ATTACHMENT 1 of ENCLOSURE 1 CONTAINS SECURITY-SENSITIVE INFORMATION
WITHHOLD UNDER 10 CFR 2.390

Xcel Energy®

AUG 1 2 2010

L-PI-10-076
10 CFR 50.90

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

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Response to Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC Nos. ME2609 and ME2610)

References:

1. Xcel Energy Letter to US NRC, "License Amendment Request (LAR) to Adopt the Alternative Source Term Methodology," dated October 27, 2009 (ADAMS Accession No. ML093160583).
2. US NRC Letter to Xcel Energy, "Prairie Island Nuclear Generating Plant, Units 1 and 2 – Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC Nos. ME2609 and ME2610)," dated March 26, 2010 (ADAMS Accession No. ML100820298).
3. Xcel Energy Letter to US NRC, "Response to Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC Nos. ME2609 and ME2610)," dated April 29, 2010 (ADAMS Accession No. ML101200083).
4. US NRC Letter to Xcel Energy, "Prairie Island Nuclear Generating Plant, Units 1 and 2 – Requests for Additional Information (RAI) Associated with Adoption of the Alternative Source Term (AST) Methodology (TAC Nos. ME2609 and ME2610)," dated May 20, 2010 (ADAMS Accession No. ML101380011).
5. Xcel Energy Letter to US NRC, "Response to Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC Nos. ME2609 and ME2610)," dated May 25, 2010 (ADAMS Accession No. ML101460064).
6. Xcel Energy Letter to US NRC, "Response to Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC Nos. ME2609 and ME2610)," dated June 23, 2010 (ADAMS Accession No. ML101760017).

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A001
NRR

In Reference 1, the Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, requested an amendment to the Technical Specifications (TS) for Prairie Island Nuclear Generating Plant (PINGP). The proposed amendment requested to adopt the Alternative Source Term (AST) methodology, in addition to TS changes supported by the AST design basis accident radiological consequence analyses.

In Reference 2, the Nuclear Regulatory Commission (NRC) Staff requested additional information to support their review of Reference 1. In Reference 3 and Reference 5, NSPM provided responses to these requests for additional information (RAI). In Reference 4, the NRC Staff requested additional information. Reference 6 provided responses to these NRC Staff RAIs, specifically, responses to RAIs from the Accident Dose Branch, with the exception of RAI 9. The enclosure to this letter provides the response to RAI 9, as well as additional information which provides updates to the original LAR.

NSPM requests that Attachment 1 of Enclosure 1, which contains security-sensitive information, be withheld from public disclosure in accordance with 10 CFR 2.390. NSPM submits this supplement in accordance with the provisions of 10 CFR 50.90.

The supplemental information provided in this letter does not impact the conclusions of the Determination of No Significant Hazards Consideration and Environmental Assessment presented in the October 27, 2009 submittal, as supplemented by letters dated April 29, 2010, May 25, 2010 and June 23, 2010.

In accordance with 10 CFR 50.91, NSPM is notifying the State of Minnesota of this LAR supplement by transmitting a copy of this letter and Enclosure to the designated State Official.

If there are any questions or if additional information is needed, please contact Ms. Amy Hazelhoff, at 269-370-7445.

Summary of Commitments

This letter contains no new commitments and no revisions to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on AUG 12 2010

Mark A. Schimmel
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosure

cc: Administrator, Region III, USNRC (without Attachments)
Project Manager, PINGP, USNRC
Resident Inspector, PINGP, USNRC (without Attachments)
State of Minnesota (without Attachments)

Enclosure 1

Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI)

ACCIDENT DOSE BRANCH (AADB)

Please provide the following information for the Nuclear Regulatory Commission (NRC) staff to continue its review:

NRC RAI - AADB RAI 9

Figures 3.1-2 and 3.1-3 provide an illustration of the arrangement of two sets of vents. In each case, what is the orientation of the vents and assumed line of sight width of a postulated release moving directly toward each intake receptor? Will all of the vents in one group release at the same time, with the same level of activity? If not, what is the horizontal distance to each receptor from the nearest or limiting vent in each group? The LAR analysis assumed a diffuse release based upon either a circle or triangle surrogate estimate. Are the horizontal distances to each receptor in those cases from the assumed center or closest point of each geometric figure?

Response

The specific questions in the RAI related to diffuse source modeling are not applicable because the TDAFWP Exhaust was removed as the assumed release location in the analysis and the SG PORV was modeled as a point source. These changes required revisions to the affected analyses, as discussed below.

Figures 3.1-2 and 3.1-3 in the enclosure of the license amendment request (LAR) (Accession Number ML093160583) illustrated the diffuse release area for the Main Steam Safety Valve/Power Operated Relief Valve (MSSV/PORV) Source and the Turbine Driven Auxiliary Feedwater Pump (TDAFWP)/Steam Dump Source, respectively. The Steam Dump Source is also referred to as the Atmospheric Dump Valves (ADV). During the preparation of the response to RAI AADB #9, an error was discovered in the X/Q calculation for the Unit 1 TDAFWP Exhaust to the Unit 1 Control Room (CR) Vent Intake. It was discovered that the shortest distance from the perimeter of the diffuse area to the Unit 1 CR Vent Intake is approximately 6 meters. As shown in Table 3.1-8 of the enclosure to the LAR, the distance used in the X/Q calculation was 9.6 meters. This error discovery is documented in the Prairie Island Nuclear Generating Plant (PINGP) Corrective Action Program.

