

LHC-Beam Commissioning Working Group

Notes from the meeting held on 9 February 2010

Present: Maria Alabau, Reyes Alemany, Gianluigi Arduini, Ralph Assmann, Roger Bailey, Helmut Burkhardt, Roderik Bruce, Oliver Brüning, Rama Calaga, Pierre Charrue, Lene Drosdal, Massimiliano Ferro-Luzzi, Kajetan Fuchsberger, Massimo Giovannozzi, Brennan Goddard, Per Hagen, Eugenia Hatzangeli, Eva Barbara Holzer, Delphine Jacquet, Lars Jensen, Malika Meddahi (chair), Gulia Papotti, Laurette Ponce, Bruno Puccio, Frank Schmidt, Marek Strzelczyk, Ralph Steinhagen, Ezio Todesco, Glenn Vanbavinckhove, Walter Venturini Delsolaro, Jörg Wenninger, Simon White, Uli Wienands, Daniel Wollmann.

Excused: Rossano Giachino, Verena Kain, Mike Lamont, Alick Macpherson, Stefano Redaelli, Stefan Roesler, Jan Uythoven.

1. Comments from previous minutes

Massimiliano Ferro-Luzzi: The experiments are indeed interested in 450 GeV collisions, with stable beam conditions but beyond the pilot intensity as the rate should be at least 20 Hz per IP.

It was confirmed that the first commissioning work will address the major 2009 issues, such as the hump, and for this, the dipole spectrometers would have to be off. Massimiliano Ferro-Luzzi clarified that if the solenoids need to be off as well, this should be coordinated (huge cryogenic magnets with 4-5 hours ramp up/down time). The dipoles are warm magnets which can be ramped up/down in about 20-30 min.

Pierre Charrue on the Virtualisation infrastructure: [Status report:](#)

The virtual machine infrastructure is composed of 4 vmware servers and one NFS file server (2 TBytes of disk space) on the same network switch on the Technical Network. In addition, there are one TN-TRUSTED connection broker on the GPN and one secured connection broker to connect from outside CERN.

At the end of last year, the virtual PC infrastructure was tested and deployed and the user accounts were progressively migrated. In January 2010, the WTS was handed over to IT.

Since the deployment, there have been 3 major issues:

- Monday 7 Dec. 09: Extremely heavy load on the NFS server due to a new IT anti-virus – had to temporary disable the anti-virus deployment.
- Friday 22 Jan. 2010: The VM-NFS disks got 100% filled up and therefore all VMs were blocked – had to clean the backup snapshots, add 500Mb of additional disks and more thorough disc-space monitoring.
- Monday 1 Feb. 2010: The VM-NFS server crashed and therefore all VMs were blocked - post-mortem of the crash did not show any useful information

Next steps:

- Replace the NFS server with a more powerful and robust file server. Delay: 3-4 weeks;
- Carefully monitor all parameters on the operating system and on the VMWare level;
- Enhance the overall VM infrastructure.

Finally: Please use mailing list: VPC-Support@cern.ch to contact VPC team (no direct email to BE/CO colleagues).

Malika Meddahi: will the replacement of the NFS server be transparent to the users?
Pierre Charrue: When the new server will be available, users will be informed individually and their account moved. This can be done over night if needed.
Lars Jensen: When will the virtual machine replace the entire current terminal servers?
Pierre Charrue: we must first build confidence in the overall new system. In a month time, Pierre Charrue will report back at the LHC BC WG.

2. HWC progress and readiness of the LHC systems – Gianluigi Arduini ([slides](#))

It has been a very active week end with a strong support of the QPS team available. The QPS field team are working in two shifts, to perform tunnel interventions and fix non conformities. Other colleagues also helped and in total, about 25 people per day were present (plus normal shift crew). Two shifts per day were performed, and three shift as of Sunday. Gianluigi Arduini thanked all the colleagues for their effort.

The major commissioning steps for the nQPS were listed, and the status of each of the sector given:

- Sector 1-2 is available for operation for PGC and pre-cycle;
- Sector 3-4 misses the last step to 6 kA energy extraction RB and RDF/D;
- Sector 2-3: the nQPS interlock test RB and RQF/D has started;
- Sector 5-6: now performing the current ramps to obtain bus splice coefficients before moving to the nQPS interlock tests;
- Other 4 sectors: fixing non-conformities (e.g. swaps of cards for the new QPS, make sure cards are properly installed, programmed...). Several tunnels accesses are required during this step.

To be noted: Due to the 3.5 TeV operation –vs. 7 TeV- two nQPS commissioning steps have been suspended: nQPS heater firing at 0 current from symmetric quench boards (very unlikely) and their analyses.

Issues:

Sector 4-5: RB: one heater was not firing correctly. The Quench heater is being re-configured.

Sector 7-8: earth problem on RQF circuit. Cable for reference magnet to be replaced. Cable may have been damaged from movement of the rack.

Sector 2-3 and 4-5 are stopped for cryo interventions. Conditions should be back tomorrow morning for S45 and evening for S23.

Schedule:

All sectors should have their powering tests completed for 15 February, at the exception of Sector 7-8.

Over the week end of the 13-14 February, as no QPS expert will be available, Gianluigi Arduini proposed that this time is used for pending activities, such as pyramids and powering tests, PGCs, pre-cycles, Interlock and LBDS tests.

