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December 8, 2008

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco,

Docket No. 52-021
MHI Ref: UAP-HF-08277

Subject: MHI's Response to US-APWR DCD RAI No. 99-1602 Revision 0

Reference: 1) "Request for Additional Information No. 99-1602 Revision 0, SRP Section: 06.04, Application Section: 6.4" dated November 10, 2008.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 99-1602 Revision 0."

Enclosed is the response to one RAI contained within Reference 1.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of the submittals. His contact information is below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Response to Request for Additional Information No. 99-1602 Revision 0

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-08277
Docket Number 52-021

Response to Request for Additional Information No. 99-1602 Revision 0

December 2008

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

12/08/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No.52-021

RAI NO.:	**NO.99-1602 REVISION 0**
SRP SECTION:	**06.04 – Control Room Habitability System**
APPLICATION SECTION:	**DCD 6.4**
DATE OF RAI ISSUE:	**11/10/2008**

QUESTION NO. : 06.04-3

In the July 31, 2008 response to RAI No. 26, Question 06.04-1, main control room doses for each design basis accident (DBA) and discussion of the analysis assumptions used in the calculation of the doses were provided. The response also indicated that no changes to the DCD are proposed.

To show compliance with GDC-19 for each accident, the main control room dose results for each DBA should be added to the DCD, either in Chapter 6.4 or in the Chapter 15 discussion of the DBA dose analysis. This would also accommodate applicant preparation and NRC staff review of DBA control room dose analyses for COL applications that do not have control room atmospheric dispersion factors that are less than the DCD reference values.

ANSWER:

MHI is in agreement with the NRC's view. MHI will add main control room (MCR) dose results for each DBA to the DCD, in Chapter 15. The following is the answer to RAI No. 26:

The loss of coolant accident (LOCA) MCR dose is dominated by the inflow (inleak and intake) while direct shine doses are less important. Other DBAs have a similar relationship, i.e. inflow dominates the dose. Therefore in the table below only the doses determined from inflow are shown for non-LOCA events. For the LOCA event, dose includes direct shine.

However, a precise assessment value of MCR dose should essentially include a direct radiation shine dose although of a smaller contribution compared to an inflow dose for each event. Thus, a direct radiation shine dose is added, which is replaced with the highest direct radiation shine dose at the time of LOCA with the largest source term to allow bounding assessment. Thus, adding the direct radiation shine dose at the time of LOCA leads to a conservative result, as shown in the following.

Event	Control Room TEDE*1 dose*2	Comments
Steam system piping failure	3.4 rem	Pre-transient iodine spike
	4.3 rem	Transient-initiated iodine spike
Reactor coolant pump rotor seizure	1.1 rem	
Rod ejection accident	4.4 rem	
Failure of small lines carrying primary coolant outside containment	0.57 rem	
Steam generator tube rupture	3.5 rem	Pre-transient iodine spike
	0.61 rem	Transient-initiated iodine spike
Loss of coolant accident	4.5 rem	Includes direct shine = 0.018 rem
Fuel handling accident	0.69 rem	Occurred in fuel handling area
	3.4 rem	Occurred in containment

Note:
*1 TEDE: total effective dose equivalent
*2 The direct radiation shine dose at the time of LOCA is added as a direct dose for each event, on the basis of which, DCD is revised correspondingly.

Impact on DCD

Chapter 15 also incorporates the following revisions.

Table 15.0-17
Summary of Calculated Doses for Events with a Radiological Release

Accident or Case	EAB and LPZ Dose Criteria (rem TEDE)	Calculated EAB Dose (rem TEDE)	Calculated LPZ Dose (rem TEDE)	MCR Dose Criteria (rem TEDE)	Calculated MCR Dose*2 (rem TEDE)
LOCA *2	25	13	13	5	4.5
Steam generator tube rupture					
Fuel damage or pre-incident spike	25	3.6	1.5	5	3.5
Coincident iodine spike	2.5	0.96	0.43	5	0.61
Steam system piping failure					
Fuel damage or pre-incident spike	25	0.19	0.11	5	3.4
Coincident iodine spike	2.5	0.32	0.28	5	4.3
RCP rotor seizure	2.5	0.49	0.70	5	1.1
Failure of small lines carrying primary coolant outside containment *1	2.5	1.5	0.60	5	0.57
Rod ejection accident	6.3	5.1	4.5	5	4.4
Fuel handling accident					
Occurred in fuel handling area	6.3	3.3	1.4	5	0.69
Occurred in containment	6.3	3.3	1.4	5	3.4

Notes:

*1 The acceptance criterion except for the failure of small lines carrying primary coolant outside containment is based on RG 1.183. The acceptance criterion for the failure of small lines carrying primary coolant outside containment is based on SRP 15.6.2.

