

Prepared by Haixin Huang

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Reviewed by: *Sara Beavers*

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**AGS RING RADIATION SECURITY CHECK-OFF LIST
For Polarized Proton Operation
C-A Run Plan FY2009 –January 2009**

Note: Extraction of proton (beams generated at Tandem) from the Booster into the AGS is not allowed until this check-off list is completed.

To prevent extraction of beam from the Booster the extraction septum (F6) and the bending magnets DH2 and DH3 in the BTA transfer line must remain off.

This is accomplished by locking and HOLD tagging the power supplies for the F6 septum and for DH2&3.

1a. _____ F6 septum

_____, _____ (tag #s)
_____, _____ (Date/time applied) _____ (Person)

and

1b. _____ DH2&3 HOLD tags

_____, _____ (tag #s)
_____, _____ (Date/time applied) _____ (Person)

OR

when either the Booster or AGS access control system has undergone re-certification, by locking and HOLD tagging of the Booster Extraction Key.

1c. ___ (ACG) Booster Access control system functional testing completed _____ (Date completed)

or

1d. ___ (ACG) AGS Access control system functional testing completed _____ (Date completed)

1e. ___ (LPA) Booster extraction key

Tag number:5041

January 8, 2009, 14:35(Date/time applied) Haixin Huang (Person)

2. The following chipmunks monitors must be in place and have undergone their regular "re-verification" and interlock check. IG will sign for the location and computer aspects and ACG will sign for the interlocks.

2a. ____ (ACG) NMO54&55 Crossing of Cockcroft Road over AGS ring
____ (BCIG)

2b. ____ (ACG) NMO 1&38 Trench EEA ramp
____ (BCIG)

2c. ____ (ACG) NMO56 B fan house
____ (BCIG)

2d. ____ (ACG) NMO57 C fan house
____ (BCIG)

2e. ____ (ACG) NMO46 D fan house
____ (BCIG)

2f. ____ (ACG) NMO47 E fan house
____ (BCIG)

2g. ____ (ACG) NMO48 South plug door
____ (BCIG)

2h. ____ (ACG) NMO22 North plug door
____ (BCIG)

2i. ____ (ACG) NMO49 NCA labyrinth
____ (BCIG)

2j. ____ (ACG) NMO77 NCA shield wall
____ (BCIG)

2k. ____ (ACG) NMO31 South wiring tunnel
____ (BCIG)

2l. ____ (ACG) NMO32 Target building north
____ (BCIG)

2m. ____ (ACG) NMO76 Northwest corner of the target building
____ (BCIG)

2n. ____ (ACG) NMO29 Switchyard head wall
____ (BCIG)

____ (RSCC) (for position)

2o. ____ (ACG) NMO30 Switchyard head wall #2
____ (BCIG)

____ (RSCC) (for position)

3. ____ (LEA) AGS ring penetrations and shielding visually inspected for physical integrity, i.e. without gaps, removal of shielding blocks, and other openings.

From the South gate that are counterclockwise: SEB beam line exit, South wiring tunnel, North wiring tunnel, North gate plug door, North gate man gate, FEB beam line exit, North conjunction area man gate, K7 escape hatch, Booster transfer line (BTA) entrance, Booster/AGS shield wall, Booster /AGS labyrinth gate, HEBT man gate, HEBT Injection line entrance, C14 escape hatch, old HITL penetration, South plug door, South man gate.

3a. ____ (LEA) Shielding inside the AGS ring near I-14, I-17 and I-19 back in place

3b. ____ (LEA) Shielding in the AGS ring near F-13 in place.

3c. ____ (LEA) Shielding in the aisle between the South plug and the AGS ring in place.

- 3d. ____ (LEA) Shielding in the aisle between the North plug and the AGS ring in place.
- 3e. ____ (LEA) Steel (buoy anchor) shielding in place in the North conjunction area.
- 3f. ____ (LEA) Shielding in the AGS ring towards the zero degree port of the U-line in place.
- 3g. ____ (LEA) Shielding in the AGS ring near B19 which covers beam pipe for the old west experimental area.

- 3.1. ____ (LES) Inspect for physical integrity: Target Building Shielding and North Conjunction Area Shield Wall
- 3.2 ____ (LES) Holes in AGS to switchyard 10 foot shielding checked and plugged and reviewed with the RSCC.
- 3.3 ____ (LES) Shielding in the vertical cracks on the side of AD2 installed and reviewed with the RSCC.
- 3.4 ____ (LES) Barrier in place between AD3 and AD4 to prevent access to AD2 area.
- 4. ____ (RCD) Posting on barrier inside switchyard --entry prohibited.
- 5. ____ (LPA) Fences on the berm of the external perimeter of AGS ring in place.

