Nuclear Operating Company

South Texas Project Electric Generating Station 4000 Avenue F – Suite A Bay City, Texas 77414

September 22, 2009
U7-C-STP-NRC-090158

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Second Re-submittal of Response to Request for Additional Information

References:
1) Letter, Scott Head to Document Control Desk. "Re-submittal of Response to Request for Additional Information", dated August 13, 2009 (U7-C-STP-NRC-090106).

2) Letter, Mark McBurnett to Document Control Desk, "Response to Request for Additional Information", dated July 20, 2009 (U7-C-STP-NRC-090075).

3) Letter, Jessie Muir to Scott Head, "Request for Additional Information, Letter Number Three Related to the Environmental Report for the South Texas Combined License Application", dated April 22, 2009 (ML0909060303).

Attached is a re-submittal of Reference Letters 1 and 2 which contained the response to NRC question 05.04.02-01 as requested in Reference Letter 3. We understand that these letters, the attachment, and the enclosed DVD source files were not docketed because some files on the DVD did not comply with the requirements for electronic submission in NRC Guidance Document, "Guidance for Electronic Submissions to the NRC," dated November 20, 2007.

Please note that the files on the enclosed DVD remain unable to comply with this guidance and can not be formatted as PDF files. The NRC Staff requested that the files be submitted in the native formats required by the software in which they are created, to support development of the Draft Environmental Impact Statement. Specifically, these files contain input/output codes for various models and calculation packages that support RAI 05.04.02-01.

STI: 32539439

D091
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Further, we understand that the PDF files included in the original submittal's DVD did not meet the electronic submittal guidance. File "2005 Radioactive Effluent Release Report" has been deleted from the DVD because it has been previously supplied to the NRC. The contents of this file may be found in Agencywide Document Access and Management System (ADAMS) under accession numbers ML061290124, ML061290125, and ML061290127.

In addition, the file "DCD12-02" has also been deleted from the DVD. This file contained Section 12.2, Radiation Sources, from the Advanced Boiling Water Reactor Design Control Document which received final design certification from the NRC in May 1997. This information is also available through the NRC website and the ADAMS Public Legacy Library.

Finally, the Document Control Desk requested that all compressed files (ZIP files) on the DVD be submitted in uncompressed form. The enclosed DVD contains no compressed files.

We request that you place the enclosed information on the docket and make the source files available for use by NRC Staff.

There are no commitments in this letter.

If you have any questions, please feel free to contact me at (361) 972-7136, or Russell W. Kiesling at (361) 972-4716

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 9/22/09

Scott Head
Manager, Regulatory Affairs
South Texas Project, Units 3 & 4

rwk

Enclosures:

1. Re-submittal of Letter, Mark McBurnett to Document Control Desk, "Response to Request for Additional Information", dated July 20, 2009 (U7-C-STP-NRC-090075).

2. DVD Containing Gaspar Calculation Package and XOQDOQ Input/Output Files.

cc: w/o attachment except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Division for Regulatory Services
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspection Unit Manager
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

*Steven P. Frantz, Esquire
A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP
1111 Pennsylvania Ave. NW
Washington, D.C. 20004

*George F. Wunder
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

*Jessie Muir
Two White Flint North
U.S. Nuclear Regulatory Commission
Mail Drop T6D32
11545 Rockville Pike
Rockville, MD 20852-2738

(electronic copy)

*George Wunder
Loren R. Plisco
*Jessie Muir
U. S. Nuclear Regulatory Commission

Steve Winn
Eddy Daniels
Joseph Kiwak
Nuclear Innovation North America

Jon C. Wood, Esquire
Cox Smith Matthews

J. J. Nesrsta
R. K. Temple
Kevin Pollo
L. D. Blaylock
CPS Energy

Enclosure 1. Previously submitted letters:

- U7-C-STP-NRC-090075. Response to Request for Additional Information, July 20, 2009.

- U7-C-STP-NRC-090106. Re-submittal of Response to Request for Additional Information, August 13, 2009.

Nuclear Operating Company

South Texas Project Electric Generating Station 4000 Avenue F – Suite A Bay City, Texas 77414

August 13, 2009
U7-C-STP-NRC-090106

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Re-submittal of Response to Request for Additional Information

References:
1) Letter, Mark McBurnett to Document Control Desk, "Response to Request for Additional Information", dated July 20, 2009 (U7-C-STP-NRC-090075)

2) Letter, Jessie Muir to Scott Head, "Request for Additional Information, Letter Number Three Related to the Environmental Report for the South Texas Combined License Application", dated April 22, 2009, ML0909060303

Attached is a re-submittal of Reference Letter 1 which contained the response to NRC question 05.04.02-01 as requested in Reference Letter 2. We understand that this letter, the attachment, and the enclosed DVD source files were not docketed because some files on the DVD did not comply with the requirements for electronic submission in NRC Guidance Document, "Guidance for Electronic Submissions to the NRC," dated November 20, 2007.

Please note that the files on the enclosed DVD remain unable to comply with this guidance and can not be formatted as pdf files. The NRC Staff requested that the files be submitted in the native formats required by the software in which they are utilized, to support development of the Draft Environmental Impact Statement. Specifically, these files contain input/output codes for various models and calculation packages that support RAI 05.04.02-01.

We request that you place this information on the docket and make the source files available for use by NRC Staff.

There are no commitments in this letter.

STI: 32520310

If you have any questions, please feel free to contact me at (361) 972-7136, or Russell W. Kiesling at (361) 972-4716

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 8/13/09

Scott Head
Manager, Regulatory Affairs
South Texas Project, Units 3 & 4

rwk

Attachment:

Re-submittal of Letter, Mark McBurnett to Document Control Desk, "Response to Request for Additional Information", dated July 20, 2009 (U7-C-STP-NRC-090075)

Enclosure:

DVD Containing Gaspar Calculation Package and XOQDOQ Input/Output Files

cc: w/o attachment except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA
Assistant Commissioner
Division for Regulatory Services
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.
Inspection Unit Manager
Texas Department of State Health Services
P. O. Box 149347
Austin, Texas 78714-9347

C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

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1111 Pennsylvania Ave. NW
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Cox Smith Matthews

J. J. Nesrsta
R. K. Temple
Kevin Pollo
L. D. Blaylock
CPS Energy

Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

July 20, 2009
U7-C-STP-NRC-090075

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Request for Additional Information

References: 1. Letter, Jessie Muir to Scott Head, "Request for Additional Information, Letter Number Three Related to the Environmental Report for the South Texas Combined License Application", dated April 22, 2009, ML090960331

2. Letter, Greg Gibson to Document Control Desk, "Response to Requests or Additional Information," dated July 15, 2008, ML082040684

Attached is a response to an NRC staff question included in Reference 1 related to Combined License Application (COLA) Part 3 (ER) Chapter 5.

The attachment provides our response to the ER RAI question listed below:

05.04.02-01

As noted on page 22 of the attached response, the markups of ER Tables 7.1-12, 7.1-14, and 7.1-15 supersede those previously provided in our response to ER RAI Question 07.01-02 included in Reference 2.

Where a revision to the COLA is indicated, it will be incorporated into a future revision of the COLA.

There are no commitments in this letter.

If you have any questions regarding these responses, please contact me at (361) 972-7206, or Russell W. Kiesling at (361) 972-4716.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 7/20/2009

Mark McBurnett
Vice President, Oversight & Regulatory Affairs
South Texas Project Units 3 & 4

jwc

Attachment:

Question 05.04.02-1

Enclosure: CD containing GASPAR Calculation Package and XOQDOQ Input-Output Files

cc: w/o attachment except*
(paper copy)

Director, Office of New Reactors
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
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11545 Rockville Pike
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RAI 05.04.02-01

RAI 05.04.02-01:

QUESTION SUMMARY:

Provide the new X/Q and D/Q files and GASPAR input/output files in electronic form and provide associated revisions to impacted sections of the ER.

