

LHC-Beam Commissioning Working Group

Notes from the meeting held on 4 August 2009

Present: Reyes Alemany, Roger Bailey, Helmut Burkhardt, Andy Butterworth, Pierre Charrue, Massimo Giovannozzi, Eugenia Hatziangeli, Lars Jensen, John Jowett, Mike Lamont (chair), Malika Meddahi, Gabriel Mueller, Mario Pereira, Mirko Pojer, Bruno Puccio, Stefano Redaelli, Wojtek Sliwinski, Ralph Steinhagen, Marek Strzelczyk, Jan Uythoven.

Excused: Gianluigi Arduini, Oliver Brüning, Brennan Goddard, Magali Gruwé, Verena Kain, Grzegorz Kruk, Stefan Roesler, Walter Venturini Delsolaro, Jörg Wenninger.

1. Comments and actions from the last minutes

Comments on the settings of the separation / crossing scheme during the squeeze: [comments](#).

Massimo Giovannozzi confirmed that during the squeeze the settings / currents of the dipoles generating the crossing/separation scheme need to be changed linearly in between two matched values of β^* to avoid non-closure of the bumps.

Settings of the crossing and separation bumps have been given by Massimo Giovannozzi to OP.

2. News from LMC – Mike Lamont (slides)

The minutes, written by Frank Zimmermann, will be available [here](#).

TI 2 and TI 8 interleaved beam tests are now scheduled to **25-28 September**. New version of the LHC schedule V3.5 was shown. Tentative dates for the injection tests into the LHC will be investigated and added into the LHC schedule: **Mike Lamont**.

Main subjects (details in Mike's talk).

- TI 2 / TI 8 beam test results – Brennan Goddard
- DFBA flexible problem – Laurent Taviani
- Update on the bus segment resistance measurements – Andre Siemko
- Fluka model of bus bar simulations – Jörg Wenninger

Decision on the maximum LHC energy will be taken after the next LMC.

3. Dry Run news – Reyes Alemany (slides), Pierre Charrue (slides)

Week 29: Post Mortem

PM data clients –BIS, BI, PVSS (PIC), BLM, BPM, PC, collimators, Alarms, UPS, FMCM
Analysis = Pre-analysis (1 min after PM event) + Analysis (max 7 min after PM event)

Week 30: LBDS B2, RF, FGC new version, incorporation

- Successful first dry run of the beam dump system beam 2: Armed with the beam interlocking system without problems using the new sequence; Ramped to 7 TeV, dumped and re-armed; Mode inject & dump tried successfully; XPOC worked well. Left successfully armed at 5 TeV over night; Triggered in the course of the next morning due to some RF manipulation during the dry run; One GTO of an MKB switch broke. The beam dump BI needs some follow-up

- New version of the RF FGCs: all working well. Ramped and put to injection settings with the sequencer and equipstate. Only some issues for the logging and one command in equipstate.

- RF real time input for radial modulation: after sorting out the mapping on the FGCs to enable the correct real time input channels, everything worked very well. Need however an additional command on equipstate to be able to check the enabling of the real time channels and a task in the sequencer to check this before injection. Logging of the orbit feedback service unit which contains the settings for the radial modulation has to be set up. Detailed summary:

<https://espace.cern.ch/mddb/Activity%20Tracking%20Tool/Activity%20Tracking%20Welcome.aspx?View={593B6E53-F6F9-4485-8646-E7E683D0F681}&SelectedID=40>

Week 31: RBAC strict, LBDS B2, Squeeze, MKI, Injection sequence, IQC

- Programmed dump on beam 2 worked without problem. For next time, envisage having the beam dump events coming out automatically to be able to see the XPOC under these conditions.

- Incorporation: still a little issue with incorporation in the middle of a beam process. Will be tested again week 32 and also the incorporation for the whole hypercycle.

