MITSUBISHI HEAVY INDUSTRIES, LTD.

16-5, KONAN 2-CHOME, MINATO-KU

June 4, 2009

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

Attention: Mr. Jeffery A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-09284

Subject: MHI's Responses to US-APWR DCD Draft Open Items RSAC 2.3.4 and RAI No. 42-772.

References: 1) "Draft Open Items RSAC 2.3.4, SRP Section: 02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases," dated February 12, 2009.

2) "Request for Additional Information No. 42-772 Revision 0, SRP Section: 02.03.04 – Short Term Atmospheric Dispersion Estimates for Accident Releases, Application Section: DCD Tier 2 Appendix 15A," dated July 30, 2008.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") documents as listed in Enclosures.

Enclosed are the responses to 7 Draft Open items and amended response to 4 RAIs No. 42-772 Revision 0 contained within References 1 and 2.

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 provided below.

Sincerely,

Y. Ogata

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

Enclosures:

1. "Responses to Draft Open Items RSAC 2.3.4 Revision 0"
2. "Responses Revision 1 to Request for Additional Information No. 42-772 Revision 0"

CC: J. A. Ciocco
C. K. Paulson

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NRO

Contact Information

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Enclosure 1

UAP-HF-09284
Docket No. 52-021

Response to Draft Open Items RSAC 2.3.4, Revision 0

June, 2009

DRAFT OPEN ITEMS RSAC 2.3.4

6/4/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-1] This question is related to the applicant's responses to RAI 02.03.04-1 and 15.00.03-17.

Justify the methodology used to evaluate doses to the main control room (MRC) and technical support center (TSC) for the failure of small lines carrying primary coolant outside containment accident.

a. The responses to RAI 02.03.04-1 and 15.00.03-17 state that the TSC dose consequence evaluation for this accident uses atmospheric dispersion factors (χ/Q values) based on the assumption that radioactive materials leaked into the auxiliary building are transferred directly to the TSC through the access building interior door. This implies that the assumed pathway from the reactor coolant spill in the auxiliary building to the TSC is entirely indoors. The use of χ/Q values in a dose consequence evaluation is appropriate only when the release pathway is assumed to travel at least partway outside of any buildings in that χ/Q values account for atmospheric dispersion when the effluent travels outside in the ambient environment. The ARCON96 atmospheric dispersion model accounts for atmospheric turbulence as effluents travel outdoors and are not appropriate for modeling "indoor" transport and dispersion.

b. Tables 02.03.04-1 and 15.00.03-17-5 seem to indicate that the release pathway for both the MCR and TSC dose consequence evaluations for this accident is the same; i.e., the auxiliary building/reactor coolant system sampling line located within the auxiliary building. This location is shown as "8" in Figures 02.03.04-1 and 15.00.03-17-1. Describe the assumed airborne (outdoor) effluent pathway between reactor coolant spill in the auxiliary building and the MCR. If the reactivity in the spilled reactor coolant is assumed to be discharged to the atmospheric from the plant vent stack for the purposes of modeling MCR doses, then the plant vent should be identified as the release pathway in the tables and figures referenced above.

ANSWER:

a. The application of ARCON96 to indoor dispersion modeling is not appropriate, as you pointed out. Since the sampling system line is the release point in failure of small lines carrying primary coolant outside containment and it does not directly release to the environment, the release point for this event is changed to the plant vent (source "9" in

Figure 02.03.04-6-1 in the answer for Open Item 02.03.04-6) which releases directly to the environment. Similarly, since the air lock and equipment hatch which are the present release points for the fuel handling accident within containment also do not directly release to environment, the release point for this event is also changed to the plant vent.

b. See the above answer "a". In DCD Tier 1 Table 2.1-1, DCD Tier 2 Table 2.0-1 and Table 15A-18 through 15A-23, χ/Q values used for MCR / TSC dose consequence evaluation in failure of small lines carrying primary coolant outside containment and fuel handling accident inside containment will be changed appropriately. Sampling system line, air lock and equipment hatch will be removed from Figure 02.03.04-1 of RAI and Table 02.03.04-1 and Table 2.3-2 of RAI which indicate positional relation between sources and receptors. Dose consequence evaluation in DCD Tier 2 chapter 15 will be revised with the change of χ/Q values.

Impact on DCD

In DCD Tier 1 Table 2.1-1, DCD Tier 2 Table 2.0-1 and Table 15A-18 through 15A-23, χ/Q values used for MCR / TSC dose consequence evaluation in failure of small lines carrying primary coolant outside containment and fuel handling accident inside containment should be changed appropriately. (See Table 02.03.04-6-1 in the answer to Open Item 02.03.04-6, which is the revised one of Table 02.03.04-1 of RAI 02.03.04-1 and Table 2.3-2 and 2.3-3 of RAI 02.03.04-2 and Figure 02.03.04-6-1 in the answer to Open Item 02.03.04-6, which is the revised one of Figure 02.03.04-1 of RAI 02.03.04-1)
Table 02.03.04-6-1 in the answer of Open Item 02.03.04-6 should be added at the end of Section 2.3 in DCD Tier 2. Figure 15A-1 should be revised in DCD Tier 2 as Figure 02.03.04-6-1 in response to Open Item 02.03.04-6.

Dose consequence evaluation in DCD Tier 2 chapter 15 should be revised with the change of χ/Q values.

Impact on COLA

Table of "Key Site Parameter" and Figure of "Site Plan with Release and Intake Locations" in FSAR Chapter 2 will be revised.

Impact on PRA

There is no impact on the PRA.

6/4/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-2] This question is related to the applicant's responses to RAIs 02.03.04-1 and 02.03.04-2.

Address the following apparent discrepancies between the information presented in Figure 02.03.04-1 provided in the response to RAI 02.03.04-1 and the information presented in Table 2.3-2 provided in the response to RAI 02.03.04-2:

a. Table 2.3-2 lists four class 1E electrical room HVAC intakes (i.e., southeast, southwest, northeast, northwest) whereas Figure 02.03.04-1 shows only two class 1E electrical room HVAC intakes.

b. Table 2.3-2 lists two auxiliary building HVAC intakes (i.e., north, south) whereas Figure 02.03.04-1 shows only one auxiliary building HVAC intake.

c. Table 2.3-2 lists two containment airlock sources (i.e., north, south) whereas Figure 02.03.04-1 shows only one containment airlock source.

ANSWER:

a. The source and receptor positions shown in Figure 02.03.04-1 of RAI 02.03.04-1 are not all listed. That figure showed only the source and receptor positions of χ/Q used by the radiological consequence in Chapter 15 of DCD. Table 2.3-2 of RAI 02.03.04-2 selected the positional relations between the source and receptor for the COL applicant. Since the focus is different, as previously mentioned, there are some differences between Figure 02.03.04-1 of RAI 02.03.04-1 and Table 2.3-2 of RAI 02.03.04-2.
Table 2.3-2 of RAI 02.03.04-2 and Figure 02.03.04-1 of RAI 02.03.04-1 is revised as the response of Open Item 02.03.04-6. (See the Table 02.03.04-6-1 and Figure 02.03.04-6-1 of the answer of Open Item 02.03.04-6.)

b. This answer is same as above answer "a".

c. As has already been in the answer for Open Item 02.03.04-1, radioactive materials will be emitted through the vent stack in the case of the failure of small lines carrying primary coolant . outside containment accident and therefore, the positional relations between the source and receptor will be reconsidered for the COL applicant. Radioactive materials will be also emitted through the vent stack in the case of the fuel handling accident within containment. For the COL applicant, the relations of location between the sources and receptors of each accident is reconsidered and corrected in Table 02.03.04-6-1 and Figure 02.03.04-6-1, as answer of Open Item 02.03.04-6.

Impact on DCD

In DCD Tier 2 Figure 15A-1, plant north should be added and sampling system line, air lock and equipment hatch should be removed from Figure and Tables which indicate positional relation between sources and receptors. (See Figure 02.03.04-6-1 in the answer to Open Item 02.03.04-6, which is the revised one of Figure 02.03.04-1 of RAI 02.03.04-1)

Figure 15 A-1 in DCD Tier 2 should be revised as Figure 02.03.04-6-1 in the answer to Open Item 02.03.04-6, and Table 02.03.04-6-1in the answer of Open Item 02.03.04-6 should be added at the end of Section 2.3 in DCD Tier 2.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

OPEN ITEMS RSAC 2.3.4

6/4/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-3] This question is related to the applicant's response to RAI 02.03.04-2.

a. Describe the methodology used to determine the initial lateral and vertical diffusion coefficients (i.e., 7.98 meters and 5.03 meters, respectively) presented in the proposed DCD Tier 2 Table 2.3-1 for containment leakage releases. Discuss how this methodology compares to the approach discussed in Sections C.3.2.4.4 and C.3.2.4.5 of RG 1.194.

b. Describe the methodology used to determine the release height for the area sources (e.g., containment, fuel handling area, equipment hatch, and air lock) presented in the proposed DCD Tier 2 Table 2.3-4. Discuss how this methodology compares to the approach discussed in Section C.3.2.4.5 of RG 1.194 (i.e., the release height for area sources should be set to the vertical center of the area source).

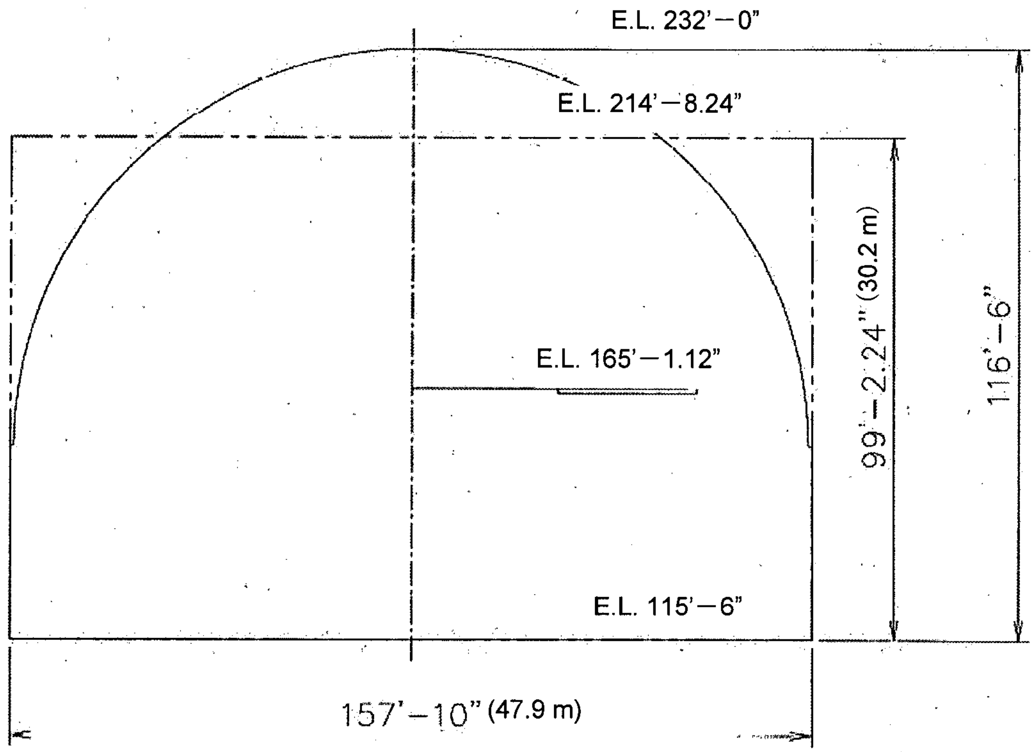
c. Revise DCD Tier 2 Section 2.3 to include information regarding receptor heights (e.g. the distance above ground level for the main control room HVAC intake, reactor building door, auxiliary building HVAC intake, Class 1E electrical room HVAC intake, technical support center HVAC intake, access building door).These data are required inputs to the ARCON96 atmospheric dispersion model.

d. Ensure the release height and receptor height data to be presented in DCD Tier 2 Section 2.3 are consistent with the vertical distance data presented in DCD Tier 2 Tables 15A-18 through 15A-23.

ANSWER:

(a)The lateral and vertical diffusion coefficients are determined by the area of area source. The area source in the DCD Tier 2 Table 2.3-1 is determined from cross-sectional area of CV. that is perpendicular to the line of sight from the CV surface above the roof of the reactor building, which is nearest to a intake, toward any control room intake. Because the CV is a circular shape, the cross-sectional area of the CV is common for all receptors which located at different directions. The width and height of the area source (i.e., 47.9 meters and 30.2 meters respectively) are determined from the equivalent rectangular area to the cross-sectional area of the CV (see Fig

02.03.04-3-1). Therefore, the initial lateral and vertical coefficient are determined according to Section C.3.2.4.4. and C.3.2.4.5. of RG 1.194 (i.e., Width and height of area source are divided by 6.).



