
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.: 207-8247
SRP Section: 12.02 – Radiation Sources
Application Section: 12.2
Date of RAI Issue: 09/11/2015

Question No. 12.02-16

REGULATIONS AND GUIDANCE

10 CFR 52.47(a)(8) requires that the FSAR contain, the information necessary to demonstrate compliance with any technically relevant portions of the Three Mile Island requirements set forth in 10 CFR 50.34(f), except paragraphs (f)(1)(xii), (f)(2)(ix), and (f)(3)(v).

10 CFR 50.34(f)(2)(vii) requires that the applicant preform radiation and shielding design reviews of spaces around systems that may, as a result of an accident, contain accident source term, and design as necessary to permit adequate access to important areas and to protect safety equipment from the radiation environment.

10 CFR 50, GDC 19 requires that radiation exposure for the duration of an accident does not exceed 5 rem whole body, or its equivalent to any part of the body.

SRP 12.2 indicates that the applicant should provide a description of radiation sources during accident conditions in the plant which are used in shielding calculations and that the source terms should be based from NUREG_0737, Item II.B.2, or RG 1.183.

SRP 12.3-12.4 indicates that the staff will conduct shielding design review to ensure that the design permits adequate access to important areas and provides for protection of safety equipment from radiation, following an accident.

ISSUE

While the applicant provided assumptions for developing source post-accident source terms in FSAR Table 12.2-24, consistent with RG 1.183, the applicant does not provide source term information for major post-accident sources (while Table 12.2-24 provides post-accident gap release and early in-vessel release to containment sump water and atmosphere, which are used

as an assumption in developing sources, it does not provide the source terms of major systems or components in radionuclide concentrations or gamma energies).

To develop post-accident source terms in recirculating fluids, the information in Table 12.2-24 is needed, however, source terms are based on the volume of recirculating fluids, size of components, time after the release, and other factors. Therefore, the post-accident source term information currently provided in the FSAR is insufficient to meet the SRP.

In addition to recirculating fluids, the applicant does not provide any source term information for post-accident control room ventilation filters. The assumptions and source terms for these filters are required to ensure that doses do not exceed 5 rem in accordance with GDC 19.

In addition, the applicant does not provide shielding information for the main control room or technical support center.

Therefore, the staff requests the following information:

INFORMATION NEEDED

1. Please update the FSAR to provide source term information for systems that recirculate post-accident fluids outside containment (such as the shutdown cooling system, safety-injection system or other systems containing radioactive fluid), with time intervals showing how the source term changes during the duration of the accident. Also in the FSAR, indicate which systems are included in the source terms provided and provide the total volume of recirculating fluid (or in the response, point to information elsewhere in the FSAR where this information can be found). In the response, provide the basis for the volume of recirculating fluid used in developing the source term.
2. Update the FSAR to provide maximum post-accident source term information for all control room and technical support center emergency ventilation filters using appropriate assumptions for post-accident filter loading (for example, using assumptions for radioactive material entering the control room ventilation system, equivalent to material assumed in the Chapter 15 control room dose analysis).
3. Update the FSAR to provide radioactive source dimensions and parameters for major post-accident source term components such as the shutdown cooling pumps and accident emergency control room ventilation filters and identify the locations of these components.
4. Indicate if there are any filters (either normal operation or accident) physically within the main control room or technical support center areas (those areas requiring continuous access). If so, discuss shielding of these filters and the dose from these components during design basis accidents.
5. Indicate radiation shielding thicknesses for the main control room and technical support center in the FSAR and indicate how the design ensures that there are not radiation streaming paths that could affect doses to these areas.
6. Ensure that in responding to the above questions, that information in FSAR Chapter 15 is still valid (for example, ensure that emergency ventilation filter shine dose rates

provided in Chapter 15 are still accurate). If not, please update the FSAR, as appropriate.

Response – Rev. 2

1. To determine the source term in the systems containing post-accident radioactive fluids, it is assumed that all radionuclides except noble gases released to the containment atmosphere until the early in-vessel release phase of the AST (Alternative Source Term) are mixed instantaneously and homogeneously in the primary containment sump water at the start of the accident. The specific activity of circulating water as a function of time is then calculated using the volume of the circulating water considering radioactive decay and in-growth of daughters as shown in the equation below.

$$N = \frac{C}{V} \times R \times e^{-\lambda t}$$

Where,

N : specific activity of circulating water (Bq/cm³)

R : release fraction, Table 12.2-24 of DCD

C : core inventory (Bq)

V : total volume of circulating water (cm³), 2.44E+09 cm³, Table 15.6.5-13 of DCD

λ : decay constant (hr⁻¹)

t : decay time (hr)

The total source terms (i.e., total activity) in each component of the circulating systems are calculated by multiplying the above specific activity by the volume of each component. The radioactive concentrations of post-accident recirculating water (i.e., IRWST) will be added to DCD Table 12.2-24 [including some additional changes based on recalculations.](#)

[Based on a question raised during the Shielding Audit, the related shielding calculations for a post-accident condition were recalculated considering the revised radioactive concentrations in the Table 12.2-24. Since these revised external dose rates can increase Accident Mission Doses, KHNP performed the impact evaluation of the Accident Mission Dose analyses. Along with the above change, it was found that two more changes should be considered, they are described below.](#)

- ① [Revised on-site atmospheric dispersion factors provided by the response to RAI 20-7912, Questions 02.03.04-1.](#)
- ② [Changes of the airborne concentration used for the inhalation and submersion dose rates: In the previous Mission Dose analyses, the radionuclide concentration at the point of the HVAC intake was taken into account conservatively. However, since the operator will not continuously stand in front of the intake point during the](#)

LOCA condition; for a realistic analysis of the inhalation dose rate, the diffused and saturated concentrations of the radioactive materials in the whole area of Auxiliary building should be considered.

Base on above three changes, the Accident Mission Doses were re-evaluated, and DCD Table 12.4-8 will be revised.

The source term estimation method described above is applicable to the following components of the engineered safety systems which use water in the IRWST during post-accident conditions:

- Shutdown Cooling System : shutdown cooling pumps, shutdown cooling mini flow heat exchanger
- Safety Injection System: safety injection pump
- Containment Spray System : containment spray pump, containment spray heat exchanger, containment spray mini flow heat exchanger
- Piping : associated pipes of the above systems

The list of the above components will be added to DCD Table 12.2-24 and the volumes which are considered as a source region are provided in Table 1.

Table 1 Source dimensions for component containing post-accident radioactive fluids

Component	Location		Source		Source Dimension			
	Elevation	Room No.	Shape	Qty	Diameter (cm)	Length (cm)	Height (cm)	Volume (cm ³)
Shutdown cooling pump	50 ft	050-A04A 050-A04B	Cylinder	1	38.1	-	609.6	6.95E+05
Shutdown cooling mini flow heat exchanger	50 ft	050-A04A 050-A04B	U-tube	80	1.41	-	173.4	4.33E+04
Safety injection pump	50 ft	050-A02C 050-A02D 050-A03A 050-A03B	Cylinder	1	25.5	-	609.6	3.11E+05
Containment spray pump	50 ft	050-A01C 050-A01D	Cylinder	1	38.1	-	609.6	6.95E+05
Containment spray heat exchanger	55 ft	055-A01C 055-A01D	U-tube	346	2.93	-	701.0	3.27E+06
Containment spray mini flow heat exchanger	50 ft	050-A01C 050-A01D	Cylinder	24	2.29	-	186.1	3.68E+04

2. It is assumed that the source term within the control room emergency makeup ACU is the largest value in the case of a Post-LOCA. The RADTRAD code calculates the cumulative elemental and organic iodine atoms and the aerosol mass deposited on the MCR recirculation charcoal/HEPA filters.

The amount of total iodine and aerosol activities deposited on the charcoal and HEPA filters in the Main Control Room Emergency Ventilation System is presented in Table 2. The values will be added to DCD Table 12.2-24.

Table 2 Post-Accident Total Iodine and Aerosol Activity on MCR Charcoal/HEPA Filters

Isotope	Cumulative Activity (Bq)				
	1 hr	1 day	1 hr	1 week	1 hr
I-131	2.77E+09	1.75E+10	2.25E+10	4.84E+25	3.12E+10
I-132	3.70E+09	2.33E+10	2.99E+10	7.69E+23	4.16E+10
I-133	5.30E+09	3.34E+10	4.29E+10	9.99E+24	5.96E+10
I-134	5.19E+08	3.28E+09	4.22E+09	4.16E+22	5.87E+09
I-135	3.96E+09	2.49E+10	3.20E+10	2.37E+24	4.45E+10
Co-58	1.67E+05	9.05E+05	9.54E+05	1.63E-02	9.90E+05
Co-60	1.28E+05	6.93E+05	7.30E+05	3.52E-01	7.58E+05
Rb-86	5.68E+06	3.08E+07	3.24E+07	2.17E-01	3.37E+07
Sr-89	1.99E+08	1.08E+09	1.14E+09	2.13E+01	1.18E+09
Sr-90	1.79E+07	9.69E+07	1.02E+08	4.08E+02	1.06E+08
Sr-91	2.11E+08	1.14E+09	1.20E+09	1.81E-01	1.25E+09
Sr-92	1.17E+08	6.32E+08	6.67E+08	2.89E-02	6.92E+08
Y-90	2.46E+05	1.33E+06	1.40E+06	1.40E-03	1.46E+06
Y-91	2.46E+06	1.33E+07	1.40E+07	3.11E-01	1.46E+07
Y-92	9.73E+06	5.27E+07	5.56E+07	3.14E-03	5.77E+07
Y-93	1.56E+06	8.46E+06	8.91E+06	1.45E-03	9.25E+06
Zr-95	2.85E+06	1.54E+07	1.63E+07	4.12E-01	1.69E+07
Zr-97	2.37E+06	1.28E+07	1.35E+07	3.85E-03	1.40E+07
Nb-95	2.84E+06	1.54E+07	1.62E+07	2.26E-01	1.69E+07
Mo-99	3.59E+07	1.95E+08	2.05E+08	2.33E-01	2.13E+08
Tc-99m	3.26E+07	1.77E+08	1.86E+08	1.93E-02	1.93E+08
Ru-103	3.38E+07	1.83E+08	1.93E+08	3.25E+00	2.00E+08
Ru-105	1.54E+07	8.33E+07	8.78E+07	7.11E-03	9.11E+07
Ru-106	1.51E+07	8.21E+07	8.65E+07	1.41E+01	8.97E+07
Rh-105	2.28E+07	1.24E+08	1.30E+08	8.41E-02	1.35E+08
Sb-127	3.67E+07	1.99E+08	2.10E+08	4.27E-01	2.18E+08
Sb-129	7.61E+07	4.12E+08	4.34E+08	4.21E-02	4.51E+08
Te-127	3.72E+07	2.02E+08	2.13E+08	4.39E-02	2.21E+08
Te-127m	6.30E+06	3.41E+07	3.60E+07	2.07E+00	3.73E+07
Te-129	9.43E+07	5.11E+08	5.39E+08	1.40E-02	5.59E+08
Te-129m	2.52E+07	1.36E+08	1.44E+08	2.60E+00	1.49E+08
Te-131m	7.62E+07	4.13E+08	4.35E+08	2.97E-01	4.52E+08
Te-132	5.32E+08	2.88E+09	3.04E+09	5.45E+00	3.16E+09
Cs-134	6.11E+08	3.31E+09	3.49E+09	1.47E+03	3.62E+09
Cs-136	1.56E+08	8.45E+08	8.90E+08	6.61E+00	9.24E+08
Cs-137	3.39E+08	1.83E+09	1.93E+09	1.21E+04	2.01E+09
Ba-139	5.88E+07	3.19E+08	3.36E+08	1.12E-02	3.49E+08
Ba-140	3.00E+08	1.63E+09	1.72E+09	1.28E+01	1.78E+09
La-140	4.57E+06	2.47E+07	2.61E+07	2.55E-02	2.71E+07
La-141	1.56E+06	8.46E+06	8.92E+06	8.58E-04	9.25E+06
La-142	6.40E+05	3.47E+06	3.65E+06	1.39E-04	3.79E+06
Ce-141	6.82E+06	3.69E+07	3.89E+07	7.43E-01	4.04E+07
Ce-143	6.50E+06	3.52E+07	3.71E+07	3.04E-02	3.85E+07
Ce-144	4.94E+06	2.68E+07	2.82E+07	4.82E+00	2.93E+07
Pr-143	2.73E+06	1.48E+07	1.56E+07	1.26E-01	1.61E+07
Nd-147	1.08E+06	5.86E+06	6.18E+06	4.16E-02	6.41E+06
Np-239	8.63E+07	4.67E+08	4.93E+08	1.16E+00	5.11E+08
Pu-238	2.54E+04	1.38E+05	1.45E+05	4.62E+00	1.51E+05
Pu-239	1.22E+03	6.62E+03	6.98E+03	6.11E+01	7.24E+03
Pu-240	2.30E+03	1.24E+04	1.31E+04	3.13E+01	1.36E+04
Pu-241	6.45E+05	3.50E+06	3.69E+06	1.95E+01	3.82E+06

Am-241	2.78E+02	1.50E+03	1.59E+03	2.52E-01	1.65E+03
Cm-242	1.39E+05	7.53E+05	7.94E+05	1.30E-01	8.23E+05
Cm-244	1.98E+04	1.07E+05	1.13E+05	7.62E-01	1.18E+05

3. Source dimensions for component containing post-accident radioactive fluids are presented in Table 1 and will be added to DCD Table 12.2-25.

