Minutes of the 25th FOM meeting held on 08.09.2009

Agenda:

1) Follow-up of the last meeting (K. Hanke)
2) Status of the machines (supervisors)
   - PS bus-bar fault (D. Bodart)
   - PS-MPS problem (Y. Gaillard)
5) Schedule (K. Hanke)
6) AOB

1. Follow-up of the last meeting

The minutes of the 24th FOM meeting were approved.

The two open actions (status of SPS BWS414 and completion of EIS in document of S. Hutchins) are kept open.

2. Status of the machines

LINAC2 (D. KÜCHLER for F. GERIGK):

The temporary fix of the vacuum leak with a 'cloche' is still in place. The permanent replacement of this arrangement has been constructed and is ready to be put in place. TE/VSC is asking for a 1h stop for this intervention today or Wednesday (see *schedule*). The sealing of the cloche could be compromised if there was a power cut.

On Saturday the linac was stopped twice due to the watchdog – several attempts to reset the watchdog were required until the system reacted. It was also noticed that the watchdog alarm was not visible in LASER. Related to this problem, E. Roux requests time for watchdog tests during the long injector MD next week and E. Metral has allocated a time slot during the MD on Monday 14 September.

On Monday the quadrupole LA1.QDN21S had an auxiliary power supply problem; the 5 V power supply was changed by the piquet.

K. Hanke mentioned that Tuesday last week a degradation of the Linac2 vacuum was observed. G. Vandoni replied that this was due to a reduced pumping speed, but that the situation is OK.

PSB (K. HANKE):

The Booster had a difficult week.

There were two main problems, one affecting the vertical recombination septum of rings 1+2 and the other one the second harmonic cavity.

The problem with the septum BT1.SMV10 showed similar symptoms as the extraction septum a week earlier. The current acquisitions exhibited important variations leading to losses and

trajectory fluctuations. After investigations the problem could be solved on Monday by replacing a regulation rack, which attenuated the 50 kHz noise observed. Nevertheless the origin of this noise source could not yet be identified.

The second issue concerning the second harmonic cavity of ring 3 perturbed operation during several days. Adjustments of RF functions, steering and various other machine settings could not solve the problem. Yesterday the reason of the problem could finally be identified; the amplifier of a feedback loop was exchanged in a short access in the evening, after which beam operation could resume in the usual way.

Another minor problem concern was related to one sextupole magnet – the piquet PO found a whole multipole rack down and had to exchange a 30 V power supply.

According to OASIS the PSB extraction comes 1 ms too late; this is being followed up.

ISOLDE (E. PISELLI):

GPS: Tuesday last week beam was sent to the users. On Wednesday early morning the supervisor had to reset a PLC in the high voltage room to bring back the target heating. Another intervention was needed to reboot a DSC for the high voltage. The users finished their experiment Wednesday at 8am. On Friday target cool-down was initiated, followed by a target change yesterday.

HRS: Tuesday last week stable beam was taken to tune the separator. Wednesday morning the proton scan was performed and in the afternoon REX was tuned with stable beam. Thursday morning the users discovered water in the ISOLDE hall. This is a known problem due to condensation from the air conditioning system. The TI operator was called and sent CEGELEC personnel to clean up. Stable beam tuning continued. Friday morning there was no beam due to the PS access; radioactive beam was taken in the afternoon until beam had to be stopped because of PSB problems. As the transfer line steering had to be changed, a new proton scan was required. The beam was again handed over to the users after 10pm. The run throughout the weekend went well with only one intervention (reset of the separator).

ISOLDE users (A. HERLERT):

Despite all problems the REX run went well. Users were happy with the sodium run and have changed to RILIS to measure polonium. Up to now everything is fine and they hope for higher intensities to finish their run.

For the coming week (Thursday until Monday) ISOLDE has a special request concerning the composition of the supercycle. K. Hanke asked A. Herlert to get into contact with R. Steerenberg.

