

## **Review Areas to be Addressed in a COL Application Referencing a Certified Design**

### Chapter 12 Radiation Protection

#### 12.1 Assuring that Occupational Radiation Exposures Are As Low As Is Reasonably Achievable (ALARA)

##### 12.1.1 Policy Considerations

- Describe the management policy related to ensuring that occupational radiation exposures are ALARA.
- Describe the applicable responsibilities and related activities to be performed by management personnel who have plant operational responsibility for radiation protection. \*
- Describe the policy of maintaining occupational exposures ALARA as it will be applied to plant operations.
- Address how the applicant will follow the guidance provided in Regulatory Guides 1.8, 8.8, and 8.10, specifically as it applies to the implementation of policy, organization, training, and design review guidance. \*
- Describe how experience from past designs and operating plants is used to develop an improved radiation protection design to ensure that occupational radiation exposures are ALARA.

##### 12.1.2 Design Considerations

- Describe the ALARA design guidance and training (both general and specific) that is given to the individual designers and engineers during initial plant design, and describe provisions for continuing ALARA facility design reviews once the plant is operational.
- In accordance with the requirements of 10 CFR 20.1406, describe the design approaches implemented to minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.
- Describe the design considerations implemented to ensure that occupational radiation exposures during decommissioning will be ALARA.

##### 12.1.3 Operational Consideration

- Describe the operational considerations to the level of detail provided in the applicable sections of Draft Regulatory Guide 1145 (DG-1145). \*
- Describe how the operational plans, procedures, and policies for ensuring that occupational radiation exposures are ALARA have incorporated information from operating plant experience.

- Describe the measures of planning and accomplishing work, including interfaces between radiation protection, operations, maintenance, planning, and scheduling.
- Indicate how the plant will follow the guidance provided in Regulatory Guides 8.2, 8.7, 8.9, 8.13, 8.15, 8.20, 8.25, 8.26, 8.27, 8.28, 8.29, 8.34, 8.35, 8.36, and 8.38. If the plant will not follow the guidance contained in these RGs, describe the specific alternative approaches to be used. \*

## 12.2 Radiation Sources

### 12.2.1 Contained Sources

- Describe any required radiation sources containing byproduct, source, and special nuclear material that may warrant shielding design consideration. Provide a listing of isotope, quantity, form, and use for any of these sources which exceed 100 millicuries.
- Provide a description of any additional contained radiation sources not identified in Section 12.2.1 of the DCD for the referenced plant design, including radiation sources used for instrument calibration or radiography. \*
- For those cases where the contained source term information referenced in the DCD for the referenced plant design has changed, provide updated source term information. This source term information should include isotopic composition, source strength, and source geometry (including information on component dimensions, volume, wall material compositions, effective source density, equipment self shielding, and position in room).

## 12.3 Radiation Protection Design Features

### 12.3.1 Facility Design Features

- Describe each very high radiation area and refer to its location on the plant layout diagrams. Provide detailed drawings showing isometric views of each very high radiation area and indicate physical access controls and radiation monitor locations for each of these areas.
- On the scaled facility layout drawings, show the location of all sources described in Section 12.2 of the SAR and identify those sources in a manner that can easily be related to tables containing the pertinent quantitative source parameters. Accurately locate source positions, indicating the approximate size and shape of each source.
- On the scaled facility layout drawings, indicate locations of area, airborne radioactivity, and portal radiation monitors.

### 12.3.2 Shielding

- Describe the features/shielding used to preclude radiation streaming from the annulus between the reactor vessel and the biological shield into containment areas that may be occupied during refueling operations (BWR designs)
- Address the administrative controls for use of the design features provided to control

access to radiologically restricted areas, including potentially very high radiation areas, such as the fuel transfer tube during refueling operations and the reactor cavity. \*

#### 12.3.4 Area Radiation and Airborne Radioactivity Monitoring Instrumentation

- Address the criteria and methods for obtaining representative in-plant airborne radioactivity concentrations, including radioiodines and other radioactive materials, from the work areas being sampled. \*
- Address the use of portable instruments, and the associated training and procedures, to accurately determine the airborne iodine concentration in areas within the facility where plant personnel may be present during an accident. \*

#### 12.3.5 Dose Assessment

- For multi-unit plants, provide estimated annual doses to construction workers in a new unit construction area, as a result of radiation from onsite radiation sources from the existing operating plant(s).

### 12.5 Operational Radiation Protection Program

#### 12.5.1 Organization

- Describe the administrative organization of the radiation protection program, including the authority and responsibility of each identified position. Indicate whether and, if so, how the applicant has followed the guidance in Regulatory Guides 1.8, 8.2, 8.8, and 8.10. Conversely, if the applicant has not followed that guidance, describe the specific alternative approaches used. \*
- Describe the experience and qualification of the personnel responsible for various aspects of the radiation protection program and for handling and monitoring radioactive materials, including special nuclear, source, and byproduct materials.
- Describe management and staff authorities and responsibilities for implementing and documenting radiation protection program reviews, as required by 10 CFR 20.1101 and 20.2102.

#### 12.5.2 Equipment, Instrumentation, and Facilities

- Provide the criteria for selecting portable and laboratory technical equipment and instrumentation for use in performing radiation and contamination surveys, monitoring and sampling in-plant airborne radioactivity, area radiation monitoring, and for personnel monitoring during normal operation, anticipated operational occurrences, and accident conditions. Include the locations, quantity (considering equipment unavailability), and types of each type of instrument.
- Describe and identify the location of those radiation protection facilities that were not previously described in an applicable design control document.
- Indicate whether and, if so, how the applicant has followed the guidance provided in

Regulatory Guides 1.97, 8.4, 8.6, 8.8, 8.9, 8.15, 8.20, 8.26, and 8.28. Conversely, if the applicant has not followed that guidance, describe the specific alternative methods used.

### 12.5.3 Procedures

- For each of the following categories, describe the radiation protection procedures and methods of operation that have been developed to ensure that occupational radiation exposures are ALARA. \*

- Radiological surveillance
- Access control
- Radiation work permits
- Contamination control
- Personnel monitoring and dose control
- Respiratory protection
- Radioactive material control
- Posting and labeling
- Radiation protection training
- Quality assurance

- In accordance with the requirements of 10 CFR 20.1406, describe those operational procedures implemented to minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.

- Regulatory Guides 1.8, 8.2, 8.7, 8.8, and 8.10 and the applicable portions of NUREG-1736 provide guidance for use in developing procedures for radiation protection. Indicate whether and, if so, how the applicant has followed this guidance. Conversely, if the applicant has not followed that guidance, describe the specific alternative approaches to be used.

\* COL Action Item for AP1000