

Machine Protection Working Group

Minutes of the 1st meeting held on March 9th 2001

Present: F. Bordry, J.C. Billy, E. Carlier, E. Cennini, P. Charrue, E. Ciapala, B. Dehning, R. Denz, E. Gschwendtner, J.B. Jeanneret, J.F. Juget, D. Lacarrere, G. Mugnai, B. Puccio, R. Schmidt, L. Serio, N. Siegel, F. Szoncso, J. Wenninger

Main topics of this meeting:

Mandate of the Working Group
Members of the Working Group
Topics for future meetings

The aim and the mandate of this new WG were presented by R.Schmidt. He emphasized the fact that many players, scattered over the divisions and groups, are involved in the work. While some teams work on systems for machine protection (beam dumping system, quench protection...), others provide interfaces to the machine protection (power converter, access system, ...). It was pointed out in the discussion that the boundaries between machine and personnel protection must be clearly defined as the LHC falls under the INB regulations. A classification must be defined together with the Access and Interlock WG. Environmental protection must also not be forgotten. It was recognized that we have to build up a culture/knowledge on safety and reliability. To organize some form of "training" was proposed.

The injection lines TI2 and TI8 will probably be included in the scope of the WG. Exchange of signals with the SPS is certainly required. Some of this work will clearly require interactions with the InjWG and with the future Mr/Mrs Interlock for the SPS (this is likely to be a member of the SL/OP group).

From the groups / teams that are concerned with machine protection, one representative will ensure communication with the MPWG. The meeting is open, and the minutes will be on the WEB: <http://lhc-mpwg.web.cern.ch/lhc-mpwg/>

R. Schmidt also presented a list of the topics to be treated in future meetings. The list is appended below.

F. Bordry stressed the fact that the SL/PO group is presently finalizing the specifications for the power converters. He will present some aspects of those specifications related to machine protection in the next meeting, since a fast feedback is required!

Future meetings are planned always at 10.00, for 30 March 2001, 20 April 2001, 11 May 2001, 1 June 2001, 22 June 2001

Preliminary agenda for the next meeting:

- Planning for the systems for Machine Protection (P.Bonnal, F.Bordry, E.Carlier, R.Denz)
- Interface between Power Converters and Power Interlock System (B.Puccio, F.Bordry, R.Schmidt)
- Glossary of Terms (R.Schmidt)

Appendix: Proposed list of topics.

Items that came up during the discussion have been added and are underlined.

General points:

- Glossary of terms (example: Machine Protection System, Beam Dump Systems, etc.)
- Overall Architecture of the Machine Protection System
- Failure scenarios:
 - tour around the systems - what failure in your system would you anticipate that could lead to POWER ABORT or BEAM ABORT?
 - failure of electrical circuits and impact on beam (continue O.Brünings work)
 - what happens in case of a power cut?
 - what happens in case the control system breaks down?
- Protection of LHC and experiments when **injecting beam** (take into account the work of the InjWG)
- Conditions for injecting beam (take into account condition for access - collaborate with Access and Interlock WG and InjWG)
- Interlocks in transfer lines
- Reliability of systems
- Safety standards - do we need to be educated?

Interfaces and Information exchange:

- Positive / Negative logic for signal names in the machine protection system
- Interfaces between Beam and Power Interlock and other systems (standard to be defined)
- How to track energy of beams for the beam dump system?
- How to track abort gap for the beam dump system?
- Fail safe transmission of signals

Open questions related to protection:

- How to protect machine against failure of warm magnets (short time constants)?
- UPS - for systems that are important for machine protection (see also TEWG)

- Critical software - where and how?

What should trigger a beam abort?

- Should the beam dump depend on operational states (such as beam current and energy) ?
- Dump both beams or only one?
- What power converters - for what operation state?
- Beam Loss Monitors - how to use them?
- RF and Feedback
- Emergency stops !

What is required for post mortem analysis?

- To be discussed in collaboration with the Controls Project

Others

- LHC Experiments - objects that move close to the beam
- Experience from the String II interlock system
- Evolution of the system :
 - reserve slots
 - tracing of modifications (INB !)