C-AD

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***R**adiation*

***S**afety* Minutes of Radiation Safety Committee of March 12, 2010

***C**ommittee*

Subject: LINAC Access Controls

Present: D. Beavis, R. Karol, C. Theisen, A. Etkin, J. Alessi, P. Bergh, D. Raparia, E. Lessard, M. Minty, P. Sullivan, P.K. Job, and J. Reich

LINAC Access Controls

The committee continued its review of the plans to upgrade the access controls for the Linac. The minutes of the previous meeting[1] have been distributed. The review followed the suggestions provided in a memo by D. Beavis[2].

The review of the general details of the future upgrade was completed and the final details will be reviewed by s sub-group and sent to the committee.

The committee started the review with considering the purpose and use of the various areas and gates inside the Linac tunnel.

BLIP Spur

The area inside the BLIP spur is a contamination area. In addition, one of the locations with the highest residual activity is near the BLIP wall at the end of the transport line. Only RCTs assigned to CA control work and access to this area. If RCTs related to BLIP activities need to access the area they conduct their activities through the CA RCTs. All entries to this area require an RWP and there are only a few personnel that enter the area.

The committee recommended:

The BLIP gate can be removed from the access control system when it is upgraded.

(Ck-Fy2012-Linac-699) BLIP gate will be locked via a padlock and sweep procedure. The keys to the lock will be limited and a smaller group can determine who is allowed keys, this is most likely be HP and a few people in Linac operations. Access will require

an RWP. The door will have a tamper wire or equivalent signifying that the area has not been entered enabling the sweep teams to know the spur has not been entered.

(Ck-Fy2012-Linac-700) The blip spur area will have a crash cord accessible and the location of the nearest beam-imminent alarm box will be carefully considered for personnel in the spur.

Tank 9 Gate

Presently the tank 9 gate is in the beam operational mode. All internal gates will crash the beam if their reset is lost. This is not desirable for the upgraded system. However, if a gate is used to define a sweep zone then this aspect must be handled properly.

Linac-HEBT Gate

The Linac-HEBT gate prevents access to the section of the tunnel where the ion beams are being transported from the tandem to the Booster. Dose levels are usually quite low and even in a worst case fault are below 50 rem/hr at a foot. It is expected that this transfer will end before the upgrade is complete. Administrative controls can be used to control access at this gate if necessary. The gate will no longer be needed unless it is used as an internal zone gate.

Stone

The rolling plug door, stone, define the perimeter of the HEBT area. The plug door must retain its redundant interlocks.

Fence Gate

The fence gate is next to the moving plug. This gate is needed for Restricted Access and Controlled Access. The interlocks should be designed for these functions of the gate. The gate should does define the perimeter of the Linac for beam operations.

HEBT-AGS Gate and NZ322 gate

The HEBT-AGS gate defines the perimeter of the Linac area for beam operations. The NZ322 gate defines the perimeter for the AGS for AGS operations. Neither gate is intended to be used for Controlled Access to the adjacent area. The area between these two gates should be allowed to be reset under either Restricted or Controlled Access.

The committee recommended:

> **(CK-LINAC-FY2010-701)** A sub-committee will review that the upgrade will be consistent with the discussion for the gates given above.

General Interlock Requirements and Comments

1. The Linac interlocks can define a series of sweep zones if desired. These zones can remain reset even if the Linac is opened on Restricted Access.
2. Each sweep zone will have an appropriate number of sequenced sweep stations.
3. The tunnel will have crash cords distributed.
4. Documentation will be reviewed that it complies with the requirements of the RadCon manual.
5. The timer to delay beam will be set to 60 seconds. The min. allowed is 30 seconds. The crash system will be designed so that personnel in the tunnel should be able to reach a crash actuator within 30 seconds with an initial 10 seconds allotted to recognize that the alarm has sounded.
6. The perimeter interlocks for beam operation will be redundant and as independent as possible.
7. The committee would prefer that the second chain of interlocks not monitor all the functions such as alarms, sequence search stations, crash function, etc. The second chain should focus on the portions of the system that is required to be redundant.
8. Redundant devices will remove the radiation hazard.
9. Existing devices to remove the radiation will be examined and determined whether they should be replaced. This evaluation should consider where the devices are in their expected lifetimes.
10. Most chipmunks are only required to be in one of the interlock chains, the primary chain. However, it may be necessary for pump hose chipmunks to be in both interlock chains. This needs to be examined in the design phase.
11. Controlled access will be allowed at the tank 1 gate and/or the plug gate. Key trees will be used and the option of remote Controlled Access considered. The cost per gate is approximately $10,000 for the first gate and a lesser amount for a second gate.
12. Reachback on detected failures of critical device will be provided.

(CK-LINAC-FY2010-702) A sub-committee will review that the system design meets the above requirements and features.

The integration of testing with the system design should be reviewed early in the sedign phase. Choices should be made in the design that decreases the impact of testing on resources and operations. **(CK-Linac-FY2010-703)**

Implementation Plans

No details plans were presented to the committee. The present planning is to install the replacement system in parallel to the existing system. The existing system will be used until the final system is ready for operations. The changeover is expected in the summer of FY2011. This summer will have some hardware and component installed so that

testing an installation can occur during the FY2010 shutdown and during operations in FY2011. As time allows during operations in FY2011 additional hardware may be installed. The Access Controls Group preferred this approach over a time-phased approached where aspects of the new system would be made operational in the summer of FY2010 and the rest in the summer of FY2011.

(CK-LINAC-FY2010-704) All new components must be covered, labeled, marked in a manner that they do not confuse any workers at the Linac.

(CK-LINAC-FY2010-705) The design layout needs to be reviewed prior to installation.

(CK-LINAC-FY2010-706) The wring requirements need to be clearly established before design begins. This includes clarifying what is required, what is "good practice", and what is desired.

(CK-LINAC-FY2010-707) A meeting with the fire engineer needs to be arranged to determine the egress requirements for the Linac and the AGS. This may impact the gates at the end of the Linac and the AGS-Booster interface.

(CK-LINAC-FY2010-708) The subcommittee should review the Resource Loaded Schedule (RLS) for design, purchasing, installation, and testing.

References

1. RSC Minutes of March 2, 2010, "LINAC Access Controls and NSRL Operator-less Access".
2. D. Beavis, "Linac Access Control System", Feb. 12, 2010.

CC: Present
RSC
RSC Minutes file
RSC NSRL file
RSC Linac file
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