

MCR Operator Training

Procedure for Sweeping
Primary Beam Enclosures

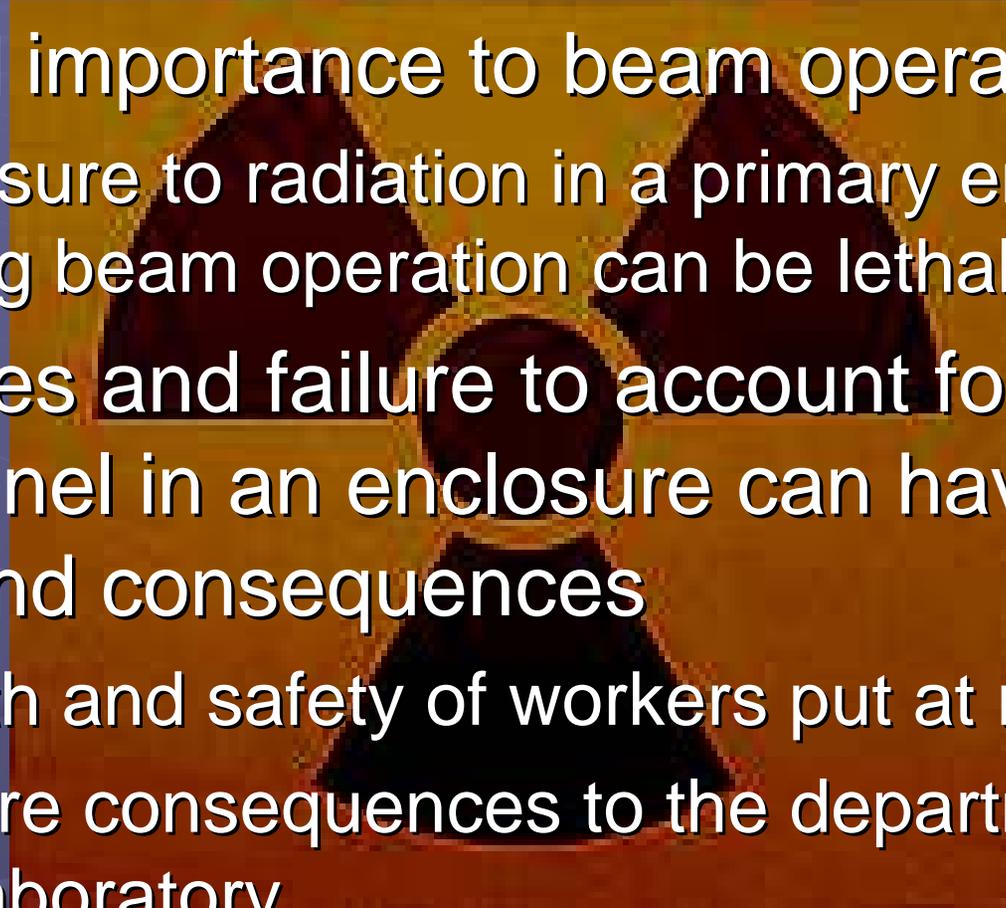
OPM 4.56

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Sweeping of Primary Enclosures

- Critical importance to beam operations
 - Exposure to radiation in a primary enclosure during beam operation can be lethal
- Mistakes and failure to account for all personnel in an enclosure can have profound consequences
 - Health and safety of workers put at risk
 - Severe consequences to the department and the laboratory



