

End Week 47 (November 27th 2011) – Status of Accelerators

Ions only in the complex.

TI (Jesper Nielsen)

Quite week - here's the link to last weeks summary for

<http://wikis/display/TIOP/2011/11/28/TI+summary+week+47%2C+2011>

Source & LINAC 3 (Richard Scrivens)

Smooth operation until source re-fill on Friday. Source refill went smoothly but the change of a amp tube revealed a water leak. Capacitor sparked on re-start, necessitating dis-assembly, polishing plates, replacing kapton and reassembly. Back in action 21:30 Friday evening.

LEIR (Christian Carli)

During last week, LEIR has been running smoothly and delivered almost the expected intensities with Linac3 beam currents below 20 uA. No beam from Friday morning until late evening due to a Linac3 source refill (planned) and RF problems with Linac3 (delaying the restart).

Some work on electron cooler settings allowed reducing losses during accumulation (small fraction of the stack lost on the injection septum around the maximum of the injection bump) and around capture and first part of the ramp (probably improved RF capture with a cooler bringing the beam to a slightly higher energy before switching off the cooler).

PS (Simone Gilardoni)

The PS week was dedicated to ions, as foreseen, with the regular filling of the LHC and the physics beam for the NA area.

There were the usual minor problems/resets but POPS unfortunately suffered a lot during the week.

On Tuesday afternoon POPS went down due to a problem with the cooling water and then with an issue related to the feedback from the electrical network. Then during the night, two IGBTs broke down at about

1:41 AM. The expert promptly intervened but could not fix the problem. At ~7:00 AM it was decided to switch back to the Rotating Machine. After discussion with Jean-Paul Burnet, it was decided to try to have POPS back on Thursday, with the goal of a short run with POPS before the stop due to the oven re-filling of the Pb source. It was in fact not possible to restore POPS operation immediately due to a missing spare part of one of the connectors that was delivered from an external company Wednesday evening.

POPS could be back on thursday at about 12:00, but unfortunately went down again due to a problem with the control parts of the IGBTs.

A second switch to POPS was tried on Friday morning but unfortunately it went down again in the afternoon. A series of faulty control cards had to be replaced, probably the same cause of thursday fault, and after a reset of the FGC, POPS could continue to run without any particular problem. I

want to thanks J.P. Burnet, F. Boattini and all the EPC colleagues for the different interventions during the week.

Concerning the operational beams, the operators continued to work on the optimization of the LHC Nominal ion beam, in particular the injection had to be re-steered few times. There were also some intensity fluctuations of about 10%, already present at injection.

We tried to investigate them, also by changing the supercycle composition but it was not possible to find the source of the oscillation, produced already at LEIR injection.

Concerning MTE, the work continued with ion cycles. A 2 GeV and 1.4 GeV cycles were used to measure the machine linear coupling plus, for the 2 GeV, to test the machine stability with islands.

A 14 GeV/c cycle was prepared to test the hybrid MTE, tests that should take place this week. Islands were observed by kicking the beam in the usual manner.

A 20 GeV/c TOF-like cycle was prepared and trajectory measurement at extraction taken to optimize the closure of the slow-bump.

SPS (Django Manglunki)

A busy week for the SPS which delivered ions to the LHC, to the North Area in fixed target, and in coast to UA9 for machine developments.

On Monday morning, the cycle for extraction at 80GeV/c/u to the North Area was loaded; the beam was ready for NA61 and UA9 in the evening around 21:30.

NA61 in H2 took Be fragments, and UA9 on H8 the primary Pb beam; this was made possible by the absence of protons in the complex, with the agreement of the DSO.

On Tuesday afternoon the PS had a first problem with POPS, giving 3h down time. A second one happened on Tuesday night, giving 7h down time.

On Wednesday morning started a 48h floating MD with coasting beam for UA9, but first the LHC had to be filled. During the filling, a fault was detected on an RF tube in Linac3. It was decided to wait until Friday to change it in the shadow of the source refill. The same morning transmitter 10 (800MHz) tripped and was left off duty as it is not essential for ions.

During the 48h MD for UA9, whenever LHC needed the pilots, we took advantage of the sequence to deliver primary ion beams to NA61 in view of future tests.

On Wednesday night we started to have problems with the RF power, with trips on transmitter 4 (3:30h down time in the night then 8 more hours on Thursday afternoon)

As it looked we were able to fill the LHC with only 25% on the power available, time was given to the RF teams to try and solve the problem in between fills, at the expense of North area beams.

On Friday morning after a last LHC fill the source was stopped for a refill. During the stop access was given to fix a wire scanner in BA4.

The source was available around 15:00 but the change of tube in Linac 3 revealed another problem with a sparked capacitor; beam was back around 21:00 from Linac 3, and at 23:00 from the PS after another problem with POPS. In the mean time the RF teams had finished diagnosing the problem.

They traced it to a wrong internal measurement of the actual power, and a faulty transformer which will have to be changed during the technical stop. LHC was filled then fixed target operation resumed for NA61 and UA9.

The week-end was pretty quiet, with up to $1.4E8$ ions delivered per bunch to the LHC (twice the design), in $0.7\mu\text{m}$ normalised rms transverse emittances (70% design). In between LHC fillings the duty cycle for fixed target is close to 50% so we should be in good position to change to the last momentum of $40\text{GeV}/c/u$ on Tuesday 29th, as expected.

LHC

Productive week with main time-outs reflecting injector availability as described above.

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