

## End Week 32 (August 15<sup>th</sup> 2011) – Status of Accelerators

### Linacs (M. O'Neil)

**Linac 2:** Quiet week.

Thursday. A quadrupole power supply (LI.QDN20) required the intervention of the Piquet Power to reset it.

Sunday. Thunderstorm caused Linac to trip. Reset within 20 minutes.

**Linac 3:**

After tuning and conditioning of the source and some adjustments to the Tank 1 feedback gain the Linac is delivering a stable beam of 26-27uA to LEIR.

### PS Booster (J. Tan)

Busy and difficult week for the Booster.

Tuesday

In the morning the septum in the extraction line BT.SMV20 had an issue with an auxiliary power supply, leading to mis-steered beams and beam losses. The specialists have been called and replaced the power supply, in the shadow of the beam cut for the PS access, so that the down time for physics was reduced to 40mn.

Follow up of InCA with E.Roux.

In the afternoon, the beam was cut from time to time: the BI.STP external condition appeared "bad". The PICO was called but could not do anything as the problem vanished. This problem appeared again several times till Wednesday morning, lasting a couple of mn and vanished again.

In the evening the cavity BR4.C04 tripped and had a status off. It went on after a reset but dropped again shortly after. The specialist was called, went into the ring (with RP) and replaced a broken 100W driver. The total down time was ~4hours.

Wednesday

The InCA team has successfully released a new version of InCA, transparent for the operation.

Thursday

There was a planned access in the PS. The beam was cut for the users for half an hour.

Sunday

At 10:40PM, the PSB was down due to a thunderstorm. Some equipment could not be restarted remotely: BR2.C02 and MPS. The RF specialist and the PIPO were called and came for fixing the problem. The total down time was nearly 3hours.

### ISOLDE (E. Siesling)

**GPS:**

Running with a UC target.

The Collaps experiment finished a successful Cd run on Monday.

Isoltrap experiment took over for their run on Fr and RA. Shared time to use the central beamline with REX (setting-up from HRS) and RILIS for At laser ionisation (at GPS). Isoltrap finished a successful run on Saturday (measured 5 new masses plus 1 nucleus).

Now GPS is in radioactive cooldown (no protons until target-change coming Tuesday). Stable beam is being taken by the CRIS experiment.

**Issues:**

Scaling of the GPS separator magnet isn't working properly: We use different massfactors for higher and lower masses to compensate the offset. Modification of the system foreseen during the shutdown.

On Friday the target heating went down due to a broken PLC (POWGPS) power-supply. Exchanged it for a spare: OK again.

GPS20 sector: turbo pump GPS22 is down but so far we can do without it (will involve vacuum specialists when they are back from holidays).

The N2 bottles for venting the beamlines are empty (vacuum specialists on holidays).

**HRS:**

Target change done Tuesday to a YO cold plasma target. REX run for Miniball planned on 72Kr coming week.

Setting-up HRS and ISCOOL done followed by REXtrap injection and REX setting-up (ongoing). Proton scan and yield tests done on Friday.

**Issues:**

Both of the small HRS and GPS roughing pumps to pump the plasma targets gasline were found broken when wanting to fill the YO cold plasma gasline. This was due to problems last week with lost communication of the dsc cfc-ccr-cgrilis with the gas-system PLCs: at loss of communication the valves would all open and the pumps would start to run. Running with no resistance they kicked out all oil and ran dry. We have taken them out to get verified if they have survived and are borrowing a similar pump from one of the experiments in the meantime.

Christophe Mitifiot and Mathieu Donze (EN/STI) have adapted the PLC program and FESA class to avoid the problems during communication loss (valves will close and pump will stop instead).

Difficulties finding the right stable beam for REX setting-up. The metallic beams (K, RB and Mn) seem to have large amounts of contaminants, probably molecules. Also not all of the noble gas beams are perfectly clean. Other problem is that the metallic and noble beams get ionized at different energies making correct injection into the RFQ (ISCOOL) difficult.

We decided to set-up REX using 80Kr (clean but not the perfect beam to set up with).

**REX:**

Difficulties injecting into REXtrap as described before. Setting-up will continue Monday. (Many thanks for the help from Fredrik and Thierry to help understanding the physics side of things).

**Issues:**

The turbo pump in the RAO died on tuesday - replaced by Paul Demarest (TE/VSC) and Fredrik Wenander

It was foreseen to provide Miniball with stable  $^{22}\text{Ne}^{6+}$  beam from EBIS and the REX Linac, however, the power-supply for the 9-Gap cavity died on friday-afternoon (at 17:30). Han Broere came in but nothing could be done. Repair will take place on monday-morning and the  $^{22}\text{Ne}$  for Miniball has been postponed.

**Schedule:**

Many thanks to PSB (Jocelyn) for coordinating the stop(s) at the booster with us and the experiments.

