



Summary of the 27th FOM Meeting

Held on Tuesday 26th September 2017

Agenda (<https://indico.cern.ch/event/668260>)

- 1. Follow-up of the last FOM*
- 2. Status of the machines*
- 3. Debriefing of the ITS3*
- 4. Schedule updates*
- 5. AOB*

B. Mikulec chaired the meeting.
The list of presence can be found in [Annex 1](#).

1. Follow-up of the last FOM

Minutes of the last meeting were approved.

2. Status of the machines

LHC

M. Giovannozzi reported for the LHC. Smooth restart after the technical stop. Next fill will be with normal (non-BCMS) 8b4e beam with higher intensity of $1.2 \cdot 10^{11}$ protons per bunch to check if the newly installed solenoid gives any improvement. BCMS version of 8b4e will be asked later.

Comment from **R. Froeschl**: The yearly 30 hour RP survey for beam loss studies could be scheduled after the stop of the high intensity beams. The first high intensity beam to be stopped will be SFTPRO on Oct 23. The survey could be envisaged for Oct 24, but this collides with the LHC MD4 block. The date for the 30 hour survey has to be further discussed.

Comment from **R. Steerenberg**: Indeed, this would compromise the MD.

Comment from **R. Froeschl**: Another possibility is to stop on December 4 to measure on December 5, but the information from the SFTPRO losses would be lost.

Comment from **R. Steerenberg**: There was also a proposition to move the MD4 block to week 47.

Comment from **B. Mikulec**: This needs to be further discussed.

Comment from **K. Cornelis**: This measurement after the stop of SFTPRO is very important for the SPS because of the changes that were implemented the past year to see if this led to a real improvement in the machine activation. We should not lose the possibility for direct comparison.

Linac2&Linac3

D. Kuchler provided the report by email, presentation is at [Annex 2](#).

G. Bellodi was the Linac2 supervisor and the machine availability was 99%.

For the technical stop on Tuesday all foreseen interventions were completed: air filters maintenance, source HV column cleaning, removal of dust sensor, installation of N2 feeding cable at tank1 intersection, control of tunnel cooling.

Thursday night: At 23h vacuum pressure spikes in Tank1 triggered an RF interlock on all tanks, not immediately resettable. RF expert was called on site. A reset of the tanks and restart of operation was possible after 30 minutes. The problem re-appeared just before 5am, but this time RF reset worked immediately. On Friday morning the vacuum team carried out investigations on an ion pump near Tank1, which was found to have gone off during the night a couple of hours before the Interlock. Upon inspection in the tunnel the ion pump was found to be faulty and was switched off. The quality of vacuum in the DTL should not be compromised by this. The RF interlock connected to the faulty pump has been moved to a different pump right next to it.

At Linac3 the source maintenance was done (plasma chamber, extraction system and gas bottle changed). The beam was back on Friday afternoon. The source is still a bit unstable and conditioning is ongoing.

LEIR

M.E. Angelotta presented the LEIR status ([Annex 3](#)). LEIR was off from Monday 18/09 to Friday 22/09 due to the Linac3 source maintenance works. It restarted with low-intensity EARLY/NOMINAL beams. There was an issue with ITE.BHN30 that often tripped over the weekend. It was restarted by the SIS automatic recovery system. Experts have reverted one parameter back to previous value on Monday 25/09 afternoon.

On 22nd and 23rd of September there was LLRF MD in preparation for LIU:

- Deployed h=3+6. Synchronization algorithm will be upgraded soon.
- Operation with h=2+4+6 (with two cavities) partially deployed.

CRF43 tripped with non-recoverable INTERLOCK fault. The problem was solved on 25th of September.

PSB

A. Findlay presented the status of the PS Booster ([Annex 4](#)). It was a decent week with 97.5% availability, where most of the stops were due to the linacs. On Tuesday the technical stop took place, for which all the works were carried out as planned. Vacuum recovery after wire scanner installations dictated that the beam was back in the PSB on Wednesday at 2AM. R4 didn't come back due to an LLRF issue, which was fixed by the specialists. Later it was found to be a general bug in the updated firmware for all rings. The RF specialists returned to a previous version of the



firmware, which required a 15 minute beam stop on Wednesday afternoon and it's been stable since. The replaced horizontal wire scanner in R2 is working correctly once more.

ISOLDE

E. Siesling reported the status of ISOLDE ([Annex 5](#)). It has been another very good week at ISOLDE with 98% availability.

At HRS the target change was carried out on Monday and setting up of the beam started for the VITO experiment. On Thursday some difficulties with setting up bunched beam through the HRS ISCOOL (RFQ). It was previously running at 40kV and changing to 50kV was not straightforward. On Thursday afternoon managed to deliver stable beam to VITO. Later that night continued with the radioactive run (Na beams). They have been running very smoothly since.

