Accelerator complex status

End week 19 (Sunday 10th May 2015)

TI (Peter Sollander)

TI summary in the usual place:

https://wikis/display/TIOP/2015/05/11/TI+summary+week+19,+2015

The main event was the water problem that stopped S12 cryogenics.

Linac2 (Jean-Baptiste Lallement)

On Monday, the source arc current was increased from 45 A to 47 A for LHC and ISOLDE beams. For these users, the proton beam current delivered at the PSB is now slightly more than 150 mA.

On Tuesday, a fault on the RFQ RF solved by a reset stopped the beam for 13 minutes.

On Wednesday, the watchdog cut the beam twice (no clear reason found). Total beam off time: 10 minutes.

No more problems for the rest of the week.

Booster (Elena Benedetto)

Busy week, with many beams and beam flavors delivered to PS, SPS, LHC and Isolde for physics, MDs and setting-up, varying intensities "a` la demande", and optimizing settings.

The setting up of the BCMS beam in the longitudinal plane was done, now it fits nicely into the tight longitudinal specs. A second iteration to optimize the transverse plane may be needed.

Few problems/puzzles:

- Issue with the Qstrips in Ring4, to control the working point: Already on Monday when trying to bring Ring 4 transverse emittances of the BCMS25 beam into specs, we realized that for Ring 4 the calculated tune (as seen by the samplers) and the measured tune showed large discrepancies. The Q-strip settings of this ring have to be very different compared to the other rings to align the tunes. Probably a problem with the Q-strips of Ring 4. EPC specialist could find no anomalies in the power converters. Investigation are continuing and more beam measurements are planned this week.
- We had few times issue with TOF synchronization to PS, disappearing by itself.
- BI3.QNO50 power supply was replaced with the spare.
- BTY.DHZ323 & BTY.DVT324 went on fault several times on Friday and local reset was enough. Finally no more local reset was possible. Specialist went on site and did a few reinitializations that solved the issue. The problem came back a few times during the weekend.
- BLMs are triggering in the extraction line, when sending beam to the BDump. We suspect it is due to backscattering from the new Dump and asked EN/STI for feedback (Fluka studies).

- This afternoon/tonight we had several times an RF control issue. The beam goes completely debunched before extraction. After a few minutes, the problem disappears...

PS (Rende Steerenberg)

The start of last week was good for the PS. With delivery for physics of the slow extracted beam to the north branch in the East Area and steering and optimization of the beam to the IRRAD zone. However, towards the end of the week intermittent problems with the 10 MHz cavities coarse tuning system caused substantial accumulated down time, in particular for beams that use harmonic 21 (i.e. LHC multi-bunch beams, hence doublet beam). At the end of the week the system was made working by enlarging the error detection windows. However, during the technical stop substantial work is required on the system to make it work again under nominal conditions.

A problem with POPS prolonged the beam stop for the 10 MHz cavity issue on Saturday afternoon.

Early Monday morning the EAST and TOF beam were perturbed, most likely due to a problem with the RF synchronization between PSB and PS.

Otherwise the PS was delivering the LHCPROBE/INDIV for the LHC, the SFTPRO for NA fixed target physics, the TOF beam for nTOF and the East beam for T9 and T10 in the north branch of the East Area.

The setting up of the AD beam and the BCMS beam are in progress.

SPS (Verena Kain)

In week 19 the SPS accumulated a significant amount of downtime. The main downtime causes will be listed below.

Fixed target beams:

Sharing Sunday evening: 50/50/40. The motorization of the T2 target is only partially functioning. The target must not be put in “safe” (= air). According to the DSO the safety for personnel when accidently opening a door in the zones downstream of the target is not compromised.

Doublet beam:

Friday during day-time the doublet beam was played in parallel to fixed target beams and the LHC compound cycle. The doublet beam is now in a very good shape. Intensities of more than 1.55e+11 per doublet with emittances 4.8 um in H and < 4 um in V for 72 bunches were achieved at 450 GeV, with less than 10 % losses through the cycle. Defocusing octupoles with negative polarity helped to stabilize the beam. The next steps will include further optimization of all parameters and then to set up extraction.

LHC 25 ns 12 bunches:

12 bunches, 25 ns, were extracted on the TT40, TT60 TEDs. The kicker delays and the BQM will need further fine-tuning to be ready for the LHC.

