

Accelerator complex status

End week 32 (Sunday 14th August 2016)

TI (Ronan Ledru & Chris Wetton)

Summary for the last week:

<https://wikis.cern.ch/display/TIOP/2016/08/14/TI+summary+week+32%2C+2016>

LEIR (Django Manglunki)

An eventful week for LEIR.

Following the full commissioning of the new low-level RF system, the first RF MD using both cavities took place on Monday 8/08 afternoon.

On Tuesday 9/08 in the morning, the LINAC3 was using the beam for its weekly MD and a water leak was discovered on the blade of the extraction septum ER.SMH40. The blade was changed during the day by B.Balhan/TE-ABT and the septum was again operational the next day. No time was lost for LEIR as the beam down time was completely in the shadow of the LINAC3 MD and subsequent source refill. The beam was back on Wednesday afternoon. However a vacuum pump (ER.VCH40-S5.VPCI1) had been sprayed by the water leak and will have to be fixed during the next source refill or Linac3 MD.

On Wednesday 10/08 morning another intervention took place on the transverse feedback, to place its power amplifiers were under PLC control, but the Xmotif application still controls the low-level electronics of the TFB.

On Wednesday 10/08 afternoon the LEIR patrol had to be redone as it was lost during a repair of the MAD.

On Thursday 11/08 morning the OASIS signals for both cavities were made operational. The beam was given back to the LINAC3 team for a dedicated MD as the PS was not ready to take it because of a vacuum leak.

On Friday 12/08 morning at 10:00, the power supply of the injection septum ER.SMH11 tripped, with no reset possible. The acquired current was nominal with the status OFF, indicating a controls problem. This was eventually solved by the EPC standby person, and it was possible to inject the beam from 13:00 onwards.

The new optics were loaded for the first time on MDOPTIC on Friday 12/08 in the afternoon.

Several times during the week, one of the trimming power supplies (ER.QFT23) tripped, causing one of the main (ER.QFN2344) to also trip.

On Saturday 13/08 morning the RF cavity ER.CRF41 tripped and could not be reset remotely. Also the new Low Level RF frontend cvf-363-allbc1 was giving errors. As in addition the frequency of the ER.QFT23 trips had increased over the week-end, it was decided to stop the machine completely.

The EPC and LLRF specialists have been notified and asked to intervene first thing on Monday morning.

AD (Lars Joergensen)

The AD had a good week with plenty of uptime.

Monday

Injection kicker problem. Needed reset, but this is recurring.

Mains and Ejection Septum power supply problem. Solved by FL.

Tuesday

Quad fault. Reset. Very brief downtime.

Thursday

PS down with vacuum problem. No beam.

Friday

As PS comes back online we experience problems with the Injection kickers again, but this is easily resolved. The Electron Cooler collector power supply is also in fault and one of the modules is in fault. With the help of FL the module is exchanged.

Saturday

Quads in fault. Will not restart. FL fix the problem with a local reset.

One of the Front-end servers for the GEM detectors is not responding. No specialist is available. At the site we discover that the power supply of the VME crate is dead. No spares available. This was fixed Monday morning. In the meantime about half of the GEM detectors in the ejection lines were not usable.

Booster (Jose-Luis Sanchez Alvarez)

A very good week for the PSB with only one real issue to report this week.

Wednesday at 4h, the arc current of the Linac 2 source drops to zero. No obvious reason for fault. Downtime 2h20.

PS (Ana Guerrero Ollacarizqueta)

The main event of the week has been the vacuum leak in the flange downstream of PS internal dump PR.TDI48. On Thursday morning the pressure raised very quickly up (almost to 0.1bar in less than a minute) closing the valves of sector 40. RP, TE-VSC and the septa specialist were contacted. An intervention to find the leak took place along the morning. The leak was quickly spotted in SS48, internal dump area and EN-STI had to intervene too. Transport had to be asked to remove partly the shielding in order to localize the exact position and repair the leak, a difficult task given the high radiation levels in the area (>3mSv/h at contact).