PS (R. STEERENBERG):

Tuesday last week the first quadrupole in the East Area beam line (F61.QFO01) tripped due to an external fault. It could be reset remotely, but continued to trip several times throughout the week. The reason was an insufficient water flow (remark: solved during the PS access on 09/09/09).

There were also frequent radiation alarms because some extraction elements did not pulse. It was found that GFA's sometimes send functions although they are disabled. CO is following this up.

On Sunday evening a gap relay had to be changed in cavity C46 requiring a 45 min. machine access.

On Thursday early morning the MPS tripped (see detailed report under paragraph 4)). In the shadow of this problem work was ongoing on the simulated B-train that showed quite some discrepancies compared to the measured B-train, which led to frequent cavity trips, in particular for ion cycles. A scaling factor in the CVORB was adapted, and now the values of the simulated B-train are very close to those of the measured B-train.

Yesterday the beam was cut due to tests on the bending magnet BHZ6024 in the FTA line that caused the TT2 security chain to trip for about 2 hours.

East Area (L. GATIGNON):

Apart from the PS problems and the trips of the F61 quadrupole, one magnet trip in the T9 line can be reported. OPERA managed to finish their program earlier than planned. The next T10 users will come only next week.

East Area Users (H. BREUKER):

DIRAC was running on higher intensity as usual and had therefore increased losses. Since Sunday the intensity was again reduced and now DIRAC operation continues in a stable way.

AD (K. MIKLUHA):

3 problems occurred last week: the vertical pre-driver power supply of the stochastic cooler needed frequent resets; the dipole DI.BHZ6034 was down for 11 hours on Tuesday and Friday evening the extraction kicker started to kick out the beam 1.2 μs too early. Using new settings solved the last problem, but ASACUSA and ATRAP had to retune their timings. A. Findlay reported that the RF group followed up this problem; an RF switch in the synchronisation loop had died and was replaced, which allowed to return to the usual timings.

On Saturday evening the demineralised water pump of ASACUSA got overheated, and practically the whole machine went down. It took about 1.5h to recover.

AD users (H. BREUKER):

ATRAP and ALPHA lost about 50% of their beam time due to the sum of all problems.

ALPHA had a water leak on Saturday, which could be fixed by the users.

The trap of ASACUSA is running excellent. ASACUSA commissioned its new positron source, which is in regular use since about 1 week.

NTOF ():

No report.

SPS (E. METRAL):

On Wednesday the 4th CNGS1 was replaced by CNGS2 to study the PS MTE extraction. Looking at the fast transformer in TT10 it seemed there was more than a factor 10 between intensities of the core and the islands, while looking in TT2 it was closer to a factor 6. Furthermore, the losses at PS extraction were bigger than usual and will be followed up by OP. In addition, only the 4 islands were injected and the individual trajectories studied. During this

study, the old optics for both TT2 and TT10 were used. Since then, new optics were implemented, and this analysis should be redone.

During the weekend some time was lost due to several trips of the transmitter TRX2.

E. Metral mentioned that several SPS interventions are on the waiting list for the next access: intervention on a beam position monitor in LSS4, the injection kicker, on the dump kicker, change of a BLM crate in BA5 and 6 and of an acquisition card for the ZS. In addition all remaining magnet problems (3 MBAs and 1 QD) have to be addressed including an exchange of magnet MBA23230. K. Hanke said that this has to be coordinated with the CPS interventions.

CNGS (E. GSCHWENDTNER):

Beam operation runs fine. Some interventions are planned to empty all residual water, also downstream of the target chamber.

North Area (L. GATIGNON):

The CEDAR counter could be fixed and everything is fine.

North Area Users (H. BREUKER):

The NA61 users complained about the situation of the cooling water that trips the power supplies in the racks of their readout system. The restart of their data acquisition after such a stop is always lengthy. An intervention took place yesterday with unknown result.

H4: the COMPASS calorimeter could not run last week, but now the tests could be finished.

CMS ECAL insists to start on Friday, even though the last 20 m of vacuum pipe can only be installed later (but this seems to be acceptable for them).