Sweeping of Primary Enclosures

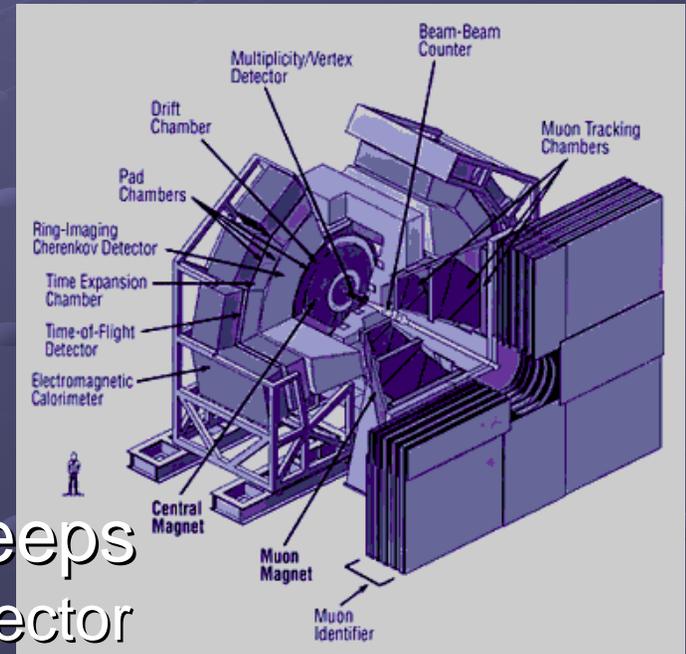
- Operators must account for all personnel and ensure that all personnel have exited an enclosure before starting beam operations
- Operations Coordinator decides when a sweep is to be performed or reperformed
 - Also responsible for assigning members to sweep team



The Sweep Team



- Team Leader
 - Responsible for completion of sweep
- May consist of one or more operators
- Several two- or three-person teams of sweepers may be required for some sweeps
 - Example: PHENIX detector
- For certain sweeps, sweepers may also consist of experimenters to serve as ***static watch***



Sweep Team Leader

● Team Leader

- Assures that beam enclosure clear of personnel when area is reset
- Ensures that area not reset until all personnel have exited
- Responsible for all prerequisites on checklist
 - Keys
 - Flashlights, etc.
- Enters appropriate information on checklist
- Files checklist in appropriate binder
- Authorized to abort sweep if sweep cannot be properly executed
 - Example: Shield blocks not in place



Sweep Prerequisites

- LOTO must be applied to AGS and Booster rings before sweeping
- Enclosure must be nearly free of personnel before sweep begins
- Sweepers must have appropriate training
 - PASS
 - C-A Access Training
 - Annual review of job specific Radiation Work Permit and attached work instructions
- Team leader must assemble appropriate keys and checklists for given enclosure
 - Sweep keys
 - Reset/Enable Keys



Sweep Checklist

RHIC Zone 12z1 Sweep Checklist

Team Leader (TL) _____ Sweeper#2 (S2) _____

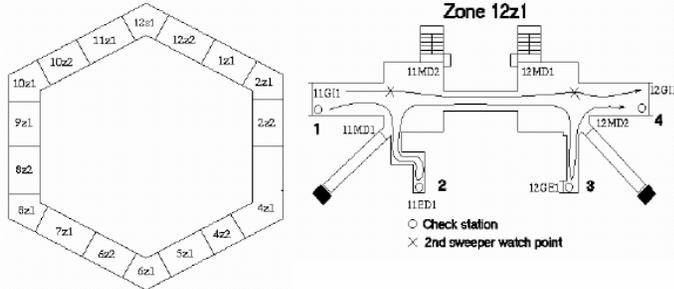
Time: _____ Date: _____

Warning:

IF any workers are encountered during the sweep, THEN contact the OC to see if the sweep should be aborted. Workers shall leave the enclosure WITH the sweep team. IF the workers crash out of the enclosure AND do not exit with the sweep team, THEN the sweep shall be re-started.

Prerequisites

- Two persons to perform the sweep,
- At least one sweeper not restricted from working at heights over five feet.
- RHIC Zone 12z1 Sweep Checklist (two pages)
- Zones 11z1 and 12z2 should be swept first.
- Required Tools: at least ONE FLASHLIGHT.
- Walkie-talkies
- All Doors closed THEN 12z1 set to Controlled Access
- Approved padlocks (4) for Monitored Doors (may be in place)
- Keys: TWO Sweep Reset keys S/R015 (one each sweeper), Controlled Access key CA014 (Team leader), two padlock keys.



