Summary of the 6th FOM Meeting

Held on Tuesday 2nd May 2017

Agenda (https://indico.cern.ch/event/635380/)

1. *Follow-up of the last FOM*
2. *Status of the machines*
3. *SPS HW commissioning summary*
4. *Schedule update*
5. *AOB*

1. Follow-up of the last FOM

B. Mikulec chaired the meeting.

The list of presence can be found in Annex 0.

The minutes of the 5th FOM were approved.

Addendum to last week FOM minutes:

An action was opened: Organise a discussion with all machines responsible to improve monitoring and/or procedures for FGC power converters (**C. Mugnier**). **C. Mugnier** said it was ongoing. The action stays open.

2. Status of the machines.

Linac2 & Linac3

R. Wegner reported the status of the linacs (Annex 2).

It was a very good week for Linac2 with no fault. On Wednesday the low level RF system for the RFQ amplifier was re-adjusted for longer beams.

Linac3 was running pretty well and currently producing a stable Xenon beam (~30 uA).

D. Manglunki commented that the last Linac3 current transformer (T41) shows a slightly degraded transmission. **R. Alemany** said this might be due to some steering settings that were adjusted last week.

LEIR

D. Manglunki reported on the LEIR status. The RF cavity 41 moved while baking out a vacuum chamber and cannot be reconnected to its amplifier. The RF, survey and vacuum teams will move the cavity carefully (ceramic chamber, no spare available) to make the connection possible.

PSB

B. Mikulec presented the status of the PS Booster (Annex 3).

During this week a lot of effort went into continuing beam preparation and trying to understand the longitudinal issues (high intensity in ring 2 blows up beam in ring 1 and longitudinal instability in ring 4 with high intensity).

The beams for the upcoming physics users are available within specifications (ToF, EAST, AD), as well as the requested LHC25 beam. ISOLDE has been taking first physics beam throughout the week.

Summary of findings concerning the RF problems:

Observation 1: R4 C04 has spikes from ~c750 until extraction, often destroying the beam and causing losses; this happens also using the R0 beam control. **Workaround**: switch off the C04 "RF Act", which limits the intensity to ~700E10, shortening the bunch, but the beam is stable. An access of ~2h is requested to disconnect, test and recalibrate the cavity.

Observation 2: the beam in R2 induces longitudinal blow-up of the beam in R1, most notable with high intensity beams, measurable as starting between c600-c700. An induced voltage in the R1 C02 (500 -600 V) is seen when its RF Act is OFF AND we have beam only in *R2*; the inverse is not true. There is a phase modulation visible on R1 C02 that is related to the intensity and radial position of the *R2* beam, this is thought to be what blows the R1 beam up; a change to last year's phase pickup didn't help. **Workaround**: radial steering in R1 to +9 mm during the cycle, which minimizes the blow-up, but more importantly minimizes the losses on the first BLM at extraction. It is also possible to greatly reduce the R1 blow-up by doing a -10 mm radial steering on R2, but we found the losses on the extraction BLM to be higher, despite the R1 beam blow-up being lower.

Answering a question from **D. Manglunki** on the second observation, **S. Albright** confirmed that the problem might be due to a damaged shielding of a cable.

ISOLDE

A. Rodriguez reported the status of ISOLDE (Annex 4).

The first physics experiment of the year was completed on Friday morning (35Ar from HRS target to the VITO experimental station). The second physics experiment started on Friday evening and will continue until tomorrow (133In from GPS to the IDS experimental station). There was no major issue to report and the run went very smoothly over the week-end.

ISOLDE Users

K. Johnston said that on HRS 35Ar was taken to the VITO beamline in the first phase of an experiment, which aims to ultimately measure the quark mixing matrix element of 35Ar to a precision of 0.5%.

This first part of the experiment was more to do with establishing the technical aspects required for this measurement including the polarization of the beam and choice of implantation crystal. After a couple of difficult days a reasonable asymmetry was seen after implantation into NaF, although some more technical developments are needed.

On GPS the ISOLDE decay station has been measuring beta-delayed neutron emission from 133In. This is quite a difficult beam to produce (only several hundred ions per second), but the run has been very smooth and the yields have been good. Excellent statistics on both the ground and isomeric state have been achieved and the experiment should complete its program by tomorrow.

PS

F. Tecker reported the status of the PS (Annex 5).

The PS had a busy week, with the preparation of many beams to be available by Monday May 1st. LHC 25ns 12 bunches, NTOF, AD (with new RF sources), and EAST for North branch and IRRAD+CHARM were prepared. Furthermore, MTE fixed target beam, LHCINDIV and LHCPROBE were sent to the SPS.

Beam permits were signed for EAST-North on Wednesday, EAST IRRAD+CHARM on Friday, and NTOF on Saturday.

The main downtimes were for the pole face winding control upgrade, a fix of NTOF water infiltrations and issues with the bending magnet F61.BHZ03 for EAST, the 10 MHz cavity C10-11 and an interlock on FTN.QDE480 (only affecting NTOF).

East Area

B. Rae said that beam was sent to T10 on Sunday and T9 yesterday. Everything looking good at the moment.

East Area Users

H. Wilkens said that the users were happy.

nToF Users

F. Mingrone said that they see only half the intensity they should on the BCT 468. **L. Jensen** took note and will follow this up.

