End Week 46 (November 21st 2010) – Status of Accelerators

Proton operation finished at 8:00 Monday 22nd November.

Isolde (Didier Voulot)

HRS

IS471/IS463 (ISOLTRAP/CRIS) taking beam from HRS since Friday 12/11.

The run was due to stop on Thursday morning for a run on GPS for WITCH. This run was cancelled following a failure on WITCH and ISOLTRAP/CRIS were allowed to continue until proton stops on Monday morning.

Numerous interruptions due to PSB problems and intervention on PS cavities.

Some good results for ISOLTRAP, less successful for CRIS.

GPS

No operation due to WITCH problem. IS433 cancelled. Target change on Tuesday cancelled (CaO CP).

RABBIT irradiation (direct irradiation of samples in the PSB proton beam) of Ge samples took place successfully on Thursday.

First time this set-up is used since 2006.

LEIR (Maria Elena Angoletta)

Quiet week for LEIR.

On Wed 17 Nov the LInac3 oven was refilled (in coincidence with the LHC proton MD) and beam was back by Thursday 18 Nov.

Unfortunately, on Friday 19 morning problems with the source performance appeared, whereby only about 10 microamp could be delivered to LEIR instead of the usual 20 to 24. The Linac3 crew worked on the problem and on Saturday the source was stabilised at about 15 microamp, corresponding to about 1E10 charges (to be compared with the 1.6 E10 value we typically obtained over the last weeks).

Work on the Linac3 source continued on Sunday and the intensity extracted from LEIR could reach 1.3 E10 charges.

Last but not least, during the week studies continued on the damper problems, underlying a control problem that switches off the horizontal damper at 1200 ms. What is exactly doing this and why is still under investigation

AD (Bruno Dupuy)

- Monday. Patch on water leak (magnet DR.QFW22) and looking for the short circuit on QMAIN1 line (magnet DR.QFW24).

After several access in the machine. The operational beam was restored for the experimental area at 16H00.

- Tuesday. Begin of the booster distributor problem's.

Multiple beam interruption, the specialists have begun the diagnostics on booster distributor.

- Wednesday. Restoring nominal proton beam.

Reset a circuit breaker on the extraction line DE0, by First-Line (20 minutes).

Since the beginning of the Booster distributor problems, the proton beam on target AD was reduce by ~25% at 1000e10, the nominal is equals to 1500e10 proton. J-M Nonglaton has worked on Linac and Booster adjustment to restore the nominal proton intensity on ADE target.

Lot of beam interruption , PS (cavity) and PSB (distributor).

- Thursday. back to the normal problems!

Injection Power Supply DI.BHZ6044. Power Supply ON, no fault, but acquired current zero (From 6H00 to 8H00). This issue was solved by First-Line.

The power-supply DR.QUAD was restarted by First-Line, because, the remote restarting was not impossible. (this is a recurring problem => Investigation by PO).

- Friday. Nothing special.

- Saturday Stable beam.

During the night at 23H, the Asacusa team have switched on, the DR.XRC16+41 (This magnet is not used for the nominal beam). Thus, the extracted beam have reduce from >3.1e7 to 2.7e7 anti-protons by shot.

-Sunday. Energy adjustment.

I was called at 7H30 by CCC because the beam was to lower and unstable for ALPHA.

After analysis of the recordings (Thanks' to EqpSurvey). The E-cooler electron beam energy was adjusted at 100Mev/c, and the power supply DR.XRC16+41 was switched off.

Since there we have > 3.1E7 anti-protons extracted.

Conclusion:

Week was very disturbed by the PSB & CPS problems. Despite this, the intensity of the beams from the PS and PSB, have been more than correct. For the AD, some normal intervention on power supplies by First Line team.

PS (Alan Findlay)

We'll, what can I say except that the machine suffered from a bad case of premature discharge at injection, forcing us to limp to the end of the run!

Tuesday morning the specialists for the Distributor were called to investigate the reason for the BI4.DISP dropping out and making a big mess of our injection. They worked until 01H15 in the morning before admitting defeat and going home to get some rest. If we left the BI4.DISP off we could at least get stable beam on 3 rings, but leaving it on meant the beam was unstable and it would eventually go off and need resetting in any case. The team were back the following morning and were following the lead that they had a noisy trigger that was provoking the thyratron to discharge early.

The LHC was due to take protons again on Wednesday, and by 12H30 there was enormous pressure to supply stable beam, which was not possible if we left the specialists to debug their hardware, so we were forced to ask them to stop. As the LHC beams requested only required 3 PSB rings, we came up with an operational solution where we changed the injection timings so as to inject in rings 2,3 & 4 and sacrificed ring 1. Like this, we could supply all LHC needs, with the other users 1 ring down. The operators then tried to recover the beam that would normally be dumped and send it to ring 1, but this was only stable for the AD and ISOLDE users.

