

Accelerator Complex Status

End week 37 (Monday 14 September 2015)

TI (Jesper Nielsen):

On Thursday 10/09 there was a hydrocarbon alarm in LHC7. TI onsite with firemen, nothing alarming, nevertheless it was decided to put in place a stopper temporarily. On Friday 11/09 at 15:59 an Electrical perturbation caused a dump of the LHC beam. EDF confirmed they manipulated a breaker on a 400kV line between Bois-tillot et Chamoson.

Sunday 13/09 23:07 an Electrical perturbation caused a dump of the LHC beam . EDF confirmed a lightning strike in the Annecy region. 5h 26m downtime for LHC.

Detailed report can be found at:

<https://wikis/display/TIOP/2015/09/14/TI+summary+week+37%2C+2015>

LINAC2 (Dethlef Kuchler):

Very smooth running with only a planned 2 hour stop Friday morning.

LINAC3 (Detlef Kuchler):

A gage was replaced on Monday last week and the pepper pot was taken out. Beam was back on Tuesday. However, on Friday the replaced gage that failed too and was replaced. Beam is back since Monday morning.

LEIR (Steen Jensen):

This week has offered the following events in LEIR:

- Tuesday 8/9 and Wednesday 9/9
- Jerome managed to significantly improve the intensity transferred to LEIR as shown below. This was done by adjusting the orbit correction (dipoles).
- Alan worked to bring down the losses at capture for NOMINAL and EARLY and made some progress. However, the radial position does not seem to be as expected and work focused on the radial loop. He will investigate further next week with Maria-Elena to see if the radial loop response behaves correctly.

Wednesday 9/9

- Ejection was prevented by ER.KFH34 not kicking (seemingly stuck in "STANDBY" state despite control being "ON"). A reset cycle cleared the issue.

Thursday 10/9

- Beam lost in the evening due to LN3 HT shutdown.

Friday 11/9

- Beam back at around 8h00.
-]Ejection does not seem optimal. The BCT readings at ETP and EE will first be verified, possibly followed by adjustments between EE and ETP.
- Beam lost again around 11h30 due to recurring LN3 vacuum gauge (IP.VGF_GAS) problem – will be fixed on Monday 14/9

Saturday & Sunday

- No beam

PS Booster (Klaus Hanke)

A reasonable week for the PSB with not too much down time, nevertheless a few issues.

Friday there was a scheduled stop of 1h for interventions in the Linac and PS, the Booster re-started timely at 10:00. However shortly later a quadrupole in the injection line of Ring 3 tripped and we were running with only three remaining rings until the EPC piquet had fixed the problem after about one hour (changed a card on the power supply).

Friday evening problems started with the ISOLDE HRS user, the trajectories were going wild in the transfer line and the beam was stopped by the BLMs. Throughout the weekend these problems appeared and disappeared again, so far not understood. Lots of attempts were made to identify faulty equipment but so far without success.

In addition to the recurrent ISOLDE problems, on Sunday morning six dipoles tripped (DVT/DHZ 4L1/11L1 rings 2 and 3); the piquet was called and after about 45 min he brought the dipoles back to life (the circuit breaker of the ventilator was engaged on this rack; the piquet disengaged it and changed the ventilator).

ISOLDE (Emanuele Matli):

HRS

ISOLTRAP taking 33Mg and 34Mg.

- Tuesday afternoon yield check and beam handled to users at ~ 6PM
- During the night the scanners starting having problems: updates taking too long.
- Wednesday morning a reboot of the front end after closing all the running applications in the control room had no effect => We show users how to use the expert application, which is refreshing correctly, pointing to a problem with the user application.
- The problem wasn't present anymore on Friday when we checked with Elefterius.
- Call on Wednesday night for a problem with scanner expert application: "phone assisted" reboot of front end via Diamon solved the problem.
- Friday, during the procedures of emptying the balloons the vacuum valves were accidentally closed. Rapid intervention of the vacuum operator who immediately restored the situation, but this probably caused the trip of the power supplies in the central line, and we only realised that 1h later...
- Line heating tripped again Saturday causing 2h stop.

Other

- It looks like the YCC0.BSC0800 scanner is not working [eLogbook 09/09/2015 10:03]

PS (Ana Guerrero)

This week has been very stable for PS, all operational beams have been delivered without issues

On Wednesday there was a MTE dedicated MD with very good progress in the SPS side. In PS Further work in the longitudinal plane is needed.

A beam was prepared and delivered for a LHC MD with low intensity and large emittance LHC50ns, equivalent to the LHC25ns intensity and emittance.

On Friday there was a 2h beam stop for work on the unavailable 80MHz cavity. The problem has been now understood and a solution will be envisaged for the ion run.

AD (Bertrand Lefort):

The AD machine had less than 4 hours of down time.

