

2nd R2E Mitigation Project Meeting

13th January 2011

Present: M. Brugger (MB), M. Calviani (MC), J. Andrew Osborne (JO), A.-L. Perrot (ALP), C. Jach (CJ), S. Roesler (SR), K. Roed (KR), G. Spiezia (GS), Y. Thurel (YT)

Agenda:

1. Comments on minutes of the 1st R2E Project Meeting
2. Round table of urgent issues and Work-Package Reports
 - a. Integration & Implementation (ALP)
 - b. PC R&D (YT)
 - c. Monitoring & Calculations (MC)
 - d. Radiation Tests (GS)
 - e. News from OP (MP)
 - f. Civil Engineering (JO)
 - g. Safety (CJ, SR)
3. Chamonix 2011 Preparations (ALP + MB)
4. A.O.B.
 - a. Next R2E Project and Committee meeting

Comments on minutes of 1st R2E Project Meeting and other news

- JO provided information on the thickness of the UX15/UL14/UL16 wall. He confirmed that the thickness for the minimum distance is 140 cm \pm 10 cm. The uncertainty could be reduced by another specialized tomographic measurement, which requires time and efforts. MC confirms that the conclusions for the radiation levels will not change significantly given the uncertainty. MB concluded that a parallel relocation study (not using the affected area) shall be conducted so that a decision can be based on the early measurements in 2011.
- Related to the previous point, during the Xmas break two battery-driven RadMons will be installed in the UX15 cavern, to investigate the high energy hadron fluence in the cavern and benchmark the FLUKA simulation (i.e. the ATLAS geometry implementation) used to estimate the radiation levels in the UL14/16.
- ALP provided an updated figure on the budget for shielding and relocation (see [link](#)): the values are valid within ~20-30%.
- MB reports on the possible collaboration with the University of Montpellier: a confirmation has been obtained and the agreement has been put in the Marie-Curie proposal. Moreover contacts have been established with TRAD, a private company which is also doing radiation tests of electronic equipment.
- CJ commented that the new Staff Member who will work on the Study of the Safe Room will come as early as March (earlier than expected). We can therefore expect to have the first

results concerning the fire-safety study for the TZ76 and the bypass at P5 by April. F. Corsanego will also collaborate with this new person to help clarify eventual issues.

Round Table and Work Package report

Integration and Implementation (ALP)

117 blocks of shielding have been received and they are at CERN today. For what concerns the Xmas activities, the shielding improvement activities are completed and all the R2E activities are going according to plans. The next ICLs will concentrate in finishing up the Point-5 activities: fire centrals are being moved at P5 and P7 (and not the fire detectors themselves). The ECR for Fire/ODH is close to be finished. After P5 the ICL will start with P1. ECRs are prepared by ALP in parallel.

PC R&D (YT) (slides)

YT reports that the design for the new radiation-hard power converters has started. A preliminary list of components to be tested will be available soon, and includes high power IGBT and power diodes. The Marie-Curie post description for TE/EPC is also on going.

Radiation Tests (GS) (slides)

GS reports on the latest news from PSI last test (December 2010). DerivFIP has been found to be a weak component, while the analysis of Cypress 130/90 nm memories for the new-gen RadMon and the 400 nm Toshiba memories is on-going. A collaboration framework has been established with PSI; under this agreement (not formalized yet), CERN will go to PSI for 1 weekend per month to perform generic component testing.

Tests are also foreseen at CEA-Valduc (displacement damage measurements), CNRAD (power converters, QPS equipment, etc.) and – starting from May – at H4IRRAD (power converters (racks) and EN/EL equipment).

Monitoring and Calculations (MC) (slides)

MC reports on the updates from the MCWG. Apart from continuous updates to layout maps, LHC Combined Monitoring Tool and a new summary of intensity/luminosity for the 2010 run, the main results concern: 1) the updated RadMon/BLM ratio values ($1E6\text{cm}^{-2}\text{mGy}^{-1}$), which now is based on loss locations in P7/P3 and in the ARC; 2) the TLD dose readings for the LHC (which help obtaining risk factors from various locations in the LHC and help comparing it with FLUKA simulations) ; the results of a new application benchmark FLUKA/RadMon at P7 (agreement within factor of 1x-5x); 4) updated FLUKA simulations for P1/RR shielding. ALP requested the references of the reports for the calculation results: MC and MB will provide them in the coming days (always collected and available on the R2E website, see Publications).

Civil Engineering (JO)

A new fellow will start working for Point-5 activities as of 1st February.

News from LHC Beam Operation (MP) ([slides](#))

As of the Evian 2010 meeting, the strategy for beam operation in 2011 is to operate with 75 ns bunch spacing and with a maximum of 930 bunches per beam. It is also foreseen to go for scrubbing at 50 ns bunch spacing and the target β^* is <2.5 m. The emittance is foreseen to be nominal like the bunch intensity ($1.2 \cdot 10^{11}$ p/bunch) with 125 days at peak luminosity ($1 \cdot 10^{33}$ Hz \cdot cm $^{-2}$ in 2011). The integrated luminosity is foreseen to be $\sim 1\text{-}3$ fb $^{-1}$ (assuming 50 ns bunch spacing it could grow up to 5 fb $^{-1}$, still considering a beam energy of 3.5 TeV).

It seems unlikely that there will be additional quench tests that are going to be performed in the near future, due to a new magnet failure scenario that was not considered in the past. MC proposes to ask for controlled slow losses – far from the quench limit – in some particular locations (for example in 14R2), in order to have a controlled location where to evaluate the risk-factor R ($=\Phi_{th}/\Phi_{HEH}$). MP says that it seems feasible.

Given the tight time constraints prior LHC restart, all tunnel activities have to be finished soon (important impact on TLD reinstallation -> MC & MB).

Layout of Chamonix 2011 presentations

ALP and MB presents draft versions of the presentation for the Chamonix 2011 workshop (final versions available on the [Chamonix website](#)).

Next proposed R2E Meetings:

R2E Project

- February 24th (shifted from 3rd)
- March 31st
- April 28th

R2E Committee

- March 10th
- April 7th (or 14th TBC)