Dimensions for the MCR filter is provided in DCD Table 15.6-13 (3 of 3). The geometric model for the MCR charcoal filter shine dose calculation is shown in Figure 1. This model is based on the location of the MCR ACU and surrounding concrete shielding. In the shielding analysis, the charcoal tray of height 1.65 m is conservatively used.

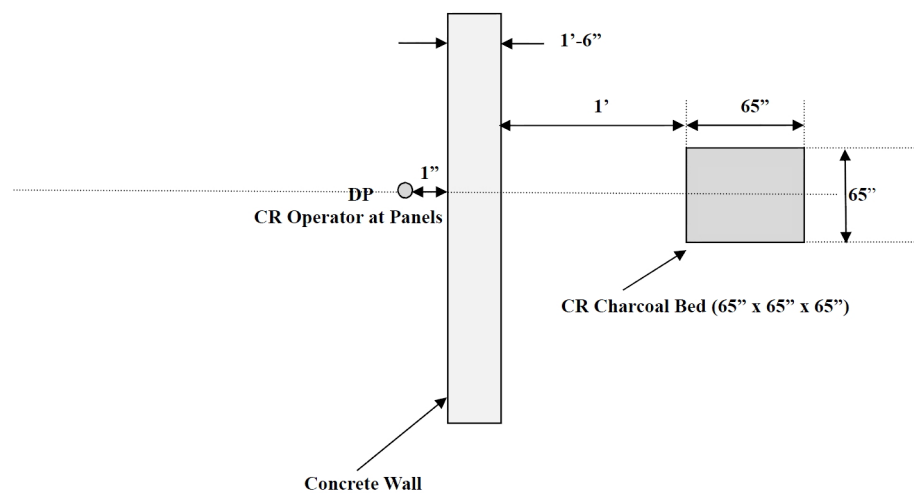


Figure 1 MCR Charcoal Filter Shine Geometric Shielding Model

4. There are no additional filters to be considered in the shielding analysis within the CRE except for the emergency makeup ACU.
5. The CRE is designed in accordance with the design requirements in 10 CFR Part 50, Appendix A, GDC 19, and is shielded so that, after a postulated DBA, radiation exposure in the CRE for the duration of the accident does not exceed 50 mSv TEDE.

The CRE will be maintained at a minimum 3.175 mm (0.125 in) of water gauge of positive pressure with respect to the surrounding areas to provide habitability and to prevent uncontrolled incoming air leakage during normal and emergency modes of operation.

Since the elevation of MCR and TSC is 156'-0" and the major penetrations of the containment building toward the MCR/TSC direction are located in other elevations, there is no radiation streaming path from containment to the MCR/TSC during the accident.

The shielding design and the thickness for the MCR/TSC are described in detail in Subsection 6.4.2.5 and Table 6.4-1 of the DCD.

6. As described in DCD Subsection 6.4.2.5, the MCR/TSC shielding design is performed in accordance with the guidance in RG 1.183, which is consistent with the approaches applied in Chapter 15. The assumptions, parameters and results provided in DCD Subsection 15.6.5.5 are still valid with this response.

Impact on DCD

DCD Table [12.2-24](#) and [12.4-8](#) will be revised as indicated in Attachment 1.

DCD Table 12.2-25 will be revised as indicated in Attachment 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 Environmental Report.

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Table 12.2-24

(1 of 14)

Source Terms for Post-Accident Shielding Analysis

Source Term ⁽¹⁾	Gap Release		Early In-Vessel Release Plus Gap Release	
	Nuclide Group ⁽²⁾	Percentage	Nuclide Group ⁽²⁾	Percentage
Liquid-containing systems ⁽³⁾	2 and 3	5 %	2	40 %
			3	30 %
			4	5 %
			5	2 %
			6	0.25 %
			7	0.02 %
			8	0.05 %
			Airborne	1, 2, and 3
2	40 %			
3	30 %			
4	5 %			
5	2 %			
6	0.25 %			
7	0.02 %			
8	0.05 %			

a. Initial Release Fraction from the Core

(1) The source terms represent the initial releases from the core into the reactor containment building sump water and atmosphere.

(2) Nuclide Group 1: Xe, Kr

Nuclide Group 2: I, Br

Nuclide Group 3: Cs, Rb

Nuclide Group 4: Te, Sb, Se

Nuclide Group 5: Sr, Ba

Nuclide Group 6: Co, Ru, Rh, Pd, Mo, Tc

Nuclide Group 7: Am, Cm, La, Zr, Nd, Eu, Nb, Pm, Pr, Sm, Y

Nuclide Group 8: Ce, Pr, Nd

(3) The following components of the engineered safety systems use water in the IRWST during post-accident conditions:

- Shutdown Cooling System : shutdown cooling pumps, shutdown cooling mini flow heat exchanger
- Safety Injection System : safety injection pump
- Containment Spray System : containment spray pump, containment spray heat exchanger, containment spray mini flow heat exchanger
- Piping : associated pipes of the above systems

Add the "A" following end of this table

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“A” (Update Table 12.2-24) (1 of 13)

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Table 12.2-24 (2 of 14)

b. Radioactive Concentration of Post-Accident Recirculating Water (Bq/cc) (1 of 5)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Se-84	2.75E+07	9.25E+01	0.00E+00	0.00E+00	0.00E+00
Se-85	1.37E+07	2.24E-21	0.00E+00	0.00E+00	0.00E+00
Se-87	2.03E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Br-84	2.25E+08	6.08E+07	5.26E-06	8.54E-88	0.00E+00
Br-85	2.59E+08	1.30E+02	0.00E+00	0.00E+00	0.00E+00
Br-87	4.25E+08	1.61E-11	0.00E+00	0.00E+00	0.00E+00
Br-88	4.28E+08	1.40E-58	0.00E+00	0.00E+00	0.00E+00
Br-89	2.89E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kr-85	0.00E+00	3.93E+00	2.73E+01	2.79E+01	2.78E+01
Kr-85m	0.00E+00	2.39E+06	6.80E+04	1.43E-05	1.16E-42
Rb-86	1.59E+06	1.59E+06	1.53E+06	1.23E+06	5.22E+05
Rb-88	5.74E+08	5.55E+07	2.55E-16	0.00E+00	0.00E+00
Rb-89	7.62E+08	5.15E+07	6.41E-20	0.00E+00	0.00E+00
Rb-90	7.19E+08	9.00E+01	0.00E+00	0.00E+00	0.00E+00
Rb-91	9.04E+08	2.17E-10	0.00E+00	0.00E+00	0.00E+00
Sr-89	4.68E+07	4.69E+07	4.63E+07	4.27E+07	3.11E+07
Sr-90	4.20E+06	4.20E+06	4.20E+06	4.20E+06	4.19E+06
Sr-91	6.30E+07	5.86E+07	1.09E+07	2.99E+02	9.65E-16
Sr-92	6.35E+07	4.92E+07	1.37E+05	1.38E-11	6.67E-73
Sr-95	5.93E+07	1.24E-34	0.00E+00	0.00E+00	0.00E+00
Y-90	4.43E+04	8.90E+04	9.94E+05	3.52E+06	4.19E+06
Y-91	5.74E+05	5.92E+05	9.13E+05	9.24E+05	7.03E+05
Y-91m	3.64E+05	1.98E+07	6.88E+06	1.88E+02	6.07E-16
Y-92	6.41E+05	1.04E+07	1.45E+06	1.08E-06	1.23E-53
Y-93	4.60E+05	4.29E+05	8.86E+04	4.52E+00	1.60E-16
Y-95	7.08E+05	1.35E+04	3.68E-36	0.00E+00	0.00E+00
Zr-93	0.00E+00	2.30E-05	2.80E-04	3.46E-04	3.46E-04
Zr-95	6.70E+05	6.70E+05	6.63E+05	6.21E+05	4.84E+05
Zr-97	6.37E+05	6.11E+05	2.38E+05	6.48E+02	9.53E-08
Nb-93m	0.00E+00	6.29E-11	2.30E-08	2.88E-07	1.32E-06
Nb-95	6.68E+05	6.68E+05	6.68E+05	6.65E+05	6.21E+05

7.63E+08

7.20E+08

4.21E+06

4.21E+06

8.92E+04

4.44E+04

6.71E+05

6.71E+05

5.16E+07

9.01E+01

4.21E+06

4.21E+06

4.20E+06

9.97E+05

3.53E+06

4.20E+06

6.64E+05

6.22E+05

4.85E+05

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“A” (Update Table 12.2-24) (2 of 13)

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Table 12.2-24 (3 of 14)

b. Radioactive Concentration of Post-Accident Recirculating Water (Bq/cc) (2 of 5)

	Nuclide	Elapsed Time after the onset of the Accident					
		0 hr	1 hr	1 day	1 week	1 month	
4.28E+01	Nb-95m	0.00E+00	4.27E+01	9.32E+02	3.79E+03	4.09E+03	9.33E+02
	Nb-97	0.00E+00	2.69E+05	2.56E+05	6.98E+02	1.03E-07	
	Nb-97m	0.00E+00	5.80E+05	2.26E+05	6.14E+02	9.04E-08	
	Nb-99	4.14E+05	6.81E-71	0.00E+00	0.00E+00	0.00E+00	
3.23E-03	Mo-99	8.74E+06	8.65E+06	6.79E+06	1.50E+06	4.56E+03	7.25E-02
7.70E+06	Mo-103	7.79E+06	6.76E-12	0.00E+00	0.00E+00	0.00E+00	7.70E+06
	Tc-99	0.00E+00	3.22E-03	7.24E-02	2.76E-01	3.34E-01	
5.17E+06	Tc-99m	7.69E+06	7.69E+06	6.57E+06	1.46E+06	4.44E+03	1.43E+05
6.04E+06	Tc-103	7.89E+06	1.67E-15	0.00E+00	0.00E+00	0.00E+00	2.46E-05
	Tc-106	4.52E+06	2.32E-23	0.00E+00	0.00E+00	0.00E+00	9.23E-43
	Ru-103	7.94E+06	7.93E+06	7.80E+06	7.02E+06	4.68E+06	
	Ru-105	6.03E+06	5.16E+06	1.42E+05	2.45E-05	9.22E-43	
	Ru-106	3.57E+06	3.57E+06	3.56E+06	3.52E+06	3.37E+06	6.04E-06
	Rh-103m	0.00E+00	4.14E+06	7.79E+06	7.01E+06	4.67E+06	2.27E-43
8.79E+06	Rh-105	5.40E+06	5.40E+06	3.89E+06	2.33E+05	4.65E+00	
8.86E+06	Rh-105m	0.00E+00	1.27E+06	3.50E+04	6.03E-06	2.26E-43	7.40E+06
	Rh-106	0.00E+00	3.57E+06	3.56E+06	3.52E+06	3.37E+06	
	Sb-127	8.85E+06	8.78E+06	7.39E+06	2.51E+06	3.99E+04	
4.33E+07	Sb-129	3.03E+07	2.59E+07	6.91E+05	9.72E-05	1.67E-42	
6.85E+07	Sb-131	7.44E+07	1.22E+07	1.06E-11	0.00E+00	0.00E+00	
	Sb-132	4.32E+07	1.53E+01	0.00E+00	0.00E+00	0.00E+00	
	Sb-133	6.84E+07	2.04E+00	0.00E+00	0.00E+00	0.00E+00	
	Sb-134	1.32E+07	4.00E-92	0.00E+00	0.00E+00	0.00E+00	
	Te-127	8.77E+06	8.77E+06	8.14E+06	3.75E+06	1.29E+06	
	Te-127m	1.48E+06	1.48E+06	1.48E+06	1.45E+06	1.27E+06	
	Te-129	2.89E+07	2.80E+07	4.44E+06	3.23E+06	2.01E+06	
	Te-129m	5.90E+06	5.90E+06	5.81E+06	5.13E+06	3.19E+06	
	Te-131	7.56E+07	1.77E+07	2.50E+06	8.96E+04	2.59E-01	
	Te-131m	1.93E+07	1.89E+07	1.11E+07	3.98E+05	1.15E+00	
	Te-132	1.29E+08	1.28E+08	1.04E+08	2.91E+07	2.18E+05	
	Te-133	1.09E+08	1.05E+07	2.29E-01	2.58E-48	0.00E+00	