The ground level is E.L.=2' -8"

Width $_{\text{area source}}$ = 157 ft = 47.9 m
Height $_{\text{area source}}$ = 99 ft = 30.2 m

Figure 02.03.04-3-1 Area Source for Containment Shell

(b) The height of area source presented in the DCD Tier 2 is determined according to the C.3.2.4.5 of RG 1.194. In other words, the height of area source is set to the vertical center of the area source (see Fig 02.03.04-3-1). The upper and lower height of area source is 212 feet 1.24 inches and 112 feet 11 inches from the ground level, respectively. Therefore the release height for area source is determined to 162 feet 6.12 inches from ground level, which locates at the vertical center of the area source. This height is commonly used for all receptors because the area source for each receptor is same for all receptors (the details are described in the answer of the Open Item 02.03.04-3(a).).

(c) All receptors are assumed to be rectangular. The corner of the rectangular nearest to the source is selected as the location of a receptor for the conservative prediction. The receptor heights are described in Table 02.03.04-3-1 for COL applicants. These receptors are also listed in the Table 0.203.04-6-1 in the answer of Open Item 02.03.04-6, as the combinations of source and receptor for each accident.

Table 02.03.04-3-1 Receptor heights

Receptors	The height to the lower limit(1)(m)	The height to the upper limit(1)(m)
Main control room HVAC intake (east and west)	14.3(2)	17.1(3)
Class 1E electrical room HVAC intake (south-east and south-west)	14.3(2)	17.1(3)
Class 1E electrical room HVAC intake (north-east and north-west)	14.3(2)	16.2(3)
Reactor building door	7.3(4)	9.8(5)
Auxiliary building and technical support center HVAC intake (north and south)	23.2(2)	27.1(3)

NOTES:

(1) The distance is from the ground level. The ground level is E.L.=2' -8". The receptors are assumed as rectangular, and then the closer corner of receptor height is used to derive the vertical distance between sources and receptors.

(2) For release from main steam line (east) and fuel handling area.

(3) For release from containment, plant vent, main steam line (west), main steam relief valve and main steam safety valve.

(4) For release from fuel handling area.

(5) For release from containment, plant vent, main steam line (east and west), main steam relief valve and main steam safety valve.

(d) The vertical distance data presented in DCD Tier 2 Tables 15A-18 though 15A-23 are determine from the source height and receptor height data presented in DCD Tier 2 Section 2.3. All receptors are assumed to be rectangular as above mentioned (details are described in the answer of the Open Item 02.03.04-3(c)), the vertical distance are determined by using the closer receptor height for each source height. Although the source heights, receptor heights and vertical distances are described Table 02.03.04-6-1 in the answer Open Item 02.03.04-6, These values are the distance differences in a unit of meter from the source to the receptor. The distance differences in a unit of feet are obtained at first and then are rounded off. Those rounded numbers in a unit of feet are converted to in a unit of meter. Note that these values are a bit different from the source height and receptor height in the Table 02.03.04-3-1, because the source height and receptor height in a unit of meter are directly converted from in a unit of feet.

Impact on DCD

Figure 02.03.04.03-1 and Tables 02.03.04.03-1 of this answer of Open Item 02.03.04-3 should be added at Section 2.3 in DCD Tier 2. The content of this answer (i.e. the method of area source and the receptor heights) should be added at Section 2.3 in DCD Tier 2. The lateral and vertical initial diffusion coefficient should be deleted at Table 2.3-1 of RAI 02.03.04-2, because these values are included in Table 02.03.04-6-1, as answer of Open Item 02.03.04-6. The Air lock and

Equipment hatch and Reactor coolant system sample line should be deleted at Table 2.3-4 of RAI 02.03.04-2, as described in the answer of Open Item 02.03.04-1.
The above revised Table 2.3-1 and Table 2.3-4 of RAI 02.03.04-2 should be added in DCD Tier 2.

Impact on COLA

Table of "Key Site Parameter" and Figure of "Site Plan with Release and Intake Locations" in FSAR Chapter 2 will be revised.

Impact on PRA

There is no impact on the PRA.

DRAFT OPEN ITEMS RSAC 2.3.4

6/4/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-4] This question is related to the applicant's response to RAI 02.03.04-2.

The last footnotes to proposed DCD Tier 2 Tables 2.3-2 and 2.3-3 are incorrect and should be either revised or deleted.

The footnotes to proposed DCD Tier 2 Tables 2.3-2 and 2.3-3 state the diffusion equations described in ARCON96 (e.g., Revision 1 to NUREG-6331 [sic]) are used for calculating MCR χ/Q values, together with the conservative meteorological condition based on RG 1.194 (e.g., F stability with wind speeds of 1.0 m/s). F stability with a wind speed of 1.0 m/s is a conservative (e.g., 95-percentile) meteorological condition for the Murphy-Camped model discussed in Section C.4 of RG 1.194 but is not a conservative meteorological condition for the ARCON96 atmospheric dispersion model. Although ARCON96 uses a simple Gaussian dispersion model, the concentrations predicted by ARCON96 do not vary inversely with wind speed for all wind speeds because the building wake correction algorithm is not a linear function of wind speed. A plot of ARCON96 χ/Q values as a function of wind speed and stability class, as presented in Figure 1, shows conservative χ/Q values are associated with wind speeds of 3 to 4 m/s.

ANSWER:

The meteorological condition of F stability with 1 m/s is not conservative for the ARCON96 dispersion model as you mention. However in the present analyses the dispersion associated with F stability with 1 m/s is multiplied by a factor of 2. By modifying the χ/Q model in this way the dispersion results envelop most existing plant χ/Q values in US. That is we did not use ARCON96 directly in DCD.

In the Figure 02.03.04-4-1 we have plotted the 0-8 hours ARCON96 dispersion (s/m^3) versus slant distance (m) for several wind speeds (m/s) and the values used in this analysis, i.e. 1 m/s with a multiplier of 2. As is shown the variation with the higher wind speeds is less than 15 % as compared with the values used in this analysis. Therefore we believe our modification to the ARCON96 model yields sufficiently conservative results.

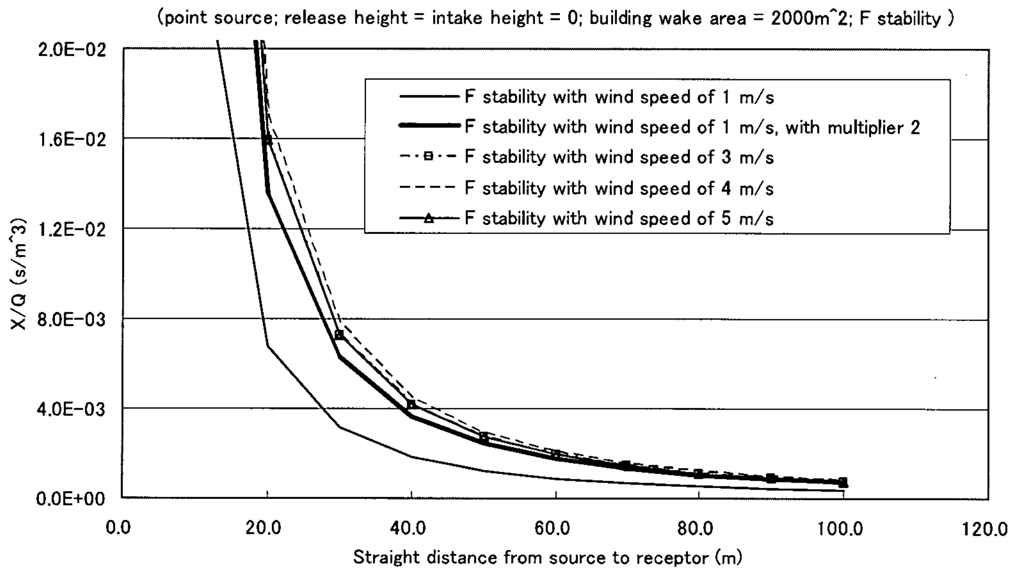


Figure 02.03.04-4-1 χ/Q values relate to wind speed

Impact on DCD

The expression "*conservative meteorological condition based on RG 1.194*", that is the footnotes of Table 2.3-2 and 2.3-3 in RAI 02.03.04-2, should be changed to "*meteorological condition based on RG 1.194*" for the revised DCD.
The sentence " It is not used the ARCON96 in DCD" should be added in the foot notes of Table 2.3-2 of answer of and answer of RAI 02.03.04-4 for revised DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

DRAFT OPEN ITEMS RSAC 2.3.4

6/4/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-5] This question is related to the applicant's response to RAI 02.03.04-2.

Clarify the COL applicant's expectations regarding the site-specific calculation of TSC χ/Q values.

The necessary data for COL applicants to calculate TSC χ/Q values are presented in the proposed DCD Tier 2 Tables 2.3-1, 2.3-3, and 2.3-4. However, there is no combined license information item specifying that COL applicants calculate TSC χ/Q values and there are no TSC χ/Q values listed as key site parameters in either DCD Tier 1 Table 2.1-1 or DCD Tier 2 Table 2.0-1. If it can be demonstrated that the MCR dose consequence model will always be bounding for the TSC, then there is no need for COL applicants to calculate site-specific TSC χ/Q values. However, if the MCR dose consequence model is not bounding for the TSC, then TSC χ/Q values should be included as key site parameters in DCD Tier 1 Table 2.1-1 and DCD Tier 2 Table 2.0-1 and COL applicants should be directed to calculate site-specific TSC χ/Q values for comparison with the TSC χ/Q values listed as key site parameters.

ANSWER:

The same comment was shown in the RAI 15.00.03-25 (RAI No.105-1624) for chapter 15 of DCD of the US-APWR. The answer to the RAI is that the MCR dose consequence model are not bounding for the TSC, therefore the TSC x/Q values will be added to DCD Tier 1 Table 2.1-1 and DCD Tier 2 Table 2.0-1 in DCD.

Impact on DCD

As the answer of RAI 15.00.03-25, Table 2.0-1 in DCD will be revised.

Impact on COLA

Table of "Key Site Parameter" in FSAR Chapter 2 will be revised.

Impact on PRA

There is no impact on the PRA.

DRAFT OPEN ITEMS RSAC 2.3.4

6/4/2009

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SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-6] This question is related to the applicant's response to RAI 02.03.04-3.

Revise the MCR intake and inleakage locations presented in DCD Tier 1 Table 2.1-1, DCD Tier 2 Table 2.0-1, and DCD Tier 2 Tables 15A-18 through 15A-23 as discussed below.

DCD Tier 2 Tables 15A-18 through 15A-23 identify main control room (MCR) intake and inleakage locations for each postulated accident and anticipated operational occurrence. Similarly, DCD Tier 1 Table 2.1-1 and DCD Tier 2 Table 2.0-1 identify inleakage locations for some (but not all) of the postulated accidents and anticipated operational occurrences. The MCR intake and inleakage locations shown in these tables are the bounding locations based, in part, on the results of the "generic" atmospheric dispersion analyses performed by MHI for the purposes of generating χ/Q values for use in the MCR dose analyses. These generic atmospheric dispersion analyses varied χ/Q values as a function of downwind distance but did not take into consideration that χ/Q values are also a function of wind direction frequency which can vary from site to site. Consequently, COL applicants should be directed to evaluate χ/Q values for each inleakage location (i.e., class 1E electrical room HVAC intake, auxiliary building HVAC intake, and reactor building door) for each accident release point and compare the resulting bounding χ/Q values with the corresponding key site parameter values listed in DCD Tier 1 Table 2.1-1 and DCD Tier 2 Table 2.0-1, unless an inleakage location is not a feasible for a particular accident scenario (e.g., a loss-of-coolant accident generates an emergency core cooling system actuation signal which stops the auxiliary building HVAC).

ANSWER:

The DCD will be revised.
We will describe the bounding x/Q's at each inleakage or intake location, based on the "generic" atmospheric dispersion analysis introduced by MHI, for each accident release point. The x/Q's at each receptor will conservatively be set to the largest value determined for the inleakage and intake locations.