Friday 11/09/15 Morning, DI.QDE6010 power supply is found OFF, the 2 VERO are dead and the main fuse melts. Even with the power supply OFF, the Working-sets were reporting an ON Mode and 3000 Amps AQN. A JIRA has been filled. The new refactored PowM1553 class should solve this issue. —> Down Time 3 hours

Monday 14/09/15 14:48, ASACUSA vented some air into the common extraction line, causing the gates valves to shut. The good news is that the fast valves have reacted correctly and that the vacuum was partially restored in one hour. This re-open the discussion about centralising the gates opening/closing in order to be able to be sure that only the experiment receiving the beam has an opened valve.

—> Down Time 1 hours

SPS (Benoit Salvant):

It was a good week for the SPS, with regular delivery of protons to North Area and LHC (72 and 144 bunches), as well as first extraction of the MTE beam onto the North Area targets.

Concerning the 144 bunches extraction, the LHC filling schemes prepared on Saturday expected 225 ns spacing between PS batches (which is the nominal spacing), while all the checks performed so far in 2015 (in particular all scrubbing fills and injection checks) had been done with 250 ns batch spacing. In the short term, it was therefore decided to change the filling schemes to abide by the 250 ns batch spacing. The 225 ns batch spacing was tested in May and June by the kicker specialist, but it was observed – for instance this weekend – that the first bunches around the 250 ns gap were kicked by the MKPs which resulted in larger transverse emittance in the LHC. Further optimization by the kicker specialist and reliability checks are therefore needed before switching to 225 ns spacing if it is needed when the LHC is more filled.

The dedicated MD on Wednesday allowed continuing the setting up of the ramp and the slow extraction to TT20 and eventually to the targets. This setting up went very smoothly but the losses along the cycle are still high and require further optimization (in particular on flat bottom and at the beginning of acceleration).

The only downtimes of the week due to the SPS were:

- 30 min on Monday due to a vacuum spike in an injection kicker. The same vacuum spike came back on Tuesday. In both cases, it occurred during or following an LHC-type 25 ns cycle.
- 20 min due a BETS fault that needed a reset on Saturday night as the LHC required beam
- 2 RF issues were difficult to diagnose as no clear alarm appeared: TRX2 transmitter was not pulsing on Wednesday and cavity 6 (800 MHz) tripped on Sunday. The latter took one hour to find out while LHC was waiting for beam. It would be important that these alarm issues are solved in the near future.

Other issues to follow up include:

- An issue was found with the server for the wire scanners in BA5 on Wednesday afternoon. The BI experts investigated and informed that these wire scanners cannot be used until a card is checked on Monday.
- Still on Wednesday, the LHC complained about losses due to the particles before and after the expected filled buckets. This could be mitigated by reducing the bunch length from 4.5 ns to 4.0 ns from CPS.
- One of the important BLMs on the North Area splitters does not give signal anymore, but fixing it would require an intervention in a high radiation area. Further discussions are needed with BE-BI and DGS-RP.
- A high variation in bunch intensity was recorded in an LHC fill that dumped at injection on Sunday afternoon, and the BQM window may have to be tightened if investigations conclude that it could be the cause for the dump.

LHC (From 8:30 meeting, Jorg Wenninger and Mike Lamont):

Wednesday there was a switch from 459 bunches to 745 bunches, initially with 72 bunches per injection. Friday night there was a 13-hour long fill dumped by OP with 745 bunches and 72 bpi. This was followed on Saturday by a 90m de-squeeze commissioning, which was unfortunately hampered by cryo instabilities. On Sunday a cryo stability issues delaying injection and aborted a few injection attempts. However this was followed by the first fill with 745 bunches and 144 bpi. This fill was unfortunately dumped due to the storms that triggered some FMCMs. This morning a second fill of 745 bunches with 144 bpi was put in stable beams around 07:00. The next steps of the intensity increase will be done smoothly, by steps of 144 for stability, e-cloud and cryo reasons. The injection and energy ramp require a bit of waiting for the cryo to catch-up.

Some other items addressed:

- The QPS has no SEU anymore, but communication problems and consequent resetting requires firing the heaters.
- The abort gap cleaning was tested, but at two last fills the abort gap was found filled at 6.5 TeV. This could be cleaned with the abort gap cleaning
- There are also many UFOs observed that did not cause beam dumps
- A stability beam test was made using two trains of 50 ns with similar transverse emittances and intensities as for the 25 ns, indicating no electron could and perhaps conforming that the high values of octopoles required for

the 25 ns beam are necessary to avoid instabilities due to e-cloud and not due to machine impedance.

Next steps:

- Continue the intensity ramp up with 889 bunches for the next fill. There are also a few MDs and check in the bucket list that will be addressed, depending on the status of the CMS magnet.