- Squeeze of combined point 1 and point 5: it is containing for the time being also the changes of the separation to the pre-collision values. This will change. Otherwise it worked (the triplets circuits could not be fully tested yet).

- Injection kicker pre-pulses are now delayed in both cases by 1.2 ms. Like this the kickers are pulsing fine. The jitter of 700 us between slow timing and pre-pulse has been confirmed. The charging of the PFNs therefore has to take place a bit earlier (presently 2.5 ms before injection).

- The first version of the IQC analysis on server with GUI was tested. Three analysis modules (injected intensity, RF bucket check and beam losses) and the overall module are available. Looks good, working reliably for beam 1. For beam 2 never got any BLM data. All details at

<https://espace.cern.ch/mddb/Activity%20Tracking%20Tool/Activity%20Tracking%20Welcome.aspx?View={593B6E53-F6F9-4485-8646-E7E683D0F681}&SelectedID=42>

- Pierre Charrue presented the outcomes of the RBAC strict mode test of 29th July:

Reminder: 3 RBAC modes: no-check, lenient, strict mode. Strict mode requires the client application to acquire a token and the CMW server to have an access map that at least protects the SET properties. For the tests, a list of all LHC front-end was built (455), together with an exception list 9OASIS, LHC timing...). All CMW servers from 307 FrontEnd were passed to strict (364 servers). Default mode was left to lenient. Under these conditions, OP stated to test all the applications. A majority of the main LHC applications worked very well. Problems: access maps were deployed by some equipment groups and therefore some RAC rules were harder than before; CMW-proxy has its own token therefore specific rules have to be added in the access-maps; some applications did not have token; some CMW servers do not have an access map. CMW issue was discovered (but not linked to RBAC, but to CMW itself). Some issues were not clear (concerning SIS, BIC, MCS...) and have to be further investigated.

Decision after the dry run: RBAC strict left on. CMW issue is well understood and a fix is being distributed to the users. All the colleagues from other applications will be contacted to make sure their client application has a valid token and their CMW servers have a valid access-map. All test details:

<https://espace.cern.ch/mddb/Activity%20Tracking%20Tool/Activity%20Tracking%20Welcome.aspx?View={593B6E53-F6F9-4485-8646-E7E683D0F681}&SelectedID=41>

As of Monday 14th September, strict RBAC mode will be the default in the configuration files.

Upcoming dry runs:

- W32: Beam dump beam 1 and follow ups - Incorporation, RBAC strict, Fidel ...
- W33: DIP handshake, LHC state machine, follow-ups
- W35 transverse damper and abort gap cleaning

Mike Lamont thanked the OP team for this rigorous work and the good results obtained.

4. Handling function stop points during the betatron squeeze – Stefano Redaelli ([slides](#))

Stefano Redaelli first reminded how the squeeze is implemented in LSA. During the commissioning the squeeze needs to stop for detailed measurements and adjustments. Natural stop points are the matched points. Possible solutions exist for the implementation of the required stop / resume functionality and the chosen one was to split the functions in “segments” as top-level implementation and load / drive one segment at a time.

Implementation: specify t_start and t_end of any segment when loading the functions - standard triggers can be used (software, timing). For PC's, get an exception if t_start and t_end do not correspond to times of matched optics Protection: If one sends segments that are not adjacent, HW will give a first-point-mismatch exceptions. Same implementation approach was applied for the collimators and example with / without stops was presented.

Incorporation: When discrete trims are made at intermediate stopping points, the new settings will be appropriately incorporated into the function. The incorporation is available in LSA and will be tested.

Handling collimator thresholds: collimator limit functions are critical parameters and require special handling. The digital signature associated to settings is computed for the full function of the complete beam process - what to do with the function segments? Preferred solution: Use virtual critical settings for the segment being played.

Mike Lamont congratulated Stefano Redaelli for this very nice work on this critical subject.

Next meeting

Tuesday 25 August 2009, 15:30, 874-1-011. Agenda will be sent in due time.

Malika Meddahi.