Accelerator Complex Status

End week 40 (Monday 5 October 2020)

Technical Infrastructure (J. Nielsen):

Last week was extremely busy. It was also the first week without the 2nd operator on shift, as the cryo desk is now manned by an operator 24/7. During peak times the TI operator on normal days jumps in if necessary.

- Statistics:
  - Over 17'000 alarms were received
  - 847 incoming and 410 outgoing phone calls, totalling 1257
- Events:
  - Monday 28.09, water was found in the PSB during an access. About 110 liters of water was removed by the fire brigade. A leak on a weld of one of the injection bumper magnets was found.
  - Also, on Monday an AUG button was activated during Beam Imminent Warning test in BA6. The workers were not aware of the tests and pushed the button when they heard the BIW signal.
  - On Wednesday 30.09, There was an evacuation of BA1 during the fire detection maintenance. After further investigation it was discovered that the company working on it had set of the evacuation in BA1 by error during the maintenance. They had called the fire department to inform but had not called TI.
  - Thursday and Friday were dominated by works in and around BA5 with AUG tests on Saturday.
- Details: https://wikis.cern.ch/display/TIOP/2020/10/05/TI+week+summary,+Week+40

LINAC 4 (P. Skowronski):

This week there was not much beam operation in Linac4 due to accesses to the PSB, DTL3 klystron that had to be exchanged and modification of L4T beam stopper powering.

- **Monday:**
  - PSB access all day
  - Adjustments of BCT timings in linac
  - Completing linac checklist
- **Tuesday:**
  - PSB access all day
  - Linac4 access: cabling modifications around the source to reduce effects of electric perturbations when the source is sparking.
  - Installation of missing trajectory corrector magnet L4T.MCHV.1415. Spare magnet of LT/LTB/BI was used.
  - Difficult beam restart because of frozen control of bend L4T.RBH.021. EPC specialist continued to work on this issue over the week and corrected at least couple of bugs.
- **Wednesday:**
  - Linac4 in access mode: decoupling of electric powering of L4T beam stopper from be L4T.RBH.021. Fuse for the beam stopper needed to be exchanged already 3

times this year, and on the previous day it was finally traced to perturbations from bending magnet L4T.RBH.021. Both are EIS and their control is in the same rack. The specialist communicated that it has to be fixed ASAP. Partial DSO tests (the beam stopper part only) were repeated.
    - Tuning of the delay between the 2 choppers while looking at raw BPM signals. Using 18.9 ns, what corresponds to beam time of flight between the choppers, reduced the rise time measured with BPMs to 9 ns. Theoretical value is 10 ns.
    - While working with the chopper the RF specialists heard sounds of sparking on DTL3. After opening the waveguide they found dust, that was immediately removed.
- **Thursday:**
    - In the morning inspection of DTL3. The sparking did not stop. Found output of the klystron damaged. Klystron exchange took all day.
- **Friday:**
    - Regulation of DTL3 klystron.
    - Beam back at 14h30, verification of beam quality with BSM measurements OK.
    - BCT timing adjustments to get correct current measurement for minimum pulse length (<1 us)

PS Booster (G. P. Di Giovanni):

An eventful week for the PSB HW commissioning, with additional unplanned interventions and unavoidable disruptions of the Linac4 beam commissioning to LBE, due to the prolonged access time.

- On Monday, during one of the planned accesses, a water leak was found in BI3.BSW1L1. TE-ABT experts investigated and agreed to perform the intervention in the shadow of the BI.SMV10 reconnection and final leak detection, planned for Tuesday all day.
- On Tuesday both interventions on BI.SMV10 and BI3.BSW1L1 lasted all day, but could not be fully completed, so they were successfully finished on Wednesday morning.
    - An additional access is still needed and planned for Monday 6/10 for TE-ABT to perform powering tests while visually inspecting the equipment.
    - Because of the delays, a few activities had to be reshuffled around or postponed (e.g. the survey checks of the BI line).
- On Wednesday TE-VSC had to intervene on two vacuum leaks:
    - After venting Ring 3, due to the exchange of the BI3.BSW1L1, TE-VSC detected a small leak @ 1.5e-7 mbar*l/s in BR.BHZ162. They localized it inside the BHZ with an endoscopy and managed to fix it with Vacseal.
    - The TE-VSC team took the occasion to test the vacuum chambers from the same manufacturer and found another leak situated on Ring 2 of BR.BHZ11, @ 4e-8 mbar*l/s. Unfortunately, the leak could not be fixed with Vacseal, but TE-VSC considers it well compatible with operation.
    - TE-VSC is now investigating the soldering of the chambers to see if there is any inherent weakness of the procured chambers.
    - BHZ11, BHZ151 and BHZ162 are special magnets because of their configuration and spare chambers will only be available in about 4 weeks (delay related to COVID).
    - A discussion has been organized to decide if a replacement of the chambers is needed and, anyway, define the best procedure for the chambers exchange. The

PSB injection/extraction area is rather packed with equipment, so the intervention may take several days.

- Despite the interruptions, several tests were carried out:
  - Polarity checks of the special TRIMs and for the SHAVERS.
  - Dry run of the distributor in the BI line. A few cable inversions were found and corrected.
  - FGC firmware updates for the PSB multipoles and orbit correctors and general progress on the commissioning of the converters in the transfer lines.
  - POPS-B pulsing tests repeated by TE-EPC experts.
  - Commissioning of the LLRF advancing according to the updated planning.

ELENA (L. Ponce):

Last week was again quite intense in ELENA, with a couple of HW issues, but good progress with the line commissioning could be made.

- There was an issue with a BTV seen IN beam but not being effectiveley IN (not an issue for this one) but the EIS is also a BTV of the same type, so a check was asked for.
- On Friday, BI equipped 9 more monitors with electronics and the end of the straight line could be reached with beam. Some work is needed on controls aspects to take the first curve in the ALPHA line.
- A Big thanks to LSA colleagues (Roman, Delphine, Michi) who deployed the new structure for the lines despite the late request their heavy workload.

AD (L. Ponce):

The new e-cooler collector assembly (main workshop) is getting late and will probably not be ready for installation on time with respect to the planned commissioning. The commissioning planning will need to be revisited.