

End Week 31 (August 8th 2010) – Status of Accelerators

ISOLDE (Emiliano Piselli)

HRS:

Target change done on Thursday.

GPS:

Beam to users till Tuesday morning, when I started a target change. Unfortunately during this operation the automatic cycle of the robot taking the target off the FE and putting it on a shelf was interrupted just after the lead door had opened and while carrying the Pb target with a dose rate of 350mSv/h at 10cm. After many investigations and test performed by Richard Catherall and J. L. Grenard [EN-HE] I was able to change target in the late afternoon on Wednesday. The problem seemed to be stemming from the hardware communications between the door microswitches, the pneumatic pistons and the door opening relays in the control room but it is still unclear why this happened. The best guess is that by manipulating the relays (all 33 of them) one has come unstuck which in turn unblocked the situation.

Stable beam tuning on Thursday morning and beam to users the same day in the afternoon.

No major problems during the weekend.

AD (Bruno Dupuy)

It was a quiet week.

The period of MD (Monday from 8:00 to 21:00) dedicated to Stochastic Cooling did not permit a significant improvement of the extracted bunch length. Also Tuesday afternoon, other settings, were used to optimize the beam. Around 6:00 p.m. the settings were good enough to restart the capture of data for ASACUSA.

-Target Station Cooling Fault

The station stopped because of a temperature fault. It happened Thursday during the user meeting.

The specialist made a reset of the interlock and restarted the water pump.

- Top Scraper blocked in beam.

Thursday, morning a test of the 'future new emittance measurement application' has been made.

Following this, the afternoon the PLC Scraper was frozen. Return to normal after software reset by specialist.

- Poor Water pressure on the DE0.QN40

It happened Friday end of the day. It was solved during the night by magnet piquet hotline. It took us 3h to put beam back.

- I was called Saturday morning because the beam was too unstable for ALPHA.

The energy of the electron-cooler at the extraction and some setting were adjusted to improve the beam for ALPHA. The intensity of the beam is correct $> 3 \cdot 10^{17}$ anti-protons. The length of the bunch is large, and not stable.

SPS (Django Manglunki)

A good week for the SPS.

The number of protons on target for CNGS reached $2.1 \cdot 10^{19}$ ($1.9 \cdot 10^{19}$ expected).

LHC has routinely been filled with the multibatch LHC2 user, transverse emittances being adjusted on demand between 2 and 3 microns.

In the North Area, H8 has been set up for "primary" protons at $400 \text{ GeV}/c$ (max 2kHz, or 20k protons per spill) for AMS. On Thursday, the sharing was momentarily changed for 3 hours to give twice the intensity on T4

($8 \cdot 10^{12}$ instead of $4 \cdot 10^{12}$) at the expense of Compass ($2 \cdot 10^{13}$ instead of $2.4 \cdot 10^{13}$).

On the MD front for the LHC beams, there was progress on the 150ns bunch spacing (user LHCFAST3), fast ramp on multibunch (user LHC3), and studies of high intensity single bunch (user MD1).

As during last week, there were a few problems on MKD, necessitating the intervention of the BT piquet.

PS (Rende Steerenberg)

Last week was a rather good week for the PS, with only minor issues of which most were solved quickly.

The nominal intensity of the nTOF dedicated beam was increased from $7 \cdot 10^{12}$ to $8.5 \cdot 10^{12}$ protons and was sent to nTOF on a regular basis.

Multiple failures and difficult diagnostics of a non-stable failure on the ARCON EST caused a 5.5 hours shutdown of the accelerator complex. LHC was operation as not affected by the unavailability of the injectors.

During the first part of the week test were made on the LHC 150 ns beam with intensities beyond the $8 \cdot 10^{11}$ protons per bunch. This beam was taken by the SPS with additional blow up in the PS and the beam reached the SPS magnetic flat top within specifications and nominal bunch intensity.

During the second part of the week the LHCINDIV beam was copied on MDPS and the intensity was pushed to nearly $3 \cdot 10^{11}$ per bunch in the PS. The beam characteristics were quite good. However, precise transverse emittance measurements could not be made as the wire scanners do no longer work correctly.

Also the MTE work continued during the week with many test and measurements on the beam for different setting of the transverse damper that is used to excite the beam during the transverse capture process.

The preparation for the ion operation were also started with restating and testing the ion injection elements, the magnetic cycle and the tuning of the 80 MHz cavity. This means that during the ion

operation there will be no hot spare 80 MHz cavity for proton operation, meaning more risk of down time for the LHC in case of a 80 MHz cavity failure.

Booster (Bettina Mikulec)

Monday last week the ISOLDE watchdog problem affecting the staggered ISOLDE beams has finally been understood: The transformer used by the watchdog has an integration time window of about 2 us. This window should be long enough to accommodate all the extracted bunches. During this period, the transformer has an offset of about -50 mV, which is recognised as a virtual loss. This offset cannot be corrected with the old acquisition electronics. The STAGISO beam has three bunches spaced by 16 us: in this case the time gate is repeated three times. The virtual loss due to the offset is thus integrated three times, giving a fake beam loss of about 150 E10 p. Moreover, the watchdog is not ppm; if there is the STAGISO beam played with the HRS or GPS beams, the virtual loss is large enough to trigger the watchdog. BI and CO are working to make the watchdog ppm.

The new transformer electronics is also in preparation for the final renovation of the system.

Wednesday 4/8 the ARCON system stopped working around 9pm. According to the procedures the Linac2 beam stopper was put in and the RP piquet informed. Beams were back shortly before 3am the next day, but now the ARCON East + PAXS51 (injection PS) are connected to the CTF location on the alarm panel in the CCC.

Thursday 5/8 around 6am the BI and BT vacuum valves showed a 'non-valid' status, and the pressure in the region increased to $\sim 1E-6$. The vacuum specialist and piquet were informed (there is no vacuum controls piquet). 2 hours later beams were back and the vacuum recovered. The reason of the failure was a faulty power supply of a vacuum controls rack; in the case when communication to the controls rack gets lost, the ion pumps are switched off.

Half of the SEMgrid BTM.BEM.SF03 is not working; emittance measurements in the BTM line are therefore not anymore possible. All specialists are on vacation; hopefully repair can start on Monday next week.

As additional remark, the LHCINDIV beam has been provided to the LHC throughout the week. Quite some preparations were required for the SPS MD that took place Thursday and Friday last week.

Otherwise the machine is running fine as usual...

Technical infrastructure (Peter Sollander)

- Monday 2/8: Rain leaks into building SDX2 and drips onto access control equipment stopping the LHC.
- Tuesday 3/8: The breaker EOJ101.Q5/32.19L3 trips and switches off rack DYPQ.A19L3=R32, dumping the beam. TE/MPE went in to flick the switch back on. It is not understood why the breaker tripped.
- Wednesday 4/8: Patrol lost in U15 dumps the machine. No door opened however. This event is under investigation by the access control team and ATLAS.
- Saturday 7/8: SEQ2 filters (LHC compensator at point 2) tripped while LHC off for other reasons.

LHC – full details under coordination at:

Steady running at 25 on 25 bunches – 1 inverse picobarn delivered since first collisions on 30th March.

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