FULL TEXT (supporting information):

The applicant responded to Safety RAI 02.03.04-5 stating that new X/Qs and D/Qs will be recalculated based on an envelope surrounding the "power block". The applicant also responded to Safety RAI 02.03.05-8 stating: "In response to RAI 02.03.04-5, the long-term atmospheric dispersion estimates for routine releases are being recalculated and receptor distances listed in Table 2.3S-26 will be revised to be consistent with information from Revision 15 of the STP Offsite Dose Calculation Manual dated October 1, 2007." Provide the new X/Q and D/Q files and the GASPAR input/output files for staff review. Provide revised sections of the Environmental Report impacted by the changes described in the responses to RAI 02.03.04-5 and RAI 02.03.05-8.

RESPONSE:

The new X/Q and D/Q files and the GASPAR input/output files are included as an enclosure to this RAI response. The revised sections of the Environmental Report impacted by the changes described in the responses to RAI 02.03.04-5 and RAI 02.03.05-8 are provided below.

ER Section 2.7 Revisions

The fourth and fifth paragraphs of ER Subsection 2.7.5.1 will be revised as follows:

> The EAB and site boundary for STP 3 & 4 are shown in Figure 2.1-1. The EAB~~which~~ is an oval centered at a point (305 feet) directly west of the center of the STP 2 Reactor Building. Since the EAB is centered on the existing STP 1 & 2, the distance to the EAB from the ~~center of~~envelope surrounding the STP 3 & 4 power block is different for each directional sector. These distances are specified in Table 2.7-12. ~~To be conservative, the shortest distances in each direction to the EAB were determined as presented in Table 2.7-13.~~
>
> The LPZ is a 3-mile radius circle centered at the same point as the EAB (see Figure 2.1-1). The distances from the envelope surrounding the STP 3 & 4 power block to the LPZ are specified in Table 2.7-12. ~~Similarly, the shortest distances in each direction to the LPZ were determined as presented in Table 2.7-13.~~

The twelfth paragraph of Subsection 2.7.5.1 will be revised as follows:

To be conservative, the shortest distance in each sector from the STP 3 & 4 power block envelope~~reactor buildings to the EAB or the STP 4 reactor building~~ to the EAB was entered as input ~~for each downwind sector~~ to calculate the χ/Q values at the EAB. Similarly, the shortest distance from STP 3 & 4 power block envelope ~~reactor buildings~~ to the LPZ is entered as input to calculate the χ/Q values at the LPZ.

ER Subsection 2.7.5.2 will be revised as shown below:

2.7.5.2 PAVAN Modeling Results

The PAVAN 0.5% predicted maximum 0-2 hours EAB χ/Q value of 2.74E-04 is less than the corresponding DCD EAB χ/Q value of 1.37E-03. Similarly, the PAVAN 0.5% predicted maximum 0-2 hours LPZ χ/Q value of 5.27E-05 is less than the corresponding DCD LPZ χ/Q value of 4.11E-04. RG 1.145 states the reported χ/Q value should be the maximum sector χ/Q or the 5% overall site χ/Q, whichever is higher (Reference 2.7-31). Therefore the 0.5% sector-dependent values above were compared to the DCD because they are higher than the 5.0% overall site values.

While the 0.5% χ/Qs are the largest values and used as a comparison against the DCD, ~~The PAVAN modeling results for~~ the 50th percentile overall site χ/Q values at the EAB and the LPZ relative to the 0- to 2-hour time period, the annual average time period, and other intermediate time intervals evaluated by the PAVAN model are presented below.

Receptor Location	0–2 hours	0–8 hours	8–24 hours	1–4 days	4–30 days	Annual Average
EAB (sec/m^3)	~~4.20E-05~~ 8.18E-05	~~3.65E-05~~ 6.96E-05	~~3.40E-05~~ 6.42E-05	~~2.92E-05~~ 5.40E-05	~~2.35E-05~~ 4.20E-05	~~1.80E-05~~ 3.09E-05
LPZ (sec/m^3)	~~4.95E-06~~ 9.71E-06	~~3.54E-06~~ 6.30E-06	~~3.00E-06~~ 5.07E-06	~~2.08E-06~~ 3.17E-06	~~1.24E-06~~ 1.62E-06	~~6.54E-07~~ 7.09E-07

~~The PAVAN predicted maximum 0-2 hours EAB χ/Q (4.20E-05) is lower than the corresponding DCD EAB χ/Q value (1.37E-03). Similarly, the PAVAN predicted maximum 0-2 hours LPZ χ/Q value (4.95E-06) is lower than the corresponding DCD LPZ χ/Q value (4.11E-04).~~

The first paragraph of ER Subsection 2.7.6.1 will be revised as follows:

The NRC-sponsored XOQDOQ computer program, as described in, XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations NUREG/CR-2919 (Reference 2.7-36), is used to estimate χ/Q values due to routine releases of gaseous effluents to the atmosphere. The XOQDOQ computer code has the primary function of calculating annual average χ/Q values and annual average relative deposition (D/Q) values at receptors of interest (e.g., at the EAB,

site boundary, ~~and LPZ boundaries~~ and at the nearest milk cow, residence, vegetable garden, and meat animal). The χ/Q and D/Q values due to intermittent releases, which occur during routine operation, may also be evaluated using the XOQDOQ model.

The seventh and ninth bullets of the third paragraph of ER Subsection 2.7.6.1 will be revised as follows:

Minimum building cross-sectional area: 2,134 square meters (Reactor Building structure, including building tapers and all appurtenances)

Distances from the release point to the nearest residence, nearest EAB boundary, site boundary, vegetable garden, Unit 4 reactor and meat animal

The fourth paragraph of ER Subsection 2.7.6.1 will be revised as follows:

The ABWR reactor design has been used to calculate the minimum building cross-sectional area for evaluating building downwash as discussed in NUREG/CR-2919 (Reference 2.7-36). ~~The reactor building is a rectangular structure. Therefore, based on the width (56.6 meters) and height (37.7 meters) of the reactor building, the cross-sectional area of the reactor structure is calculated to be 2,134 meters squared.~~

The second paragraph of ER Subsection 2.7.6.2 will be revised as follows:

The overall maximum annual average χ/Q value (with no decay) is 8.3E-05 sec/m^3 and occurs at the STP 4 reactor due to the releases from the STP 3 reactor. The maximum annual average χ/Q values with no decay (along with the direction and distance of the receptor locations relative to the STP site) for the other sensitive receptor types are:

- ~~6.2E-07~~ 6.3E-07 sec/m^3 for the nearest residence occurring in the WSW sector at a distance of ~~2.19~~ 2.18 miles.
- Because the same shortest distance (~~2.19~~ 2.18 miles, in the WSW sector) was used to estimate χ/Q values for the nearest vegetable garden and meat animal, the same χ/Q value (~~6.2E-07~~ 6.3E-07 sec/m^3) was obtained at these receptors.
- ~~1.3E-05~~ 8.10E-06 sec/m^3 for the nearest ~~EAB~~site boundary occurring in the ~~NW~~NNW sector at a distance of ~~0.58~~ 0.69 miles.

Reference 2.7-37 in Section 2.7.8 will also be revised as shown below:

2.7-37 Offsite Dose Calculation Manual (~~ODCM~~ODCM), Revision ~~13~~15, South Texas Project, ~~January 1, 2006~~October 1, 2007.

