# End Week 13 (April 3rd 2011) – Status of Accelerators

## LINAC 2 (Giulia Bellodi)

**Linac2 had a fairly quiet week.**

On Monday a high intensity MD was carried out with the old RF tubes.

Source and RFQ settings were pushed and a max current of 177mA out of the DTL could be achieved (vs 167mA starting point). The MD should be repeated with the RF tubes newly installed during the TS at a convenient time, in order to compare results and draw meaningful conclusions.

The TS was started a few hours earlier than planned just before midnight on Tuesday and lasted until lunchtime on Thursday. On Tuesday morning a problem was discovered with the temperature regulation of the DTL tanks water cooling, with a steady fall in temperature since the RF had been switched off the night before, eventually touching the 1deg max excursion alarm threshold. CV found a fault on a self-regulating valve and this was eventually corrected by the end of the TS. CV alarms have been set at 25 and 23.5 deg (max, min).

All TS listed interventions were carried out, including the replacement of the RF tubes.

Watchdog cut the beam on a couple of occasions, with correct action.

## Booster (Bettina Mikulec)

The main activity of last week was the technical stop. All planned interventions could successfully be carried out. The activities ranged from a demineralized water system intervention, magnet, cavity and septa maintenance, BI interventions including the exchange of 2 wire scanners and others).

In parallel, timing modules were upgraded and vacuum devices renamed.

Thursday afternoon the PSB was restarted once the PS access was finished. After a couple of piquet interventions and FEC reboots, beam was back in the PSB at 8h30pm.

On Friday around 5pm ring 2 of the CNGS beam got lost. The operator found the horizontal shaver pulsing even though the timing was disabled. Finally the piquet PO solved the problem – the timing card was in local mode.

On Saturday, checks have been made after the wire scanner exchange during the technical stop; several problems are present, and the specialist has been contacted. Most probably some software adjustments are still outstanding.

A trip of BT3.DVT4 and BR1.C16 stopped the CNGS beam (cut by the BLMs) in the afternoon. Beam was back a few minutes later after a reset.

Since Sunday there is no acquisition on the transformers measuring the beam to the PS. This will be followed up on Monday.

### Beams:

- The AD beam has been coarsely set up as AD will soon take beam.
- Setup done of the parasitic TOF beam on ring 2 of the user EASTA.

## PS (Rende Steerenberg)

The week was dominated by a technical stop that for the Ps started on Monday evening around 23:00 when the beam together with all the equipment were switched off. In the course of Thursday afternoon the machine was switched back on with the first beam extracted around on Thursday evening around 19:30.

The beam for nTOF was switched of last week and beam was not produced since then in awaiting of a the green light from the radiation protection team.

On Monday, when the LHC and SPS technical stop had already started, but some tests with beam were carried out in the PS.

During the technical stop several activities took place like tightening the connections of the doublets and the installation of the fast wire mechanics in the tank in SS69 that was already installed during the shutdown. Initially the vacuum did not go down well and a seal was replaced after which the vacuum recovered well.

In the night of Thursday to Friday work took place on the hybrid MTE beam for which the orbit measurement system was used. The later caused problems (also during the weekend) that could not be resolved by the OP team and setting up had to be abandoned. Lately there are regularly problem with the orbit measurement system and discussions with BI on solving the issues are foreseen this week.

Later in the night and on Friday morning the LHC beams were tested and measured.

Over the weekend there were a few issues with some of the 10 MHz cavities and the spare cavity was used instead until the cavity specialist intervened twice during the weekend.

## SPS (Karel Cornelis)

All beams were stopped on Monday morning in order to let LSS1 cool down for the interventions which started on Tuesday. The technical stop went smoothly, all interventions could be done as planned and, very important, The QD119 could be repaired in situ.

The idea was to take beam on Thursday evening, but the vacuum in the MKDH (horizontal dump kicker) was too poor to have it conditioned. Moreover, the vacuum people discovered a leak on a gauge of MKE4, which could luckily be repaired with varnish. They used the night to bake out the scraper, in the same sector as MKDH. Friday morning the vacuum was slightly better and both kickers, MKDH and MKE4 were conditioned.

We took beam in the afternoon and discovered that QD429, which was changes during the stop, was 1.4mm to low. Geometers were called in to rectify this. The reference vizier on the magnet was probably not well adjusted.

After that, SPS could finally start. Probe, INDIV and 75nsec beams were delivered to LHC over the weekend. Friday night and Saturday morning there were frequent problems with the QS and QD power supply. The specialists came in on Saturday and it seems now to be fixed. Sunday we had to stop the CNGS for a few hours, because of a broken power supply on the ring beam loss monitors.

CNGS has been running with reduced intensity over the weekend because of one RF amplifier has been taken out of service. It has a burned transformer, and it will be replaced today.

The vacuum on the beam dump is behaving very well, no problem to dump high intensity beams. The vacuum on the MKDH is still poor and we still have to be careful with scrubbing beams. We can deliver 4 batches of 75nsec beams and 2 batches of 50nsec beams for the moment. Today we will try 25nsec beams.

## LHC

Week 13: technical stop, recovery and set-up for scrubbing.

Recovery from TS:

- Conservative cool-down of S45 in light of QRL problem – X-rayed during TS.
- Dilution kicker problem MKB.B2

Beam back 22:00 Friday. Collimator re-setup following re-alignment in TS. Loss maps reveal problem with hierarchy (beam 1, H) – not understood. Partial re-setup required.

Injection region aperture check – OK.

Injection set-up for higher intensities started. Vacuum kicking off in triplets around IP5 with CMS solenoid off (8 + 24 +24)

Sunday evening – hit by controls card problem on 18 kV/400 V transformer circuit breaker point 7. Lost UPS and collimator front-ends necessitating re-editing by hand of resolver zero positions.

http://lhc-commissioning.web.cern.ch/lhc-commissioning/

## TI (Peter Sollander)

Wednesday, March 30

Compensator LHC P2 tripped. The reason was first thought to be an over voltage on the 400kV network (416kV measured at the time of the compensator trip). TI in contact with EDF to have the voltage lowered. This was done within 15 minutes. However, EDF informed that by contract, they should deliver 400kV +/- 5%, hence we can expect the voltage to vary between 380 and 420kV.
After investigation, it turned out to be an I0 electrical fault on the compensator. No news back from TE/EPC on what was the problem nor what has been done to fix it.

Sunday, April 3 Two problems in the evening:

- Problem with a controls board measuring temperature on a 18kV/400V transformer in UJ76 cuts power three times from 17:30 in the afternoon before the problem is found and the board is re-tightened at around 23:30.
- When switching the beam back on and starting the Beam Imminent Warnings, the evacuation central in point 2, SESEV-00102, trips. GS/ASE and EN/EL piquets called in and found breaker tripped (EAD372/2E). Breaker switched back on without problem (reason for trip not yet explained).