6. ____ (LPU) AGS extraction into the U line. One of the following must be signed

____ (LPU) RSC No FEB check-off list satisfied

OR

____ (LPU) RSC Check-off list allowing AGS extraction (ion beams) into the U line satisfied

7. ____ (LPE) AGS extraction into Switchyard prevented with RSC check-off list preventing AGS extraction into the switchyard completed.

***** See drawing D10-M-489-4 for Berm radiation boundaries *****

- 8. ____ (RCD) AGS Ring interior posted as Radiation Area except for :
 - 1. Region posted as Controlled Area to allow access to building 928 (the building housing the Siemens Motor Generator). This means that Cockroft Road (the road over the AGS ring berm), and the extension of that road to building 928 are posted as Controlled Areas.

Signs and postings in place – Radiation Area

- 9. ____ (RCD) At the AGS berm perimeter fences, including the North Conjunction Area and the fences between Bldg. 914 and Bldg. 919 and between the U-line and Bldg. 912.
- 10. ____ (RCD) Approaches to the South wiring tunnel from the Westinghouse area and from the MCR terminal room.

- 11.1 ____ (RCD) At the fence defining the radiation area at the South plug door.
- 11.2 ____ (RCD) At the area around the North Gate (or Bldg. 912).
- 11.3 ____ (RCD) The Ramp area from Bldg. 911 to Bldg. 912 (or Bldg. 912).

Signs and postings in place—High Radiation Area

- 12. ____ (RCD) At all the entrances of the AGS ring, i.e. at the South plug door and the South gate, at the North gate and North plug door, at the North conjunction area and at the entry hatch to the AGS ring from the South wiring tunnel.
- 13. ____ (RCD) Fences around the C14 and K7 escape hatches.

Sign and postings in place- High Radiation Area with beam on

- 14. ____ (RCD) Fan houses A, B, C, D and E
- 15. ____ (RCD) NW corner of exterior wall of target building
- 16. ____ (RCD) At the entrances of the South wiring tunnel, i.e. from the MCR terminal room, from the Westinghouse area and from the Target building
- 17. ____ (RCD) At the gates of the dual wiring trenches to the South wiring tunnel
- 18. ____ (RCD) At the fence at the tunnel from HITL to the AGS ring.
- 19. ____ (RCD) At the fence in the FEB tunnel, which locks the area of the spurs towards the AGS.
- 20. ____ (RCD) On the entry hatch of the North wiring tunnel.
- 21. ____ (MCR) V primary blockhouse sweep procedure has been updated (TPL 09-01).
- 23. ____ (RSCC) Active temporary changes or bypasses for AGS have been reviewed. **(RSC item CK-FY2009-AGS-561).**
- 24. ____ (ACG) SEB access controls removed or bypassed from the AGS interlocks.
- 25. ____ (RCD) posting at switchyard gates as no entry call MCR and as a high radiation area with beam on.
- 26. ____ (RSCC) Switchyard ready for beam in AGS
- 27. ____ (LPA) Once stable injection and circulation is achieved then the injection energy fault study of the switchyard headwall should be conducted.
- 28. ____ (LPA) Once stable acceleration and achieved the "full" energy fault study of the switchyard headwall should be conducted.

Given that the above list is complete:

- 29. ____ (LPA) Beam may be injected and accelerated in the AGS.

30. _____ (OC) Verified that the above list is complete.

List of chipmunks relevant to AGS with their alarm and interlock levels.

Location	NMO number	Interlock level	Alarm level
Trench EEA ramp	1	50	10
AGS North Gate	22	20	16
South wiring tunnel	31	20	16
Target bldg North catwalk	32	20	10
D fan house	46	50	20
E fan house	47	0	40
South plug door	48	2.5	2
N. conjunction labyrinth gate	49	2.5	2
AGS ring road west	54	2.5	2
AGS ring road east	55	2.5	2
B fan house	56	50	20
C fan house	57	50	40
N' west corner of the target bldg.	76	2.5	1.6
NCA shield wall	77	20	5
Switchyard Headwall	29	50	10
Switchyard headwall #2	30	50	10

List of Titles

- OC Operation Coordinator on Shift
- MCR Main Control Room (P.F. Ingrassia or designee)
- RSCC Radiation Safety Committee Chair (D. Beavis or designee)
- RCD Radiation Control Division (P. Bergh or designee)
- ACG Access Control Group (J. Reich or designee)
- LEA Liaison Engineer for AGS ring (J. Tuozzolo or designee)
- LPA Liaison Physicist for AGS ring (H. Huang or designee)
- LPE Liaison Physicist for Exp. areas (K. Brown or designee)
- LPU Liaison Physicist for U-Line (K. Brown or designee)
- LES Liaison Engineer for target building shielding (A. Pendzick)
- LEU Liaison Engineer for U-Line (D. Phillips, C. Pearson)
- BCIG Beam Components and Instrumentation Group (R. Atkins or designee)