ER Tables 2.7-12, 2.7-14, and 2.7-15 will be replaced in their entirety as shown below and on the following pages. ER Table 2.7-13 will be deleted.

Table 2.7-12 EAB and LPZ Distances from STP Units 3 & 4

Distance from STP Unit 3				
Directional Sector	To EAB (feet)	To EAB (meters)	To LPZ (feet)	To LPZ (meters)
N	3,431	1,046	14,180	4,323
NNE	3,831	1,168	14,761	4,500
NE	4,731	1,443	15,416	4,699
ENE	5,870	1,790	16,157	4,925
E	6,745	2,056	16,855	5,138
ESE	7,356	2,243	17,408	5,306
SE	7,381	2,250	17,697	5,395
SSE	6,567	2,002	17,672	5,387
S	6,112	1,863	17,337	5,285
SSW	5,973	1,821	16,759	5,109
SW	5,421	1,653	16,154	4,924
WSW	4,534	1,382	15,309	4,667
W	4,173	1,272	14,675	4,473
WNW	3,945	1,203	14,210	4,332
NW	3,638	1,109	13,978	4,261
NNW	3,497	1,066	13,996	4,267

TABLE 2.7-12 EAB and LPZ Distances from STP Units 3 & 4 (Continued)

Distance from STP 4				
Directional Sector	To EAB (feet)	To EAB (meters)	To LPZ (feet)	To LPZ (meters)
N	3,326	1,014	14,180	4,323
NNE	3,746	1,142	14,998	4,572
NE	4,943	1,507	15,970	4,868
ENE	6,519	1,987	16,945	5,165
E	7,648	2,332	17,760	5,414
ESE	8,208	2,502	18,257	5,565
SE	7,881	2,403	18,333	5,588
SSE	6,584	2,007	17,973	5,479
S	6,036	1,840	17,250	5,258
SSW	5,413	1,650	16,307	4,971
SW	4,499	1,372	15,320	4,670
WSW	3,558	1,085	14,433	4,400
W	3,273	998	13,770	4,198
WNW	3,201	976	13,396	4,084
NW	3,050	930	13,340	4,067
NNW	3,122	952	13,610	4,149

Table 2.7-12 EAB and LPZ Distances from STP Units 3 & 4				
Distance from Envelope Surrounding STP 3 & 4				
Directional Sector	**To EAB (feet)**	**To EAB (meter)**	**To LPZ (feet)**	**To LPZ (meter)**
N	2503	763	13304	4055
NNE	2572	784	13684	4171
NE	2815	858	14183	4323
ENE	3691	1125	14941	4554
E	5098	1554	15912	4850
ESE	6335	1931	16765	5110
SE	6611	2015	17287	5269
SSE	6106	1861	17241	5255
S	5650	1722	16486	5025
SSW	4911	1497	15545	4738
SW	3825	1166	14350	4374
WSW	3084	940	13701	4176
W	2746	837	13182	4018
WNW	2343	714	12874	3924
NW	2251	686	12831	3911
NNW	2464	751	13156	4010

Note: Distances to the EAB in Table 2.7-15 are different from those in Table 2.7-12. Distances in Table 2.7-15 are measured from the closer of the two Reactor Building plant stacks while those in Table 2.7-12 are measured from the power block envelope.

Table 2.7-13 will be deleted and the following text will be indicated in the COLA:

Table 2.7-13 [NOT USED]

~~Table 2.7-13 Shortest Distances from STP 3 & 4 to EAB and LPZ~~						
~~Directional Sector~~	~~Unit~~	~~To EAB (feet)~~	~~To EAB (meters)~~	~~Unit~~	~~To LPZ (feet)~~	~~To LPZ (meters)~~
~~N~~	~~4~~	~~3,326~~	~~1,014~~	~~3 & 4~~	~~14,180~~	~~4,323~~
~~NNE~~	~~4~~	~~3,746~~	~~1,142~~	~~3~~	~~14,761~~	~~4,500~~
~~NE~~	~~3~~	~~4,731~~	~~1,443~~	~~3~~	~~15,416~~	~~4,699~~
~~ENE~~	~~3~~	~~5,870~~	~~1,790~~	~~3~~	~~16,157~~	~~4,925~~
~~E~~	~~3~~	~~6,745~~	~~2,056~~	~~3~~	~~16,855~~	~~5,138~~
~~ESE~~	~~3~~	~~7,356~~	~~2,243~~	~~3~~	~~17,408~~	~~5,306~~
~~SE~~	~~3~~	~~7,381~~	~~2,250~~	~~3~~	~~17,697~~	~~5,395~~
~~SSE~~	~~3~~	~~6,567~~	~~2,002~~	~~3~~	~~17,672~~	~~5,387~~
~~S~~	~~4~~	~~6,036~~	~~1,840~~	~~4~~	~~17,250~~	~~5,258~~
~~SSW~~	~~4~~	~~5,413~~	~~1,650~~	~~4~~	~~16,307~~	~~4,971~~
~~SW~~	~~4~~	~~4,499~~	~~1,372~~	~~4~~	~~15,320~~	~~4,670~~
~~WSW~~	~~4~~	~~3,558~~	~~1,085~~	~~4~~	~~14,433~~	~~4,400~~
~~W~~	~~4~~	~~3,273~~	~~998~~	~~4~~	~~13,770~~	~~4,198~~
~~WNW~~	~~4~~	~~3,201~~	~~976~~	~~4~~	~~13,396~~	~~4,084~~
~~NW~~	~~4~~	~~3,050~~	~~930~~	~~4~~	~~13,340~~	~~4,067~~
~~NNW~~	~~4~~	~~3,122~~	~~952~~	~~4~~	~~13,610~~	~~4,149~~

Table 2.7-14 Distances to Sensitive Receptors					
	Distance to Nearest Milk Cow, Residence, Vegetable Garden, and Meat Animal (meters) from		Distance to Nearest Milk Cow, Residence, Vegetable Garden, and Meat Animal (meters) from		Closest of two (meters)
Direction	Center of 1 & 2	Center of 3 & 4	Unit 4	Unit 3	Unit 3 or 4
N	5,600	5,174	5,193	5,158	5,158
NNE	8,000	7,858	7,924	7,794	7,794
NE	8,000	8,000	8,278	8,066	8,000
ENE	8,000	8,000	8,585	8,324	8,000
E	8,000	8,000	8,805	8,531	8,000
ESE	5,600	6,387	8,585	6,262	6,262
SE	5,600	6,396	6,495	6,297	6,297
SSE	8,000	8,000	8,794	8,658	8,000
S	0	0	0	0	0
SSW	8,000	8,000	8,180	8,260	8,000
SW	7,200	7,112	7,027	7,198	7,027
WSW	4,000	3,632	3,517	3,748	3,517
W	7,200	6,561	6,425	6,698	6,425
WNW	6,400	5,619	5,490	5,747	5,490
NW	7,200	6,407	6,313	6,503	6,313
NNW	5,600	4,936	4,896	4,979	4,896

Notes: If distance is greater than 8,000 the distance is taken as 8,000
If a pathway is not applicable, the receptor distance is 0

Table 2.7-14 Distances to Sensitive Receptors

Direction	Distance to Nearest Milk Cow, Residence, Vegetable Garden, and Meat Animal (meters) from Center of Units 1 & 2	Distance to Nearest Milk Cow, Residence, Vegetable Garden, and Meat Animal (meters) from Unit 4	Distance to Nearest Milk Cow, Residence, Vegetable Garden, and Meat Animal (meters) from Unit 3	Closest of two (meters) Unit 3 or 4
N	5600	5193	5157	5157
NNE	8000	7932	7802	7802
NE	8000	8295	8083	8083
ENE	7200	7811	7549	7549
E	8000	8831	8557	8557
ESE	5600	6538	6287	6287
SE	5600	6517	6319	6319
SSE	8000	8768	8650	8650
S	0	0	0	0
SSW	8000	8177	8256	8177
SW	7200	7015	7185	7015
WSW	4000	3506	3734	3506
W	7200	6399	6673	6399
WNW	7200	6264	6521	6264
NW	7200	6292	6482	6292
NNW	5600	4884	4966	4884

Notes: If distance from Units 1 & 2 is greater than 8,000 meters the distance is taken as 8,000 meters.
If a pathway is not applicable, the receptor distance is 0.

