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Date: 1/4/12

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Date: 1/5/12

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Date: 1/5/12

RHIC RS Check-off List for Proton operation (100 GeV pp) - FY12

- **Beam in RHIC and the X-,Y-lines is inhibited unless all items on the following list are checked off.**
- **Beam can only be dumped in the RHIC dump areas unless special approved conditions apply.**

PREREQUISITES

1. _____ (SGH) PASS functional test for RHIC Operation complete.

X-, Y-LINE REQUIREMENTS

2. _____ Prevent Beam Transport through X and Y -line

   2.1 _____ (RLP) SWM (psswm) W-line switching magnet p.s. LOTO.
   lock# _____ tag# _____ date _____ person _____

   2.2 _____ (RLP) X arc (psxarc90) p.s. LOTO .
   lock# _____ tag# _____ date _____ person _____

   2.3 _____ (RLP) Y arc (psyarc90) p.s. LOTO .
   lock# _____ tag# _____ date _____ person _____

OR

3. _____ (RLP) Equivalent lockout of upstream elements. (List attached.)

X-AND Y-LINE ITEMS

4. _____ (LEW) Check of X- and Y-line shielding berm.

5. _____ (LEW) X- and Y-line ventilation shafts secured.

6. _____ (LEW) Survey shafts above X- and Y-line secured.

7. _____ (RCD) Area north of Thompson Road posted as "controlled area" and roped off.

WORDING FOR SIGNS

Sign-A	Tunnel Gates: Caution, Radioactive Materials Area, Controlled Area, Entry Requirements: TLD, Exit Requirements: Activation Check
Sign-B	Area Buildings: Caution, Controlled Area
Sign-C	Fence Posting: Caution, Controlled Area, Entry Requirements Posted at Gate
Sign-D	Fence Gates: Contact MCR for Entry x4662
Sign-E	Access Road at Ring Road: Controlled Area Ahead where Training Required for Access
Sign-F	Shielding: Caution, No Climbing, No Ladders
Sign-G	Roof Ladder Access: Controlled Area, TLD required. Contact Building Manager for Access
Sign-H	Radiation Barriers (Patio Blocks): Caution, Facility Boundary, Contact Liaison Engineer Before Removal"
Sign-I	Controlled Area, TLD required with Beam on. Contact MCR x4662 for Beam Status.
Sign-J	Caution: No overhead work with beam on. Contact MCR x4662 for beam status.

FENCE AND BUILDING POSTINGS

8. _____ (RCD) Barriers around Survey Shafts on collider berm outside fenced areas and 2 above X and Y lines posted as Sign-H

9. _____ (RCD) Fence gates at 2 o'clock IR posted with Sign-D.

10. _____ (RCD) Ladder cover on 2 o'clock support building posted as Sign-G.

11. _____ (RCD) Verify special posting exists on blocks at 2 o'clock IR which reads Sign-F. Area outside roped off (removed 1002C) and posted F.

12. _____ (RCD) Fences at 4 o'clock IR posted with Sign-C. Gates posted with Sign-D. (Signs have to be permanently up.)

13. _____ (RCD) Ladder cover on 4 o'clock support building posted with Sign-G.

14. _____ (RCD) Verify fence is in place on berm above 5 o'clock (yellow) injection area with posting Sign-D.

15. _____ (RCD) Verify fence is in place on berm above 6 o'clock (blue) injection area with posting Sign-D.

16. _____ (RCD) Fence gates at 6 o'clock IR posted with Sign-D.

17. _____ (RCD) Patio block barrier exists around both VJR pipe penetrations at 6 o'clock and are posted with Sign-H.

18. _____ (RCD) Ladder covers at 6 o'clock are posted with Sign-G. NOTE: One ladder goes from WAH roof to assembly bldg. Roof.

19. _____ (RCD) Thin shielding areas above both entry gates from the high-bay area into STAR IR posted with Sign-J.

20. _____ (RCD) Fence gate outside 7GE1 gate posted with Sign-I.

21. _____ (RCD) Patio block barrier exists around both VJR pipe penetrations at 8 o'clock with posting Sign-H.

22. _____ (RCD) South side fence gates at 8 o'clock IR posted with Sign-D.

23. _____ (RCD) Perimeter fence gates at 8 o'clock IR posted with Sign-D.

24. _____ (RCD) Ladder cover on 8 o'clock support building posted with Sign-G.

25. _____ (RCD) Fence gates at 9 o'clock beam dump posted with Sign-D.

26. _____ (RCD) Fence gates at 10 o'clock beam dump posted with Sign-D.