Accordingly, COL applicants will be able to compare the resulting bounding x/Q calculated by ARCON96 with the corresponding x/Q listed in DCD. The combination of sources and receptors are listed in Table 02.03.04-6-1 and Figure 02.03.04-6-1of the answer of Open Item 02.03.04-6. In addition, the locations of the main steam relief valve and the main steam safety valve were displayed by only the location No.5 in Figure 02.03.04-1 of the answer for RAI 02.03.04-1.,In Figure 02.03.04-6-1 of the answer of Open Item 02.03.04-6, they are separately displayed and then they are displayed at 2 locations at the west and the east for the plant north, respectively. Also the main steam line No.4 in RAI02.03.04-1 are displayed at 2 locations similar as the main steam relief valve and the main steam safety valve. Accordingly, all source locations are also displayed additionally in Figure 02.03.04-6-1. In DCD, in case of release from steam line, relief valve and safety valve, the MCR and TSC X/Q values are calculated at only the combination of source and receptor, which has the shortest distance between them. Because in COL the calculation of MCR and TSC X/Q values are depended on not only the distance but also the meteorological condition (i.e. wind direction, wind directional frequency, etc.), the all combination of sources and receptors for each sources are added in Table 02.03.04-6-1 of the answer of Open Item 02.03.04-6.

The following tables added on Table 02.03.04-6-1(1) through Table 02.03.04-6-1(7) from Table 02.03.04-1(1) through Table 02.03.04-1(6) of RAI 02.03.04-1 revision 0.are as follows.

- **Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 2 of 12)**
- **Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 4 of 12)**
- **Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 7 of 12)**
- **Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 8 of 12)**
- **Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 10 of 12)**
- **Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 12 of 12)**
- **Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 2 of 8)**
- **Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 5 of 8)**
- **Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 6 of 8)**
- **Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 8 of 8)**
- **Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 4 of 11)**
- **Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 7 of 11)**
- **Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 8 of 11)**
- **Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 11 of 11)**
- **Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 2 of 8)**
- **Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 5 of 8)**
- **Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 6 of 8)**
- **Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 8 of 8)**

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 1 of 12)

Accidents		Steam system piping failure						
		MCR						
Sources		Main steam line break releases						
	Locations (1)	5 of the East	5 of the West	5 of the East		5 of the West		
	Release heights (m) (2)	12.8	26.2	12.8		26.2		
Receptors		Intake		Inleak				
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	14.3	17.1	14.3	14.3	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		17	25	20	17	26	25	33
Vertical distance (m) (3)		0	-8.8	0	0	-9.8	-8.8	-16
Straight distance (m) (3)		17	26	20	17	28	26	37
Direction Receptor to Source (degree) (4)		256	93	234	256	110	93	132
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.9×10^{-2}		1.9×10^{-2}				
	8-24 hr	1.1×10^{-2}		1.1×10^{-2}				
	24-96 hr	7.1×10^{-3}		7.1×10^{-3}				
	96-720 hr	3.1×10^{-3}		3.1×10^{-3}				

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 2 of 12)

Accidents		Steam system piping failure						
		MCR						
Sources		Main steam line break releases						
	Locations (1)	5 of the West	5 of the East	5 of the West		5 of the East		
	Release heights (m) (2)	26.2	12.8	26.2		12.8		
Receptors		Intake		Inleak				
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	17.1	14.3	16.2	17.1	14.3	14.3	9.8
Horizontal distance Source to Receptor (m)(3)		40	49	41	40	50	49	55
Vertical distance (m) (3)		-8.8	0	-9.8	-8.8	0	0	-2.7
Straight distance (m) (3)		41	49	42	41	50	49	55
Direction Receptor to Source (degree) (4)		269	95	258	269	104	95	118
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.9×10^{-2}		1.9×10^{-2}				
	8-24 hr	1.1×10^{-2}		1.1×10^{-2}				
	24-96 hr	7.1×10^{-3}		7.1×10^{-3}				
	96-720 hr	3.1×10^{-3}		3.1×10^{-3}				

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 3 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 4 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 5 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 6 of 12)

Accidents		Steam system piping failure					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 7 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 8 of 12)

Accidents		Steam system piping failure					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 9 of 12)

Accidents		Steam system piping failure			
		TSC			
Sources	Locations (1)	Main steam line break releases			
		5 of the West			
	Release heights (m) (2)	26.2			
Receptors	Locations (1)	Intake		Inleak	
		TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1
Horizontal distance to Intake (m)(3)		84	67	84	67
Vertical distance (m) (3)		0	0	0	0
Straight distance (m) (3)		84	67	84	67
Direction Receptor to Source (degree) (4)		135	118	135	118
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	1.5×10^{-3}		1.5×10^{-3}	
	8-24 hr	8.4×10^{-4}		8.4×10^{-4}	
	24-96 hr	5.3×10^{-4}		5.3×10^{-4}	
	96-720 hr	2.3×10^{-4}		2.3×10^{-4}	

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 10 of 12)

Accidents		Steam system piping failure			
		TSC			
Sources	Locations (1)	Main steam line break releases 5 of the East			
	Release heights (m) (2)	12.8			
Receptors	Locations (1)	Intake		Inleak	
		TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	23.2	23.2	23.2	23.2
Horizontal distance to Intake (m)(3)		104	91	104	91
Vertical distance (m) (3)		10	10	10	10
Straight distance (m) (3)		105	91	105	91
Direction Receptor to Source (degree) (4)		127	113	127	113
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	1.5×10^{-3}		1.5×10^{-3}	
	8-24 hr	8.4×10^{-4}		8.4×10^{-4}	
	24-96 hr	5.3×10^{-4}		5.3×10^{-4}	
	96-720 hr	2.3×10^{-4}		2.3×10^{-4}	

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 11 of 12)

Accidents		Steam system piping failure							
		TSC							
Sources		Main steam relief valve and safety valve releases							
	Locations (1)	6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors		Intake				Inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-6-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 12 of 12)

Accidents		Steam system piping failure							
		TSC							
Sources		Main steam relief valve and safety valve releases							
	Locations (1)	6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors		Intake				Inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 1 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 2 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 3 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources	Locations [1]	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) [2]	40.5		38.7	
Receptors	Locations [1]	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake[7]	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake[7]
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) [2]	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)[3]		27	31	24	26
Vertical distance (m) [3]		-24	-23	-22	-21
Straight distance (m) [3]		36	39	33	33
Direction Receptor to Source (degree) [4]		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) [6]	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 4 of 8)

Accidents		RCP rotor seizure accident					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 5 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m) (3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 6 of 8)

Accidents		RCP rotor seizure accident					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 7 of 8)

Accidents		RCP rotor seizure accident							
		TSC							
Sources		Main steam relief valve and safety valve releas							
	Locations (1)	6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors		Intake				Inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-6-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 8 of 8)

Accidents		RCP rotor seizure accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 1 of 11)

Accidents		Rod Ejection Accident								
		MCR								
Sources	Locations (1)	Plant vent								
		9								
	Release heights (m) (2)	69.8								
Receptors		Intake		Inleak						
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	27.1	27.1	9.8
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56	55	60	37
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52	-43	-43	-60
Straight distance (m) (3)		86	77	83	86	73	77	69	74	71
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21	92	65	33
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.4×10^{-3}						
	8-24 hr	6.6×10^{-4}		8.0×10^{-4}						
	24-96 hr	4.2×10^{-4}		5.1×10^{-4}						
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}						

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 2 of 11)

Accidents		Rod Ejection Accident								
		MCR								
Sources		Ground level containment release point (5)								
	Locations (1)	2 of the East	2 of the West	1 of the East	2 of the East	1 of the West	2 of the West	3 of the North	3 of the South	4
	Release heights (m) (2)	49.4								
Receptors		Intake		Inleak						
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	27.1	27.1	9.8
Horizontal distance Source to Receptor (m)(3)		32	32	27	32	27	32	44	46	17
Vertical distance (m) (3)		-32	-32	-33	-32	-33	-32	-22	-22	-39
Straight distance (m) (3)		45	45	42	45	42	45	49	51	43
Direction Receptor to Source (degree) (4)		325	35	320	325	40	35	98	75	53
Lateral diffusion coefficient (m)		7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98
Vertical diffusion coefficient (m)		5.03	5.03	5.03	5.03	5.03	5.03	5.03	5.03	5.03
χ/Q (s/m^3) (6)	0-8 hr	2.2×10^{-3}		2.4×10^{-3}						
	8-24 hr	1.3×10^{-3}		1.4×10^{-3}						
	24-96 hr	8.3×10^{-4}		9.1×10^{-4}						
	96-720 hr	3.6×10^{-4}		4.0×10^{-4}						

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 3 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors	Locations (1)	Intake			
		MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 4 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
Sources	Locations (1)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
Sources	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
Receptors	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
Receptors		a of the East	a of the East	a of the West	a of the West
Receptors	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 5 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 6 of 11)

Accidents		Rod Ejection Accident					
		MCR					
Sources		Main steam relief valve and safety valve releases					
	Locations (1)	6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 7 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 8 of 11)

Accidents		Rod Ejection Accident					
		MCR					
Sources		Main steam relief valve and safety valve releases					
Sources	Locations (1)	6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
Sources	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
Receptors	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
Receptors	Locations (1)	d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
Receptors	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
X/Q (s/m^3) (6)	8-24 hr	3.1×10^{-3}					
X/Q (s/m^3) (6)	24-96 hr	2.0×10^{-3}					
X/Q (s/m^3) (6)	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 9 of 11)

Accidents		Rod Ejection Accident							
		TSC							
Sources	Locations (1)	Plant vent		Ground level containment release point (5)		Plant vent		Ground level containment release point (5)	
		9		3 of the North	3 of the South	9		3 of the North	3 of the South
	Release heights (m) (2)	69.8		49.4		69.8		49.4	
Receptors		Intake				inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m) (3)		55	60	44	46	55	60	44	46
Vertical distance (m) (3)		-43	-43	-22	-22	-43	-43	-22	-22
Straight distance (m) (3)		69	74	49	51	69	74	49	51
Direction Receptor to Source (degree) (4)		92	65	98	75	92	65	98	75
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}		1.9×10^{-3}		1.7×10^{-3}		1.9×10^{-3}	
	8-24 hr	9.9×10^{-4}		1.1×10^{-3}		9.9×10^{-4}		1.1×10^{-3}	
	24-96 hr	6.3×10^{-4}		7.2×10^{-4}		6.3×10^{-4}		7.2×10^{-4}	
	96-720 hr	2.8×10^{-4}		3.2×10^{-4}		2.8×10^{-4}		3.2×10^{-4}	

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 10 of 11)

Accidents		Rod Ejection Accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}				1.4×10^{-3}			
	8-24 hr	8.0×10^{-4}				8.0×10^{-4}			
	24-96 hr	5.1×10^{-4}				5.1×10^{-4}			
	96-720 hr	2.2×10^{-4}				2.2×10^{-4}			

Table 02.03.04-6-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 11 of 11)

Accidents		Rod Ejection Accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}				1.4×10^{-3}			
	8-24 hr	8.0×10^{-4}				8.0×10^{-4}			
	24-96 hr	5.1×10^{-4}				5.1×10^{-4}			
	96-720 hr	2.2×10^{-4}				2.2×10^{-4}			

Table 02.03.04-6-1(4) Combination of Sources and Receptors for Failure of Small Lines Carrying Primary Coolant Outside Containment analyses in the DCD(Sheet 1 of 2)

Accidents		Failure of Small Lines Carrying Primary Coolant Outside Containment					
		MCR					
Sources	Locations (1)	Plant vent					
		9					
	Release heights (m) (2)	69.8					
Receptors	Locations (1)	Intake		Inleak			
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52
Straight distance (m) (3)		86	77	83	86	73	77
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.2×10^{-3}			
	8-24 hr	6.6×10^{-4}		8.0×10^{-4}			
	24-96 hr	4.2×10^{-4}		5.1×10^{-4}			
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}			

Table 02.03.04-6-1(4) Combination of Sources and Receptors for Failure of Small Lines Carrying Primary Coolant Outside Containment analyses in the DCD (Sheet 2 of 2)

Accidents		Failure of Small Lines Carrying Primary Coolant Outside Containment						
		MCR			TSC			
Sources	Locations (1)	Plant vent			Plant vent			
		9			9			
	Release heights (m) (2)	69.8			69.8			
Receptors		Inleak			Intake		inleak	
	Locations (1)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	b	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	9.8	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		55	60	37	55	60	55	60
Vertical distance (m) (3)		-43	-43	-60	-43	-43	-43	-43
Straight distance (m) (3)		69	74	71	69	74	69	74
Direction Receptor to Source (degree) (4)		92	65	33	92	65	92	65
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}			1.4×10^{-3}		1.4×10^{-3}	
	8-24 hr	8.0×10^{-4}			8.0×10^{-4}		8.0×10^{-4}	
	24-96 hr	5.1×10^{-4}			5.1×10^{-4}		5.1×10^{-4}	
	96-720 hr	2.2×10^{-4}			2.2×10^{-4}		2.2×10^{-4}	

