Summary of the 8th FOM Meeting

Held on Tuesday 16th MAY 2017

Agenda (https://indico.cern.ch/event/639234)

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *Technical Stop activities*
4. *Schedule updates*
5. *AOB*

V. Kain chaired the meeting.
The list of presence is in Annex 1.

1. Follow-up of the last FOM

Minutes were approved.

2. Status of the machines

Linac2 & Linac3

D. Kuchler (for **G. Bellodi)** reported the status of the linacs (Annex 2).

Linac2 had a good week. On Monday afternoon an RF intervention was scheduled to replace RF tubes in the LT.CDB10 and CDB12 cavities, which had been found to be at the limit of failure in a routine inspection. The actual swap took about 1.5 hours, but some difficulties were later experienced in the retuning of the cavities until the original settings were found and restored. Operational conditions were recovered after about 4h from the start of the intervention (at 20h).
Less than an hour after that, a problem with the start/stop timings of LT.BCT20 triggered the watchdog to cut the beam. The problem was correctly spotted by the PSB operator and fixed by the BI specialist (40 minutes downtime).
The rest of the week saw smooth operation.

Linac3 officially handed over beam to LEIR for start of their commissioning last Monday.
The de-bunching cavity could be finally set up after ion beam measurements in the LBS line were made possible again (after fixing some diagnostics and controls problems).
There were suspicions that that beam was not according to the specs (energy, charge).
For that reason a retuning of the beam at the exit of the IH linac (lowering beam energy and re-centering the beam in the ITF transfer line) were carried out to optimize the conditions for injection and beam circulation in LEIR. The current delivered to LEIR was thus improved by 3-4 uA (32 uA average on BCT41).

LEIR

D. Manglunki reported the status (Annex 3)
Power supplies issues are mostly solved

- EI.BHN1020: an interlock cable had not been plugged in and resulted in a magnet fault; it took 2 weeks to be resolved
- The issue of ITE.BHN30 tripping frequently is not understood yet.

The energy of the beam from Linac3 is 1.5% lower than nominal. This had also been the case for argon and lead ions.
RF commissioning was carried out on Thursday and Friday. Energy matching is still to be done with the PS.

First extraction was performed on Friday

- RP measurements are scheduled for tomorrow (Wednesday)
- Could deliver beam to PS earlier than foreseen (before May 29 while it was originally scheduled for June 12)

Cycle clean-up is ongoing.

Comment **H. Demarau**: There are RF modifications to be done in the PS during the technical stop necessary for ion acceleration.
Answer from **D. Manglunki**: What can be done in the PS nevertheless without implying the RF:

- Preparation of magnetic cycle
- Test of injection elements (bump 26 , septum 26, kicker 28)
- Sublimation

PSB

J.-F. Comblin reported the status of the PS Booster for **V. Forte** (Annex 3).
Smooth operation with few blocking faults and various warnings (mainly CO-related). Machine availability was 98%.
Few interventions on RF during beginning of the week:

- R1-2 crosstalk seems to be cured (to be followed up this week).
- Some changes required in C02-C04 relative phase GFAs due to delays after change of RF cables (to be followed up this week for beams captured in double RF).

STAGISO is available for ISOLDE requests.
Tuning of high intensity MTE was performed in the second part of the week.

- Emittance in R4 was reduced mainly by adapting injection steering, tunes and multipolar resonance correctors.
- MTE Cycle taken on Saturday by PS at 1600e10 p total intensity.
- Possible to arrive to 2000e10 p for MTE, but emittances need to be further reduced: R3 has very large emittances, probably related to bad tunes. Ring 4 is also still not within the specs.

MD beams prepared for:

- 160 MeV tune shift vs. intensity study at different chromaticities.
- Tune measurements.