Table 2.7-15 XOQDOQ Predicted Maximum χ/Q and D/Q Values at Receptors of Interest

	Type of Location	Direction from Site	Distance (miles)	X/Q (sec/m^3)
No Decay	EAB	NW	0.58	1.30E-05
	Residence	WSW	2.19	6.20E-07
	Meat Animal	WSW	2.19	6.20E-07
	Vegetable Garden	WSW	2.19	6.20E-07
	Unit 4 Reactor	WNW	0.17	8.30E-05
2.26-Day Decay	EAB	NW	0.58	1.30E-05
	Residence	WSW	2.19	6.20E-07
	Meat Animal	WSW	2.19	6.20E-07
	Vegetable Garden	WSW	2.19	6.20E-07
	Unit 4 Reactor	WNW	0.17	8.30E-05
8-Day Decay	EAB	NW	0.58	1.20E-05
	Residence	WSW	2.19	5.10E-07
	Meat Animal	WSW	2.19	5.10E-07
	Vegetable Garden	WSW	2.19	5.10E-07
	Unit 4 Reactor	WNW	0.17	8.00E-05
	Type of Location	**Direction from Site**	**Distance (miles)**	**D/Q (1/m^2)**
	EAB	NW	0.58	8.50E-08
	Residence	NNW	3.04	1.80E-09
	Meat Animal	NNW	3.04	1.80E-09
	Vegetable Garden	NNW	3.04	1.80E-09
	Unit 4 Reactor	WNW	0.17	3.40E-07

Table 2.7-15 XOQDOQ-Predicted Maximum χ/Q and D/Q Values at Receptors of Interest

	Type of Location	Direction from Site	Distance (miles)	χ/Q (sec/m^3)
No Decay	EAB	NW	0.52	1.50E-05
	Site Boundary	NNW	0.69	8.10E-06
	Residence	WSW	2.18	6.30E-07
	Meat Animal	WSW	2.18	6.30E-07
	Vegetable Garden	WSW	2.18	6.30E-07
	Unit 4 Reactor	WNW	0.17	8.30E-05
2.26-Day Decay	EAB	NW	0.52	1.50E-05
	Site Boundary	NNW	0.69	8.10E-06
	Residence	WSW	2.18	6.20E-07
	Meat Animal	WSW	2.18	6.20E-07
	Vegetable Garden	WSW	2.18	6.20E-07
	Unit 4 Reactor	WNW	0.17	8.30E-05
8-Day Decay	EAB	NW	0.52	1.40E-05
	Site Boundary	NNW	0.69	7.30E-06
	Residence	WSW	2.18	5.10E-07
	Meat Animal	WSW	2.18	5.10E-07
	Vegetable Garden	WSW	2.18	5.10E-07
	Unit 4 Reactor	WNW	0.17	8.00E-05
	Type of Location	**Direction from Site**	**Distance (miles)**	**D/Q (1/m^2)**
	EAB	NW/NNW	0.52	1.00E-07
	Site Boundary	NNW	0.69	6.40E-08
	Residence	NNW	3.03	1.80E-09
	Meat Animal	NNW	3.03	1.80E-09
	Vegetable Garden	NNW	3.03	1.80E-09
	Unit 4 Reactor	WNW	0.17	3.40E-07

Note: Distances to the EAB in Table 2.7-15 are different from those in Table 2.7-12. Distances in Table 2.7-15 are measured from the closer of the 2 Reactor Building plant stacks while those in Table 2.7-12 are measured from the power block envelope.

ER Section 4.5 Revision

The fourth paragraph of ER Section 4.5.3.1 will be revised as follows:

> The construction location for STP 3 & 4 is farther away from STP 1 & 2 and the OSGSF than are the respective TLD stations where dose rates are measured from each source. The STP 1 & 2 Offsite Dose Calculation Manual (ODCM) indicates that the dose rate at a TLD from a given source may be extrapolated to another location as follows (Reference 4.5-6, Part B, Section 4.7):

The fifth bullet in the seventh paragraph of ER Section 4.5.3.1 will be revised as follows:

> In Table 4.5-9, direct radiation dose rates are determined as follows:
>
> - STP 3 – STP 3 must be considered as a source of direct radiation at the STP 4 construction site in the timeframe between STP 3 becoming operational and STP 4 becoming operational. The plant shielding design acceptance criteria for the ABWR specify a maximum dose rate due to direct and scattered radiation of 2.5 mrem/yr at the EAB. As indicated in Section 2.7, the distances from STP 3 to the EAB and to the STP 4 reactor are ~~0.58~~0.52 and 0.17 mile, respectively. Using Equation 4.5-1, the maximum dose rate to the STP 4 construction workers may be estimated as follows:
>
> $D_{STP4} = (2.5) * (~~0.58~~0.52/0.17)^2 = ~~29~~23$ mrem/yr

The third paragraph of ER Section 4.5.4.4 will be revised as follows:

> As indicated in Table 3.10-2, the peak workforce strength during any month of construction is 5950 people. Although this peak is scheduled to last for less than a year, it is conservatively assumed that the peak is maintained over the course of an entire year for the purpose of calculating the maximum annual workforce dose. Based on the TEDE dose rate of ~~18~~17 mrem/yr from Table 4.5-15, the maximum annual collective dose to the construction work force is estimated to be:
>
> (5950 people)(~~0.018~~0.017 rem) = ~~107~~101 person-rem

Reference 4.5-6 in Section 4.5.5 will be revised as shown below:

> 4.5-6 "Offsite Dose Calculation Manual (ODCM)," South Texas Project, Rev ~~14~~15.

ER Tables 4.5-9, 4.5-15, 4.5-16, 4.5-17, and 4.5-19 will be revised as shown below and on the following pages.

Table 4.5-9 Direct Doses to Construction Workers

Source	Distance from Source (ft)		Dose Rate (mrem/yr)		Annual Dose to Worker (mrem)
	To TLD Location	To Construction Location	TLD Location	Construction Location	
STP 1 & 2	600	2300	28	7.3	1.7
OSGSF	10	700	10	1.0	0.24
LTSF	–	700	–	1.0	0.24
OSF	–	–	–	1.0	0.24
STP 3	–	900	–	~~29~~23	~~6.9~~5.5
Total for STP 1 & 2	–	–	–	10	2.4
Total for STP 1, 2 & 3	–	–	–	~~39~~33	~~9.3~~7.9

Note: All doses are at the center of STP 4 construction area. The distance of 900 ft from STP 3 to STP4 corresponds to 0.17 mile (ER Section 2.7). The other distances are estimated from Figures 4.5-1, 4.5-2, and 4.5-3.

The dose rates at the TLD locations are based on Table 4.5-8, with a factor of two applied for conservatism.

STP 1 & 2 dose rate at the construction location is obtained using Equation 4.5-2. For the OSGSF, the construction location dose rate is estimated from a Monte Carlo calculation as this dose rate is higher than that based on the TLD measurement. The dose rate from the proposed LTSF is also based on a calculation. The dose from the OSF is an estimate.