Consistent with RG 1.194, Regulatory Position C.3.4, it is not appropriate to use ARCON96 to model this source-receptor pair with a distance of 6 meters. Thus, the necessity of modeling the TDAFWP Exhaust line as a release point in the analyses was reconsidered. This re-assessment considered the scenarios where this release path could be used and a comparison of the X/Qs from the TDAFWP Exhaust to other release locations. Based on this re-assessment, the TDAFWP Exhaust is excluded as a release location in the Alternative Source Term (AST) analysis. As described in Xcel Energy letter L-PI-09-033, dated March 16, 2009 (ML090890180) an acceptable receptor location for determining the dispersion factors for unfiltered inleakage into the Control Room Envelope would be the center of the Control Room ceiling since the atmospheric dispersion value can be considered an average value for inleakage locations around the Control Room envelope. The horizontal distance from the TDAFWP steam exhaust to the center of the Control Room ceiling is 17 meters. The distance for the Unit 2 Group 1 PORV to the CR Vent Intake point source is 13 meters, thus, it can reasonably be concluded that using the PORV to the CR intake provides more conservative X/Q results.

Based on the above discussion, the TDAFWP Exhaust will not be used as a release location in the dose analysis. Not using the TDAFWP Exhaust as a release location impacts the following secondary side accident sequences

- Main Steam Line Break (MSLB)
- Steam Generator Tube Rupture (SGTR)
- Control Rod Ejection Accident (CREA)
- Locked Rotor Accident (LRA).

Without steam being released from the TDAFWP Exhaust during these accident sequences, all of the steam is released from the associated Steam Generator (SG) PORVs. The change in release locations required the analyses for these four accident sequences to be revised. The changes are summarized below. The revised calculations for these four accident sequences are provided in Attachments 2, 3, 4, and 5 to this enclosure. These revised analyses supersede in their entirety the analyses that were sent with the original LAR as Attachments 9, 10, 11 and 12.

<u>Atmospheric Dispersion Factors</u>
As part of the revisions to the dose analysis for the four secondary side accident sequences the release from the SG PORV was assumed as a point release in lieu of a diffuse release (i.e., PORV/MSSV). This change to a point source release was made to account for only using the SG PORV, which represents the expected plant response during the longer time durations following an event. With the change to modeling the release from the SG PORV as a point source in lieu of a diffuse source, the specific questions in the RAI are not applicable. That is, the distance used is the minimum distance from the point source to the

receptor and release is not divided between multiple vents at the point source release location.

As shown on Figure 3.1-1 of the enclosure to the LAR, there are two PORVs per Unit; Group 1 PORV and Group 2 PORV. The location of the Unit 1 and Unit 2 Group 1 and Group 2 PORVs are shown on Figure 1, which is provided in Attachment 1.

The X/Q values for the Group 1 PORV to the 121 CR Vent Intake and the 122 CR Vent Intake were previously submitted to the NRC in Letter L-PI-09-056, dated May 1, 2009 (ML091210703). The input values used in ARCON96 to determine the X/Qs for the PORVs are also provided in Letter L-PI-09-056, Table 1. From Table 2 of Letter L-PI-09-056, the X/Qs for the Group 1 PORVs to the 121 and 122 CR Vent Intakes are provided in Table 1, below. The X/Q limiting values shown in Table 1 were used in the revised dose analysis in lieu of the X/Q values for the Unit 1 and Unit 2 MSSVs/PORV – Group 1 in Tables 3.1-11 and 3.1-12 in the enclosure to the LAR. The X/Q values for the Unit 1 and Unit 2 MSSVs/PORV – Group 1 in the enclosure to the LAR should be disregarded as these are superseded by the corresponding values shown in Table 1.

Table 1
(Revisions to Tables 3.1-11 and 3.1-12)
Group 1 PORV to CR Vent Intake X/Q Values

Source/Receptor	X/Q (sec/m^3)				
	(0-2 hour)	(2-8 hour)	(8-24 hour)	(1-4 days)	(4-30 days)
Unit 1 Group 1 PORV to 121 CR Vent Intake	1.90E-02	1.38E-02	5.73E-03	3.71E-03	2.89E-03
Unit 1 Group 1 PORV to 122 CR Vent Intake	1.36E-03	1.08E-03	4.65E-04	3.31E-04	2.56E-04
Unit 2 Group 1 PORV to 121 CR Vent Intake	2.05E-03	1.48E-03	6.24E-04	4.35E-04	3.68E-04
Unit 2 Group 1 PORV to 122 CR Vent Intake	3.07E-02	2.49E-02	1.12E-02	7.78E-03	6.17E-03

As shown in the Table 1, the limiting source/receptor pair is Unit 2 Group 1 PORV to 122 CR Vent Intake. As shown in Table 2 of Letter L-PI-09-056, the X/Q values for the Unit 2 Group 1 PORV to 122 CR Vent Intake are also greater than the X/Q values for the Group 1 PORV (Unit 1 or Unit 2) to the CR Inleakage location.

