Minutes Linac4 HW and BC Working Group Meeting 18/09/2019


Presentations and Discussions:

Approval of Minutes and Open Actions (G.P. Di Giovanni)

- The minutes of the last meeting were approved.
- Action “Follow up on 3 MeV chopper dump damage; propose long-term solutions”. A. Lombardi reported that EN-STI inspected the 3 MeV dump and it was OK. The beam will be disposed towards the bottom during the LBE run. The long term solution will come after the experience with the LBE run.
- Action “Provide functional specifications for a new 3 MeV chopper dump”. A. Lombardi reported that the specifications have been sent via email to EN-STI. G.P. Di Giovanni proposed to write a short functional specification for EN-STI in a document.
- Action “Organise a Linac4 beam dynamics meeting to propose a strategy for the emittance measurement in view of the non-Gaussian tails”. A. Lombardi will organise a meeting in the next couple of weeks.
- G.P. Di Giovanni asked G. Bellodi if she could update the procedure for the phasing of the CCDTL5-6 before the beam commissioning. G. Bellodi reported that she is working on it and waiting for additional feedback from the BE-RF team.

Linac4 Connection to PSB – Issues and Non-Conformities (L. Timeo, J. Coupard)

- J. Coupard and L. Timeo reported on the progress of the Linac4 and Linac4 connection shutdown activities.
- Linac4:
  - Cleaning in the Linac4 tunnel and surface area started, i.e. activity related to the Open Days.
  - Smoothing alignment campaign ongoing. J.F. Fuchs finished the calculations for the vertical alignment of the main elements and he is finalising the calculations for the radial alignment. Based on the calculations, the team will perform the alignment of the secondary elements. Work progressing well, but the schedule is tight. Maximum effort to avoid coactivities.
  - The alignment of the DTL-CCDTL intertank was supposed to be done today, but it was post-poned to next week, as J.F. Fuchs prefers to realign the intertank when the team is idle because he is performing calculations. The exact date has still to be arranged and he will be asked with a 24/48 hours notice. R. Wegner pointed out that the wave guides for DTL3, CCDTL1 and the bunchers are open to allow the intertank alignment and BE-RF needs still half a day to close the wave guides after the alignment. This should be taken in consideration when defining the schedule.
Next Thursday/Friday SMB should perform an intervention for making the tunnel air tight, but it could conflict with the alignment activities. If the alignment team will work until the last available hour on Friday, the SMB intervention may need to be post-poned to Monday 30th September, i.e introduce one day of delay in the start of the LBE run.

- **S. D'Armancourt** confirmed to **L. Timeo** that only one day of work is needed.
- **J. Coupard** asked if SMB could work on the other side, close to the LT.BHZ20. **L. Timeo** replied that it would be possible, but still **J.F. Fuchs** may need to work in the vicinity and prefers not to have anyone else in the area.
- **J. Coupard** will organise a visit with SMB this upcoming Friday, so to decide how to better proceed. SMB has already pre-warned the contractors for an intervention on Friday 27th September.

- **Switchyard:**
  - The cables for LTB.BPM10 have been pulled and are available.
  - IST are ongoing, so the machine is lock-out.
  - BE-BI will need an access for the BPM, for the w畏escanners and the sem grids. **J. Coupard** will check the access conditions in terms of safety.
  - General issue concerning the cleaning-up of some of the areas. This is now closely followed up with the LS2C, as the situation is not improving. Actually quite the opposite. And it is not acceptable to leave behind so much material and equipment.