Note:

References to positions in the tunnel are made using the RHIC magnets. The identity of the local magnet can be determined by looking up at the "lower" cable tray and reading the magnet name on a blue (B) or yellow (Y) label. For example, the convention used is: I05Q17 (Inside, Q17) or O-05Q17 (Outside, Q17).
References are for inside locations and are visible only by the Team Leader

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Check

1. Sweep team enters 12z1 after TL requests simultaneous release from MCR (12GE1 is the recommended entry door).
2. TL opens 12GE1 gate by turning the CA014 key clockwise, in the Controlled Access key-switch while Operator in MCR presses simultaneous release for 12GE1.
3. Sweeper 2 passes under the RHIC rings to the outside.

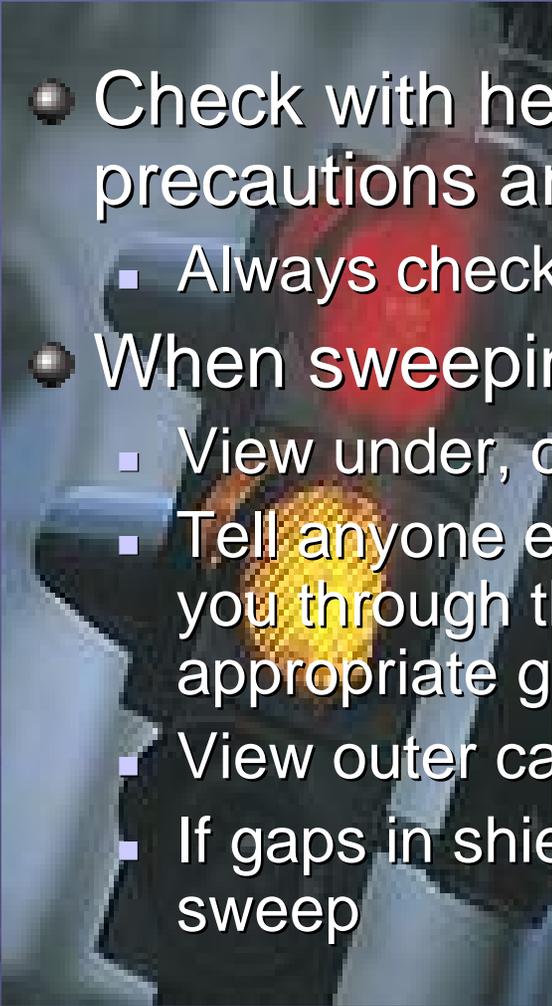
Note:

11MD1, 11MD2, 12MD1, and 12MD2 doors **MUST** be reset before the sweep begins.