At GPS/HIE ISOLDE there was one more day (from Wednesday until Thursday morning) of 94Rb with a 6.2MeV/u at a reduced proton current (0.5uA) delivered to the Miniball experiment. Afterwards, at the Low Energy part of ISOLDE, there were some collections of long lived 226Ra at the GLM line (without protons on target).

On Friday the target at GPS was changed according to the schedule. Stable beam setting-up has started for the next HIE ISOLDE run and will continue on Monday.

Technical problems:

- The Technical stop on Tuesday has been pretty much transparent for ISOLDE.
- Only two trips of REX RF amplifiers (7 Gap1 & 3) and once an SRF amplifier (XLH2.CAV3) on Wednesday during the HIE ISOLDE run for Miniball. The machine has been remarkably stable during the whole run considering all 15 SRF amplifiers are running at high gradient. Also on the REX side things have been very stable.
- A turbo pump controller had to be replaced at REX Trap on Wednesday morning.
- For some time now some of the convertors for the electrostatic elements in the MSW/CAO sector would drop off. Specialist replaced some of the old connections on the inhibit/vacuum interlocks and the situation seem to be stable now.
- The power convertors for one of the elements in the HRS sector (HRS.QP330-Vert & Hor) trips from time to time. The power supplies have been changed, but the issue is still there. This might be related to a cable problem or short in the machine. To be investigated.
- Few interruptions of protons from PSB, but causing very little downtime.

ISOLDE Users

K. Johnston: The main users last week were on HRS taking polarised 26-28Na beams to the VITO beamline. The aim here is to perform beta-NMR measurements on liquid samples using a differential pumping system. This is a challenging experiment and it is still in its early days. The



operation of ISOLDE was very smooth over the course of the experiment and the first measurements in ionic liquids have been carried out. The next step will be to study DNA quadruplexes, which may be possible before the end of the year. In addition, on GPS two shifts were taken by Miniball of ^{94}Rb at 6.4MeV/u after the technical stop before HRS took the remainder of the week.

PS

D. Cotte reported the status of the PS ([Annex 6](#)). Beam availability 89%. Little bit difficult restart after the technical stop:

- Vacuum condition ready for beam around 3AM on Wednesday morning.
- V346 process not running on cfv-353-allbc4, restarted by RF specialist.
- Pulse repeater power supply cable unplugged in Central building, what prevented C20/C40/C80 cavities to pulse (downtime 4h).
- Beam for COLDEX available around noon on Wednesday instead of 8AM.
- C80/08 relay gap was staying open and in local mode, which was solved by the RF specialist.

PFW are not tripping anymore and regulation seems to be better. 2 vertical FWS back in operation. Other issues:

- Another pulse repeater for LLRF got broken on Friday night (downtime 3h30). Huge radiation levels reported by RP during its troubleshooting and it is still being investigated. SR16 reminder was sent to PS&PSB section.
- POPS tripped twice this week, but the restart was immediate.

PS delivered integrated 1.44×10^{19} protons for nTOF, which is 77.8 % of the total intensity forecasted for 2017. Automatic logging of FTN.BTV484 screenshots is now available in Timber.

East Area

L. Gatignon: CLOUD experiment started and it runs smoothly, as well as “Beam for schools”. This Friday, 29th of September, in the East Area there will be a visit of the Council and Canadian ambassador at 12h45. The beams need to be stopped 15 minutes before. CCC will be called when the visit is finished.

East Area Users

H. Wilkens: The 2017 edition of Beam Lines for School had 180 participating teams, a total 1500 high-school students from 41 countries participated to preparing proposals. Two teams were selected as winners and are now using the T9 beam line: From Canada, The Charging Cavaliers will use a scintillation detector to search for fractionally charged particles in the beam, and from Italy the team TCO-ASA will use a study the Cherenkov effect using a self-build detector read by SiPM devices.



In T11 the Cloud experiment will this year add the study of marine components (f.i. Iodine) in the nucleation process leading to cloud formation.

nToF

D. Macina: Running fine. Keep asking for a max intensity of 700×10^{10} protons for the dedicated bunches (had up to 780 in the past) and 300×10^{10} minimum for the parasitic ones.

AD

B. Dupuy reported on the AD status ([Annex 7](#)). Availability 98%.

During the technical stop inspection of the electron-cooling revealed poor conductivity of the demineralized water circuit of the collector. The resin filters were exchanged. Other inspections did not reveal any anomalies.

The ALPHA beam was moving horizontally, which was fixed by tuning an extraction kicker and First Line preventive intervention on DE0.DHZ45 power supply.