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 1 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors	Locations (1)	Intake			
		MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m) (3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 2 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors	Locations (1)	Intake			
		MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 3 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 4 of 8)

Accidents		SGTR					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 5 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 6 of 8)

Accidents		SGTR					
		MCR					
Sources	Locations (1)	6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 7 of 8)

Accidents		SGTR							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-6-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 8 of 8)

Accidents		SGTR							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-6-1(6) Combination of Sources and Receptors for LOCA Analysis in the DCD (Sheet 1 of 3)

Accidents		LOCA						
		MCR						
Sources	Locations (1)	Plant vent						
		9						
	Release heights (m) (2)	69.8						
Receptors		intake		Inleak				
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56	37
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52	-60
Straight distance (m) (3)		86	77	83	86	73	77	71
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21	33
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.4×10^{-3}				
	8-24 hr	6.6×10^{-4}		7.7×10^{-4}				
	24-96 hr	4.2×10^{-4}		4.9×10^{-4}				
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}				

Table 02.03.04-6-1(6) Combination of Sources and Receptors for LOCA Analysis in the DCD (Sheet 2 of 3)

Accidents		LOCA						
		MCR						
Sources	Locations (1)	Ground level containment release point (5)						
		2 of the East	2 of the West	1 of the East	2 of the East	1 of the West	2 of the West	4
	Release heights (m) (2)	49.4						
Receptors	Locations (1)	Intake		Inleak				
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		32	32	27	32	27	32	17
Vertical distance (m) (3)		-32	-32	-33	-32	-33	-32	-39
Straight distance (m) (3)		45	45	42	45	42	45	43
Direction Receptor to Source (degree) (4)		325	35	320	325	40	35	53
Lateral diffusion coefficient (m)		7.98	7.98	7.98	7.98	7.98	7.98	7.98
Vertical diffusion coefficient (m)		5.03	5.03	5.03	5.03	5.03	5.03	5.03
χ/Q (s/m^3) (6)	0-8 hr	2.2×10^{-3}		2.4×10^{-3}				
	8-24 hr	1.3×10^{-3}		1.4×10^{-3}				
	24-96 hr	8.3×10^{-4}		9.1×10^{-4}				
	96-720 hr	3.6×10^{-4}		4.0×10^{-4}				

Table 02.03.04-6-1(6) Combination of Sources and Receptors for LOCA Analysis in the DCD (Sheet 3 of 3)

Accidents		LOCA							
		TSC							
Sources	Locations (1)	Plant vent				Ground level containment release point (5)			
		9				3 of the North			
	Release heights (m) (2)	69.8				49.4			
Receptors	Locations (1)	Intake		inleak		Intake		inleak	
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		55	60	55	60	44	46	44	46
Vertical distance (m) (3)		-43	-43	-43	-43	-22	-22	-22	-22
Straight distance (m) (3)		69	74	69	74	49	51	49	51
Direction Receptor to Source (degree) (4)		92	65	92	65	98	75	98	75
Lateral diffusion coefficient (m)		0	0	0	0	7.98	7.98	7.98	7.98
Vertical diffusion coefficient (m)		0	0	0	0	5.03	5.03	5.03	5.03
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}		1.4×10^{-3}		1.9×10^{-3}		1.9×10^{-3}	
	8-24 hr	8.0×10^{-4}		8.0×10^{-4}		1.1×10^{-3}		1.1×10^{-3}	
	24-96 hr	5.1×10^{-4}		5.1×10^{-4}		7.2×10^{-4}		7.2×10^{-4}	
	96-720 hr	2.2×10^{-4}		2.2×10^{-4}		3.2×10^{-4}		3.2×10^{-4}	

Table 02.03.04-6-1(7) Combination of Sources and Receptors for Fuel Handling Accident Analysis in the DCD (Sheet 1 of 3)

Accidents		Fuel handling accident in the containment								
		MCR								
Sources	Locations (1)	Plant vent								
		9								
	Release heights (m) (2)	69.8								
Receptors		Intake		Inleak						
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	27.1	27.1	9.8
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56	55	60	37
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52	-43	-43	-60
Straight distance (m) (3)		86	77	83	86	73	77	69	74	71
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21	92	65	33
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.4×10^{-3}						
	8-24 hr	6.6×10^{-4}		8.0×10^{-4}						
	24-96 hr	4.2×10^{-4}		5.1×10^{-4}						
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}						

Table 02.03.04-6-1(7) Combination of Sources and Receptors for Fuel Handling Accident Analysis in the DCD (Sheet 2 of 3)

Accidents		Fuel handling accident in the fuel handling area								
		MCR								
Sources	Locations (1)	Fuel handling area								
		8								
	Release heights (m) (2)	5.8								
Receptors	Locations (1)	Intake		Inleak						
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	14.3	14.3	14.3	14.3	14.3	14.3	23.2	23.2	7.3
Horizontal distance Source to Receptor (m)(3)		82	105	76	82	100	105	103	114	89
Vertical distance (m) (3)		8.5	8.5	8.5	8.5	8.5	8.5	17	17	1.5
Straight distance (m) (3)		83	105	76	83	100	105	105	115	89
Direction Receptor to Source (degree) (4)		360	38	360	360	41	38	75	61	47
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	9.9×10^{-4}		1.1×10^{-3}						
	8-24 hr	5.9×10^{-4}		6.7×10^{-4}						
	24-96 hr	3.7×10^{-4}		4.3×10^{-4}						
	96-720 hr	1.6×10^{-4}		1.9×10^{-4}						

Table 02.03.04-6-1(7) Combination of Sources and Receptors for Fuel Handling Accident Analysis in the DCD (Sheet 3 of 3)

Accidents		Fuel handling accident in the containment				Fuel handling accident in the fuel handling area			
		TSC							
Sources	Locations (1)	Plant vent				Fuel handling area			
		9				8			
	Release heights (m) (2)	69.8				5.8			
Receptors	Locations (1)	Intake		inleak		Intake		inleak	
		TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	23.2	23.2	23.2	23.2
Horizontal distance Source to Receptor (m)(3)		55	60	55	60	103	114	103	114
Vertical distance (m) (3)		-43	-43	-43	-43	17	17	17	17
Straight distance (m) (3)		69	74	69	74	105	115	105	115
Direction Receptor to Source (degree) (4)		92	65	92	65	75	61	75	61
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}		1.4×10^{-3}		6.7×10^{-4}		6.7×10^{-4}	
	8-24 hr	8.0×10^{-4}		8.0×10^{-4}		3.9×10^{-4}		3.9×10^{-4}	
	24-96 hr	5.1×10^{-4}		5.1×10^{-4}		2.5×10^{-4}		2.5×10^{-4}	
	96-720 hr	2.2×10^{-4}		2.2×10^{-4}		1.1×10^{-4}		1.1×10^{-4}	

NOTES:

(1) The inside of a parenthesis shows the source locations and receptor locations of the Figure 02.03.04-6-1

(2) The height is from the ground level. The ground level is E.L.= 2' -8"

(3) These values are the distance differences in a unit of meter from the source to the receptor. After the distance differences are calculated from the locations of the source and the receptor in a unit of feet, the resulted distance differences are rounded off. Those rounded numbers of the distance differences are converted to those in a unit of meter. Therefore, note that these values are a bit different from the difference between the source height and receptor height in a unit of meter indicated in the above (2), because the source height and receptor height in a unit of meter are directly converted from those in a unit of feet, without any calculation in a unit of feet.

(4) The angle of receptors from Plant North centering on sources (Direction increases in a clockwise fashion based on the Plant North, i.e. The Plant North is 0 degree.)

(5) Area source, which is determined from the method in Sections C.3.2.4.4 and C.3.2.4.5 of RG 1.194.

(6) - These χ/Q values are for US-APWR DCD Chapter15.

- The χ/Q values of MCR can't be directly calculated by ARCON96 itself because there is no site specific meteorological data in the stage of the DCD. Therefore, the diffusion equations described in ARCON96 (e.g. Revision 1 to NUREG-6331) are used for calculating the χ/Q values of MCR, together with the meteorological condition based on RG 1.194 (e.g., F stability with wind speeds of 1.0 m/s) and multiplier. According to the setting method of these χ/Q values, the closer the distance the more conservative it becomes. It is not used the ARCON96 directly in DCD.
- For each sources, the χ/Q values for inleakage and intake are set as those of the path with the shortest straight distances, respectively.

(7) Class 1E electrical room HVAC intake (south – east) and MCR HVAC Intake (east) are same intake duct (i.e. they are same location).

(8) Class 1E electrical room HVAC intake (south – west) and MCR HVAC Intake (west) are same intake duct (i.e. they are same location).

SOURCES

1. Containment Shell to Class 1E electrical room HVAC intake (As Diffuse Area Source)
2. Containment Shell to Control Room HVAC Intake and Class 1E electrical room HVAC intake (As Diffuse Area Source)
3. Containment Shell to Auxiliary Building HVAC Intake and technical support center HVAC Intake (As Diffuse Area Source)
4. Containment Shell to Reactor Building Door (As Diffuse Area Source)
5. Main Steam Line (Source points are in the west and the east.)
6. Relief Valve (Source points are in the west and the east.)
7. Safety Valve (Source points are in the west and the east.)
8. Fuel Handling Area
9. Plant Vent

RECEPTORS

a. Main Control Room HVAC Intake
b. Reactor Building Door
c. Auxiliary Building HVAC Intake and Technical Support Center HVAC Intake
d. Class 1E electrical room HVAC intake

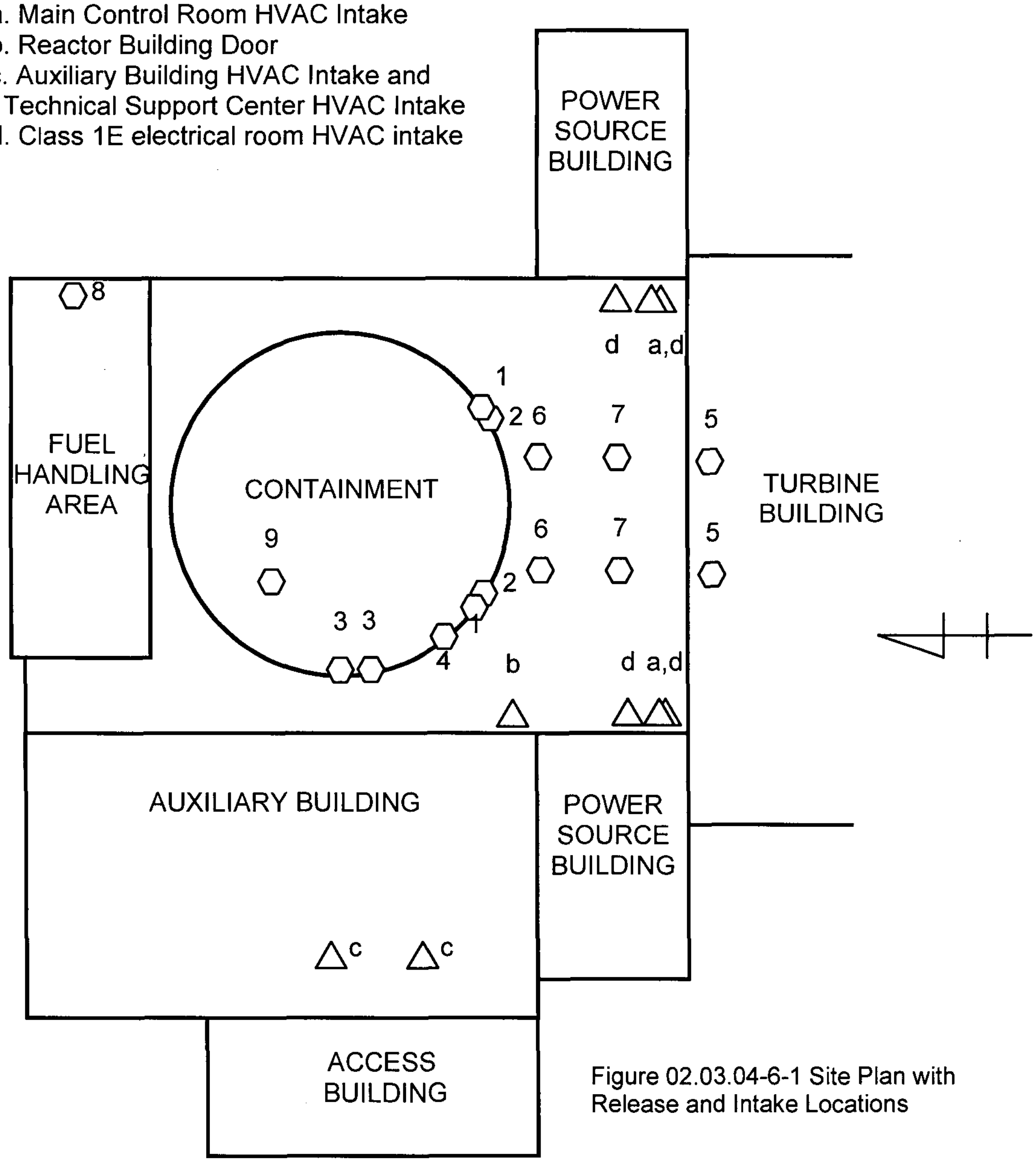

Figure 02.03.04-6-1 Site Plan with Release and Intake Locations

Impact on DCD

DCD should be revised as described in “Impact on DCD” of Open Item 02.03.04-1.

