End Week 20 (May 17th) – Status of Accelerators

LINAC (Detlef Kuchler)

It was a good week for the Linac. No problems.

In the night to Wednesday the LEIR water station lost 43 m3 of demin water due to a broken relais.

A similar problem we had already last year. Due to this the return pressure went up to 5bars.

Fortunately this did not affect the operation, but opened a safety valve at Linac3.

CTF3 (Steffen Doebert)

We operated CTF3 all week last week. During the week we had commissioning beam with a focus on optics measurements in the Delay Loop and later on to establish the matching for transfer line 2 (TL2). Over the weekend we run beam for 30 GHz production and conditioning.

We had some minor problems with Klystrons and controls mainly due to overloaded front end computers. We will continue commissioning this week.

AD (Pavel Belochitskii)

It was the first week of AD start up. Below day by day status report.

Monday 11: test of security chain in target area, followed by power supply tests there.

Tuesday 12: problem with injection timing was fixed by J.-C. Bau. Various problems with two MTV screens in 9000 injection. G.Grawer continued test of magnetic horn.

WednesdayTest of magnetic horn continued, now in remote.

Thursday: problems with MTV screens fixed (S.Burger). DI.BHZ6044 and DI.QDE6070 off. Fixed during the day by firstline. PS team made a steering of AD beam in TT2 line. Horn still can't operate at high current, interlock problems. With tiny beam injected (about 3 10^6) we observed deceleration down to 100 MeV/c.

Friday: interlock problems with magnetic horn. Faults of ejection kicker fixed. No production beam.

Saturday and Sunday: work with a beam of reduced intensity.

Fault of main solenoid of electron cooler didn't allow to wok at 300 MeV/c and below, and we concentrated on machine optimization at top energy 3.57 GeV.

Fine delays of injection kicker have been optimized, followed by steering of production beam to the target.

Stochastic cooling system operation at injection energy and 2 GeV/c has been checked: excellent cooling performance, small beam emittances.

Then we looked at bunch rotation set up, and optimized phased of cavities w.r.t. PS.

Horn pulse timing was optimized.

As result, we have now 3 10^7 pbars at injection and around the same at 2 GeV/c.

ISOLDE (Pascal Fernier)

HRS : target #398 @30kV; utilisateur = Collaps

mardi : setting-up stable beam 71Ga

mercredi : yield measurement + Rillis laser optimisation

He tank changed on the Rfq

faisceau utilise par Collaps : 71Ga --> 85Ga.

jeudi : plc Porfq down --> 30 mn arret

plc Isohrs down --> le rebbot provoque l'arret du chauffage cible sans destruction de celle-ci;chauffage puis Rillis optimisation; faisceau de retour @21H30.

vendredi : booster septum injection water leak detection;.

GPS: target #397 @30kV; utilisateur GLM

faisceau mardi & mercredi sans probleme particulier et fin du run mercredi soir.

Booster (Klaus Hanke)

Smooth running during the first part of the week, with only minor technical problems which were followed up on the spot. VELO finished a first series of measurements Tuesday night.

Work was done on LHCINDIV, and on beams for the PS MTE as well as on the wire scanners.

Thursday morning short stop for PS access, in parallel intervention on BR3.C04.

Friday morning injection septum (BI.SMH) down and not resettable. Leak suspected and confirmed later during the morning (cooling water leaking into the vacuum). After analysis of the situation the following procedure was decided:

- running without cooling water during the weekend; beam intensity limited as beam loss on the septum is the main contributor to heating. Septum current and vacuum are monitored.

- stop Monday morning 08:00 for 24h radiation cool-down, requested by RP.

- intervention as from Tuesday 08:00. The septum needs to be changed for a spare, an intervention which has never been done. The time estimate for the intervention itself is one day, with a large uncertainty on this estimate. It is likely that the extraction septum, which is in the same vacuum sector, needs bake-out afterwards. In this case the total duration of the stop would be of the order of several days.

All activities planned for the technical stop on 25/5 will be advanced as far as possible. The idea is to start up the machines as soon as the intervention is finished, and then not to stop again on 25/5.

The Booster was re-started Friday night, after solving some issues with the lift interlock and with a quadrupole which did not come back. During the weekend operation with EAST, SFTPRO, AD and ISOLDE (limited in intensity). No problem with the septum.

Both on Saturday and Sunday cases were observed where BTY.BHZ301 switched to the wrong destination. While on Saturday the piquet CO could solve the problem by a reset, on Sunday this was not possible. To be followed up.

Also on Sunday there was a stop of 1.5h due to the C02 cavities. The problem could be solved by the expert (grid control unit changed).

PS (Yannis Papaphilippou)

- Delivered a 40s super-cycle with EAST beams, SFTPRO, LHC beams for setting up (INDIV, PROBE). Continued setting up of TOF beam. On Thursday, an EASTB beam was steered correctly to DIRAC.

- On Tuesday, C51 tripped and the specialist asked for a tunnel access. At the same time, PICO was called and changed a pulse repeater (2h without beam). Next morning, the specialist informed us that a random short circuit was observed in C51. It was replaced by C11. At the beginning, it was thought that this was coming from the high voltage tubes outside the tunnel. Later on Wednesday afternoon an access was requested and scheduled for Thursday morning. During the intervention, a leak was found causing a short-circuit on an amplifier of C51. The leak was fixed and the cavity was not switched on until the afternoon to leave the ampli drying (3h without beam).