4. TL verifies 11MD1 and 12MD2 are RESET by looking for the amber reset lamp on the 11MD1 and 12MD2 security boxes.
5. IF one or both doors are not reset, THEN TL shall open the door, walk to the orange door at the end of the tunnel, sweep back to 11MD1/12MD2, close the door, padlock the door, and RESET the gate by turning the S/R015 key in the RESET keyswitch on the security box. TL observes each amber RESET lamp light.
6. S2 verifies 11MD2 and 12MD1 are RESET by looking for the amber reset lamp on the 11MD2 and 12MD1 security boxes.
7. IF one or both doors are not reset, THEN S2 shall open the door, walk to the bottom of the stairs, go under the stairs, sweep back through 11MD2/12MD1, close the door, padlock the door, and RESET the door by turning the S/R015 key in the RESET keyswitch on the 11MD2/12MD1 security box. TL observes each amber RESET lamp light.
8. Sweep Team walks Counter Clockwise (CCW) around RHIC to 11G1 gate (S2 on the outside).
9. TL resets gate 11G1 using the S/R015 key in the RESET keyswitch.
10. TL observes the yellow RESET lamp is lit.
11. TL STARTS SWEEP by turning the S/R015 key CW in the SWEEP key-switch (12XCS1)
12. TL observes AREA SECURED lamp blink once.
13. Sweep Team sweeps Clockwise (CW) to the electrical panels at I-11D5.
14. Sweep Team checks behind electrical panels and overhead.
15. Sweep Team sweeps CW around RHIC.
16. Sweep Team halts and S2 stands static watch at end of I11WTCQ2.
17. TL walks down labyrinth to 11ED1.
18. TL resets gate 11ED1 using the S/R015 key in the RESET keyswitch.
19. TL observes the yellow RESET lamp is lighted.
20. TL sets check station #2 (12XCS2) by turning S/R015 key in the SWEEP keyswitch
21. TL observes AREA SECURED lamp blink once.
22. TL sweeps out the labyrinth and rejoins S2.
23. TL checks overhead cryogenic penetration tunnel with a flashlight
24. S2 checks the Exhaust Fan Vent Barrier at 11DX magnet.
25. Sweep Team sweeps CW through the vapor barrier (door) in the Interaction Region (IR) and closes the door behind them.
26. S2 checks the Exhaust Fan Vent Barrier at 12DX magnet.
27. TL checks overhead cryogenic penetration tunnel with a flashlight
28. Sweep Team halts and S2 stands static watch between I-12 DX& I-12D0.
29. TL walks down labyrinth to 12GE1.
30. TL sets check station #3 (12XCS3) by turning S/R015 key in the SWEEP keyswitch
31. TL observes AREA SECURED lamp blink once.
32. TL sweeps out the labyrinth and rejoins S2.
33. View overhead utility tube at I-12D1.
34. Sweep Team sweeps Clockwise (CW) to the electrical panels at I-12D5.
35. Sweep Team checks behind and above electrical panels including overhead alcove barricade is in place.
36. Sweep Team sweeps to 12G1 and verifies both gates are closed.
37. TL resets gate 12G1 using the S/R015 key in the RESET keyswitch.
38. TL observes the yellow RESET lamp is lighted
39. TL ENDS SWEEP by turning the S/R015 key SWEEP key in the SWEEP keyswitch on 12XCS4. The sweep check station is located adjacent to the gate reset box
40. TL observes the yellow AREA SECURED lamp is lighted

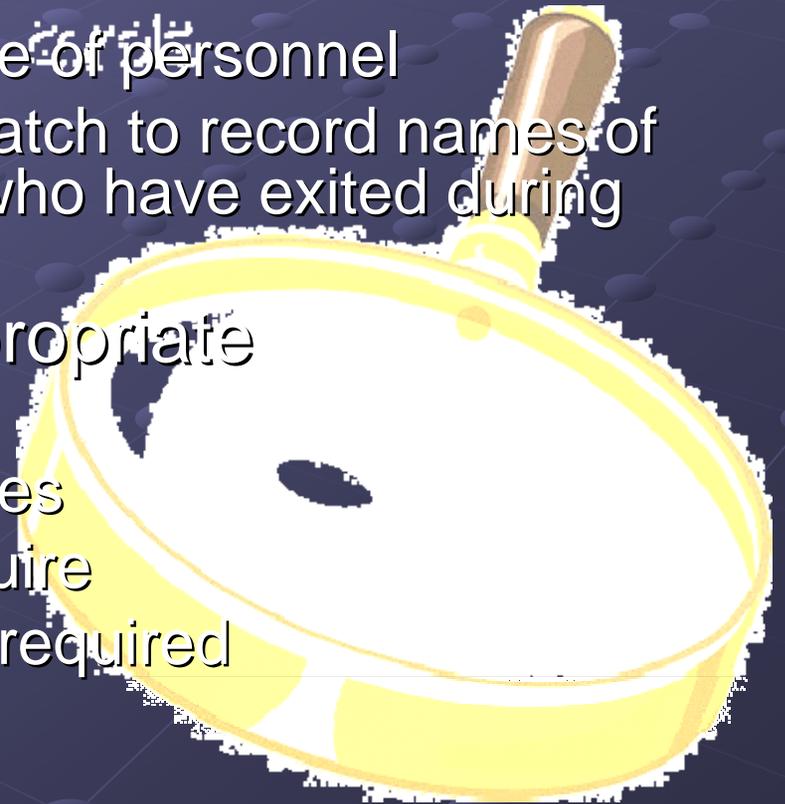
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Precautions

