

## End Week 44 (November 7th 2010) – Status of Accelerators

### Booster (Alan Findlay)

The PSB had a great week, with nothing of any note to report except smooth operation. Then Saturday rolled up and gave the PSB a good hiding!

If you're sitting comfortably, then I'll begin. Just before 3pm a water fault took the machine out and the ST technician later reported that the PSB water station had been emptied of 900 liters in under 10 minutes, so the hunt was on for the source. The CPS crew quickly got themselves organized, and the PSB, TT2 and PS were all checked for 900l puddles, which it was thought, shouldn't be so hard to find. Oh how wrong they were, as after a thorough check of all the closed areas with equipment fed from this station, the puddle remained elusive. It took until 7:30pm before the source of the leak could be found, when a lot of water was noted under the floor just behind the reference magnet close to the MPS.

The reason was a broken hose which was quickly fixed, but it had been difficult to find due to the leak occurring right beside a drain which evacuated a lot of the water before it could be seen. Nevertheless, there was a significant amount of water in the false floor cavity, so the firemen and the equipment specialists worked to dry up as best as they could and get the equipment ready for testing. There was a notable amount of water left under the floor of the power house building just beside where the hose had blown, but in agreement with PiPO (and his boss) and the TI team, we took the decision that since there were no faults on this equipment we could try to switch back on this 18kV cell, which was done without problems just before 10pm.

Then started the painful process of getting the machine back up and running, but the CPS crew did a sterling job of getting as much of the machine up as possible, resulting in some beam injected and accelerated in all rings by 11pm. After discussing with the team the remaining problems, we solved a couple more by phone and got a bit closer to getting back on our feet, but not close enough to avoid me coming in to help out with the last few recalcitrant problems just before midnight. Which was nice.

The PiPO got our last few multipoles back up and running, but both the H=1 & H=2 beams in the supercycle were demonstrating serious losses on R1 & R2, which looked to be a non PPM problem, so we started investigating all HW for R1 & R2, although the EAST beams were already available jet before 11pm. By 3am I suggested that we try to send only R3 & R4 to any users who could make use of them, as we were still working on rings 1&2 without much joy. It was then noticed that the AD user passed suggesting that it was in fact a PPM problem and not the HW problem we had thought, which helped us get things back together.

As is often the case, there was nothing clear cut about the solution to our problems, but partially reloading from archive on NORMGPS gave us beam back on R1 not only on this user but on CNGS as well! By 4:30am we had 3 rings up for most users, but R2 was still refusing to play ball, and I was needing some sleep! I discussed with the operator various checks that could be made, which he started and passed on to the morning crew.

The fresh blood the following morning found that copying the Q Strips from the AD user onto CNGS & SFTPRO, brought these users back to "normal" intensities, as was the case on NORMGPS. TOF remained 5-10% lower than expected, but by 07H30 we were back in business.

Monday I will follow this up with the rest of the team to try to find out why we had to make such dramatic changes to the Q Strip functions, only for some users and after a water fault!?!?!

Otherwise, things are just dandy!

## **PS (Yannis Papaphilippou)**

It was a good week for the PS, delivering regularly proton beams to the users and the LHC ion beam. Only one long stop occurred on Saturday afternoon due a water leak in the PSB central building and subsequent problem with 2 of its rings (see PSB report). As the corresponding water station is also feeding the TT2 line, ion beams were cut as well during the leak investigation and were back in the PS during the evening (after ~5h), followed by the EAST beams. The high-intensity beams were injected back to the PS early Sunday morning.

## **LINACS (Giulia Bellodi)**

### **Linac2**

Ran very smoothly throughout the week: no problems to report.

### **Linac3**

Both ovens were refilled on Monday.

On Tuesday morning the source was found in HT shutdown with a shortcircuit on the intermediate electrode (~10kOhm). Repair was agreed and beam was again available after conditioning on Wednesday afternoon.

Intensity dropped overnight and there was a source trip at 7am on Thursday morning. Beam was back around 11am and retuning was necessary through the rest of the day for stabilisation. Just before midnight beam became shortly unavailable because of an RF trip that needed a reset.

More source stability problems on Friday and Saturday required frequent retuning.