STP 3 dose rate at the construction location is obtained using Equation 4.5-1. If the calculated dose rate at the construction location is less than 1 mrem/yr, it is rounded up to 1 mrem/yr. The annual doses are obtained by multiplying the construction location dose rates by the ratio of 2,080 hr/yr to 8,760 hr/yr.

Table 4.5-15 Construction Worker Annual Dose Summary

Pathway	Annual Dose (mrem)		
	Total Body	Critical Organ	TEDE
Direct Radiation	~~9.37.9~~	–	~~9.37.9~~
Gaseous Effluents	8.3	18	8.9
Liquid Effluents	0.032	0.032	0.042
Total	~~1816~~	18	~~1817~~

Note: The individual pathway doses are from Tables 4.5-9, 4.5-13, and 4.5-14. Although the critical organs are different for the gaseous and liquid effluent pathways, they are conservatively added. Direct radiation to critical organ is not measured.

Table 4.5-16 Comparison of Annual Doses with 10 CFR 20.1201 Criteria for Occupational Doses

Organ	Annual Dose (rem)	
	Worker	Limit
TEDE	~~0.0180.017~~	5
Organ other than lens of the eye	0.018	50
Lens of the eye	0.018	15
Skin	0.017	50

Note: The doses for TEDE and organ other than lens of the eye are from Table 4.5-15.

The skin dose is from Table 4.5-13.

The dose to the lens of the eye is assumed to be the critical organ dose from Table 4.5-15.

Table 4.5-17 Comparison of Annual Doses with 10 CFR 20.1301 Criteria for Members of the Public

Criteria	Worker	Limit
Annual Dose (mrem TEDE)	~~18~~17	100
Unrestricted area dose rate (mrem/hr)	~~0.0088~~0.0081	2

Note: The annual worker dose is from Table 4.5-15. The unrestricted dose rate is obtained by dividing the annual dose by the exposure time of 2,080 hr/yr.

Table 4.5-19 Comparison of Annual Doses with 40 CFR 190.10 Criteria for Members of the Public

	Annual Dose (mrem)	
Organ	Worker	Limit
Whole body	~~18~~16	25
Thyroid	18	75
Other organ	18	25

Note: The annual worker doses are from Table 4.5-15.

ER Section 5.4 Revision

Section 5.4.1 will be revised as follows:

Radioactive liquids and gases would be discharged to the environment during normal operation of STP 3 & 4. The released quantities have been estimated in Tables ~~12.2-20~~ 3.5-1 (~~gases~~liquids) and ~~12.2-22~~ 3.5-2 (~~liquids~~gases) ~~of the ABWR DCD~~. The impact of these releases and any direct radiation to individuals, population groups, and biota in the vicinity of the new units was evaluated by considering the most important pathways from the release to the receptors of interest. The major pathways are those that could yield the highest radiological doses for a given receptor. The relative importance of a pathway is based on the type and amount of radioactivity released, the environmental transport mechanism, and the consumption or usage factors of the receptor.

The exposure pathways considered and the analytical methods used to estimate doses to the maximally exposed individual (MEI) and to the population surrounding the new units are based on NRC Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR 50," Appendix I (Rev.1, October 1977) (Reference 5.4-1) and NRC Regulatory Guide (RG) 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of

Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," (Revision 1, July 1977) (Reference 5.4-2). An MEI is a member of the public located to receive the maximum possible calculated dose. The annual dose to each nearby receptor indicated in Section 2.7, corresponding to those in Table B4-6 (Reference 5.4-3) from the estimated new unit releases was calculated, and the maximum of those was denoted the MEI. The use of the MEI allows comparisons with established dose criteria to the public.

The second and fourth paragraphs of Section 5.4.1.2 will be revised as follows:

Section 2.7 describes the meteorological data, gives the dispersion and deposition factors, and gives the locations of the individual receptors (distance and direction) relative to STP 3 & 4. Those same receptors are described, with locations relative to STP 1 & 2, in Reference 5.4-3.

The spatial distribution of population was discussed in Section 2.5. The agricultural production for the 50 miles surrounding the site was obtained from 2002 National Census of Agriculture county data. The input parameters for the gaseous pathway are presented in Tables 5.4-2 and 5.4-3, and the receptor locations of maximum exposure, determined from GASPAR calculations are shown in Table ~~5.4-3~~ 5.4-4.

The second paragraph of Section 5.4.2.2 will be revised as follows:

The annual total body dose to the MEI is 0.35 mrem per unit as calculated by GASPAR to a child residing ~~2.19~~ 2.18 miles WSW of the new units that would be exposed through plume, ground, inhalation, and ingestion of locally grown meat and vegetables pathways. Milk consumption was not considered because, based on annual Land Use Census results (Reference 5.4-3), no milk animals are located within 5 miles of the plant. The maximum GASPAR calculated annual thyroid dose of 2.27 mrem per unit is to a child residing ~~3.04~~ 3.03 miles NNW of the new units. Experience at STP 1 & 2 (e.g., Reference 5.4-6), indicates that these calculations are likely conservative.

The first paragraph of Section 5.4.3 will be revised as follows:

In this section, the radiological impacts to individuals and population groups from liquid and gaseous effluents are presented using the methodologies and parameters specified in Subsection 5.4.1. Table 5.4-7 estimates the total body and organ doses to the MEI from liquid effluents and gaseous releases from STP 3 & 4 for analytical endpoints prescribed in 10 CFR 50, Appendix I. The MEI receptor age group and location are those described in Subsection 5.4.2, a teenager using Little Robbins Slough for liquid pathway doses to all organs except bone, a child using Little Robbins Slough for liquid pathway doses to bone, a child residing ~~2.19~~ 2.18 miles WSW of STP 3 & 4 for total body gaseous pathway doses, and a child residing ~~3.04~~ 3.03 miles NNW of STP 3 & 4 for gaseous doses to the thyroid. Appendix I design limits are prescribed in terms of dose from a single unit; doses from STP 3 & 4 are presented likewise. As the table indicates, the single-unit doses are below Appendix I limits.

Reference 5.4-3 will be revised in Section 5.4.6 as follows:

5.4-3 "Offsite Dose Calculation Manual," STP (South Texas Project), Revision 15, October 1, 2007.

Tables 5.4-4, 5.4-6, 5.4-7, 5.4-8, 5.4-9, and 5.4-10 will be revised as follows:

Table 5.4-4 Gaseous Pathway Receptor Locations

Receptor	Direction	Distance (miles)
Site boundary	NNW	~~0.58~~ 0.69
Maximally exposed individual (MEI), total body and all organs but thyroid	WSW	~~2.19~~ 2.18
MEI, thyroid	NNW	~~3.04~~ 3.03

Source: From GASPAR II (Reference 5.4-11) calculations of dose at nearby receptors (receptors given in Reference 5.4-3). Locations of maximum dose are reported above.