In letter dated June 19, 2009, the NRC issued License Amendment 191 (Unit 1) and 180 (Unit 2) for revision to the Loss of Coolant Accident (LOCA) and MSLB radiological consequence analyses (TID source term). In the associated Safety Evaluation (SE), Section 3.1.2 and Table 3.1, the NRC concluded that the 0-2 hour X/Q values for the Unit 2 Group 1 PORV to 122 CR Vent Intake were acceptable. The X/Q values for the other time periods were not specifically discussed in the NRC SE as these were not used in the associated radiological consequence analysis. However, given that the X/Q values for the time periods after 0-2 hours are determined using the same code and input values, these values would also be acceptable.

For the Group 2 PORV to CR Vent Intake, new X/Q values were recalculated based on modeling the PORV as a point source in lieu of a diffuse source as shown in the enclosure to the LAR. The review of the Group 2 PORVs with respect to locations of Units 1 and 2 CR Vent Intakes indicates that the Unit 2 Group 2 PORV is located closer to the Unit 2 CR Vent Intake. The same southeast prevailing wind would carry releases from the Group 2 PORVs to the Units 1 and 2 CR Vent Intakes. Based on the shorter distance, the X/Q values for the Unit 2 Group 2 PORV to 122 CR Vent Intake would be limiting. Therefore, new X/Q values for Unit 2 Group 2 PORV to 122 CR Vent Intake were determined for use in the revised radiological consequence analysis. The design inputs used in ARCON96 to determine the X/Q values for the Unit 2 Group 2 PORV to 122 CR Vent Intake source/receptor pair are provided in Table 2. The design inputs shown in Table 2 supersede the design inputs for the Unit 2 Group 2 PORV to 122 CR Vent Intake shown in Table 3.1-10 in the enclosure to the LAR. The X/Q values determined based on the design inputs in Table 2 are shown in Table 3. The X/Q values shown in Table 3 are used in the revised dose analysis and supersede the X/Q values for the MSSVs/PORV – Group 2 to 122 CR Vent Intake shown in Tables 3.1-11 and 3.1-12 in the enclosure to the LAR.

Table 2
(Revisions to Table 3.1-10)
Design Inputs used to Determine ARCON96 X/Q Values
For Unit 2 Group 2 PORV to 122 CR Vent Intake

ARCON96 Parameter	Input Value
Meteorological Information	
Period of Meteorological Data	1993 – 1997
Lower Measurement Height (meters)	10.0
Upper Measurement Height (meters)	60.0
Wind Speed Units	miles/hour
Meteorological Data File Names	PI93.met, PI94.met, PI95.met, PI96.met, PI97.met
Source Parameters	
Release Type	Ground
Release Height	28.2
Building Area	2176
Vertical Velocity (meters/sec)	0.0
Stack Flow (meters^3/sec)	0.0
Stack Radius (meters)	0.0
Initial Diffusion Coefficients (σ_y, σ_z)	0.0, 0.0
Receptor Parameters	
Distance to Receptor (meters)	52.1
Intake Height (meters)	25.7
Elevation Difference (meters)	0
Direction to Source (deg az)	156
Default Information	
Surface Roughness Length (meters)	0.20
Wind Direction Window (deg az)	90
Minimum Wind Speed (meters/sec)	0.5
Averaging Sector Width Constant	4.3

Table 3
(Revisions to Tables 3.1-11 and 3.1-12)
Unit 2 Group 2 PORV to 122 CR Vent Intake

Source/Receptor	X/Q (sec/m^3)				
	(0-2 hour)	(2-8 hour)	(8-24 hour)	(1-4 days)	(4-30 days)
Unit 2 Group 2 PORV to 122 CR Vent Intake	2.20E-03	1.81E-03	7.97E-04	5.16E-04	4.00E-04

