

C-AD

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Radiation

Safety Minutes of Radiation Safety Committee of April 7, 2011

Committee

Subject: Review of Changes for the AGS ACS

Present: D. Beavis, R. Karol, E.T. Lessard, A. Etkin, C. Theisen, J. Sandberg, B. Van Kuik, J. Reich, P. Sampson, L. Snyderstrup, P. Ingrassia, K. Brown, L. Ahrens, and G. Mahler

The Access Control System (ACS) for the AGS with PLCs is now in the design phase. Many of the existing features will be incorporated into the new PLC system. The main focus of this meeting was to consider potential changes to the logic and features of the system, before the design is too advanced. A preliminary agenda¹ was distributed a few hours before the meeting and used to guide the discussion.

Sweep Gate

The committee recommends that a sweep gate be added to the access control system. (CK-AGS-FY2012-750)

The sweep gate would decrease the number of personnel required to conduct a sweep of the AGS ring. Five personnel are involved in the present ring sweep. One person is a gate watch and makes a list of all personnel that exit the south gate once the sweep process has started. Two teams of two personnel each sweep the ring in opposite directions making lists of any personnel encountered. The new sweep gate would require a gate watch and one sweep team of two people. They would reset the sweep gate and any opening of the gate would drop the sweep.

The sweep gate must have the following implementation unless modified by a subcommittee (CK-AGS-FY2012-751):

- The physical barrier must prevent personnel from climbing over.
- The door should have two sensors since it is in a high radiation area.
- The door logic can be in one of the interlock systems.
- The door should not lock since this would represent an issue with life safety.
- The door will drop the sweep if opened before the sweep is complete and transfers the sweep complete to the south gate when the south gate is reset.
- There will be a sweep gate on the inside and outside of the ring magnets.

- Indicators must be at the gate to warn personnel of the gate status.

Preliminary locations in the G section were discussed. The overhead-tunnel crane does not operate in the G section of the ring. This location reduces potential interferences between the crane and the sweep gate. This does require some doubling back of the sweep team. Other locations can be considered if they offer advantages.

Sweep Zones

The representatives from operations and maintenance had at one time expressed an interest in having the AGS ring partitioned into zones similar to the RHIC ring. Since that time they have come to the conclusion that most of the benefit would be derived from a sweep gate and much less benefit from having the ring divided into two or three zones. There may be mechanical issues related to the crane and loads moved by the crane. **The committee did not recommend placing such zones in the design due to the lack of interest from the operations and maintenance groups.**

Requirements and Logic for Adjacent Areas

The AGS has several areas with weak shielding or penetrations. These areas were discussed to determine if it was appropriate to change the methods implemented to provide protection.

Northwest corner of target area: This area is swept and locked prior to operation of the AGS with beam. This area has weaknesses associated with the junction of the target building shielding blocks and the beginning of the tunnel. In addition there is also the structure of the north wiring tunnel that adds to the weakness of the shielding for this area. Two chipmunks in the area of north wiring hatch and the north catwalk limit the radiation due to beam faults in the ring near this area. **It was recommended that this area continue to be protected in the same manner.**

TtB to AGS stub tunnel: This area is swept and locked before the AGS is injected with beam. The area was used for the direct injection of the AGS with ions from the Tandem. The stub tunnel has not been used for this purpose for about 15-20 years. **It was recommended that the area be protected in the same manner. However, it is further recommended that the effort to seal the penetration between the AGS and the stub tunnel be evaluated this summer to see if the area restriction can be removed. (CK-FY12-AGS-752)**

There are two adjacent stub tunnels between the AGS and the upstream U line: This area has been protected by dual interlocks on a resettable gate. This area is now part of the AGS interlocks. At present personnel are not allowed into the upstream U line unless the AGS is off. However, with low intensity operations and the placement of radiation detectors, personnel have been allowed in the

upstream U line to prepare the magnets for operations or conduct repairs. **The recommendations for this area were (CK-FY2012-AGS-753):**

- The gate will be a zone of the AGS system.
- The gate will have dual interlocks and have a reset.
- A check station will be placed at the front of the transport tunnel. The zero-degree tunnel has a permanent barrier.
- The gate will remain reset if not opened and will not depend on the restricted or controlled status of the AGS ring.
- The gate will remain locked if the AGS is in access prohibited.

