

ALARA Design Considerations and Reviews

Approved by
Signature on File
Manager of Design Engineering

1.0 Purpose

This procedure establishes the process to apply the radiological design requirements established in the WSRC Manual WSRC-TM-95-1, Standard No. 01064, Radiological Design Requirements. Implementation of this process ensures and documents that design activities include considerations that will limit radiation exposure to personnel in SRS facilities to As Low As Reasonably Achievable (ALARA).

2.0 Scope

This procedure applies to all design activities at SRS conducted by Design Engineering personnel for SRS nuclear facilities, radiological facilities, or other SRS facilities containing processes that contain, convey, or use radioactive material.

Design activities (Reference 7.1) subjected to this procedure are projects or tasks which result in the issuance of new design or physical modifications to existing design via:

- Drawings
- Design Change Packages
- Design Change Forms
- Commercial Drawings
- Field Change Request
- Redlines
- Specifications

Design documents issued to document "as built" configurations are not subjected to the requirements of this procedure.

3.0 Terms and Definitions

The following term is introduced in this procedure. Refer to the Glossary for the definition of additional terms.

ALARA - ALARA is an acronym for the concept of reducing radiation dose to levels As Low As Reasonably Achievable. ALARA is not a dose limit but constitutes a design philosophy that promotes the optimizing of design for keeping radiation doses to personnel as far below the applicable limits as social, technical, economic, practical and public policy considerations reasonably permit.

4.0 Responsibilities

4.1 Design Authority (DA)

- Determines whether ALARA design considerations and radiological engineering support are required based on known scope of the design activity during the input phase of the design activity in accordance with manual E7, procedure 2.05. Design Authority completes ALARA screening (available on the Conduct of Engineering (COE) Web Page under Technical Agency Contacts). If the answer to any screening question is "Yes," and ALARA is determined to be applicable, the DA contacts the Radiological Technology group for appropriate implementation of Engineering Standard 01064, WSRC-TM-95-1. The DA includes the results in the design input.
- Ensures that needed ALARA design considerations are identified during design.
- Ensures that appropriate radiological and ALARA optimization analyses are performed and that radiological requirements necessary to support the design are provided.
- Coordinates the radiological design with the appropriate Radiological Design Authority.

4.2 Project Engineer

- Accepts applicability of ALARA to the design activities through design input.

4.3 Discipline Engineering Group Lead

- Assures that appropriate ALARA design considerations are employed in the design activity.
- Assures that the appropriate Supplemental Design Checklists (SDC) are completed by the RE and the checker has verified that the appropriate design considerations identified in the checklists are incorporated in the design. The Supplemental Design Checklists are available on the Design Engineering Web Page under "Guidance Documents", 'Checklists'.

4.4 Responsible Engineer (RE)

- Coordinates the design with Design Authority and/or Radiological Design Authority, as appropriate.
- Performs review of ALARA design considerations to be incorporated into the design by completing the ALARA Design Review Form, Attachment 8.1 and associated SDCs.
- Obtains inter-disciplinary input when required, to adequately conduct the ALARA design review. Identifies and incorporates into the design appropriate ALARA design considerations based on the review of the SDCs.

5.0 Procedure

- 5.1** The Design Authority completes ALARA screening (available on the COE Web Page under Technical Agency Contacts). If the answer to any screening question is "Yes," and ALARA is determined to be applicable, the Design Authority contacts the Radiological Technology Group for appropriate implementation requirements of Engineering Standard 01064, WSRC-TM-95-1. The results are included in the design input.
- 5.2** The Design Authority documents the applicability of ALARA for the proposed plant modification/new construction in the Modification Traveler (MT), Manual E7, procedure 2.05.

