

Notes from LEReC Machine Protection interfaces and requirements Meeting

Date: Nov. 5, 2013

Attending: Kevin Brown, Mike Blaskiewicz, Joe Tuozzolo, Sergey Belomestnykh, Charlie Theisen, Roberto Than, Toby Miller, Alexei Fedotov, Ed Lessard, Brian Sheehy, Igor Pinayev, Jim Jamilkowski

Subject: LE RHIC eCooling Machine Protection interfaces and requirements

Agenda:

1. Short presentation on MP for eCooling by K. Brown
2. Discussion

Summary of meeting:

1. We touched upon Personnel Protection System (PPS) issues and there are slightly different requirements for the eCooling area (in 2 o'clock) from the normal RF cavity area (in 4 o'clock) PPS. Most significantly there will be an electron beam that can create radiation. The PPS will be reviewed by the Radiation Safety Committee, who will make recommendations. For cost estimate purposes we assume the PPS will be similar to the 4 o'clock systems with the addition of some area monitors. The PPS will provide an input to the Machine Protection System (MPS).
2. Beam shut off will be done using a shutter at the source. A redundant shutoff will be given to the RF system, which will also prevent any dark current electrons from going to higher energy.
3. The beam dump will need thermocouples that will provide an input to the MPS.
4. A primary goal of the MPS will be to protect damage to the beam pipes and to prevent beam from being directed into the RHIC triplet superconducting magnets. This means the bend magnets in the system will need to participate in the beam permits and must operate within a defined window of currents such that the high intensity electron beam cannot be deflected into the beam pipes nor into the RHIC magnets. [note: see comments below, on post meeting conversation between Bob Lambiase, Charlie Theisen, and Kevin Brown]
5. BPMs and the beam current DCCTs will have inputs to the MPS, to interlock the beam if it falls outside tolerance. The DCCTs will act as a beam loss monitor (the difference between the input and dump DCCT's must not exceed some threshold).
6. There will be BLMs for the electron beam that will participate in the MPS.

Action items:

1. Alexei will provide response time requirements
2. Each group needs to provide the number of inputs they will provide to the e-beam permit system
3. Need to discuss with PS group how to monitor PS states for MPS

For item 1, Alexei has provided a preliminary value of 50 – 100 microseconds to shut beam off. That is the value we assume for the cost estimates.

For item 3, Charlie Theisen and Kevin Brown spoke to Bob Lambiase and it was agreed a secondary current monitor for each bend magnet will be added to the PS cost estimate. These will be used to set window thresholds on the current for each magnet for the MPS. The controls cost estimate will include the interface to these secondary current monitors to the MPS.