Accelerator Complex Status

End week 46 (Monday 16 November 2020)

Technical Infrastructure (J. Nielsen):

- A rather good week for TI.
- Statistics:
  - Close to 6'500 alarms
  - 814 phone calls (577 incoming, 237 outgoing)
  - 107 ODM created
- Events worth mentioning:
  - Wed. 11.11 at 15:33 there was an ODH alarm in UPR57. The sector is in cool down phase for CRYO, no access was possible immediately. After CRYO operations prepared the sector for access, the fire brigade entered and shortly after the gas piquet. The problem was technical, no leak found. No faulty equipment was found, but a signal converter was changed to be on the safe side.
  - Also on Wed 11.11 at 15:58 Linac4 4 tripped during the re-powering of the SEQ59 SVC. Indeed, the compensator had tripped in the evening, and the re-powering had been coordinated with Linac 4 operations.
  - Mon. 16.11 at 04:15 there was an electrical perturbation on the 400 kV recorded and later confirmed by RTE. It caused many alarms that clearer immediately after. No consequences detected.
- Details: https://wikis.cern.ch/display/TIOP/2020/11/16/TI+week+summary,+Week+46

LINAC 4 (B. Mikulec):

- **PIMS0102 issue** (slow observed phase drift of PIMS02):
  - The drift seems to be rather produced by an element changing the phase of the forward power on the arm to the PIMS01 cavity, but as the LLRF stabilizes the PIMS01 voltage in amplitude and phase the drift is observed on the PIMS02 cavity - which follows the klystron output.
  - The problem could be traced back to the line from the splitter over the circulator to the PIMS01 cavity.
  - On Friday investigations on the suspected circulator surfaced a tiny water leak forming a small puddle of water on one of the ferrite plates; the water was then flowing along the wave-guide and evaporated. Friday afternoon PIMS0102 circulators were tested running without water cooling.
  - The decision was taken to organise the exchange of the pair of circulators for Monday (each one weighing 2 tons). It is expected to return to Linac4 beam operation by Tuesday afternoon.
- Investigations of a few wire scanner and SEM grid issues; as these issues are concentrated at important locations it might be decided to proceed to an exchange during an access in w48.
- Finalisation of the last open issues concerning the transverse reference profiles. In addition, the operational BSM2 application was upgraded to provide the correct longitudinal reference profiles depending on the loaded optics.
- Timing modifications for improved PSB/Linac4 synchronisation: the start of synchronisation of Linac4 begins now 10 ms before the beam instead of 100 ms, which

improves the precision; the CO timing team installed a new frontend to also separate the PSB FGCs from the other PSB injection timings.
- Setup of the main cycles required for the first weeks of PSB beam commissioning. Start using the reference tool for beam documentation, requiring parallel support from A. Rey.

Next 2 weeks beam operation restricted to Linac4 dump due to Switchyard and PSB accesses.
- A Linac4 phasing MD is planned together with ABP, BI, RF and OP experts.
- Points to follow up: re-optimisation of chopping efficiency and investigation of small energy-dependency observed as a function of chopping factor.

PS Booster (F. Chapuis) :

Daily activity during the week:
- Reliability Run of all the TE-EPC converters (POPSb, POWM1553, FGC_62 and FGC_63) from 6:00am to 9:00pm;
- CheckList follow-up;
- Planning preparation for the interventions in Week47/48.

Monday 09/11 :
- POPSb : several trips during the day occurring on QFO converters.
- A relay involved in the voltage measure of the 3 Phases has been suspected and changed without success. Temporarily, the threshold has been increased.
- Cycle Editor : a new version released featuring a functionality on how to send the function:
- Option 1: send to the Hardware and propagate to LSA parameter;
- Option 2: send only to Hardware.