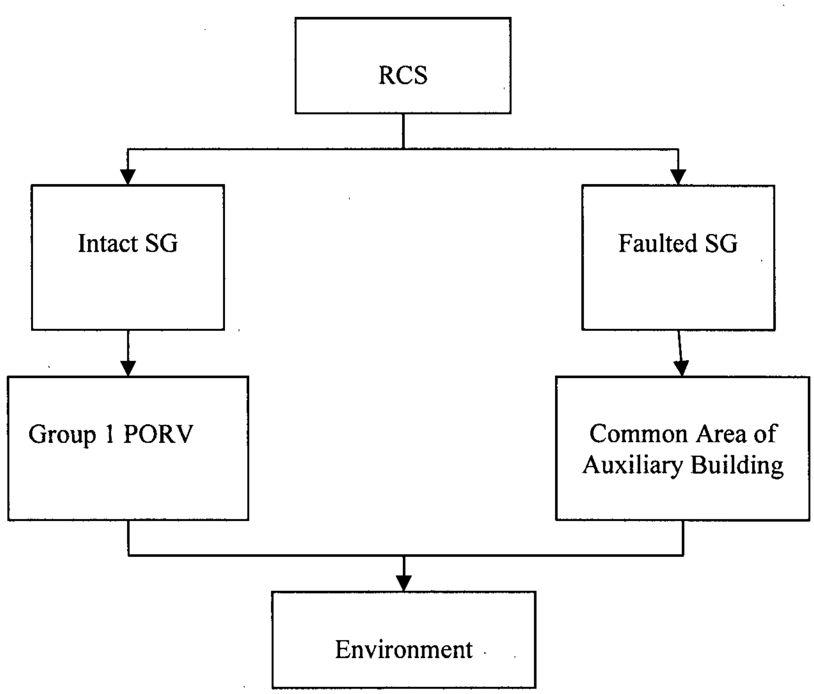
Attachment 4, Table H, of the enclosure to the LAR also identifies that the TDAFW Exhaust and the PORV/Safety Valves were modeled as diffuse releases. With the above discussed changes, this is no longer the case. That is, with these changes the TDAFW Exhaust is not included in the analysis as a release source and the PORV is modeled as a point release source. Therefore, the discussion of modeling the TDAFW Exhaust and the PORV/Safety Valves in Attachment 4, Table H, of the enclosure to the LAR should be disregarded.

Main Steam Line Break (MSLB) Radiological Assessment

The MSLB radiological consequence analysis has been revised to reflect not including the TDAFWP Exhaust as a release location. Revision 1 to the calculation (GEN-PI-078, "Main Steam Line Break (MSLB) Accident Analysis Using AST") is provided in Attachment 2 to this enclosure. This revision supersedes in its entirety GEN-PI-078, Revision 0, which was provided in the LAR as Attachment 9. The following discussion summarizes the impacts to Section 3.6 of the enclosure to the LAR.

Section 3.6.2 of the enclosure to the LAR provides a schematic of the analytical model used in the MSLB analysis. Figure 2 provides a revised schematic of the analytical model and supersedes Figure 3.6-1 in the enclosure to the LAR (the change is the TDAFWP Steam Exhaust is deleted as a release path from the Intact SG).

Figure 2
(Revised Figure 3.6-1)
MSLB Analytical Model



Section 3.6.4 of the enclosure to the LAR discusses the radiological release paths modeled in the analysis. The radiological release path for the faulted SG is not changed. The radiological release path for the intact SG is changed to delete the TDAFW Steam Exhaust as a release path. With this change, the total steam mass release shown in Table 3.6-2 is through the Group 1 PORV. Table 4 shows the steam mass release through the PORV and supersedes Table 3.6-2 in the enclosure to the LAR.

Table 4
(Revised Table 3.6-2)
MSLB Intact SG Steam Mass Releases

Time Interval	Total Steam Mass Release (lbm)	Total Steam Mass Release Through Group 1 PORV (lbm)
0 – 2 hours	226,414	226,414
2 – 8 hours	406,952	406,952
8 – 24 hours	796,899	796,899
24 – 45.5 hours	863,053	863,053

With the entire steam release from the Intact SG considered to be through the Group 1 PORV, the total steam mass release from the Intact SG uses the atmospheric dispersion factor for the Unit 2 Group 1 PORV to the 122 CR Vent Intake. Thus, there is no need to use an average atmospheric dispersion factor as shown in Table 3.6-3 of the enclosure to the LAR. Thus, the average atmospheric dispersion factors shown in Table 3.6-3 of the enclosure to the LAR are not used in the revised MSLB radiological consequence analysis and should be disregarded.

Table 3.6-4 in the enclosure to the LAR shows the input parameters used in the MSLB radiological consequence analysis. Based on the assumption that the total steam mass release from the intact SG is from the Unit 2 Group 1 PORV, selected input parameters are revised. The revised values are shown in Table 5. All other parameter values in Table 3.6-4 are unchanged in the revised MSLB radiological consequence analysis. The values for the input parameters in Table 3.6-4 that correspond to the parameters shown in Table 5 should be disregarded as these are superseded by the values in Table 5.

Table 5
(Revisions to Table 3.6-4)
MSLB Analysis Input Parameters

Input Parameter	Input Value in LAR	Revised Input Value
Auxiliary feedwater pump turbine steam release rate	12,000 lbm/hr 0-2 hrs 11,000 lbm/hr 2-8 hrs 9,500 lbm/hr 8-24 hrs 9,000 lbm/hr 24-45.5 hrs	Not modeled
Unit 1 CR air intake X/Qs for Unit 1 ADV / Aux Feedwater Turbine Exhaust release	Table 3.1-12 in enclosure to LAR	Not modeled
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 1 – Intact SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.

The radiological consequences to the personnel in the Control Room are impacted by the above changes. The radiological consequences at the Exclusion Area Boundary (EAB) and Low Population Zone (LPZ) are not impacted by these release point changes. Table 6 shows the revised Control Room results and supersedes the Control Room TEDE results in Tables 3.6-5 and 3.6-6 of the enclosure to the LAR. The Control Room TEDE results in Tables 3.6-5 and 3.6-6 of the enclosure to the LAR should be disregarded.