Regarding the tentative date of the injection test on Wednesday 17 February, it was agreed to check the HWC status at the end of this week and quantify the impact on the HWC progress, if any. In the meantime, work will continue in preparing the injection tests.

Gianluigi Arduini said that Markus Zerlauth has proposed a simplified procedure for the LHC access by limiting the current in the LHC circuits during short expert interventions ([DRAFT specs](#)). This proposal needs the support of the power convertor colleagues in order to perform the required modifications of the FGCs. This simplified procedure is of great interest for the optimisation of the LHC beam operation. Therefore the LHC BC WG fully supports the implementation of this modification and encourages EPC to take action.

3. Dry run news – Reyes Alemany

Much work has been done since January by the Dry run team ([slides](#)).

Week 02: New proxies test and implementation, LBDS-INJ alarm test, MKQA dipole test

Week 03: BLM and BPM capture test, LBDS alarm test, IQC

Week 04: LBDS arming, MKI pulsing and IQC new version.

Week 05: Injection and dump system test in preparation for beam

Week 06: INJ&LBDS, AC dipole, S12 PGC +3.5 TeV

The list of tested systems and issues has been presented and are available in Reyes' presentation. As always the progress are available in the tracking pages:

<https://espace.cern.ch/mddb/Activity%20Tracking%20Tool/Activity%20Tracking%20Welcome.aspx?View={593B6E53-F6F9-4485-8646-E7E683D0F681}&SelectedID=63>

Plans for week 07: RF work, Inj, LBDS, Coll. to run through the nominal sequence, BI, Experiments. All included in the LHC NomCycle. + 3.5 TeV on available sectors

Plans for week 08: all pending issues to be covered.

Concerning the MKI, Brennan Goddard added that the CCC dry runs put into evidence several problems which were fixed. The vacuum issue with the cryo is being investigated.

Jörg Wenninger: MKI BETS: to be redone again with +/- 1 GeV

Jörg Wenninger: report from the MPP:

- SIS: QPS status signal is now also blocking the injection - alarm will not be ignored anymore;
- New interlock on the RF TDCs: will avoid de-synchronized injection;
- New interlock on the triplet movement system motors;
- IQC: After an emergency dump: OP crew will have to check the Post Mortem and acknowledge this reading before being able to inject ;
- BIC: pre-operational check to be done before every fills (Otherwise the injection will be blocked);
- BLM: One BLM at the TDI will have its integration time constant modified (avoid signal saturation). The two BLMs at that location will be unchanged, one removed from the BIC and one used to cross-check with the modified one.
- Collimator BLM: also cross-checked signals will be used. SEM will still be active, Threshold will have to be added at some point, and changes on the electronics are on going.

Jörg Wenninger: It was checked that at 3.5 TeV, there is no problems in making wire scans, at least with an intensity of few 10^{11} . To be verified with the first scans.

4- [Preparation for the sector test](#)

Malika Meddahi showed a preliminary plan for the injection tests ([slide](#)).

Roger Bailey confirmed that DSO tests are not needed.

Jörg Wenninger reminded that access will be needed in order to re-enable all BIC channels, prior to beam tests.

The interest of performing an injection test, few days before the re-start of the LHC beam commissioning was questioned. It was reminded that an early test of few hours, if it has no impact on the HWC, would allow checking all the systems, before the re-start of the beam commissioning. It was agreed that at least sending the beams to the bottom TI TED would already be very beneficial.

Massimiliano Ferro-Luzzi said that the experiments were told that, for the time being, the closure date of 15th of February was maintained. They are informed of the currently

planned 17th February injection test and told that the plan would be updated at the end of this week, based on progress with HWC.

Concerning LHC point 2: Jörg Wenninger asked whether ALICE could close on 17th Feb. and Massimiliano Ferro-Luzzi answered that, indeed, they currently plan to patrol and go to restricted mode on Monday 15th.

List of follow-up actions is available [here](#) and the progress will be discussed at the 17:00 meeting.

5. A.O.B

Daily 8:30 HWC meeting in the CCC conference room.

Daily 17:00 machine check-out meeting, starting as of tomorrow, 10 February, CCC glass box.

Roger Bailey: LHC Media Day: will be scheduled for the first colliding beams at high energy -3.5 TeV- and broadcast worldwide.

A week notice has been requested, with the preference that this event happens mid-week. It was agreed that when beam has been accelerated to 3.5 TeV, the media will be informed and in the meantime commissioning work (squeeze, MPP) will continue.

Eugenia Hatzangeli: any requests for facilities to be provided by CO should be known as soon as possible.

Questions:

- Can stable beams be declared on the Media day? Yes, if a week before all requested tests are performed, with one beam at a time, or with bucket-shifted bunches so that they do not collide. It was confirmed that the optics won't be squeezed.
- Can all the separation bumps be collapsed at the same time? Yes, can be tested earlier on with both beams, with shifted bunches.
- Can displays be made available to illustrate what is going on? e.g. separation bump being collapsed... to be followed up: Roger Bailey.

Next meeting: **16 February 2010**, 15:30, 874-1-01. Agenda will be sent in due time.

Malika Meddahi.