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“A” (Update Table 12.2-24) (3 of 13)

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Table 12.2-24 (4 of 14)

b. Radioactive Concentration of Post-Accident Recirculating Water (Bq/cc) (3 of 5)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Te-133m	9.10E+07	4.30E+07	1.36E+00	1.54E-47	0.00E+00
Te-134	1.92E+08	7.10E+07	8.18E-03	4.90E-65	0.00E+00
Te-135	9.49E+07	3.42E-49	0.00E+00	0.00E+00	0.00E+00
I-129	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01
I-131	7.26E+08	7.24E+08	6.67E+08	3.99E+08	5.49E+07
I-132	1.05E+09	8.10E+08	1.08E+08	3.00E+07	2.25E+05
I-133	1.54E+09	1.49E+09	6.95E+08	5.72E+06	5.87E-02
I-134	1.75E+09	8.56E+08	1.43E+01	5.12E-49	0.00E+00
I-135	1.45E+09	1.31E+09	1.17E+08	3.24E+01	2.35E-24
I-137	7.48E+08	6.62E-36	0.00E+00	0.00E+00	0.00E+00
I-138	3.75E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xe-131m	0.00E+00	1.92E+04	4.30E+05	1.96E+06	1.63E+06
Xe-133	0.00E+00	8.09E+06	1.27E+08	1.20E+08	5.92E+06
Xe-133m	0.00E+00	5.72E+05	8.14E+06	3.07E+06	2.19E+03
Xe-135	0.00E+00	9.53E+07	3.09E+08	1.07E+04	6.22E-15
Xe-135m	0.00E+00	2.08E+08	2.01E+07	5.56E+00	4.04E-25
Cs-134	1.70E+08	1.70E+08	1.70E+08	1.69E+08	1.65E+08
Cs-135	3.65E+02	3.65E+02	3.65E+02	3.65E+02	3.65E+02
Cs-136	4.36E+07	4.35E+07	4.14E+07	3.02E+07	8.98E+06
Cs-137	9.41E+07	9.41E+07	9.41E+07	9.41E+07	9.39E+07
Cs-138	1.12E+09	3.08E+08	3.86E-05	6.51E-86	0.00E+00
Cs-140	9.69E+08	1.00E-08	0.00E+00	0.00E+00	0.00E+00
Ba-137m	5.98E+06	8.90E+07	8.90E+07	8.90E+07	8.89E+07
Ba-139	7.19E+07	4.36E+07	4.37E+02	2.20E-29	0.00E+00
Ba-140	7.11E+07	7.09E+07	6.73E+07	4.87E+07	1.40E+07
Ba-143	5.80E+07	1.20E-72	0.00E+00	0.00E+00	0.00E+00
Ba-144	4.84E+07	1.47E-91	0.00E+00	0.00E+00	0.00E+00
La-140	7.13E+05	1.91E+06	2.39E+07	5.15E+07	1.61E+07
La-141	6.56E+05	5.50E+05	9.62E+03	9.57E-08	6.40E-50
La-142	6.57E+05	4.25E+05	1.88E+01	1.02E-26	0.00E+00
La-143	6.51E+05	3.34E+04	7.09E-26	0.00E+00	0.00E+00

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“A” (Update Table 12.2-24) (4 of 13)

Table 12.2-24 (5 of 14)

b. Radioactive Concentration of Post-Accident Recirculating Water (Bq/cc) (4 of 5)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
La-144	5.93E+05	4.79E-22	0.00E+00	0.00E+00	0.00E+00
Ce-141	6.42E+05	1.60E+06	1.57E+06	1.38E+06	8.46E+05
Ce-143	6.40E+05	1.64E+06	9.91E+05	4.81E+04	4.44E-01
Ce-144	1.16E+06	1.16E+06	1.16E+06	1.14E+06	1.08E+06
Pr-143	4.67E+05	6.39E+05	6.71E+05	5.71E+05	1.78E+05
Pr-144	4.66E+05	1.10E+06	1.16E+06	1.14E+06	1.08E+06
Pr-144m	0.00E+00	1.65E+04	1.65E+04	1.63E+04	1.54E+04
Nd-147	2.57E+05	2.56E+05	2.41E+05	1.65E+05	3.87E+04
Pm-147	0.00E+00	7.74E+00	1.80E+02	1.05E+03	2.47E+03
Sm-147	0.00E+00	2.89E-15	1.63E-12	7.06E-11	8.65E-10
Tl-207	0.00E+00	1.24E-21	1.62E-21	5.24E-22	8.85E-22
Tl-208	6.83E-19	0.00E+00	0.00E+00	0.00E+00	2.29E-21
Tl-209	4.00E-16	0.00E+00	3.67E-20	3.19E-20	6.68E-21
Pb-209	0.00E+00	8.72E-21	7.73E-21	6.82E-19	4.81E-19
Pb-210	4.59E-16	0.00E+00	3.99E-16	4.62E-16	0.00E+00
Pb-211	7.83E-17	0.00E+00	1.41E-22	0.00E+00	1.61E-22
Pb-212	0.00E+00	3.13E-22	0.00E+00	0.00E+00	9.82E-21
Pb-214	0.00E+00	1.09E-15	1.09E-15	1.81E-15	4.64E-15
Bi-210	0.00E+00	7.82E-17	4.58E-16	6.84E-16	4.92E-16
Bi-211	1.15E-15	0.00E+00	1.76E-21	1.70E-20	1.26E-21
Bi-213	5.96E-16	0.00E+00	2.75E-22	1.03E-18	4.55E-18
Bi-214	0.00E+00	1.14E-15	1.21E-15	1.54E-15	4.67E-15
Po-210	3.85E-16	5.95E-16	9.23E-16	1.37E-15	1.04E-15
Po-211	0.00E+00	1.52E-24	2.40E-24	0.00E+00	1.61E-25
Po-213	0.00E+00	2.69E-22	1.01E-18	4.45E-18	2.46E-18
Po-214	0.00E+00	3.84E-16	4.37E-16	7.67E-16	3.89E-15
Po-215	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-21
Po-216	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-20
Po-218	0.00E+00	6.34E-16	9.98E-16	1.28E-15	4.64E-15
At-217	0.00E+00	2.15E-18	2.87E-18	4.35E-19	1.32E-19
Rn-220	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-20

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“A” (Update Table 12.2-24) (5 of 13)

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Table 12.2-24 (6 of 14)

b. Radioactive Concentration of Post-Accident Recirculating Water (Bq/cc) (5 of 5)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Rn-222	0.00E+00	6.00E-16	2.53E-16	4.19E-16	4.00E-15
Fr-221	0.00E+00	0.00E+00	1.23E-17	4.08E-18	7.07E-19
Fr-223	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.54E-22
Ra-224	0.00E+00	4.69E-22	0.00E+00	5.97E-22	1.33E-21
Ra-225	0.00E+00	3.85E-18	2.41E-18	0.00E+00	2.46E-18
Ra-226	0.00E+00	3.49E-16	7.43E-16	1.35E-15	6.77E-15
Ra-228	0.00E+00	7.14E-22	0.00E+00	0.00E+00	6.90E-20
Ac-225	0.00E+00	1.84E-18	1.09E-20	3.42E-19	1.95E-18
Ac-227	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.79E-20
Ac-228	0.00E+00	3.55E-20	0.00E+00	2.21E-22	4.05E-20
Th-228	0.00E+00	1.03E-20	0.00E+00	4.76E-20	6.32E-20
Th-229	0.00E+00	2.40E-18	1.82E-18	6.53E-18	4.90E-18
Th-230	0.00E+00	9.12E-16	5.71E-13	2.79E-11	5.14E-10
Th-231	0.00E+00	4.34E-13	2.06E-10	4.29E-09	2.24E-08
Th-232	0.00E+00	1.12E-21	0.00E+00	1.41E-19	2.69E-18
Pa-231	0.00E+00	0.00E+00	0.00E+00	7.13E-16	1.85E-14
Pa-233	0.00E+00	1.29E-12	7.40E-10	3.55E-08	5.99E-07
U-233	0.00E+00	0.00E+00	6.15E-18	1.22E-15	7.34E-14
U-234	0.00E+00	1.93E-06	4.63E-05	3.24E-04	1.39E-03
U-235	0.00E+00	3.22E-11	7.76E-10	5.48E-09	2.36E-08
U-236	0.00E+00	1.82E-09	4.37E-08	3.06E-07	1.31E-06
U-237	0.00E+00	1.59E-02	3.63E-01	1.91E+00	3.54E+00
Np-237	0.00E+00	2.41E-09	5.83E-08	4.26E-07	2.07E-06
Np-239	2.11E+07	2.08E+07	1.57E+07	2.69E+06	3.09E+03
Pu-238	5.96E+03	5.96E+03	5.96E+03	5.96E+03	5.98E+03
Pu-239	2.87E+02	2.87E+02	2.88E+02	2.92E+02	2.93E+02
Pu-240	5.39E+02	5.39E+02	5.39E+02	5.39E+02	5.39E+02
Pu-241	1.52E+05	1.52E+05	1.52E+05	1.52E+05	1.51E+05
Am-241	6.52E+01	6.52E+01	6.59E+01	6.99E+01	8.52E+01
Cm-242	3.27E+04	3.27E+04	3.26E+04	3.17E+04	2.88E+04
Cm-244	4.66E+03	4.66E+03	4.66E+03	4.66E+03	4.65E+03

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“A” (Update Table 12.2-24) (6 of 13)

Table 12.2-24 (7 of 14)

c. Radioactive Concentration of Post-Accident Airborne in Containment (Bq/cc) (1 of 6)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Se-84	7.56E+05	2.54E+00	0.00E+00	0.00E+00	0.00E+00
Se-85	3.77E+05	6.15E-23	0.00E+00	0.00E+00	0.00E+00
Se-87	5.60E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Br-84	5.92E-12	1.67E+06	1.45E-07	2.35E-89	0.00E+00
Br-85	6.55E-11	3.57E+00	0.00E+00	0.00E+00	0.00E+00
Br-87	2.03E-10	4.43E-13	0.00E+00	0.00E+00	0.00E+00
Br-88	6.82E-10	3.86E-60	0.00E+00	0.00E+00	0.00E+00
Br-89	2.56E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kr-85	6.62E+05	6.62E+05	6.62E+05	6.61E+05	6.59E+05
Kr-85m	1.78E+07	1.53E+07	4.36E+05	9.20E-05	7.46E-42
Kr-87	3.65E+07	2.12E+07	7.60E+01	6.21E-33	0.00E+00
Kr-88	5.16E+07	4.04E+07	1.47E+05	8.04E-11	2.48E-69
Kr-89	6.63E+07	1.28E+02	0.00E+00	0.00E+00	0.00E+00
Kr-90	7.21E+07	2.13E-26	0.00E+00	0.00E+00	0.00E+00
Kr-91	4.97E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rb-86	1.89E+05	1.89E+05	1.82E+05	1.46E+05	6.20E+04
Rb-87	0.00E+00	4.70E-08	1.12E-07	1.12E-07	1.12E-07
Rb-88	1.58E+07	4.11E+07	1.65E+05	8.98E-11	2.77E-69
Rb-89	2.10E+07	2.57E+06	3.20E-21	0.00E+00	0.00E+00
Rb-90	1.98E+07	9.08E+00	1.12E-96	0.00E+00	0.00E+00
Rb-90m	0.00E+00	7.75E+01	1.90E-95	0.00E+00	0.00E+00
Rb-91	2.49E+07	5.97E-12	0.00E+00	0.00E+00	0.00E+00
Sr-89	1.29E+06	1.30E+06	1.28E+06	1.18E+06	8.60E+05
Sr-90	1.16E+05	1.16E+05	1.16E+05	1.16E+05	1.16E+05
Sr-91	1.73E+06	1.61E+06	3.00E+05	8.21E+00	2.65E-17
Sr-92	1.75E+06	1.36E+06	3.78E+03	3.81E-13	1.84E-74
Sr-95	1.63E+06	3.40E-36	0.00E+00	0.00E+00	0.00E+00
Y-90	1.22E+03	2.45E+03	2.75E+04	9.73E+04	1.16E+05
Y-91	1.58E+04	1.63E+04	2.51E+04	2.54E+04	1.93E+04
Y-91m	1.00E+04	5.44E+05	1.89E+05	5.17E+00	1.67E-17
Y-92	1.77E+04	2.88E+05	3.98E+04	2.97E-08	3.40E-55

