

Objectives of the Review on Machine Protection and Beam Interlocks

11 April – 13 April 2005

Safe operation of the LHC in presence of the energy stored in each beam of up to 360 MJ requires using several systems: collimators and beam absorbers, beam dumping systems, beam monitoring, beam interlocks etc. Machine protection will be important during all phases of operation: starting with the beam transfer from SPS to LHC, injection, ramp, squeeze and collisions.

Collimators and beam absorbers must be correctly adjusted, already during injection, when dumping the beam, but also when accelerating and during the store.

Failures are detected by beam loss monitors, by other beam instruments, by the quench protection system and other hardware related equipment. Beam dump requests are transmitted via the beam interlock system to the beam dumping system, and the beam is safely extracted into the beam dump block.

The overall strategy of the LHC machine protection is discussed. The functionality of the systems with respect to machine protection is presented.

Main emphasis of the review is on the interfaces between these systems during beam operation.

The review will discuss interlocking the LHC, in particular the signals that are exchanged between different systems in the LHC as well as between LHC, SPS and the transfer lines between the two accelerators.

Questions to the reviewers

- Do you consider the overall strategy for machine protection adequate, and what could be the main risks?
- Are there mechanisms for beam losses not being considered that could impact on the strategy?
- Are the interfaces between the different systems clearly defined?
- Are there other protection devices that should be considered?
- Are there other input channels for the Beam Interlock System that should be considered?
- Will the protection systems have the required safety?
- Will the protection systems allow for efficient operation (availability)?
- Based on experience elsewhere: what is most critical and where have been surprises?