There was a PS intervention in the afternoon, so the specialists continued their investigations, but by the end of it could not identify why their thyratron was discharging outside of the timing they were sending, and they were getting short of ideas, so we left it until the LHC would stop taking beam.

We also had a problem on the C16 cavity for R4, and this meant that we now had R4 down as well, so we had to intervene inside the HV cage to identify of the problem was real or just a faulty interlock. After an hour Matthias had found the faulty interlock and repaired it.

The operators did a great job of keeping the machine performance up despite our unusual operating conditions, and they made the best of a bad deal.

On Friday we were told that the LHC would continue with protons until Saturday, and after discussions with the Distributor specialists, the machine supervisors and the physics coordinator, we all agreed to limp on to the end of the run without ring 1.

After the beam is cut on Monday, the Distributor team will have the time they need to solve their problems, so we'll leave the PSB cycling with our typical supercycle and timings, even though we'll switch off the hardware.

A bad week for the PSB, but we managed to fill the LHC as required, and gave as much beam as we could to the other users.

PS (Simone Gilardoni)

The PS week was pretty good.

We were delivering a reduced intensity to the SFTPRO and the CNGS due to the problem with the PSB distributor.

During the week there were only few issues related to the RF.

The 80MHz-88 cavity tripped few times since Monday already, in particular when used for the ions.

The 10 MHz cavity in SS51 broke down and two accesses were needed to fix it, first to change the amplifier, then a filter.

I would like to thank to the RF experts for the interventions.

Concerning INCA, it was not possible sometimes to remove the beam request for some of the users.

CO has been informed while the operators found a workaround by using the external conditions.

Concerning MTE, we tried the capture without the PFW and F8L. We managed to do it at reduced intensity due to the PSB problem. The goal was to check if the oscillation in the capture is produced by the PFW or the F8L.

The analysis is ongoing.

SPS (Elias Metral)

The week started with a very good news for CNGS: the level of 4E19 pot per year was reached for the first time (reminder: 3.8E19 was the goal for the 2010 CNGS run). On Monday and Tuesday the foreseen floating MD took place, during which the coastable cycle for ions to be used later by UA9 was first set up and then used by UA9. As with the other coast proton cycles a huge transverse emittance blow-up (i.e. doubling in the order of ½ or 1 h) was measured in particular in the horizontal plane. The origin of this blow-up still has to be explained, as it was certainly not present in the past, and it might be due to some uncompensated ripple on the main magnets (to be confirmed). Concerning the ion working point it should be noticed that three were used in three years, which means that either we have a lot of freedom or the optimum remains to be found: (1) in 2007, Qx ~ 26.13 and Qy ~ 26.25; (2) in 2009, Qx ~ 26.20 and Qy ~ 26.25; (3) in 2010, Qx ~ 26.38 and Qy ~ 26.20. During the UA9 experiment, unexpected features of the ion-crystal interaction were revealed, which need to be studied in more detail. On Tuesday, in order not to have to reduce the intensities from LEIR, Jorg increased the LHC safe intensity beam flag by 16 % (1.45E10 instead of 1.25E10).

During the night between Tuesday and Wednesday, the LHC 50 ns and 75 ns proton beams were checked to be ready for the LHC ecloud MD between Wednesday and Saturday. On Wednesday, K. Fisher changed two spare converters in the main dipole configuration, replacing the SMD 2 and 12 by the 13 and 14.

On Thursday, the scraper was causing unexpected beam losses during the cycle. In order to solve this, a horizontal bump of 5 mm was done around the scraper. Furthermore, some BIC interlocks (BPM LSS6) were observed when increasing the intensity and it was due to the gain in BA6, which was too high. Reducing it (as we are used to do for CNGS, but may be not yet for LHC…) solved the problem.

On Friday, the 50 ns beam was taken by the LHC instead of the 75 ns beam used so far. The LHC proton MD ended on Saturday morning.

On Sunday, the intensity on the LHCION2 cycle was lower than expected, which was due to some issues in the Linac3 and in TT10.

TI (Peter Sollander)

Two relatively small major events during this week:

• Monday 15 November, an electrical perturbation dumps the LHC beam in the morning. A 6% voltage drop for 50ms seen on the LHC 66kV supplies at points 2,4,6 and 8.

• Tuesday 16 November; LHC stopped for an RF problem, CV sent in for a quick access to fix a drain pump in UX45. The intervention took longer than expected and delayed the restart by approximately 30 minutes

LHC

Out of ions for e-cloud studies with 75 and 50 ns bunch spacing on Wednesday. Back to ions Saturday morning.

Full details under “coordination” at

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