6.19E+06
7.14E+06
1.17E+07
1.18E+07
7.95E+06

4.36E+04
4.37E+04

4.21E+04
3.37E+04
1.43E+04

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"A" (Update Table 12.2-24) (7 of 13)

Table 12.2-24 (8 of 14)

c. Radioactive Concentration of Post-Accident Airborne in Containment (Bq/cc) (2 of 6)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Y-93	1.27E+04	1.19E+04	2.45E+03	1.25E-01	4.41E-18
Y-95	1.95E+04	3.71E+02	1.01E-37	0.00E+00	0.00E+00
Zr-93	0.00E+00	6.34E-07	7.72E-06	9.56E-06	9.56E-06
Zr-95	1.85E+04	1.85E+04	1.83E+04	1.71E+04	1.34E+04
Zr-97	1.75E+04	1.68E+04	6.54E+03	1.78E+01	2.62E-09
Nb-93m	0.00E+00	1.74E-12	6.34E-10	7.94E-09	3.65E-08
Nb-95	1.84E+04	1.84E+04	1.84E+04	1.83E+04	1.71E+04
Nb-95m	0.00E+00	1.18E+00	2.57E+01	1.05E+02	1.13E+02
Nb-97	0.00E+00	7.38E+03	7.05E+03	1.92E+01	2.82E-09
Nb-97m	0.00E+00	1.59E+04	6.20E+03	1.69E+01	2.48E-09
Nb-99	1.14E+04	1.88E-72	0.00E+00	0.00E+00	0.00E+00
Mo-99	2.41E+05	2.38E+05	1.87E+05	4.13E+04	1.26E+02
Mo-103	2.15E+05	1.86E-13	0.00E+00	0.00E+00	0.00E+00
Tc-99	0.00E+00	8.89E-05	2.00E-03	7.61E-03	9.20E-03
Tc-99m	2.12E+05	2.12E+05	1.81E+05	4.03E+04	1.22E+02
Tc-103	2.17E+05	4.60E-17	0.00E+00	0.00E+00	0.00E+00
Tc-106	1.24E+05	6.37E-25	0.00E+00	0.00E+00	0.00E+00
Ru-103	2.19E+05	2.19E+05	2.15E+05	1.94E+05	1.29E+05
Ru-105	1.66E+05	1.42E+05	3.92E+03	6.76E-07	2.54E-44
Ru-106	9.82E+04	9.82E+04	9.80E+04	9.69E+04	9.28E+04
Rh-103m	0.00E+00	1.14E+05	2.15E+05	1.93E+05	1.29E+05
Rh-105	1.49E+05	1.49E+05	1.07E+05	6.42E+03	1.28E-01
Rh-105m	0.00E+00	3.49E+04	9.62E+02	1.66E-07	6.23E-45
Rh-106	0.00E+00	9.82E+04	9.80E+04	9.69E+04	9.28E+04
Sb-127	2.44E+05	2.42E+05	2.04E+05	6.92E+04	1.10E+03
Sb-129	8.35E+05	7.13E+05	1.90E+04	2.68E-06	4.59E-44
Sb-131	2.05E+06	3.36E+05	2.92E-13	0.00E+00	0.00E+00
Sb-132	1.19E+06	4.22E-01	0.00E+00	0.00E+00	0.00E+00
Sb-133	1.89E+06	5.63E-02	0.00E+00	0.00E+00	0.00E+00
Sb-134	3.64E+05	1.10E-93	0.00E+00	0.00E+00	0.00E+00
Te-127	2.42E+05	2.42E+05	2.24E+05	1.03E+05	3.54E+04

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"A" (Update Table 12.2-24) (8 of 13)

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Table 12.2-24 (9 of 14)

c. Radioactive Concentration of Post-Accident Airborne in Containment (Bq/cc) (3 of 6)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Te-127m	4.07E+04	4.07E+04	4.07E+04	3.99E+04	3.49E+04
Te-129	7.96E+05	7.72E+05	1.23E+05	8.93E+04	5.56E+04
Te-129m	1.63E+05	1.63E+05	1.60E+05	1.42E+05	8.82E+04
Te-131	2.08E+06	4.88E+05	6.88E+04	2.47E+03	7.14E-03
Te-131m	5.32E+05	5.20E+05	3.06E+05	1.10E+04	3.17E-02
Te-132	3.55E+06	3.52E+06	2.87E+06	8.01E+05	6.01E+03
Te-133	3.01E+06	2.90E+05	6.30E-03	7.11E-50	0.00E+00
Te-133m	2.51E+06	1.18E+06	3.76E-02	4.24E-49	0.00E+00
1.02E+00 Te-134	5.30E+06	1.96E+06	2.26E-04	1.35E-66	0.00E+00
2.00E+07 Te-135	2.61E+06	9.41E-51	0.00E+00	0.00E+00	0.00E+00
2.90E+07 I-129	2.28E-23	1.02E+00	1.02E+00	1.02E+00	1.02E+00
4.23E+07 I-131	1.62E-14	1.99E+07	1.84E+07	1.10E+07	1.51E+06
4.83E+07 I-132	1.36E-12	2.24E+07	2.97E+06	8.25E+05	6.19E+03
3.99E+07 I-133	1.50E-13	4.10E+07	1.91E+07	1.57E+05	1.61E-03
2.06E+07 I-134	3.57E-12	2.36E+07	3.94E-01	1.41E-50	0.00E+00
1.03E+07 I-135	4.74E-13	3.59E+07	3.22E+06	8.91E-01	6.47E-26
I-137	4.61E-10	1.82E-37	0.00E+00	0.00E+00	0.00E+00
I-138	1.73E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xe-131m	7.36E+05	7.35E+05	7.06E+05	5.42E+05	1.72E+05
Xe-133	1.05E+08	1.05E+08	9.58E+07	4.56E+07	2.20E+06
Xe-133m	3.23E+06	3.20E+06	2.58E+06	4.37E+05	3.03E+02
Xe-135	3.16E+07	3.25E+07	1.37E+07	3.86E+02	2.23E-16
Xe-135m	2.19E+07	7.17E+06	5.53E+05	1.53E-01	1.11E-26
Xe-137	9.66E+07	1.86E+03	0.00E+00	0.00E+00	0.00E+00
Xe-138	9.77E+07	5.15E+06	2.05E-23	0.00E+00	0.00E+00
Xe-140	5.76E+07	1.19E-72	0.00E+00	0.00E+00	0.00E+00
Cs-134	4.67E+06	4.67E+06	4.67E+06	4.64E+06	4.54E+06
Cs-135	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
Cs-136	1.20E+06	1.20E+06	1.14E+06	8.30E+05	2.47E+05
Cs-137	2.59E+06	2.59E+06	2.59E+06	2.59E+06	2.59E+06
Cs-138	3.09E+07	2.55E+07	3.70E-06	6.24E-87	0.00E+00

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"A" (Update Table 12.2-24) (9 of 13)

Table 12.2-24 (10 of 14)

c. Radioactive Concentration of Post-Accident Airborne in Containment (Bq/cc) (4 of 6)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Cs-140	2.67E+07	2.76E-10	0.00E+00	0.00E+00	0.00E+00
Ba-137m	1.65E+05	2.45E+06	2.45E+06	2.45E+06	2.45E+06
Ba-139	1.98E+06	1.20E+06	1.20E+01	6.05E-31	0.00E+00
Ba-140	1.96E+06	1.96E+06	1.86E+06	1.34E+06	3.86E+05
Ba-143	1.60E+06	3.31E-74	0.00E+00	0.00E+00	0.00E+00
Ba-144	1.33E+06	4.03E-93	0.00E+00	0.00E+00	0.00E+00
La-140	1.96E+04	5.27E+04	6.58E+05	1.42E+06	4.44E+05
La-141	1.81E+04	1.52E+04	2.65E+02	2.64E-09	1.77E-51
La-142	1.81E+04	1.17E+04	5.17E-01	2.82E-28	0.00E+00
La-143	1.79E+04	9.18E+02	1.95E-27	0.00E+00	0.00E+00
La-144	1.63E+04	1.32E-23	0.00E+00	0.00E+00	0.00E+00
Ce-141	4.41E+04	4.41E+04	4.33E+04	3.81E+04	2.33E+04
Ce-143	4.50E+04	4.41E+04	2.72E+04	1.32E+03	1.22E-02
Ce-144	3.20E+04	3.20E+04	3.19E+04	3.15E+04	2.97E+04
Pr-143	1.76E+04	1.77E+04	1.85E+04	1.57E+04	4.89E+03
Pr-144	1.28E+04	3.02E+04	3.19E+04	3.15E+04	2.97E+04
Pr-144m	0.00E+00	4.56E+02	4.56E+02	4.50E+02	4.25E+02
Nd-147	7.07E+03	7.05E+03	6.64E+03	4.54E+03	1.06E+03
Pm-147	0.00E+00	2.13E-01	4.95E+00	2.89E+01	6.79E+01
Sm-147	0.00E+00	7.94E-17	4.48E-14	1.94E-12	2.38E-11
Tl-207	0.00E+00	3.42E-23	4.46E-23	1.44E-23	2.44E-23
Tl-208	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.29E-23
Tl-209	0.00E+00	0.00E+00	1.01E-21	8.81E-22	1.85E-22
Pb-209	0.00E+00	2.40E-22	2.13E-22	1.88E-20	1.33E-20
Pb-210	0.00E+00	0.00E+00	1.10E-17	1.27E-17	0.00E+00
Pb-211	0.00E+00	0.00E+00	3.88E-24	0.00E+00	4.44E-24
Pb-212	0.00E+00	8.59E-24	0.00E+00	0.00E+00	2.70E-22
Pb-214	0.00E+00	2.99E-17	3.00E-17	4.98E-17	1.28E-16
Bi-210	0.00E+00	2.15E-18	1.26E-17	1.88E-17	1.35E-17
Bi-211	0.00E+00	4.85E-23	4.67E-22	0.00E+00	3.47E-23
Bi-213	0.00E+00	7.55E-24	2.85E-20	1.26E-19	6.95E-20

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"A" (Update Table 12.2-24) (10 of 13)

Table 12.2-24 (11 of 14)

c. Radioactive Concentration of Post-Accident Airborne in Containment (Bq/cc) (5 of 6)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
Bi-214	0.00E+00	3.15E-17	3.34E-17	4.25E-17	1.29E-16
Po-210	0.00E+00	1.64E-17	2.54E-17	3.76E-17	2.86E-17
Po-211	0.00E+00	4.18E-26	6.62E-26	0.00E+00	4.43E-27
Po-213	0.00E+00	7.39E-24	2.79E-20	1.23E-19	6.80E-20
Po-214	0.00E+00	1.06E-17	1.20E-17	2.11E-17	1.07E-16
Po-215	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E-23
Po-216	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.46E-22
Po-218	0.00E+00	1.74E-17	2.75E-17	3.53E-17	1.28E-16
At-217	0.00E+00	5.92E-20	7.92E-20	1.20E-20	3.64E-21
Rn-220	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.48E-22
Rn-222	0.00E+00	1.65E-17	6.97E-18	1.15E-17	1.10E-16
Fr-221	0.00E+00	0.00E+00	3.38E-19	1.13E-19	1.95E-20
Fr-223	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.75E-24
Ra-224	0.00E+00	1.29E-23	0.00E+00	1.64E-23	3.66E-23
Ra-225	0.00E+00	1.06E-19	6.65E-20	0.00E+00	6.79E-20
Ra-226	0.00E+00	9.61E-18	2.04E-17	3.72E-17	1.86E-16
Ra-228	0.00E+00	1.96E-23	0.00E+00	0.00E+00	1.89E-21
Ac-225	0.00E+00	5.06E-20	2.99E-22	9.45E-21	5.38E-20
Ac-227	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-21
Ac-228	0.00E+00	9.75E-22	0.00E+00	6.08E-24	1.11E-21
Th-228	0.00E+00	2.82E-22	0.00E+00	1.31E-21	1.74E-21
Th-229	0.00E+00	6.64E-20	5.03E-20	1.80E-19	1.35E-19
Th-230	0.00E+00	2.51E-17	1.57E-14	7.69E-13	1.41E-11
Th-231	0.00E+00	1.19E-14	5.66E-12	1.18E-10	6.17E-10
Th-232	0.00E+00	3.08E-23	0.00E+00	3.88E-21	7.37E-20
Pa-231	0.00E+00	0.00E+00	0.00E+00	1.96E-17	5.09E-16
Pa-233	0.00E+00	3.56E-14	2.04E-11	9.80E-10	1.65E-08
U-233	0.00E+00	0.00E+00	1.70E-19	3.37E-17	2.03E-15
U-234	0.00E+00	5.30E-08	1.27E-06	8.91E-06	3.82E-05
U-235	0.00E+00	8.88E-13	2.14E-11	1.51E-10	6.50E-10
U-236	0.00E+00	5.00E-11	1.20E-09	8.40E-09	3.60E-08

