

End Week 43 (October 31st 2010) – Status of Accelerators

ISOLDE (Didier Voulot)

Good week for ISOLDE.

HRS + REX (+RILIS) delivering ^{78}Zn to Miniball since Fri 22/10 and until Monday morning. Good yields, smooth run, EBIS cathode is still working...

GPS target change on Thursday. Target ion source test with new high density UC material (could potentially give much higher yields) to start on Monday.

Main issue this week: communication problem with a PLC (HRS.POW) controlling PO equipment for the HRS target. The PLC gets stuck and eventually reboots itself causing the target heating to stop. The HRS was cooled down on three occasions, twice because of the PLC and once while attempting to debug the problem. Surprisingly the target survived. Resolving this problem is now a top priority for ISOLDE. Need attention from PO and CO experts.

The GPS robot failed its calibration test and got stuck, during Thursday's target change. The robot could be restarted and re-calibrated manually. The cause for the loss of calibration is not yet understood.

In total the HRS beam was stopped for about 10h on Thursday (PS intervention, delayed target change on GPS, target heating failure on HRS). The beam was back around 17h30.

AD (Bruno Dupuy)

- Monday. Return to normal operation at 100MeV

lot of difficulties to switch the AD from 500MeV extraction (ACE) to 100MeV (ATRAP, ALPHA, ASACUSA).

For some reason the steering was bad for ASACUSA line. We had to redo it from scratch.

- Tuesday. Large water leak on the magnet DR.QFW22.

Something like 7 hours of troubleshooting.

- Wednesday, access to the machine to restart a ionic pump, damaged by water leakage.

1 hour without beam.

- Thursday, access to the ring to finish the work on the ionic pump and put a gauge in working order.

Work done in the shadow of the PS access.

The beam is back from the PS. But there was very heavy losses on the ramp between 2GeV and 300MeV.

The power supply DR.DVT2904 was found in fault, despite a correct remote state visible by the control system.

After repair, the losses are reduced but still present. Despite the intervention of several specialists (- RF Alain Findlay - eCooling Gerard Tranquille and Pavel).

We do not find the origin of this problem.

We leave the machine in the state during the night. Extracted at $2.5E7$ Instead of $3E7$ antiprotons.

- Friday - looking for losses from 2Gev to 300Mev

All the day was devoted to investigation of this losses.

Finally the specialist RF A.findlay decreases this losses, by increased the gain of the phase loop and one RF voltage adjustment during the ramp.

That does not explain the cause of this losses.

Injection power-supplies (Big Capacitors)

DI.BHZ6044 (from 2h58 to 5h00)

- Saturday - lot of bad power-supplies - Target cooling pump - (from 10H00 to 17H00)

I was called at 10H03 by CCC because the beam was lost during the last ramp before 100Mev

I discovered that The TRIM power-supply DR.BHZTR48+49 was down. After a remote OFF followed by ON, all the QUAD and MAIN power-supplies of the ring were OFF. In addition, the TARGET COOLING PUMP was stopped (Maybe a glitch on power network). First line was called and power supplies (by beam order) DI.BHZ6044, DR.DHZ2913, DR.DVT4408, DR.DVT2917, DR.BHZTR48+49, DR.SME5307S_ALA were repaired between 10H30 to 15H00. The end of the afternoon was devoted to setting the ATRAP line.

- Sunday - DI.BHZ6034

Again several capacitors have been changed by first line.

In conclusion, Performance and beam quality are not yet optimal.

Settings after the ACE experiment to extract a 100Mev needs further improvement.

PS (Simone Gilardoni)

The PS had a good week. The main problem was related to the cavity 80 MHz installed in SS08. On Tuesday the first investigations done outside the tunnel did not show any problem that could explain the fact that the cavity cannot deliver the nominal voltage needed for the LHC beams. In agreement with the experts, a first access in the tunnel was scheduled for Wednesday morning to carry few more tests. The access was finally delay to Thursday morning due to the LHC schedule. The tests did not revealed any evident cause for the cavity problems. It was decided then to tune the cavity for the ions, to reduced the programmed voltage with the hope that the ion bunch length would be good enough to allow the setting up of the ions the SPS. This was actually the case, with the voltage limited to 120 kV. Unfortunately the cavity was dropping quite often, but the faults could be always remotely reset. I would like to thank the RF specialists for the investigations and their flexibility for the multiple changes in the schedule for the intervention.

The operation will continue with the 80-08 MHz cavity tuned for ions until the end of the proton run. This also means that we are without a fully operational spare cavity for the proton run.