*2 ~~Calculated MCR dose for the LOCA is 4.5 rem. (See Section 15.6.5.)~~ The direct radiation shine dose at the time of LOCA is added as a direct dose for each event.

15.1.5.5.3 Results

The calculated TEDE doses have been analyzed for the limiting 2-hour dose at the EAB and for the duration of the transient at the LPZ outer boundary. These doses are calculated for both the accident-initiated iodine spike and the pre-transient iodine spike cases. Table 15.1.5-3 lists the results.

As shown in Table 15.1.5-3, for the case in which the iodine spike is initiated by the accident, the TEDE doses for the limiting 2-hour case are calculated to be 0.32 rem at the EAB and 0.28 rem at the LPZ outer boundary. These doses are less than 10% of the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34.

As shown in Table 15.1.5-3, for the case in which the steam line piping failure occurs coincidently with a pre-transient iodine spike, the TEDE doses are calculated to be 0.19 rem at the EAB and 0.11 rem at the LPZ outer boundary. These doses are less than the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34.

The doses for the MCR for the steam line piping failure are bounded by the doses calculated for the LOCA event described in Section 15.6.5.5. ~~Consequently, no doses are provided for the steam line piping failure event.~~

Table 15.1.5-2
Parameters Used in Evaluating the Radiological Consequences of Steam System Piping Failure (Sheet 2 of 2)

Parameter	Value
Activity Release Data for the Steam Generator in the Faulted Loop	
Primary-to-secondary leak rate (gpd)	150
Flow flashing fraction (lb/min)	
0 to 14 h	0.874
Steam release (lb)	
0 to 0.00112 h	120,000
0.00112 to 0.00278 h	158,000
0.00278 to 0.0612 h	2,190,000
0.0612 to 0.412 h	657,000
0.412 to 14 h	0
Iodine Partition Coefficient	1
Activity Release Data for the Steam Generator in the Intact Loops	
Primary-to-secondary leak rate (gpd)	450
Steam released (lb)	
0 to 8 h	1,540,000
8 to 14 h	1,540,000
Iodine partition coefficient	100
Particulate partition coefficient for moisture carryover in the steam generators	1000
MCR Parameters	
Control room envelope volume (including MCR)	See Table 15.6.5-5.
Occupancy frequency	See Table 15.6.5-5.
Total unfiltered inleakage	See Table 15.6.5-5.
Main control room HVAC system	See Table 15.6.5-5.
Radiological Dose Parameters	
χ/Q	See Table 15.0-13.
Breathing rate	See Table 15.0-13.
Dose conversion factors	See Table 15.0-14.

Table 15.1.5-3
Radiological Consequences of Steam System Piping Failure

Dose Location	TEDE Dose (rem)
Transient-initiated iodine spike	
EAB (0 to 2 hours)	0.32
LPZ outer boundary	0.28
MCR *1	4.3
Pre-transient iodine spike	
EAB (0 to 2 hours)	0.19
LPZ outer boundary	0.11
MCR *1	3.4

Note:
*1 The direct radiation shine dose at the time of LOCA is added as a direct radiation shine dose.

15.3.3.5.3 Results

The calculated TEDE doses for the limiting 2-hour period at the EAB and for the duration of the transient at the LPZ outer boundary are listed in Table 15.3.3-5.

As shown in Table 15.3.3-5, the TEDE doses for the limiting 2-hour period are calculated to be 0.49 rem at the EAB and 0.70 rem at the LPZ outer boundary. These doses are less than 10% of the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34.

