Summary of the 14th FOM Meeting

Held on Tuesday 27th June 2017

Agenda (https://indico.cern.ch/event/648565)

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

B. Mikulec chaired the meeting.
The list of presence is in Annex 1.

1. Follow-up of the last FOM

Minutes of the last meeting were approved.

2. Status of the machines

Linac2&Linac3

R. Wegner reported the status of the Linac2&Linac3 (Annex 2).
Linac2 had 100% availability. From Tuesday to Friday higher spark rate was observed, most probably due to hot and humid weather.

Linac3 also had a good week. A few trips of the RF generator were recorded (remotely resettable). On Thursday the temperature of the chilled water raised what triggered an interlock for a solenoid. The cooling system was regulated what fixed the issue.
Question from **B. Mikulec**: Is there any more margin for the cooling system?
Answer by **S. Deleval**: No. The temperature on that day was above the design value.
Comment from **B. Mikulec**: On the last IEFC **S. Deleval** gave a presentation concerning the issues and the situation of the injector cooling systems. Many of the current issues will be addressed during LS2, and certain actions will already be taken before.

LEIR

M. E. Angoletta reported for LEIR (Annex 3). It was a good week with no specific issues, apart from some elements tripping and needing TLC (ETL.BHN10-INJ, kickers ER.KRF31, ER.KFH32, ER.KFN34 on 21/06). Activities during the week:

- Linac3 MDs (19/06 and 20/06)
- ITE BPM studies (21/06 and 22/06
- LLRF servoloop measurements (22/06)
- LLRF MD (22/06): initial setup for h=3+6 operation
- LLRF MD (23/06): initial setup by S. Hancock on cavity voltage measurement via beam + Tomoscope

PSB

A. Findlay presented the status of the PS Booster (Annex 4). It was a worse week for the PSB, availability at 95%.

On Thursday the MPS was problematic, with a thermal problem causing one of the supplies to be swapped with the spare what generated 2 hours downtime. Waiting for an update as to when the original will be re-connected. BE4.DHZ11L1 gave the machine a lot of grief during the week, with the PiPO having to intervene numerous times to try to repair it. Eventually on Friday evening the power supply was changed in the shadow of the cavity issue and it has remained operational since.

Friday evening around 19h15 the R3 C16 cavity, which is used for bunch shaping and longitudinal shaving, tripped and required the cavity specialist to intervene. After diagnostics on the surface, it required a machine access to change the amplifier, so the access process was put into motion. Slowly, at 20h30 the machine was vented for access, but it seems that all the standard IMPACTs that are set-up for such situations were de-activated for the last technical stop as usual, but they were not re-activated afterwards, as is normally the case. After a long wait for the unfortunate RF & RP specialists, the ZORA piquet had managed to get things sorted out, then after a further delay for the access system to get the updated information, they were finally granted access after 1 hour 15mins. The result was not good however, the changed tube demonstrated the same fault, and it is now expected that there is a faulty connector/socket for the tube. As this equipment is rather old and access very difficult, it will take some time to check how exactly this equipment was made and how to change the connector/socket. It took 3hrs 20mins to get through this process, so beam was back for 3 rings and in degraded mode for R3 around 23H45.

The shavers where necessary to replace the missing longitudinal shaving on certain users.

All IMPACTs have since been re-activated for PSB & L2.

Otherwise, the week was spent setting up MD beams and adjusting operational beams as required. The RF team also put the R4 Finemet back in operation as a H=2 replacement for the GPS & HRS users on Wednesday.

Once again this week, there were several periods where there weren't sufficient MD users free to do the MD program and the setting up required. It will be watched as it often delays the setting up of the upcoming beams that are required in the complex.

Comment from **C. Rossi**: The C16 problem is still not understood and is being investigated. Access may be necessary again.
Comment from **A. Findlay**: The specialist performs investigations using the zero cycle.

Question from **S. Hancock**: How bad do the beams look without R3 C16?
Question from **B. Mikulec**: It is a question for the machines downstream, how degraded is the beam arriving there?
Answer by **T.Eriksson**: It is no big issue for the AD.
Comment from **K. Cornelis**: For the time being it is quite good in the SPS, however, it might turn out to be insufficient for the MD beams next week.
Answer: We can eventually use another ring for these beams.

Comment from **A. Findlay**: The access might take longer than expected, as it was the case the last time. Can the intervention eventually wait until TS2?
After an inquiry of the FOM participants **B. Mikulec** proposed to wait until ITS2 with the intervention to minimise loss of physics time.

ISOLDE

M. L. Bonito reported the status of ISOLDE (Annex 5). 79% availability, however most of the downtime issues due to the PSB issues and accesses. There was 75 minutes downtime due to condensate water dripping on power supplies.

This week there was no physics in HRS. Target change is scheduled on Friday and beam setting up on Monday.

First HIE-ISOLDE beam delivered to MINIBALL for detector calibration. Some cavities tripped during the weekend, a normal restart worked.

