Accelerator Complex Status

End week 31 (Monday 6 August 2018)

TI (Ronan Ledru)

Wed. 1 August at 15:13 there was a trip of the BA81 cooling water for a leak alarm.
Fri. 3 August at 14:45 the BA81 cooling water circuits tripped again. The CV piquet were on site to refill the expansion vessel manually as there is a leak somewhere on the circuit following the fault of the 01/08. The circuit tripped for a leak alarm just as the piquet were about to start the refill. They managed to restart the circuit immediately and complete the refill.
Fri. 3 August between 14:30 and 15:00 an increase was seen in the chilled water temperature in UX85. This caused a stop of the main chiller of the vertex detector cooling system and consequently LHCb data taking to stop. The on-site expert from CV intervened very quickly to get conditions back to normal.
Sun. 5 August at 06:13 an electrical disturbance caused by a fault on the RTE 225kV GENISSIAT - VERBOIS line, resulted in a stop of most of the accelerators.
PS and PSB had RF cavities and power supplies that tripped. The LHC was in the middle of a fill and lost both the RF, LHCb Dipole magnet and the ALICE compensator.
Details: https://wikis.cern.ch/display/TIOP/2018/08/06/TI+Summary+Week%2C+31

LINAC2 (Francesco Di Lorenzo):

Linac2 is running quite well.
The spark rate has increased during the week. We got 160 flashes over in the source so that on Friday in the afternoon we decided to clean the source, due to this intervention I asked 40 minutes to the Booster's operator. The source has been cleaned by Mike, Sebastien and myself. After the intervention the spark rate has reduced a lot, to get in three days 15 flashes over.

LINAC3 (Francesco Di Lorenzo):

On Monday Detlef has restarted the source after the power cut of Saturday, this operation has permit to restart the beam in the source but not in the entire of Linac. After several checking the IGBT plate of the power converter for the amplifier of the Tank 3 has been refurbished but this intervention didn't help to deliver the beam. Therefore is had been decided to change the tube of the amplifier of the tank3
On Tuesday the RF group changed the tube of the Tank3 amplifier. This operation allowed the delivery of beam with an intensity of 24-25 uA. In the night the HT tripped but could be solved by a reset.
On Wednesday the source ran well.
On Thursday the Linac3 has been off for the entire day, due to the lead oven re-filling (by Detlef), and the replacement of the SEMgrid (vertical and horizontal) by the BI Group after the RFQ. But after this operation has been decided to wait over night for the vacuum recovering.
On Friday after the RF conditioning the beam has been delivered.

On Sunday a power cut stopped the HT in the source around 7.30 in the morning that has been restarted around 9.00 o'clock by me and Mike has tried to tune the source in order to have a reasonable intensity.

LINAC4:

Still in technical stop.

LEIR (Simon Hirlander):

LEIR had a short but good week (Tuesday, Wednesday Afternoon, Friday). Only a few trips during the week, which could be corrected immediately. Only once the piquet had to investigate a problem on ER.DWV41 and ER.DEV22 on Wednesday (1st of August). When the beam was available, the new Schottky system was used to identify possible energy changes and correct them. After a short time, the beam for the AMDRF cycle achieved LIU intensity (3rd of August) again. All other cycles showed stable behavior.

PSB (Simon Albright):

It was in most respects a very calm week for the PSB punctuated by a few short stops, with 3 longer ones just over an hour in length. The challenge for the week was a combination of the weather, which prevented sufficient cooling of the MPS; and the shortage of fuses, which lead the expert to request that for any trip of the MPS we call the piquet before attempting a restart. To prevent the MPS overheating and tripping, which would lead to a longer stop than usual whilst waiting for the Piquet, the operator monitored the temperature of the cooling water and removed cycles if it was getting too high. As a result there was occasionally a slightly reduced duty factor for physics.

Otherwise a very quiet week with 95% availability and an usually large number of MDs, with time booked from Monday 0800 until Sunday 2000 non-stop.

ISOLDE (Erwin Siesling):

It has been a very busy, productive and successful week at ISOLDE with a very dense schedule but relatively few operational issues.

