

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 6-7854

SRP Section: 12.05 – Operational Radiation Protection Program

Application Section: 12.5

Date of RAI Issued: 05/14/2015

Question No. 12.05-1

10 CFR Part 20 requires licensees to determine and record occupational exposures to demonstrate compliance with dose limits to adults.

DCD Table 1.9-1 provides a listing of NRC Regulatory Guides (RG) and indicates their applicability to the APR 1400 design. This table distinguishes between Regulatory Guides that are not applicable to the APR1400 or its associated COL applicants (listed as “Not applicable” in the table) and those that are not applicable to the DCD but are applicable to the COL applicant (listed as “Not applicable (COL)” in the table). Many of the division 8 (occupational health) regulatory guides that are listed as “Not Applicable” would apply to a COL applicant and some of these RGs even have COL items associated with them. For example, RG 8.29, “Instruction Concerning Risks from Occupational Radiation Exposure” is listed as “Not applicable” in Table 1.9-1, while there is a COL item related to RG 8.29 in DCD Table 12.1.

In addition, SRP Section 12.5 indicates that the application should contain information describing the implementation of Regulatory Guide 8.4, “Direct-Reading and Indirect-Reading Pocket Dosimeters,” or provide an alternative. While DCD Table 1.9-1 indicates that RG 8.4 applies to the COL applicant, the staff cannot identify any COL item associated with RG 8.4.

1. Please update DCD Table 1.9-1 to ensure that all Regulatory Guides that would be considered applicable to a COL applicant are appropriately labeled, “Not applicable (COL).”
2. Please update DCD Section 12.1 or 12.5 to include either 1) information on compliance with RG 8.4, 2) a new or revised COL item requesting that the COL applicant provide information on how the plant follows RG 8.4, or 3) a justified alternative approach to SRP Section 12.5.

Response

1. Regulatory Guides (RGs) 8.26, 8.27, 8.28 and 8.29 are applicable to a COL applicant referencing the APR1400 design. Therefore, DCD Table 1.9-1 will be updated to denote these RGs as COL items. Please refer to Attachment 1 for DCD markups.
 2. DCD Section 12.1 will be updated to include RG 8.4 as a COL item. For clarity, DCD Section 12.5 will also be updated to provide a pointer to Section 12.1 indicating that the RGs are applicable to a COL applicant. Please refer to Attachment 2 of this response for the DCD markups.
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Impact on DCD

DCD Table 1.8-2 and 1.9-1 will be revised as indicated in Attachment 1.

DCD Subsections 12.1.3.1, 12.1.4, 12.1.5 and Section 12.5 will be revised as indicated in Attachment 2.

Impact on PRA

There is no impact on the PRA.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical and Environmental Reports.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

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Table 1.8-2 (20 of 29)

Item No.	Description
COL 11.5(4)	The COL applicant is to prepare an ODCM that contains a description of the methodology and parameters for calculation of the offsite doses for the gaseous and liquid effluents. The COL applicant is to follow NEI 07-09A as an alternative to providing an offsite dose calculation manual.
COL 11.5(5)	The COL applicant is to provide analytical procedures and sensitivity for selected radioanalytical methods and types of sampling media for site-specific matter.
COL 11.5(6)	The COL applicant is to develop the calibration procedures in accordance with NRC RG 1.33 and 4.15.
COL 11.5(7)	The COL applicant is to develop detailed location and tubing installation and provide the sampling method including the sampling time to acquire representative sampling.
COL 11.5(8)	The COL applicant is to provide operational procedures and maintenance programs related to leak detection and contamination control.
COL 11.5(9)	The COL applicant is to develop a radiological and environmental monitoring program, taking into consideration local land use and census data in identifying all potential radiation exposure pathways. The COL applicant is to follow NEI 07-09A as an alternative to providing a radiological and environmental monitoring program.
COL 12.1(1)	The COL applicant is to provide the organizational structure to effectively implement the radiation protection policy, training, and reviews consistent with operational and maintenance requirements, while satisfying the applicable regulations and Regulatory Guides including NRC RGs 1.33, 1.8, 8.8, and 8.10.
COL 12.1(2)	The COL applicant 8.4 , describe the operational radiation protection program to provide reasonable assurance that occupational radiation exposures are ALARA.
COL 12.1(3)	The COL applicant is to describe how the plant follows the guidance provided in NRC RGs 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.
COL 12.2(1)	The COL applicant is to provide any additional contained radiation sources, such as instrument calibration radiation sources, that are not identified in Subsection 12.2.1.
COL 12.3(1)	The COL applicant is to provide portable instruments and the associated training and procedures in accordance with 10 CFR 50.34(f)(2)(xxvii) and the criteria in Item III.D.3.3 of NUREG-0737.
COL 12.3(2)	The COL applicant is to determine the WARN and ALARM setpoints of the ARMS based on the site-specific conditions and operational requirements

