

Minutes of the MPP meeting of January 16th, 2009

Present: J. Wenninger, S. Redaelli, R. Alemany, W. Venturini-Delsolaro, M. Gruwé, V. Kain, D. Macina, J. Strait, J. Uythoven, M. Lamont, R. Appleby, R. Assmann, B. Puccio, B. Todd, M. Zerlauth, L. Ponce, R. Schmidt.

Status of the LHC Software Interlock System (SIS) [J. Wenninger]

J. Wenninger presented the status of the LHC Software Interlock System (SIS). The basic architecture and the concept of permit tree - used to determine the logic of the beam permit calculations - were reviewed. Jörg commented that so far the SIS was completely independent from LSA but this will change in 2009, when a more complicated logic will be available for the monitoring of additional equipment. For the LHC operation in 2008 a new feature was added: it was possible to manipulate complex data structures (until 2007 it has only been possible to define basic operations on single property fields or to different fields of the same FESA property).

Amongst the required follow-ups in preparation for the 2009 operation, **J. Wenninger** mentioned the following aspects that were not satisfactorily addressed in 2008 (see also Jörg's slides):

- Optimization of the time required to enable the **Inj&Dump mode** with the sequencer in order to leave to the SIS enough time to react.
- Monitoring of the relative position of the **TCDQ/TCSG elements** in point 6.
- Survey of status and position of the **triplet alignment system**
- Specific checks during the **energy ramp**: check that the references are followed and verify that the correct settings are being used.

In addition, Jörg also mentioned the need of defining **protected beam parameters** in the LSA database to be used as references for the SIS.

There were various comments about the movement of the superconducting triplet. These magnets are equipped in all points with a complex remote positioning system. **S. Redaelli** is following-up the operational aspects of this system in collaboration with the colleagues from TS/SU. A draft of a functional specification document that addresses this topics has been circulated in December. It was agreed that the machine protection aspects will be reviewed in a dedicate presentation at this meeting.

Plans for machine protection commissioning [J. Wenninger]

J. Wenninger presented for comments a draft of the presentation that he will give at Chamoin2009 on status and plan for the commissioning of the LHC machine protection systems. The final presentation is by now available on the workshop web site:

<http://indico.cern.ch/conferenceDisplay.py?confId=45433>

In particular, Jörg reviewed the assumption of safe beam parameters and on the required safety factors to ensure a safe beam operation. In order to ensure the required flexibility during commissioning, Jörg has proposed a phased implementation of the save beam flag, with different "safe" limit in the different commissioning phases and for different beam energies (a detailed table is available in Jörg's slides).

Jörg's proposal triggered an animated discussion. **R. Assmann** disagrees with the definition of safe limit based only on local damage level of metals. We should also consider other aspects, for example the total number of magnets that can be quenched. He also reminded that the beam emittance should also be taken into account into the definition of safe beams.

There was a general agreement that during commissioning we should be as conservative as possible. The table proposed by Jörg seemed conservative enough because he proposed limits significantly below the assumed damage limits. Dangerous machine manipulations and tests done for the first time (first ramp, first squeeze, ...) should always be done with low-intensity pilot beams.

R. Assmann commented that we should never use intensities larger than what we strictly need. On the other hand, it is also clear that there will be cases when we will need to increase the intensity. For example, we need to have injected more beam to be left with a measurable beam at higher energies, in case of poor transmission during energy ramp (**J. Wenninger**). **S. Redaelli** commented that this conservative approach is also built into the beam commissioning procedures. **R. Alemany** agrees and stated that clearly, if Jörg's table will be accepted, we will have to review the overall commissioning procedures to make sure that all the relevant machine protection aspects are properly taken into account.

A.O.B's

- **J. Wenninger** reported that the LHC Machine Advisory Committee (MAC) of last December gave an overall very positive feedback about the progress of the LHC machine protection commissioning. No specific major problems were identified.
- **Status of machine protection specifications:** **J. Wenninger** commented that the MPS procedures of the various systems are being published and approved through the EDMS system. The systems for which only a preliminary version of the procedures exist are collimation, beam dump and vacuum. The other systems are in the process of being approved. It was asked whether there is a commissioning procedure for the RF system. This is not foreseen for the moment however **J. Uythoven** commented that there could be aspects that are relevant for MP and that have an effect on other system, such as the control of the frequency and the failure of critical elements (klystrons, ...). Jörg will follow this up.
- **Machine protection aspects for ions:** The definition of the safe beam flag and of the BLM thresholds for ions should be reviewed. **J. Wenninger** will follow-up the preparation of a dedicated MPP meeting on ion aspects after Chamonix. Concerning the settings of BLM thresholds, **S. Redaelli** commented that according to the various presentations at the collimation working group meeting and according to the RHIC experience, the operation baseline is that the ion thresholds should be the same as for protons.