206th Meeting of the Machine Protection Panel

LHC topics

April 23rd, 2021 via Zoom

Participants:
Chiara Bracco (SY-ABT), Andrea Calia (BE-OP), Eva Calvo Giraldo (SY-BI), Matteo Camillocci (BE-OP), Yann Dutheil (SY-ABT), Cédric Hernalsteens (TE-MPE), Michi Hostettler (BE-OP), Grzegorz Kruk (BE-CSS), Dragoslav Lazic (EP-UCM), Anton Lechner (SY-STI), Nicolas Magnin (SY-ABT), Filip Moortgat (EP-CMG), Brian Petersen (EP-ADT), Jan Uythoven (TE-MPE), Belen Salvachua (SY-BI), Brad Schofield (BE-ICS), Georges Trad (BE-OP), Jorg Wenninger (BE-OP), Christoph Wiesner (TE-MPE), Daniel Wollmann (TE-MPE).

The slides of all presentations can be found on the website of the Machine Protection Panel and on Indico (206th meeting).

Minutes from the 205th MPP meeting (LHC topics)

Daniel briefly reviewed the minutes of the 205th MPP on the re-commissioning of the vacuum system and recalled the actions. With no additional comments, the minutes are approved.

Re-commissioning of Injection Protection System and LDBS (Yann Dutheil)

Injection system

Yann first presented the re-commissioning plan for the injection system, based on the already existing procedure EDMS-889343 v4.0.

The notable changes were presented:

- The MKI2B magnet has been exchanged, which has no impact on the re-commissioning procedure.
- The TCDI collimators in TI2/TI8 have also been upgraded to the longer devices TCDIL. They protect the LHC from SPS extraction and transfer line failures. The test and validation procedure for these devices will remain the same.
- The TDI collimators have been replaced by 3 TDIS collimators each, which are shorter devices. They protect the LHC aperture from MKI failures. The test and validation procedure will remain the same.

- The variable AGK (change during the YETS 2016/2017) introduces some changes, see the details in the last section. The test and validation procedure remain the same, but the wording will be adapted.

The first re-commissioning phase will start in June 2021 with beam up to the downstream TEDs. The BLMs and injection flags will be tested. All SPS extraction tests will be performed.

For the beam tests of September 2021, all the steps from the EDMS procedure will be performed, except the tests related to the injection of SPS trains and those related to the injection of high-intensity bunches. The BETS of MSI/TDI will remain bypassed with the TDIs set at 10 sigmas.

The Run3 re-commissioning will take place in February 2022. All tests will be performed again, in particular because the BIS will have been reopened following the September 2021 beam tests.

LBDS

The procedure is EDMS-896392 v3.0, released in 2016.

The main changes are:

- Additional new capacitors have been installed for the MKB generators. It does not affect the system behavior nor the procedures.
- MKB retriggering has been implemented for the case of an erratic MKB triggering: A new direct link is connected to the TSUs to trigger a synchronous dump in case of an MKB erratic firing. Also, a new delayed pulse for redundant asynchronous triggering was added. The procedure needs to be updated accordingly. The overall behavior of these signals is tested before the re-commissioning. No major change to the recommissioning steps is expected.
- Some of the BLMs in the dump lines have been exchanged, mostly the device names. The testing of the direct BLMs will remain the same as for Run2, which was presented in the 164th MPP meeting.
- The variable AGK, which was introduced during the YETS 2016/2017, requires some update of the wording in the re-commissioning procedure. The commissioning steps remain the same. The test and validation procedure remain the same.

For the pilot beam test in autumn 2021, all tests defined in the procedure will be performed, except the following (the section numbers refer to the EDMS procedure):

- TCDQ asynchronous dump (7.3.3);
- MKD waveform scan with beam (7.5.1);
- Interlock BPMs (7.9.1);
- Abort gap monitor (7.9.8);
- Increasing intensity check (7.11);
- Abort gap cleaning (7.12);
- TDE dump block at increasing intensity (7.13).

Variable AGK

The variable abort gap keeper length was introduced in YETS 2016-2017 because the SPS and TCDIs were limiting the length of the injected trains to 144 bunches. Previously the AGK was fixed at 288 bunches.
The AGK commissioning is not modified. The wording of parts of the procedure needs to be adapted for variable length and choice of buckets. Action: release AGK commissioning document in EDMS and link to MPP tree (Y. Dutheil)

Conclusion

The existing documents for injection and extraction MPS commissioning procedures are being updated, with no major change.

For the beam tests in 2021, a reduced set of tests and validation will be performed.

Discussion

Daniel asked a question about the blindable BLMs and if they are part of the injection procedure. Chiara replied that the tests should be described in the injection protection commissioning procedure, however, they are performed together in collaboration with BI.

Action: Add commissioning of blindable BLMs to the injection procedure (Y. Dutheil).

Jorg commented on the MKI and how to pulse the MKI remotely before all the systems are ready. The MSI and TDI BETS will be bypassed (masked) and one needs to define how to commission these systems. It was clarified that the input of the BETS on the BIS will be masked.

Jorg commented on the injection system recommissioning for Run3 and asked why it is related to the BIS reopening. Yann replied that this is mentioned explicitly in the procedure. Jan added that as the injection and LBDS are critical systems, redoing all tests is definitely worth doing.

Summary of actions

The actions from the meeting are:

- Re-commissioning of Injection Protection System and LDBS:
    1. Release AGK commissioning document in EDMS and link to MPP tree (Y. Dutheil)
    2. Add commissioning of blindable BLMs to the injection procedure (Y. Dutheil)