ELENA was operating with antiprotons and managed to decelerate the beam and keep it until the end of the second plateau. It was disturbed by a problem on the Horn PLC upgrade. This time was not lost; it was used for setting of the protons on the target through the screens (usually very disruptive for the users).

Comment from **E. Carrier** received by email: The problem was due to the spare power supply test, which proved to be incompatible with the PLC code of the original unit. The attempt to make a code common to both power supplies proved to be impossible and the initial code configuration was put back in place. A code compatible with the standby power supply is available in the event of a power failure.

AD Users

H. Wilkens: The ALPHA experiment is planning an intervention on their cryostat. Thus a reduced liquid helium request from the AD users.

SPS

V. Kain reported the SPS status ([Annex 8](#)).

The UA9 run was quite successful. There was an issue with CTRIM that were not accepted so no trims were possible during COAST. It was fixed by the LSA team within the UA9 run.

During the technical stop it was found that the polyurethane jack of QF.518 completely collapsed. It was fixed and realignment done. Upgraded DIP, BCT3 FESA class to version 3, SIS and some electronics elements. The BCT upgrade caused many issues:



-
- All BCT-related SIS interlocks were wrong and caused downtime (TIDVG dumped intensity, normalized losses...).
 - The SPS “Larger” page was not working until Friday.
 - Many applications needed release.
 - Certain things could/should have been discussed before with OP, for example sampling frequency change.
 - However, it is not easy to prepare better in the future

Fixed target beam was back later than promised (lunchtime on Thursday) because of an issue with a water leak of a magnet in TDC2. Since then the Fixed Target beam has improved transmission to above 98% and had a very good availability over the weekend, since last week 92.5 %.

Due to the realignment following the jack repair the orbit has changed and re-steering of the LHC transfer lines was required. On Monday an orbit correction of the extraction region was done, which needed further steering of the transfer lines.

12 bunch train was unstable during ramp due to power and software issue with 800 MHz. It was fixed by experts on Thursday.

COLDEX run with 288 bunches up to $1.5e+11$ ppb. Beam only in the afternoon due to PS RF issue.

Question from B. Mikulec: Concerning the BCT upgrade story, was the intervention coordinated with BI and CO?

A.: No, it was not, because it was supposed to be a simple and transparent change of a FESA class version from 2 to 3.

Comment from M. Gourber-Pace: It was not discussed between BI and controls and there is a lesson learnt for the future.

Comment from E. Carlier: We have a problem with MKP erratic events on PFN 6. The situation where the PFNs are charged without pre-pulse arriving should be strictly avoided.

Comment from K. Cornelis: To avoid this issue the MKP application will be updated to show more clearly what is programmed in the timing as injection events and how many kicks are enabled with respect to how many injections are requested with beam.

North Area

B. Rae: Apart from the SPS issue with the leak on TDC2 it was smooth running.

North Area Users

H. Wilkens: During the technical stop the NA64 experiment reconfigured from the setup for the invisible search for a dark photon, to the search for a visible decay of a new boson into e^+/e^- .



Extension of their program is motivated by the anomaly observed in 8Be^* at ATOMKI. For this it will run with $45\text{E}11$ protons on T2, which will be raised to $55\text{E}11$ protons by the end of the week.

HiRadMat

No report.

AWAKE

No report.

CLEAR

P. Skowronski (replacing **D. Gamba**, [Annex 9](#)). On Thursday finished installations for the plasma lens experiment. On Friday the beam was transported through the newly installed capillary. Still struggling with some control issues and CO is working on solutions. Since Friday evening performed set for irradiation tests.

TI

J. Nielsen: Nothing to report.

3. Debriefing of the ITS3

Linac2&Linac3

A. Berjillos Barranco reported for the linacs ([Annex 10](#)).

In Linac2 everything was completed as planned, the machine was closed at 16h and the beam was back at 17:30.

In Linac3 the stop was for the whole week and the beam was back on Friday.

LEIR

D. Nicosia reported for the LEIR ([Annex 11](#)). Most of the interventions were general inspections and all went smoothly.

PSB

D. Hay reported for the PSB ([Annex 12](#)). All interventions were successfully completed with exception of the installation of 2 BLMs at BR.BHZ52, where a problem with cable a extension was discovered. It will be fixed at the next opportunity when it is possible to access for 2h.

There were not enough keys to enter the machine and an additional box will be installed during YETS.



