

## 158<sup>th</sup> Meeting of the Machine Protection Panel

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The meeting took place on February the 23<sup>rd</sup> in 774/1-079.

Participants: C. Bracco, R. Bruce, C. Hessler, E.B. Holzer, D. Lazic, A. Lechner, B. Lindstrom, B. Petersen, M. Valette, J. Wenninger, C. Wiesner, D. Wollmann, M. Zerlauth.

The slides of all presentations can be found on the website of the Machine Protection Panel:

<http://lhc-mpwg.web.cern.ch/lhc-mpwg/>

### 1.1 Approval of MPP#157's minutes

- Actions from the 157<sup>th</sup> MPP:
  - E.B. Holzer: Include into the BLM disabling rules a restriction for IPQs in LSS that BLMs in position 2 and 3 are not disabled at the same time.
  - Collimation: Request from the impedance team an official statement on the plans and a maximum beam intensities to be used for the crystals with ion physics beam.
- There was an offline comment from J. Jowett on the format of the minutes.

### 1.2 MPS re-commissioning after YETS 2017/18 - Injection Protection / LBDS (C. Bracco)

- Chiara presented the status of the injection protection system in view of the recommissioning.
- The MPS procedures have been updated and can be found at the following links for [injection](#) and [extraction](#). The Abort Gap Keeper length modification procedure will be released once verified and following the publishing after the results of the dedicated MD (#2930) have been published.
- For the injection commissioning, 7.5 shifts will be needed for validation of the SPS extraction, transfer lines and LHC injection (2.5 SPS + 5 LHC). The preliminary hardware tests include standard MPS tests without beam and logic tests from the interlocks. For the SPS extraction validation, only pilot beams will be needed for setting up the extraction and performing aperture measurements. The same is true for the transfer lines (here extra aperture measurements with dipole kicks with 30 degrees phase shifts because of the TI8 smoothing are foreseen). The validation of injection would first include reference trajectory measurements with pilots, collimator alignment, and tests of the blind-able BLM functionality. Extra measurements of the aperture and waveform will be needed for the newly replaced injection kicker MKI.8D. The injection validation for trains would be checked with 12 bunches then with increased train lengths according to the ramp up allowed by MPP until 144 bunches.
  - Daniel asked about the status of the blind-able BLMs. Anton reminded that the blind-out time window was not exactly

calibrated. Barbara asked if some monitor factor changes would be needed following the implementation of this. It was agreed not to change anything for the 2018 run, eventually some additional filters might be necessary for high losses. Daniel concluded the strategy was verified last year and there are two racks with different firmware for the blind-able BLMs. A decision should be taken at some point whether to conserve the 2 different firmware version or whether to deprecate the functionality if not needed in the future (beware of the higher intensities after the LIU upgrade however).

- Daniel asked if trains of 288 bunches were foreseen. It is not possible with BCMS beams but with standard beam. Jorg answered it would not be used in the beginning of the year and emphasized that these beams need sufficient setup time to get to the usual beam quality.
- For the extraction setup and validation 3 shifts would be needed. First, aperture measurements would be performed with pilots to ensure there are no bottlenecks, before ramping nominal bunches. Then the TCDQ would be aligned and the AGK and interlock BPMs would be setup and validated. Once trains with 12 bunches are available, the interlocked BPMs will be validated for trains. In summary it is possible to inject trains when all tests are performed except for the blind-able BLMs, and it is possible ramping 1 nominal when the ring and extraction channel apertures are measured.
  - Jorg re-arranged the shifts in the planning to perform these tests before the first ramp with a nominal bunch.
  - Markus asked about the LBDS reliability run and an open issue about the verification of the redundant powering of the LBDS system. CO has monitored this to check the redundant powering and refurbished the frontend. Thibaut and Nicolas will be performing the final check with EN/EL the week before Easter.

**Action (ABT): check on redundant powering of the LBDS (UPS test)**

After the meeting, Chiara gave an update, stating that the test was pending until CV had completed some interventions.

- Barbara proposed that the exercise of reducing BLM families and special thresholds should be redone during LS2, based on the data from this year. There are now a lot of special families and filters which make it complicated to maintain. Anton added there are various collimators and shielding which will be modified during LS2 and therefore the situation will be different after LS2.

Daniel asked what needed to be done in view of  $\beta^*$  levelling (e.g. loss maps, asynchronous beam dumps, reliability of the  $\beta^*$  value) in view of a CollWG on the 5<sup>th</sup> of March with Kajetan and Michi H. for the software implementation of levelling and combined collimator movement. Jorg checked with TOTEM and no calibration is needed with the levelled  $\beta^*$  values. He added that it is most likely that the levelling

will be done via  $\beta^*$  and not crossing angle. The TCDQs will be tighter at  $\beta^*=25$  cm, with asymmetric settings in  $\sigma$  for B1 and B2, which has to be discussed with the CollWG.

**AOB - Summary of intensity cruise checklist for 2017 proton operation (MPP)**

- The [checklist](#) was a very tedious work and the MPP thanks everyone for the efforts of completing it. This year, the plan is to have 8 weeks cycles, with less fills to check and less different settings in the same batch.

**AOB - MPS re-commissioning planning overview (M. Zerlauth, D. Wollmann)**

- All MPS responsible are due to present in the MPP. A list of preliminary dates is available on the slides. No date is foreseen yet for the Collimation system and the BLMs.

**AOB - all**

- For AFP's roman pots, due to delays some detector packages will only be installed during a TS in 2018. They asked what needs to be revalidated once the packages are installed. Two shifts would be needed, for loss maps and alignment. Taking into account the usual re-validation after a TS, this should cause no or only little overhead.
  - Roderick commented a pre-alignment could be done then fine-tuned when the detector is in. Markus gave the precision that last year mechanical movement was prevented during these operations and verified afterwards, if the alinement remained within tolerances the pots were not realigned.
  - Jorg added that to confirm the number of shifts, a more detailed scenario was required.