H6: EUDET moved in its final configuration. There is a second project installed upstream (MIMOSA) running fine.

Also the Italian drift tube project for ATLAS is running successfully.

LINAC3 (D. KUECHLER):

The Linac3 source needed regular tuning. It is now running routinely around 20-22 μA. On Tuesday and Wednesday the RF and the source tripped due to chilled water problems. As planned, on Friday the SEMgrid and Faraday cup has been removed from the ITFS line, in order to install the vacuum desorption experiment starting straight after the SPS ion MD period; in case of problems it might be more difficult to solve them due to reduced instrumentation.

LEIR (M. CHANEL):

The machine is running fine. M-E. Angoletta reported on the successful interventions on the cavity server loop, but added that there was still room for improvement.

PS WITH IONS ():

Nothing to report.

SPS WITH IONS (D. MANGLUNKI):

SPS was running with ions only during Tuesday and Wednesday. Progress is slow and every minute of beam time is needed.

Rephasing studies at the flat top have started, and J. Wenninger was working on the chromaticity along the cycle.

Last night the ion cycle has been kept in the supercycle, which allowed a quick restart in the morning and avoided loosing time.

D. Manglunki reminded everybody that in case of a Linac2 or PSB stop ions could/should replace the proton cycles.

Beam will be needed this week Tuesday, Wednesday and Friday.

CTF3 (D. MANGLUNKI):

Tuesday afternoon was lost due to the repair of the access interlock system; during a RP campaign to put signs on access doors, holes were drilled and a safety cable damaged. M. Widorski replied that this was a planned intervention undertaken by contractors.

A combined beam could be set up in the Combiner Ring (CR) with >14A and further optimised by orbit correction and orbit closure. The beam was then extracted to TL2. TL2 was rematched, which allowed recovering the factor that had been lost (166 MW extracted from PETS).

Since Thursday late afternoon, a problem with the gun was suspected. Finally, it was found on Friday afternoon that someone had moved in a normally unused screen directly behind the gun.

Yesterday the machine was restarted, reaching quickly good conditions (15 A recombined beam).

TI (P. SOLLANDER):

2 interventions are planned: a restart of the TIM application tomorrow at noon (difficulties with the access system could occur during this period) and an IT intervention on the 15th from 9-11 am (moving 5 network services from 874 to the North Area).

K. Hanke invited everybody to consult from now on the link '[Upcoming interventions]' on the FOM home page. K. Kostro mentioned that he tried to add an intervention on this web page, but had no access. K. Hanke will ask S. Dubourg to grant him access.

3. PS bus bar fault (D. Bodart)

D. Bodart explained the [PS bus bar fault] from the 3rd/4th September, where effectively 2 faults occurred. The symptom was that the main generator had tripped with an irregular function detected by the new control system. A high voltage test on the magnet circuit revealed a short circuit to ground for the lower coils of the main magnets (below the threshold of the ground fault detection circuit). By sectioning the machine, the problem was identified as a short to ground for the bus bar between main units 22 and 23.

Embedded in-between the bus bar insulation for the upper and lower coils is a grounded copper strip, resulting in each bus bar showing a potential up to ±4.5 kV to the strip. The two faults were that the lower coil bus bar insulation had failed to this strip, while the upper coil bus bar had failed to the grounded covers.

It was decided (in order to continue the ion run) to provide a temporary fix removing the ground connection of the strip to resolve the ground problem with the lower coil circuit. In addition the insulation of the assembly to ground was secured by a kapton wrap.

It has been made clear that this repair is only a short-term solution. The removal of the copper shield from ground potential does no longer protect the bus bar from arcing, and thus the generation of a fire can no longer be excluded. Therefore the replacement of the bus bar by a spare is required.

The spare bus bar dates back to the 50s, and the proposal consist in taking the spare out of the machine (max. 2h including cool-down) and refurbish it (count ~2 weeks including tests). For the replacement the septum SMH23 needs to be removed, which could be done in 1 day if well planned. The time-consuming part of this intervention will be the pump-down of septum SMH26, which could take up to 7 days.

