



Action Follow-up; Space

Requirements of Crab Cavities

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The purpose of this meeting was to follow-up an action defined in the last [HL-PLC meeting](#), which revealed a possible issue with available space for the location of power drivers, couplers and low-level RF equipment for the crab cavities in IR1 and IR5.

Considering the current constraint of the cavity design, the use of RRs (RR13, RR17, RR53, RR57) is almost excluded as they are not compliant with the 40m distance constraint for low-life RF (crab cavities at 155m from IP, RRs at 240m).

As already studied for the R2E project, building a new shaft is ~ 10 times more expensive than a gallery, hence the baseline proposal would be to build a new gallery parallel to the LHC tunnel, starting from the existing bypass of the experimental caverns.

Construction of such galleries must probably commence during LS2, as otherwise it would not be possible to fit the finalization of civil works and installation of equipment into a regular LS3.

Civil engineering for the cavern and gallery is estimated to ~ 1 year for physical construction, with additional time required for finalization and re-installation of equipment. The cost of excavating a gallery of 100m is estimated at around 20kCHF/m, fully finished amounting to some ~ 5 MCHF per side per IP, i.e. 20 MCHF for IR1 and IR5.

DFBX and DFBL are in currently in the baseline for removal to the surface, whereas the DFBA would remain in its current location (mainly issue for R2E, not HL-LHC).

Conclusion:

Plan A: Assumption of getting a gallery done, which requires a realistic estimate of Civil Engineering in terms of time, schedule, manpower -> Action S. Weisz who provided details of similar study done for R2E project and presented in Chamonix 2010: “ [Slide 17-19](#) describe a shaft + service gallery system on each side of point 1 and 5. The surface available within each service gallery was 100m², the total cost was estimated at 37.8 MCHF (4 shafts and 4 service galleries). The objective of the new service galleries was to relocate the equipment in the RR, which explains the position retained. The corresponding [paper](#) is also annexed, please look at the last chapter before the summary.”

Plan B: Study possibility of accepting longer delays between cavity and low-level RF -> Action RF team