A leftover from the power cut last week is instabilities in the cryo plant. Especially the HIE ISOLDE SRF cavity 06 (which is the first cavity in the second cryo module) is particular suffering from this and it was decided to isolate it and compensate with the remaining cavities (now 18 in total with cavity 3 in CM4 down from the start). This involved re-phasing of the SRF cavities after SRF06, a time consuming task which was done in a record time by Alberto up to SRF12 to assure the requested energies for the rest of the REX/HIE_ISOLDE run for Miniball this week.

This week Miniball experiment running with beam from REX/HIE -ISOLDE:

HRS: Tuesday-evening continued with one more run on 142Ba33+ at 4.2MeV/u to Miniball.

GPS: Tuesday-daytime: Setting-up of the separator, proton beam and yield checks.
Miniball runs from GPS:
Wednesday-evening/night 222Rn51+ at 4.2MeV/u
Thursday-evening/night 224Rn52+ at 5MeV/u
As of Friday-evening + weekend 226Rn52+ at 5MeV/u

Issues:
PSB related:
No protons Wednesday-evening for 3/4hr due to tripping of the PSB BTM.QNO05 power supply.
LINAC2 access which was transparent: Scheduled during our target change at HRS. Thanks PSB (Simon Albright) for the cooperation!
Limitations of protons to ISOLDE due to super-cycle restrictions: MPS room overheating
ISOLDE related:
- Tuesday the old Tapestation broke (blocked motor) just after the Rn yield measurements. Yield checks on other elements with this (rarely used) ThC target were done on the faraday-cup later during the week. The Tapestation repair is scheduled for coming Tuesday (after the run finishes). New Tapestation being tested (at the LA2 line).
- Wednesday night several CAO low energy central beamline electrostatic element's power supplies tripped once.
- EBIS electron gun seems to have suffered from the power-cut. Current fluctuating. We hope it will hold.
- Very few trips of the REX RF amplifiers (IHS) during the run.
- Numerous trips of the SRF cavities in cryo module 2 as of Friday during the 226Rn run due to running closer to their max gradient.

Others worth mentioning:
Installation on Thursday of stripping foils in two of the HEBT diagnostic boxes (in XT00 and XT03) for the upcoming 8B run at XT03. Many thanks to William Andreazza (BI) Paul Demarest, Guillermo Fernandez (Vac group) for their intervention and Sergey Sadovich (BI) for verifying the HIE instrumentation signals.

The users seem to be very happy with the quality and intensity of the different beams. They are grateful for the flexibility and effort from OP in changing to the different isotopes and REX/HIE ISOLDE energies.

Sunday at 18h30 the line of the GPS target broke and put an end to a very successful run. Even though it is a pity and we will not be able to do the 224Rn at 4.25MeV/u as was foreseen for tomorrow we still had a very good run and excellent yields from this ThC target for the range of isotopes we sent to Miniball the last few days and nights. We will now concentrate on the next run from HRS as of tomorrow.

PS (Matthew Fraser):

On Monday it was back to business as usual for the fixed target beams, with good availability from the PS throughout the week. The situation was rather different for the LHC. On Monday morning the LLRF team took over from the piquet and continued working on the LHC beam control all day without success. By the end of the day, the RF investigations were under the co-ordination of Andy Butterworth. During the day on Monday and overnight the LHC continued with single bunch injections. An access to adjust the MKBV voltage (LHC dump vertical dilution kicker) was urgently rescheduled on Tuesday to give the PS LLRF team time to work in the shadow of LHC accesses originally planned for later in the week. By the end of the day on Tuesday, 12 bunch trains could be produced and were used to carry out a 600 bunch fill of the LHC overnight (trains of 36 bunches from the SPS). A meeting with BE and RF management on Wednesday morning put into place a plan of action: a clone of Friday's operational settings was made and by lunch time a timing (PAX.SSWH84REF for h = 84) was found enabled since the troubles at the weekend. Once disabled, and with the phase loop gain correctly adjusted, the 48 bunch LHC BCMS beam could be used to fill the LHC in the afternoon after a total of 60 hours downtime. The last injection of the fill was interrupted due to the trip of a power converter on a FEC for the RF beam control, needing a piquet intervention. On Thursday afternoon the new TOF cycle was successfully rolled out, which will significantly reduce the induced radio-activation of the PS ring. On Friday, there was a small amount of downtime with a short, planned Linac2 intervention taking almost an hour and the East Area lost about 30 minutes of beam due to F61.DHZ18 that tripped, likely because of the high temperatures. This weekend was quiet compared to last weekend. The LHC had to be filled several times using the spare C11 cavity as C91 misbehaved all weekend, despite HLRF intervention. An electrical glitch on Sunday morning tripped the accelerator complex but the recovery in the PS was relatively quick and the power supply of the transition jump quads needed a piquet intervention.