Table 5.4-6 Gaseous Pathway Doses for Maximally Exposed Individual [1]
Two Units (millirem per year)

PATHWAY	T.BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID [4]	LUNG	SKIN
PLUME	3.34E-01	3.34E-01	3.34E-01	3.34E-01	3.34E-01	1.73E-01	3.41E-01	9.24E-01
GROUND	4.72E-02	4.72E-02	4.72E-02	4.72E-02	4.72E-02	5.66E-02	4.72E-02	5.54E-02
VEGETABLE								
ADULT [2]	8.17E-02	8.07E-02	3.51E-01	8.81E-02	8.04E-02	1.66E+00	6.86E-02	6.69E-02
TEEN [2]	1.23E-01	1.22E-01	5.68E-01	1.40E-01	1.28E-01	2.11E+00	1.11E-01	1.08E-01
CHILD	2.76E-01	2.69E-01	1.36E+00	3.11E-01	2.89E-01	3.98E+00	2.62E-01	2.58E-01
MEAT								
ADULT	2.65E-02	3.60E-02	1.23E-01	2.75E-02	2.63E-02	7.98E-02	2.49E-02	2.46E-02
TEEN	2.18E-02	2.71E-02	1.04E-01	2.30E-02	2.20E-02	5.93E-02	2.10E-02	2.07E-02
CHILD	4.00E-02	4.22E-02	1.96E-01	4.17E-02	4.04E-02	9.34E-02	3.91E-02	3.88E-02
COW MILK [3]								
ADULT	4.16E-02	3.29E-02	1.48E-01	4.97E-02	4.35E-02	1.95E+00	2.87E-02	2.73E-02
TEEN	6.71E-02	5.69E-02	2.70E-01	8.89E-02	7.81E-02	3.10E+00	5.28E-02	4.99E-02
CHILD	1.44E-01	1.27E-01	6.63E-01	1.87E-01	1.68E-01	6.20E+00	1.26E-01	1.22E-01
INFANT [2]	2.86E-01	2.71E-01	1.29E+00	3.85E-01	3.29E-01	1.50E+01	2.62E-01	2.54E-01
GOAT MILK [3]								
ADULT	6.22E-02	3.19E-02	1.65E-01	7.67E-02	5.39E-02	2.55E+00	3.26E-02	2.81E-02
TEEN	8.66E-02	5.60E-02	3.03E-01	1.36E-01	9.61E-02	4.05E+00	6.00E-02	5.09E-02
CHILD	1.58E-01	1.27E-01	7.41E-01	2.66E-01	1.98E-01	8.09E+00	1.37E-01	1.23E-01
INFANT	3.00E-01	2.62E-01	1.42E+00	5.40E-01	3.79E-01	1.96E+01	2.81E-01	2.56E-01
INHAL								
ADULT	3.24E-03	4.27E-03	1.63E-03	4.81E-03	6.11E-03	1.49E-01	7.33E-03	2.06E-03
TEEN	3.50E-03	4.66E-03	2.25E-03	5.83E-03	7.59E-03	1.95E-01	1.01E-02	2.08E-03
CHILD	3.34E-03	3.53E-03	3.02E-03	5.42E-03	6.92E-03	2.41E-01	8.50E-03	1.84E-03
INFANT	2.07E-03	1.91E-03	2.25E-03	4.20E-03	4.34E-03	2.20E-01	6.11E-03	1.06E-03
SUM OF VIABLE PATHWAYS (CHILD)	7.01E-01	6.96E-01	1.94E+00	7.39E-01	7.18E-01	4.54E+00	6.98E-01	1.28E+00

[1] Maximally exposed individual for total body and all organs except thyroid is child resident, ~~2.19~~ 2.18 miles WSW of new units.

[2] Adult, teen and infant doses are presented as additional information.

[3] Cow milk and goat milk pathway doses are hypothetical for this location and are presented as additional information only; no milk animals are located within 5 miles of the plant.

[4] Maximally exposed individual for thyroid. Child resident ~~3.04~~ 3.03 miles NNW.

Ground level releases assumed.

Source: GASPAR II calculated pathway doses for locations indicated in footnotes [1] and [4] (see also Table 5.4-4).

Table 5.4-7 Comparison of Annual Maximally Exposed Individual Doses with 10 CFR 50, Appendix I Criteria

		Annual Dose	
Type of Dose	**Location**	**ABWR (per unit)**	**Limit**
Liquid effluent	Little Robbins Slough		
Total body (mrem) [5]		2.63E-4 [1]	3
Maximum organ – Bone (mrem)		1.15E-3 [7]	10
Gaseous effluent [2]	Site Boundary		
Gamma air (mrad) [6]		~~5.30~~ 3.30	10
Beta air (mrad)		~~6.85~~ 4.28	20
Total external body (mrem)		~~4.84~~ 3.20	5
Skin (mrem)		~~11.3~~ 7.25	15
Iodines and particulates [3] (gaseous effluents)			
Maximum organ – thyroid (mrem)	MEI	~~2.18~~ 2.19 [4]	15

[1] Teenager using Little Robbins Slough.

[2] ~~North-~~Northwest Site Boundary. Ground level releases assumed.

[3] Includes Tritium and Carbon-14 terrestrial food chain dose (and inhalation dose for calculation ease and conservatism), consistent with Table 1 of (Reference 5.4-1).

[4] Child eating home grown meat and vegetables. Difference between Table 5.4-7 and 5.4-8 thyroid dose is 0.087 millirem per unit from noble gases in the plume.

[5] One-one thousandth of a rem (roentgen equivalent man). For gamma and beta exposure, one mrem = one mrad.

[6] One-one thousandth of a rad (radiation absorbed dose), or 0.1 ergs per gram of biological mass.

[7] Child using Little Robbins Slough.

Source: GASPAR II and LADTAP II calculated doses.

Table 5.4-8 Comparison of Maximally Exposed Individual Doses with 40 CFR 190 Criteria – (millirem per year)

	STP 3 & 4 (ABWR)				STP 1 & 2 (Existing) [4]			Site Total	Regulatory Limit
	Direct Radiation	Liquid [1]	Gaseous	Total	Liquid	Gaseous	Total		
Total body	5.0	0.00025	0.70 [2]	5.70	0.0042	~~0.0072~~ 0.0080	~~0.011~~ 0.012	5.71	25
Thyroid	NA	0.00011	4.54 [3]	4.54	0.0041	~~0.0099~~ 0.0097	0.014	4.55	75
Other organ - bone	NA	0.0023	1.94 [2]	1.94	0.00077	~~0.00079~~ 0.0011	~~0.0016~~ 0.0019	1.94	25

[1] Child using Little Robbins Slough for shoreline activities and fishing.

[2] Residence with meat animal and vegetable garden, dose to child, ~~2.19~~ 2.18 miles WSW of new units (MEI).

[3] Residence with meat animal and vegetable garden, dose to child, ~~3.04~~ 3.03 miles NNW of new units (MEI).

[4] References 5.4-6 and 5.4-11. Same receptors as STP 3 & 4.

NA = Not applicable.

Table 5.4-9 Collective Total Body Doses within 50 Miles (person-rem per year)

	STP 3 & 4		STP 1 & 2	
	Liquid	**Gaseous**	**Liquid**	**Gaseous**
Noble gases	0	0.11	0	0.0018
Iodines and particulates	0.0030	0.14	0.00076	~~0.00043~~ 0.00042
Tritium and C-14	0.0000056	0.32	0.00068	0.017
Total [1]	0.0030	0.58	0.0014	0.019
Natural background [2]	1.85E5		1.85E5	

Source: STP 1 & 2 source terms from Reference 5.4-6. STP 3 & 4 source terms from Tables 3.5-1 and 3.5-2.

[1] Differences between sum of components and total is due to round off.

[2] Natural background dose is based on a dose rate of 360 mrem/person/yr and an estimated 2060 population of 514,003 (Table 2.5-2).

Table 5.4-10 Doses to Biota from Liquid and Gaseous Effluents – STP 3 & 4

	Dose (millirad per year)		
Biota	Liquid effluents [1]	Gaseous effluents [2]	Total
Fish	0.24	0	0.24
Invertebrate	0.55	0	0.55
Algae	0.14	0	0.14
Muskrat	0.21	~~12.42~~ 8.45	~~12.63~~ 8.66
Raccoon	0.13	~~14.67~~ 9.96	~~14.80~~ 10.09
Heron	0.18	~~12.42~~ 8.45	~~12.60~~ 8.63
Duck	0.29	~~14.67~~ 9.96	~~14.96~~ 10.25

[1] Using Little Robbins Slough water.