**PS (A. Grudiev)**

In general, smooth running providing beams for all users. LHC\_50ns double bunch 36 and 12 bunches, AD, EASTA EASTB, EASTC, TOF, SFTPRO and CNGS operation continued at nominal intensities.

On Thursday afternoon, for the first time this year, Ions were injected in the PS accelerated and extracted to D3 at intensity close to half of what is supposed to be on the Early beam.

**Problems:**

There were 3 beams stops in total for 1-2 hours each on Monday, Tuesday and Thursday for 40 MHz cavity 77 repair. The mechanical problem on the tuner system has been fixed, cavity tuned and put back in operation.

On Sunday morning from 9 to 10 a.m. there was a stop of the beams extracted to TT2 due to problem with BSW16-14. PIPO fixed the problem by replacing faulty timing card.

Restart of the PS after the thunderstorm power glitch on Sunday night at 22:40 took 3.5 hours. Several equipments have to be restarted by the specialists: POPS, BFA21P & BFA9P. At last POPS has been restarted by the specialist at 2:20 and all beams came back.

**AD (T. Eriksson)**

Normal stable running with good intensity except:

- 7 hours total downtime Tue-Thu due to PS and PSB RF problems + interventions.
- 12 hours downtime due to AD stochastic cooling HW-fault Thu night - Fri morning, no specialist reachable during night. Faulty relay replacement Fri morning.

- 4 hours lost this morning due to power glitch affecting PSB/PS/AD.

### **LEIR (S. Pasinelli)**

This week of LEIR setting-up was intense.

At the beginning of week the beam EARLY had a very low intensity and the NOMINAL beam was lost during acceleration.

During all the week, the LINAC3 has provided to us a stable beam, with an intensity of 23-25  $\mu\text{A}$ .

We have worked in priority on EARLY beam.

Thursday we have coupled, with success, the LEIR - PS in order to allow PS-RF experts to work on the RF.

Friday, with only one injection, we have ejected  $>1.5e10$  and we have had  $>1.3e10$  at the entrance of PS.

The NOMINAL beam is now accelerated with half of its intensity.

The next week we will send the EARLY beam to PS and we will continue the setting-up on the NOMINAL.

### **SPS (D. Manglunki)**

Not a great week for the SPS

For the first half of the week, the SFTPRO beam has been perturbed a lot during LHC fillings. As the LHC beam intensity per bunch increased over  $1.3E11$ , the ZS tripped more and more often during the ramp on the LHC cycle. It was first decided to decrease its voltage down to  $-30\text{kV}$  and stop SFTPRO during LHC fillings, but it rapidly turned out it was the ion traps which were sparking, and that turning off SFTPRO without moving out the girders did not help. Eventually, injecting a smaller intensity per bunch from the PSB improved the situation. An MD will be performed next week to try and optimise the settings of the ion traps, possibly with the help of a negative extraction bump during the ramp on the LHC cycle. A quick testing of this idea was not possible due to the interlocks which precisely prevent an extraction bump from pulsing on an LHC cycle.

On Tuesday, in the shadow of a PS intervention, another vacuum leak detection was performed in 520, this time successfully identifying the magnet which needed to be changed, MBA52050. It was agreed to organise the intervention on Thursday. The beam was stopped on Thursday morning at 7:00, the exchange went smoothly and the beam was back at 22:00.

During the week, whenever possible, T. Bohl tuned the longitudinal blowup on the LHC beam to try and optimise it.

On Saturday evening the beams stopped being injected by an apparent MKP problem. With the help of the kicker piquet, both low-level RF piquets (SPS & PS), it was traced to the missing RF prepulse from PS, and fixed by the CO piquet. The down time was about 5 hours.

On Sunday, a quadrupole tripped in the Compass line. An eight hour intervention by the TE/EPC piquet and one engineer he had called in, only could partially restore it and allow a limited current.

After 8 hours of downtime, Compass restarted taking the beam in degraded mode but the power supply will need to be properly fixed on Monday morning once the relevant specialists are back.

Also on Sunday, two parasitic MDs took place: High-bandwidth feedback system studies which had been planned to take place during the week, but could not because of the optimisation of the bunch length for LHC, and extraction of a Q20 LHC beam, as LHC was down for the week-end.

At 22:40 on Sunday a power glitch induced by a thunderstorm brought down power of all accelerators. The SPS beam was back at 2:20.

On the CNGS front, there were several trips of the reflector, but the number of protons on target ( $3.55E19$ ) is still around 15% higher than the expected number to date ( $3.1E19$ ).

### **LHC (J. Wenninger)**

Main issues were:

- Bunch intensity increased to  $1.35E11$ , while keeping emittances of around 2microm.
- Peak luminosity of  $>2.2E33$
- Cryo problem with cold compressor in point 8. Started on Saturday, beam conditions expected for Tuesday.

More details under:

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

### **TI (P. Sollander)**

Main event of the week was the electrical glitch and power cut on Sunday evening, 22:40. All accelerators tripped, many problems in TI too. No EDF report available yet.