

Accelerator complex status

End week 10 (Sunday 9th March 2015)

Summary:

- Steady operation with argon to North area. Change to third energy last Tuesday.
- Booster continues set-up with protons (LHC25, SFTPRO, ISOGPS) and wrestling with a selection of problems
- Linac2 source off on Thursday for about 23 hours with a broken cathode.
- Successful LHC sector test over the weekend.

Linacs (Rolf Wegner)

Linac2 had a more difficult week:

- Monday afternoon, 1h stop for the exchange of a high voltage cable in the RFQ Frank James amplifier (follow-up of problems experienced the weekend before). The amplifier has been running stable since then.
- Monday a small ripple of 1..2% on the source current has been seen every hour for ~10 min. A 30 min beam stop had been planned for Friday for an investigation in the source cage.
- Thursday 15.15, no beam from the source. The source cathode was broken. The replacement was started immediately, the responsible technician came in from vacation and replaced the broken cathode with a new one. 2 vacuum valves were replaced as well. The intervention finished around 8pm. Pump down over night.
- Friday early morning the vacuum was good enough so that the conditioning of the new cathode could be started. Beam was back at 2pm on Friday.
- Over the weekend a few flashovers of the source happened (which is not unusual) but the Linac was running well. The source intensity is still ~10% below the nominal one but will increase over the next weeks.

Linac3 is running extremely well and providing stable beam.

LEIR (Sergio Pasinelli and Django Manglunki)

A pretty good week for LEIR, no major breakdown but a peculiar incident on Wednesday, see below.

On Monday 2/3 night, ripple was observed on ETL.BVN10. On Tuesday 3/3 TE/EPC specialists confirmed it not to be real but due to a bad contact on the OASIS cable.

On Wednesday 4/3 morning at 8:30, a slow loss appeared on all cycles.

The loss shape looked like it was due to a pressure bump caused by vacuum leak, but the gauges readings looked normal, which was also confirmed by the TE/VSC piquet person. It was cured by drastically decreasing the current (from 360A to 260A) in the coils used to expand and recompress the electron beam, respectively upstream and downstream the cooling section in the electron cooler. These coils are in series and their current is thus controlled by a single parameter. After a few hours, it was possible to bring the current in the coils back to its nominal value.

The current explanation is that there was a temporary short in the compressing coil, and the electron beam was too wide when impinging on the collector, decreasing the collection efficiency. The lost electrons increased the local pressure enough to create the losses observed on the ion beam. This will have to be investigated during the technical stop on 19/3, with a possible intervention after the Ar run.

No other incident all week, quiet week-end as well, apart from unstable injection trajectories on Friday & Sunday which each time needed a re-optimization of the PS Stray field compensation parameters.

Booster (Elena Benedetto)

Good start, except for a problem (bad connection on a card) on BT3.DVT20, fixed by the expert.

Checks on LHC25 and LHCPROBE on Tuesday afternoon confirmed that the beams were within the specs for the LHC sector test (couldn't measure emittances)

On Tuesday afternoon, the Wire scanner of Ring2, Vertical plane, got stuck in the IN position. Despite the intervention of the experts, attempting a remote reinitialization and then an access in the tunnel, the Wire Scanner finally broke. See emails of Rhodri and a report at the coming FOM.

Beam stop from Thursday afternoon until Friday early afternoon, for the Linac2 source cathode failure and intervention. On Friday morning we profited of the stop to have some intervention:

- Tests on the MPS to troubleshoot ripples on the main quadrupoles caused by the Trim1+4 power supply.
- Vacuum expert requested access to investigate about failure located onto a vacuum pump in 3L1 Straight-Section. The problem has been identified; a wire (linking the Pump to a junction box) will be changed during the next Technical Stop.

Protons back on Friday before 14:00. Intensity from the Linac2 slightly lower, as expected, but it eventually improved and the LHC25 beam came back to its nominal intensity in the late afternoon without any readjustments.

On Sunday morning, trajectory (therefore intensity) fluctuation on LHCPROBE, starting from LT.BPM30, both H and V. Looks like a quadrupole problem, but the sampling does not reveal anything. To be followed-up.

Beams:

- LHC25 and Probe were ready for the LHC.
- SFTPRO delivered to the PS
- The new scheme for a short 50ms C16 longitudinal blow-up has been successfully applied on a clone of LHC25 and it is operational for the LHC50.
- Setting up of ISOGPS has started.

PS (Jakub Wozniak)

It was a good week for the PS itself but still quite interrupted by a number of external events.

