

End Week 28 (July 15th 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 (Jesper Nielsen)

Monday, July 9

- 07:30 -- CNGS beams stopped to allow for an intervention on the ventilation. After verification with EN-CV it turns out that the intervention was not necessary in the end. TI will supervise the dew point in the CNGS tunnel once per shift.
- CRYO stop due to a frozen compressed air line. See [major event](#)

Wednesday, July 11

- Communication problems in ATLAS. Two IT switches had problems, see [minor event](#)

Sunday, July 15

- ODH alarm in UJ33, decided to wait for an access, the intervention was done in the shadow of a CRYO problem. See [minor event](#)

LEIR (Maria Elena Angoletta)

Another pretty un-great week for LEIR.

A reasonably intense beam (up to 22uA) was available on Monday afternoon from Linac3, after the source refill carried out the week before and after an MD done in Linac3 on Monday morning.

An MTG general problem stopped all operation on several machines (LEIR included) on Monday afternoon but was quickly solved.

After restarting or resetting a few equipments, and going locally to restart power supply with a non-functioning 1553 connection, some weak beam could be accumulated, captured, accelerated and synchronised ready for extraction, which was great news.

On Monday afternoon the problem of the synchronisation between Linac3 and LEIR was also finally solved. The problem was that before the machines startup several TG8s timing units were replaced with CTRVs. It turns out that CTRVs have an offset feature to allow front-ends to compensate for different cable lengths of central timing cables, which didn't exist for TG8. The default value for this was of 100 microseconds and it was left such for Linac3, so all timings on Linac3 were being sent out 100 microseconds later than in the TG8 era (i.e. the previous run). LEIR also has this feature, and it was also sending timings out 100us late, but during the initial setting up of LEIR this was corrected by setting timings earlier. The offset was not available on the working set but deeply hidden in the database, the piquet control was not aware of them and we had to wait for the expert to come back from holidays to find the problem. The initial suggestion by the group CO to change all timings to take into account these 100 us was refused as it would have made unusable all archives

made so far. It was then decided to set the offset in the database to 0 and go back to the situation we had in the past (until somebody changes by mistake the value in the database, actually...).

Anyhow, on Monday evening we were reasonably optimistic that things were finally getting back on track. As it turns out, we were wrong (oh, so wrong!) in our optimism.

On Tuesday we steered the injection lines to improve the efficiency but we started noticing that often the beam got either completely or mostly lost after the capture, sometimes immediately, sometimes after 200 ms.

We started investigating this behaviour and discovered that several functions (such as ER.GSQFT20/23/24), that were editable the week before, were not editable anymore. It was also impossible to reload archives, so we had to wait for the CO group to solve these new problems.

On Thursday late afternoon, some database modifications and two (!) INCA releases afterwards, we were finally able to control again our machine. We kept looking for the reason of the beam loss and finally on Friday late afternoon, when we were at our wits' end and after calling magnet and controls experts, we traced the problem to a bad contact in the distribution of the measured Btrain.

Three cables were changed as well as three Lemo-to-BNC connectors that were in the distribution chain for Bup and Bdown. This will be followed up with controls people (responsible for distribution system) next week to tidy things up and to make sure there are no further problems.

After this and with basically no setup of the LEIR machine, we were able to have at extraction 60% of the nominal intensity for the EARLY beam and 50% of the nominal intensity for the NOMINAL beam.

Of course, owing mostly to controls problems, LEIR is now nearly two weeks late with respect to the original planning. Next week we'll do our best to provide a decent intensity for the PS, but we have already warned our PS colleagues that the dedicated MDs and setting up are still to be done in LEIR when the beam will not be available at all to the PS.

Last but not least, LINAC3 and LEIR representatives showed at the MSWG meeting on Friday afternoon the main problems experienced at startup. Clearly a big issue was the controls layer, which was delivered late, not fully functioning, very little validated and often setup in a different way with respect to what it supposed to replace. This created hardware damages (in Linac3), delayed the machines startup and generated a good amount of extra work for supervisors and for all experts alike. The consensus was that a timely delivery and better validation of the various tools and settings by the CO group would optimise the use of the department's resources, would avoid extra "fire-fighting" work for the instrumentation groups and, finally, would be just good old common sense.

AD (Joao Carlos Oliveira)

We only had problems with a power supply on injection line (FTA.QFO9052).

- Friday, power team replaced some capacitors. 4 hours down time.
- Today, Sunday, first line replaced a small power supply on the FTA.QFO9052. One hour down time.

The rest of the week was quiet.

ISOLDE (Pascal Fernier)

HRS : target #480 run @40kV CRIS les nuits.

Run satisfaisant pour les physiciens – Arrêt de la machine HRS vendredi matin pour liberer la ligne de transfert CAO.

