

Thursday 19 January 1995

K. Reece

*RICR.*

Minutes of meeting: Radiation Safety Committee

Date: Thursday 12 January 1995

Present: L.Ahrens, H.Brown, I.H.Chiang, R.Connolly, A.Etkin, D.Lazarus, E.Lessard, S.Musolino, E.Njoku, K.Reece, J.Spinner, D.Trbojevic, R.Frankel, M.Harrison, W.MacKay, A.Soukas

Subject(s): Critical devices for RHIC and g-2.

Some discussion of RHIC reviews preceded the suggested agenda. It was noted that RHIC has an external review scheduled for mid-March 1995 and that the RSC has not completed all the internal reviews. Also stated, although many of these RHIC issues have been before the RSC for 18 months, the RSC has now closed-out 8 of 9 items; the remaining item being the review of the interlock logic. It was agreed that a standard AND/OR representation of the interlock logic will be generated by an RSC sub-committee (A.Etkin - chair) and submitted for review and approval. A memorandum from the RSC Chair to M. Harrison will note an expected date for this logic diagram as well as documentation that the other 8 issues have been completed.

Definition: [DOE 5480.25 Guidance, page 31, Part 1.F.4]

(4) *"Critical devices are specific accelerator or beam line components that are used to ensure that the accelerator beam is either inhibited or cannot be steered into areas where people are present. Common examples are steering magnets and beam stops or collimators. Other examples are systems which operate on the injector or ion source to inhibit the beam.*

(a) *Two critical devices should be used in an interlock system if a whole-body Very High Radiation Area, as defined in the DOE RadCon Manual, can be produced.*

(b) *The status of each critical device should be monitored to ensure that the devices are in the "safe" condition when personnel access is allowed. If only one device is used, two separate indication systems should be provided. If the "safe" condition is lost, the beam should be inhibited by operation of other critical devices upstream. Critical device command systems should be independent of the monitoring system.*

**Critical devices for RHIC** (W. MacKay)

The RHIC area for this review is from the W-line shield wall to the RHIC arcs.

1. Critical devices are UD3-6 (8 degree bend) and WD1-8 (20 degree bend). [For the second critical device WD1-8, only 15 degrees of the 20 degree bend is before the W-line shield wall.]
  - 1.1 Each device is powered from only one power supply.
  - 1.2 Polarities should be verified and LOTO.
2. Each "beam switch" will be independently verified to inhibit the beam and keep the area within classification.
3. Each PLC division (local controller) interlocks both critical devices.
4. Fault study locations have been defined (RSC meeting minutes 25 August 1994); details will be provided in each Fault Study Plan.
5. No access will be allowed to this area until fault studies have been completed and reviewed.
6. Estimates of fault levels at the W-line shield wall should be done prior to the fault studies.
7. May add UD1&2 (4 degree bend) as a third critical device if necessary.

**Critical devices for g-2** (H. Brown)

This area includes the upstream U-line, g-2 target station, V1 secondary beamline to the g-2 ring.

1. An upstream U-line beam plug (beamstop) is included as a possible critical device.
2. As with RHIC, all critical devices will be independently verified by beam fault studies, (locations to be defined).
3. Estimates of pulsed radiation levels should be provided prior to these fault studies.

Given the number of areas involved, an RSC sub-committee was formed to review the critical devices (E.Lessard - chair, H.Brown, R.Frankel, J.Spinner). Included in this review should be a logic diagram for these critical devices and access states for the areas. This sub-committee review should be presented to the full RSC by mid-March. Also at that time, an overview of the g-2 operation should be ready for consideration.

Attachments: RHIC critical device list.  
g-2 critical device/access matrix

cc: RSC file.

waldo 1/9/95

Critical Devices for Radiation Safety for 927 Tunnel and RHIC (up to shield wall at North end)

Area	Rad Class Beam on	Rad Class Beam off	Division I Device	Source I	Source I Location	Division II Device	Source II	Source II Location	Reach Back
W,X,Y-lines North of Shield Wall	I	IV	UD3→6 Dipoles	PSUARC8	A-House	WD1→8 Dipoles	PSWARC20	1000P	UD1→2 H10 Septum G10 kicker

Notes:

1. To operate protons to  $g - 2$  experiment, UC1 and UFOIL must be retracted. The flags UF1 and UF2 should probably be retracted during normal running for ALARA.
2. Magnet busses are connected in series through individual power supplies, each with an AC CB.

4/6/94

Minimum, most D/S Security Element Requirements for Access to Various Areas

g<sup>2</sup> Critical Device / Access Matrix

MODE AREA	AGSOFF Inject - Clearance	No Extractn G10 - H10 U12 - UBP	Prots to V	Prots to V,W	Prots to W	HI to W
U	OK	No	No	No	No	No
UW	OK	Maybe	No	No	No	No
V Tgt	OK (Hi Resid)	Maybe	No	No	No	No
VI Prim	OK	OK	No	No	No	No
Q9 House	OK	OK	$\overline{VID1} \cdot \overline{VID2}$	$\overline{VID1} \cdot \overline{VID2}$	$\overline{VD34}$	$\overline{VD34}$
VI Tunnel	OK	OK	[Q9]	[Q9]	[Q9]	[Q9]
DB Pit	OK	OK	$\frac{[Q9] + [VID56]}{[Pit]}$	$\frac{[Q9] + [VID56]}{[Pit]}$	[Q9]	[Q9]
u Ring	OK	OK	[Pit]	[Pit]	[Q9]	[Q9]
WXY	OK	OK	$\overline{80} \cdot \overline{200}$	No	No	No
RHIC	OK	OK	$\frac{[WXY] + [ARCX \cdot ARCY]}{[ARCX \cdot ARCY]}$	$\overline{ARCX} \cdot \overline{ARCY}$	$\overline{ARCX} \cdot \overline{ARCY}$	$\overline{ARCX} \cdot \overline{ARCY}$

OK = Free Access  
 No = NO ACCESS  
 [X] = Requirement for Area X in the Same Mode Column.

• = AND  
 + = OR

UBP = Hypothetical U Line Beam Plug