Table 6
(Revisions to Tables 3.6-5 and 3.6-6)
MSLB Control Room Radiological Consequence Results

	Control Room TEDE Dose (Rem) (Pre-Accident Iodine Spike) (Replaces CR TEDE Dose in Table 3.6-5)	**Control Room TEDE Dose (Rem) (Concurrent Iodine Spike) (Replaces CR TEDE Dose in Table 3.6-6)**
Primary to Secondary (P-T-S) Iodine Release Faulted SG	1.16E-01	1.13E+00
Dryout SG Liquid Iodine Release Faulted SG	8.75E-02	8.75E-02
P-T-S Noble Gas (NG) Release Faulted SG	1.85E-03	1.52E-03
P-T-S Iodine Release Intact SG	2.63E-01	2.50E+00
Liquid Iodine Release Intact SG	2.50E-01	2.50E-01
P-T-S Noble Gas Release Intact SG	1.15E-03	9.19E-04
External Cloud*	4.51E-02	4.51E-02
CR Filter Shine*	2.33E-02	2.33E-02
Total	7.88E-01	4.04E+00
Allowable TEDE Limit	**5.00E+00**	**5.00E+00**

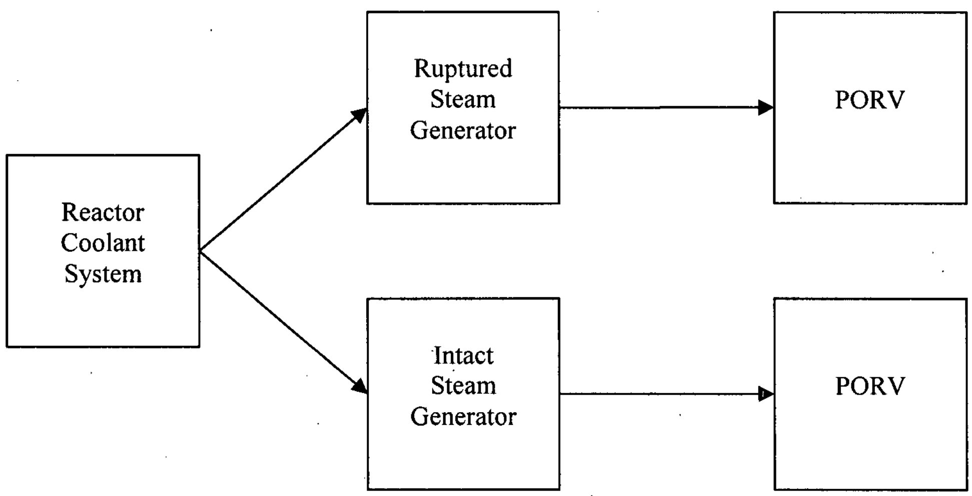
* Post-LOCA External Cloud and CR Filter Shine Doses Used from Section 3.3 of the enclosure to the LAR.

Steam Generator Tube Rupture (SGTR) Radiological Assessment

The SGTR radiological consequence analysis has been revised to reflect not including the TDAFWP Exhaust as a release location. Revision 1 to the calculation (GEN-PI-081, "EAB, LPZ and CR Doses Due to Steam Generator Tube Rupture Accident - AST") is provided in Attachment 3 to this enclosure. This revision supersedes in its entirety GEN-PI-081, Revision 0, which was provided in the LAR as Attachment 10. The following discussion summarizes the impacts to Section 3.7 of the enclosure to the LAR.

Section 3.7.2 of the enclosure to the LAR provides a schematic of the analytical model used in the SGTR analysis. Figure 3 provides a revised schematic of the analytical model and supersedes Figure 3.7-1 in the enclosure to the LAR (the change is the TDAFWP Steam Exhaust is deleted as a release path from the Steam Generators).

Figure 3
(Revised Figure 3.7-1)
SGTR Analytical Model



Section 3.7.4 of the enclosure to the LAR discusses the radiological release paths modeled in the analysis. Consistent with the change to the analytical model depicted by the above figure, the radiological release path for the faulted SG and the intact SG is changed to delete the TDAFW Steam Exhaust as a release path. Table 7 summarizes the steam mass release points following a SGTR and supersedes Table 3.7-2 in the enclosure to the LAR.

Table 7
(Revised Table 3.7-2)
SGTR Steam Release Locations

Time Period	Ruptured SG	Intact SG
0 – 30 minutes	Unit 2 Group 1 PORV	Unit 2 Group 1 PORV
30 minutes – 2 hours		Unit 2 Group 2 PORV
2 – 8 hours		Unit 2 Group 2 PORV
8 – 14 hours		Unit 2 Group 2 PORV

To be consistent with the methodology discussed in the enclosure to the LAR, the intact SG is modeled with its activity release via the Group 1 PORV during the initial 30 minutes of the event.

With this change, the total steam mass release from the ruptured SG shown in Table 3.7-3 is through the PORV. This is shown in the following table; which supersedes Table 3.7-3.