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Table 1.9-1 (37 of 38)

NRC Regulatory Guide		Revision / Issue Date	Conformance or Summary Description of Deviation	DCD Tier 2 Section
8.26	Applications of Bioassay for Fission and Activation Products	09/1980	Not applicable (COL)	N/A
8.27	Radiation Protection Training for Personnel at Light-Water-Cooled Nuclear Power Plants	03/1981	Not applicable (COL)	N/A
8.28	Audible-Alarm Dosimeters	08/1981	Not applicable (COL)	N/A
8.29	Instruction Concerning Risks from Occupational Radiation Exposure	Rev. 1 02/1996	Not applicable (COL)	N/A
8.30	Health Physics Surveys in Uranium Recovery Facilities	Rev. 1 05/2002	Not applicable	N/A
8.31	Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities Will Be as Low as Is Reasonably Achievable	Rev. 1 05/2002	Not applicable	N/A
8.32	Criteria for Establishing a Tritium Bioassay Program	07/1988	Not applicable (COL)	N/A
8.34	Monitoring Criteria and Methods To Calculate Occupational Radiation Doses	07/1992	Not applicable (COL)	N/A
8.35	Planned Special Exposures	Rev. 1 08/2010	Not applicable (COL)	N/A
8.36	Radiation Dose to the Embryo/Fetus	07/1992	Not applicable (COL)	N/A
8.37	ALARA Levels for Effluents from Materials Facilities	07/1993	Not applicable (COL)	N/A

APR1400 DCD TIER 2**12.1.3 Operational Considerations**

The COL applicant is to describe the operational radiation protection program to provide reasonable assurance that occupational radiation exposures are ALARA (COL 12.1(2)). The APR1400 radiation protection design is implemented in conjunction with operational procedures and programs. Radiological health and safety procedures are developed and are continually reviewed and updated as necessary to provide reasonable assurance that occupational radiation exposures are ALARA. These procedures incorporate experience gained from plant operations. Improvements suggested during design and operation are incorporated and implemented to continually update the program to maximize protection of the plant personnel, the public, the environment, and the equipment.

The general manager of the radiation protection team is responsible for developing and updating radiological health and safety procedures. The plant manager supervises activities governed by these procedures so that workers are properly protected at all times. All personnel receive the training required to perform their assigned tasks safely.

12.1.3.1 General Operational Considerations for Maintaining Exposures
ALARA

8.4 (Reference 25),

The COL applicant is to describe how the plant follows the guidance provided in NRC RGs 8.2 (Reference 7), 8.7 (Reference 8), 8.9 (Reference 9), 8.13 (Reference 10), 8.15 (Reference 11), 8.20 (Reference 12), 8.25 (Reference 13), 8.26 (Reference 14), 8.27 (Reference 15), 8.28 (Reference 16), 8.29 (Reference 17), 8.34 (Reference 18), 8.35 (Reference 19), 8.36 (Reference 20), and 8.38 (Reference 21) (COL 12.1(3)).