Unfortunately there was no time this week to carry on with 25 ns commissioning for 4 batches as is required for the first HiRadMat test week 20.

Main causes of SPS downtime:

Tuesday morning main dipole MBB 30330 developed an inter-turn short and had to be exchanged. This lead to a downtime of ~ 25 h. Beam was back Wednesday ~ 13:00. Unfortunately the Coldex vacuum chamber repair could not be carried out at the same time due to a missing piece.

Power converter issues on the RBI.816 in TI 8 and the injection septum MSI kept coming back several times this week (~ 2 h downtime from the MSI). The cause does not seem to be fully understood. The experts suspect the Imin, these power converters are running with, is too low.

Roughly 13 h downtime were caused by the PS. The PS was suffering from various RF cavity issues throughout the week and a POPS failure this weekend.

ISOLDE (Jose Alberto Rodriguez)

For GPS:

2015/05/05 - Tuesday:

- Proton scan early in the morning
- Laser optimization
- Beam to REX for a couple of hours
- Initial yield measurements
- Problem with one of the sector vacuum valves in the low energy transport line. Unable to open it using the control system. Problem solved by disconnecting and connecting the control cables in the valve itself
- Problems with transmission to the Windmill experimental station. Very little beam reached the Windmill experimental station. The grid after the separator magnet was accidentally used during the night (~10-20% transmission through it)

2015/05/06 - Wednesday:

- Beam to the Windmill and the ISOLTRAP experimental stations (238U, 197Au and several other isotopes of gold)
- Transmission to Windmill still poor (~ a factor 30 lower than to ISOLTRAP). It was improved after stable beam was used, but still far from the counts measured in ISOLTRAP
- A misalignment of the experimental station was discovered. It looks like the experimental station was off by ~1cm. Users decided to vent the sector (to atmospheric pressure, but not opening to the outside world), realign the experimental station and try again. The transmission improved after this, but it is still a factor ten lower than the one reported by ISOLTRAP
- Target and line temperatures were lowered during part of the night to increase the life of the target

2015/05/07 - Thursday:

- Protons stopped at ~ 9:00 for target change in HRS

- The change of target in HRS was delayed to ~14:30. It was decided not to put protons in the GPS to avoid postponing several planned interventions (investigation on a possible leak in the HRS separator and access to the HV room
- In the meantime, ISOLTRAP took stable 197Au beam
- Protons back to GPS at ~17:00.
- Transmission check to the tape station using several tunes
- GPS target characterization
- Exotic beam back to users for the night

2015/05/08 - Friday:

- Target heating power supply turned off at ~6:00. No issues found after restarting the power supply
- Beam back to users for the day

2015/05/09 - Saturday:

- Users (RILIS and Windmill) report several changes in supercycle structure that affected their measurements. They had to restart several scans because of the structure and average current changes.
- Line heating power supply turned off at ~20:45.

2015/05/10 - Sunday:

- Interruption in protons from booster (~00:40-2:50). Other than this, many hours of beam to users
- Increased the temperature in the target and the line (~23:50)

2015/05/11 - Monday:

- Several short interruptions of proton beam from the booster during the night. Other than this, many hours of beam to users.
- Users decided to conclude the experiment at ~7:30 this morning
- Planned for today: send beam to REX in the morning

For HRS:

2015/05/05 - Tuesday:

- Nothing to report other than some tests of the automatic tuning software for the line

2015/05/06 - Wednesday:

- Nothing to report other than some tests of the RFQ cooler buncher (between ~10:00 and 14:30)
- Ramping down of the target and line heating in the late afternoon.

2015/05/07 - Thursday:

- Target change at ~14:30

- Target and line heating at ~18:00

2015/05/08 - Friday:

- First beam with new target extracted from HRS in the morning
- Transmission of CO molecular beam through the RFQ was measured. It looks like the molecule does not break when it goes through the RFQ.
- Line heated to nominal (395A) for the weekend

2015/05/09-10 - Saturday and Sunday:

- Target and line heated to outgas over the weekend. HV and anode off.

2015/05/11 - Monday:

- Plan for today: prepare beam tune to tape station; proton scan in the afternoon