AGS Fan Houses: The fan houses are locked and secured before beam operations. **It was recommended to leave them protected in this fashion.**

Fenced areas outside the AGS escape hatches: The areas outside the AGS escape hatches are fenced and the gate locked. If a person exits the AGS ring in an emergency they can use a key stored inside a box to open the gate from inside the fence. The area is checked as part of the AGS sweep procedure. Several options were discussed for improving this area. **It was recommended that a subcommittee more carefully consider the options and decide what solution to use. (CK-AGS-FY2012-754).**

AGS North and South Plug Doors. There are two plug doors for the AGS ring that are used when large equipment is necessary to be transported into the ring or out. These doors weigh many tons and are movable with a motor system. These plug doors are rarely used. The south plug door has the motor disconnect switch located inside the AGS ring near the plug door. The North plug door motor disconnect switch is located outside the ring. If the motor switch is RS LOTOed off on the inside of the ring the plug doors are considered inaccessible since all other entrances to the ring will meet this classification and it would require cranes to remove the shielding. **The committee recommends (CK-FY2010-755):**

- The North plug door disconnect switch be inside the AGS enclosure.
- The plug doors will be opened and closed via a procedure that requires the motor power to be RS LOTOed off when the plugs are closed.
- The procedure should allow the doors to be opened in either “Controlled or Restricted Access”.
- The closed position of the plug doors will be monitored with dual interlocks.

Miscellaneous Doors and Hatches

RF to AGS utility tunnels. There are two adjacent tunnels for routing utilities from the RF building to the inside of the AGS ring at the north end of the south wiring tunnel. The barriers at the junction of the tunnels and the south wiring tunnel are monitored by dual interlocks and padlocked. **It was recommended that (CK-FY2012-AGS-756):**

- The barriers be bolted shut to meet the standards for inaccessible. They will not be monitored by the new interlock systems.
- Opening of the barriers will follow the OPM on removing radiation shielding and barriers which requires RS LOTO.
- The outer barriers, which are outside of the tunnel shielding, will be bolted shut and removal will follow the OPM for removing radiation barriers. These can be protected by padlocks if the dose rates at the inner barriers are sufficiently low that the hazard is not considered a grave danger.
- The outer and inner barriers will require inspection at startup.

South Wiring Tunnel Hatch: There is a hatch and a vertical ladder that goes from the south wiring tunnel to the AGS ring. This hatch is presently monitored with dual interlocks and is also padlocked. The lock is checked as part of the sweep process of the south wiring tunnel. This hatch leads from a dual protected zone (the south wiring tunnel) to another dual protected zone (the AGS ring). **The committee recommends (CK-FY2010_AGS-757):**

- The hatch will be controlled by a lock and procedure.
- The hatch will not be monitored by the new interlock systems.
- The lock will continue to be checked by the south wiring tunnel sweep procedure.

North Wiring Tunnel Hatch: This hatch has a vertical ladder that leads to the AGS tunnel floor in the north wiring tunnel. This tunnel area has been blocked near the AGS ring with a wall constructed of concrete patio blocks. This area is now considered a confined space. **The committee recommends (CK-fy2012-AGS-758):**

- The hatch will be bolted shut to comply with the standards of inaccessible.
- Unbolting the hatch will only be done under the OPM for removing radiation barriers.

Other AGS Items

With the use of the PLC systems for the AGS interlocks the one-gate rule for the AGS will no longer be required. Additional details of the AGS interlocks will be discussed at a meeting in the next 1-2 weeks. This will include the Booster to AGS labyrinth and the AGS to Linac labyrinth.

Non-AGS Items

The committee was informed of three other pieces of business that has been handled by subcommittee.

An e-mail (by D. beavis) was generated to consider the radiation hazards of the operating the FPC to 46 kVp. The recommendation that the area was already suitable for this test was reviewed by R. Karol and P. Bergh and found acceptable.

The documents related to low energy running were reviewed along with TLD and soil sample data. It was recommended² that the 9 GeV injection of RHIC could be conducted without additional restrictions. This was reviewed by R. Karol and P. Bergh, whom in which had found it to be acceptable.

An evaluation of gravel removal from an area that was a former transformer area has been made. It was determined that the gravel can be removed and not replaced. The evaluation will be documented and reviewed.

References

- 1) Meeting agenda, D. Beavis, March 7, 2011
- 2) D. Beavis, http://www.c-ad.bnl.gov/esfd/RSC/Memos/RHIC_9gev_fy11.pdf

CC:

Present
RSC
RSC AGS File
RSC Minutes File
H. Huang