"A" (Update Table 12.2-24) (11 of 13)

Table 12.2-24 (12 of 14)

c. Radioactive Concentration of Post-Accident Airborne in Containment (Bq/cc) (6 of 6)

Nuclide	Elapsed Time after the onset of the Accident				
	0 hr	1 hr	1 day	1 week	1 month
U-237	0.00E+00	4.37E-04	9.99E-03	5.25E-02	9.74E-02
Np-237	0.00E+00	6.65E-11	1.61E-09	1.18E-08	5.71E-08
Np-239	5.81E+05	5.74E+05	4.33E+05	7.40E+04	8.50E+01
Pu-238	1.64E+02	1.64E+02	1.64E+02	1.64E+02	1.64E+02
Pu-239	7.90E+00	7.90E+00	7.94E+00	8.04E+00	8.06E+00
Pu-240	1.48E+01	1.48E+01	1.48E+01	1.48E+01	1.48E+01
Pu-241	4.18E+03	4.18E+03	4.18E+03	4.18E+03	4.16E+03
Am-241	1.80E+00	1.80E+00	1.82E+00	1.93E+00	2.35E+00
Cm-242	9.01E+02	9.01E+02	8.97E+02	8.75E+02	7.93E+02
Cm-244	1.28E+02	1.28E+02	1.28E+02	1.28E+02	1.28E+02

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RAI 207-8247 - Question 12.02-16, Rev.0

"A" (Update Table 12.2-24) (12 of 13)

RAI 207-8247 - Question 12.02-16, Rev.1

Table 12.2-24 (13 of 14)

d. MCR Emergency Makeup ACU Filter Inventories (Bq) (1 of 2)

Nuclide	Elapsed Time after the onset of the Accident				
	1 hr	1 hr	4 days	1 week	1 month
I-131	2.82E+08	7.49E+09	1.25E+10	1.53E+10	2.34E+10
I-132	3.76E+08	9.98E+09	1.66E+10	2.04E+10	3.11E+10
I-133	5.40E+08	1.43E+10	2.39E+10	2.93E+10	4.47E+10
I-134	5.34E+07	1.42E+09	2.36E+09	2.89E+09	4.42E+09
I-135	4.04E+08	1.07E+10	1.78E+10	2.19E+10	3.34E+10
Co-58	5.41E+05	4.61E+06	4.87E+06	4.97E+06	5.06E+06
Co-60	4.14E+05	3.53E+06	3.73E+06	3.81E+06	3.87E+06
Rb-86	1.84E+07	1.57E+08	1.65E+08	1.69E+08	1.72E+08
Sr-89	6.44E+08	5.49E+09	5.80E+09	5.93E+09	6.02E+09
Sr-90	5.79E+07	4.94E+08	5.21E+08	5.33E+08	5.42E+08
Sr-91	6.83E+08	5.82E+09	6.14E+09	6.28E+09	6.38E+09
Sr-92	3.79E+08	3.23E+09	3.41E+09	3.49E+09	3.54E+09
Y-90	8.04E+05	6.85E+06	7.23E+06	7.40E+06	7.52E+06
Y-91	7.95E+06	6.78E+07	7.16E+07	7.32E+07	7.44E+07
Y-92	3.25E+07	2.77E+08	2.93E+08	2.99E+08	3.04E+08
Y-93	5.06E+06	4.31E+07	4.55E+07	4.65E+07	4.73E+07
Zr-95	9.23E+06	7.86E+07	8.30E+07	8.49E+07	8.63E+07
Zr-97	7.68E+06	6.54E+07	6.91E+07	7.06E+07	7.18E+07
Nb-95	9.21E+06	7.85E+07	8.29E+07	8.47E+07	8.61E+07
Mo-99	1.16E+08	9.91E+08	1.05E+09	1.07E+09	1.09E+09
Tc-99m	1.06E+08	9.00E+08	9.50E+08	9.72E+08	9.88E+08
Ru-103	1.09E+08	9.31E+08	9.83E+08	1.01E+09	1.02E+09
Ru-105	4.99E+07	4.25E+08	4.49E+08	4.59E+08	4.66E+08
Ru-106	4.90E+07	4.18E+08	4.41E+08	4.51E+08	4.58E+08
Rh-105	7.39E+07	6.30E+08	6.65E+08	6.80E+08	6.91E+08
Sb-127	1.19E+08	1.01E+09	1.07E+09	1.09E+09	1.11E+09
Sb-129	2.47E+08	2.10E+09	2.22E+09	2.27E+09	2.31E+09
Te-127	1.21E+08	1.03E+09	1.09E+09	1.11E+09	1.13E+09
Te-127m	2.04E+07	1.74E+08	1.83E+08	1.88E+08	1.91E+08
Te-129	3.07E+08	2.61E+09	2.76E+09	2.82E+09	2.87E+09
Te-129m	8.15E+07	6.95E+08	7.34E+08	7.50E+08	7.62E+08

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RAI 207-8247 - Question 12.02-16, Rev.0

"A" (Update Table 12.2-24) (12 of 13)

RAI 207-8247 - Question 12.02-16, Rev.1

Table 12.2-24 (14 of 14)

d. MCR Emergency Makeup ACU Filter Inventories (Bq) (2 of 2)

Nuclide	Elapsed Time after the onset of the Accident				
	1 hr	1 hr	4 days	1 week	1 month
Te-131m	2.47E+08	2.10E+09	2.22E+09	2.27E+09	2.31E+09
Te-132	1.72E+09	1.47E+10	1.55E+10	1.59E+10	1.61E+10
Cs-134	1.98E+09	1.68E+10	1.78E+10	1.82E+10	1.85E+10
Cs-136	5.05E+08	4.30E+09	4.54E+09	4.64E+09	4.72E+09
Cs-137	1.10E+09	9.34E+09	9.86E+09	1.01E+10	1.02E+10
Ba-139	1.92E+08	1.63E+09	1.72E+09	1.76E+09	1.79E+09
Ba-140	9.73E+08	8.29E+09	8.75E+09	8.95E+09	9.10E+09
La-140	1.50E+07	1.28E+08	1.35E+08	1.38E+08	1.40E+08
La-141	5.07E+06	4.32E+07	4.56E+07	4.66E+07	4.74E+07
La-142	2.08E+06	1.77E+07	1.87E+07	1.92E+07	1.95E+07
Ce-141	2.21E+07	1.88E+08	1.99E+08	2.03E+08	2.06E+08
Ce-143	2.10E+07	1.79E+08	1.89E+08	1.94E+08	1.97E+08
Ce-144	1.60E+07	1.36E+08	1.44E+08	1.47E+08	1.50E+08
Pr-143	8.82E+06	7.52E+07	7.94E+07	8.12E+07	8.25E+07
Nd-147	3.50E+06	2.99E+07	3.15E+07	3.22E+07	3.27E+07
Np-239	2.79E+08	2.38E+09	2.51E+09	2.57E+09	2.61E+09
Pu-238	8.24E+04	7.02E+05	7.41E+05	7.58E+05	7.70E+05
Pu-239	3.96E+03	3.37E+04	3.56E+04	3.64E+04	3.70E+04
Pu-240	7.43E+03	6.33E+04	6.69E+04	6.84E+04	6.95E+04
Pu-241	2.09E+06	1.78E+07	1.88E+07	1.92E+07	1.95E+07
Am-241	8.99E+02	7.66E+03	8.09E+03	8.27E+03	8.41E+03
Cm-242	4.50E+05	3.83E+06	4.05E+06	4.14E+06	4.21E+06
Cm-244	6.42E+04	5.47E+05	5.78E+05	5.91E+05	6.00E+05

"A" (Update Table 12.2-24) (12 of 13)

Table 12.2-24 (13 of 14)

RAI 207-8247 - Question 12.02-16, Rev.1

RAI 207-8247 - Question 12.02-16, Rev.2

d. MCR Emergency Makeup ACU Filter Inventories (Bq) (1 of 2)

Nuclide	Elapsed Time After the Onset of the Accident					
	1 hour	1 day	4 days	1 week	1 month	
I-131	2.77E+09	1.75E+10	2.25E+10	4.84E+25	3.12E+10	2.48E+10
I-132	3.70E+09	2.33E+10	2.99E+10	7.69E+23	4.16E+10	3.31E+10
I-133	5.30E+09	3.34E+10	4.29E+10	9.99E+24	5.96E+10	4.75E+10
I-134	5.19E+08	3.28E+09	4.22E+09	4.16E+22	5.87E+09	4.67E+09
I-135	3.96E+09	2.49E+10	3.20E+10	2.37E+24	4.45E+10	3.55E+10
Co-58	1.67E+05	9.05E+05	9.54E+05	1.63E-02	9.90E+05	9.72E+05
Co-60	1.28E+05	6.93E+05	7.30E+05	3.52E-01	7.58E+05	7.44E+05
Rb-86	5.68E+06	3.08E+07	3.24E+07	2.17E-01	3.37E+07	3.31E+07
Sr-89	1.99E+08	1.08E+09	1.14E+09	2.13E+01	1.18E+09	1.16E+09
Sr-90	1.79E+07	9.69E+07	1.02E+08	4.08E+02	1.06E+08	1.04E+08
Sr-91	2.11E+08	1.14E+09	1.20E+09	1.81E-01	1.25E+09	1.23E+09
Sr-92	1.17E+08	6.32E+08	6.67E+08	2.89E-02	6.92E+08	6.79E+08
Y-90	2.46E+05	1.33E+06	1.40E+06	1.40E-03	1.46E+06	1.43E+06
Y-91	2.46E+06	1.33E+07	1.40E+07	3.11E-01	1.46E+07	1.43E+07
Y-92	9.73E+06	5.27E+07	5.56E+07	3.14E-03	5.77E+07	5.67E+07
Y-93	1.56E+06	8.46E+06	8.91E+06	1.43E-03	9.25E+06	9.09E+06
Zr-95	2.85E+06	1.54E+07	1.63E+07	4.12E-01	1.69E+07	1.66E+07
Zr-97	2.37E+06	1.28E+07	1.35E+07	3.85E-03	1.40E+07	1.38E+07
Nb-95	2.84E+06	1.54E+07	1.62E+07	2.26E-01	1.69E+07	1.66E+07
Mo-99	3.59E+07	1.95E+08	2.05E+08	2.37E-01	2.13E+08	2.09E+08
Tc-99m	3.26E+07	1.77E+08	1.86E+08	1.93E-02	1.93E+08	1.90E+08
Ru-103	3.38E+07	1.83E+08	1.93E+08	3.25E+00	2.00E+08	1.97E+08
Ru-105	1.54E+07	8.33E+07	8.78E+07	7.11E-03	9.11E+07	8.95E+07
Ru-106	1.51E+07	8.21E+07	8.65E+07	1.41E+01	8.97E+07	8.82E+07
Rh-105	2.28E+07	1.24E+08	1.30E+08	8.41E-02	1.35E+08	1.33E+08
Sb-127	3.67E+07	1.99E+08	2.10E+08	4.27E-01	2.18E+08	2.14E+08
Sb-129	7.61E+07	4.12E+08	4.34E+08	4.21E-02	4.51E+08	4.43E+08
Te-127	3.72E+07	2.02E+08	2.13E+08	4.39E-02	2.21E+08	2.17E+08
Te-127m	6.30E+06	3.41E+07	3.60E+07	2.07E+00	3.73E+07	3.67E+07
Te-129	9.43E+07	5.11E+08	5.39E+08	1.40E-02	5.59E+08	5.49E+08
Te-129m	2.52E+07	1.36E+08	1.44E+08	2.60E+00	1.49E+08	1.47E+08

“A” (Update Table 12.2-24) (13 of 13)

Table 12.2-24 (14 of 14)