Impact on COLA

Table of “Key Site Parameter” and Figure of “Site Plan with Release and Intake Locations” in FSAR Chapter 2 will be revised.

Impact on PRA

There is no impact on the PRA.

6/4/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

SRP SECTION: **02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**

APPLICATION SECTION: **DCD Tier 2, Section 2.3.4**

DATE OF DRAFT OPEN ITEMS ISSUE: **2/13/2009**

[Open Item 02.03.04-7] This question is related to the applicant's response to RAI 02.03.04-4.

The response to RAI 02.03.04-4 incorrectly states that F stability with a wind speed of 1.0 m/s is a conservative meteorological condition for the ARCON96 atmospheric dispersion model and should be corrected accordingly.

The response to RAI 02.03.04-4 proposes a revision to DCD Tier 2 Section 2.3.4 which states, in part, that the main control room (MCR) 0-8 hr key site parameter χ/Q values were calculated based on the diffusion equations used in the ARCON96 atmospheric dispersion model (Revision 1 to NUREG-6331 [sic]) and conservative meteorological conditions (e.g., F stability and 1.0 m/s wind speed). F stability with a wind speed of 1.0 m/s is a conservative (e.g., 95-percentile) meteorological condition for the Murphy-Camped model discussed in Section C.4 of RG 1.194 but is not a conservative meteorological condition for the ARCON96 atmospheric dispersion model. Although ARCON96 uses a simple Gaussian dispersion model, the concentrations predicted by ARCON96 do not vary inversely with wind speed for all wind speeds because the building wake correction algorithm is not a linear function of wind speed. A plot of ARCON96 χ/Q values as a function of wind speed and stability class, as presented in Figure 1, shows conservative χ/Q values are associated with wind speeds of 3 to 4 m/s.

ANSWER:

This question is the same as Open Item 02.03.04-4.

The meteorological condition of F stability with 1 m/s is not conservative for the ARCON96 dispersion model as you mention. However we did not use the ARCON96 directly in DCD for X/Q calculation, we used the formula based on ARCON96 with multiplier with conservatism. In the present analyses the dispersion associated with F stability with 1 m/s is multiplied by a factor of 2. By modifying the X/Q model in this way the dispersion results envelop most existing plant x/Q values in US. Therefore we believe our modification to the ARCON96 model yields sufficiently conservative results. That is we did not use ARCON96 directly in DCD.

Impact on DCD

The expression “*the conservative meteorological condition referred to RG 1.194*” described in “Impact on DCD” of RAI 02.03.04-4 should be changed to “*the meteorological condition referred to RG 1.194*” for the revised DCD.
The sentence “ It is not used the ARCON96 in DCD” should be added in the foot notes of Table 2.3-2 of answer of and answer of RAI 02.03.04-4 for revised DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

Enclosure 2

UAP-HF-09284
Docket No. 52-021

Responses Revision 1 to Request for Additional Information No. 42-772, Revision 0

June, 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO.42-772 REVISION 0**
SRP SECTION:	**02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**
APPLICATION SECTION:	**DCD Tier 2 Appendix 15A**
DATE OF RAI ISSUE:	**7/30/2008**

QUESTION NO. : 02.03.04-1

Revise DCD Tier 2 Figure 15A-1 to (1) indicate plant north and (2) add the technical support center (TSC) intake and inleakage locations.

The applicant stated in DCD Tier 2 Section 15.6.5.5.1.3 that the dose calculation model used to evaluate main control room (MCR) habitability for the loss-of-coolant accident (including source term, transport, and release assumptions) were also used to evaluate the TSC habitability for the same event. The applicant also stated that the distances from release points to receptors are almost the same between the TSC and MCR; therefore, the radiological consequences in the TSC are represented by those in the MCR. DCD Tier 2 Figure 15A-1 is a site plan showing release locations and MCR receptors. The TSC intake and inleakage locations should be added to Figure 15A-1 to confirm the applicant's statement that the distances from release points to receptors are almost the same between the TSC and MCR.

ANSWER:

Figure 02.03.04-1 is a site plan showing release locations and, MCR and TSC receptors for the US-APWR. MHI will revise DCD Tier 2 Figure 15A-1 to (1) indicate plant north and (2) add the TSC intake and inleakage locations.

The TSC is located inside the access building. The TSC heating, ventilation, and air conditioning (HVAC) intake and the auxiliary building (A/B) HVAC intake are located on the roof of the A/B. The air enters from same louver to these intakes. The TSC inleakage location for all the DBAs, except for the failure of small lines carrying primary coolant outside of the containment, is assumed to be equal to the TSC HVAC intake and inleakage location.
In the failure of small lines carrying primary coolant outside of the containment, the radioactivity in spilled reactor coolant is postulated to be discharged to the atmosphere from the plant vent, and be transferred to the TSC via the TSC HVAC system.

The MCR and TSC intake and inleakage locations are provided in Table 02.03.04-1(1) through Table 02.03.04-1(7).

The distances from sources to receptors for TSC are generally equivalent to or longer than the distances for MCR, except for plant vent pathway of the loss-of-coolant accident (LOCA), the rod ejection accident, the failure of small lines carrying primary coolant outside containment and the fuel handling accident in the in the containment.
In the LOCA and the rod ejection accident, though the distances from plant vent to receptors for the TSC are shorter than those distances for the MCR, the distances from other sources for TSC are longer than those distances for MCR. As the result the TSC dose is less than the MCR dose. In addition, though the TSC dose due to the failure of small lines and the fuel handling accident in the containment are larger than the MCR dose in those events, the TSC dose due to these accidents are bounded by the MCR dose during the LOCA. Therefore the radiological consequences in the TSC are bounded by those in the MCR.

The following tables added on Table 02.03.04-1(1) through Table 02.03.04-1(7) from Table 02.03.04-1(1) through Table 02.03.04-1(6) of RAI 02.03.04-1 Revision 0.are as follows.

- **Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 2 of 12)**
- **Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 4 of 12)**
- **Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 7 of 12)**
- **Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 8 of 12)**
- **Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 10 of 12)**
- **Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 12 of 12)**
- **Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 2 of 8)**
- **Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 5 of 8)**
- **Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 6 of 8)**
- **Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 8 of 8)**
- **Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 4 of 11)**
- **Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 7 of 11)**
- **Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 8 of 11)**
- **Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 11 of 11)**
- **Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 2 of 8)**
- **Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 5 of 8)**
- **Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 6 of 8)**
- **Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 8 of 8)**

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 1 of 12)

Accidents		Steam system piping failure						
		MCR						
Sources		Main steam line break releases						
	Locations (1)	5 of the East	5 of the West	5 of the East		5 of the West		
	Release heights (m) (2)	12.8	26.2	12.8		26.2		
Receptors		Intake		Inleak				
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	14.3	17.1	14.3	14.3	16.2	17.1	9.8
Horizontal distance Source to Receptor (m) (3)		17	25	20	17	26	25	33
Vertical distance (m) (3)		0	-8.8	0	0	-9.8	-8.8	-16
Straight distance (m) (3)		17	26	20	17	28	26	37
Direction Receptor to Source (degree) (4)		256	93	234	256	110	93	132
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.9×10^{-2}		1.9×10^{-2}				
	8-24 hr	1.1×10^{-2}		1.1×10^{-2}				
	24-96 hr	7.1×10^{-3}		7.1×10^{-3}				
	96-720 hr	3.1×10^{-3}		3.1×10^{-3}				

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 2 of 12)

Accidents		Steam system piping failure						
		MCR						
Sources		Main steam line break releases						
	Locations (1)	5 of the West	5 of the East	5 of the West		5 of the East		
	Release heights (m) (2)	26.2	12.8	26.2		12.8		
Receptors		Intake		Inleak				
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	17.1	14.3	16.2	17.1	14.3	14.3	9.8
Horizontal distance Source to Receptor (m) (3)		40	49	41	40	50	49	55
Vertical distance (m) (3)		-8.8	0	-9.8	-8.8	0	0	-2.7
Straight distance (m) (3)		41	49	42	41	50	49	55
Direction Receptor to Source (degree) (4)		269	95	258	269	104	95	118
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	1.9×10^{-2}		1.9×10^{-2}				
	8-24 hr	1.1×10^{-2}		1.1×10^{-2}				
	24-96 hr	7.1×10^{-3}		7.1×10^{-3}				
	96-720 hr	3.1×10^{-3}		3.1×10^{-3}				

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 3 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 4 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors	Locations (1)	Intake			
		MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 5 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 6 of 12)

Accidents		Steam system piping failure					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 7 of 12)

Accidents		Steam system piping failure			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 8 of 12)

Accidents		Steam system piping failure					
		MCR					
Sources		Main steam relief valve and safety valve releases					
	Locations (1)	6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 9 of 12)

Accidents		Steam system piping failure			
		TSC			
Sources	Locations (1)	Main steam line break releases			
		5 of the West			
	Release heights (m) (2)	26.2			
Receptors	Locations (1)	Intake		Inleak	
		TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1
Horizontal distance to Intake (m)(3)		84	67	84	67
Vertical distance (m) (3)		0	0	0	0
Straight distance (m) (3)		84	67	84	67
Direction Receptor to Source (degree) (4)		135	118	135	118
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.5×10^{-3}		1.5×10^{-3}	
	8-24 hr	8.4×10^{-4}		8.4×10^{-4}	
	24-96 hr	5.3×10^{-4}		5.3×10^{-4}	
	96-720 hr	2.3×10^{-4}		2.3×10^{-4}	

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 10 of 12)

Accidents		Steam system piping failure			
		TSC			
Sources	Locations (1)	Main steam line break releases			
		5 of the East			
	Release heights (m) (2)	12.8			
Receptors	Locations (1)	Intake		Inleak	
		TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	23.2	23.2	23.2	23.2
Horizontal distance to Intake (m)(3)		104	91	104	91
Vertical distance (m) (3)		10	10	10	10
Straight distance (m) (3)		105	91	105	91
Direction Receptor to Source (degree) (4)		127	113	127	113
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.5×10^{-3}		1.5×10^{-3}	
	8-24 hr	8.4×10^{-4}		8.4×10^{-4}	
	24-96 hr	5.3×10^{-4}		5.3×10^{-4}	
	96-720 hr	2.3×10^{-4}		2.3×10^{-4}	

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 11 of 12)

Accidents		Steam system piping failure							
		TSC							
Sources		Main steam relief valve and safety valve releases							
	Locations (1)	6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors		Intake				Inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-1(1) Combination of Sources and Receptors for Steam System Piping Failure Analysis in the DCD (Sheet 12 of 12)

Accidents		Steam system piping failure							
		TSC							
Sources		Main steam relief valve and safety valve releases							
	Locations (1)	6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors		Intake				Inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 1 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 2 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 3 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 4 of 8)

Accidents		RCP rotor seizure accident					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 5 of 8)

Accidents		RCP rotor seizure accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors		Inleak			
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 6 of 8)

Accidents		RCP rotor seizure accident					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 7 of 8)

Accidents		RCP rotor seizure accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releas							
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-1(2) Combination of Sources and Receptors for RCP Rotor Seizure Analysis in the DCD (Sheet 8 of 8)