The doses for the MCR for the RCP rotor seizure event are bounded by the doses calculated for the LOCA event described in Section 15.6.5.5. ~~Consequently, no doses are provided for the RCP rotor seizure event.~~

Table 15.3.3-4
Parameters Used in Evaluating the Radiological Consequences of RCP Rotor Seizure (Sheet 1 of 2)

Parameter	Value
Initial reactor coolant activity (from rods leaking prior to transient)	
Core thermal power level (MWt)	4540 (2% above the design core thermal power)
Iodine	Initial concentration equal to the 1.0 □Ci/g DE I-131 in the reactor coolant. (See Table 15.0-10.)
Alkali metals	Based on 1% fuel defect (See Table 11.1-2.)
Noble gas	300 □Ci/g DE Xe-133 (See Table 15.0-12.)
Iodine chemical form	elemental:97%, organic:3%
Initial secondary coolant activity (from rods leaking prior to transient)	
Secondary system initial iodine and alkali metals concentration	Based on 10% of reactor coolant concentration
Source term	
Core activity	See Table 15.0-14.
Fraction of core inventory assumed released into reactor coolant (from rods that fail during RCP Rotor Seizure transient)	
Fraction of fuel rods assumed to fail during transient (%)	10
Radial power peaking factor (to calculate fraction of total inventory in failed rods)	1.78
Iodine fission product gap fraction Alkali metal fission product gap fraction Noble gas fission product gap fraction	See Table 15.0-8. See Table 15.0-8. See Table 15.0-8.
RCS and steam system parameters	
Total steam generator tube leakage (gpd)	600
Reactor coolant mass (lb)	646,000
Secondary coolant mass, 4 steam generators (lb)	456,000
Primary-to-secondary leakage duration (h)	14
Steam released (lb)	
0 to 8 h	1,540,000
8 to 14 h	1,540,000
Iodine partition coefficient	100
Particulate partition coefficient for moisture carryover in the steam generators	1000
Offsite power	Lost after trip
~~**Radiological dose parameters**~~	
~~χ/Q~~	~~See Table 15.0-13.~~
~~Breathing rate~~	~~See Table 15.0-13.~~
~~Dose conversion factors~~	~~See Table 15.0-14.~~

Table 15.3.3-4
Parameters Used in Evaluating the Radiological Consequences of RCP Rotor Seizure (Sheet 2 of 2)

Parameter	Value
MCR Parameters	
Control room envelope volume (including MCR)	See Table 15.6.5-5.
Occupancy frequency	See Table 15.6.5-5.
Total unfiltered inleakage	See Table 15.6.5-5.
Main control room HVAC system	See Table 15.6.5-5.
Radiological dose parameters	
χ/Q	See Table 15.0-13.
Breathing rate	See Table 15.0-13.
Dose conversion factors	See Table 15.0-14.

Table 15.3.3-5
Radiological Consequences of a RCP Rotor Seizure

Dose Location	TEDE Dose (rem)
EAB (10 to 12 hours)	0.49
LPZ outer boundary	0.70
MCR [*1]	1.1

Note:
[*1]The direct radiation shine dose at the time of LOCA is added as a direct radiation shine dose.

15.4.8.5.3 Results

The calculated TEDE doses have been analyzed for the limiting 2-hour dose at the EAB and for the duration of the transient at the LPZ outer boundary. The results are listed in Table 15.4.8-4.

As shown in Table 15.4.8-4, the TEDE doses are calculated to be 5.1 rem at the EAB and 4.5 rem at the LPZ outer boundary. These doses are less than 25% of the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34.

The doses for the MCR for the rod ejection accident are bounded by the doses calculated for the LOCA event described in Section 15.6.5.5. ~~Consequently, no doses are provided for the rod ejection accident.~~

Table 15.4.8-3
Parameters Used in Evaluating the Radiological Consequences of the Rod Ejection Accident (Sheet 1 of 2)