**Results from 3 MeV Run (A. Lombardi)**

- **A. Lombardi** reported orally on the results of the 3 MeV run.
- Two main goals:
  - Check the performance of autopilot.
  - Perform a campaign to study the alignment of the source with the goal to reconcile the differences observed in the tunnel with respect to the test stand, which has better transmission performance.
- The test with autopilot were very successful.
- BE-ABP confirmed the alignment issue even with the wider steerers setting specially allowed by TE-EPC for this check. For the time being BE-ABP preferred to avoid an alignment campaign of the source as the current and its transmission is currently considered sufficient for the production of the post-LS2 beams. Nevertheless, the alignment will be studied in more detail in the next weeks and BE-ABP will come up with a proposal. **R. Wegner** asked if the mis-alignment is a simple offset. **A. Lombardi** said that it is a bit more complicated than a simple offset.
- **A. Lombardi** agreed to present a few slides at the next meeting.
**Status of ISTs**

- **R. Mompo** reported on the WIC tests done last Friday. General good success and a few minor problems were identified and are currently being investigated. Preliminary checks with the power converters were performed. Sometimes the converters were not connected to the magnets and, because of that, **R. Mompo** would like to repeat the tests at the first available occasion when the full connection chain is present. The BIS connection will be tested today.

- **D. Nisbet** reported on the ongoing activities for the control of the power converters:
  - A few good news:
    - New firmware deployed on the system connected to the BIS, except for the quadrupoles which are still locked out. The firmware should be deployed on Thursday.
    - Software team ready to deploy the fixes for the polarity change in the steerers in the L4L. **A. Lombardi** said that the software fix could be deployed anytime. It is just important to communicate beforehand with the source experts.
    - Also a few software bugs discovered when testing the horizontal bending:
      - Issue with the Multi-ppm support. TE-EPC can reproduce the problem in simulation. This issue has the highest priority and the team is working on it.
      - Issue with setting the pulse length has been solved.
      - Ongoing issue with the 1 ms offset between the FGC and the diagnostic. The issue is a fundamental problem. TE-EPC is working with the timing team to figure out the origin of the problem. The positive news is that the power converters are pulsing at the right time.
      - Issue with the subscription sometimes getting lost. The problem is being investigated, but it has a low priority.
      - **A. Lombardi** added if TE-EPC could look into the issue reported at [http://elogbook.cern.ch/eLogbook/attach_viewer.jsp?attach_id=1982623](http://elogbook.cern.ch/eLogbook/attach_viewer.jsp?attach_id=1982623) with the CCV of 3 power converters of the source going to zero when closing their knobs.
    - TE-EPC would like to request to schedule some time at the start-up to investigate the power converters. Because of the lock-out, TE-EPC cannot access ~95% of their system and this slows down the debugging process. Also TE-EPC plans to deploy the latest firmware on the converters. The idea would be to make sure the remaining power converters are working correctly and once done, deploy the new firmware (already running on 5% of the accessible converters) on them. **R. Mompo** asked if, after any firmware/software upgrade, the interlock should be tested. **D. Nisbet** answered that it is not needed as these upgrades are transparent to the interlock connections.
  - **P. Skowronski** reported of an issue, encountered on Monday, with restarting the power supplies for the source. The expert intervention was needed. **D. Nisbet** said that this was due to a software upgrade and it was not unexpected. A similar issue was also previously observed in other power converters but it has been fixed for the source, so it should not happen again.
• **G.P. Di Giovanni** could not access the planning for the IST because of technical issues with the keyboard connection. In any case the planning for the ISTs can either be found in the EN-ACE Microsoft Project planning for the LBE line run or on **ASM**, and the ISTs are also listed in the **OP Checklist**.
  o **R. Wegner** confirmed that BE-RF IST are completed.
  o **J. Parra-Lopez** said that the IST in the transfer line are starting today.
  o **A. Goldblatt** confirmed the ongoing IST for the LASER concerning the software aspects. BE-BI is also checking the ADC once again.
  o **F. Roncarolo** said that all SEM grids and wire scanners have been installed. The wirescanner are fine and investigations are ongoing on the SEM grids, because of the noise observed on a few wires.
  o **F. Roncarolo** mentioned that while performing tests of the LASER, the expected injection timing was not coming every 1 μs, as expected. BE-CO and **A. Findlay** were contacted and solved the problem.

*AoB and Tour de Table*

• Nothing to report.

Minutes by G.P. Di Giovanni 18/09/2019