
REVISED 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.: 225-8254
SRP Section: 12.03 – 12.04 Radiation Protection Design Features
Application Section: 12.3 – 12.4
Date of RAI Issue: 09/24/2015

Question No. 12.03-20

SRP 12.3-12.4 indicates that, the applicant's area radiation monitoring system is designed to (1) monitor the radiation levels in areas where radiation levels could become significant and where personnel may be present, (2) alarm when the radiation levels exceed preset levels to warn of increased radiation levels, and (3) provide a continuous record of radiation levels at key locations throughout the plant.

In addition, ANSI/ANS-HPSSC-6.8.1-1981, which the applicant references and which is referenced in the SRP provides examples of locations for radiation monitors in a PWR plant in Table 2. Table 2 also provides examples of appropriate ranges for monitors.

1. The following area radiation monitors identified in ANSI-18.1 do not appear in the APR1400 design;
 - a. Radwaste and drumming station control panel areas.
 - b. Shutdown cooling system pump and heat exchanger areas
 - c. Auxiliary Building and Compound Building HVAC filter areas
 - d. Equipment decontamination areas
 - e. Safe shutdown panel areas

Please provide area monitors at these locations or justify why they are not necessary.

2. Please indicate why the low radioactive waste storage area radiation monitor (RE-321) has a range that can detect higher radiation levels than the medium radioactive waste storage area monitors (RE-322 and RE-323).

Response – Rev.1**1.a Radwaste and drumming station control panel areas**

There are four radwaste drumming areas as follows:

- Spent filter drumming area at 78'-0" elevation near the filter and demineralizer area in the south-east corner of the Auxiliary Building (AB);
- R/O concentrate drumming area at 63'-0" elevation inside the Compound Building (CPB);
- DAW drumming area at 85'-0" elevation in the north-east area of CPB; and
- Spent resin dewatering area at 100'-0" at the truck bay area inside CPB.

The drumming and capping operations for spent filters, R/O concentrates, DAW, and spent resin are performed by mobile subsystems in designated areas. The operations of these systems are to be controlled remotely from the Radwaste Control Room (RWCR) or by the COL applicant as stipulated in COL 11.4(3). The COL applicant is to prepare a plan to develop and use operating procedures, including the use of portable radiation monitoring instruments for the drumming and capping operations. Hence area radiation monitors in these areas are not provided.

The COL item 11.4(3) will be revised to include the use of portable radiation monitors for drumming and capping operations in these areas.

1.b Shutdown cooling system pump and heat exchanger areas

There are two trains of shutdown cooling system (SC) heat exchangers and pumps. They are located at the plant north-east and south-east corners of the basemat floor (Elevation 55'-0") inside the AB. Since the cubicles for these exchangers and pumps are designated higher than Radiation Zone 6, they are equipped with locked doors and entrances to these cubicles are administratively controlled. When entrance is required, operating procedures are to be followed, including conducting radiation survey and component decontamination. Since entrance is not expected to be routine or frequent, area radiation monitors are not provided for these cubicles as indicated in DCD Subsection 12.3.4.1.3.

1.c Auxiliary Building (AB) and Compound Building (CPB) HVAC filter areas

The AB and CPB HVAC air cleaning units (ACUs) are equipped with inlet gaseous process radiation monitors to measure the radioactivity processed in the corresponding filters (both medium and HEPA filters, and charcoal adsorbers). The operation of the ACUs is discussed in DCD Section 9.4 for the corresponding HVAC systems, and the gaseous process radiation monitors are summarized in DCD Section 11.5 Table 11.5-1. Since the concentrations of the radioactive effluents downstream of the ACU are continuously monitored and a sudden increase of the radioactive concentrations is indicated by these monitors, area radiation monitors are not provided.

1.d Equipment decontamination areas

Equipment decontamination is performed in the hot machine shop located at 100'-0" elevation inside CPB. An area radiation monitor (RE-293) is provided. Please refer to DCD Table 12.3-6.

1.e Safe shutdown panel areas

The safe shutdown panels are located in the main control room and the technical support center, in which area radiation monitors are provided. An area monitor is provided for the main control room (RE-275) and another for technical support center (PR-RE-279) to measure gross gamma dose rates.

2. The area radiation monitors (RE-321, RE-322, RE-323, RE-324, and RE-325) are designated to be used in a site-specific Interim Radwaste Storage Facility that is determined by the COL Applicant, in accordance with the response provided in RAI 116-8054, Question No. 14.03.08-4. These area radiation monitors are deleted from Table 12.3-6.

In addition to the above responses, Figure 12.3-6 will be revised to add a note.

Impact on DCD

DCD Tier 2 Table 1.8-2, Subsections 11.4.1.7, 11.4.9, and Figure 12.3-6 will be revised as indicated in Attachment 1 and 2.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environment Report.