Tuesday 10/11:
- External Conditions Test: Recombination Kicker EC did not work**,** issue sent – not yet solved;
- Preparation for the Fast-Interlock Dry-Run: checking the readiness of the BTM.BHZ10, BTY.BVT101, BT.BHZ10 and BT.BHZ.BTM;
- POPSb down and Simulated B-Train unavailable: white-Rabbit problem caused by the switch has been fixed**.**
- LINAC4 cloned Basic_Cycle_100/250/450keV to create the complete set of operational cycles: LHCPILOT, LHCINDIV, TOF, BCMS, ISOHRS, MTE,… to run in full PPM mode.

Wednesday 11/11:
- POPSb trip due to CUBEXP function non-propagated to all the cycles played in the Supercycle;
- The CUBEXP function has a special setting: “return to 0 gauss” to reset the B-Train integrator;
- This special setting should be temporary and the integrator reset have to be fix by the B-Train team.
- FI (Fast Interlock) Dry-Run (led by B.Mikulec): some issues reported, correction ongoing;

Thursday 12/11:
- QStrip issue (QCF): POPSb circuits (BHZ, QFO/QDE and TRIM) ramp down induce a current in QCF and triggers the warning “REF_RATE_LIM”. TE-EPC studies a solution.

Friday 13/11:
- K-Modulation application Dry-Run (led by G.P. Di Giovanni): done;

- BI.BSW basic tests (led by G.P. Di Giovanni): checking of the behaviour with the new Timing chain (triggered by the brand new BIX.W200-CT).

PS (K. Hanke):

The hardware commissioning continued rather successfully last week:

- POPS commissioning has been successfully completed.
- B-train regulation is working and POPS is field regulated.
- This week and next week magnet tests for PSR and SWY.
- DSO test for access point A03.PSR done, following the repair of the "boucle cable".
- The n-TOF zone is unsafe until extra fence will been installed (responsibility with EN-STI), preventing the hardware commissioning of the FTN line.
- The RF C80.08 fast tuner installation is delayed to week 50/51
- This week RF will correct the 10 MHz water cooling circuits for all the cavities.

ISOLDE (A. Rodriguez):

- We managed to complete the main milestone of the beam commissioning program for this year. We injected 23Na+ from the new GPS front-end into the REX-TRAP, charge breed it to 23Na9+ in the REX-EBIS and accelerated the beam to 10.43 MeV/u. The beam transmission through the linac was 81% which is ~8-9 % higher than in previous years.
- We were working on injection of Sm during the rest of the week., We found a few problems that we are trying to understand together with F. Wenander from ABP. So, we still have some work to do.
- Yesterday we had a problem with the tuner of the IH structure in REX and we have had to organize an access to the tunnel this morning. The experts are taking a look at it as we speak.
- Other than that, we keep working on different issues related to beam instrumentation trying to solve the outstanding issues.

ELENA (Laurette Ponce):

A very good week for ELENA with very good beam availability allowing to perform several studies on the cycle: optimization of coupling compensation, investigation on quadrupole circuits hysteresis, e-cooler magnetic system compensation, bunch length measurement and possible reduction on the request of Gbar. In parallel, ABT completed the sets of measurement on LNE50 line.
The X-ray imaging of the BTV was perforemed on Thursday, presently waiting for the analysis results from BI experts.

Linac 3 (Detlef Kuchler):

The week was dedicated to the source operation and RF commissioning.

- The source was fully commissioned by Wednesday. Thursday the very first test with the new movable extractor could be done. It is operational now. For the next two weeks more detailed studies are foreseen.
    - Thursday/Friday the RFQ was commissioned with beam. Energy measurements could be done in the ITFS line. The values of 2018 could be confirmed.
    - During the week the two vistars for Linac3 were made operational gain.
- The most annoying issue this week was with OASIS. It showed unstable and erratic behaviour, which was especially a problem over the remote connection. Fortunately an older version was made available by CO while they were working on the actual one.
- The check list is done by 80% (3.5% failures). The rest is mainly beam commissioning and transfer line.