M. Chanel asked which vacuum level was required when no ion operation was considered. There was no clear answer to this question. G. Vandoni explained that approximately 5 days were needed only for the thermal cool-down, but depending on the vacuum level that will be reached it might be possible to avoid bake-out if the region will by under steady nitrogen flow. D. Bodart supported this statement by adding that last year the exchange of magnet 25 could be done without bake-out by keeping the sector under dry atmosphere.

TE/MSC proposes to perform in parallel with that intervention the replacement of sextupole SS07 in this sector showing an interlock problem; the shimming of the coils is not OK leading to up to 3 mm movement.

S. Hancock asked if SMH26 should be removed after the ion run, but this idea was controversial. He also wanted to know if there were more ‘temporary fixes’ present in the PS, which was negated. R. Brown questioned if there could be more cut copper strips. D. Bodart said if this was the case, it was not on purpose. It was agreed to do a round in the PS to check this.

R. Scrivens asked if there was a procedure what to do in case of another earth fault. R. Steerenberg explained that the instruction for the operators was to stop the machine and not try a reset.

4. PS MPS problem (Y. Gaillard)

Y. Gaillard laid out the PS MPS fault from the 4th of September in a few slides. He explained that the generator was feeding two stations (B and C) with 6.6 kV AC, which deliver 4.5 kV to the main magnets. When the MPS tripped, station C went down and the thyristors were no longer powered. Effectively the fault showed up as a +/-15 V auxiliary power supply fault. Investigations showed that components were burnt on an electronics card supplied by the auxiliary power of +/-15 V. These cards are quite old; 4 are in use, 1 is faulty (to be repaired) and 1 spare is available.

When the thyristors were checked, one stack didn’t hold more than 300 V. The thyristors had been successfully tested at 3500 V, but the suspicion is that there is a problem with the gate circuits, which has to be confirmed today. The stack with 6 thyristors had been changed. The spare situation of the thyristors is in order.

There were actually 3 different problems at the same time in the PS: the earth fault in the magnet bus bar, the failure of the auxiliary +/-15 V power supply (for firing pulse amplifiers, fiber optic transmitter and receiver) and probably a thyristor failure. It is likely that these events were linked to each-other. It is not yet known which of the 3 events was the initial cause of failure. One can

only suspect that the problem on the +/-15V power supply has probably generated a fault in the gate system. TE/EPC will continue the investigations.

The question when the new MPS would be operational came up. Commissioning will be started this year, but the system will only be made operational during the 2010/2011 shutdown.

5. Schedule / Supercycle / MD planning

The 2009 schedule (V3.5) is available at:

https://espace.cern.ch/be-dep/BEDepartmentalDocuments/BE/Schedule2009.pdf

The supercycle composition is available at this web page.

The schedule of the MD can be found on the MD web page.

The detailed planning for the TI2 and TI8 tests on 26th- 28th of September with protons and ions has been laid out by M. Meddahi (see linked file).

After consultation of everybody present, the required Linac2 and PS interventions were scheduled for Wednesday morning: all beams will be stopped at 8am. Access will be granted to Linac2 and PS after the usual cool-down time of 15' and 30', respectively. The estimated total beam time lost is 1h30.

A meeting will take place after this FOM meeting with the aim to schedule the PS intervention to repair the damaged bus bar.

Remark: this intervention is foreseen to take place in week 41; R. Brown will report on this subject during the next FOM meeting.

6. AOB

K. Kostro mentioned that new Java libraries affecting RBAC and Java client libraries will be released today. They will be effective once the applications are reloaded.

7. Next meeting

The next meeting will be held on Tuesday, September 15th at 10:00 in 874-1-011.

Preliminary Agenda:

1. Follow-up of the last meeting
2. Status of the machines
3. Planned PS bus bar intervention week 41 (R. Brown)
4. Schedule
5. AOB

Minutes edited by B. Mikulec