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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
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South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Proposed Standard Departure from ABWR DCD Tier 2 Chapter 12

The attachment to this letter provides a proposed standard departure from the Advanced Boiling Water Reactor (ABWR) Design Control Document (DCD) Tier 2, Chapter 12 and the associated changes to the STP 3 & 4 combined license application (COLA).

The STP 3 & 4 COLA incorporates by reference from the generic ABWR DCD the information in Tier 2 Table 12.2-3b, "Gamma Ray Source Energy Spectra – Post-Operation Gamma Sources in the Core (pJ/W·s)," and Tier 2 Table 12.2-3c, "Gamma Ray Source Energy Spectra – Gamma Ray Sources External to the Core During Operation." To address apparent errors in the units in Table 12.2-3b and Table 12.2-3c, NINA proposes a Tier 2 standard departure in order to prevent the inadvertent use of the information with incorrect units. This restriction is intended to be in effect until the information in the tables is revised and the apparent errors in the units are corrected, as authorized by Section VIII.B.5 of Appendix A to 10 CFR Part 52.

Changes to the COLA where indicated will be incorporated into the next routine revision of the COLA following NRC acceptance of the proposed departure.

There are no commitments in this letter.

If you have any questions, please contact Scott Head at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

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NRO

STI 32865568

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

Executed on 5-5-11

Mark McBurnett
Senior Vice President, Oversight and Regulatory Affairs
Nuclear Innovation North America LLC

ccc

Attachment: STD DEP 12.2-1

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

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Standard Departure from ABWR DCD Tier 2 Tables 12.2-3b and 12.2-3c

NINA proposes a Tier 2 standard departure (STD DEP) from the ABWR DCD, Tier 2 Section 12.2, designated as STD DEP 12.2-1, which adds a footnote to Table 12.2-3b and Table 12.2-3c.

The purpose of the footnote in Table 12.2-3b and Table 12.2-3c is to address apparent errors in the units. It can be reasonably deduced that the units in Table 12.2-3b should be $J/s \cdot MW_t$ instead of $pJ/W \cdot s$, and that the units in Table 12.2-3c should be $pJ/cm^3/s/W_t$, instead of $pJ/cm^3/s/MW_t$. Because source terms of the appropriate magnitude were used in the design of the certified ABWR DCD, this error has no safety significance.

The apparent errors in units in the table information result in six orders of magnitude (1E-06) difference in the values in the tables. These extremely low values for source terms were not used for the ABWR DCD. Source terms of the appropriate magnitude were used in the design of the ABWR facility, including shielding design and equipment qualifications, as described in the certified ABWR DCD and approved ABWR DCD material. Examples supporting this conclusion include:

- Tier 2 Section 12.4 Dose Assessment, includes dose estimates for occupational exposure in the drywell and the Reactor Building, and explains why the effective dose rates are expected to be lower than typical dose rates at comparable locations for boiling water reactors.
- Tier 2 Subsection 12.4.5 Work at Power, provides a comparison of effective dose rates for a typical BWR and the ABWR design, which is also lower and within one order of magnitude.
- Tier 2 Appendix 3I Equipment Qualification Environmental Design Criteria, Subsection 3I.3.1.2 Radiation, provides Tables 3I-7 through 3I-11 that define radiation environment conditions for areas inside and outside the primary containment during plant normal operating conditions, including the Reactor Building. The evaluated conditions for the ABWR are consistent with values determined at other boiling water reactors (refer to NUREG-1503 Volume 1, Section 3.11.3).
- The gross properties of the ABWR shielding design, including containment and building walls, are consistent with the typical shielding design for a boiling water reactor and result in full power and shutdown operational radiation zones ranging from approximately 1 mrem/hr to greater than 100 mrem/hr in the Reactor Building, as shown in Tier 1 Section 3.2 Radiation Protection, and associated figures. These values are approximately within one order of magnitude of values for typical boiling water reactors.

In conclusion, by inspection of the general shielding requirements, expected operational dose rates, and environmental qualifications for equipment due to radiation environment, the apparent errors in the units in the tables were not used for the design of the ABWR.

To prevent the inadvertent use of the information with incorrect units, the footnotes state that the information in the tables shall not be used for detailed facility design, including shielding design and evaluation of equipment qualification, operational procedures, or as a basis for any changes to the final safety analysis report (FSAR).

Changes to the STP 3 & 4 COLA

STP 3 & 4 COLA Part 2, Tier 2 Section 12.2 and Tables 12.2-3b and 12.2-3c will be revised as shown below. Changes to the COLA are indicated by gray highlight, except that information in the tables that does not depart from the ABWR DCD is indicated by *italicized* font.

12.2 Radiation Sources

The information in this section of the reference ABWR DCD, including all subsections and tables, is incorporated by reference with the following departures and supplements.

