MP3 review,
General summary session

Content

MP3 review topics

1. MP3 organisation
2. Preparation for powering tests
3. Software tools for powering tests
4. Powering tests
5. MP3 after HWC
6. General discussion

About 2 slides per session giving a quick overview of discussed topics and impression of the discussion.

Session 1. MP3 organisation *(Jean-Philippe and Ivan)*

Pre-HWC organisation of the MP3

Motivation - Mandate - Members/competences – Meetings. In general OK, maybe a need for an EE expert in MP3?

Recommendations and follow up – **Recommendations are not always followed up strictly**.

Powering test 2013 – Mixed feelings: Great learning experience, many failed tests by quenches, coupling and saturation of protection systems.

MP3 organisation during HWC

MP3-CCC team - One responsible per week – Shift coordination. Analysis/signatures and reporting of NCs. Analysis manual and software tools. Bottleneck was not MP3, but HW.

QPS and OP note that **all additions, like CSCM caused the delays due to lack of expert resources, specifically for QPS**. Also the middleware and control systems did not work timely. Bob and Sandor made a good help from outside, unfortunately only available during 2014: **QPS expert in CCC** would have been very effcient.

Session 1. MP3 organisation *(Jean-Philippe and Ivan)*

Many people commented that it is important to keep traceability of issues and changes and that if possible, targets for HWC should be fixed early, and avoid for instance last minute changes to FESA or last minute decision for CSCM.

MP3 organisation after HWC
Best effort – 2 interventions per week, more experience needed to see if piquet is needed.
Software tools are extremely helpful.

Practical aspects
Fluent communication through mailing, meetings and weekly summaries, **worked well, but is there enough traceability?**

Twiki environment – is this a good longterm solution?
APEX database, can we extend this? **Clearly the google docs need to be internal, not external. Tracking is very important.**

Session 2. Preparation for powering tests *(Michele and Daniel)*

A lot of effort has gone into preparation, getting the powering tests more homogeneous and have a common approach for procedures.

Analysis manual

- Main support for MP3-CCC team -Evolved during HWC -QPS analysis? -EE PM analysis module? Needs completion and cleanup!

This is the moment for updates, cleanups, make obsolete, etc. since we freshly came from HWC!!

- Procedures, analysis manual, analysis tools, etc...

EE criteria: split up in protection issues and in non-protection issues may be needed.

Interactions with other teams

Currently manual data transfer from OP on quenches in all circuits towards MP3 during operation. May need to be systematic.
Have a single issues list may help

Overlap between actors, systems, tests (IST and powering) etc. is unavoidable: in some cases some efficiency steps may be made.

Session 2. Preparation for powering tests (Michele and Daniel)

MP3 Twiki page
- **Seemed a good choice, high number of unique users, widely used,**

Powering procedures and test criteria. Major review and revision before HWC. **Improved coherence, important learning process for MP3 members**

PIC seems to be a bit out of the loop of the MP3 documents, since they are now placed in a seperate document, **which is OK. Some specific QPS parts of PIC testing may be included in procedures.**

Overlap between IST and powering tests becomes more important. **The swapping of signals may be checked with a specific test even at low current.**

To be completed: **PGC powering document.**
Procedure for RCO/RCD is available and to be included in 600 A circuit procedure.

MP3 only focusses on powering, but does not always take carefully into account what has **happened in IST.**

Session 3. Software tools *(Sandrine and Zinur)*

Overall impression during this session
Software is in general working very well and was also work in progress during commissioning.
Many stream lining is done and connections between the different systems made more efficient, for instance with the RB quench analysis tool and QH reference data checks!
Homogeneity of data and/or communication between systems seems the largest challenge for hardware and software development. MP3 is very happy with the support from the software teams.

Possible improvements: Adding earth fault detection to discharge tool.

