

Radiation

Safety

Committee

Minutes of Radiation Safety Committee of August 24, 2000

Polarized Proton Commissioning and Proton/Ion Faults near Thompson Road

Attending: D. Phillips, J.W. Glenn, N. Williams, A. Stevens, A. Etkin, N. Tsoupas, T. Roser, W. Mackay, R. Karol, W. Van Asselt and D. Beavis

Motivation: The meeting was called to assess the possible fault levels near Thompson Road both for heavy ions and polarized protons. The discussion of requirements for polarized proton commissioning was to continue from the previous meeting (August 23, 2000).

The committee was informed that the hardware configuration of the RF system for operations this year makes it impossible to accidentally load an ion cycle with protons. In addition, the hardware (for this year) makes it impossible for the AGS to accelerate more than one polarized proton pulse per cycle. The committee agreed that for this year it was only credible to have polarized proton faults with one pulse per AGS cycle. The polarized proton fault scenarios 2 and 4 discussed in previous meetings are not possible for this year. Memo's documenting these limitations will be provided to the RSC Chair prior to polarized proton commissioning in AtR. **(CK-ATR-polarized protons-2000)**

A note from C.J. Gardner (attachment 1) was provided to the committee that details the maximum possible intensity for Au ions. The maximum possible intensity is estimated to be 9.0×10^9 Au ions per AGS cycle. The AGS has not achieved this extracted intensity but typically intensities are 2.0×10^9 Au ions per AGS cycle. These cycles are loaded into RHIC with a 5 second repetition rate.

The Possible Fault levels near Thompson Road (an uncontrolled area at present) are:

Au Operations

Au/cycle	mrem/cycle	mrem/hr	comment
2.0×10^9	0.077	93	5 second rep. Rate
9.0×10^9	0.483	583	Max. credible with 3.6 sec. Rep rate

Polarized Proton Operations (FY2000)

p/cycle	mrem/cycle	mrem/hr	comment
1.0×10^{11}	0.065	78	3 second rep. Rate
7.0×10^{11}	0.45	546	Max. credible with 3 sec. Rep rate

The levels are very comparable between the two modes of operation for this year. The committee has requested for maximum possible beam intensities for other ion species, which may be used in the future for RHIC. Ions other than gold are not allowed to be transferred into RHIC until they have been reviewed. **(ck-atr-Heavy ions-2001)**

The maximum credible fault under Thompson Road for future polarized proton operations is 14,000 mrem per hour, as discussed in previous meetings.

The present operations procedure for injecting RHIC relies heavily on the Thompson Road chipmunks to monitor and prevent losses under Thompson Road. These chipmunks are located at the upstream portion of the injection arcs. This is region where the beam optics suggests that large beam faults and scrapping can occur. Downstream it is expected to be much more difficult to produce large beam losses. The present chipmunks may have limited capability to monitor and terminate faults in the downstream portion of the arcs, which are located below uncontrolled areas. The committee therefore recommends:

- 1) Immediately modify the operations procedure to check the beam transmission through the arc during injection. This should prevent more than 15 Au cycles (60 bunches) and 4 polarized proton bunch to be lost under the controlled area. If a full beam fault can occur downstream of the chipmunks (which is not likely) then the maximum dose in a fault would be 1.2

mrem for 60 bunches of gold and 0.26 mrem for polarized protons (4 bunches loaded into RHIC). **(ck-RHIC)** This is expected to be completed by August 25.

- 2) Place additional chipmunks over the injection arcs to provide better coverage of potential scrapping losses. **(Ck-RHIC)** If necessary the additional chipmunks may be attached in series to the existing chipmunks, but this must have an engineering review. All chipmunks must have interlocking capability. If the scalar counts are in series (used for alarms) then it is preferred that the downstream chipmunks have the scalar counts. This is expected to be complete by August 30. For FY2001 any added chipmunks must have complete scalar readouts. **(ck-RHIC-20001)**
- 3) A fault study will be conducted in the arcs for both gold ions and polarized protons. **(CK-RHIC)** The polarized proton fault study can be done after experience in gained operating the injection arc with polarized protons.
- 4) As much area as possible along the arcs at a transverse distance of 20 feet should be converted to a controlled area. **(ck-RHIC)**

The RSC chair or his designee will monitor the progress on closing these items on a timely basis.

The committee procedure 9.11 has some requirements that are more restrictive than DOE and BNL requirements. The committee agreed that the procedure should be modified to allow for exceptions to these more restrictive requirements when it is deemed appropriate. The RSC chairman will have the procedure modified.

There are many conflicting issues and opinions regarding Thompson Road as an uncontrolled region. The committee agrees that if only radiological issues are considered then this area should be upgraded to at least a controlled area.

Attachments:

- 1) Note from C.J. Gardner, August 22, 2000.