STD DEP 12.2-1 (Tables 12.2-3b and 12.2-3c)

Table 12.2-3b Gamma Ray Source Energy Spectra – Post-Operation Gamma Sources in the Core* (pJ/W.s)‡

	Time after Shutdown			
Energy Bounds (pJ)	***0 s***	***1 day***	***1 week***	***1 month***
9.6E-01				
	1.3E+03	*1.6E-01*	*1.6E+00*	*1.6E-01*
6.4E-01				
	2.9E+03	*1.1E+00*	*7.4E-01*	*1.6E-01*
4.8E-01				
	1.7E+03	*9.1E-01*	*5.9E-01*	*1.6E-01*
4.2E-01				
	2.7E+03	*4.6E+01*	*2.7E+01*	*1.6E-01*
3.5E-01				
	3.4E+03	*7.2E+01*	*6.4E+00*	*8.0E-02*
2.9E-01				
	5.3E+03	*5.0E+02*	*3.4E+02*	*1.0E+02*
2.2E-01				
	5.9E+03	*3.7E+02*	*2.6E+02*	*1.8E+02*
1.4E-01				
	8.2E+03	*1.2E+03*	*6.1E+02*	*3.4E+02*
6.4E-02				
	1.9E+03	*2.9E-03*	*1.4E+02*	*5.8E+01*
1.6E-02				

* *Operating history of 3.2 years.*

‡ The information provided in this table shall not be used for detailed facility design, including shielding design and evaluation of equipment qualification, operational procedures, or as a basis for any changes to the final safety analysis report (FSAR).

Table 12.2-3c Gamma Ray Source Energy Spectra – Gamma Ray Sources External to the Core During Operation‡

	Gamma Ray Source pJ/cm³/s/MWt			
Energy Bounds (pJ)	*Zone H*	*Shroud*	*Zone 1*	*Vessel*
E > 1.60	*1.9E-07*	*2.7E-03*	*4.3E-09*	*3.0E-07*
1.28 < E < 1.60	*5.3E-04*	*41.7*	*1.2E-05*	*3.0E-04*
0.96 < E < 1.28	*0.14*	*76.9*	*2.4E-03*	*3.0E-03*
0.64 < E < 0.96	*8.3E-04*	*24.0*	*1.6E-05*	*8.2E-04*
0.32 < E < 0.64	*35.2*	*17.6*	*4.6E-02*	*8.3E-04*
0.16 < E < 0.32	*4.5E-03*	*7.7*	*6.1E-05*	*3.8E-04*
8.2E-02 < E < 0.16	*3.7E-03*	*4.6*	*5.0E-05*	*3.3E-04*
3.2E-02 < E < 8.2E-02	*1.1E-02*	*1.3*	*1.9E-04*	*3.3E-04*
E < 3.2E-02	*1.3E-04*	*0.30*	*2.6E-06*	*1.5E-05*

‡ The information provided in this table shall not be used for detailed facility design, including shielding design and evaluation of equipment qualification, operational procedures, or as a basis for any changes to the final safety analysis report (FSAR).

In order to document the impact of the new Tier 2 departure on the probabilistic risk assessment, STP 3 & 4 COLA Part 2, Tier 2 Section 19.2, Table 19.2-2, will be revised as shown below. Changes to the COLA are indicated by gray highlight.

Table 19.2-2 PRA Assessments of STP COLA Departures from ABWR DCD

Departure Number	Design Basis	US ABWR/STP Design Basis	Potential Impact on PRA (STP COLA Section)
Tier 2 (T2) Changes			
STD DEP 12.2-1 Gamma Ray Source Energy Spectra Tables	Apparent errors in the units in Tables 12.2-3b and 12.2-3c.	No changes to design basis.	No effect on the PRA, not modeled.

STP 3 & 4 COLA Part 7, Section 3.0 Departures Not Requiring Prior NRC Approval, will be revised as shown below. Changes to the COLA are indicated by gray highlight.

STD DEP 12.2-1, Gamma Ray Source Energy Spectra Tables

Description

Tier 2 Table 12.2-3b, "Gamma Ray Source Energy Spectra – Post-Operation Gamma Sources in the Core (pJ/W·s)," and Tier 2 Table 12.2-3c, "Gamma Ray Source Energy Spectra – Gamma Ray Sources External to the Core During Operation," are incorporated by reference from the generic ABWR DCD, as approved by Appendix A to 10 CFR Part 52. To address apparent errors in the units in the tables, this departure adds a footnote to each table in order to prevent the inadvertent use of the information with incorrect units. The footnotes state that the information in the tables is not to be used for detailed facility design or any changes to the FSAR.

Evaluation Summary

The footnotes are provided to address apparent errors in the units in Table 12.2-3b and Table 12.2-3c. It can be reasonably deduced that the units in Table 12.2-3b should be J/s·MW_t instead of pJ/W·s, and that the units in Table 12.2-3c should be pJ/cm^3/s/W_t, instead of pJ/cm^3/s/MWt. Because source terms of the appropriate magnitude, i.e., values with correct units, were used in the facility design, including shielding design and evaluation of equipment qualifications, for the certified ABWR DCD, this error has no safety significance.

This departure does not change the information provided in Tables 12.2-3b and 12.2-3c and approved by Appendix A to 10 CFR Part 52. The information in the tables is relevant to other information incorporated by reference from the ABWR DCD that relies on, is based on, or is developed consistent with the information in this table. The tables are not used to address any new information required to be provided by the applicant.

This change is not related to any significant error in the application, is not needed to ensure compliance with NRC regulations, is not needed to support other licensing-basis documents, and is not needed to address a significant vulnerability identified by probabilistic risk assessments.

This departure has been evaluated pursuant to the requirements in Section VIII.B.5 of Appendix A to 10 CFR Part 52. There is no impact on Tier 1 or Tier 2*, Technical Specifications, Bases of Technical Specifications, or operational requirements. Therefore, this departure has no adverse impact on the safety analysis and does not require prior NRC approval.