RBA RB quench analysis tool. **Very fast and colaborative development during HWC. Became a very important tool!**

Splice monitoring. Is running automatically. **May need to be better integrated into OP tools or better viewer may be needed.**

Session 3. Software tools *(Sandrine and Zinur)*

Other HWC systems
- EE tool **very powerful, threshold settings to be updated.**
- PIC supervision – **very reliable and stable and useful**

Database
- PM and reception tests in APEX – Manual flagging of quenches was done. **Very useful!**
- Training quenches – all data listed manually in excel files –**Needs follow-up.**

For all analysis tools:
One of the goals is to maximize **automation of the analysis tools** and make them as **homogeneous** as possible.

All analysis tools are specific **for HWC - > transfer towards operation**.
eDSL still needs more development.

Main feedback from software teams: **MP3 needs to better specify their needs.**

Session 4. Powering tests _(Félix and Jens)_

Communication

More direct communication may be needed, possibly with a **centralised information system and issues tracking** with for instance JIRA or ACCTEST. The blocking of the circuits by "failed and flagged" tests is nevertheless important. It may be useful to have **automated messages** to the equipment experts. Technical details of better tracking to be discussed.

Communication towards for instance QPS on details in the 8h30 meeting sometimes inefficient.

Documentation

- Well documented now, but a lot of documentation was done "on the fly"
- ECRs may well go through the department in the TE-TM before passing to LMC.

Session 4. Powering tests *(Félix and Jens)*

Organization
- Many things to be improved, for instance **QPS experts in the CCC.** QPS expert cannot contribute to MP3 during HWC, due to overload.
- Debugging of **QPS during powering tests**. For QPS team **schedule focus on circuit** type, mismatch **with schedule per sector.**
- In general it is important that **responsibilities are clear**. Specifically for warm magnet circuits this gave confusion.

PM/Analysis
- Many issues due to PM issues on timing precision, misalignments, toggling of boards, incoherence of signal naming with respect to database. Many of them could not be solved due to lack of time, but **need to be improved to enable automation**.
- Analysis handbook was written "**on the fly**", also QPS worked "on the fly". This makes good communication between the different teams more difficult.

No comments on **PIC** tests, since they were **well prepared, well automated** and the team was available.

Session 5. MP3 after HWC *(Mateusz and Bernhard)*

Future of Powering tests Analyses
- Automation is the future, but only with **good data quality** and **well defined criteria** and **implementation in the tools.**

Strongly desirable:
- Proper **storage of analysis data** with tools needed for **statistical and trend analysis**.

Protection relevant events need to be recognized automatically, like QH firing
- Understand origin of trips and map mutual coupling.
- **Authorize re-powering based on analysis** of QPS signals, QH, EE, diode leads, Grounding, etc.

Session 5. MP3 after HWC _(Mateusz and Bernhard)_

**Analysis of events during run 2**
Also during run 2 the **many different type of events can happen that are now unseen!!,** like U_DIFF dead, I_DCCT is missing, Spikes on I_DCCT, Noisy channels, board saturation, current lead board stalled, current lead regulation problem

No systematic check is done now during run 2: an **automatic process that scans logging data** may be useful, daily, fill by fill, online? **Result based database** is important to be able to follow evolution and **keep track of the results**.

QPS has already an online check whether the QPS signals are alive, which works very well as integrity check.

**Priorities**
- Need for **automatic analysis** for HWC including christmas breaks, event analysis during run period and continuous monitoring.
- **Priority for creating tools** to be determined by risk, machine availability, strain on human resources.

**Other topics**
- Updates and reviews of procedures needed.

General impression

OK overall, but room for improvement, like:

- Issues and **followup of tracking** could improve the HWC process.

- Now, directly after HWC, is a good moment for updating, cleaning up, etc. of procedures analyis manual etc. **Work seems not to be finished now!!**

- A shift of focus from tools for HWC to tools for operation is needed. Automation should be adapted were possible. **Currently many events can happen unnoticed!** Already available tools may be used for online checks, but needs a global effort.

- Result based database with stored analysed data is desirable.

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