On Sunday morning between 4am and 5am transmission on and downstream of TRA15 began slowly degrading, from an average of 20-21 uA current measured on TRA25 in the previous days down to 12-13uA and evidence of losses in the section between TRA05 and TRA15. Intensity at the source output, RF settings and transport to the exit of the RFQ were found to be in good order. After lengthy investigations, beam intensity was recovered around midday by changing the stripper foil and re-steering the beam on the foil itself.

## **LEIR (Sergio Pasinelli)**

The week was very calm except the problem of water flow on the magnet ITE.QFN03 and which was solved Thursday morning by the specialists.

## AD ( Joao Carlos Oliveira)

### -Tuesday, 10h00 to 18h00

Water leak detected in the machine. Leak on the quadrupole QFW22, the same magnet as the week before.

One of the coils was not properly clamped Fixed by Antony Newborough's team.

Jan Hansen's team had to dry vacuum equipment.

### -Tuesday, 18h00 to 19h00

RF problem

After beam was back we had big losses when decelerating from 2GeV to 300MeV Maria Elena Anioletta found a faulty lemo connector.

### -Tuesday, 19h00 to 20h00

Steering of ALPHA LINE

### -Tuesday, 21h30 to 22h30

We lose all beam on 100MeV flat top.

DR.BHZTR48+49 not pulsing.

### -Tuesday, 23h00 to 23h30

As I was at CERN, I did the steering of the ASACUSA line. We improved extraction intensity by doing it...

### -Friday 16h00

We lose almost all beam at 100MeV. We had to do a big energy correction on electron cooling in order to fix the problem. Colleagues from CCC had to do many corrections until Saturday morning when we come back to nominal values. Since that, no more problems with electron cooling. We have no explanation yet for this.

## SPS (Django Manglunki)

A pretty good week for the SPS, dominated by the setting up of ions for the LHC which started on Thursday. It turns out the ion intensity delivered by the SPS ( $1.2E10$  charges/bunch) is ~50% higher than expected.

From Monday to Wednesday the SPS delivered the 50ns beam to the LHC for scrubbing studies.

On Thursday the 10h floating MD has been canceled but a 4 hour North area stop took place in order to start the cabling work which had already been planned. CNGS was stopped from 8:00 until 16:00 for intervention on the ventilation system. The RF power team took advantage of the stop to change a tube and fix TRX5.

On Saturday, starting at 14:45 the SPS suffered from a long water breakdown in the injector complex, affecting the Booster and TT2. Ions were back at 20:00 as soon as TT2 was up, but it took a bit longer for the booster to restart delivering protons for CNGS and the North Area. The PSB beam kept being a bit unstable overnight.

The CNGS accumulated proton on target intensity has reached the promised value of  $3.83E19$  on Sunday night, 2 weeks before the scheduled date.

## TI (Peter Sollander)

Three major events during the week, but otherwise rather calm:

- **Tuesday, November 2:**

At 9:11 on Tuesday 2nd of November 2010 a fuse blew on one of the 230 volt Normabarre distribution plugs for Rack 5422 of the CCC computer room. All equipment in the rack has dual power inputs however when the totality of the rack took power from the other distribution plug it exceeded the two times 10 amp thermal fuses of the HP Racks and so finally all power was lost to the rack. The LHC beam was dumped due to the LHC software interlock system going down. There were also problems for the TI monitoring system. The Normabarres should have been protected by 16A fuses rather than 10A. BE/CO is taking the necessary actions to avoid future problems.

- **Friday, November 5:**

13:14, an 18kV circuit breaker opens and stops CNGS for 2.5 hours. First investigations indicate a problem with a connector on a SEPAM (protection device). Pending information from EN/EL at Wednesday's TIOC.

- **Saturday, November 6:**

Water leak on Booster water station (FDED-00065) stops the PSB for more than 7 hours. EN/CV piquet on site and quickly finds that the leak is on the circuit "locaux techniques", isolates the circuit, locates the leak to a flexible hose. Fire brigade called in to help get the water off the floor. Quite some air in the circuit makes it take a while to fill it up and put it back in service.

## LHC – full details under coordination at:

Electron cloud investigations during the first part of the week.

Switched to ions on Thursday, first collisions early Sunday morning.

Stable beams for Monday.

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