Next week the main priority is to check and/or set up the beams for the LHC

Question from **V. Kain**: What was the reason for the crosstalk between R1 and R2?
Answer by **S. Albright**: The reason is not clear, and it is possible that the problem is still there (although at the moment no evidence can be seen of it).
The best explanation I know of is that the BR1.C02 drive cable was starting to age and the earth connection was not perfect, which was replaced. There were also other replacements made in the HLRF, but these were less likely to be the cause. Since several things were changed relatively close together, I cannot be sure the drive cable is the explanation, but that is the most likely one. Obviously, the exact cause cannot be verified, but it currently appears to be cured and the drive cable is the most likely culprit. I will be doing some more work to confirm this in the near future.

ISOLDE

E. Matli reported the status of ISOLDE

HRS:

CRIS took beam until Thursday morning without major issues.

GPS:

Target #595 was reinstalled last week after a failed attempt with #575 that was leaking. Setting up was straightforward as the target was already used on GPS.

Recurring issue with front-end electrode that again moved by itself all the way into the target and was impossible to control until C.Mitifiot's intervention to reset it.
GPS separator magnet needed a local reset of the FGC but OK afterwards.
Proton scan on converter done on Thursday morning and stable beam to ISOLTRAP in the afternoon.
Ti production was much lower than expected despite several attempts to restore proper conditions.
ISOLTRAP took Sr/Rb beam during the w/e.

HIE:

Continuing with the phasing of the normal conducting linac.
All 15 super conducting cavities are running at 1MV/m.
Setting up of the field-regulated dipoles in the experimental lines by EPC is ongoing.

ISOLDE Users

E. Matli for **K. Johnston**:

On HRS the In run to the CRIS experiment finished on Thursday. This was an excellent run with many new measurements on a chain of In isotopes from 113In to 131In.

On GPS the leaking target of the week before resulted in a cancelled run for the ISOLTRAP experiment. Fortunately, the ISOLTRAP team were able to take a used target to explore isotopes relevant to another experiment, which is due to run later this year. The weekend allowed for systematic tests for a new way of performing Q-value measurements. Although no new data was collected, the tests were successful and the results look promising for the future runs. The cancelled run should be re-scheduled later this year.

PS

A. Guerrero Ollacarizqueta reported the status of the PS (Annex 5).
Very stable week with only minor issues until Thursday afternoon:

- PIPO and First Line were called for devices: PE.BSW57, PR XSE, PR.QSE, F61S.QFO01; 6h1/2 downtime for EAST beams
- Access scheduled on Friday for repairing a water cooling issue on 10MHz cavity C11; 1h1/2 beam downtime
- Following the access, the SMH16 power supply became uncontrollable after a crate reboot. A reboot of the G64 crate followed by a restart of the task restored the control; 1h1/2 beam down time

Beam status

- All operational beams as requested sent to SPS: LHCIndiv, LHC25 12b and 72b.
  - Voltage issue with 80MHz cavities solved
- BCMS work ongoing.

- East Irrad beam line set-up.
- Beams delivered at nominal intensity: AD and TOF.
- MTE sent to SPS with 600 -700 e10p.
  - 1600e10p ready and working on 2000e10p.

Question from **V. Kain**: Even though the RF issue was fixed the bunches are still too long.
Answer by **H. Demarau**: Last Friday evening the issue with the 80 MHz cavities C80-88 and C80-89 (delivering only half the programmed voltage) has been fixed by the specialist and all three 80 MHz give full voltage again for the bunch rotation. The bunch rotation timings have then been adjusted on Monday evening (actually set back to the parameters of 2016). The bunch length at extraction is now again the expected nominal 4 ns. Thomas will check again on the SPS side.

East Area

B.Rae: Good week, nothing to report.

East Area Users

H. Wilkens: The EA irradiation facility started to irradiate samples. Received requests to irradiate 230 samples with protons in IRRAD, and 12 primary users in the CHARM mixed field facility.
On T9 this week the CMS timing detectors are being tested with beam, and on T10 the ALICE Inner Tracker System (ITS) as well as the Time Projection Chamber (TPC) upgrade teams are testing their device.

nToF

D. Macina: All fine. This morning there is access for installations. Afterwards it is scheduled to run until next Monday, when another installation slot is scheduled.