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- Check with health physics to determine if special precautions are needed
 - Always check if entering a contamination area
 - When sweeping:
 - View under, over, and behind elements for personnel
 - Tell anyone encountered they must walk in front of you through the unsecured area and out of the appropriate gate
 - View outer cave shielding for gaps
 - If gaps in shielding are found, notify OC and abort sweep

Procedure for Conducting Sweep

- Team leader makes sure enclosure is ready for sweep
 - LOTO applied
 - Enclosure free or nearly free of personnel
 - If nearly free, assign gatewatch to record names of persons encountered and who have exited during sweep
- Team leader inspects appropriate checklist to determine
 - Number of sweepers requires
 - Gate keys/Sweep keys require
 - Padlocks/Other equipment required

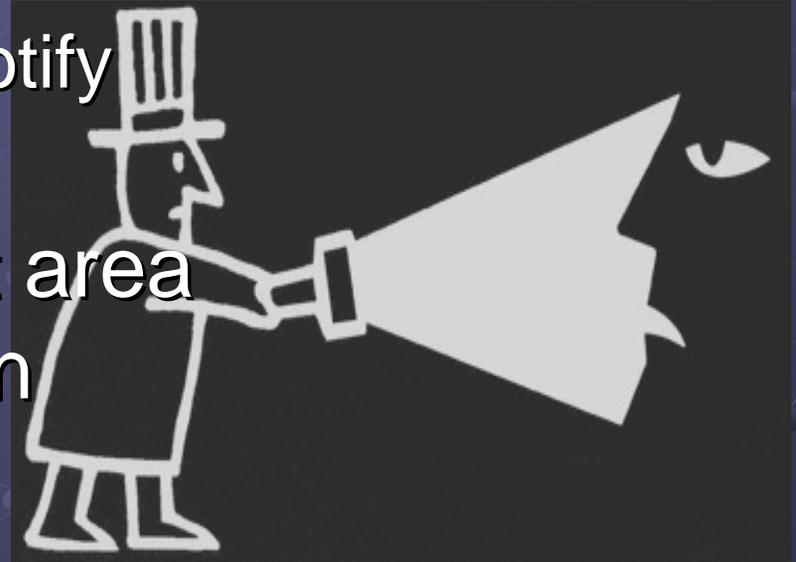


Procedure for Conducting Sweep

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- Team leader assembles sweep team
 - Team leader makes announcement over PA system that enclosure will be placed on controlled access and swept
 - No PA system for RHIC or ATR
 - Team leader switches or requests that switch be made to controlled access for appropriate enclosure
 - Enclosure is swept free of personnel following good sweep practice

Procedure for Conducting Sweep

- Team leader notifies OC of completion of sweep
 - If sweep aborted than notify OC of reasons for abort
- Team leader shall reset area or have the area reset in MCR
- Team leader shall file checklists in the Completed Sweeps Checklist binder



Good Sweep Practices

- ***Search over, under, and around all beamline components and obstacles***
- Consult HP to learn of special conditions in enclosure
 - Always consult before entering contamination area
- Observe all radiation postings and practice ALARA near activated components
- Record names of persons encountered in sweep and verify that names appear on gate log after exiting enclosure

Good Practices

- Search every dead end
- Search every void larger than 23 cm where personnel might be stranded
- Keep secured areas free of personnel when assigned to static watch
- Search for gaps in shielding
- Find and remove tools left by workers
 - All such items must be checked for activation
- Always sign the C-A Radiation Work Permit Access Control Log before and after sweeping
 - RHIC does not require an RWP for sweeping