Table 8
(Revised Table 3.7-3)
SGTR Ruptured SG Steam Mass Releases

Time Interval	Total Steam Mass Release (lbm)	Ruptured SG PORV Mass Release (lbm)
0 - 0.5 hours	80,500	80,500

With this change, the total steam mass release from the intact SG shown in Table 3.7-4 is through the PORV. This is shown in the following table; which supersedes Table 3.7-4.

Table 9
(Revised Table 3.7-4)
SGTR Intact SG Steam Mass Releases

Time Interval	Total Steam Mass Release (lbm)	Intact SG PORV Mass Release (lbm)
0 - 2 hours	237,100	237,100
2 - 8 hours	569,000	569,000
8 - 14 hours	416,000	416,000

With all of the steam release from the Ruptured and Intact SGs through the PORVs, there is no need for using an average atmospheric dispersion factor as shown in Tables 3.7-5 and 3.7-6, respectively. Thus, the average atmospheric dispersion factors shown in Tables 3.7-5 and 3.7-6 are not used in the revised SGTR radiological consequence analysis and Tables 3.7-5 and 3.7-6 should be disregarded.

Table 3.7-7 in the enclosure to the LAR shows the input parameters used in the SGTR radiological consequence analysis. Based on the assumption that the total steam mass release from the Ruptured and Intact SGs is from the Unit 2 PORVs, selected input parameters are revised. The revised parameter values are shown in the following table. All other parameter values in Table 3.7-7 in the enclosure to the LAR are unchanged in the revised SGTR radiological consequence analysis. The values for the input parameters in Table 3.7-7 that correspond to the parameters shown in Table 10 should be disregarded as these are superseded by the values in Table 10.

Table 10
(Revisions to Table 3.7-7)
SGTR Analysis Input Parameters

Input Parameter	Input Value in LAR	Revised Input Value
Auxiliary feedwater pump turbine steam release rate	12,000 lbm/hr for entire duration of 0 – 14 hours	Not modeled
Unit 1 CR air intake X/Qs for Unit 1 ADV / Aux Feedwater Turbine Exhaust release	Table 3.1-12 in enclosure to LAR	Not modeled
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 1 – Ruptured SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 2 – Intact SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.

The radiological consequences to the personnel in the Control Room are impacted by the above changes. The radiological consequences at the EAB and LPZ are not impacted by these release point changes. Table 11 shows the updated Control Room results and supersedes the Control Room TEDE results shown in Tables 3.7-8 and 3.7-9 in the enclosure to the LAR. The Control Room TEDE results in Tables 3.7-8 and 3.7-9 of the enclosure to the LAR should be disregarded.

Table 11
(Revisions to Tables 3.7-8 and 3.7-9)
SGTR Control Room Radiological Consequence Results

	Control Room TEDE Dose (Rem) (Pre-Accident Iodine Spike) (Replaces CR TEDE Dose in Table 3.7-8)	**Control Room TEDE Dose (Rem) (Concurrent Iodine Spike) (Replaces CR TEDE Dose in Table 3.7-9)**
P-T-S Iodine Release	4.14E+00	3.33E+00
SG Liquid Iodine Release	6.23E-03	6.23E-03
Noble Gas Release	4.61E-01	3.73E-02
External Cloud*	4.51E-02	4.51E-02
CR Filter Shine*	2.33E-02	2.33E-02
Total	4.67E+00	3.45E+00
Allowable TEDE Limit	**5.00E+00**	**5.00E+00**

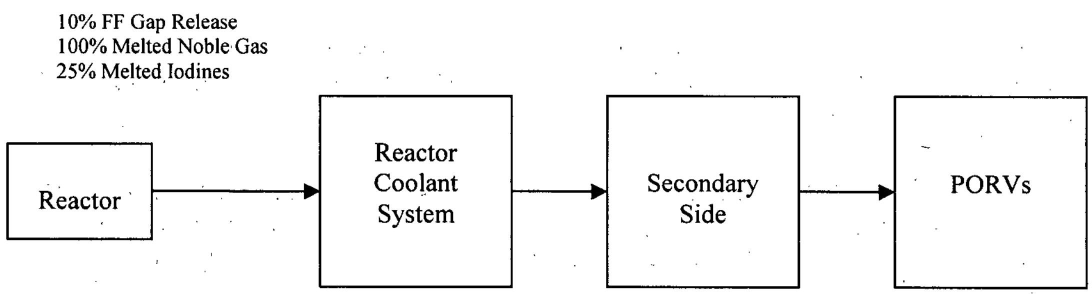
* Post-LOCA External Cloud and CR Filter Shine Doses Used from Section 3.3 of the enclosure to the LAR.

Control Rod Ejection Accident (CREA) Radiological Assessment

The CREA radiological consequence analysis has been revised to reflect not including the TDAFWP Exhaust as a release location. Revision 1 to the calculation (GEN-PI-082, "Control Rod Ejection Accident - AST") is provided in Attachment 4 to this enclosure. This revision supersedes in its entirety GEN-PI-082, Revision 0, which was provided in the LAR as Attachment 11. The following discussion summarizes the impacts to Section 3.8 of the enclosure to the LAR.