AD (Pierre Freyermuth):

This week the experts of AD electron cooling and vacuum worked as fast as they could to reassemble the faulty part of the electron cooler. They manage to have the green light from vacuum to restart the cathode current ramping by Friday. In the meantime we tried to restart as much as possible our magnets and equipment.
On Friday however, once the electron beam was restarted the vacuum raised, as expected. But it means the conditioning still has to continue during the weekend.
We gave this week an access in the target area for civil engineering guided by S. De Man.
Both zones were in OP procedure Total (7 and 9), and these procedures were finished Friday. All the lock outs are remove, however there is still two forgotten red button in the ring to be removed on Monday.

All in all, we hope to restart completely AD this week.

ELENA (Sergio Pasinelli):

The schedule defined at the Monday meeting was:

- Restart the machine.
- Adjustments/Measurements
- GBar asked the beam for Wednesday and Thursday with an option for Friday.

Like the other machine, ELENA has suffered of the last Saturday glitch on the electrical network. Most of the ELENA devices were OFF or in faults.

- The vacuum control has lost these references, which prevented the valves from opening.
- After to have recovered the vacuum references, we found missing interlocks from vacuum to the WIC, which also prevented to switch ON the electrostatic power supplies.
- Injection kicker has suffered of a missing value from a penning gauge.

We manage to inject Hminus beam in ELENA Tuesday but the beam was lost few milliseconds after the injection.

- BTrain crates were in faults. Specialist was called, he has rebooted them but errors are still present. These errors did not affect operation as WhiteRabbit transmission was not affected.
- The cycle editor was affected by LNR.BHZ time out which prevent us to do changes the ELENA cycle.

Wednesday we spent the day to try to keep the beam in the machine until the ejection but without success. Our main suspect was the RF. The LLRF specialist was busy on the injectors.
Gbar was not ready to take the beam.

Thursday the LLRF specialist found wrong signals coming from the cavity. The HLRF specialist has changed the final amplifier of the cavity.
After the intervention we have injected and kept the beam in ELENA until the ejection.
Beam was sent to GBar in the afternoon.

Friday GBar requested the beam and received it.

SPS (Karel Cornelis)

A very good week for Fixed Target. Monday and Tuesday SPS suffered a bit from an unstable MTE (5^{th} turn) resulting in an unstable spill for slow extraction. Since Tuesday afternoon everything is under control and since then, NA62 is happy. The night from Wednesday to Thursday there was a 40min stop due to orbit correctors in sextant 5 which were stuck at a DC current of 0.6 A. A PSU for acquisition and DAC card had to be changed. During the very hot days we had reduce a bit the duty cycle in order to keep the cooling circuits below trip level. The cooling for Power Converters in BA1 and the magnet cooling in BA3 are the most critical one.

The full LHC beam was only back on Wednesday. Due to problems with the C40 and C80 in the PS (a leftover of the weekend glitch) the full bunch trains could not be produced. On Tuesday, a 12 bunch beam was available for LHC filling and the 48 bunches were available on Wednesday at noon.
The new cycle with Q26 for ions revealed a current limitation on the QD circuit.

LHC (David Nisbet & Stefano Redaelli)

Due to the unavailability of BCMS beam from the PS (40/80 MHz synchronization issues), the LHC could not operate normally until Wednesday midday. The 3 bunch stable beams was done, including coupling measurements through the cycle, but the 600b fill had to be done with 12b trains. As of Wednesday afternoon the LHC recovered slowly (quite a few QPS & EPC issues) and came back to good production for the weekend.
To fill the gap while BCMS beams were not available the ABT proposal to lower the voltage of 2 MKBVs by 20% was implemented on Tuesday (advanced by 2 days). The LBDS system was revalidated with dry and probe bunch dumps at injection and 6.5 TeV.
RF saturation was observed over the weekend at each incoming batch. The Klystron voltage has been re-adjusted to 58 kV.
Since Thursday serious luminosity production was achieved and about 2 fb^{-1} were accumulated over the weekend.