



**Nebraska Public Power District**

*Nebraska's Energy Leader*

NLS2000058  
June 29, 2000

U.S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

Gentlemen:

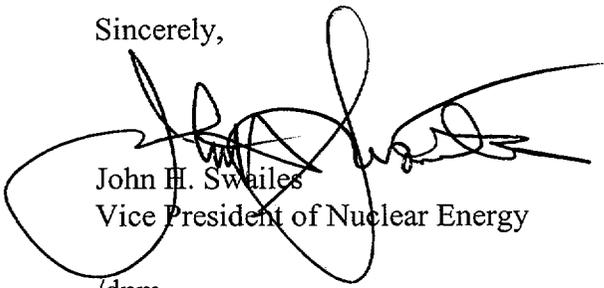
**Subject:** Response to Supplemental Request for Additional Information - Individual Plant Examination for External Events (IPEEE)  
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

**Reference:** Letter to J. H. Swailes (NPPD) from Lawrence J. Burkhart (USNRC) dated March 1, 2000, "Request for Additional Information Related to the Individual Plant Examination of External Events (IPEEE) for the Cooper Nuclear Station (TAC No. M83611)"

The purpose of this letter is to submit to the Nuclear Regulatory Commission (NRC) the Nebraska Public Power District's (District's) response to the Supplemental Request for Additional Information (RAI) dated March 1, 2000, referenced above. The attached response addresses RAI Question 3. As per discussions between the NRC Nuclear Reactor Regulation Project Manager for Cooper Nuclear Station (CNS) and the CNS Assistant Licensing Manager, the individual responses to RAI Questions 1 and 2 are still being developed. The District plans to submit the responses to the remaining questions no later than September 22, 2000.

Should you have any questions concerning this matter, please contact Sharon Mahler at 402-825-5236.

Sincerely,



John H. Swailes  
Vice President of Nuclear Energy

/dnm  
Attachments

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cc: Regional Administrator  
USNRC - Region IV

Senior Project Manager  
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector  
USNRC

NPG Distribution

**Nebraska Public Power District's Response to the NRC Staff's  
Supplemental Request for Additional Information  
Concerning Postulated Fire Scenarios Evaluated in the  
Individual Plant Examination for External Events for the  
Cooper Nuclear Station**

The following is the Nebraska Public Power District's (District's) response to Question 3 contained in the Nuclear Regulatory Commission's (NRC's) Supplemental Request for Additional Information (RAI), dated March 1, 2000 (Reference 1), concerning certain postulated fire scenarios discussed in the Individual Plant Examination for External Events (IPEEE) for the Cooper Nuclear Station (CNS)(Reference 2). References cited in the NRC's request and/or in the District's response are listed at the end. As per discussions between the NRC Nuclear Reactor Regulation Project Manager for CNS and the CNS Assistant Licensing Manager, the individual responses to RAI Questions 1 and 2 are still being developed. The District plans to submit the responses to the remaining questions no later than September 22, 2000.

The CNS IPEEE (Reference 2) was submitted to the NRC on October 30, 1996, in response to Generic Letter 88-20, Supplement 4 (Reference 3). The CNS IPEEE contains a systematic probabilistic assessment of potential plant vulnerabilities to postulated external events, including but not limited to internal fire scenarios, utilizing the Electric Power Research Institute (EPRI) Fire-Induced Vulnerability Evaluation (FIVE) methodology (Reference 4).

**Supplemental RAI 3:**

*Additional information is needed with respect to the response to the original RAI question A.10. The concern is associated with the assumption that the cables at CNS are as good or better than IEEE-383 qualified cables. The licensee cited previous tests and NRC licensing documents as supporting this assumption. A review of the licensing documents indicates that the only tests performed were associated with cable flammability. The IEEE-383 standard includes both a flammability test and aging and thermal performance tests associated with loss-of-coolant accidents. The flammability tests are acceptable in the context of dismissing self-ignited cable fires (this was one part of the question). However, flammability tests alone do not demonstrate that a given cable has the same thermal damage thresholds that one normally associates with fully qualified cables (this was the second part of the question).*

*The selection of thermal damage temperatures should consider the specific cable insulation materials associated with the cables at CNS or should bound the lower limit of thermal damage for unqualified cables.*

- (A) *It is not clear that cables are qualified equivalent to IEEE-383 (including thermal damage threshold criteria). Demonstrate that cables are qualified to a standard equivalent to IEEE-383 or provide the results of an assessment of the impact of using*

*thermal damage limits associated with unqualified cables (i.e., lower damage threshold than used in the original assessment) on quantitative screening of fire areas.*

(B) *If any damage scenarios in quantitatively screened compartments are impacted, please provide a reassessment of the CDF contribution for those compartments.*

**District Response to Supplemental RAI 3:**

In the District's response to Question A.10 of the original RAI (Reference 5), the District established a general position that qualification of Class 1E cables, as described in the CNS IPEEE submittal, is equivalent to IEEE-383 (Reference 6) qualified cables. The information below provides additional detail as to how this position was reached along with information that demonstrates the qualification status of these cables. In summary, IEEE-383 equivalency at CNS is based on the flammability tests and on aging and post accident performance tests.

