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C-A OPERATIONS PROCEDURES MANUAL

9.1.12 Procedure for Review of C-A Shielding Design

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Approved: \_\_\_\_\_ *Signature on File* \_\_\_\_\_  
Collider-Accelerator Department Chairman Date

D. Beavis

## 9.1.12 Procedure for Review of C-A Shielding Design

### 1. Purpose

- 1.1 To provide instructions for liaison physicists and [C-A Radiation Safety Committee](#) (RSC) members for the process for review of shielding design for C-A facilities. Examples of events which should institute a shielding design review are the following:
  - 1.1.1 installation of a new experiment or beam line,
  - 1.1.2 substantial increases in beam intensity in an existing beam line,
  - 1.1.3 removal of a substantial amount of material which acts as shielding for either the main ring or an existing beam line. These examples are not meant to be exhaustive.
- 1.2 Shielding placed for dose reduction purposes in existing radiological areas does not require review, but notification must be made to the C-A RSC Chairman and the C-A ALARA Committee Chairman.
- 1.3 All shielding at C-A facilities is under the scope of this procedure except for task specific shielding which is installed on a temporary basis for work and is part of an ALARA or RWP review.

### 2. Responsibilities

The C-A RSC or assigned subcommittee is responsible to review shielding designs to assure that the design provides the required level of protection. Both the C-A RSC and the ESHQ Associate Chair are responsible for approving the shielding design.

### 3. Prerequisites

C-A RSC members, [liaison physicists, and liaison engineers](#).

### 4. Precautions

Failure to carefully review the shielding design can result in the potential of unnecessary dose to personnel.

### 5. Procedures

- 5.1 If the liaison physicist or liaison engineer is modifying shielding which is for dose reduction purposes in an existing radiological area with an approved radiological configuration then:

5.1.1 The shielding may be modified without immediate review of the RSC or the

ALARA Committee.

- 5.1.2 The liaison physicist or liaison engineer shall notify the RSC Chairman and the ALARA Committee chairman of the modifications.
- 5.1.3 The RSC chairman and the ALARA chairman will determine if additional reviews are required.
  
- 5.2 The liaison physicist will describe the radiation issues and protection methods to the C-A RSC in a written description.
- 5.3 The C-A RSC will review and make recommendations on the shielding design.
- 5.4 The C-A RSC will assign a subcommittee to review the final shielding design upon its completion.
  - 5.4.1 The subcommittee for secondary beam shielding will consist of the liaison physicist, liaison engineer, and at least one member of the C-A RSC.
  - 5.4.2 The subcommittee for primary beam shielding will consist of the [liaison physicist, liaison engineer](#), and at least two members of the C-A RSC.
- 5.5 The liaison physicist will work with the liaison engineer to complete the shielding design.
- 5.6 The liaison physicist will present the shielding design to the sub-committee for review of a facility. The review shall establish that the shield meets the following goals:
  - 5.6.1 Limit the annual site-boundary dose equivalent to 5 mrem.
  - 5.6.2 Limit the annual on-site dose equivalent to inadvertently exposed people in non-C-A facilities to 25 mrem per person.
  - 5.6.3 Limit the maximum accumulated dose equivalent to any area where access is not controlled to less than 20 mrem during a fault condition.
  - 5.6.4 For continuously occupied locations the dose equivalent rate shall be as low as reasonably achievable (ALARA) but in no case shall the design allow greater than 0.5 mrem in 1 hour or 20 mrem in 1 week.
  - 5.6.5 Dose equivalent rates where occupancy is not continuous shall be ALARA but in no case shall the design allow greater than 1 rem in 1 year for whole body radiation, or 3 rem in 1 year for the lens of the eye, or 10 rem in 1 year for any organ or tissue.
- 5.7 The subcommittee will recommend approval of the shielding design to the C-A RSC Chairman in writing.
- 5.8 The C-A RSC, and the ESHQ Associate Chair must approve the shielding design.

The record of approval can be part of RSC meeting minutes or a separate document signed by both the RSC Chair and the ESHQ Associate Chair and distributed to RSC members and the C-A Department Chairman.

- 5.9 The approved official shielding print will be assigned an identifying number and become a permanent record of the shielding for the area.
- 5.10 The C-A RSC Chair will file a copy of the Committee review and approval in the RSC files and provide the project engineer with a copy of the approval.
- 5.11 Radiation surveys and fault studies will be conducted to verify the adequacy of the shielding.
- 5.12 A member of the subcommittee will be assigned to review the fault study plan whenever possible.

**6. Documentation**

- 6.1 Written description submitted by the liaison physicist prior to the C-A RSC review.
- 6.2 The minutes of the C-A RSC meeting(s).
- 6.3 The shielding official print.
- 6.4 Shielding surveys conducted under the appropriate fault study procedure.
- 6.5 Subcommittee review and written approval.

**7. References**

None

**8. Attachments**

None