Accidents		RCP rotor seizure accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
X/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 1 of 11)

Accidents		Rod Ejection Accident								
		MCR								
Sources	Locations (1)	Plant vent								
		9								
	Release heights (m) (2)	69.8								
Receptors		Intake		Inleak						
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake (8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	27.1	27.1	9.8
Horizontal distance Source to Receptor (m) (3)		68	56	63	68	50	56	55	60	37
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52	-43	-43	-60
Straight distance (m) (3)		86	77	83	86	73	77	69	74	71
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21	92	65	33
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.4×10^{-3}						
	8-24 hr	6.6×10^{-4}		8.0×10^{-4}						
	24-96 hr	4.2×10^{-4}		5.1×10^{-4}						
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}						

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 2 of 11)

Accidents		Rod Ejection Accident								
		MCR								
Sources		Ground level containment release point (5)								
	Locations (1)	2 of the East	2 of the West	1 of the East	2 of the East	1 of the West	2 of the West	3 of the North	3 of the South	4
	Release heights (m) (2)	49.4								
Receptors		Intake		Inleak						
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	27.1	27.1	9.8
Horizontal distance Source to Receptor (m)(3)		32	32	27	32	27	32	44	46	17
Vertical distance (m) (3)		-32	-32	-33	-32	-33	-32	-22	-22	-39
Straight distance (m) (3)		45	45	42	45	42	45	49	51	43
Direction Receptor to Source (degree) (4)		325	35	320	325	40	35	98	75	53
Lateral diffusion coefficient (m)		7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98
Vertical diffusion coefficient (m)		5.03	5.03	5.03	5.03	5.03	5.03	5.03	5.03	5.03
χ/Q (s/m^3) (6)	0-8 hr	2.2×10^{-3}		2.4×10^{-3}						
	8-24 hr	1.3×10^{-3}		1.4×10^{-3}						
	24-96 hr	8.3×10^{-4}		9.1×10^{-4}						
	96-720 hr	3.6×10^{-4}		4.0×10^{-4}						

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 3 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
Sources	Locations (1)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
Sources	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
Receptors	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
Receptors	Locations (1)	a of the East	a of the East	a of the West	a of the West
Receptors	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 4 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors		Intake			
	Locations (1)	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m)(3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 5 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 6 of 11)

Accidents		Rod Ejection Accident					
		MCR					
Sources	Locations (1)	Main steam relief valve and safety valve releases					
		6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors	Locations (1)	Inleak					
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 7 of 11)

Accidents		Rod Ejection Accident			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 8 of 11)

Accidents		Rod Ejection Accident					
		MCR					
Sources		Main steam relief valve and safety valve releases					
	Locations (1)	6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 9 of 11)

Accidents		Rod Ejection Accident							
		TSC							
Sources	Locations (1)	Plant vent		Ground level containment release point (5)		Plant vent		Ground level containment release point (5)	
		9		3 of the North	3 of the South	9		3 of the North	3 of the South
	Release heights (m) (2)	69.8		49.4		69.8		49.4	
Receptors		Intake				inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		55	60	44	46	55	60	44	46
Vertical distance (m) (3)		-43	-43	-22	-22	-43	-43	-22	-22
Straight distance (m) (3)		69	74	49	51	69	74	49	51
Direction Receptor to Source (degree) (4)		92	65	98	75	92	65	98	75
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}		1.9×10^{-3}		1.7×10^{-3}		1.9×10^{-3}	
	8-24 hr	9.9×10^{-4}		1.1×10^{-3}		9.9×10^{-4}		1.1×10^{-3}	
	24-96 hr	6.3×10^{-4}		7.2×10^{-4}		6.3×10^{-4}		7.2×10^{-4}	
	96-720 hr	2.8×10^{-4}		3.2×10^{-4}		2.8×10^{-4}		3.2×10^{-4}	

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 10 of 11)

Accidents		Rod Ejection Accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}				1.4×10^{-3}			
	8-24 hr	8.0×10^{-4}				8.0×10^{-4}			
	24-96 hr	5.1×10^{-4}				5.1×10^{-4}			
	96-720 hr	2.2×10^{-4}				2.2×10^{-4}			

Table 02.03.04-1(3) Combination of Sources and Receptors for Rod Ejection Accident Analysis in the DCD (Sheet 11 of 11)

Accidents		Rod Ejection Accident							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}				1.4×10^{-3}			
	8-24 hr	8.0×10^{-4}				8.0×10^{-4}			
	24-96 hr	5.1×10^{-4}				5.1×10^{-4}			
	96-720 hr	2.2×10^{-4}				2.2×10^{-4}			

Table 02.03.04-1(4) Combination of Sources and Receptors for Failure of Small Lines Carrying Primary Coolant Outside Containment analyses in the DCD(Sheet 1 of 2)

Accidents		Failure of Small Lines Carrying Primary Coolant Outside Containment					
		MCR					
Sources	Locations (1)	Plant vent					
		9					
	Release heights (m) (2)	69.8					
Receptors	Locations (1)	Intake		Inleak			
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52
Straight distance (m) (3)		86	77	83	86	73	77
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.2×10^{-3}			
	8-24 hr	6.6×10^{-4}		8.0×10^{-4}			
	24-96 hr	4.2×10^{-4}		5.1×10^{-4}			
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}			

Table 02.03.04-1(4) Combination of Sources and Receptors for Failure of Small Lines Carrying Primary Coolant Outside Containment analyses in the DCD (Sheet 2 of 2)

Accidents		Failure of Small Lines Carrying Primary Coolant Outside Containment						
		MCR			TSC			
Sources	Locations (1)	Plant vent			Plant vent			
		9			9			
	Release heights (m) (2)	69.8			69.8			
Receptors	Locations (1)	Inleak			Intake		inleak	
		Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	b	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	9.8	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		55	60	37	55	60	55	60
Vertical distance (m) (3)		-43	-43	-60	-43	-43	-43	-43
Straight distance (m) (3)		69	74	71	69	74	69	74
Direction Receptor to Source (degree) (4)		92	65	33	92	65	92	65
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}			1.4×10^{-3}		1.4×10^{-3}	
	8-24 hr	8.0×10^{-4}			8.0×10^{-4}		8.0×10^{-4}	
	24-96 hr	5.1×10^{-4}			5.1×10^{-4}		5.1×10^{-4}	
	96-720 hr	2.2×10^{-4}			2.2×10^{-4}		2.2×10^{-4}	

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 1 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)	6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors	Locations (1)	Intake			
		MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m) (3)		31	26	31	26
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		39	33	39	33
Direction Receptor to Source (degree) (4)		309	291	51	69
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 2 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)	7 of the West (Main steam safety valve)	6 of the East (Main steam relief valve)	7 of the East (Main steam safety valve)
	Release heights (m) (2)	40.5	38.7	40.5	38.7
Receptors	Locations (1)	Intake			
		MCR HVAC intake	MCR HVAC intake	MCR HVAC intake	MCR HVAC intake
		a of the East	a of the East	a of the West	a of the West
	Receptor heights (m) (2)	17.1	17.1	17.1	17.1
Horizontal distance Source to Receptor (m) (3)		48	41	45	41
Vertical distance (m) (3)		-23	-21	-23	-21
Straight distance (m) (3)		53	47	51	47
Direction Receptor to Source (degree) (4)		294	283	64	77
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 3 of 8)

Accidents		SGTR			
		MCR			
Sources		Main steam relief valve and safety valve releases			
	Locations (1)	6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors		Inleak			
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		27	31	24	26
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		36	39	33	33
Direction Receptor to Source (degree) (4)		299	309	277	291
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 4 of 8)

Accidents		SGTR					
		MCR					
Sources		Main steam relief valve and safety valve releases					
	Locations (1)	6 of the West (Main steam relief valve)			7 of the West (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		27	31	24	24	26	24
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		36	39	39	33	33	38
Direction Receptor to Source (degree) (4)		61	51	88	83	69	101
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 5 of 8)

Accidents		SGTR			
		MCR			
Sources	Locations (1)	Main steam relief valve and safety valve releases			
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7	
Receptors	Locations (1)	Inleak			
		Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)
		d of the North-East	d of the South-East	d of the North-East	d of the South-East
	Receptor heights (m) (2)	16.2	17.1	16.2	17.1
Horizontal distance Source to Receptor (m)(3)		44	48	41	41
Vertical distance (m) (3)		-24	-23	-22	-21
Straight distance (m) (3)		51	53	46	47
Direction Receptor to Source (degree) (4)		287	294	274	283
Lateral diffusion coefficient (m)		0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}			
	8-24 hr	3.1×10^{-3}			
	24-96 hr	2.0×10^{-3}			
	96-720 hr	8.7×10^{-4}			

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 6 of 8)

Accidents		SGTR					
		MCR					
Sources	Locations (1)	6 of the East (Main steam relief valve)			7 of the East (Main steam safety valve)		
	Release heights (m) (2)	40.5			38.7		
Receptors		Inleak					
	Locations (1)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		d of the North-West	d of the South-West	b	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	16.2	17.1	9.8	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		42	45	41	41	41	41
Vertical distance (m) (3)		-24	-23	-30	-22	-21	-29
Straight distance (m) (3)		49	51	51	46	47	50
Direction Receptor to Source (degree) (4)		72	64	89	86	77	97
Lateral diffusion coefficient (m)		0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	5.3×10^{-3}					
	8-24 hr	3.1×10^{-3}					
	24-96 hr	2.0×10^{-3}					
	96-720 hr	8.7×10^{-4}					

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 7 of 8)

Accidents		SGTR							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)		6 of the West (Main steam relief valve)		7 of the West (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors		Intake				Inleak			
	Locations (1)	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m) (3)		69	60	72	61	69	60	72	61
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		70	61	73	62	70	61	73	62
Direction Receptor to Source (degree) (4)		121	98	125	103	121	98	125	103
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-1(5) Combination of Sources and Receptors for Steam Generator Tube Rupture (SGTR) analyses in the DCD (Sheet 8 of 8)

Accidents		SGTR							
		TSC							
Sources	Locations (1)	Main steam relief valve and safety valve releases							
		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)		6 of the East (Main steam relief valve)		7 of the East (Main steam safety valve)	
	Release heights (m) (2)	40.5		38.7		40.5		38.7	
Receptors	Locations (1)	Intake				Inleak			
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Auxiliary building HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m)(3)		84	76	86	77	84	76	86	77
Vertical distance (m) (3)		-13	-13	-11	-11	-13	-13	-11	-11
Straight distance (m) (3)		85	77	87	78	85	77	87	78
Direction Receptor to Source (degree) (4)		115	96	119	100	115	96	119	100
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.7×10^{-3}				1.7×10^{-3}			
	8-24 hr	9.9×10^{-4}				9.9×10^{-4}			
	24-96 hr	6.3×10^{-4}				6.3×10^{-4}			
	96-720 hr	2.8×10^{-4}				2.8×10^{-4}			

Table 02.03.04-1(6) Combination of Sources and Receptors for LOCA Analysis in the DCD (Sheet 1 of 3)

Accidents		LOCA						
		MCR						
Sources	Locations (1)	Plant vent						
		9						
	Release heights (m) (2)	69.8						
Receptors	Locations (1)	intake		Inleak				
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56	37
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52	-60
Straight distance (m) (3)		86	77	83	86	73	77	71
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21	33
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.4×10^{-3}				
	8-24 hr	6.6×10^{-4}		7.7×10^{-4}				
	24-96 hr	4.2×10^{-4}		4.9×10^{-4}				
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}				

Table 02.03.04-1(6) Combination of Sources and Receptors for LOCA Analysis in the DCD (Sheet 2 of 3)

Accidents		LOCA						
		MCR						
Sources	Locations (1)	Ground level containment release point (5)						
		2 of the East	2 of the West	1 of the East	2 of the East	1 of the West	2 of the West	4
	Release heights (m) (2)	49.4						
Receptors	Locations (1)	Intake		Inleak				
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	9.8
Horizontal distance Source to Receptor (m)(3)		32	32	27	32	27	32	17
Vertical distance (m) (3)		-32	-32	-33	-32	-33	-32	-39
Straight distance (m) (3)		45	45	42	45	42	45	43
Direction Receptor to Source (degree) (4)		325	35	320	325	40	35	53
Lateral diffusion coefficient (m)		7.98	7.98	7.98	7.98	7.98	7.98	7.98
Vertical diffusion coefficient (m)		5.03	5.03	5.03	5.03	5.03	5.03	5.03
χ/Q (s/m^3) (6)	0-8 hr	2.2×10^{-3}		2.4×10^{-3}				
	8-24 hr	1.3×10^{-3}		1.4×10^{-3}				
	24-96 hr	8.3×10^{-4}		9.1×10^{-4}				
	96-720 hr	3.6×10^{-4}		4.0×10^{-4}				