The leak was found to be in the vacuum flange downstream of the dump tank. After the exchange of the gasket, traces of burnt could be clearly seen on the seal, pointing out to an electrical issue as the origin of the breakage. RF intervened to check the RF bypass which was working correctly at the time of the measurement but which showed black traces on one of the contacts effectively suggesting a

contact problem at some stage that would have blocked the current path creating arcs. The bypass was exchanged too.

By the end of the afternoon the pumping could resume and a check in the evening showed that the leak was totally repaired.

Early in the morning the pressure was checked again and the shielding could be mounted. Even if initially the pressure rose to high levels, vacuum specialists managed to keep the injection septum under good enough conditions so that finally the SMH42 did not need a bake-out that would have cost probably a 7 day stop.

The beam resumed on Friday at midday after 30h of down time.

On the same Friday ions were sent to SPS. Before the leak the lifetime was around 4 to 4.5s, after, there was not enough signal along the range needed for the computation. The measurements will resume as soon as the ions are back to the PS.

Other issues during the week:

- POPS has tripped twice this week but could be easily restarted causing only 10 minutes down time each.
- On Tuesday a beam control stability issue in the double splitting of the BCMS beam affected the LHC filling foreseen in the morning. It was found that the old h28/42 switching (75ns beam) was affecting the distribution of the 20MHz cavity C20-92 return signal producing spikes in the phase loop.
- On Wednesday east beams were down during 45mn due to repeated trips of the extraction septum SMH57, the problem was found in one of the electronics card in the power supply.

On Tuesday the MD in view to produce a 80 bunch beam by destroying one h21 bunch by excitation with the transverse damper was successful

SPS (Verena Kain)

Week 32 was a rather difficult week for the SPS. The availability for fixed target was less than 73 %. The main sources of downtime this week are summarised in the following.

- LINAC2 caused 2 1/2 h SPS downtime Tuesday night. 3 1/2 h were lost from the MD time on Wednesday due to a vacuum leak at a gauge at position 514. The leak was repaired by tightening the flange.
- Another vacuum problem in TT20 close to the splitters lead to an anticipated stop of the MD and a slight delay (30 minutes) for the restart with FT beam. A "window-valve" had moved in and could not be moved out remotely anymore. Access was required.
- Then about 30 h were lost from Thursday to Friday with the PS dump 48 vacuum problem,
- 1 1/2 h Saturday morning due to loss of communication with the controllers of the vacuum gauges close to the splitters, which lead to closing the valves and piquet intervention,
- 1 h Saturday night due to a problem with the RF revolution frequency distribution
- and finally 6 h Sunday afternoon due to a faulty DCCT on the MST in LSS2. No spare was available so the experts switched to the DCCT that is used for the primary ion interlock. The situation will have to be reviewed on Monday.

Since after the intervention on the mains last Sunday where the experts switched back to the QF power supply from the QS, the fixed target spill showed a significant ripple with intensity fluctuations of more than 50 %. Even switching back to the QS did not improve the situation much (noise now at ~ 30 Hz instead of 60 Hz). The ripple seems to be enhanced since last weekend. That is why 2 h without any beam needs to be negotiated with physics and/or MD coordination to re-optimize the regulation of the QF as well the QS power supplies. The EPC experts will be available from the end of week 33.

A vertical orbit change has been observed in the operational high intensity LHC cycle. The interlock levels in the extraction regions have had to be moved slowly down in the vertical plane by about 1 mm since the end of last week. MICADO indicates the error source at 527. To be followed up.

To optimise scheduling the HiRadMat experiment ESScoat should be executed the coming Monday or Tuesday.

Preparation for the upcoming LHC MD week has not started in the SPS due to all the difficulties.

Unfortunately, not much progress was made on the PILOT LHC ion beam this week due to very low intensity from the SPS injectors after the PS vacuum issue, power supply issues in LEIR and limited available time.