12.1.3.2 Design Features for ALARA During Maintenance and Inspection

The APR1400 design incorporates lessons learned from past designs, as well as the recommendations from NRC RGs 8.8 and 8.10. Design features to provide reasonable assurance that personnel exposure is maintained ALARA during maintenance and inspection activities are as follows:

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for systems and components that handle contaminated or potentially contaminated fluids. Decommissioning considerations are provided in Subsection 12.4.2.

12.1.4 Combined License Information

COL 12.1(1) The COL applicant is to provide the organizational structure to effectively implement the radiation protection policy, training, and reviews consistent with operational and maintenance requirements, while satisfying the applicable regulations and Regulatory Guides including NRC RGs 1.33, 1.8, 8.8, and 8.10.

COL 12.1(2) The COL applicant is to describe the operational radiation protection program to provide reasonable assurance that occupational radiation exposures are ALARA.

COL 12.1(3) The COL applicant is to describe how the plant follows the guidance provided in NRC RGs 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.



8.4,

12.1.5 References

1. NEI 07-08A, "Generic FSAR Template Guidance for Ensuring that Occupational Radiation Exposures are as Low as is Reasonably Achievable (ALARA)," Nuclear Energy Institute, October 2009.
2. Regulatory Guide 1.8, "Qualification & Training of Personnel for Nuclear Power Plants," Rev. 3, U.S. Nuclear Regulatory Commission, May 2000.
3. Regulatory Guide 1.33, "Quality Assurance Program Requirements Operation," Rev. 3, U.S. Nuclear Regulatory Commission, June 2013.
4. Regulatory Guide 8.8, "Information Relevant to Ensuring the Occupational Radiation Exposures at Nuclear Power Stations will be ALARA," Rev. 3, U.S. Nuclear Regulatory Commission, June 1978.

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17. Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure," Rev. 1, U.S. Nuclear Regulatory Commission, February 1996.
18. Regulatory Guide 8.34, "Monitoring Criteria and Methods To Calculate Occupational Radiation Doses," U.S. Nuclear Regulatory Commission, July 1992.
19. Regulatory Guide 8.35, "Planned Special Exposures," Rev. 1, U.S. Nuclear Regulatory Commission, August 2010.
20. Regulatory Guide 8.36, "Radiation Dose to the Embryo/Fetus," U.S. Nuclear Regulatory Commission, July 1992.
21. Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas of Nuclear Plants," Rev. 1, U.S. Nuclear Regulatory Commission, May 2006.
22. Regulatory Guide 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning," U.S. Nuclear Regulatory Commission, June 2008.
23. NEI 07-03A, "Generic FSAR Template Guidance for Radiation Protection Program," Nuclear Energy Institute, May 2009.
24. NEI 08-08A, "Generic FSAR Template Guidance for Life Cycle Minimization of Contamination," Nuclear Energy Institute, October 2009.

25. Regulatory Guide 8.4, "Personal Monitoring Device—Direct Reading Pocket Dosimeters", Rev.1, U.S. Nuclear Regulatory Commission, June 2011

APR1400 DCD TIER 2**12.5 Operational Radiation Protection Program**

To achieve the goal of maintaining occupational and public doses both below regulatory limits and as low as is reasonably achievable (ALARA), the operational radiation protection program shall be developed and implemented by the COL applicant in such a way that the program is clearly and sufficiently described in accordance with all applicable guidance.

↖ ↗ (COL 12.1 (3))

The COL applicant is to provide the operational radiation protection program, which includes the following: (Reference 1) (COL 12.5(1))

- a Organizational positions, functional responsibilities, experience, and qualifications of personnel responsible for the radiation protection program
- b Equipment necessary to measure radioactivity as well as radiation fields and exposures including:
 - 1) The number, type, range, sensitivity, calibration method and frequency, availability
 - 2) The planned use of portable, fixed, laboratory, and personnel monitoring instrumentation
- c Health physics facilities and associated protective equipment for controlling ORE and contamination
- d Description of the methods for ensuring development of the training, retraining, and indoctrination program and the radiation protection instruction manuals
- e Procedures:
 - 1) To receive, store, transfer, and dispose of radioactive material
 - 2) To control exposures