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- 5.3 To minimize potential rework and costs, ALARA design considerations should be identified and incorporated into the design as early as possible. RE shall review the design input for applicability of the ALARA to the design activities, and other ALARA design considerations. If the design input states ALARA applicability to the design activities, RE shall complete the ALARA Design Review Form (Attachment 8.1), and the appropriate SDC. Applicable ALARA design considerations shall be documented and incorporated into the design. When coordination with Design Authority and/or Radiological Design Authority is required, the RE shall inform the Lead. The ALARA Design Review Form is signed by the RE and Checker/Verifier and included in the associated design output documentation.
- 5.4 The RE first enters the information requested on the ALARA Design Review Form using the instructions provided below.
- Modification Traveler (MT) or Design Change Notice (DCN) Number or Design Change Form (DCF) - enters the unique number of documents included in the ALARA Design Review
 - Brief Description of Scope - Briefly describes the scope of the design activity associated with the ALARA design review. If a DCP is being used to issue design, the project number or the task number shall be identified, and the DCP shall be identified. If a design is being issued via DCF, the project number or the task number shall be identified, and the DCF shall be identified. For new grass roots design being issued via drawings, the project number shall be identified and the drawings for which the ALARA design review is applicable shall also be identified.
- 5.5 The RE answers the questions provided on the ALARA Design Review Form. A "yes" response indicates that ALARA design considerations provided on the corresponding SDC are required to be reviewed and incorporated, as appropriate, in the design. A "no" response indicates that ALARA design considerations are not required.
- 5.6 The RE completes the ALARA Design Review Package (ALARA Design Review Form and applicable Supplemental Checklists), enters any comments in the applicable section of the ALARA Design Review Form, and enters his/her name, signature, and date in the spaces provided on the bottom of the ALARA Design Review Form. The checker or verifier verifies that the items identified in the SDCs are incorporated in the design.

6.0 Records

The ALARA Design Review Package shall be included as a part of the design output documents.

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7.0 References

- 7.1 WSRC Conduct of Engineering and Technical Support Procedure Manual E7
- Procedure 2.05, Modification Traveler
 - Procedure 2.37, Design Change Form
 - Procedure 2.38, Design Change Package
 - Procedure 1.53, Commercial Drawings
 - Procedure 1.55, Field Change Request
 - Procedure 1.57, Redlines
- 7.2 WSRC Radiological Control Manual 5Q
- 7.3 SRS Engineering Standard Manual WSRC-TM-95-1, Standard No: 01064, Radiological Design Considerations.
- 7.4 Title 10 Code of Federal Regulations, Part 835, Occupational Radiation Protection
- 7.5 DOE-HDBK-1132-99, Design Considerations, April 1999
- 7.6 Supplemental Design Checklists (1 – 5)

8.0 Attachments

- 8.1 ALARA Design Review Form

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Attachment 8.1

ALARA Design Review Form

MT or DCF/DCN Number _____ Title _____

Brief Description of the
Scope _____

Reference(s) _____

Answer the following ALARA screening questions. If the answer is **YES** to any of the questions, complete the appropriate Supplemental Design Checklist(s) (SDC). The SDCs can be accessed on the Design Engineering Web page under 'Guidance Documents', then 'Checklists'.

MT or DCF Number _____ Title _____

| <u>RADIOLOGICAL QUESTIONS:</u> | YES | NO |
|---|------------|-----------|
| 1. Does the design activity involve performance in, or require entry to, an area in an existing facility posted as a "Radiation Area" or greater, or a "Contamination Area" or greater, or an "Airborne Radiation Area", or an area in a new facility which, following facility operation, will contain or process radioactive material? If yes, review attached Supplemental Design Checklist SDC-1. | | |
| 2. Does the design activity involve any system that does, or will (following facility operation), contain, convey, or use radioactive materials? If yes, review attached Supplemental Design Checklist SDC-2. | | |
| 3. Does the design activity involve changes to shielding requirements or the use of penetrations in shield walls? If yes, review attached Supplemental Design Checklist SDC-3. | | |
| 4. Does the design activity involve new ventilation systems, modifications to existing ventilation systems, or the conversion of a clean area to a radiological area? If yes, review attached Supplemental Design Checklist SDC-4. | | |
| 5. Does the design activity involve area (including Nuclear Incident Monitoring – NIM), airborne, process, or effluent radiation monitoring systems? If yes, review attached Supplemental Design Checklist SDC-5. | | |

Comments _____

Responsible Engineer _____

Date _____

Checker/Verifier _____

Date _____