

## End Week 15 (April 18<sup>th</sup> 2011) – Status of Accelerators

### Linacs (F. Gerigk)

**Linac 2:** quiet week for Linac2:

on Monday, 11:4: replacement of power control for LA1 Quad,

Wednesday, 13:4: intervention by EN/CV to reduce the temperature oscillations of the ventilation system in the Linac2 tunnel. This reduced the water temperature oscillations from 22.7 - 23.3 to 22.8 - 23 degrees.

**Linac3: -shutdown**

### PS Booster (K. Hanke)

Another difficult week.

Throughout the week we were struggling with the R1 problem which is still not understood, although the situation is much better than last week.

Monday access was given to the machine in order to check a few things that had been modified during the technical stop; a visual inspection of the wire scanner R1 was done, and an earth connection that had been done during the tech stop was removed. Unfortunately this did not change the losses on R1.

Tuesday losses occurred on R2 with the same symptoms, so it was believed that R2 had been infected by the same disease that was going on in R1. Again all the hardware was checked without finding a smoking gun.

On Wednesday the situation degraded, and the beam from R2 became unusable for the LHC. While we were checking everything again and again, we noticed that a power supply of a NIM crate died in front of our eyes, and replacing it cured all problems related to R2. Unfortunately the R1 problems persisted. In the afternoon again all hw was checked, in particular the TFB. Before touching anything, all of a sudden the loss pattern on R1 changed. There were much less losses, and at a different location in the cycle. However, there were still bad shots.

On Thursday night some prbs with the C16 on R1 could be solved by the specialist. During the day the RF specialist continued the hunt for the cause of the R1 losses w/o success. Many things were optimized, but the underlying problem remained unclear. At 17:09 the R1 losses disappeared without any correlation to what we had done.

Friday night all cavities of R2 tripped. Could be solved by local reset; found a NIM crate OFF. Throughout the day investigations on the hw of R1 continued, some noise on the pick-ups was corrected by changing a power supply but this was not the real source of the prbs. Fr evening the TOF beam in the PSB was found to be longitudinally bad (too long), cured by adjusting the C04 voltage function.

Sunday morning prbs started with the C04 on R2, first resettable. Later it tripped again and the specialist was called. Access was given and the specialist changed an amplifier which cured the problem.

### **PS (G. Metral)**

Pas de problème majeur cette semaine.

Remise en service de la mesure FMR

La MPS est tombée quelque fois par mauvaise programmation (le responsable du programme d'application regarde avec l'équipe INCA et le groupe Power pour corriger ce problème)

Sur l'opération LHC50ns, le kicker d'extraction PS est maintenant ferme au plus juste apres le batch pour ne pas extraire les 'ghosts' bunchs qui suivent.

Un essai a été fait cette semaine pour passer plus rapidement du mode LHC50ns 36bunch a LHC50ns 12bunch sur un même User avec LSA sur lequel on change une dizaine de paramètres pour passer d'un mode a l'autre: Rf setting pour les splittings, longueur du kicker d'extraction.. Il semble pour l'instant que ca soit plus compliqué que prévu (ces settings changent au cours du temps).

Quelques problèmes on été mis en évidence sur l'utilisation du scope Oasis installé sur les signaux rapides du PS. Le mode multi-acquisition ne fonctionne pas correctement pour les premières traces acquises.

Une observation est en cours pour voir si le PS est a l'origine des Ghost bunch observe a l'intérieur du batch pour l'opération LHC50ns.

### **SPS (K. Cornelis)**

SPS continued with CNGS production and the 50nsec beam for LHC scrubbing and LHC physics towards the end of the week. Although CNGS suffered from weak performance of the Booster, in the beginning of the week, and also this weekend, we managed to have a good production level and we almost caught up with the delay of the projected integrated proton curve. Besides the normal TRX trips there were no big problems on the CNGS side.

On the LHC beam we suffered two main problems this week. On Wednesday evening, the 50nsec beam was becoming longitudinally unstable. The bunches started to oscillate violently, creating longitudinal blow up and beam losses, creating a beam dump. After a long investigation, the RF experts could not find anything wrong with the different feedbacks, blow up or other equipment. The only thing we observed in the end was that we could keep the beam stable if it was kept in a narrow range of radial steering. Further investigation to understand this sensitivity is going on.

Another problem is the rise time of the proton inflector. A lot of time was spent to align the timing different PFN's so that the kick doesn't touch the last and first bunch of consequent batches. It turned out that it was impossible to keep these bunches unaffected, and the experts found a PFN7 with a too low rise time and a jitter. This problem is not solved yet.

## LHC (R. Assmann)

**Main goals for the week: electron cloud studies and 50 ns set-up for physics operation.**

Using bunch trains of 36 instead of 72 bunches for 50 ns physics.

Sunday: stable beams for physics with 336 bunches over 9 hours, peak luminosity  $3.8E32$ .

Sunday/Monday night: flash-over of injection kicker beam 2, during injection, quenches on 11 magnets. Recovery without beam ongoing.

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

## TI (P. Sollander)

- Sunday, April 10: a short (50ms) voltage drop on 400kV EDF supply tripped RF and stopped SPS for 20 minutes. EDF confirms the problem and explains that it was due to a short circuit on the network (not at CERN).
- Tuesday, April 12: Short-circuit phase to earth on circuit RQX.R8 UA87. Intervention by EPC to find the fuses on all three phases blown on ERD130/87. EPC found evidence of an arc having developed between the R phases and the electrical distribution chassis. No remaining short circuit. New fuses put in and feeder switched back on. The LHC was already off, so no additional down time recorded due to this event.
- Thursday, April 14: Electrical perturbation recorded on LHC points 2 and 4 (and nowhere else). LHC was not running at the time (06:27), but power supply RQ10.R6 tripped.
- Saturday, April 16:
  - o Compensator LHC2 tripped in the morning. Intervention by EL and EPC. ALICE ramped down. Compensator properly stopped and locked out, ready to switch beams back on from 09:25.
  - o Demineralized water problem in LHC sector 3-4 stops the machine for three hours. A water flow is seen to be zero and sends an interlock. TI operator finds that it is a faulty flow meter. After discussion with CV piquet, TI puts the minimum threshold to zero also to allow to start with faulty sensor. Water is put back. The zero limit is still active. Waiting for next access to send CV in to fix the problem permanently.