27. _____ (RCD) Fence gates at 10 o'clock VJR pipe penetrations posted with Sign-D.

28. _____ (RCD) Patio block barrier exists around both 10 o'clock VJR pipe penetrations and is posted with Sign-H.

29. _____ (RCD) Ladder cover on 10 o'clock support building posted with Sign-G.

30. _____ (RCD) Electronic house on the berm (over stochastic cooling penetrations) posted with Sign-I.

31. _____ (RCD) Fence gates at 12 o'clock IR posted with Sign-D.

32. _____ (RCD) Ladder cover on 1012 support building posted with Sign-G.

33. _____ (RCD) "Interior" fence exists around both VJR pipe penetrations at 12 o'clock, posted with Sign-D.

34. _____ (RCD) Patio block barrier exists around both VJR pipe penetrations at 12 o'clock and are posted with Sign-H.

35. _____ (RCD) 5 ft. collider perimeter fence posted as Controlled Area with signs 40 ft. apart.

36. _____ (RCD) Signs on boundaries between C-A collider berm fence and BNL Security fence designating entrances into Controlled Areas.

37. _____ (RCD) Openings in 5 ft. collider berm perimeter fence draped with chains.

38. _____ (RCD) Posting Rennaissance Road prior to entering RHIC berm as CONTROLLED AREA.

ENTRY GATES AND POSTINGS

39. _____ (LE) All RHIC gates verified as complete barriers.

40. _____ (RCD) All RHIC tunnel access gates except 2GE1, 10GE and 12GE1 posted with Sign-A.

SHIELDING

41. _____ (LE) Shielding blocks in place at 2 o'clock IR.

42. _____ (LE) Two 4 ft. high cable way labyrinths exist at 2 o'clock.

43. _____ (LE) 4 o'clock shielding in place and complete.

44. _____ (LE) 4 o'clock shield wall has no vertical cracks which exceed 3/8". (Exception permitted by RSC Chair or designee.)

45. _____ (LE) Shield blocks in place at 6 o'clock IR. Front wall has no vertical cracks which exceed 3/8" or horizontal cracks which exceed 1/4". (Exception permitted by RSC chair or designee.)

46. _____ (LE) Permanent shield wall at 8 o'clock IR has no vertical cracks which exceed 3/8". (Exception permitted by RSC chair or designee.)

47. _____ (LE) Movable shield wall at 8 o'clock IR has no horizontal cracks which exceed 1/4". (Exception permitted by RSC chair or designee.)

48. _____ (LE) Cracks between movable door and walls in PHENIX when movable door is closed do not exceed 1.5" in direction parallel to beam and 3/4" in direction perpendicular to beam. (Exception permitted by RSC chair or designee.)

49. _____ (LE) Shield blocks at 8 o'clock cover both magnet access ports. Nominal length 4 ft.; overlap with walls marked.

50. _____ (LE) Shielding between blue collimator and entrance to 8GE2 labyrinth in place.

51. _____ (LE) Holes in PHENIX muon steel barriered.

52. _____ (LE) Shield blocks at 10 o'clock in place at magnet access port. Nominal 5 ft. thickness.

53. _____ (LE) Shield blocks in place at 12 o'clock IR.

54. _____ (LE) Shield blocks cover both magnet access ports at 12 o'clock. Nominal length 12 ft.

MISCELLANEOUS RADIATION MONITORING

55. _____ (RLP) Chipmunks required for RHIC in place. RHIC chipmunks are alarming only (See attached list).

56. _____ (SGH) NMON250 (RF chipmunk in tunnel) is in no-alarm and non-interlocking mode while RHIC is operated with beam. It is in a mode to interlock RF critical devices when zone 4Z2 is accessible and RF enabled.

57. _____ (IG) Verify that chipmunks have been successfully tested in place.

58. _____ (SGH) PASS/ACS temporary change and bypass logbook has been reviewed with RSCC.

59. _____ (EC) All removable soil samples are in place.

60. _____ (RSCC or CME) Beam dumps are satisfactory for initial startup. Review is in progress to fully evaluate the impact of stochastic cooling.

61. _____ (MCRGL) Procedure in place to instruct MCR operators on what actions to take in the event of a chipmunk failure.

READINESS FOR BEAM

62. _____ (RLP or LEW) Large movable shield door at PHENIX is closed and LOTOed. lock# _____ tag# _____ date _____ person _____

63. _____ (RASC) RHIC abort system ready for beam (protons at 100 GeV).

64. _____ (RLP) RHIC BLAM system configuration adjusted for proton beam operation at 100 GeV. Beam current measuring devices are setup to measure proton beams.