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Table 1.8-2 (19 of 29)

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Item No.	Description
COL 11.4(1)	The COL applicant can incorporate an onsite laundry facility for processing of contaminated clothing.
COL 11.4(2)	The COL applicant is to perform a site-specific cost-benefit analysis following the guidance in NRC RG 1.110.
COL 11.4(3)	The COL applicant is to provide reasonable assurance that the provisions and requirements of ANSI/ANS-40.37-2009 are met. The COL applicant is to provide reasonable assurance that mobile and temporary solid radwaste processing and its interconnection to plant systems conform with regulatory requirements and guidance such as 10 CFR 50.34a, 10 CFR 20.1406, and NRC RG 1.143. The COL applicant is to prepare a plan to develop and use operating procedures so the guidance and information in IE Bulletin 80-10 are followed.
COL 11.4(4)	The COL applicant is to provide P&IDs.
COL 11.4(5)	The COL applicant is to prepare the site process control program and the site radiological environmental monitoring program.
COL 11.4(6)	The COL applicant is responsible for the collection, temporary storage, and shipment of mixed waste for offsite treatment and disposal.
COL 11.4(7)	The COL applicant is responsible for the provision of a site-wide IRSF for interim storage of radioactive wastes.
COL 11.4(8)	The COL applicant is to provide a mobile crane to retrieve a waste package that becomes stuck in the lifted condition or that is dropped.
COL 11.4(9)	The COL applicant is also to provide operational procedures to properly ship low-level wastes to external sites in accordance with US NRC and US Department of Transportation (DOT) regulations.
COL 11.4(10)	The COL applicant is to prepare the operational procedures and maintenance programs for the SWMS as related to leak detection and contamination control.
COL 11.4(11)	The COL applicant is to develop plant-wide RG 4.21 life-cycle planning for minimization of contamination program following the guidance in NEI 08-08A, in which the SWMS procedures and programs are to be integrated.
COL 11.4(12)	The COL applicant is to maintain the complete documentation of system design, construction, design modifications, field changes, and operations.
COL 11.5(1)	The COL applicant is to determine the WARN and ALARM setpoints of the PERMSS based on the site-specific conditions and operational requirements.
COL 11.5(2)	The COL applicant is to develop an annual report that specifies the quantity of each principal radionuclide released to unrestricted areas in liquid and gaseous effluents.
COL 11.5(3)	The COL applicant is to provide site-specific procedures that conform with the numerical guides of 10 CFR 50.34a and 10 CFR Part 50, Appendix I.

, and IE Bulletin 80-10

operations

regulatory

and portable radiation monitoring instruments, so that
regulator requirements and guidance

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, and IE Bulletin 80-10 (Reference 1)

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The COL applicant is to provide reasonable assurance that mobile and temporary solid radwaste processing equipment and its interconnections to plant systems conform with regulatory requirements and guidance such as 10 CFR 50.34a (Reference 21), 10 CFR 20.1406 (Reference 26), and NRC RG 1.143 (Reference 15) (COL 11.4(3)). The COL applicant is to prepare a plan to develop and use operating procedures so the guidance and information in IE Bulletin 80-10 (Reference 1) are followed (COL 11.4(3)).

11.4.2 System Description

The primary functions of the SWMS are to process, package, and store the dry and wet solid wastes generated from the plant in accordance with regulatory guidelines, to handle and store dry and low-activity wastes prior to shipment to the offsite disposal facility, and to provide reasonable assurance that plant personnel and public radiation exposure is ALARA.

regulatory

and portable radiation monitoring instruments, so that
regulator requirements and guidance

The SWMS handles wet and dry solid wastes, prepares for the waste transportation and offsite disposal as described in Subsection 11.4.1.4, and is divided into the following subsystems:

- a. Spent resin transfer and packaging subsystem
- b. Spent filter handling subsystem
- c. Dry active waste subsystem
- d. R/O concentrate treatment subsystem
- e. Temporary waste storage subsystem

The expected and maximum annual waste volumes are shown in Table 11.4-1. The expected and design basis (1 percent fuel defect) activity levels of solid waste in the SWMS are presented in Tables 11.4-2 and 11.4-3.

The SWMS boundary starts at the receipt of waste from various waste generation components and ends where the packaged and dewatered waste is loaded onto a truck for

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Instruments, including backflushing provisions, are located in low-radiation areas when possible for accessibility and fulfillment of the ALARA provisions. A list of alarm instruments and location of readouts is presented in Table 11.4-6.

11.4.9 Combined License Information

COL 11.4(1) The COL applicant can incorporate an onsite laundry facility for processing of contaminated clothing.

COL 11.4(2) The COL applicant is to perform a site-specific cost-benefit analysis following the guidance in NRC RG 1.110.

COL 11.4(3) The COL applicant is to provide reasonable assurance that the provisions and requirements of ANSI/ANS-40.37-2009 are met. The COL applicant is to provide reasonable assurance that mobile and temporary solid radwaste processing and its interconnection to plant systems conform with regulatory requirements and guidance such as 10 CFR 50.34a, 10 CFR 20.1406, ~~and~~ NRC RG 1.143. The COL applicant is to prepare a plan to develop and use operating procedures ~~so the guidance and information in IE Bulletin 80-10 are followed.~~

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COL 11.4(4) The COL applicant is to provide P&IDs.

regulatory

COL 11.4(5) The COL applicant is to prepare the site process control program and the site radiological environmental monitoring program.

COL 11.4(6) The COL applicant is responsible for the collection, temporary storage, and shipment of mixed waste for offsite treatment and disposal.

COL 11.4(7) The COL applicant is responsible for the provision of a site-wide IRSF for interim storage of radioactive wastes.

COL 11.4(8) The COL applicant is to provide a mobile crane to retrieve a waste package that becomes stuck in the lifted condition or that is dropped.

Security-Related Information – Withhold Under 10 CFR 2.390

Figure 12.3-6 Radiation Zones(Normal) Auxiliary/Containment Building El.137'-6"