AD

L. Bojtar reported on the AD status (Annex 5)**.**
No major issues encountered during the week, only resets of the ejection kicker, bunch rotation cavities and the main quad power supplies.
There was a power cut in the AD hall Monday (May 15) night, but afterwards nearly all systems were functioning correctly. Recovery took about 2 hours.
A planned intervention to the target area performed on Tuesday (May 9). It required grounding of two power supplies by the security procedure. It was arranged with First-Line in advance for 13h00, but they only arrived at the work site 1 h later. We kindly request First-Line to start the work at the arranged time to avoid loss of time for all equipment experts involved.

AD Users

H. Wilkens: All fine. ASACUSA beam permit is finally signed.

Question from **V. Kain**: What happened with the beam permit?

Answer by **R. Steerenberg**: The AD secondary beam permits were not yet fully signed when beam was sent toward the experiment for setting up the beam lines on May 1st. Following this a meeting took place last week between members of BE-OP and the BE safety unit to discuss the issue and more importantly how to avoid this happening again in the future. A list of actions has been drawn up and agreed upon for implementation.

SPS

H. Bartosik reported the status of the SPS (Annex 6).
Smooth start of SPS NA physics on Monday. Some downtime due to Linac2 and deployment of FGC upgrade (for main power converters).
ZS extraction septa alignment scan performed on Tuesday to minimize losses. Not conclusive yet, another scan to be performed next week.
Cooling issues of a few magnets in the NA with high duty cycle resolved in shadow of dedicated MD on Wednesday.
Since Thursday intensity on SFTPRO cycle about 1.1e13 ppp at flat top with a sharing of about 15/15/45 units on the targets.
About 3.5h downtime on Friday due to PS access and issues with the PS extraction septum at restart.
Cooling issue on extraction elements in LSS2 with high SFTPRO duty cycle being investigated.
Pilot and Indiv bunches sent to the LHC for commissioning activities.
25ns beam for scrubbing in preparation for the HiRadMat: up to 4x72 bunches on flat bottom.
Main limitation is pressure rise in vented and partially modified LSS4 extraction area – clear conditioning already seen.
Commissioning and setting up of 800 MHz cavities ongoing.
Up to 3 batches accelerated to top energy for validation of TIDVG as requested by EN-STI – graphite outgassing observed due to heating beyond bake-out temperature with 3 batches.
HiRadMat run started yesterday.
Setting up of LHC25ns cycle is ongoing (LHC expects 12 bunches tomorrow).

Question from **R. Steerenberg**: May the TIDVG conditioning be an issue?
Answer by **K. Cornelis**: Today it reached temperature above 120 degrees and it started outgassing. Conditioning will be slow because it is graphite block now, so the gas comes from the volume and not the surface only. We increased vacuum threshold to 1e-6 at the TIDVG. The typical slow conditioning is not problem for operation but might be for certain MDs.

Question from **H. Wilkens**: When will the intensity be increased for Compass?
Answer by **K. Cornelis**: We need to get HiRadMat started first and then we will see.

North Area

B. Rae: Started physics. Unfortunately, last week could not tune H8 beam line with the primary beam ("micro beam"). Most probably the problem comes from the microcollimator. Had to fall back to secondary mode (without microcollimator) on Monday and the beam seems to be good now. Apart from this, all the beamlines started smoothly.

North Area Users

H. Wilkens: The H8 problem is annoying for UA9, they have to do it with secondary beam with larger divergence. So more time is needed to gather the required amount of data. Other users are happy.