Section 3.8.2 of the enclosure to the LAR provides a schematic of the analytical model used in the CREA analysis. Figure 4 provides a revised schematic of the analytical model and supersedes the Steam Generator Release Path shown in Figure 3.8-1 in the enclosure of the LAR (the change is the TDAFWP Steam Exhaust is deleted as a release path from the Steam Generators).

Figure 4
(Revised Figure 3.8-1)
CREA Analytical Model



Section 3.8.4.2 of the enclosure to the LAR discusses the radiological release paths modeled in the analysis. The radiological release path for the SG is changed to delete the TDAFW Steam Exhaust as a release path. With this change, the total steam mass release shown in Table 3.8-5 is through the PORVs. This is shown in Table 12; which supersedes Table 3.8-5.

Table 12
(Revised Table 3.8-5)
CREA Steam Mass Releases

Time Interval	Total Steam Mass Release (lbm)	Total Steam Mass Release Through PORVs (lbm)
0 – 2 hours	226,414	226,414
2 – 8 hours	406,952	406,952
8 – 24 hours	796,899	796,899
24 – 45.5 hours	863,053	863,053

With the steam release through the PORVs and not the TDAFWP Steam Exhaust the average atmospheric dispersion factors shown in Table 13 supersede those shown in Table 3.8-7 in the enclosure to the LAR. As discussed above, the highest X/Q values are for the Unit 2 PORVs to the 122 CR Vent Intake. Thus, a replacement for Table 3.8-6 in the enclosure to the LAR is not necessary as these would be bounded by the X/Q values shown in Table 13. Therefore, Table 3.8-6 should be disregarded in total. The X/Qs for the Group 1 and Group 2 PORVs can be averaged as the activity concentrations in each SG are assumed to be the same – use of methodology for combining multiple release sources was addressed in the response to NRC AABD RAI #2, which was sent per letter dated May 25, 2010 (ML101460064).

Table 13
(Revised Table 3.8-7)
Effective Unit 2 Atmospheric Dispersion Factors
PORVs to 122 CR Vent Intake

Time Interval (hr)	Unit 2 Group 1 PORV X/Q (sec/m^3) A	Unit 2 Group 2 PORV X/Q (sec/m^3) B	Effective PORV X/Q (sec/m^3) 0.6*A + 0.4*B
0 - 2	3.07E-02	2.20E-03	1.93E-02
2 - 8	2.49E-02	1.81E-03	1.57E-02
8 - 24	1.12E-02	7.97E-04	7.04E-03
24 - 96	7.78E-03	5.16E-04	4.87E-03
96 - 720	6.17E-03	4.00E-04	3.86E-03

Table 3.8-8 in the enclosure to the LAR shows the input parameters used in the CREA radiological consequence analysis. Based on the assumption that the total steam mass release from the Intact SGs is from the Unit 2 PORVs, selected input parameters are revised. The revised parameter values are shown in Table 14. All other parameter values are unchanged in the revised CREA radiological consequence analysis. The values for the input parameters in Table 3.8-8 that correspond to the parameters shown in Table 14 should be disregarded as these are superseded by the values in Table 14.

Table 14
(Revisions to Table 3.8-8)
CREA Analysis Input Parameters

Input Parameter	Input Value in LAR	Revised Input Value
TDAFW Pump Steam Exhaust Release Rate	12,000 lbm/hr 0-2 hrs 11,000 lbm/hr 2-8 hrs 9,500 lbm/hr 8-24 hrs 9,000 lbm/hr 24-45.5 hrs	Not modeled
Unit 1 CR air intake X/Qs for Unit 1 ADV / Aux Feedwater Turbine Exhaust release	Table 3.1-12 in enclosure to LAR	Not modeled
Unit 2 CR air intake X/Qs for Unit 2 ADV / Aux Feedwater Turbine Exhaust release	Table 3.1-12 in enclosure to LAR	Not modeled
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 1 – Intact SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 2 – Intact SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.

The radiological consequences to the personnel in the Control Room are impacted by the above changes. The radiological consequences at the EAB and LPZ are not impacted by these release point changes. Table 15 shows the updated Control Room results and supersedes the Control Room TEDE results shown in Table 3.8-9 in the enclosure to the LAR. The Control Room TEDE results in Table 3.8-9 should be disregarded.

Table 15
(Revisions to Table 3.8-9)
CREA Control Room Radiological Consequence Results

	Control Room TEDE Dose (Rem) (Replaces CR TEDE Dose in Table 3.8-9)
Containment Leakage	4.11E-01
Iodine Release Intact SGs	3.10E+00
Noble Gas Release Intact SGs	3.05E-01
Liquid iodine Release Intact SGs	1.07E-02
External Cloud*	4.51E-02
CR Filter Shine*	2.33E-02
Total	3.91E+00
Allowable TEDE Limit	**5.00E+00**

