

End Week 35 (September 3rd 2012) – Status of Accelerators

Statistics


nTOF: <https://espace.cern.ch/be-dep/OP/PS/default.aspx>

CNGS: https://accstat.web.cern.ch/accstat/statistics/charts/2012/SPS/CNGS_Target_Cumul2012.jpeg

LHC: <http://lhc-statistics.web.cern.ch/LHC-Statistics/index.php>

TI (Peter Sollander)

<http://wikis/display/TIOP/2012/08/27/TI+summary%2C+week+35+2012>

<p>Wednesday, August 29</p>	<ul style="list-style-type: none"> • Waterleak in ASACUSA experiment. Firemen on-site to close the water supply with the responsible of the experiment. EN-CV will intervene in the morning. See Minor event • SMB cable from BA4 off again. Intervention with EDF foreseen for Monday. This time with SPS + LHC stopped and BE-CO + IT onsite to make sure we see no problems with earth currents flipping 30mA protections in the CCR. See Minor event • AD all power off, physics still running though. It turned out to be a short circuit on an electronics card. See Minor event • SEQ2 Compensator OFF, experiments and CRYO problems when trying to restart. See major event
<p>Thursday, August 30</p>	<ul style="list-style-type: none"> • Electrical perturbation in the night between Albertville and Montarie. Takes out POPS, PS+PSB and LHCb. See Major Event  <ul style="list-style-type: none"> • CMS interlock on a rack, problem with a temperature sensor, see Major Event • Perturbation on the Swiss 200kV network. All accelerators and LHCb stopped, see Major Event • Leak warning on PS water circuit, causes the PS to stop. See Major Event
<p>Friday, August 31</p>	<ul style="list-style-type: none"> • Electrical perturbation, seen by RTE (Vielmoulin - Genissiat) takes out all machines + Alice, LHCb and ATLAS. See Major Event

Thursday

- At 10:15 there was a new power glitch : BR1.C02, BR2.C02 and BR4.C02 in fault (filament fault), BTY.QFO210 in fault. The down time was short ~ 6mn.
- There were losses at the beginning of the ISOLDE cycles between injection and C400: after resetting the Qstrip, the machine went back to a normal state.
- The PIPO was called for BR1.DSHAV4L4 having a "negative" AQN problem. He solved the problem.

Friday

- Morning the BI3.DIS had to be reset twice.
- Again a power glitch : MPS dropped and restarted after a reset. 5mn down time.
- The extraction kicker BE1.KFA14L1 had to be reset in the afternoon.
- During the night there was a resetable fault on BR4.C02.
- Shortly after there was a radiation alarm on PAXS22 : the linac watchdog cut the beam for ISOLDE. The Linac2 supervisor and the Rf specialist were called. The latter suggested to reduce the LI.CRFQ of 100mV.

Sunday

- The Linac watchdog cut the CNGS beam : it seemed to be the same issue as Isolde on Friday night. The operator had decreased the RFQ amplitude by 100mV. To be followed up.

On going beam Beam studies :

160MEV measurements

H9 type beam for ions

LHC Probe 4 rings

ISOLDE (P. Fernier)

Wednesday to Friday night

Setting-up GPS with ^{181}Ta /stable and Rex with $^{181}\text{Ta}^{40+}$, $^{181}\text{Ta}^{43+}$, $^{181}\text{Ta}^{48+}$

Setting up Rex with $^{210}\text{Rn}^{51+}$ and beam to Miniball but they saw $^{181}\text{Ta}^{160+}$ and no Radon.

Saturday

New setting up of GPS and Rex and scale the machine to $^{221}\text{Rd}^{52+}$; beam intensity is really far from intensity expected (0.08pA instead of 3pA) due to low production of the target.

Problems

PLC of the target heating changed.

Investigation of HT drift is postponed due to the run prolongation.

PS (S. Gilardoni)

The PS had a good week.

On Monday we had a long stop due to the repairing of the vacuum leak in the BTP line. Fortunately, the adding of some glue was enough to re-establish a good vacuum. The leak was causing some worries since it was located not too far away from the PS injection septum. After discussion with the vacuum expert, it was decided that there is no need to have a further intervention to change the repaired vacuum chamber with a new one. The only remaining risk for the septum would be a sudden collapse of the bellow near the leak in case of a new leak, too fast for the valve separating BTP and the PS ring to close before having atmospheric pressure at the septum. This event is considered very unlikely to happen.

POPS tripped few times during the week, but the Piquet could solve all the problems. On Monday there was a problem with the cooling water. On Wednesday night POPS could not be restarted by the operators after an electrical glitch, and the piquet had to intervene. On Thursday morning another electrical perturbation caused a new trip. On Friday morning the trip was caused by an IGBT trip. On Saturday a resistor had to be changed by the piquet.