ISOLDE Users

K. Johnston provided the report be e-mail:
'*Last week a variety of Bi isotopes were measured by experiment IS608. This was the first collaboration between two previously independent spectrometers at ISOLDE: the windmill and the ISOLDE decay station (IDS). Alpha spectroscopy at windmill was complemented by hyperfine spectroscopy at IDS and many new results were obtained on Bi isotopes from 188 – 215Bi.*
The only puzzle was the apparent non-production of isotopes beyond 215Bi: 216-218Bi were seen relatively easily last year. Nonetheless, this did not affect the physics programme and the experiment was able to complete its programme.'

PS

A. Guerrero Ollacarizqueta reported the status of the PS (Annex 6). 92% availability.

- Half an hour beam downtime due to an issue with 10MHz cavities C76 and C11 and the specialist had to intervene.
- A repeater failure stopped all 200MHz during 3.5h. The intervention was carried out by RF who was already on site.
- On Tuesday the water cooling issue affecting SMH57 was solved.
- PIPO was called for a non-resettable trip on bumper 14, 40m downtime.
- PE.SMH16 tripped several times due to a vacuum interlock triggered mainly by the losses created by kicker 71 pulsing with incorrect user value. Beams affected for 2.5h.
- On Friday a problem on a NIM crate affecting the LHC beam control stopped all LHC beams over half an hour.
- Yesterday a PS patrol was done following a firemen intervention.
- Measurements on MTE emittance in SPS show almost twice the emittance in the core than in the islands. The issue is still under investigation.
- A big effort is ongoing to understand and reduce the emittance growth on LHC Indiv and LHC1 beams.
- Doublet beam was prepared longitudinally
- Wednesday MDs:
  - PS dedicated MD interrupting all beams for physics. No real improvement on the regulation could be achieved.
  - Beams slightly perturbed by the BGI MD. Signals can be measured without magnet, but is lost as soon as the magnet is switched on. BI investigating
  - New B train was successfully used for RF and POPS feedback loops.
  - Finemet cavity set-up

Question from **B. Mikulec**: Concerning the emittance growth, is there any understanding of the issue?
Answer: For the LHC1 beam this was related to a head tail instability. For LHCINDIV tunes had to be corrected.

Comment from **M. Hourican**: Concerning the fire brigade intervention, a valve broke and started smoking. The personnel alarmed by the smell called the firemen, however, they did not find it because it was hidden behind a shielding.
Comment from **B. Mikulec**: The info to also look behind the shielding should be passed to the fire brigade.

East Area

N. Charitonidis reported for East Area. In general, smooth operation of all lines with BabyMIND in T9 still checking their hardware till Sunday. In T9 and T10 the CCC operator had to search the area on Wednesday evening, as no user with patrol right was present in the area.
After a discussion it was said that patrol rights expire and that this has to be surveyed closely.

East Area Users

H. Wilkens: BabyMind detector commissioning is in progress.

nToF

F. Mingrone: Running smoothly, measurements are ongoing. Still asking for more protons and further optimization of the super-cycle.

AD

B. Dupuy reported on the AD status (Annex 7). Good availability of 90%.
No problems in AD, most of the downtime due to the issues in PSB. BASE experiment restarted taking data. There was an issue with the FGC3 control of the power converters that was not allowing to swap polarity what was needed to do scans in the BASE line. It was related to a bad equipment configuration and was fixed by EPC support.

AD Users

H. Wilkens: Not so good time for ASACUSA and ATRAP because they had to cancel their beam time due to their technical problems.

ELENA

T. Eriksson reported that anti protons were finally injected into the ELENA ring, but still they were not captured. Proton source is broken again and waiting for a spare part.

Question from **B. Mikulec**: Do you plan to get more spare parts for the source?
Answer: We have spare parts. This particular one was not likely to fail therefore was not on stock.

SPS

H. Bartosik: reported the status of the SPS (Annex 8). An average week for the SPS, with 87% beam availability. Investigated and improved LSS2 slow extraction losses for SFTPRO. Ongoing work on improving transmission (not more than 92% for now). Prepared 200 ns batch spacing for the LHC including BCMS. The feed-forward on 200 MHz main RF still cannot be used because it does more harm than improvement. On Wednesday there was an MD on emittance growth in coast as preparation for crab cavity tests. LHC was warned about coasting beam tests, anyway they started asking for beam at 2PM and the MD was not completed.
In LSS2 extraction channel to the North Area the ZS cathode was found to be misaligned by 2 mm. After realignment, the losses are back to the 2007 reference value. Transmission on SFTPRO cycle is not yet optimal for high intensity beams (max so far about 92%). Optimization of trajectories from PS to SPS was done, but there is still room for improvement. H emittance of core MTE is double compared to islands (without the core losses at injection are reduced by 50%), investigations are ongoing. Intensity delivered to the fixed target experiments is ahead of schedule.
Downtimes:

- 2h for FGC update

- 2h for exchange of tube in TX1
- 15h due to injector downtime

North Area

N. Charitonidis: Smooth and stable operation. K12 was running stably, apart from a short First Line call at the end of the Wednesday MD. In H6, B6 took 4 hours to be restarted by First Line after the Wednesday MD.