HiRadMat

B. Rae: They are happy and should start soon.

AWAKE

S. Gessner reported for AWAKE.
Proton beam will start on 27th of May. They are preparing to sign the beam permit.

LHC

R. Steerenberg: Progressing very well with single bunches. Tomorrow they will take 12 bunches and over the weekend they will try to get stable beams. Afterwards it is planned to keep stable beams through the nights and continue commissioning during the days.

3. Technical stop

3.1. Linac2

C. Mastrostefano gave the presentation (Annex 7).
List of known items:

- Switch of pressurized air to disconnect a safety compressor
- Urgent intervention on access system of CPS.
- Cooling control
- Mesure the intertank 2-3 gap.
- Maintenance of Faraday cage of the source.
- SEMgrid-LTL.MSG10V; LTE.MSG10HV.
- Visual inspection of magnets.
- FBCT filters installation.
- Vacuum Intersection tank 1.
- RP Survey & RP follow-up ITS1-2017.
- Beam Instrumentation: measurement of transformers.
- Temporary electrical supply in Bldg. 363 for BHZ20.

For the last item, it is requested to cut electricity at the moment the beam is stopped.
At 15h should be able to start back with beam to have it sent to PSB at 16h.

Comment **K. Cornelis**: SPS stop will be at least 24h, so no point in rushing.

3.2. Linac3

C. Mastrostefano gave the presentation (Annex 8).
Only one request for alignment to measure transfer line between LINAC3 and PS.
Comment from **D. Kuchler**: We will install pepper pot and it will take 24h. It was agreed with the vacuum.
D. Manglunki: Vacuum has not agreed yet.
D. Kuchler: We want to install it to see if it is an aperture restriction, and in case it is, it can be removed during the next stop.
J. Ferreira: It should be fast to pump down because it is a small sector.

3.3. LEIR

D. Manglunki gave the presentation (Annex 9).
Mostly checks:

- SMH40 covers
- CRF41 tubes
- Magnet visual inspection
- Beam current Transformer EI.BCT10 – Cable swap
- Beam ionisation monitor BIPMH – Re-cabling
- Water circuits – Verification of water pressure

Please submit impacts this week. Impact intervention period: TS1-LEIR-2017

3.4. PSB

D. Hay gave the presentation (Annex 10).

- Connection of power converters B361
- PSB: Magnet visual inspection
- TS – Urgent intervention on CPS access system
- Control of ventilation pump
- Installation of BTMS system
- Installation of FBCT filters
- Closing valve on 2MHz RF system to fix leak in 361-1-003
- Visual inspection of the magnetic septa

Need FOM authorisation for works under the false floors in the BRF2 (BSW power converters)
The total time length is defined by water leak intervention in 361-1-003 to open the water valves in the machine when it is done.

3.5. PS

S. Mataguez gave the presentation (Annex 11).
Mostly inspections:

- Inspection of L2-BOOSTER transfer line.
- Survey Check height of straight section vacuum chamber height SS01, SS03, SS12, SS13, SS14, SS18, SS19, SS20, SS21, SS43, SS44.
- Inspection septa PS.
- Inspections of the magnets in the transfer line.
- Inspection ventilation tunnel TT2.
- Inspection of ventilation control and network EG+EC.
- RP Survey & RP follow-up ITS1-2017.
- Visit Fire Safety Engineering team.
- Reparation BLM connecteur en SD69.
- Inspect UES208 pre-amplifiers.
- Measure de Bypass RF SD01, SD02.
- CPS access system repair.
- Checks for decaling campaign.
- Intervention of demineralized water system for magnet ED.
- ED network inside the ring.
- WR B-Train in the POPS feedback loop. Tests the WR B-Train in the POPS feedback loop and implement the PPM functionality for Parallel MD capability during the run 2017.

Maximum 6h time span.

There is a patch panel with many unused cables and they could be unplugged to assure that they can be removed.

Comment from **H. Demerau:** The cables have not been checked yet in detail. Sensitive equipment is fed from the patch panel. He would prefer to check the cables over the next months first.
Comment from **S. Mataguez**: So we don't touch them.