GPS : target #482 Ta : run @30kV pour experience MAYA via Rex – Setting-up stable 39K et 9Be, setting-up Rillis, setting-up Trap, Ebis, linac : tres bonne transmission pour des Isotopes legers – Proton scan et yield check → production 11Be > x10 valeur attendue.

Machine prete jeudi matin mais grosse fuite de vide ☹ faisceau pris samedi a 13H00

Problemes technique :

Probleme de watch-dog HRS : resolu mercredi par l'equipe BI qui a applique HT sur cables transformateur BTY. TRA325 pour supprimer les mauvais contacts.

Intervention dans la zone separateur HRS mardi matin pour inspection fenetre Rillis et fellow Tim.

Pompe num 2 reseau eau demineralisee suspecte, commutation prevue pour lundi 23/07.

GPS.FC490 situee dans la zone separateur GPS ne fonctionne plus, il faudra intervenir a la fin du run quand le niveau de radiation sera acceptable

BOOSTER (Giovanni Rumolo)

Here are a few outstanding items from this week at the PSB:

- Miscellaneous problems with some BCTs already began last week. On the good side, the transformer BTY.BCT325, which is right in front of the HRS target and is important for statistics, proton count and for the ISOLDE watchdog, could be remotely repaired and is back to function correctly and there was no need to implement a workaround (as discussed at last week's FOM). Unfortunately, a final solution for the injection transformers BI.BCT10 and 20 hasn't yet been found. The faulty electronics recently exchanged still causes a wrong delay in the timing of acquisition. This has been temporarily compensated via software, but the issue still needs to be followed up to implement a final hardware fix.

- The bad performance of Ring 1 has been further investigated but it hasn't been yet improved to its best. The losses during the cycle could be corrected with a slightly positive radial steering (though the reason for that remains unclear), while no good settings have been found to avoid the large losses between injection and capture occurring for high intensities (number of turns injected above 6-7).

Although users do not really suffer from this (all beams going to PS use intensities per ring below $700e10$ p, while the lower intensity of Ring 1 can be compensated with larger intensities on the other rings for the ISOLDE users), this issue will still be closely investigated in the coming weeks.

- The bad PSB-PS transfer occurring on some shots has been traced back to the wrong setting of the fine delay BEX.SSYNCFD, which will have to be recalculated and set back to the correct value on all LSA cycles in the PSB.

Otherwise, the beam availability from the PSB to PS and ISOLDE during this week has been close to 100%.

PS (Ana Guerrero Ollacarizqueta)

This week the beam was off for about four and a half hours. Three interventions were needed due to 10MHz cavity failures (C10-96, C10-91 and the spare C11), causing a downtime of almost three hours because of the required accesses. Two MTG issues added 30 minutes. POPS tripped due to a perturbation in the B measurement and came back operational after half an hour.

The CNGS beam extraction continues to be a puzzle. The radiation levels at the PAXS35 radiation monitor change without intervention so the intensity has to be lowered to $1.5-1.6 \cdot 10^{13}$, during certain periods. An attempt to set up the extraction and steering along the line according to last year's references was done but even if the transmission efficiency increased and the losses at extraction were the same we had to rollback due

to the radiation levels attained at PAXS35. Such behavior suggests that in the current configuration part of the losses are seen somewhere else.

Work was done on the EASTB beam to provide a better spill to DIRAC.

The beams for the LHC 25ns MDs were delivered without problems.

The ions from LEIR are expected today so ion related elements have been checked. KFA28 and C80-08 not yet operational.

SPS (Django Manglunki)

The SPS delivered beam to all users this week: North Area, CNGS, HiRadMat and LHC, as well as machine developments.

On Monday the second attempt to fix the vacuum leak in TDC2 eventually succeeded.

On Monday afternoon, an MTG problem occurred, blocking all timing throughout the complex. In the SPS it happened just before transition on a CNGS cycle and the beam was properly dumped without equipment damage.

On Tuesday morning the valves could be opened in TDC2 and beam operations resumed in the North Area.

Wednesday from 8:00 to 20:00 took place a floating MD: Q20 and bunch rotation at high energy.

Wednesday night a first attempt to deliver HiRadMat high intensity failed as the Beam Energy Tracking System (BETS) was seeing a wrong extraction energy, 450GeV instead of 440.

Thursday another floating MD was supposed to take place between 08:00 and 20:00 but a lot of time was used to fill the LHC and diagnose the BETS, so the MD users did not see much beam.

Thursday evening some copper-melting beam was delivered to HiRadMat after the BT software specialists solved the BETS problem (missing prepulse).

There were lots of LHC fillings during the week-end, with optimisations of the scraper settings.

LHC

Floating MD followed by 90 m run. Choppy proton physics over the weekend leading to Van der Meer scans on Monday.

More details:

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