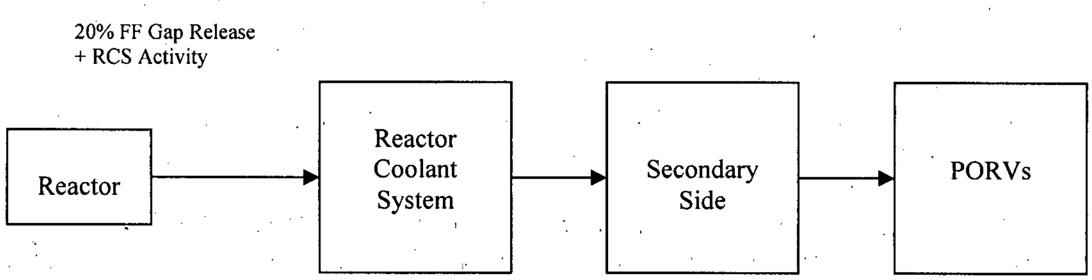
* Post-LOCA External Cloud and CR Filter Shine Doses Used from Section 3.3 of the enclosure to the LAR.

Locked Rotor Accident (LRA) Radiological Assessment

The LRA radiological consequence analysis has been revised to reflect not including the TDAFWP Exhaust as a release location. Revision 1 to the calculation (GEN-PI-083, "Locked Rotor Accident (LRA) Analysis Using AST") is provided in Attachment 5 to this enclosure. This revision supersedes in its entirety GEN-PI-083, Revision 0, which was provided in the LAR as Attachment 12. The following discussion summarizes the impacts to Section 3.9 of the enclosure to the LAR.

Section 3.9.2 of the enclosure to the LAR provides a schematic of the analytical model used in the LRA analysis. Figure 5 provides a revised schematic of the analytical model and supersedes Figure 3.9-1 in the enclosure to the LAR (the change is the TDAFWP Steam Exhaust is deleted as a release path from the Steam Generators):

Figure 5
(Revised Figure 3.9-1)
LRA Analytical Model



As described in Section 3.9.4 of the enclosure to the LAR, the radiological release paths modeled in the analysis are the same as the steam release paths described for the CREA analysis. This is also the case with the revised analysis. Thus, the steam mass releases and average X/Q values for the revised LRA analysis are the same as those described above for the CREA.

Table 3.9-3 in the enclosure to the LAR shows the input parameters used in the LRA radiological consequence analysis. Based on the assumption that the total steam mass release from the SGs is from the Unit 2 PORVs, selected input parameters are revised. The revised parameter values are shown in Table 16. All other parameter values in Table 3.9-3 are unchanged in the revised LRA radiological consequence analysis. The values for the input parameters in Table 3.9-3 that correspond to the parameters shown in Table 16 should be disregarded as these are superseded by the values in Table 16.

Table 16
(Revisions to Table 3.9-3)
LRA Analysis Input Parameters

Input Parameter	Input Value in LAR	Revised Input Value
TDAFW Pump Steam Exhaust Release Rate	12,000 lbm/hr 0-2 hrs 11,000 lbm/hr 2-8 hrs 9,500 lbm/hr 8-24 hrs 9,000 lbm/hr 24-45.5 hrs	Not modeled
Unit 1 CR air intake X/Qs for Unit 1 ADV / Aux Feedwater Turbine Exhaust release	Table 3.1-12 in enclosure to LAR	Not modeled
Unit 2 CR air intake X/Qs for Unit 2 ADV / Aux Feedwater Turbine Exhaust release	Table 3.1-12 in enclosure to LAR	Not modeled
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 1 – Intact SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.
Unit 2 CR air intake X/Qs for Unit 2 Safety and Relief Valve Group 2 – Intact SG	Table 3.1-12 in enclosure to LAR (based on diffuse source)	Modeled as point source release – refer to above discussion.

The radiological consequences to the personnel in the Control Room are impacted by the above changes. The radiological consequences at the EAB and the LPZ are not impacted by these release point changes. Table 17 shows the updated Control Room results and supersedes the Control Room TEDE results shown in Table 3.9-4 in the enclosure to the LAR. The Control Room TEDE results in Table 3.9-4 of the enclosure to the LAR should be disregarded.

Table 17
(Revisions to Table 3.9-4)
LRA Control Room Radiological Consequence Results

	Control Room TEDE Dose (Rem) (Replaces CR TEDE Dose in Table 3.9-4)
Iodine Release Intact SGs	4.12E+00
Noble Gas Release Intact SGs	1.32E-01
Liquid Iodine Release Intact SGs	1.07E-02
External Cloud*	4.51E-02
CR Filter Shine*	2.33E-02
Total	4.33E+00
Allowable TEDE Limit	**5.00E+00**

* Post-LOCA External Cloud and CR Filter Shine Doses Used from Section 3.3 of the enclosure to the LAR.

<u>Summary and Conclusion</u>
With the removal of the TDAFWP Exhaust as the assumed release location in the analysis and the change to model the SG PORV as a point source, the specific questions in the RAI related to diffuse source modeling are not applicable. These changes required revisions to the affected analyses. These changes impacted the analysis results for the Control Room personnel. The revisions did not impact the analysis results at the Exclusion Area Boundary or the Low Population Zone. As shown above, the Control Room TEDE dose for each of the revised analysis are all less than the allowable limits. This is consistent with the conclusions in the LAR.