks

radioprotection group check required

- 50% of particles outside concrete shield are low energetic neutrons
- The dose can be considerably reduced in the DAQ floor (beam level) adding 80 cm of concrete on Saleve side
- The concrete top help to lower the dose under the ceiling, small effects on DAQ floor
- 20-25 cm of borated polyethylene are more or less equivalent to 80cm of concrete
- Absorbtion by the buiding walls is unknown
- Other radical solutions are possible, but with costs and work enourmous

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