- During the same intervention the polarity of BTP.DVT50's was found inversed as compared with BTP.DVT20 and 30. The observed problem, during last week, with badly injected orbit in the PS was thus solved.

- On Wednesday morning, a water leak was observed on LEIR water station. CEGELEC initially asked for an access in the PS but finally did not want to enter as they found the problem in LINAC3-LEIR area (pump not working which caused an overpressure of the water network). An access was still scheduled in PS and it was observed that there was not water in the tunnel (1h without beam).

- Following the problem with the PSB injection septum, EAST, SFTPRO and AD beams were only delivered during the weekend.

SPS (Jorg Wenninger)

Not a great week... !

Monday an electrical fault in BA1 brought the SPS down for most of the day (mains, colling, FECs...). FT beam was re-established in the evening.

Tuesday morning the slow extraction was suddenly affected by strange beam loss, and weird extraction loss pattern appeared. This could be traced to a large current error of the SPS main dipoles around 4000 ms in the cycle, a region where the PCs have to give the maximum voltage due to the saturation. All beams had to be stopped. A unusual but constant current of up to 20 A had been observed in that part of the cycle before, but now this error increased and soon exceeded 50 A. PO experts investigated the problem and replaced few week elements, and in the late afternoon

the current error had completely vanished (also the 20 A excursion that had been there previously). The tune function were corrected on both SFT and CNGS cycles and operated resumed.

After a quiet night the same problem appeared again on **Wednesday morning**. New and more in depth investigation revealed that the voltage was saturating. Eventually PO found a faulty power supply in the reference voltage distribution, and in the late afternoon the problem was fixed. So far it has not appeared.

Friday all beams were stopped due to the problem with the booster injection septum. Although the booster started to deliver beam in the evening, we were only able to deliver beam to the North Area users Saturday morning ~06:00 due to a problem with the MBE2103 PC.

For the rest of the time we delivered beam to the North targets.

On the LHC beam front we have successfully accelerated 12 bunches and later a probe beam (~ 5E9) on the LHCFAST cycle. Tunes, orbit and radial position were corrected. A first iteration of chromaticity correction was made (to be continued). As expected the field at injection was quite different due to the 13.5 GeV dip, the main dipole current had to be increased by ~1 A. Note that the 12 bunches are very unstable, as the damper is not yet tuned.

On the CNGS side I made a number of attempts to extract the beam to the TT40 TED, but all failed due to the problems mentioned above (+ others).

In addition we only got the papers signed to authorize extraction to the TT40 TED on Friday morning. A last check of the MKE4 extraction kicker on Friday afternoon revealed a problem with the kicker energy tracking system that could be fixed. The kicker finally pulsed on the LHCFAST cycle, but stopped for unknown reasons after a few minutes (no interlocks). This will have to be followed up coming week.

On Friday at 16:00 we made a consignation of the MSE418 (R. Giachino) in order to strap the access interlocks on all TI8 converters for a TI8 heat run. The run is still ongoing as there are problems with the RBI.816 (main bends), RBIV.811 and RQID.805 (main defoc. quads) and RQIF.804 (main foc. quads). The PCs trip regularly on an interlock fault (intervals of 30 minutes to few hours). The PO piquet could not find anything and thinks it is a cooling problem. But we see no magnet interlock, neither at the PC nor at the level of the magnet interlock system. At the moment we are closely monitoring the situation: the PCs are ON again since ~19:30 - so far no trip. This may have to be followed up next week.

For the future coordinator we have here a conflict between testing the MKE4 (needs MSE418 ON) and TI8 (MSE418 consigne). We may resolve the conflict by exchanging the consignation of the MSE for another bend in TT40. In any case we will not have any beam in the SPS in the next 3 days...

TI (Peter Sollander)

• Monday, May 11: Short-circuit on water pump in BA1 trips the 18kV and stops the SPS. The electrical problem was solved in one hour, but SPS downtime was approximately 7 hours.

• Wednesday, May 13: Water leak on Linac3/LEIR. 30m3 lost. Problem was a sensor giving wrong reading.

• Sunday, May 17: TI8 magnet heating up, water problem suspected, CV piquet on site but found no problem on their circuits.

LHC

Sector 34

A variety of consolidation issues being resolved. MPAQ this coming Friday. Cabling starts W21.

Splices

Sector 12 M3 splices – 4 outliers – plus results from S34, S67, S56. Four sectors measured. Cold sectors start today.

Given results - where does one stop? If open then repair not nominal splices? See individual splices which range through a hit list of 59.9 to 30 micro ohm and on down to what value?

Quadrupoles – to be done.

Reduce quadrupole time constant – additional dump resistors – reduce risk of quench propagating from quadrupole to bus bar. Beam ? Unlikely except for connection cryostat. Take resistor out of dipole circuit –possible knock on to QPS?

Cryo

S45 – 80 K – next step 20 K

S23 – not particularly stable at around 25K – looking for stability for splice measurements. Filling stand alone magnets & DFBs etc.

S78 – air leak near point 8 – restart this week – average temp around 70 K

QPS

Successful tests of pre-series of BB quench boards

Crates – production plan for production at CERN in place – for end ofJune.

Power supplies on order

QSYM – 80% of testing of 2nd prototype

WorldFIP into S23

QPS in use for 80 K splice measurements