Concerning the LHC beam, we closely followed the beam quality for the entire week. In particular, it is clear that the beam quality, both for the longitudinal as for the transverse plane, degrades if the intensity at PS injection is larger than $650\text{-}660\text{E}10$ ppp ($1.83\text{E}11$ ppb at PS extraction). For larger intensities extracted from the PS, more losses are observed during the LHC ramp corresponding also to finally a smaller peak luminosity. After discussion with Gianluigi, we decided to limit the intensity in the PS to $650\text{-}660\text{E}10$, that should bring the intensity in the LHC to $\sim 1.6\text{E}11$ ppb. Thursday afternoon was particularly bad for the LHC beam. While in the morning the beam was as good as usual, multiple problems degraded suddenly the beam. The first injection was very poor due to some jitter on the PSB recombination kickers, sometimes the beam was not injected at all. Once this was solved, the injection trajectories had to be re-trimmed. There were slow losses on the flat bottom, but without observable beam instabilities, that required a trim of the working point. Then the beam could not be extracted due to missing extraction timings: apparently we were not receiving correctly the synchronization frequency from the SPS. Friday afternoon was again difficult. While filling the LHC one module of the injection kicker was pulsing at a wrong value, probably degrading the beam quality, and two 10 MHz cavities were tripping erratically. During the investigation of the different issues, different working points at injection were tried to optimize even further the beam emittances. Once this optimized, the beam was sent to the SPS, but unfortunately, the gain observed in the PS was not confirmed in the SPS. The reason for this should be clarified during next week, whereas for the LHC filling the usual working point is in use. During the Saturday night shift, one of the possible sources of the sudden intensity increase observed during the week (from $650\text{E}10$ to $680\text{-}700\text{E}10$ ppp) was identified: depending on the presence of the ISOLDE beam request in the PSB, the LHC beam intensity at PS injection can change. This change is very significant, in particular for the beam quality both for the setting up of the RF splittings as for the transverse emittances (working point settings).

During the entire week, but in particular on Saturday and Sunday night, we observed again a sudden change in the TT2 trajectories for the CT extracted beams, without any change in the extraction HW. The problem is under investigation.

The transverse damper was put in operation on the TOF beam on Friday afternoon. Currently the system is working only on the H plane and only at injection and at fixed tune. Still, the losses on the injection flat bottom are considerably improved by the system. The damper was left in operation for the entire week end, without any particular issue. The missing functionalities should become operational soon.

Concerning MTE, we are progressing with the understanding of the orbit measurements for the kicked beam.

LEIR (S. Pasinelli)

Calm week.

Intensity from Linac 3 around 17uA instead of 20uA during the week.

Beam was sent to SPS (UA9).

Refill of the Linac3 was done Friday but Until now (Monday) no beam was received from Linac 3.

AD (L. Bojtar)

Only small problems for the AD this week:

- Wednesday afternoon we had a power cut but only a few elements went down, we could restart them without problems.
- A few resets on C02 cavity during the week.
- The power supply for the kicker DSC DADEKIK1 had to be replaced Friday.
- Today morning a ring power supply DR.BHZTR48+49 started to oscillate, FL fixed it..

SPS (D. Manglunki)

A pretty good week for the SPS.

Proton beams were delivered to the LHC, North Area, CNGS and HiRadMat.

In addition a lot of progress was made on Q20 extraction during parallel MD time.

Most beam stops were due to the PS (POPS, RF cavities, and vacuum intervention in BTP). The only long breakdown took place on Wednesday at

4:00 on the main power supplies and took nine hours to diagnose and repair, after the intervention of the piquet and several specialists. It turned out to be a fault in the regulations card. Just as the main supplies were up, it as followed by another stop, this time from the sextupoles, and a 18kV cable failure, which necessitated to switch from

SMD10 to SMD14. The 18kV repair will take place on Mondayafternoon, pending confirmation and LHC agreement.

For the ions, the 200ns beam was taken from the start of the week, and was used in coast by UA9 during a 48h long MD on Wednesday and Thursday.

LHC (G. Arduini, J. Uythoven)

- Total integrated luminosity during the week, 830 pb-1
- Total integrated luminosity this year 13.5 fb-1
- Total intensity per ring 2.25E14, bunch intensity $\sim 1.6E11$ at injection
- Inst. luminosity in ATLAS and CMS beyond $7 \times 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$
- Stable beams for 58 hours (34%)
- Downtime 75 hours (45%), dominated by the 48 hours stop for BSRT beam 2 problem and subsequent intervention.

More details under:

<http://lhc-commissioning.web.cern.ch/lhc-commissioning/news-2012/LHC-latest-news.html>