V.Kain: I think it is good moment to show the AOB item "POPS white rabbit B measurement".

F. Boattini gave the presentation (Annex 13).
Before test: (31st May 2017)

1. Change the PBL card (FGC2 crate POPS) with the one WR enabled
2. Load new FGC software (spare FGC card)
3. Simulation check of the WR transmission
4. CCC: prepare MD cycles

During the test: (1st June 2017 during four hours)

1. Run POPS with old Btrain (BupBdown)
2. Run POPS with Btrain WR transmission
3. Test Btrain by switching between pulsed and WR

After test:

1. Depending on the outcome of the Test: Reinstall old –OP cards or keep the WhiteRabbit ones

Q from **H. Demarau**: After the test, would it be possible to revert to the old system?
A: We will run with the old one. If there is a problem with PPM we bring back the old one. Switch is immediate.
Comment from **R. Steerenberg**: the beam need to be started for the night so there is no way to have any tests on June 1st.
A: Without the tests we cannot guarantee that it is operational.
Comment from **R. Steerenberg**: There is another longer stop 4 weeks later. This one is only to do the most urgent fixes.
Comment from **D. Manglunki**: It was intended to be 24h stop. It is the LHC who asks to shorten it, but with SPS not capable to restart earlier, there is no point to shorten it for all the machines.
Comment from **R. Steerenberg**: It would be good to discuss on supervisors meeting to understand exactly the times and consequences, to list the activities and arrange the schedules.

3.6. SPS:

D. McFarlane gave the presentation (Annex 12)
On request of OP the magnet MBB.13350 will be replaced, where an aperture restriction is suspected.
In parallel to the magnet exchange, a cleaning of the vacuum chamber of the MBB.13330, just upstream, will be performed in the meantime. The cleaning might require moving the MBB.13330 in the passageway, to be clarified with TE/VSC.
Finally, an endoscopy will have to be performed in the interconnect between QD.51110 and MBB.51130 where another aperture limitation is suspected.
Due to the numerous interventions, it is possible that the 24h of stop will not be sufficient, and that the vacuum team will need access until 11:00 on Thursday 01.06 to remove the pumping groups.

Detailed list of interventions per BA is listed in Annex 12.

Question from **J. Ferreira**: What do you expect to find in the vacuum chamber?
Answer by **K. Cornelis**: There is something like a wire or RF finger on the floor of the chamber.

Comment from **R. Steerenberg**: We need to report it to the LMC tomorrow.

D. McFarlane: No other intervention will be authorised in this extra time, so in case vacuum is at the required level earlier, the machine can restart right away.
Question from **R. Steerenberg**: The total time would be 36h?
Answer by **K. Cornelis**: 28h.

Question from **J. Ferreira**: Should we have the two inspected magnets ready to exchange in case needed?

4. Schedule Updates

V. Kain presented the latest version of the injector schedule.
No MDs during this week.
Awake starts on the next holiday weekend, it should be prepared well in advance to avoid troubles during the weekend.
The LHC beams need to be prepared:

- 12 bunches requested for tomorrow
- 72 bunches next week
- BCMS 12 and 48 bunches in week 22

5. AOB

A. Bland showed message from IT department concerning the "WannaCry" ransomware virus.
The IT department distributed the patch on the supported systems as soon as it was published.
However, there are multiple systems, like oscilloscopes, which still use the unsupported Windows XP and similar. In order to minimize the risk of infection the IT department intends to close CERN wide ports used by SMB v1 protocol. This may affect some communication systems, for example file remote connection of file sharing between Windows and Linux or Linux and MacOSX.
None of the vital accelerator systems uses this protocol. However, it may happen that some remote connection will not be possible anymore.

Next Meeting: 23rd of May.

Minutes reported by P.K. Skowronski on 17th of May.