MPP meeting 16 July 2010

Original agenda:

- Thresholds for BLMs with filters (B. Holzer)
- Analysis of orbit corrector magnets in the cycle (G. Kourkafas)
- AOB

Present:

Barbara Holzer, Bernd Dehning, Siegfried Wenig (ATLAS), Richard Jacobsson (LHCb), Mariusz Sapinski, Christoph Kurfuerst, Annika Nordt, Giulia Bellodi, Arjan Verweij, George Kourkafas, Rudiger Schmidt , Jorg Wenninger, Mike Koratzinos.

Minutes:

News (Jorg)

Following the internal review, there will be an external Machine Protection review, possibly 6-10 September.

Thresholds with BLMs with filters (Barbara)

Barbara gave an overview on thresholds for the BLMs that have been modified by a low-pass filter. A number of BLMs have been installed with filters (8 magnets per beam at injection). The filter has a time constant of 0.3msec, but the overall time constant of the circuit (due to cable lengths, etc.) is between 1.3 and 2.8msec.

New thresholds need to be installed for these monitors so that their response is the same as before installing the filter (obviously, the response of the monitor with and without filter depends on the time evolution of the losses and simply changing the threshold cannot make the response of the BLM the same for all types of losses). For 450GeV there is already a standard procedure, the discussion here is for higher energies. Barbara has made a simple model (for instance assuming very fast rise time for the loss) and has found that the correction for large running sums (RSs) is small (above RS6 the correction is 1) but for RS1 the threshold has to be changed by a factor of between 50 and 200 depending on the time evolution of the loss.

The proposal from the BLM team is to apply the minimum correction factor (response to a delta function) which is 0.02 for RS1 and 1 above RS6. A more refined calculation taking into account realistic rise times for the losses will be performed shortly.

It is intended that the new thresholds will be put in place by the end of the technical stop next week. As the thresholds of the modified monitors are at the moment, they are too high for short RSs (by a factor of 25 for RS1) so for short running sums and very fast losses, protection is compromised.

Beam dump on 7/7/2010 (Annika)

Annika presented some facts on the puzzling beam dump of 7/7/2010. In her analysis she also used, apart from the 0.082sec buffer available through the PM system, the BML team full buffer spanning 1.72sec (reason that these data do not go through the standard PM route is data volume).

There were five loss bumps before the eventual beam dump. The number of protons lost was 2E5.

There was a suggestion to have the long buffer available through the PM analysis tool (discuss with Markus).

Richard mentioned that the day of the dump there was a lot of uncaptured beam.

Analysis of orbit corrector magnets in the cycle (G. Kourkafas)

George presented his analysis on corrector magnets (corrector orbit dipoles CODs). The talk was in two parts:

First part: George looked at two corrector trips, one trip with beam loss and the other without. George is able to understand both events and gets reasonable fits to the data with a simple loss model. He also showed that all losses can be accounted for by integrating BLM losses. The factor used (from the BLM team) gives the correct losses to within 10%.

Second part: a look at CODs during a machine cycle. Injection: virtually no move. Ramp: there is a 'kink' at around 1.2TeV – this is known, but not fully understood. Squeeze: correctors follow the b* evolution –(there was some discussion as to the cause-effect sequence). Stable beams: difference in kick between different fills for most CODs is less than 6mrad. The worst difference was in CODs RCBV11.L1B1/ RCBV7.L1B1. These were looked at more closely and it appears that a closed bump had crept in in fill 1179, which later (from fill 1182) was taken out.

Jorg reminded us that currently the software interlock on COD kicks is as follows: when compared to a reference fill, if 2 CODs stick out by 25mrad or more, beams are dumped. An outcome of this analysis could be a tool to show if a bump creeps in from one fill to the next.

AOB

Bernd: in a recent fill, orbit appeared unchanged (due to data transmission problem) for 2 hours without being noticed, running effectively blind with respect to orbit changes (but protected). Now there is a software alarm if the orbit does not change in 10 minutes. This opened the discussion on alarms in general. The feeling of the meeting is that a better strategy is needed. Currently there are too many alarms and it is difficult for the operators to follow up everything. A state machine with important reminders coupled to a voice machine was discussed and Jorg will follow this up.