Prepared by Haixin Huang
Date: January 14, 2013
Reviewed by: Dana Beavis
Date: 1/17/13
Approved by: Dean Roser
Date: 1/17/13

AGS RING RADIATION SECURITY CHECK-OFF LIST
For Polarized Proton and Ion Operation
C-A Run Plan FY2013 –January 2013

Note: Extraction of protons 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:
(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
_____(ACIG)
2b._____(ACG) NMO56 B fan house
_____(ACIG)
2c._____(ACG) NMO57 C fan house
_____(ACIG)
2d._____(ACG) NMO46 D fan house
_____(ACIG)
2e._____(ACG) NMO48 South plug door
_____(ACIG)
2f._____(ACG) NMO22 North plug door
_____(ACIG)
2g._____(ACG) NMO31 South wiring tunnel
_____(ACIG)
2h._____(ACG) NMO32 Target building north
_____(ACIG)
2i._____(ACG) NMO76 Northwest corner of the target building
_____(ACIG)
2j._____(ACG) NMO29 Switchyard head wall
_____(ACIG)
2k._____(ACG) NMO30 Switchyard head wall #2
_____(ACIG)
2l._____(ACG) NMO49 North conjunction labyrinth gate
_____(ACIG)
2m._____(ACG) NMO77 North conjunction area shielding wall
_____(ACIG)

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-l9 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 has been changed to the following: both sets of additional blocks have been removed.
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.

3.3 _____ (LES) Shielding in the vertical cracks on the side of AD2 checked.

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) The RSC check-off list for no beam to FEB is complete.

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

7_____ (RCD) AGS Ring interior posted as Radiation Area except for :
Region posted as Controlled Area to allow access to building 928 (the building housing the Siemans 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.

8_____(RCD) Ramp area from Bldg. 911 to Bldg. 912 posted as RMA-Controlled Area.

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. _____(RCD) At the fence defining the radiation area at the South plug door.

12. ____(RCD) At the area around the North Gate (or Bldg. 912).

13. _____(RCD) Gates that provide access to the SEB switchyard.

Signs and postings in place—High Radiation Area

14. _____(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.

15. _____(RCD) Fences around the C14 and K7 escape hatches.

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

16. ____(RCD) Fan houses A, B, C, D and E

17. _____(RCD) NW corner of exterior wall of target building

18. _____(RCD) At the fence at the tunnel from HITL to the AGS ring.

19. _____(RCD) On the entry hatch of the North wiring tunnel.

20._____(LEA) RF tunnel cover plates posted as radiation barrier contact Liaison Engineer and interior barrier in place.

21. _____(ACG) Active temporary changes or bypasses for AGS have been reviewed with RSCC.

22._____(CME) Limits for proton beam onto the J10 dump/scrapper given to MCR($2.5*10^{11}$ protons per bunch and 2 bunches as maximum; $2*10^{9}$ gold per bunch and 4 bunches as maximum) .

23._____(LPA) The berm and all AGS shielding are ready for beam operations.

24_____(ACP) The crash bars at the escape hatch fences have been reviewed and approved for radiation safety and life safety.

25._____(ACP) State Tables approved and under configuration control.

26._____(CME) Wiring prints approved and under configuration control.

27._____(ACG) PLC software documented and under configuration control.

28._____(LPA) Sweep gate configuration approved as appropriate barrier.

29._____(RSCC) Reviewed RSC minutes related to new access system with ACG.

30._____(RSCC) New access control system ready for use with beam.

Given that the above list is complete:

31 ~~26~~. _____(LPA) Beam may be injected and accelerated in the AGS.

32 ~~27~~. _____ (OC) Verified that the above list is complete.

See next page for Chipmunk lists

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

Location	NMO number	Interlock level	Alarm level
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	N/A	40
South plug door	48	2.5	1
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	40
Switchyard headwall #2	30	50	40

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)
LPU	Liaison Physicist for U-Line (V. Schoefer or designee)
LES	Liaison Engineer for target building shielding (A. Pendzick)
ACIG	Beam Components and Instrumentation Group (T. Curcio or designee)
CME	Chief mechanical Engineer (Joe Tuozzolo or designee)
ACP	Access Control Physicist (A. Etkin)