On Monday there was an intervention for high voltage cable exchange on the Linac causing proton beam stop for around 1h. Later on we were disturbed by the PSB kickers BT1.KFA10/20 and unavailability of ring 1 for 30 minutes.

On Tuesday the RF work continued for the LHC25ns beam where we were having problems with the longitudinal instability of 3rd and 4th bunch. In the search for the real cause of those issues the transverse feedback system was adjusted and finally some improvement was achieved by generating the 25kV voltage with less cavities. The original root cause of it is still be investigated.

There was also a 3h proton beam stop coming from the booster.

On Wednesday we only had a short stop for 1h40 min for the ion beam because of Leir problems with the solenoid.

Thursday morning an unforeseen power cut for 2h brought the front-end (cfc-362-mkkfa28) for the KFA28 kicker down. This happened because of the EN-EL power cut in the buildings 193/197/370/195/508. Unfortunately it also affected the FEC in the 362 building which is not correctly announced in the notice.

In the afternoon our colleagues from Linac2 had to face the failure of source cathode. The replacement procedure to bring back the proton beam took around 22h30 minutes due to a necessary vacuum pumping and conditioning.

The proton beam was back on Friday afternoon around 14h00.

The weekend went without major problems for the ions together with the proton beams for the LHC sector tests.

SPS (Benoit Salvant)

It was a fairly good week for the SPS with Argon beam to the North Area (13 GeV/c followed by 19 GeV/c from Tuesday onwards) and first protons sent to the LHC for the sector tests. Here is the summary:

- The delivery of ions to the North area was smooth from the SPS point of view, apart from beam stops on Thursday night and Friday morning caused by a faulty fire detection system in BB5 (see detailed report below). The momentum change on Tuesday from 13GeV/c to 19 GeV/c took around 21h and beam could be given back to the users ahead of schedule.
- SPS also delivered the first post-LS1 pilot beams to the LHC for the sector tests (3 to 8e10 protons per bunch). The power converters of the TI2 and TI8 transfer lines were checked and repaired when needed in the beginning of the week. Beams were sent to the downstream TEDs on Friday afternoon after the recovery of the Linac 2. The delivery of protons to the LHC for the sector tests for beam 2 was affected by an issue with the Safe beam flag interlock in the BIC extraction for beam 2. This issue was solved by the interlock specialist on Friday night who changed a card in BA4 (3h downtime for beam 2). It is important to note that quite a few SIS interlocks had to be masked (e.g. FEIs, BTVs, BLMs, BPMs, collimators) to speed up the delivery of protons to LHC.

The main issues of the week were:

- On Monday, a problem that occurred on the MKE4 was solved by changing a fuse. When the FirstLine piquet was called to condemn the septa, he answered that all Firstline piquets are unavailable due to a common meeting at CERN. The piquet therefore came more than 1h after the call. TE-EPC confirmed that this meeting was needed following an issue that occurred in the LHC. TE-EPC also confirmed that 24h forewarning to condemn a power supply is not needed if the condemnation is performed during working hours (or anytime if it was not a planned activity).
- On Thursday afternoon, GS-ASE noticed an issue with the fire detection system in ECA5 and ECX5 and an intervention was planned for the next morning to take advantage of the Linac2 stop. On Thursday evening that same system detected smoke, and the fire brigade intervened (followed afterwards by the GS-ASE piquet who went in to diagnose the fault). It turned out that the motor of the smoke detection aspirator was faulty and had overheated, causing itself the alarm it detected. The intervention to replace the motor was kept for the next morning and it was decided in agreement with the fire brigade to continue running during the night since the smoke detection in the neighbouring sectors were operational and could detect smoke fast enough in case of a fire in ECX5 or ECA5. When restarting after the access of the fire brigade, there was a problem to restart the mains (SMD11). The piquet Firstline exchanged a fuse but it tripped again with the same fault. He then took SMD11 out of the configuration, which was repaired the following day by TE-EPC and put back in the configuration. GS-ASE accessed in BB5 on Friday morning and repaired the smoke aspirator. In total, 6.5h of Argon physics were lost with this series of events (2h for the fire brigade access following the fire alarm, 1.5h for the SMD11 trip and 3h for the smoke aspirator repair). Many thanks to the TI operators, fire brigade and GS-ASE piquets for their efficient help to recover beam as fast as possible after the fire alarm.
- On Friday night, a BIC interlock issue blocked extraction from LSS4 and was fixed by the specialist (see sector test summary above).