[2] Assumed residing at site boundary. Adult pathway doses from GASPAR for plume, vegetation ingestion (except herons and muskrats) and inhalation; ground exposure taken as twice adult. Relative Biological Effectiveness equals one.

ER Section 7.1 Revision

The following information provides a clarification regarding the Cleanup Water Line Break X/Q values in the ABWR DCD. In the 2008 response to RAI 7.1-2, STP acknowledged that the doses for the Cleanup Water Line Break in ER Table 7.1-12 were incorrect due to an error in the underlying doses in DCD Table 15.6-18 associated with a X/Q value of 1.37E-03 sec/m^3, described as "Chp 2" in the DCD. To address the error in the DCD, the doses in DCD Table 15.6-18 associated with a X/Q value of 2.29E-02 sec/m^3, described as "max" in the DCD, were used to calculate site-specific doses for the Cleanup Water Line Break. In Table 7.1-7 below, the site-to-DCD X/Q ratio is calculated based on the "max" DCD X/Q, and Table 7.1-12 is revised accordingly. Please note that use of the "max" DCD X/Q for the Cleanup Water Line Break supersedes the approach proposed in the response to RAI 7.1-2. The markups of Tables 7.1-12, 7.1-14, and 7.1-15 shown below supersede those provided in the response to RAI 7.1-2.

ER Tables 7.1-7 to 7.1-15 will be revised as shown on the following pages:

Table 7.1-7 Atmospheric Dispersion Factors

Location	Time (hr)	χ/Q (sec/m^3)		Ratio (Site/DCD)
		Site	DCD	
EAB – Cleanup Water Line Break	0 – 2	8.18E-05	2.29E-02	3.57E-03
EAB – Other	0 – 2	~~4.20E-05~~ 8.18E-05	1.37E-03	~~3.07E-02~~ 5.97E-02
LPZ – LOCA	0 – 8	~~3.54E-06~~ 6.30E-06	1.56E-04	~~2.27E-02~~ 4.04E-02
	8 – 24	~~3.00E-06~~ 5.07E-06	9.61E-05	~~3.12E-02~~ 5.28E-02
	24 – 96	~~2.08E-06~~ 3.17E-06	3.36E-05	~~6.19E-02~~ 9.43E-02
	96 – 720	~~1.24E-06~~ 1.62E-06	7.42E-06	~~1.67E-01~~ 2.18E-01
LPZ – Cleanup Water Line Break	0 – 8	6.30E-06	2.29E-02	2.75E-04
LPZ – ~~Non-LOCA~~ Other	0 – 8	~~3.54E-06~~ 6.30E-06	1.37E-03	~~2.58E-3~~ 4.60E-03

Notes:

The site χ/Q values are from Section 2.7.

The DCD χ/Q values are from the ABWR DCD (Reference 7.1-1, Tables 15.6-3, 15.6-7, 15.6-13, 15.6-18, and 15.7-11), based on "Chp 2" distance, with the exception of Table 15.6-18, which is based on "max" distance.

The DCD does not show LPZ doses for accidents other than LOCA. Site LPZ doses for these non-LOCA accidents, all of which have their activity releases terminated within 8 hr, are estimated by multiplying the DCD EAB dose by the ratio of site LPZ χ/Q to DCD EAB χ/Q shown in the last row above.

Table 7.1-8 Doses for Failure of Small Lines Carrying Primary Coolant Outside Containment

Location	Time (hr)	DCD Dose (Sv)		χ/Q Ratio (Site/DCD)	Site Dose (rem)	
		Whole Body	Thyroid		Whole Body	Thyroid
EAB	0–2	9.4E-04	4.8E-02	~~3.07E-02~~ 5.97E-02	~~2.9E-03~~ 5.6E-03	~~1.5E-01~~ 2.9E-01
LPZ	0–8			~~2.58E-03~~ 4.60E-03	~~2.4E-04~~ 4.3E-04	~~1.2E-02~~ 2.2E-02
	8–24					
	24–96					
	96–720					
	Total				**~~2.4E-04~~ 4.3E-04**	**~~1.2E-02~~ 2.2E-02**
Regulatory Limit (NUREG-0800, Subsection 15.6.2)					2.5	30

Note:

DCD doses are from the ABWR DCD (Reference 7.1-1, Table 15.6-3).

The DCD does not provide LPZ doses. The site LPZ doses are obtained by multiplying the DCD EAB doses by the ratio of LPZ χ/Q to DCD EAB χ/Q.

Table 7.1-9 Doses for Main Steam Line Break, Preexisting Iodine Spike

Location	Time (hr)	DCD Dose (Sv)		χ/Q Ratio (Site/DCD)	Site Dose (rem)	
		Whole Body	Thyroid		Whole Body	Thyroid
EAB	0 - 2	1.3E-02	5.1E-01	~~3.07E-02~~ 5.97E-02	~~4.0E-02~~ 7.8E-02	~~1.6E+00~~ 3.0E+00
LPZ	0 - 8			~~2.58E-03~~ 4.60E-03	~~3.4E-03~~ 6.0E-03	~~1.3E-01~~ 2.3E-01
	8 - 24					
	24 - 96					
	96 - 720					
	Total				~~**3.4E-03**~~ **6.0E-03**	~~**1.3E-01**~~ **2.3E-01**
Regulatory Limit (10 CFR 100.11)					25	300

Note:
DCD doses are from the ABWR DCD (Reference 7.1-1, Table 15.6-7).
The ABWR DCD does not provide LPZ doses. The site LPZ doses are obtained by multiplying the DCD EAB doses by the ratio of LPZ χ/Q to DCD EAB χ/Q.

Table 7.1-10 Doses for Main Steam Line Break, Equilibrium Iodine Activity

Location	Time (hr)	DCD Dose (Sv)		χ/Q Ratio (Site/DCD)	Site Dose (rem)	
		Whole Body	Thyroid		Whole Body	Thyroid
EAB	0–2	6.2E-04	2.6E-02	~~3.07E-02~~ 5.97E-02	~~1.9E-03~~ 3.7E-03	~~8.0E-02~~ 1.6E-01
LPZ	0–8			~~2.58E-03~~ 4.60E-03	~~1.6E-04~~ 2.9E-04	~~6.7E-03~~ 1.2E-02
	8–24					
	24–96					
	96–720					
	Total				~~**1.6E-04**~~ **2.9E-04**	~~**6.7E-03**~~ **1.2E-02**
Regulatory Limit (NUREG-0800, Subsection 15.6.4)					2.5	30

Note:
DCD doses are from the ABWR DCD (Reference 7.1-1, Table 15.6-7).
The ABWR DCD does not provide LPZ doses. The site LPZ doses are obtained by multiplying the DCD EAB doses by the ratio of LPZ χ/Q to DCD EAB χ/Q.

