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1CAN081605

August 29, 2016

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: General Updates
Adoption of National Fire Protection Association Standard NFPA-805
Arkansas Nuclear One, Unit 1
Docket No. 50-313
License No. DPR-51

Dear Sir or Madam:

By letter dated January 29, 2014 (Reference 1), Entergy Operations, Inc. (Entergy) submitted a request to amend the Arkansas Nuclear One, Unit 1 (ANO-1) Technical Specifications (TS) and licensing bases to comply with the requirements in 10 CFR 50.48(a), 10 CFR 50.48(c), and the guidance in Regulatory Guide (RG) 1.205, "Risk-Informed Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." The amendment request followed Nuclear Energy Institute (NEI) 04-02, "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program under 10 CFR 50.48(c)." This submittal described the methodology used to demonstrate compliance with, and transition to, National Fire Protection Association (NFPA)-805, and included regulatory evaluations, fire probabilistic risk assessments (PRAs), change evaluations, proposed modifications for non-compliances, and supporting attachments.

The NRC identified two examples of a Severity Level IV non-cited violation of License Condition 2.C(3)(b), "Fire Protection," for the failure to properly implement the risk-informed fire protection program and accurately capture component ignition frequencies in the fire PRA during the June 2016 ANO Triennial Fire Inspection (Reference 19). The inspectors noted that the ignition frequency for air compressors was approximately ten times lower than the generic fire frequency for air compressors outlined in NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities." In addition, exhaust fans of five horsepower or less were counted as ignition sources, contrary to the criteria established in NUREG/CR-6850 (including Supplement 1).

The ANO-1 request to transition to NFPA 805 (Reference 1) provided initial risk quantifications related to fire events with final values provided in letter dated March 25, 2016 (Reference 16). Because the aforementioned finding is related to risk quantifications, Entergy has performed a sensitivity analysis to determine risk impacts of the finding with respect to the overall fire risk quantifications previously submitted for ANO-1.

Entergy calculation CALC-08-E-0016-01, "Fire Probabilistic Risk Assessment Plant Partitioning and Fire Ignition Frequency Development," Revision 1, documents the ANO-1 fire ignition frequencies used to calculate the Core Damage Frequency (CDF) / Large Early Release Frequency (LERF) values that are currently under NRC review in support of the ANO-1 transition to NFPA 805. The CDF/LERF values submitted in the updated Attachment W (Reference 16) are documented in report PRA-A1-05-018, "ANO-1 Fire PRA Quantification Changes to Support Attachment W of the License Amendment Request (LAR)," Revision 0. Appendix F of PRA-A1-05-004, Revision 1, "ANO-1 Fire Scenarios Report," provides the original Hot Gas Layer (HGL) Non-Suppression Probability (NSP) calculations. These documents are impacted by the changes in the ignition frequencies associated with the non-cited violation discussed above.

Compressor Ignition Frequency

The first example described in the above NRC finding is related to the use of an erroneous alpha factor in the ignition frequency data documented in NUREG/CR-6850, Supplement 1, Fire Probabilistic Risk Assessment Methods Enhancements (Section 10.2), in the Bayesian update process for Bin 9 (Compressors). NUREG/CR-6850, Supplement 1, footnotes the Bin 9 alpha term as being an error. For simplicity, the results provided in this response conservatively replaced the Bin 9 Bayesian updated frequency used to support the updated Attachment W (Reference 16) with the mean Bin 9 ignition frequency value from NUREG/CR-6850, Supplement 1, (i.e., no Bayesian update was performed on the mean value).

Inclusion of ≤ 5 hp Motors

The second example described in the above NRC finding is related to the counting of additional ignition sources of motors of five horsepower or less. The inclusion of smaller sources into the fire ignition frequency calculation dilutes the overall frequency for each remaining ignition source within the same bin. However, the impact on CDF/LERF is typically inconsequential given that the risk reduction from removing the corresponding ignition source scenario reduces the overall plant risk calculated in the ANO-1 model.

As part of the extent of condition assessment, Entergy expanded the review from the identified fan motors listed in the NRC issued finding to review the inclusion criteria for the previously counted items listed in the following bins:

- Bin 14 (Electric Motors) – greater than 5 hp
- Bin 21 (Pumps) – greater than 5 hp
- Bin 23 (Transformers) – greater than 45 kVA
- Bin 26 (Ventilation Subsystems) – greater than 5 hp

The ignition sources in CALC-08-E-0016-01, Revision 1, which was used to generate the ignition frequencies for the CDF/LERF values submitted in the updated Attachment W (Reference 16), was reviewed to ensure the criteria for inclusion that was issued in Chapter 6 of NUREG/CR-6850, Supplement 1, were consistent with the approved guidance. A calculation to analyze the impact of the results of the review for these ignition sources resulted in a more realistic model and reduced conservatisms in the overall CDF/LERF calculations for ANO-1. This expanded review provided additional assurance of the insignificant impact on the risk insights and results provided in the updated Attachment W (Reference 16).