Parameter	Value
Core thermal power level (%)	4540 (2% above the design core thermal power)
Initial reactor (primary) coolant activity (from rods leaking prior to transient)	
Iodine	Initial concentration equal to the 1.0 µCi/g DE I-131 in the reactor coolant. (See Table 15.0-10.)
Alkali metals	Based on 1% fuel defect (See Table 11.1-2.)
Noble gases	300 µCi/g DE Xe-133 (See Table 15.0-12.)
Initial secondary coolant activity (from rods leaking prior to transient)	
Secondary system initial iodine and alkali metal concentration	Based on 10% of reactor coolant concentration
Source Term	
Core Activity	See Table 15.0-14.
Fraction of core inventory released from failed rods	
Fraction of fuel rods assumed to fail during transient (%)	10
Radial power peaking factor (to calculate fraction of total inventory in failed rods)	1.78
Iodine fission product gap fraction Alkali metal fission product gap fraction Noble gas fission product gap fraction	See Table 15.0-8.
Transient release fraction from the fuel rods (%)	11
Fraction of melted fuel (%)	0.25
Fraction of activity released from melted fuel: Iodine and alkali metals (containment release case) (Secondary side release case) Noble gases	 0.25 0.5 1.0
Iodine chemical form released from the SGs Iodine chemical form released from the containment: Iodine chemical form released from the ESF:	elemental: 97%, organic: 3% elemental: 4.85%, organic: 0.15%, particulate: 95% elemental: 97%, organic: 3%
RCS and Steam System Parameters	
Total steam generator tube leakage (gal/day)	600
Reactor coolant mass (lb) Secondary coolant mass, 4 steam generators (lb)	646,000 456,000
Primary-to-secondary leakage duration (h)	14

Table 15.4.8-3
Parameters Used in Evaluating the Radiological Consequences of the Rod Ejection Accident (Sheet 2 of 2)

Parameter	Value
RCS and Steam System Parameters	
Total steam generator tube leakage (gal/day)	600
Reactor coolant mass (lb) Secondary coolant mass, 4 steam generators (lb)	646,000 456,000
Primary-to-secondary leakage duration (h)	14
Steam released (lb)	
0 to 8 h	1,540,000
8 to 14 h	1,540,000
Iodine partition coefficient	100
Particulate partition coefficient for moisture carryover in the steam generators	1000
Offsite power	Lost after trip
Containment leakage release data	
Elemental iodine deposition removal rate Decontamination factor for elemental iodine Removal rate for particulates	See Appendix 15A.1.2. See Appendix 15A.1.2. See Appendix 15A.1.2.
Containment volume (ft^3)	2,800,000
Containment leak rate (%/d), 0-24 hr Containment leak rate (%/d), > 24 hr	0.15 0.075
Leakage fraction to the penetration areas (%) Leakage fraction to the environment (%)	50 50
Initiating time of containment spray system (min) Negative pressure arrival time of annulus emergency exhaust system (min)	35 34
HEPA filter efficiency for particulates of annulus emergency exhaust system (%)	99
ESF system leakage release data	
Recirculation water mass (lb) Recirculation water leakage rate (lb/h) Start time of recirculation water leakage (min) Flashing fraction (%)	2,360,000 17.6 30 10
Accident period (d)	30
MCR Parameters	
Control room envelope volume (including MCR)	See Table 15.6.5-5.
Occupancy frequency	See Table 15.6.5-5.
Total unfiltered inleakage	See Table 15.6.5-5.
Main control room HVAC system	See Table 15.6.5-5.
Radiological dose parameters	
χ/Q	See Table 15.0-13.
Breathing rate	See Table 15.0-13.
Dose conversion factors	See Table 15.0-14.

Table 15.4.8-4
Radiological Consequences of Rod Ejection Accident

Dose Location	TEDE Dose (rem)
EZB (0 to 2 hours)	5.1
LPZ outer boundary	4.5
MCR *1	4.4

Note:
*1 The direct radiation shine dose at the time of LOCA is added as a direct radiation shine dose.

15.6.2.5.3 Results

As shown in Table 15.6.2-2, the calculated TEDE doses are determined to be 1.5 rem at the EAB and 0.60 rem at the LPZ outer boundary.

These doses are less than 10% of the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34. The dose guideline is based on the acceptance criterion given in SRP 15.6.2.