On Monday and later on Wednesday, the EPC experts intervened to reduce the 50 Hz noise on the MPS. This improved drastically the quality of the slow extraction spill, and the beam stability of the first batch injected on the 25 ns user.

For the entire week, the 10 MHz cavities had few problems, with many trips and a failure of a relay-gap. According to the expert this is probably due to the extensive use of the cavity of this year.

On Saturday night the ARCON system in the CCC signaled a monitor fault, whereas the acquisition on the ARCON console showed that all the monitors were online and working. Following the procedure, the RP piquet was contacted to decide if the beams should be stopped or not. Unfortunately, the piquet was not expert of the injectors, so apparently he was not fully aware of the procedure to follow. According to what has been done in the last occasion we had this kind of failure, and according to the safety rules, the beams were stopped until the piquet could restart the ARCON system.

Beams:

The LHC50 could be delivered to the LHC, even if there were few faults of the multi-harmonics cavities.

Concerning MTE, the tests continued during the week in the PS to investigate the source of the spill fluctuation. On Monday, for one hour the AD was not pulsed to test if there was any correlation between the AD cycling and the spill degradation. During the week it was noticed that the tune drifted during the resonance crossing. The same effect was observed on other beams, in particular at injection.

During the weekend the MTE beam was injected again in the SPS. However, to re-inject the beam, many SPS parameters, like the Bfield for example, had to be changed with respect to the last time the beam was injected, i.e. few weeks ago. This seems to be quite unusual and further investigations will be done to understand the reasons of all the changes in the parameters.

Booster (Bettina Mikulec)

The PSB was running fine last week with only minor operational problems. Apart from the PS access on Thursday morning there was no significant beam stop.

Issues:

- BI: The gate of the extraction transfer line transformers had to be adjusted for some users as it showed wrong values. A. Guerrero installed a new saturation detection algorithm for the wire scanners with the new PMs, which seems to work fine. Wire scanner measurements have shown a relatively satisfactory performance of the new PMs, but there are still a few issues to be followed up for certain settings.
- There is a known issue with the ring 3 phase offset of cavity C04, which seems to be drifting and leads to beam oscillations at the end of the cycle. To be further investigated.
- Throughout the week we had troubles with the ring 4 vertical shaver power supply. The pulse is not what is expected, and beams using the shaver have been disturbed (LHCPILOT, EASTB, LHC50).

Workarounds have been put in place as the piquet couldn't solve the problem. The specialist is back today and will decide how to proceed.

- Early Sunday morning the ARCON system had to be rebooted (RP piquet). All beams were stopped during ~40 minutes from the start of the detection of the alarm problem.

Beams:

All operational beams could be provided. LHC50 had been reoptimised for the LHC injections. Beams were also prepared and tuned for the various MD requests.

SPS (Karel Cornelis)

The first half of the week was rather standard operation: fixed target, CNGS and LHC filling with the 150nsec beam. On Monday the CNGS was stopped for a few hours because of a ramp card problem on some function generators on TT40 power convertors. Between LHC fills, the 50nsec was set up in preparation for the LHC operation towards the end of the week.

On Thursday, a ten hour MD was planned to set up the heavy ion cycle for fixed target physics. However, the PS had to give access to work on cavity tuning before they could deliver heavy ions to the SPS. This intervention took most of the allocated MD time and it was only in the later afternoon that they could deliver ions, be it with reduced RF volts. It was then decided to cancel the ion fixed target MD and to use the short time left for the setting of the extraction with the LHC ion cycle. The ion beams could be extracted to the TED's in TT40 and TT60.

The north area physics came only back on Thursday midnight. Several hours were lost due to a bad contact on the power fuse of MBB2505, a TT20 power convertor.

On Friday, the LHC started to take the 50nsec beam. It turned out that the LHC4 user, which we prepared for that, was giving problems with the fast extraction interlock. The problem, related to some timing table numbering, could not be solved and the 50nsec beam was put on the LHC2 user.

During the week, parallel MD's continued with ions, high intensity single bunch and the Q=20 cycle.

On Saturday we tried to inject also MTE. Injection was rather unstable. For the rest, the weekend did not give any serious problems.

TI (Peter Sollander)

One major event: Saturday, October 30: 18kV transformer in LHC point1 trips (max IO EMD403/1E) at 12:45 cuts ATLAS cryogenics and CV cooling systems. Electricians on site to re-establish power decide to re-power through back-up transformer EMT206/1H because they suspect an internal fault on the transformer. Detector cooling required access to UX15, given in the evening around 21:30, all interventions finished by midnight.

LHC – full details under coordination at:

19.5 pb-1 for the week; switch to 50 ns; stable beams with 50 ns (108b); vacuum issues on switching to 24*50 ns.

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