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U.S. Nuclear Regulatory Commission
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Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Renewed Facility Operating License Nos. DPR-71 and DPR-62
Docket Nos. 50-325 and 50-324
Response to Request for Additional Information Regarding License Amendment
Request to Relocation of Specific Surveillance Frequency Requirements to a
Licensee-Controlled Program

References:

1. Letter from William R. Gideon (Duke Energy) to U.S. Nuclear Regulatory Commission, *Application For Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee-Controlled Program*, dated December 21, 2015, ADAMS Accession Number ML16004A249
2. NRC E-mail Capture, *Brunswick Unit 1 and Unit 2 Request for Additional Information related to LAR to Relocation of Specific Surveillance Frequency Requirements to Licensee Controlled Program (CAC NOS. MF7206 and MF7207)*, dated June 15, 2016, ADAMS Accession Number ML16167A174
3. Letter from William R. Gideon (Duke Energy) to U.S. Nuclear Regulatory Commission, *Response to Request for Additional Information Regarding License Amendment Request to Relocation of Specific Surveillance Frequency Requirements to a Licensee-Controlled Program*, dated July 13, 2016, ADAMS Accession Number ML 16029A225

Ladies and Gentlemen:

By letter dated December 21, 2015 (i.e., Reference 1), Duke Energy Progress, Inc., submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed amendment would modify the Technical Specifications (TSs) by relocating specific surveillance frequencies to a licensee-controlled program with the implementation of Nuclear Energy Institute (NEI) 04-10, "Risk-Informed Technical Specification Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies." Additionally, the change would add a new program, the Surveillance Frequency Control Program, to TS Section 5.5, "Programs and Manuals." The changes are consistent with Nuclear Regulatory Commission (NRC) approved Technical Specification Task Force (TSTF) Standard Technical Specifications (STS) Change TSTF-425, "Relocate Surveillance Frequencies to Licensee Control - RITSTF Initiative 5b," Revision 3.

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On June 15, 2016, by electronic mail (i.e., Reference 2), the NRC provided a request for additional information (RAI) regarding the LAR. The proposed questions were discussed by telephone with the NRC on June 13, 2016. It was agreed that a response would be provided within 30 days of receipt of the RAI, except for Question 4.c to which a response will be provided within 60 days. Duke Energy's 30-day response was provided on July 13, 2016 (i.e. Reference 3). The 60-day response is provided in the Enclosure of this letter.

No new regulatory commitments are contained in this letter.

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 457-2487.

I declare, under penalty of perjury, that the foregoing is true and correct. Executed on August 15, 2016.

Sincerely,



William R. Gideon

MAT/mat

Enclosure:

1. Response to Request for Additional Information

cc (with Enclosures):

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Response to Request for Additional Information

By letter dated December 21, 2015 (i.e., Reference 1), Duke Energy Progress, Inc., submitted a license amendment request (LAR) for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The proposed amendment would modify the Technical Specifications (TSs) by relocating specific surveillance frequencies to a licensee-controlled program with the implementation of Nuclear Energy Institute (NEI) 04-10, "Risk-Informed Technical Specification Initiative 5b, Risk-Informed Method for Control of Surveillance Frequencies." Additionally, the change would add a new program, the Surveillance Frequency Control Program (SFCP), to TS Section 5.5, "Programs and Manuals." The changes are consistent with Nuclear Regulatory Commission (NRC) approved Technical Specification Task Force (TSTF) Standard Technical Specifications (STS) Change TSTF-425, "Relocate Surveillance Frequencies to Licensee Control - RITSTF Initiative 5b," Revision 3.

On June 15, 2016, by electronic mail (i.e., Reference 2), the NRC provided a request for additional information (RAI) regarding the LAR. The proposed questions were discussed by telephone with the NRC on June 13, 2016. It was agreed that a response would be provided to Question 4.c within 60 days. Duke Energy's 60-day response to the RAI is provided below.

NRC RAI 4.c:

The following RAIs apply to the internal fire F&Os reported in Table 3 of Enclosure 2 to the LAR:

- c. Resolution to F&O 1-36 related to SR QU-B2, QU-F2, QU-B3, FQ-B1 and FQ-F1 states that effective truncation values of $1E-09/\text{yr}$ for CDF and $1E-10/\text{yr}$ for LERF are used for scenario quantification. It further states that the process for establishing truncation limits does not demonstrate that the overall model results converge and SR QU-B3 is assessed as 'Not Met'. Please provide the results from a sensitivity analysis that expands the truncation levels to those comparable for internal events, typically at least $1E-12$ for CDF, as the necessary justification why the chosen truncation levels have no impact on the SFCP.

Response:

The requested sensitivity analysis differs from the typical truncation study performed for an Internal Events Probabilistic Risk Assessment (PRA). Unlike the Internal Events PRA where the model would be quantified for Core Damage Frequency (CDF)/Large Early Release Frequency (LERF) at a particular truncation level, the Conditional Core Damage Probability (CCDP)/Conditional Large Early Release Probability (CLERP) for the Fire PRA is separately quantified for each of several thousand individual scenarios at various truncation levels, and the applicable scenario specific event frequency is applied to the cutsets in post-processing to obtain CDF/LERF. To retain the fire risk insights in the cutsets, the model was quantified using the ONEs solution. During quantification of the Fire PRA, successively lower truncation levels were selected until either $\text{CCDP} = 1$ (i.e., at which point, there is no reason to lower truncation) or the practical limitations of the software were reached (i.e., at which point, it is not possible to lower truncation). As a result, the scenario specific combinations of scenario event frequency and chosen truncation level result in a distribution of effective truncation levels. The effective truncation for most scenarios was less than $1E-9/\text{yr}$ for CDF and less than $1E-10/\text{yr}$ for LERF. Because this was at least four orders of magnitude below the total risk, there was reasonable assurance that no significant accident sequence was inadvertently eliminated.

Since fire risk insights are not required for this sensitivity analysis, the Fire PRA was quantified using the TRUEs solution to demonstrate the truncation levels comparable to those used for the Internal Events PRA. For each risk metric, the cutset files from several thousand individual scenarios, each with a scenario specific effective truncation level, were merged to obtain a cutset file having a distribution of effective truncation levels. The effective truncation level for the merged cutset file for each risk metric was progressively raised to generate the following results.

Effective Truncation	BSEP 1 CDF		BSEP 1 LERF		BSEP 2 CDF		BSEP 2 LERF	
	#cutsets	Change	#cutsets	Change	#cutsets	Change	#cutsets	Change
1E-05/yr	0		0		0		0	
1E-06/yr	2		1		4		1	
1E-07/yr	32	76%	11	70%	40	56%	11	52%
1E-08/yr	345	44%	31	10%	286	31%	40	17%
1E-09/yr	2056	23%	107	4%	1652	16%	142	7%
1E-10/yr	10710	11%	685	4%	9521	8%	831	4%
1E-11/yr	52008	5%	4341	2%	47133	4%	4688	3%
1E-12/yr	235859	2%	24352	1%	212968	2%	25251	1%

The SFCP, therefore, is not affected by the chosen truncation levels because the fire PRA can be quantified at truncation levels where convergence is similar to internal events when the objective is to evaluate the risk impact of changes in surveillance frequency rather than to obtain fire risk insights.