North Area Users

H. Wilkens: All fine, a good week.

HiRadMat

K. Cornelis: Resuming the experiment today. There were no issues. Emittance of the standard 25ns beam was too high and the PS is working on that. There is hope it will improve.

AWAKE

No report.

LHC

No report.

TI

J. Nielsen: Nothing special.

3. Technical stop interventions

Linac2

C. Mastrostefano showed the list of the planned interventions for Linac2.
Question from **B. Mikulec**: There are no very long interventions?
Answer: That is right.

Linac3

C. Mastrostefano showed the list of the planned interventions for Linac3. Only 2 interventions and none of them are lengthy.

PSB

D. Hay presented the list for PSB. Routine work, usual lengths for interventions.

PS

S. Mataguez presented the list for PS.

The longest is the installation of cabling for the BGI, which will take 2 days.

SPS

D. Mcfarlane presented the scheduled activities for SPS.
The longest intervention concerns the replacement of MBA13370 magnet, which should fit within 30h.
Alignment of TECS.51799 and TECS.51652 requires breaking the vacuum and metrology. There will be also an intervention on the lift in BA5, so all the required equipment needs to be brought down in the early morning until the lift is in operation and later accesses need to be done using BA4 or BA6.

Comment from **H. Vincke**: Radiation needs to be verified locally before approving and defining cool-down times for the magnet exchange. What about accessing the zone?
Answer: The zone will be accessed via BA2 to avoid the dump area.
Comment from **H. Vincke**: We need to repeat the same procedure as for the last magnet change during TS1.
Comment from **K. Cornelis**: As this is the aperture restriction it may be quite radioactive. The procedure needs to be eventually negotiated.
Question from **B. Mikulec**: Can you verify the levels just after the COLDEX run, when the apparatus is moved away? This would allow having a preliminary assessment.
Answer by **H. Vincke**: Yes, good point.

Comment from **D. Mcfarlane:** Last time the intervention fitted within 30h and the stop is 36h, so we can use some margin for cool-down.

Comment from **H. Vincke**: Wednesday evening time, when nobody is in the machine, is reserved for tests of the Radiation Protection robot. It is required that nobody is in the tunnel.

Question: What is the official closing time of the tunnel?
Answer: Thursday 20h.

Comment from **B. Mikulec**: We ask all persons responsible for the interventions to call the machine coordinators as soon as the jobs are finished, so hardware restart can be commenced. There are always some devices that need Piquet interventions.

4. Schedule Updates

B. Mikulec presented the version 1.2 of the injector schedule that was approved past week by the IEFC. The only unknown to this schedule was the COLDEX run.

Question: Ions to SPS are still on the plan?
Answer by **K. Cornelis**: Yes.

Schedule of beam stop before the Technical Stop for **SPS**:

1. COLDEX run:
    - **Stop all beams in the SPS at 17:00 on Monday 3/7**
    - Access for COLDEX at 17:30 after 1/2h cool-down time
    - Stop all beams in the SPS on Tuesday 4/7 at 16:30
    - Access for COLDEX on Tuesday 4/7 at 17:00 after 1/2h cool-down time
    - COLDEX moved OUT (before 18:00 4/7)
2. Post-COLDEX:
    - Low-intensity single-bunch MDs as discussed with H. Bartosik allowed until Wednesday 5/7 5:00
    - RP survey Wednesday 5/7 at 8:00
    - **Access Wednesday 5/7 from 8:30**

For **Linac2, PSB, PS, TT2** (Linac3, LEIR and AD ring not subject to any cool-down requirements):

- **All proton beams to be stopped on Wednesday 5/7 at 5:00**
    - **ISOLDE, SFTPRO, EAST, TOF beams to be stopped 16h beforehand, i.e. on Tuesday 4/7 at 16:00**
- Ion beams stop Wednesday 5/7 at 7:30
- RP survey from 8:00 to 9:00
- Access to the machines on Wednesday 5/7 as from 9:00

All subject to the current knowledge of the interventions planned in BA1.
Accesses to certain areas are only permitted on Thursday 6/7 → planning from machine coordinators to be respected.
ITS2 ends officially on Thursday 20:00, but the machines should try to restart as soon as all interventions are finished (OK from machine coordinators).

5. AOB

1. Maintenance of TT2/TFP access point YEA01.TT2=269 from June 28 08h30 until June 29 17h00. **Approved.**
2. Maintenance of PSB access point YEA01.PSB=361 from July 3 08h30 until July 4 17h00. **Approved.**

Next Meeting: 4th of July.

Minutes reported by P.K. Skowronski on 28th of June.