Table 7.1-11 Doses for Loss-of-Coolant Accident

Location	Time (hr)	DCD Dose (Sv)		χ/Q Ratio (Site/DCD)	Site Dose (rem)	
		Whole Body	Thyroid		Whole Body	Thyroid
EAB	0–2	4.1E-02	1.9E+00	~~3.07E-02~~ 5.97E-02	~~1.3E-01~~ 2.4E-01	~~5.8E+00~~ 1.1E+01
LPZ	0–8	1.0E-02	3.1E-01	~~2.27E-02~~ 4.04E-02	~~2.3E-02~~ 4.0E-02	~~7.0E-01~~ 1.3E+00
	8–24	8.0E-03	2.0E-01	~~3.12E-02~~ 5.28E-02	~~2.5E-02~~ 4.2E-02	~~6.2E-01~~ 1.1E+00
	24–96	1.1E-02	7.9E-01	~~6.19E-02~~ 9.43E-02	~~6.8E-02~~ 1.0E-01	~~4.9E+00~~ 7.5E+00
	96–720	9.0E-03	1.1E+00	~~1.67E-01~~ 2.18E-01	~~1.5E-01~~ 2.0E-01	~~1.8E+01~~ 2.4E+01
	Total	**3.8E-02**	**2.4E+00**		~~**2.7E-01**~~ **3.8E-01**	~~**2.5E+01**~~ **3.4E+01**
Regulatory Limit (10 CFR 100.11)					25	300

Note: DCD doses are from the ABWR DCD (Reference 7.1-1, Table 15.6-13)

Table 7.1-12 Doses for Cleanup Water Line Break Outside Containment

Location	Time (hr)	DCD Dose (Sv)		χ/Q Ratio (Site/DCD)	Site Dose (rem)	
		Whole Body	Thyroid		Whole Body	Thyroid
EAB	0–2	~~1.7E-04~~ 2.8E-03	~~1.7E-04~~ 3.0E-01	~~3.07E-02~~ 3.57E-03	~~5.2E-04~~ 1.0E-03	~~5.2E-04~~ 1.1E-01
LPZ	0–8			~~2.58E-03~~ 2.75E-04	~~4.4E-05~~ 7.7E-05	~~4.4E-05~~ 8.3E-03
	8–24					
	24–96					
	96–720					
	Total				**~~4.4E-05~~ 7.7E-05**	**~~4.4E-05~~ 8.3E-03**
Regulatory Limit (10 CFR 100.11)					25	300

Notes:

DCD doses are from the ABWR DCD (Reference 7.1-1, Table 15.6-18) based on the "max" χ/Q value.

The DCD does not provide LPZ doses. The site LPZ doses are obtained by multiplying the DCD EAB doses by the ratio of LPZ χ/Q to DCD EAB χ/Q.

Table 7.1-13 Doses for Fuel Handling Accident

Location	Time (hr)	DCD Dose (Sv)		χ/Q Ratio (Site/DCD)	Site Dose (rem)	
		Whole Body	Thyroid		Whole Body	Thyroid
EAB	0–2	1.2E-02	7.5E-01	~~3.07E-02~~ 5.97E-02	~~3.7E-02~~ 7.2E-02	~~2.3E+00~~ 4.5E+00
LPZ	0–8			~~2.58E-03~~ 4.60E-03	~~3.1E-03~~ 5.5E-03	~~1.9E-01~~ 3.4E-01
	8 –24					
	24–96					
	96–720					
	Total				~~**3.1E-03**~~ **5.5E-03**	~~**1.9E-01**~~ **3.4E-01**
Regulatory Limit (NUREG-0800, Subsection 15.7.4)					6	75

Note:
DCD doses are from the ABWR DCD (Reference 7.1-1, Table 15.7-11).
The DCD does not provide LPZ doses. The site LPZ doses are obtained by multiplying the DCD EAB doses by the ratio of LPZ χ/Q to DCD EAB χ/Q.

Table 7.1-14 Summary of Design Basis Accident EAB Doses

DCD Section	Accident	Site Dose (rem)			Dose Limit (rem)	
		Whole Body	Thyroid	TEDE	Whole Body	Thyroid
15.6.2	Failure of Small Lines Carrying Primary Coolant Outside Containment	~~2.9E-03~~ 5.6E-03	~~1.5E-01~~ 2.9E-01	~~7.3E-03~~ 1.4E-02	2.5	30
15.6.4	Main Steam Line Break	–	–	–	–	–
	Preexisting Iodine Spike	~~4.0E-02~~ 7.8E-02	~~1.6E+00~~ 3.0E+00	~~8.7E-02~~ 1.7E-01	25	300
	Equilibrium Iodine Activity	~~1.9E-03~~ 3.7E-03	~~8.0E-02~~ 1.6E-01	~~4.3E-03~~ 8.4E-03	2.5	30
15.6.5	Loss-of-Coolant Accident	~~1.3E-01~~ 2.4E-01	~~5.8E+00~~ 1.1E+01	~~3.0E-01~~ 5.9E-01	25	300
15.6.6	Cleanup Water Line Break Outside Containment	~~5.2E-04~~ 1.0E-03	~~5.2E-04~~ 1.1E-01	~~5.4E-04~~ 4.2E-03	25	300
15.7.4	Fuel-Handling Accident	~~3.7E-02~~ 7.2E-02	~~2.3E+00~~ 4.5E+00	~~1.1E-01~~ 2.1E-01	6	75

Notes:

The site doses and dose limits are taken from Tables 7.1-8 to 7.1-13.

The dose limits are from either NUREG-0800 or 10 CFR 100.11, as indicated in Tables 7.1-8 to 7.1-13.

Preexisting Iodine Spike and Equilibrium Iodine Activity are subsets of Main Steam Line Break.

All accidents meet the 10 CFR 50.34(a)(1)(ii) dose limit of 25 rem TEDE.

Table 7.1-15 Summary of Design Basis Accident LPZ Doses

DCD Section	Accident	Site Dose (rem)			Dose Limit (rem)	
		Whole Body	Thyroid	TEDE	Whole Body	Thyroid
15.6.2	Failure of Small Lines Carrying Primary Coolant Outside Containment	~~2.4E-04~~ 4.3E-04	~~1.2E-02~~ 2.2E-02	~~6.1E-04~~ 1.1E-03	2.5	30
15.6.4	Main Steam Line Break	–	–	–	–	–
	Preexisting Iodine Spike	~~3.4E-03~~ 6.0E-03	~~1.3E-01~~ 2.3E-01	~~7.3E-03~~ 1.3E-02	25	300
	Equilibrium Iodine Activity	~~1.6E-04~~ 2.9E-04	~~6.7E-03~~ 1.2E-02	~~3.6E-04~~ 6.4E-04	2.5	30
15.6.5	Loss-of-Coolant Accident	~~2.7E-01~~ 3.8E-01	~~2.5E+01~~ 3.4E+01	~~1.0E+00~~ 1.4E+00	25	300
15.6.6	Cleanup Water Line Break Outside Containment	~~4.4E-05~~ 7.7E-05	~~4.4E-05~~ 8.3E-03	~~4.5E-05~~ 3.2E-04	25	300
15.7.4	Fuel Handling Accident	~~3.1E-03~~ 5.5E-03	~~1.9E-01~~ 3.4E-01	~~8.9E-03~~ 1.6E-02	6	75

Notes:

The site doses and dose limits are taken from Tables 7.1-8 to 7.1-13.

The dose limits are from either NUREG-0800 or 10 CFR 100.11, as indicated in Tables 7.1-8 to 7.1-13.

Preexisting Iodine Spike and Equilibrium Iodine Activity are subsets of Main Steam Line Break.

All accidents meet the 10 CFR 50.34(a)(1)(ii) dose limit of 25 rem TEDE.

RAI 05.04.02-01

ER Section 10.5S.2.6 Revision

The second paragraph of Section 10.5S.2.6 will be revised as follows:

The calculated dose to a hypothetical maximally exposed individual member of the public from STP 1 & 2 in 2005 was ~~0.011~~ 0.012 millirem. The conservative (maximum) estimated dose to the maximally exposed individual from STP 3 & 4 is 5.70 millirem per year. Therefore, if the same hypothetical individual was the maximally exposed individual to all STP units, the total annual dose will be 5.71 millirem per year. The regulatory limit in 40 CFR Part 190 for exposure to an offsite member of the public is 25 millirem per year. Cumulative impacts to the maximally exposed individual from all four units will be SMALL and will not warrant mitigation.