

Minutes PSB Upgrade WG Meeting 6th August 2015

Participants: J. Coupard, A. Findlay, V. Forte, G.M. Georgiev, K. Hanke, J. Hansen, A. Kosmicki, B. Mikulec, S. Moccia, M. Morgenstern, Y. Muttoni, A. Newborough, S. Pittet, J. Vollaire.

Agenda (<https://indico.cern.ch/event/435208/>):

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1. Approval of Minutes

- The minutes of the last LIU-PSB WG meeting #154, available [here](#), have been approved.

2. Communications

- A LIU-PSB dedicated LIU-PT meeting took place today. Annual spending status of LIU-PSB: 44%. EPC (MPS) is overspending, but S. Pittet confirmed that this doesn't affect the cost-to-completion.
- A kick-off meeting for the safety packages was organised last week to get started on the different safety package documents.

3. Follow-up of Open Actions

- All WP-holders are reminded to verify that their group requests for EN-EL have been propagated to G.M. Georgiev.
- **Transport issues:** A dedicated presentation is planned for the 17th of September.
- **Location of new wire scanners:** K. Hanke mentioned that a proposal has been circulated to split up the installation of the new wire scanners: wire scanners for one plane should be installed as originally foreseen in PSB section 11L1, but the wire scanners for the other plane should go to section 4L1. This has the advantages that both horizontal and vertical emittance measurements could be done in parallel and that the multipole stack of section 11L1 would not have to be moved. J. Hansen added that it would anyway have been impossible to pump down the region around 11L1 with the existing pumping ports. B. Mikulec added that one prototype, preferably for the vertical plane, would be installed in ring 4 (still to be defined in which of the 2 sections). **This proposal has been approved.** The vacuum team still has to verify this new configuration, which was noted by J. Hansen. BI can now go ahead to provide the missing SRRs for the new wire scanners and the matching monitor in 4L1.
- **Specifications for H0/H- current monitor:** This is urgent, in particular in view of the Half-Sector Test (HST). F. Roncarolo will be invited to present the status at the next meeting.
- **TT2 cooling:** There are ongoing discussions on the renovation of the TT2 line. The PSB cooling system renovation baseline maintains the TT2 line cooling as part of the PSB cooling system, although it would have several advantages to separate it. A final decision will be

taken once a complete evaluation of the cooling needs will be available from the TT2 line renovation discussions.

- **Water-cooled cables:** As already mentioned during the last meeting, the necessity to exchange the currently installed water-cooled cables could not be shown. In addition it would be very expensive and also not compatible with the EN-EL workload during LS2. It was decided that the situation will be left as is --> Action closed. G. M. Georgiev mentioned that maybe after a successful cable cleaning campaign (need to free shaft) spare cables can be installed to replace the equivalent of one water-cooled cable. To be studied in the future.

4. Requests to EN-EL for LIU-PSB

- G. M. Georgiev showed an updated version of his [Excel file](#).

The last open items are being worked on. One important issue is that not only the cabling requests for the new wire scanners are still missing, but most probably new racks will also be needed (that have not yet been requested). B. Dehning has been contacted to provide urgently this information.

5. Follow-up on the Shielding Simulations for the HST

M. Morgenstern presented an update of the FLUKA simulations concerning the shielding structure around the HST (see his presentation [here](#)).

Since the last presentation **shielding and dump materials have been updated** and minor changes made in the simulations.

53.31W of beam power (corresponding to 40 mA max. Linac4 current and 10 us beam pulse length) and 95% stripping efficiency (very conservative!) have been assumed.

The **prompt dose rate** is an issue for the Linac4/Linac2 interface: Part of this area (Linac2 side) is an interlocked primary beam area with no access during Linac2 operation, and during accesses or technical stops it is a Limited Stay Area. Building 363 (Linac2 racks, amplifiers, Linac2 control room....) is classified as a Simple Controlled Radiation Area. During the Linac2 operation period it can be considered as a Low Occupancy Area. Current dose rates at PAXLN202 with Linac2 operation are ~10 uSv/h, which is close to the warning level threshold corresponding to a Permanent Workplace in a Simple Controlled Radiation Areas. The area outside the fenced area will be considered as Low Occupancy Simple Controlled Radiation Area. Warning/action thresholds for Low Occupancy Simple Controlled Radiation Areas are 50/100 uSv/h, respectively. To reach the 50 uSv/h alarm threshold, half (25 uSv/h) can be attributed to the HST. In order to respect these classifications, the simulation showed that **the prompt dose rate from the HST could be increased by a factor of ~6 to ~325W** (with 95% stripping efficiency). Radiation monitors will be placed just at the start of the accessible zone in the Linac2 interface to survey the situation. In the future, in case of an alarm, the instruction to the the control room will be to first switch off the HST and then check if the increased dose rate comes from the HST or Linac2. **During technical stops the limit will be lowered in coordination with the TSO of Linac2** in order to comply with the limit for workspaces and considering that the Linac2 will not contribute anymore. **B. Mikulec mentioned that this could indeed be an important limitation for the HST if the schedule still moved, in which case the higher-intensity run would fall into the EYETS.** M. Morgenstern showed that the prompt dose rate is rather limited by radiation from the

internal dump, and therefore the new shielding didn't improve much the situation (as expected).

The **accident scenario** (breakage of the stripping foil with the full beam being absorbed in the internal dump) was also simulated. B. Mikulec said that this shouldn't be an issue, as the Beam Interlock System (BIS) will be deployed for the HST and will stop the beam to the HST in such a case → max. 1 bad shot.

M. Morgenstern also checked the **residual dose rate**, which will for example be needed in case of accesses, repairs or to estimate the cool-down time for the dismantling of the HST. Due to the very pessimistic assumption of 95% stripping efficiency (98% expected), it was stated that the results should be rescaled for 98% stripping efficiency to be more realistic. M. Morgenstern has provided this rescaling after the meeting (see the rescaled situation [here](#)). For the prompt dose rate limitation the original assumption of 53.31W of beam power could thus be increased by a factor of 8.3. As the residual dose rate might be too high to allow accesses within a short time after beam stop or a limited cool-down period before dismantling, it might be necessary to review alternative operational patterns for the high-intensity run that is scheduled for the last 2 months of the HST. It should be mentioned that the repetition rate for the FLUKA simulations was 1.2s, which can clearly be reduced.

M. Morgenstern mentioned that the detailed documentation of the simulation results was currently under internal review, and that he would provide a requested summary of the results to B. Mikulec before the end of this month.

In order to obtain an estimate for the required cool-down time for the HST, the removal sequence should be discussed. B. Mikulec organised a discussion on this subject after the meeting.

6. AOB

- The next meeting is tentatively scheduled for the 27th August 2015.
- Round table:
 - A. Kosmicki mentioned that he was waiting for last model of the support structures expected for next week to finalise the integration of BRF2/BAT. K. Hanke added that a budget code needs to be provided to D. Parchet, and the cost splitting needs to be discussed.