Table 02.03.04-1(6) Combination of Sources and Receptors for LOCA Analysis in the DCD (Sheet 3 of 3)

Accidents		LOCA							
		TSC							
Sources	Locations (1)	Plant vent				Ground level containment release point (5)			
		9				3 of the North			
	Release heights (m) (2)	69.8				49.4			
Receptors	Locations (1)	Intake		inleak		Intake		inleak	
		TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake	TSC HVAC intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1
Horizontal distance Source to Receptor (m) (3)		55	60	55	60	44	46	44	46
Vertical distance (m) (3)		-43	-43	-43	-43	-22	-22	-22	-22
Straight distance (m) (3)		69	74	69	74	49	51	49	51
Direction Receptor to Source (degree) (4)		92	65	92	65	98	75	98	75
Lateral diffusion coefficient (m)		0	0	0	0	7.98	7.98	7.98	7.98
Vertical diffusion coefficient (m)		0	0	0	0	5.03	5.03	5.03	5.03
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}		1.4×10^{-3}		1.9×10^{-3}		1.9×10^{-3}	
	8-24 hr	8.0×10^{-4}		8.0×10^{-4}		1.1×10^{-3}		1.1×10^{-3}	
	24-96 hr	5.1×10^{-4}		5.1×10^{-4}		7.2×10^{-4}		7.2×10^{-4}	
	96-720 hr	2.2×10^{-4}		2.2×10^{-4}		3.2×10^{-4}		3.2×10^{-4}	

Table 02.03.04-1(7) Combination of Sources and Receptors for Fuel Handling Accident Analysis in the DCD (Sheet 1 of 3)

Accidents		Fuel handling accident in the containment								
		MCR								
Sources	Locations (1)	Plant vent								
		9								
	Release heights (m) (2)	69.8								
Receptors		Intake		Inleak						
	Locations (1)	MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	17.1	17.1	16.2	17.1	16.2	17.1	27.1	27.1	9.8
Horizontal distance Source to Receptor (m)(3)		68	56	63	68	50	56	55	60	37
Vertical distance (m) (3)		-52	-52	-53	-52	-53	-52	-43	-43	-60
Straight distance (m) (3)		86	77	83	86	73	77	69	74	71
Direction Receptor to Source (degree) (4)		321	21	317	321	24	21	92	65	33
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.1×10^{-3}		1.4×10^{-3}						
	8-24 hr	6.6×10^{-4}		8.0×10^{-4}						
	24-96 hr	4.2×10^{-4}		5.1×10^{-4}						
	96-720 hr	1.9×10^{-4}		2.2×10^{-4}						

Table 02.03.04-1(7) Combination of Sources and Receptors for Fuel Handling Accident Analysis in the DCD (Sheet 2 of 3)

Accidents		Fuel handling accident in the fuel handling area								
		MCR								
Sources	Locations (1)	Fuel handling area								
		8								
	Release heights (m) (2)	5.8								
Receptors	Locations (1)	Intake		Inleak						
		MCR HVAC intake	MCR HVAC intake	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(7)	Class 1E electrical room HVAC intake	Class 1E electrical room HVAC intake(8)	Auxiliary building HVAC intake	Auxiliary building HVAC intake	Reactor building door
		a of the East	a of the West	d of the North-East	d of the South-East	d of the North-West	d of the South-West	c of the North	c of the South	b
	Receptor heights (m) (2)	14.3	14.3	14.3	14.3	14.3	14.3	23.2	23.2	7.3
Horizontal distance Source to Receptor (m)(3)		82	105	76	82	100	105	103	114	89
Vertical distance (m) (3)		8.5	8.5	8.5	8.5	8.5	8.5	17	17	1.5
Straight distance (m) (3)		83	105	76	83	100	105	105	115	89
Direction Receptor to Source (degree) (4)		360	38	360	360	41	38	75	61	47
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	9.9×10^{-4}		1.1×10^{-3}						
	8-24 hr	5.9×10^{-4}		6.7×10^{-4}						
	24-96 hr	3.7×10^{-4}		4.3×10^{-4}						
	96-720 hr	1.6×10^{-4}		1.9×10^{-4}						

Table 02.03.04-1(7) Combination of Sources and Receptors for Fuel Handling Accident Analysis in the DCD (Sheet 3 of 3)

Accidents		Fuel handling accident in the containment				Fuel handling accident in the fuel handling area			
		TSC							
Sources	Locations (1)	Plant vent				Fuel handling area			
		9				8			
	Release heights (m) (2)	69.8				5.8			
Receptors	Locations (1)	Intake		inleak		Intake		inleak	
		TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake	TSC HVAC intake	TSC HVAC intake	Auxiliary Building HVAC Intake	Auxiliary Building HVAC Intake
		c of the North	c of the South	c of the North	c of the South	c of the North	c of the South	c of the North	c of the South
	Receptor heights (m) (2)	27.1	27.1	27.1	27.1	23.2	23.2	23.2	23.2
Horizontal distance Source to Receptor (m)(3)		55	60	55	60	103	114	103	114
Vertical distance (m) (3)		-43	-43	-43	-43	17	17	17	17
Straight distance (m) (3)		69	74	69	74	105	115	105	115
Direction Receptor to Source (degree) (4)		92	65	92	65	75	61	75	61
Lateral diffusion coefficient (m)		0	0	0	0	0	0	0	0
Vertical diffusion coefficient (m)		0	0	0	0	0	0	0	0
χ/Q (s/m^3) (6)	0-8 hr	1.4×10^{-3}		1.4×10^{-3}		6.7×10^{-4}		6.7×10^{-4}	
	8-24 hr	8.0×10^{-4}		8.0×10^{-4}		3.9×10^{-4}		3.9×10^{-4}	
	24-96 hr	5.1×10^{-4}		5.1×10^{-4}		2.5×10^{-4}		2.5×10^{-4}	
	96-720 hr	2.2×10^{-4}		2.2×10^{-4}		1.1×10^{-4}		1.1×10^{-4}	

NOTES:

(1) The inside of a parenthesis shows the source locations and receptor locations of the Figure 02.03.04-1

(2) The height is from the ground level. The ground level is E.L.= 2' -8"

(3) These values are the distance differences in a unit of meter from the source to the receptor. After the distance differences are calculated from the locations of the source and the receptor in a unit of feet , the resulted distance differences are rounded off. Those rounded numbers of the distance differences are converted to those in a unit of meter. Therefore, note that these values are a bit different from the difference between the source height and receptor height in a unit of meter indicated in the above (2), because the source height and receptor height in a unit of meter are directly converted from those in a unit of feet, without any calculation in a unit of feet

(4) The angle of receptors from Plant North centering on sources (Direction increases in a clockwise fashion based on the Plant North, i.e. The Plant North is 0 degree.)

(5) Area source, which is determined from the method in Sections C.3.2.4.4 and C.3.2.4.5 of RG 1.194.

(6) - These χ/Q values are for US-APWR DCD Chapter15.

- The χ/Q values of MCR can't be directly calculated by ARCON96 itself because there is no site specific meteorological data in the stage of the DCD. Therefore, the diffusion equations described in ARCON96 (e.g. Revision 1 to NUREG-6331) are used for calculating the χ/Q values of MCR, together with the meteorological condition based on RG 1.194 (e.g., F stability with wind speeds of 1.0 m/s) and multiplier. According to the setting method of these χ/Q values, the closer the distance the more conservative it becomes. It is not used the ARCON96 directly in DCD.

- For each sources, the χ/Q values for inleakage and intake are set as those of the path with the shortest straight distances, respectively.

(7) Class 1E electrical room HVAC intake (south – east) and MCR HVAC Intake (east) are same intake duct (i.e. they are same location).

(8) Class 1E electrical room HVAC intake (south – west) and MCR HVAC Intake (west) are same intake duct (i.e. they are same location).

SOURCES
1. Containment Shell to Class 1E electrical room HVAC intake (As Diffuse Area Source)
2. Containment Shell to Control Room HVAC Intake and Class 1E electrical room HVAC Intake (As Diffuse Area Source)
3. Containment Shell to Auxiliary Building HVAC Intake and technical support center HVAC Intake (As Diffuse Area Source)
4. Containment Shell to Reactor Building Door (As Diffuse Area Source)
5. Main Steam Line (Source points are in the west and the east.)
6. Relief Valve (Source points are in the west and the east.)
7. Safety Valve (Source points are in the west and the east.)
8. Fuel Handling Area
9. Plant Vent

RECEPTORS
a. Main Control Room HVAC Intake
b. Reactor Building Door
c. Auxiliary Building HVAC Intake and Technical Support Center HVAC Intake
d. Class 1E electrical room HVAC intake

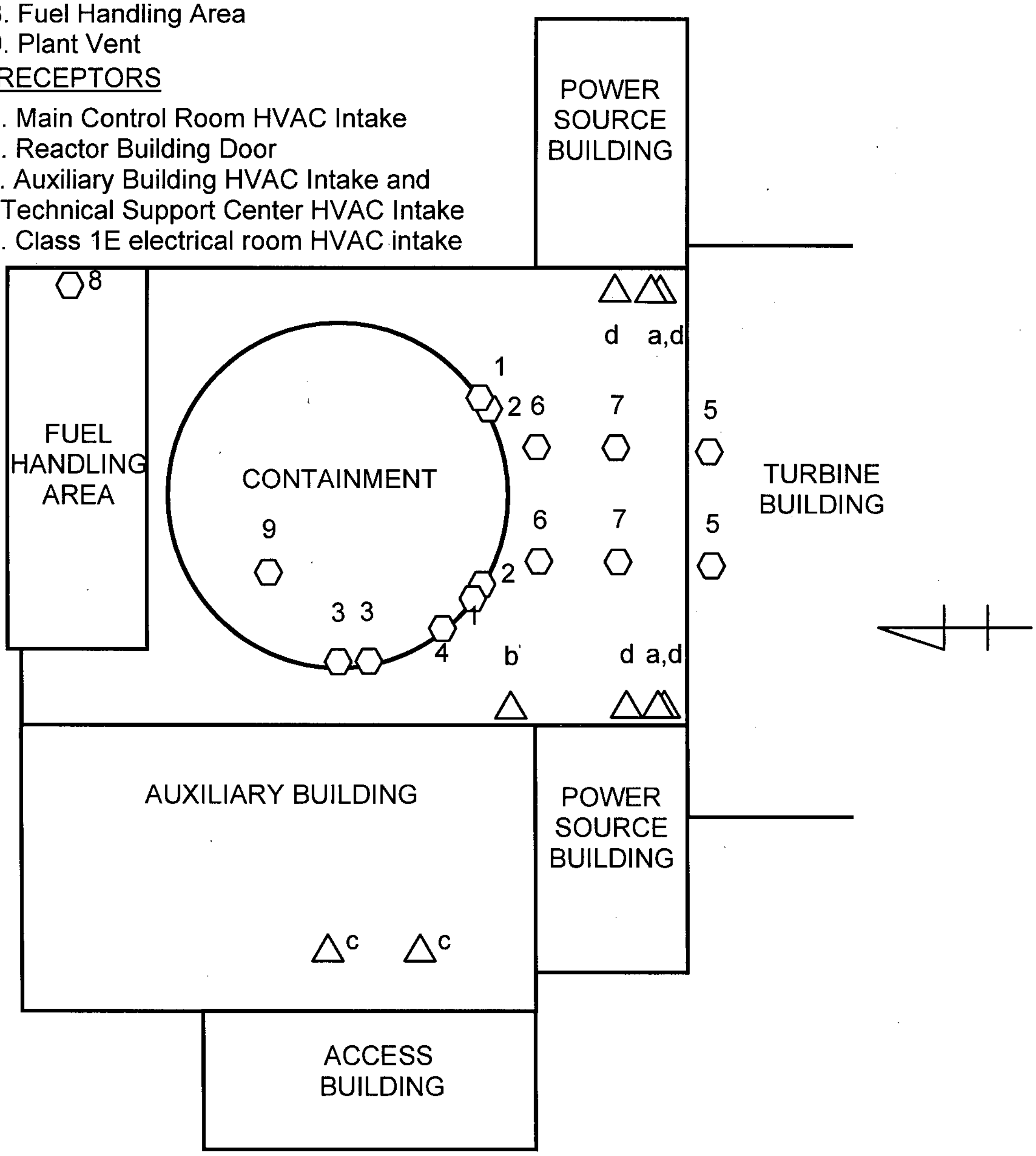

Figure 02.03.04-1 Site Plan with Release and Intake Locations

Impact on DCD

The DCD will be changed in Revision 2 to incorporate the following:

- Revise DCD Tier 2 Figure 15A-1 to indicate plant north and add the technical support center (TSC) intake and inleakage locations as indicated in Figure 02.03.04-1 in the answer of this RAI..
- Table 2.1-1 in DCD Tier 1 and Table 2.0-1 and Table 15A-18 through 15A-23 in the DCD Tier 2 should be revised as Table 02.03.04-1 in the answer of this RAI.