The doses for the MCR for the failure of small lines carrying primary coolant outside the containment are bounded by the doses calculated for the loss-of-coolant accident (LOCA) event described in subsection 15.6.5.5. ~~Consequently, no doses are provided for the failure of small lines carrying primary coolant outside containment.~~

Table 15.6.2-1
Parameters Used in Evaluating the Radiological Consequences of Failure of Small Lines Carrying Primary Coolant Outside Containment

Parameter	Value
Core thermal power level (MWt)	4540 (2% above the design core thermal power)
Reactor coolant iodine concentration	The reactor coolant iodine concentration is based on a concurrent iodine spike corresponding to 500 times the release rate of iodine at the equilibrium value (1 □Ci/g DE I-131).
Reactor coolant noble gas concentration	300 □Ci/g DE Xe-133
Break flow rate (gpm)	97 (at density of 62.4 lb/ft3)
Fraction of reactor coolant flashing	47% based on initial reactor coolant enthalpy at maximum normal RCS pressure and final reactor coolant enthalpy at atmospheric pressure
Duration of accident (min)	45
Control room envelope volume (including MCR)	See Table 15.6.5-5.
Occupancy frequency	See Table 15.6.5-5.
Total unfiltered inleakage	See Table 15.6.5-5.
Main control room HVAC system	See Table 15.6.5-5.
χ/Q	See Table 15.0-13.
Breathing rate	See Table 15.0-13.
Dose conversion factors	See Table 15.0-14.

Table 15.6.2-2
Radiological Consequences of Failure of Small Lines Carrying Primary Coolant Outside Containment

Dose Location	TEDE Dose (rem)
EAB dose (0 to 2 hours)	1.5
LPZ boundary dose	0.60
MCR [*1]	0.57

Note:
[*1] The direct radiation shine dose at the time of LOCA is added as a direct radiation shine dose.

15.6.3.5.3 Results

As shown in Table 15.6.3-5, for the case in which iodine spike is initiated by the accident, the TEDE doses for the limiting 2 hours case are calculated to be 0.96 rem at the EAB and 0.43 rem at the LPZ outer boundary. These doses are less than 10% of the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34.

As shown in Table 15.6.3-5, for the case in which the SGTR occurs coincidently with a pre-existing iodine spike, the TEDE doses are calculated to be 3.6 rem at the EAB and 1.5 rem at the LPZ outer boundary. These doses are less than the dose guideline of 25 rem TEDE stipulated by 10 CFR 50.34.

The doses for the MCR for the SGTR are bounded by the doses calculated for the loss-of-coolant accident (LOCA) event described in Section 15.6.5.5. ~~Consequently, no doses are provided for the SGTR event.~~

Table 15.6.3-4
Parameters Used in Evaluating Radiological Consequences of Steam Generator Tube Rupture (Sheet 1 of 3)

Parameter	Value
Source data	
Core thermal power level (MWt)	4540 (2% above the design core thermal power)
Accident initiated spike	Initial concentration equal to the 1.0 □Ci/g DE I-131 with an assumed iodine spike that increases the rate of iodine release into the reactor coolant by a factor of 335. (See Table 15.0-11.) The duration is 8 hours.
Pre-accident spike	Reactor coolant concentration is 60 □Ci/g DE I-131. (See Table 15.0-10.)
Reactor coolant noble gas and other radionuclides (both cases)	The noble gas concentrations in the reactor coolant are based on the Technical Specification limit of 300 □Ci/g DE Xe-133. (See Table 15.0-12.) The alkali metal concentrations in the reactor coolant are based on 1% fuel defect. (See Table 11.1-2.)
Secondary system initial iodine and alkali concentration	10% of reactor coolant concentrations.
Reactor coolant mass (lb)	646,000
Initial steam generator mass (lb)	114,000 (each SG)
Offsite power	Lost after trip
Total steam generator tube leakage prior to accident (gpd)	600
Primary-to-secondary leakage duration (h)	14
Iodine chemical form	97% elemental, 3% organic

Table 15.6.3-4
Parameters Used in Evaluating Radiological Consequences of Steam Generator Tube Rupture (Sheet 2 of 3)

