

*If you are using a printed copy of this procedure, and not the on-screen version, then you **MUST** make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.*

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

9.5.4.e Summary of C-A ALARA Work Practices

C-A-OPM Procedure in which this Attachment is used		
9.5.4		

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: _____ *Signature on File* _____
 Collider-Accelerator Department Chairman Date

P. Cernigliaro

SUMMARY OF ALARA METHODS AND WORK PRACTICES AT C-A

The following ALARA methods and work practices used to reduce exposure must be considered by the appropriate job supervisor, RCT, and FS representative.

1. Schedule work for longest effective cool-down time
2. Keep a history of equipment malfunction
3. Establish guidelines for area access based on radiation level
4. Train on mock-up equipment prior to performing the work
5. Design shielding for quick removal
6. Use remote areas for storage of hot equipment (highly irradiated equipment)
7. Compile and assess prior exposure data prior to performing work
8. Use a sufficient number of radiation monitoring points in the pre-job radiation survey
9. Select a trained and experienced work force (cross-train personnel)
10. Identify and coordinate resource requirements
11. Perform ALARA pre-job review
12. Plan access to and exit from the work area
13. Provide for service lines (air, welding, ventilation)
14. Provide communication
15. Remove or shield sources of radiation
16. Install temporary shielding
17. Decontaminate
18. Work in lowest radiation levels
19. Perform as much work as practicable outside radiation areas
20. State requirements for tools
21. State staging requirements for material, parts and tools
22. Incorporate radiological control holding points
23. Minimize discomfort of workers
24. Inspect shielding after installation
25. Conduct periodic radiation surveys during work
26. Compare exposure received during installation of shielding versus exposure saved by shielding
27. Shield travel routes
28. Shield components that have abnormally high radiation levels
29. Shield position occupied by worker
30. Keep excess personnel out of radiation area
31. Confine non-essential discussions to remote low-background areas
32. Have trained workers assist in radiation surveys
33. Evaluate use of fewer workers
34. Do not loiter or hold unnecessary conversations in radiological areas
35. In leak detection, use helium probe attached to a long handle
36. Consider using only one coil of failing magnet rather than replacing the magnet
37. Consider health physics coverage when dose rates go above 1 R/H in the work area
38. Install quick-disconnects on vacuum system and magnet, water and power cables
39. Use radiation-hardened beam line components
40. Reduce the density of beam-line components to reduce serviceability problems