PS

F. Pedrosa reported for PS ([Annex 13](#)).

The Wire Scanner was replaced, and the vacuum recovery went well and faster than initially anticipated. The RF tests went well. It was expected that 17h to finish would be quite tight and eventually the machine was closed as soon the activity was completed around 18h. The BE-RF intervention had some minor setbacks, a flow regulator had to be replaced what was not in the initial planning. The TE-VSC team, apart from the tests foreseen initially, replaced 2 communication cards and a connector (which was discovered malfunctioning during the tests). The alarm level for one of the ventilation units had to be increased because it was already close to the limit, and a 24h stop is not enough to perform the filters exchange operation (no risk to wait until the YETS).

Only 14 out of the 45 activities reported completion of the works. **Please, once intervention is finished close the corresponding IMPACT and call the coordinator, or send a message.** Otherwise it is not known if the machine closure can proceed.

Comment from **B. Mikulec**: Operations needs to be informed as well about any activity during the technical stop that could potentially affect machine operation, in the tunnel and on surface. **As for the facility coordinators, the operations crew would appreciate very much feedback** on such activities in order to have a trace in the elogbook in case of issues after the restart with beam.

H. Damerau stopped the programmed power cut “ENNC2017-168”, which would have affected the PS beam controls (LLRF). The coordinators did not receive any information about this cut.

Question from **J. Nielsen**: Why the cut was cancelled?

Answer from **H. Damerau**: The power cut would have stopped the air conditioning (located in building 359) of the installations in building 353. This would have required to shut down part of the PS beam control equipment in building 353 with the associated risk of problems during the restart. As experts were not available for the restart, we have preferred to keep the equipment running.

SPS

D. Mcfarlane reported for SPS ([Annex 14](#)). Only 4 interventions reported back (same remark as for the PS; see above).

TE-VSC: All foreseen activities are completed, nothing major to report.

BE-BI: In TT10, exchange of a dead frontend electronic card for the BPM 101302. The corresponding channel is now working and the calibration is done. The TT10 BPM instrumentation is fully ready for OP. For EO- BPM in LSS4, installed a new polarisation compensator on one of optical system and a new interferometric set-up on the second optical system. It went smoothly.

EN-HE: The lift maintenances and the both interventions at BA1 and BA5 have been held with success. It was completed faster, but no information was transferred back to the coordinator so the accesses unnecessarily continued through other points.

TE-MSC:



-
- A small water leak has been found on a brazed junction of the MBA.61590. A proper brazing repair could not be performed in situ due to the inaccessibility of the brazed joint at this location. We could however temporarily (almost) stop the leak by hammering the copper around, and a kind of gutter with Kapton foils as to guide the remaining leaking flow (approximately 1 droplet/minute for the moment) directly to the ground put in place, as to protect the surrounding equipment (vacuum pump supply). The magnet will have to be replaced during the YETS.
 - Another water leak has been found in TT20, on the gasket of a water supply hose of the quadrupole QNLD.211500. The defective gasket has been replaced.
 - The quadrupole which gave the vertical orbit kick recently has been identified in position QF.51810. The single polyurethane jack was completely collapsed (top and bottom parts in contact) due to a degradation of one of the polyurethane pads which was progressively extruded between the piston and cylinder of the jack. The jack has been replaced, and the magnet has been put back in nominal position by our colleagues of the survey.
 - All the rest of the ring and transfer lines have been inspected and are OK.

MSC is presently studying a new design of mechanical jacks in collaboration with the survey team SU and the design office EN-MME, which doesn't use the polyurethane pads, as to improve the long term reliability of these jacks.

At 5h30 a team forced a door even though clearly instructed not to and the patrol had to be redone.

4. Schedule Updates

B. Mikulec presented the latest version of the [injector schedule](#).

Comment from **H. Bartosik**: On Wednesday there will be a dedicated MD in the SPS using a coast cycle (crystal slow extraction). In parallel, when the SPS does not take beam during the MD, there will be measurements in the PS with the injection SEM grids. Therefore there will be no physics beams in both the PS and the SPS.

There will be a HiRadMat run in week 40.

SPS scrubbing MD in 2 weeks; **B. Mikulec** asked **H. Bartosik** to send the precise beam request to the injectors.

Comment by **V. Kain** concerning the DSO tests for the NA for the ions. The various coordinators are trying to find a date. It is not obvious now, as it is incompatible with various other activities (scrubbing run, proton physics end spurt). It should be defined in next year's schedule from the beginning.



Comment from R. Steerenberg: On Thursday the LHC will most likely request Xenon for MDs and a short physics run. Remains to be confirmed by the physics coordinator.

Comment from R. Alemany Fernandez: The part of the MD concerning crystals may go until Friday.

5. AOB

Maintenance of the doors YEA01.CLX=2010 from 08h30 Thursday September 28 until 17h00 Friday 29 September **was approved.**

Next Meeting: 2nd of October.

Minutes reported by P.K. Skowronski on 27th of September.