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RAI 207-8247 - Question 12.02-16, Rev.2

d. MCR Emergency Makeup ACU Filter Inventories (Bq) (2 of 2)

Nuclide	Elapsed Time After the Onset of the Accident				
	1 hour	1 day	4 days	1 week	1 month
Te-131m	7.62E+07	4.13E+08	4.35E+08	2.97E+01	4.52E+08
Te-132	5.32E+08	2.88E+09	3.04E+09	5.45E+00	3.16E+09
Cs-134	6.11E+08	3.31E+09	3.49E+09	1.47E+03	3.62E+09
Cs-136	1.56E+08	8.45E+08	8.90E+08	6.61E+00	9.24E+08
Cs-137	3.39E+08	1.83E+09	1.93E+09	1.21E+04	2.01E+09
Ba-139	5.88E+07	3.19E+08	3.36E+08	1.12E-02	3.49E+08
Ba-140	3.00E+08	1.63E+09	1.72E+09	1.28E+01	1.78E+09
La-140	4.57E+06	2.47E+07	2.61E+07	2.55E-02	2.71E+07
La-141	1.56E+06	8.46E+06	8.92E+06	8.58E-04	9.25E+06
La-142	6.40E+05	3.47E+06	3.65E+06	1.39E-04	3.79E+06
Ce-141	6.82E+06	3.69E+07	3.89E+07	7.43E-01	4.04E+07
Ce-143	6.50E+06	3.52E+07	3.71E+07	3.07E-02	3.85E+07
Ce-144	4.94E+06	2.68E+07	2.82E+07	4.82E+00	2.93E+07
Pr-143	2.73E+06	1.48E+07	1.56E+07	1.26E-01	1.61E+07
Nd-147	1.08E+06	5.86E+06	6.18E+06	4.16E-02	6.41E+06
Np-239	8.63E+07	4.67E+08	4.93E+08	1.16E+00	5.11E+08
Pu-238	2.54E+04	1.38E+05	1.45E+05	4.62E+00	1.51E+05
Pu-239	1.22E+03	6.62E+03	6.98E+03	6.11E+01	7.24E+03
Pu-240	2.30E+03	1.24E+04	1.31E+04	3.13E+01	1.36E+04
Pu-241	6.45E+05	3.50E+06	3.69E+06	1.95E+01	3.82E+06
Am-241	2.78E+02	1.50E+03	1.59E+03	2.52E-01	1.65E+03
Cm-242	1.39E+05	7.53E+05	7.94E+05	1.30E-01	8.23E+05
Cm-244	1.98E+04	1.07E+05	1.13E+05	7.62E-01	1.18E+05

4.44E+08
 3.10E+09
 3.56E+09
 9.07E+08
 1.97E+09
 3.42E+08
 1.75E+09
 2.66E+07
 9.09E+06
 3.72E+06
 3.97E+07
 3.78E+07
 2.88E+07
 1.59E+07
 6.30E+06
 5.02E+08
 1.48E+05
 7.11E+03
 1.34E+04
 3.76E+06
 1.62E+03
 8.09E+05
 1.15E+05

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Table 12.4-8 (1 of 11)

Replace this table with 'B'
starting on page 28 of 38Estimated Accident Mission Dose

- a. The vital area mission doses and dose rates for areas requiring continuous occupancy to perform post-accident vital functions

Area Requiring Continuous Occupancy	Dose (mSv)	Dose Rate (mSv/hr)	Regulatory Limit	
			Dose (mSv)	Dose Rate (mSv/hr)
MCR	44.03	0.14	50	0.15
TSC	44.03	0.14	50	0.15

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Table 12.4-8 (2 of 11)

b. Vital area mission dose for areas requiring infrequent access to perform functions (1 hour after LOCA) (1 of 2)

Replace this table with 'B' starting on page 28 of 38

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	21.98	8.81	3.23	Fig. 12.3- 20,28,40
	Sampling	11.48	20	3.83	
	Sum			7.05	
Radiochemistry Lab (085-P37)	Access	25.40	6.59	2.79	Fig. 12.3- 12,13,20,28
	Analysis	11.02	60	11.02	
	Sum			13.81	
Sample Counting Room (085-P36)	Access	24.78	6.91	2.85	Fig. 12.3- 12,13,20,28
	Analysis	10.95	60	10.95	
	Sum			13.80	
Remote Shutdown Room (137-A06D)	Access/Return	11.85	2.74	0.54	Fig. 12.3-36,40
	Operation	11.00	90	16.50	
	Sum			17.04	
Remote Control Console Room (137-A41A)	Access/Return	11.85	12.43	2.45	Fig. 12.3- 32,36,40
	Operation	11.00	90	16.50	
	Sum			18.95	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	11.85	12.72	2.51	Fig. 12.3-24,40
	Inspection	164.88	10	27.48	
	Sum			29.99	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	11.85	12.65	2.50	Fig. 12.3-24,40
	Inspection	180.83	10	30.14	
	Sum			32.64	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	11.85	10.63	2.10	Fig. 12.3-24,40
	Inspection	11.09	10	1.85	
	Sum			3.95	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	11.85	10.54	2.08	Fig. 12.3-24,40
	Inspection	11.09	10	1.85	
	Sum			3.93	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Table 12.4-8 (3 of 11)

Replace this table with 'B' starting on page 28 of 38

b. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (1 hour after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	29.30	1.39	0.68	Fig. 12.3-40
	Inspection	28.49	30	14.25	
	Sum			14.93	
I&C Equip. Room (157-A25C)	Access/Return	11.85	0.36	0.07	Fig. 12.3-40
	Inspection	11.00	30	5.50	
	Sum			5.57	
I&C Equip. Room (157-A01D)	Access/Return	11.85	0.82	0.16	Fig. 12.3-40
	Inspection	11.04	30	5.52	
	Sum			5.68	
I&C Equip. Room (157-A19D)	Access/Return	29.30	1.27	0.62	Fig. 12.3-40
	Inspection	28.49	30	14.25	
	Sum			14.87	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	21.93	18.74	6.85	Fig. 12.3- 20,28,40
	Operation	12.43	30	6.21	
	Sum			13.06	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	21.78	18.07	6.56	Fig. 12.3- 20,28,40
	Operation	12.43	30	6.21	
	Sum			12.77	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	22.65	17.42	6.58	Fig. 12.3- 20,28,40
	Operation	12.43	30	6.21	
	Sum			12.79	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	22.52	16.75	6.29	Fig. 12.3- 20,28,40
	Operation	12.43	30	6.21	
	Sum			12.50	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Table 12.4-8 (4 of 11)

Replace this table with 'B' starting on page 28 of 38

c. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (2 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	40.39	8.81	5.93	Fig. 12.3- 20,28,40
	Sampling	28.18	20	9.39	
	Sum			15.32	
Radiochemistry Lab (085-P37)	Access	43.81	6.59	4.81	Fig. 12.3- 12,13,20,28
	Analysis	27.81	60	27.81	
	Sum			32.62	
Sample Counting Room (085-P36)	Access	43.18	6.91	4.97	Fig. 12.3- 12,13,20,28
	Analysis	27.60	60	27.60	
	Sum			32.58	
Remote Shutdown Room (137-A06D)	Access/Return	30.25	2.74	1.38	Fig. 12.3-36,40
	Operation	27.74	90	41.61	
	Sum			42.99	
Remote Control Console Room (137-A41A)	Access/Return	30.25	12.43	6.27	Fig. 12.3- 32,36,40
	Operation	27.74	90	41.62	
	Sum			47.88	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	30.25	12.72	6.41	Fig. 12.3-24,40
	Inspection	182.00	10	30.33	
	Sum			36.75	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	30.25	12.65	6.38	Fig. 12.3-24,40
	Inspection	197.92	10	32.99	
	Sum			39.36	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	30.25	10.63	5.36	Fig. 12.3-24,40
	Inspection	28.01	10	4.67	
	Sum			10.03	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	30.25	10.54	5.31	Fig. 12.3-24,40
	Inspection	28.01	10	4.67	
	Sum			9.98	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Replace this table with 'B'
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Table 12.4-8 (5 of 11)

c. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (2 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	47.70	1.39	1.11	Fig. 12.3-40
	Inspection	45.32	30	22.66	
	Sum			23.77	
I&C Equip. Room (157-A25C)	Access/Return	30.25	0.36	0.18	Fig. 12.3-40
	Inspection	27.73	30	13.87	
	Sum			14.05	
I&C Equip. Room (157-A01D)	Access/Return	30.25	0.82	0.41	Fig. 12.3-40
	Inspection	27.87	30	13.94	
	Sum			14.35	
I&C Equip. Room (157-A19D)	Access/Return	47.70	1.27	1.01	Fig. 12.3-40
	Inspection	45.32	30	22.66	
	Sum			23.67	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	40.33	18.74	12.60	Fig. 12.3- 20,28,40
	Operation	30.83	30	15.42	
	Sum			28.01	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	40.19	18.07	12.10	Fig. 12.3- 20,28,40
	Operation	30.83	30	15.42	
	Sum			27.52	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	41.05	17.42	11.92	Fig. 12.3- 20,28,40
	Operation	30.83	30	15.42	
	Sum			27.33	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	40.92	16.75	11.42	Fig. 12.3- 20,28,40
	Operation	30.83	30	15.42	
	Sum			26.84	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Replace this table with 'B'
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Table 12.4-8 (6 of 11)

d. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (4 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	17.97	8.81	2.64	Fig. 12.3- 20,28,40
	Sampling	6.92	20	2.31	
	Sum			4.95	
Radiochemistry Lab (085-P37)	Access	21.38	6.59	2.35	Fig. 12.3- 12,13,20,28
	Analysis	6.50	60	6.50	
	Sum			8.84	
Sample Counting Room (085-P36)	Access	20.76	6.91	2.39	Fig. 12.3- 12,13,20,28
	Analysis	6.38	60	6.38	
	Sum			8.77	
Remote Shutdown Room (137-A06D)	Access/Return	7.83	2.74	0.36	Fig. 12.3-36,40
	Operation	6.46	90	9.69	
	Sum			10.05	
Remote Control Console Room (137-A41A)	Access/Return	7.83	12.43	1.62	Fig. 12.3- 32,36,40
	Operation	6.46	90	9.69	
	Sum			11.31	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	7.83	12.72	1.66	Fig. 12.3-24,40
	Inspection	160.46	10	26.74	
	Sum			28.40	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	7.83	12.65	1.65	Fig. 12.3-24,40
	Inspection	176.40	10	29.40	
	Sum			31.05	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	7.83	10.63	1.39	Fig. 12.3-24,40
	Inspection	6.60	10	1.10	
	Sum			2.49	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	7.83	10.54	1.38	Fig. 12.3-24,40
	Inspection	6.60	10	1.10	
	Sum			2.48	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Replace this table with 'B'
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Table 12.4-8 (7 of 11)

d. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (4 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	25.28	1.39	0.59	Fig. 12.3-40
	Inspection	23.98	30	11.99	
	Sum			12.58	
I&C Equip. Room (157-A25C)	Access/Return	7.83	0.36	0.05	Fig. 12.3-40
	Inspection	6.46	30	3.23	
	Sum			3.27	
I&C Equip. Room (157-A01D)	Access/Return	7.83	0.82	0.11	Fig. 12.3-40
	Inspection	6.53	30	3.27	
	Sum			3.37	
I&C Equip. Room (157-A19D)	Access/Return	25.28	1.27	0.54	Fig. 12.3-40
	Inspection	23.98	30	11.99	
	Sum			12.53	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	17.91	18.74	5.59	Fig. 12.3- 20,28,40
	Operation	8.41	30	4.21	
	Sum			9.80	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	17.77	18.07	5.35	Fig. 12.3- 20,28,40
	Operation	8.41	30	4.21	
	Sum			9.56	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	18.63	17.42	5.41	Fig. 12.3- 20,28,40
	Operation	8.41	30	4.21	
	Sum			9.61	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	18.50	16.75	5.16	Fig. 12.3- 20,28,40
	Operation	8.41	30	4.21	
	Sum			9.37	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Replace this table with 'B'
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Table 12.4-8 (8 of 11)

e. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (8 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	13.72	8.81	2.01	Fig. 12.3- 20,28,40
	Sampling	3.35	20	1.12	
	Sum			3.13	
Radiochemistry Lab (085-P37)	Access	17.13	6.59	1.88	Fig. 12.3- 12,13,20,28
	Analysis	2.88	60	2.88	
	Sum			4.77	
Sample Counting Room (085-P36)	Access	16.51	6.91	1.90	Fig. 12.3- 12,13,20,28
	Analysis	2.83	60	2.83	
	Sum			4.73	
Remote Shutdown Room (137-A06D)	Access/Return	3.58	2.74	0.16	Fig. 12.3-36,40
	Operation	2.86	90	4.30	
	Sum			4.46	
Remote Control Console Room (137-A41A)	Access/Return	3.58	12.43	0.74	Fig. 12.3- 32,36,40
	Operation	2.87	90	4.30	
	Sum			5.04	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	3.58	12.72	0.76	Fig. 12.3-24,40
	Inspection	156.72	10	26.12	
	Sum			26.88	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	3.58	12.65	0.75	Fig. 12.3-24,40
	Inspection	172.67	10	28.78	
	Sum			29.53	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	3.58	10.63	0.63	Fig. 12.3-24,40
	Inspection	2.94	10	0.49	
	Sum			1.12	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	3.58	10.54	0.63	Fig. 12.3-24,40
	Inspection	2.94	10	0.49	
	Sum			1.12	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Table 12.4-8 (9 of 11)

e. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (8 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	21.03	1.39	0.49	Fig. 12.3-40
	Inspection	20.35	30	10.18	
	Sum			10.66	
I&C Equip. Room (157-A25C)	Access/Return	3.58	0.36	0.02	Fig. 12.3-40
	Inspection	2.86	30	1.43	
	Sum			1.45	
I&C Equip. Room (157-A01D)	Access/Return	3.58	0.82	0.05	Fig. 12.3-40
	Inspection	2.90	30	1.45	
	Sum			1.50	
I&C Equip. Room (157-A19D)	Access/Return	21.03	1.27	0.45	Fig. 12.3-40
	Inspection	20.35	30	10.18	
	Sum			10.62	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	13.66	18.74	4.27	Fig. 12.3- 20,28,40
	Operation	4.16	30	2.08	
	Sum			6.35	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	13.52	18.07	4.07	Fig. 12.3- 20,28,40
	Operation	4.16	30	2.08	
	Sum			6.15	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	14.38	17.42	4.17	Fig. 12.3- 20,28,40
	Operation	4.16	30	2.08	
	Sum			6.26	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	14.25	16.75	3.98	Fig. 12.3- 20,28,40
	Operation	4.16	30	2.08	
	Sum			6.06	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Table 12.4-8 (10 of 11)

Replace this table with 'B' starting on page 28 of 38

f. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (24 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	1.58	8.81	0.23	Fig. 12.3- 21,29,41
	Sampling	0.72	20	0.24	
	Sum			0.47	
Radiochemistry Lab (085-P37)	Access	1.83	6.59	0.20	Fig. 12.3- 12,13,21,29
	Analysis	0.72	60	0.72	
	Sum			0.92	
Sample Counting Room (085-P36)	Access	1.78	6.91	0.20	Fig. 12.3- 12,13,21,29
	Analysis	0.71	60	0.71	
	Sum			0.92	
Remote Shutdown Room (137-A06D)	Access/Return	0.81	2.74	0.04	Fig. 12.3-37,41
	Operation	0.72	90	1.08	
	Sum			1.11	
Remote Control Console Room (137-A41A)	Access/Return	0.81	12.43	0.17	Fig. 12.3- 33,37,41
	Operation	0.72	90	1.08	
	Sum			1.25	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	0.81	12.72	0.17	Fig. 12.3-25,41
	Inspection	9.80	10	1.63	
	Sum			1.81	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	0.81	12.65	0.17	Fig. 12.3-25,41
	Inspection	12.07	10	2.01	
	Sum			2.18	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	0.81	10.63	0.14	Fig. 12.3-25,41
	Inspection	0.73	10	0.12	
	Sum			0.26	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	0.81	10.54	0.14	Fig. 12.3-25,41
	Inspection	0.73	10	0.12	
	Sum			0.26	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Replace this table with 'B'
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Table 12.4-8 (11 of 11)

f. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (24 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	0.92	1.39	0.02	Fig. 12.3-41
	Inspection	0.83	30	0.42	
	Sum			0.44	
I&C Equip. Room (157-A25C)	Access/Return	0.81	0.36	<0.01	Fig. 12.3-41
	Inspection	0.72	30	0.36	
	Sum			0.36	
I&C Equip. Room (157-A01D)	Access/Return	0.81	0.82	0.01	Fig. 12.3-41
	Inspection	0.72	30	0.36	
	Sum			0.37	
I&C Equip. Room (157-A19D)	Access/Return	0.92	1.27	0.02	Fig. 12.3-41
	Inspection	0.83	30	0.42	
	Sum			0.44	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	1.57	18.74	0.49	Fig. 12.3- 21,29,41
	Operation	0.81	30	0.41	
	Sum			0.90	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	1.56	18.07	0.47	Fig. 12.3- 21,29,41
	Operation	0.81	30	0.41	
	Sum			0.88	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	1.62	17.42	0.47	Fig. 12.3- 21,29,41
	Operation	0.81	30	0.41	
	Sum			0.88	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	1.61	16.75	0.45	Fig. 12.3- 21,29,41
	Operation	0.81	30	0.41	
	Sum			0.86	

(Note) Walk speed is assumed to be 4 km/h (13000 ft/h) for corridor and 2 km/h (6500 ft/h) for stairs.

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Table 12.4-8 (1 of 11)

Estimated Accident Mission Dose

- a. The vital area mission doses and dose rates for areas requiring continuous occupancy to perform post-accident vital functions

Area Requiring Continuous Occupancy	Dose (mSv)	Dose Rate (mSv/hr)	Regulatory Limit	
			Dose (mSv)	Dose Rate (mSv/hr)
MCR	46.9	0.148	50	0.15
TSC	46.9	0.148	50	0.15

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Table 12.4-8 (2 of 11)

b. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (1 hour after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	15.09	8.80	2.21	Fig. 12.3- 20,28,40
	Sampling	5.05	20	1.68	
	Sum			3.90	
Radiochemistry Lab (085-P37)	Access	18.65	6.59	2.05	Fig. 12.3- 12,13,20,28
	Analysis	4.52	60	4.52	
	Sum			6.57	
Sample Counting Room (085-P36)	Access	18.00	6.91	2.07	Fig. 12.3- 12,13,20,28
	Analysis	4.52	60	4.52	
	Sum			6.60	
Remote Shutdown Room (137-A06D)	Access/Return	4.52	2.73	0.21	Fig. 12.3- 36,40
	Operation	4.52	90	6.78	
	Sum			6.99	
Remote Control Console Room (137-A41A)	Access/Return	4.52	12.44	0.94	Fig. 12.3- 32,36,40
	Operation	4.52	90	6.78	
	Sum			7.72	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	4.52	12.73	0.96	Fig. 12.3- 24,40
	Inspection	202.02	10	33.67	
	Sum			34.63	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	4.52	12.64	0.95	Fig. 12.3- 24,40
	Inspection	205.14	10	34.19	
	Sum			35.14	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	4.52	10.62	0.80	Fig. 12.3- 24,40
	Inspection	4.52	10	0.75	
	Sum			1.55	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	4.52	10.54	0.79	Fig. 12.3- 24,40
	Inspection	4.52	10	0.75	
	Sum			1.55	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (3 of 11)

b. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (1 hour after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	4.52	1.39	0.10	Fig. 12.3-40
	Inspection	22.01	30	11.01	
	Sum			11.11	
I&C Equip. Room (157-A25C)	Access/Return	4.52	0.36	0.03	Fig. 12.3-40
	Inspection	4.52	30	2.26	
	Sum			2.29	
I&C Equip. Room (157-A01D)	Access/Return	4.52	0.82	0.06	Fig. 12.3-40
	Inspection	4.52	30	2.26	
	Sum			2.32	
I&C Equip. Room (157-A19D)	Access/Return	4.52	1.28	0.10	Fig. 12.3-40
	Inspection	22.01	30	11.01	
	Sum			11.10	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	15.06	18.75	4.71	Fig. 12.3- 20,28,40
	Operation	5.35	30	2.67	
	Sum			7.38	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	14.91	18.08	4.49	Fig. 12.3- 20,28,40
	Operation	5.35	30	2.67	
	Sum			7.17	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	15.79	17.43	4.59	Fig. 12.3- 20,28,40
	Operation	5.35	30	2.67	
	Sum			7.26	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	15.66	16.76	4.37	Fig. 12.3- 20,28,40
	Operation	5.35	30	2.67	
	Sum			7.05	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (4 of 11)

c. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (2 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	38.19	8.80	5.60	Fig. 12.3- 20,28,40
	Sampling	28.14	20	9.38	
	Sum			14.98	
Radiochemistry Lab (085-P37)	Access	41.75	6.59	4.59	Fig. 12.3- 12,13,20,28
	Analysis	27.62	60	27.62	
	Sum			32.21	
Sample Counting Room (085-P36)	Access	41.10	6.91	4.73	Fig. 12.3- 12,13,20,28
	Analysis	27.62	60	27.62	
	Sum			32.35	
Remote Shutdown Room (137-A06D)	Access/Return	27.62	2.73	1.26	Fig. 12.3- 36,40
	Operation	27.62	90	41.43	
	Sum			42.69	
Remote Control Console Room (137-A41A)	Access/Return	27.62	12.44	5.73	Fig. 12.3- 32,36,40
	Operation	27.62	90	41.43	
	Sum			47.16	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	27.62	12.73	5.86	Fig. 12.3- 24,40
	Inspection	225.12	10	37.52	
	Sum			43.38	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	27.62	12.64	5.82	Fig. 12.3- 24,40
	Inspection	228.24	10	38.04	
	Sum			43.86	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	27.62	10.62	4.89	Fig. 12.3- 24,40
	Inspection	27.62	10	4.60	
	Sum			9.49	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	27.62	10.54	4.85	Fig. 12.3- 24,40
	Inspection	27.62	10	4.60	
	Sum			9.46	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (5 of 11)

c. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (2 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	27.62	1.39	0.64	Fig. 12.3-40
	Inspection	45.11	30	22.55	
	Sum			23.19	
I&C Equip. Room (157-A25C)	Access/Return	27.62	0.36	0.17	Fig. 12.3-40
	Inspection	27.62	30	13.81	
	Sum			13.97	
I&C Equip. Room (157-A01D)	Access/Return	27.62	0.82	0.38	Fig. 12.3-40
	Inspection	27.62	30	13.81	
	Sum			14.19	
I&C Equip. Room (157-A19D)	Access/Return	27.62	1.28	0.59	Fig. 12.3-40
	Inspection	45.11	30	22.55	
	Sum			23.14	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	38.15	18.75	11.92	Fig. 12.3- 20,28,40
	Operation	28.44	30	14.22	
	Sum			26.15	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	38.00	18.08	11.45	Fig. 12.3- 20,28,40
	Operation	28.44	30	14.22	
	Sum			25.67	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	38.89	17.43	11.30	Fig. 12.3- 20,28,40
	Operation	28.44	30	14.22	
	Sum			25.52	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	38.75	16.76	10.83	Fig. 12.3- 20,28,40
	Operation	28.44	30	14.22	
	Sum			25.05	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (6 of 11)

d. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (4 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	39.56	8.80	5.80	Fig. 12.3- 20,28,40
	Sampling	29.52	20	9.84	
	Sum			15.64	
Radiochemistry Lab (085-P37)	Access	43.13	6.59	4.74	Fig. 12.3- 12,13,20,28
	Analysis	29.00	60	29.00	
	Sum			33.74	
Sample Counting Room (085-P36)	Access	42.48	6.91	4.89	Fig. 12.3- 12,13,20,28
	Analysis	29.00	60	29.00	
	Sum			33.89	
Remote Shutdown Room (137-A06D)	Access/Return	29.00	2.73	1.32	Fig. 12.3- 36,40
	Operation	29.00	90	43.50	
	Sum			44.82	
Remote Control Console Room (137-A41A)	Access/Return	29.00	12.44	6.01	Fig. 12.3- 32,36,40
	Operation	29.00	90	43.50	
	Sum			49.51	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	29.00	12.73	6.15	Fig. 12.3- 24,40
	Inspection	226.50	10	37.75	
	Sum			43.90	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	29.00	12.64	6.11	Fig. 12.3- 24,40
	Inspection	229.62	10	38.27	
	Sum			44.38	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	29.00	10.62	5.13	Fig. 12.3- 24,40
	Inspection	29.00	10	4.83	
	Sum			9.97	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	29.00	10.54	5.10	Fig. 12.3- 24,40
	Inspection	29.00	10	4.83	
	Sum			9.93	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (7 of 11)

d. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (4 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	29.00	1.39	0.67	Fig. 12.3-40
	Inspection	46.49	30	23.24	
	Sum			23.91	
I&C Equip. Room (157-A25C)	Access/Return	29.00	0.36	0.17	Fig. 12.3-40
	Inspection	29.00	30	14.50	
	Sum			14.67	
I&C Equip. Room (157-A01D)	Access/Return	29.00	0.82	0.40	Fig. 12.3-40
	Inspection	29.00	30	14.50	
	Sum			14.89	
I&C Equip. Room (157-A19D)	Access/Return	29.00	1.28	0.62	Fig. 12.3-40
	Inspection	46.49	30	23.24	
	Sum			23.86	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	39.53	18.75	12.35	Fig. 12.3- 20,28,40
	Operation	29.82	30	14.91	
	Sum			27.26	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	39.38	18.08	11.87	Fig. 12.3- 20,28,40
	Operation	29.82	30	14.91	
	Sum			26.78	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	40.27	17.43	11.70	Fig. 12.3- 20,28,40
	Operation	29.82	30	14.91	
	Sum			26.61	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	40.13	16.76	11.21	Fig. 12.3- 20,28,40
	Operation	29.82	30	14.91	
	Sum			26.12	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (8 of 11)

e. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (8 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	22.61	8.80	3.32	Fig. 12.3- 20,28,40
	Sampling	12.57	20	4.19	
	Sum			7.51	
Radiochemistry Lab (085-P37)	Access	26.18	6.59	2.88	Fig. 12.3- 12,13,20,28
	Analysis	12.05	60	12.05	
	Sum			14.92	
Sample Counting Room (085-P36)	Access	25.53	6.91	2.94	Fig. 12.3- 12,13,20,28
	Analysis	12.05	60	12.05	
	Sum			14.99	
Remote Shutdown Room (137-A06D)	Access/Return	12.05	2.73	0.55	Fig. 12.3- 36,40
	Operation	12.05	90	18.07	
	Sum			18.62	
Remote Control Console Room (137-A41A)	Access/Return	12.05	12.44	2.50	Fig. 12.3- 32,36,40
	Operation	12.05	90	18.07	
	Sum			20.57	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	12.05	12.73	2.55	Fig. 12.3- 24,40
	Inspection	209.55	10	34.92	
	Sum			37.48	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	12.05	12.64	2.54	Fig. 12.3- 24,40
	Inspection	212.67	10	35.44	
	Sum			37.98	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	12.05	10.62	2.13	Fig. 12.3- 24,40
	Inspection	12.05	10	2.01	
	Sum			4.14	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	12.05	10.54	2.12	Fig. 12.3- 24,40
	Inspection	12.05	10	2.01	
	Sum			4.12	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (9 of 11)

e. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (8 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	12.05	1.39	0.28	Fig. 12.3-40
	Inspection	29.54	30	14.77	
	Sum			15.05	
I&C Equip. Room (157-A25C)	Access/Return	12.05	0.36	0.07	Fig. 12.3-40
	Inspection	12.05	30	6.02	
	Sum			6.10	
I&C Equip. Room (157-A01D)	Access/Return	12.05	0.82	0.16	Fig. 12.3-40
	Inspection	12.05	30	6.02	
	Sum			6.19	
I&C Equip. Room (157-A19D)	Access/Return	12.05	1.28	0.26	Fig. 12.3-40
	Inspection	29.54	30	14.77	
	Sum			15.03	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	22.58	18.75	7.06	Fig. 12.3- 20,28,40
	Operation	12.87	30	6.44	
	Sum			13.49	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	22.43	18.08	6.76	Fig. 12.3- 20,28,40
	Operation	12.87	30	6.44	
	Sum			13.19	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	23.31	17.43	6.77	Fig. 12.3- 20,28,40
	Operation	12.87	30	6.44	
	Sum			13.21	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	23.18	16.76	6.48	Fig. 12.3- 20,28,40
	Operation	12.87	30	6.44	
	Sum			12.91	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (10 of 11)

f. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (24 hours after LOCA) (1 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
Post-accident Sample and Control Panel Room (055-A48B, A49B)	Access	2.88	8.80	0.42	Fig. 12.3- 21,29,41
	Sampling	1.94	20	0.65	
	Sum			1.07	
Radiochemistry Lab (085-P37)	Access	3.19	6.59	0.35	Fig. 12.3- 12,13,21,29
	Analysis	1.94	60	1.94	
	Sum			2.29	
Sample Counting Room (085-P36)	Access	3.13	6.91	0.36	Fig. 12.3- 12,13,21,29
	Analysis	1.94	60	1.94	
	Sum			2.30	
Remote Shutdown Room (137-A06D)	Access/Return	1.94	2.73	0.09	Fig. 12.3- 37,41
	Operation	1.94	90	2.91	
	Sum			3.00	
Remote Control Console Room (137-A41A)	Access/Return	1.94	12.44	0.40	Fig. 12.3- 33,37,41
	Operation	1.94	90	2.91	
	Sum			3.31	
Class 1E Switchgear 01A Room (078-A25A)	Access/Return	1.94	12.73	0.41	Fig. 12.3- 25,41
	Inspection	17.40	10	2.90	
	Sum			3.31	
Class 1E Switchgear 01B Room (078-A25B)	Access/Return	1.94	12.64	0.41	Fig. 12.3- 25,41
	Inspection	17.63	10	2.94	
	Sum			3.35	
Class 1E Switchgear 01C Room (078-A02C)	Access/Return	1.94	10.62	0.34	Fig. 12.3- 25,41
	Inspection	1.94	10	0.32	
	Sum			0.67	
Class 1E Switchgear 01D Room (078-A02D)	Access/Return	1.94	10.54	0.34	Fig. 12.3- 25,41
	Inspection	1.94	10	0.32	
	Sum			0.66	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

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Table 12.4-8 (11 of 11)

f. Vital area mission dose for areas requiring infrequent access to perform post-accident vital functions (24 hours after LOCA) (2 of 2)

Vital Area (Room No.)	Action	Mission Dose			Access Route
		Dose Rate (mSv/hr)	Occupancy Time (min)	Dose (mSv)	
I&C Equip. Room (157-A19C)	Access/Return	1.94	1.39	0.04	Fig. 12.3-41
	Inspection	2.04	30	1.02	
	Sum			1.07	
I&C Equip. Room (157-A25C)	Access/Return	1.94	0.36	0.01	Fig. 12.3-41
	Inspection	1.94	30	0.97	
	Sum			0.98	
I&C Equip. Room (157-A01D)	Access/Return	1.94	0.82	0.03	Fig. 12.3-41
	Inspection	1.94	30	0.97	
	Sum			1.00	
I&C Equip. Room (157-A19D)	Access/Return	1.94	1.28	0.04	Fig. 12.3-41
	Inspection	2.04	30	1.02	
	Sum			1.06	
Access Area outside the CS Pump Room (050-A01C)	Access/Return	2.86	18.75	0.90	Fig. 12.3- 21,29,41
	Operation	1.94	30	0.97	
	Sum			1.86	
Access Area outside the CS Pump Room (050-A01D)	Access/Return	2.85	18.08	0.86	Fig. 12.3- 21,29,41
	Operation	1.94	30	0.97	
	Sum			1.83	
Access Area outside the SC Pump Room (050-A04A)	Access/Return	2.93	17.43	0.85	Fig. 12.3- 21,29,41
	Operation	1.94	30	0.97	
	Sum			1.82	
Access Area outside the SC Pump Room (050-A04B)	Access/Return	2.92	16.76	0.82	Fig. 12.3- 21,29,41
	Operation	1.94	30	0.97	
	Sum			1.79	

(Note) Walk speed is usually about 4 km/h (13000 ft/h) and stairs are about 2 km/h (6500 ft/h).

APR1400 DCD TIER 2

RAI 13-7856 - Question 12.02-2, Rev.1

RAI 207-8247 - Question 12.02-16, Rev.0

RAI 207-8247 - Question 12.02-16, Rev.1

RAI 13-7856 - Question 12.02-2, Rev.3

Table 12.2-25 (1 of 3)

Radioactive Source Dimensions and Parameters Used in S

700.06	Water : 48%	0.59
747.71	Vapor : 52%	0.001293

Building	Component	Source Dimension				Source Characteristic		Housing	
		Shape	Diameter (or Width) (cm)	Length (cm)	Height (cm)	Material	Partial Density (g/cm ³)	Material	Thickness (cm)
Reactor Containment Building	Pressurizer	Cylinder	244.48	-	700.66	Water: 100 %	0.59	Steel	12.38
	Reactor coolant pump	Cylinder	185.00	-	126.74	Water: 100 %	0.75	Steel	14.00
	Reactor drain tank	Cylinder	Liquid: 162.90 Vapor: 99.70	-	528.57	Water: 27 % Vapor: 73 %	0.85 1.18	Not considered	
	Regenerative HX	Cylinder	24.69	-	400.69	Water: 85 % Steel: 15 %	0.85 1.18	Steel	2.22
	Letdown HX	Cylinder	45.72	-	341.36	Water: 88 % Steel: 12 %	0.88 0.95	Steel	2.54
	Steam generator	Annular cylinder	OD: 497.80 ID: 415.80	-	969.57	Water: 100 %	0.70	Steel	12.86
Auxiliary Building	SC HX	Cylinder	68.58	-	803.15	Water: 94 % Steel: 6 %	0.94 0.54	Steel	1.27
	SC miniflow HX	Cylinder	33.66	-	173.43	Water: 93 % Steel: 7 %	0.93 0.59	Steel	0.95
	Charging pump miniflow HX	Cylinder	38.10	-	298.70	Water: 94 %	0.94	Steel	1.27
	SC pump	Cylinder	38.1	-	609.6	Water: 100%	1	Steel	1.27
	CS HX	Cylinder	129.54	-	701.04	Water: 94 % Steel: 6 %	0.94 0.49	Steel	1.59

⊕ For post-accident, the volume to estimate source term in the heat exchanger is limited to the volume of tube side. (SC mini flow HX : 4.33E+04 cm³, CS HX : 3.27E+06 cm³)

APR1400 DCD TIER 2

CS pump	Cylinder	38.1	-	609.6	Water: 100%	1	Steel	1.27
SI pump	Cylinder	25.5	-	609.6	Water: 100%	1	Steel	0.93

Table 12.2-25 (2 of 3)

RAI 13-7856 - Question 12.02-2_Rev.1
 RAI 207-8247 - Question 12.02-16_Rev.0
 RAI 207-8247 - Question 12.02-16_Rev.1
 RAI 13-7856 - Question 12.02-2_Rev.3

Building	Component	Shape	Source Dimension			Source Characteristic		Housing	
			Diameter (or Width) (cm)	Length (cm)	Height (cm)	Material	Partial Density (g/cm ³)	Material	Thickness (cm)
Auxiliary Building	CS miniflow HX	Cylinder	31.75	-	186.06	Water: 94 % Steel: 6 %	0.94 0.45	Steel	0.95
	Equipment drain tank	Cylinder	193.59	-	610.87	Water: 50 % Vapor: 50 %	1.00 0.001293	Not considered	
	Boric acid concentrator	Cylinder	Liquid: 193.53 Vapor: 206.58	-	180.52	Water: 47 % Vapor: 53 %	1.00 0.001293	Not considered	
	SC HX	Cylinder	137.16	-	803.15	Water: 94 % Vapor: 6 %	0.942 0.453	Steel	1.27
	SFP cleanup demin.	Cylinder	145.70	-	144.17	Water: 100 %	1.00	Not considered	
	Boric acid condensate IX	Cylinder	74.60	-	206.17	Water: 100 %	1.00	Not considered	
	Deborating IX	Cylinder	105.08	-	104.49	Water: 100 %	1.00	Not considered	
	Pre-holdup IX	Cylinder	52.54	-	104.49	Water: 100 %	1.00	Not considered	
	Purification IX	Cylinder	52.54	-	104.49	Water: 100 %	1.00	Not considered	
	SFP cooling HX	Rectangular parallelepiped	31.19	134.16	198.28	Water: 67 % Steel: 33 %	0.67 2.63	Not considered	
	Volume control tank	Cylinder	120.72	-	218.09	Water: 40 % Vapor: 60 %	1.00 0.001293	Not considered	
	SGBD flash tank	Cylinder	152.40	-	455.96	Liquid: 223.23 Vapor: 330.72	1.00	Not considered	
	SGBD HX	Cylinder	42.43	-	487.68	Water: 86 % Steel: 14 %	0.90 1.12	Steel	1.27

1) For post-accident, the volume to estimate source term in the CS mini flow heat exchanger is limited to the volume of tube side, 3.68E+04 cm³.