AD - ELENA

T. Eriksson reported the status of the AD.

The first beam was sent on target Monday 24/4 at 15.00 and the first beam to physics was available on Monday 1/5 at 15.01, as planned. There were many issues during the week with Timing/Beam Request Server, C02 and C10 RF, BTV, kickers, power converters, BCCCA Cryo system, e-cooler trip etc…

Main relevant points were:

- RP alarms due to central timing modifications (resolved by BE/CO) and inj. kicker drop-outs.
- Very good beam quality obtained Friday 27/4. Eh/Ev < 0.5 pi.mm.mrad, bunch length 120 ns, 3E7 ejected thanks to both beam cooling systems working well from the start.
- Phase change PS to AD observed Saturday, offset adjusted on the AD side.
- New AD orbit system gives data, but it doesn't look correct. Info in the AD logbook.
- Beam stopper operation in experimental areas problematic, being resolved today.

ELENA was restarted on last week in proton mode in order to make sure that the SEM grids work the same way with H^-. They are presently commissioning the RF systems.

AD Users

H. Wilkens said that in spite of a very challenging planning, the users were happy that the physics started on Monday 1st, on schedule.

SPS

F. Velotti reported the status of the SPS (Annex 6).

The beam commissioning was started. The LHC PILOT beam was sent to the LHC on Saturday. LHC INDIV and FT cycle optimization were still ongoing (first NA beam on Wednesday). The main issues over the week were:

- Calibration problem in main PS translated in wrong current for both QF and QD of about 20%. Was debugged with beam.
- MKE6 problems blocked extraction for several hours.
- MSE6 cooling circuit problem, second time in less than a month. To be followed up closely.
- Current spikes on the main dipole currents observed (fixed by EPC).
- A regulation problem appeared on the QD circuit. A ~6 Hz modulation at the current range of SFTPRO at FB was also observed on the LHC INDIV (long) cycle (less severe).

The orbit excursion was reduced by 1 mm RMS on both LHC and FT beams by displacing 2 QFs and 2 QDs. The TIDVG4 commissioning is going pretty well. The vertical aperture machine study showed severe aperture restriction at 511 (confirmed by RP survey). The area will be checked with endoscopy during the next TS.

3. SPS hardware commissioning summary.

S. Cettour Cavé presented a summary of the SPS hardware commissioning (Annex 7), also on behalf of **J. Ridewood**.

The prerequisites checkout, SPS checkout and commissioning checkout schedules were presented. Overall, the SPS restart was spread over 8 weeks and the first MTE bean was successfully injected and accelerated into the SPS on the 21/04. First beam was sent to the LHC on Saturday.

The main issues that occurred during the restart were highlighted, especially the ones due to actions, upgrades, accesses or interventions that should not have been planned during the start-up and that

should be avoided (or better coordinated) next year. A better coordination of the TI2 and TI8 areas should be looked at between the SPS and LHC coordination.

In the end, the SPS was restarted 3 days ahead of schedule. **S. Cettour Cavé** concluded his presentation by acknowledging all experts and equipment groups for their collaboration and flexibility.

Concerning the TIDVG filter cartridge that was mounted in the wrong direction, **B. Mikulec** asked **S. Deleval** whether a procedure existed. He answered positively, but it was unfortunately not followed in that case.

B. Mikulec and **R. Steerenberg** will take part in the injector HW commissioning offline analysis and especially look at the TI2 and TI8 coordination or sectorization changes proposed for next year.

Concerning the issue related to the CV intervention on the PFN MKE4, **S. Deleval** sent the following mail after the meeting:

From: Serge Deleval
Sent: Tuesday, May 02, 2017 1:46 PM
To: Stephane Cettour Cave <Stephane.Cettour.Cave@cern.ch>
Cc: Bettina Mikulec <Bettina.Mikulec@cern.ch>; Jani Lehtinen <Jani.Lehtinen@cern.ch>
Subject: Maintenance ventilation ECA4 - hardware test

Bonjour Stephane,
Faisant suite à la présentation de ce matin au FOM, je voulais t'apporter quelques informations complémentaires sur l'intervention pendant les hardware tests sur la ventilation dans la zone kicker en ECA4.
Nous avions fait une investigation pour comprendre ce qui n'avait pas fonctionné de notre côté. Il en ressort que :

- TE/ABT nous a donné la date pour l'intervention
- TE/ABT nous a consigné les installations côté Kicker (il n'y avait donc pas plus de risque)
- Une autre personne de TE/ABT (qui n'était pas au courant) a interrompu l'intervention et a envoyé le mail.

Bref je pense qu'il s'agit plus d'un problème de communication que d'un oubli ou un raté, nous planifions plusieurs centaines d'interventions pendant l'arrêt technique et nous sommes bien conscients que les HW tests ne peuvent en aucun cas permettre d'effectuer des interventions.
L'année prochaine ces interventions seront effectuées bien plus tôt pendant le YETS.
Cordialement.
Serge

4. Schedule update.

B. Mikulec presented the injector schedule (Annex 8).

D. Manglunki said that LEIR will start taking the beam next Monday. The DSO tests are scheduled for Thursday morning. From then, the passerelle will be closed until the RP survey.

Wednesdays' MDs are scheduled to start next week (to be confirmed by **H. Bartosik**).

It was decided to schedule the proton injector stop requested by the PSB and SPS **tomorrow (Wed. 03/05) from 9.00 AM to 11.00 AM**.

5. AOB

There was no AOB.

Next Meeting: Tuesday 9th May 2016.

Minutes reported by JB. Lallement on 4th May.