Impact on COLA

The FSAR will be changed in Revision 1 to incorporate the following:

- The Chapter 2 in FSAR will be revised

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO.42-772 REVISION 0**
SRP SECTION:	**02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**
APPLICATION SECTION:	**DCD Tier 2 Appendix 15A**
DATE OF RAI ISSUE:	**7/30/2008**

QUESTION NO. : 02.03.04-2

Add a table of ARCON96 source/receptor inputs to the DCD for use by all future COL applicants. The table should identify ARCON96 inputs for each main control room (MCR) and technical support center (TSC) source/receptor combination developed in accordance with the guidance provided in RG 1.194 (e.g., release height above plant grade, intake height above plant grade, horizontal distance between the release point and intake, direction from the intake to source in degrees from plant north, vent vertical velocity, stack flow, stack radius, building area, diffuse source initial lateral and vertical diffusion coefficients).

Review Procedure 6.b of SRP 2.3.4 states the DC application should contain figures and tables showing the design features that would be used by COL applicants to generate MCR χ/Q values. RG 1.194 presents criteria for characterizing atmospheric dispersion conditions for evaluating the consequences of radiological releases to the MCR. RG 1.194 endorses the ARCON96 atmospheric dispersion computer code (Revision 1 to NUREG-6331) as an acceptable methodology for determining MCR χ/Q values for use in design basis accident radiological analyses. The ARCON96 source/receptor inputs required to generate TSC χ/Q values should be added to this table as well.

ANSWER:

MHI will add the following sentences and tables in the Section 2.3 of the DCD Chapter 2.

The necessary data for COL applicant to calculate χ/Q values of MCR and TSC by using ARCON96 are shown as Tables 02.03.04-2-1, 02.03.04-2-2 and 02.03.04-2-3. The combinations of sources and receptors for each accident, which is also used to the calculation of χ/Q values of MCR and TSC by using ARCON96 for COL applicant, are listed Table 02.03.04-1-1 as the answer of RAI 02.03.04-1.

Table 02.03.04-2-1 Common input parameters for χ/Q calculation of MCR and TSC

Common parameter for ARCON96	
Building area (m^2)	2000 (1)
Plant vent vertical velocity (m/s)	NA (2)
Stack flow (m^3/s)	0 (3)
Stack radius (m)	0 (4)
Elevation difference (m)	0

NOTES:

(1) According to the RG 1.194, the default value (2000 m^2) is used to reasonably calculate.

(2) The plant vent vertical velocity is not used due to ground release.

(3) The stack flow is conservatively set to zero. (See the RG 1.194.)

(4) The stack radius is set to zero according to the RG 1.194 due to zero stack flow.

Table 02.03.04-2-2 Source heights

Source	Height (1)(m)
Containment	49.4
Plant vent	69.8
Main steam line (East)	12.8
Main steam line (West)	26.2
Main steam relief valve	40.5
Main steam safety valve	38.7
Fuel handling area	5.8

NOTE:

(1) The distance is from the ground level.

Table 02.03.04-2-3 Receptor heights

Receptors	The height to the lower limit(1)(m)	The height to the upper limit(1)(m)
Control room HVAC intake (east and west)	14.3(2)	17.1(3)
Class 1E electrical room HVAC intake (south-east and south-west)	14.3(2)	17.1(3)
Class 1E electrical room HVAC intake (north-east and north-west)	14.3(2)	16.2(3)
Reactor building door	7.3(4)	9.8(5)
Auxiliary building and technical support center HVAC intake (north and south)	23.2(2)	27.1(3)

NOTES:

(1) The distance is from the ground level. The receptors are assumed as rectangular, and then the closer corner of receptor height is used to derive the vertical distance between sources and receptors.

(2) For release from main steam line (east) and fuel handling area.

(3) For release from containment, plant vent, main steam line (west), main steam relief valve and

main steam safety valve.

(4) For release from fuel handling area.

(5) For release from containment, plant vent, main steam line (east and west), main steam relief valve and main steam safety valve.

Impact on DCD

The DCD will be changed to incorporate the following:

- Table 02.03.04-2-1, 02.03.04-2-2 and 02.03.04-2-3 are added at the end of Section 2.3 in DCD.

Impact on COLA

The FSAR will be changed in Revision 1 to incorporate the following:

- The Chapter 2 in FSAR will be revised

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO.42-772 REVISION 0**
SRP SECTION:	**02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**
APPLICATION SECTION:	**DCD Tier 2 Appendix 15A**
DATE OF RAI ISSUE:	**7/30/2008**

QUESTION NO. : 02.03.04-3

Justify the main control room (MCR) intake and inleakage locations selected for each postulated accident and anticipated operational occurrence listed in DCD Tier 2 Tables 15A-18 through 15A-23. In particular, address the following:

(a) Why isn't the MCR HVAC intake listed as a receptor for the steam system piping failure, reactor cooling pump rotor seizure, rod ejection, and steam generator tube rupture postulated accidents?

(b) Why is the auxiliary building HVAC intake listed as an inleakage location for the rod ejection accident plant vent release pathway whereas the reactor building door is listed as an inleakage location for the loss-of-coolant accident plant vent release pathway?

(c) Why is the auxiliary building HVAC intake listed as an inleakage location for the rod ejection accident ground level containment release pathway whereas the class 1E electrical room HVAC intake is listed as the loss-of-coolant accident ground level containment release pathway?

ANSWER:

(a) In principle, the MCR HVAC intake is selected as an intake location, while an inleakage location is selected from among the reactor building (R/B) door (communicating with the pathway in front of MCR), class 1E electrical room HVAC intake (external air drawn in by the class 1E electrical room HVAC may leak through negative pressure sections of the MCR HVAC equipment), and auxiliary building (A/B) HVAC intake (external air drawn in by the A/B HVAC is fed to the pathway in front of MCR) such that the direct distance from a release point will be shortest.

When the χ/Q value from inleakage is smaller than that of the intake, the χ/Q value for inleakage is set equal to the χ/Q of the intake. On the other hand, if the χ/Q value from inleakage is larger than that of the intake, but the difference is 10% or less, the χ/Q value for intake is set equal to that of the inleakage (RADTRAD Ver.3.03 allows only one set of χ/Q values to be used in one calculation. These assumptions allow a reduced number of calculations). Thus, inleakage and intake dispersion from the main steam safety valve become identical. Intakes for the steam system piping failure, reactor coolant pump rotor seizure accident, rod ejection accident and steam generator tube rupture have χ/Q values different from those for the MCR HVAC. The intake location from the steam line at the time of steam system piping failure is the MCR HVAC intake and the distance from a rupture location is the same as the case of class 1E electrical room HVAC intake (Refer to answer to 02.03.04-2). This is the reason why χ/Q values are identical. In case of DCD Revision 0, focusing on the difference from inleakage (the difference was 10% or less), the class 1E electrical room HVAC intake was listed as the representative receptor. However, in DCD Revision 1 both the HVAC intake and the inleakage location are represented by MCR HVAC intake because of the same χ/Q values.

As regards the plant vent release pathway and ground level containment release pathway, the A/B HVAC intake is used because it has a shorter straight distance from the rupture location when compared to both the R/B door and class 1E electrical room HVAC intake. In the case of an accident when emergency core cooling system (ECCS) actuation signal is not issued, A/B HVAC continues its actuation. In the case of a LOCA when ECCS actuation signal is generated, the A/B HVAC stops. In case of rod ejection accident, it is anticipated that it takes considerable time before the ECCS actuation signal is emitted and the A/B HVAC is conservatively assumed to continue its actuation. Therefore the LOCA and rod ejection accident have different assumed inleakage positions.

In addition the DCD Tier 2 Tables 15A-18 through 15A-23 should be revised for COL applicant to calculate χ/Q values, because the COL applicant should be consider not only the distance from sources to receptors but also the wind directional frequency for calculation of χ/Q values by using ARCON96.

(b) This answer is included in the above answer (a).

(c) This answer is included in the above answer (a).

Impact on DCD

Table 15A-18 through 15A-23 in the DCD Tier 2 should be revised as Table 02.03.04-1 as the answer of RAI 02.03.04-1.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO.42-772 REVISION 0**
SRP SECTION:	**02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases**
APPLICATION SECTION:	**DCD Tier 2 Appendix 15A**
DATE OF RAI ISSUE:	**7/30/2008**

QUESTION NO. : 02.03.04-4

Revise the DCD to discuss in greater detail the methodology (e.g., atmospheric dispersion models, input assumptions, and meteorological data sets) used to select the exclusion area boundary (EAB), low population zone (LPZ), and main control room (MCR) atmospheric dispersion factors presented as key site parameters in DCD Tier 1 Table 2.1-1 and Tier 2 Table 2.0-1. Discuss how this methodology ensures that the selected key site parameter values bound a reasonable number of sites that have been or may be considered for a COL application.

Review Procedure 6.b of SRP 2.3.4 states site parameters should be representative of a reasonable number of sites that may be considered within a COL application and a basis should be provided for each of the site parameters.

ANSWER:

It is agreed to discuss the methodology, bounding of a reasonable number of sites in more detailed, and the basis for each of the site parameters.

Impact on DCD

The DCD will be changed in Revision 2 to incorporate the following:

- Replace the second paragraph of Subsection 2.3.4 with the following:

"The short-term χ/Q values are site-specific parameters. The χ/Q values listed in Table 2.0-1 are bounding factors for a typical US-APWR sited in most areas of the US and can be used to calculate radiological consequences of design basis accidents. There is no site specific meteorological data in the stage of the DCD. The atmospheric dispersion factors (χ/Q values) are determined as follows.

The US-APWR χ/Q value of EAB should be determined as the representative of the US plants. Therefore, the US-APWR χ/Q value of EAB is selected to envelop most values at the corresponding EAB distance (0.5 miles) of the many existing plants. This value is reasonable in comparison with the existing plants values with different EAB distances.

The χ/Q values of LPZ are also determined by using the same method as EAB at every time interval. However, the LPZ distance of US-APWR can not be specified in the stage of the DCD. Therefore, the US-APWR χ/Q values of LPZ are determined to envelop most χ/Q values of many existing plants with LPZ distance of more than 1 mile.

The 0-8 hrs χ/Q values of MCR are calculated by some formula based on both the diffusion equations used in ARCON96 (e.g. Revision 1 to NUREG-6331) and the meteorological condition referred to RG 1.194 (e.g. F stability and wind speeds of 1.0 m/s), not directly by ARCON96 itself. In this calculation formula, a multiplier is introduced to envelop the most χ/Q values of MCR of many existing plants. .It is not used the ARCON96 directly in DCD..

By using the χ/Q values of MCR at various source-receptor distances of many existing plants, it is ensured that the above calculation formula envelops the most χ/Q values of the existing plants at any source-receptor distance, and then the US-APWR χ/Q values of MCR are determined by this calculation formula.

The other time interval χ/Q values (8-24 hrs, 24-96 hrs, 96-720 hrs) of MCR are calculated by using both the above formula of 0-8 hrs χ/Q values and the time interval factors described in RG 1.194 regulatory position 4.4. These calculated χ/Q values also envelop most existing plants values.

As a result, the US-APWR χ/Q values of EAB, LPZ and MCR in DCD Tier 2 Table 2.0-1 are representative of a reasonable number of the existing plants values. The COL Applicant is to provide conservative factors as described in SRP 2.3.4 (Reference 2.3-2). If a selected site will cause excess to the bounding χ/Q values, then the COL Applicant is to demonstrate how the dose reference values in 10 CFR 52.79(a)(1)(vi) (Reference 2.3-3) and the control room dose limits in 10 CFR 50, Appendix A, General Design Criteria 19 (Reference 2.3-4) are met using site-specific χ/Q values."

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

This completes MHI's responses to the NRC's questions.