Summary

The resulting CDF/LERF associated with the two aforementioned examples is provided in the table below. The delta risk is not recalculated for this sensitivity analysis because, 1) the overall change in CDF and LERF risk has decreased when compared to the assumptions in the approved model of record, and 2) no new Variances from Deterministic Requirements or recovery actions have been added during evaluation of the NRC finding. The delta risk calculated in the most recently submitted Attachment W (Reference 16) remains conservative. The error associated with the alpha factor had no significant impact on the overall results. The combined effect of both sensitivities (erroneous alpha factor and ignition source inclusion criteria) resulted in a decrease in calculated risk for ANO-1.

Sensitivity Analysis Summary						
	Original CDF	Updated CDF	Difference	Original LERF	Updated LERF	Difference
Risk Summary	7.62E-05	7.53E-05	-9.41E-07	8.74E-06	8.74E-06	-3.70E-09

Note: Original CDF/LERF from the ANO-1 FRANC Model associated with PRA-A1-05-018, Revision 0.

Entergy has determined that the information, as detailed in this letter, does not invalidate the no significant hazards consideration included in the Reference 1 letter.

In accordance with 10 CFR 50.91(b)(1), a copy of this application is being provided to the designated Arkansas state official.

This letter contains no new commitments.

If you have any questions or require additional information, please contact Stephenie Pyle at 479-858-4704.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on August 29, 2016.

Sincerely,

ORIGINAL SIGNED BY CLAY C. WARREN

CCW/dbb

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REFERENCES:

1. Entergy letter dated January 29, 2014, *License Amendment Request to Adopt NFPA-805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2001 Edition)* (1CAN011401) (ML14029A438)

2. NRC letter dated May 5, 2015, *Arkansas Nuclear One, Unit 1 – Request for Additional Information Regarding License Amendment Request to Adopt National Fire Protection Association Standard 805* (TAC No. MF3419) (1CNA051501) (ML15091A431)

3. Entergy letter dated May 19, 2015, *Response to Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN051501) (ML15139A196)

4. Entergy letter dated June 16, 2015, *60-Day Response to Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN061501) (ML15167A503)

5. Entergy letter dated July 21, 2015, *90-Day Response to Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN071501) (ML15203A205)

6. Entergy letter dated August 12, 2015, *120-Day Response to Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN081501) (ML15224A729)

REFERENCES (continued):

7. NRC email dated September 8, 2015, *Arkansas Nuclear One, Unit 1 – 2nd Round Request for Additional Information - ANO-1 NFPA-805 LAR (TAC No. MF3419)* (1CNA091501) (ML15251A220)

8. Entergy letter dated September 22, 2015, *Round 2 Response to Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN091501) (ML15265A113)

9. NRC email dated October 6, 2015, *Arkansas Nuclear One, Unit 1 – 2nd Round Part 2 Request for Additional Information - ANO-1 NFPA-805 LAR (TAC No. MF3419)* (1CNA101501) (ML15280A114)

10. Entergy letter dated November 4, 2015, *Second Set of Round 2 Responses to Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN111501) (ML15308A452)

11. Entergy letter dated November 17, 2015, *Clarification of Response to Round 2 Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN111502) (ML15321A076)

12. NRC email dated January 12, 2016, *Arkansas Nuclear One, Unit 1 – 3rd Round Request for Additional Information - ANO-1 NFPA-805 LAR (TAC No. MF3419)* (1CNA011601) (ML16012A049)

13. Entergy letter dated January 15, 2016, *Response to Round 3 Request for Additional Information – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN011601) (ML16015A421)

14. NRC email dated February 3, 2016, *Arkansas Nuclear One, Unit 1 – PRA Integrated Analysis Request for Additional Information - ANO-1 NFPA-805 LAR (TAC No. MF3419)* (1CNA021601)

15. NRC email dated March 10, 2016, *Arkansas Nuclear One, Unit 1 – 4th Round Request for Additional Information - ANO-1 NFPA-805 LAR - TAC No. MF3419* (1CNA031601) (ML16070A131)

16. Entergy letter dated March 25, 2016, *Response to PRA RAI 03 – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN031602) (ML16088A299)

17. Entergy letter dated April 7, 2016, *Response to PRA RAI 19 – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN041601) (ML16099A057)

18. Entergy letter dated May 19, 2016, *Update to Tables S-1 and S-2 – Adoption of National Fire Protection Association Standard NFPA-805* (1CAN051602) (ML16145A349)

19. NRC letter dated August 4, 2016, *Arkansas Nuclear One – NRC Triennial Fire Protection Inspection Report (05000313/2016009 and 05000368/2016009)* (0CNA081603) (ML16218A299)