BERM AND OTHER EXTERNAL AREAS

65. _____ (CAS) Area between fences on 2 o'clock berm has been swept and locked including separate fenced "AREA 1" between shield wall and back of building 1002B.

66. _____ (CAS) Area between fences on 4 o'clock berm swept and locked.

67. _____ (CAS) Area between fences on 6 o'clock berm and roof swept and locked.

68. _____ (CAS) Area between fences on berm at 8 o'clock including both sides (above sector 7 and sector 8 scraper locations) and roof is swept and locked.

69. _____ (CAS) "AREA 1" on 10 o'clock berm (above sector 9 dump) swept and fence locked.

70. _____ (CAS) "AREA 2 & 3" at 10 o'clock swept and locked.

71. _____ (CAS) "AREA 4" on 10 o'clock berm (above sector 10 dump) swept and fence locked.

72. _____ (CAS) Area between fence at 12 o'clock swept and locked.

73. _____ (CAS) "Interior" fences at 12 o'clock swept and locked.

74. _____ (CAS) Controlled building roofs at 2 o'clock verified not occupied, and access ladders secured and locked (1002A, C-A-OPM-ATT 4.100a(Y)).

75. _____ (CAS) Controlled building roofs at 4 o'clock verified not occupied, and access ladders secured and locked (1004A, C-A-OPM-ATT 4.100a(Y)).

76. _____ (CAS) Controlled building roofs at 6 o'clock verified not occupied, and access ladders secured and locked (1006A & WAH, C-A-OPM-ATT 4.100a(Y)).

77. _____ (CAS) Controlled building roofs at 8 o'clock verified not occupied, and access ladders secured and locked (1008A, C-A-OPM-ATT 4.100a(Y)).

78. _____ (CAS) Controlled building roofs at 10 o'clock verified not occupied, and access ladders secured and locked (1010A, C-A-OPM-ATT 4.100a(Y)).

79. _____ (CAS) Controlled building roofs at 12 o'clock verified not occupied, and access ladders secured and locked (1012A, C-A-OPM-ATT 4.100a(Y)).

FINAL READINESS FOR PP BEAM

80. _____ (RLP) Collider ready for pp Beam.

81. _____ (OC) Checklist complete.

When the Check-Off List is complete, the RS LOTO of items 2 and 3 may be removed.

TABLE 1. KEY

CAS	Collider Accelerator Support
CME	Collider Mechanical Engineer, Joe Tuozzolo
CSGL	Control Software Group Leader, John Morris
EC	Environmental Compliance Rep., M. van Essendelf or designee
IG	Instrumentation Group: T. Curcio or designee
LE	Liaison Engineer, Gary McIntyre, Al Pendzick or designee
LEW	PHENIX liaison engineer: D. Phillips
RLP	RHIC Liaison Physicist: A. Drees
MCRGL	MCR group leader, Peter Ingrassia
OC	MCR Operations Coordinator
RASC	RHIC Abort System Commissioner: C. Montag
RCD	Radiological Control Division
RSCC	Radiation Safety Committee chairman: D. Beavis
SGH	Head of Security Group: J. Reich

TABLE 2. **Chipmunks required for pp Beams in RHIC.**

Name	Location	Alarm Level	Interlock
NMON264	At gate 2GE2 (1002-A)	2.5	-
NMON265	Outside 1002 (former location of fast electronics hut)	2.5	-
NMON250	At 4GI1 near rf gate for x-rays (in tunnel), no beam only	-	-
NMON251	At gate 4GE3 (1005-S labyrinth)	2.5	-
NMON252	At gate 4GE2 (1004-A labyrinth)	2.5	-
NMON232	Inside corner of 1006-B over Y-line	2.5	-
NMON233	At 5GE1 in injection house 1005-E	2.5	-
NMON234	At 6GE3 in injection house 1007-W	2.5	-
NMON235	At STAR shield wall	2.5	-
NMON236	6ED1 labyrinth, behind STAR control room	2.5	-
NMON312	8GE2 labyrinth by collimator	2.5	-
NMON313	By PHENIX shield door	2.5	-
NMON314	PHENIX counting house	2.5	-
NMON298	At gate 10GE1 (1010-A)	2.5	-
NMON280	At gate 12GE1 (1012-A)	2.5	-
NMON401	Railroad Ave	1	-
NMON216	Thompson Road @ Y	1	2.5
NMON217	Thompson Road @ X	1	2.5
NMON237	Thompson Road @ Y2	1	2.5
NMON238	Thompson Road @ X2	1	2.5