Parameter	Value
Ruptured steam generator	
Flashed break flow (lb/min)	0 - 0.0834 h : 686 0.0834 - 0.25 h : 655 0.25 – 0.334 h : 624 0.334 – 0.416 h : 343 0.416 – 0.49 h : 406 0.49 – 0.564 h : 312 0.564 – 0.637 h : 93.6 0.637 h – 14 h : 0
Steam released (lb)	0 - 0.25 h : 1,290,000 0.25 – 0.284 h : 67,500 0.284 – 0.447 h : 104,000 0.447 – 0.478 h : 16,200 0.478 – 0.508 h : 14,600 0.508 – 14 h : 0
Iodine partition coefficient	100
Particulate partition coefficient for moisture carryover in the steam generators	1000
Intact steam generators	
Total primary-to-secondary leakage rate (gpd)	600
Steam released (lb)	0 - 0.25 h : 3,860,000 0.25 – 0.417 h : 1,000,000 0.417 – 0.566 h : 279,000 0.566 – 0.715 h : 83,700 0.715 – 1.17 h : 170,000 1.17 – 8 h : 1,540,000 8 – 14 h : 1,540,000
Iodine partition coefficient	100
Particulate partition coefficient for moisture carryover in the steam generators	1000
~~**Radiological dose parameters**~~	
~~χ/Q~~	~~See Table 15.0-13.~~
~~Breathing rate~~	~~See Table 15.0-13.~~
~~Dose conversion factors~~	~~See Table 15.0-14.~~

Table 15.6.3-4
Parameters Used in Evaluating Radiological Consequences of Steam Generator Tube Rupture (Sheet 3 of 3)

Parameter	Value
MCR Parameters	
Control room envelope volume (including MCR)	See Table 15.6.5-5.
Occupancy frequency	See Table 15.6.5-5.
Total unfiltered inleakage	See Table 15.6.5-5.
Main control room HVAC system	See Table 15.6.5-5.
Radiological dose parameters	
χ/Q	See Table 15.0-13.
Breathing rate	See Table 15.0-13.
Dose conversion factors	See Table 15.0-14.

Table 15.6.3-5
Radiological Consequences of Steam Generator Tube Rupture

Dose Location	TEDE Dose (rem)
Transient-initiated iodine spike	
EAB (0 to 2 hours)	0.96
LPZ outer boundary	0.43
MCR [*1]	0.61
Pre-transient iodine spike	
EAB (0 to 2 hours)	3.6
LPZ outer boundary	1.5
MCR [*1]	3.5

Note:
[*1]The direct radiation shine dose at the time of LOCA is added as a direct radiation shine dose.

15.7.4.3 Results

Offsite doses are calculated at the EAB and the outer boundary of the LPZ. As shown in Table 15.7.4-2, the dose at the EAB is calculated to be 3.3 rem TEDE. At the outer boundary of the LPZ, the dose is calculated to be 1.4 rem TEDE.

These doses are well within the dose limit of 25 rem TEDE given in 10 CFR 50.34. "Well within" is defined as being less than or equal to 25% of the dose limit.

The doses for the main control room (MCR) from the fuel handling accident are bounded by the doses calculated for the loss-of-coolant accident (LOCA) event described in Section 15.6.5.5. ~~Consequently, no doses are provided for the fuel handling accident.~~

Table 15.7.4-1
Fuel Handling Accident Source Term Assumptions

Parameter	Value
Core thermal power level (MWt)	4540 (2% above the design core thermal power)
Decay (cooling) time (h)	24
Core source term Noble gases (Xe & Kr) Iodine	 See Table 15.0-14. See Table 15.0-14.
Fission product gap fraction: I-131 Kr-85 Other noble gases (Xe & Kr) Other iodine	 See Table 15.0-8. See Table 15.0-8. See Table 15.0-8. See Table 15.0-8.
Number of fuel assemblies in core	257
Amount of fuel damaged	1 assembly
Maximum rod radial peaking factor	1.78
Water decontamination factor for iodine	200
Release duration (h)	2
Control room envelope volume (including MCR)	See Table 15.6.5-5.
Occupancy frequency	See Table 15.6.5-5.
Total unfiltered inleakage	See Table 15.6.5-5.
Main control room HVAC system	See Table 15.6.5-5.
χ/Q	See Table 15.0-13.
Breathing rate	See Table 15.0-13.
Dose conversion factors	See Table 15.0-14.

Table 15.7.4-2
Radiological Consequences of Fuel Handling Accident

Dose Location	TEDE Dose (rem)
EAB (0 to 2 hours)	3.3
LPZ outer boundary	1.4
MCR (Occurred in fuel handling area) *1	0.69
MCR (Occurred in containment) *1	3.4

Note:
*1 The direct radiation shine dose at the time of LOCA is added as a direct radiation shine dose.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.