In order to demonstrate full equivalency to IEEE-383, 1974, it may be stated that a cable is an "IEEE-383 qualified cable" if it meets the acceptance criteria of the flammability test, the accelerated thermal and radiation aging test, and the harsh environment test [LOCA simulation with specified environmental parameter profiles], in accordance with accepted test practices as standardized in IEEE-383.

Regarding the flammability threshold part of the original RAI Question A.10, the response previously provided (Reference 7) is restated here, for completeness. It states, in part: "Cooper Nuclear Station was constructed before the Standard "IEEE-383, 1974" had become a consensus standard. In accordance with Branch Technical Position 9.5-1, Appendix A, CNS submitted a letter on December 17, 1976, which detailed the specifications and testing performed on cable types present in safety related areas of CNS, in order to demonstrate the technical basis for equivalency to IEEE-383, 1974. This letter was accepted by the NRC in the Safety Evaluation Report for Fire Protection, associated with Technical Specification Amendment 56, dated May 23, 1979. Thus, the established equivalency to IEEE-383, 1974 was the basis for utilizing the qualified cable data in the IPEEE fire analysis."

Additionally, the NRC Safety Evaluation Report associated with License Amendment 56 (Reference 8) states, on Page 4-8, in Section 4.8, in part: "Flame tests conducted on the electrical cables at Cooper plant were comparable to the combustibility tests set forth in IEEE-383 . . . Accordingly, we find the electrical cables used at the Cooper plant acceptable." This addresses the aspect of qualification with regard to a minimum demonstrated flammability threshold and confirms the equivalency of flammability tests performed on CNS cables to those prescribed by IEEE-383, 1974.

To demonstrate equivalency to IEEE-383, 1974 with respect to aging and post accident tests, CNS cables have equivalent qualification to IEEE-323, 1971, which is the parent to IEEE-383. IEEE-323, 1971 describes the basic requirements for the qualification of Class I electrical

equipment (Section 1). The qualification requirements include confirmation of the adequacy of the equipment design under normal service conditions (Section 4.3) and special conditions, such as large signals, extreme power supply voltages, fire, water, seismic forces, radiation, chemical sprays, etc. The standard requires the range, sequence, and combinations of environment to simulate the design basis event conditions (Sections 5.2.3.5 and 5.2.3.6). IEEE-383 addresses "significant environmental conditions" specifically for Class 1E cable, such as "1.3.3.1 Atmosphere" (moisture content, temperature, pressure, etc.); "1.3.3.2 Radiation" (normal dosage, design basis event dose rate, total design basis event dosage); "1.3.3.3 Chemicals" (e.g., type, spray, temperature of exposure). At the time of the cable purchases, equivalent qualification to IEEE-323, 1971 was accomplished by exposing test specimens to thermal aging, radiation aging (40-year equivalency of normal radiation and thermal conditions, plus post accident radiation exposure) and exposure to LOCA test profiles, which included steam environment, increased pressures, chemical spray, and elevated temperatures. This addresses the aspect of qualification with regard to thermal and radiation aging and harsh environment tests performed on CNS cables to those prescribed by IEEE-383, 1974.

Thus, based on the equivalency of flammability tests as discussed above, and on the tests for harsh environment and aging, it is concluded that the essential cables at CNS are de facto "IEEE-383 qualified cables."

Regarding Question 3, Part (A), the thermal damage threshold value of 700<sup>0</sup> F [371<sup>0</sup> C], per the EPRI FIVE Methodology as being applicable to "IEEE-383 qualified cables," has been assigned correctly to the Class 1E cables at CNS. Regarding Question 3, Part (B), based on there being no impacted damage scenarios in quantitatively screened compartments, no reassessment for Core Damage Frequency contribution, based on the thermal damage threshold value, is required.

### **References**

1. Letter to J. H. Swailes (NPPD) from Lawrence J Burkhart (USNRC), dated March 1, 2000, "Cooper Nuclear Station - Supplemental Request for Additional Information Regarding IPEEE Fire Analysis (TAC No. M83611)"
2. Letter NLS960143 to USNRC Document Control Desk from G. R. Horn (NPPD), dated October 30, 1996, CNS PSA - IPEEE CNS Probabilistic Safety Assessment - "Individual Plant Examination for External Events"
3. Generic Letter No. 88-20, Supplement 4, dated June 28, 1991, "Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities, 10 CFR 50.54(f)"
4. EPRI TR-100370 "Fire-Induced Vulnerability Evaluation (FIVE)," prepared by Professional Loss Control of Vernon Hills, Illinois, for the Electric Power Research Institute in Palo Alto, California. Final Report, April 1992

5. Letter to G. R. Horn (NPPD) from James R. Hall (USNRC), dated June 3, 1998, "Request for Additional Information Related to the Individual Plant Examination of External Events (IPEEE) for the Cooper Nuclear Station (TAC No. M83611)"
6. IEEE Std 383-1974: "IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations". The Institute of Electrical and Electronics Engineers, New York City, New York, February 1974.
7. Letter NLS990008 to USNRC Document Control Desk from John H. Swailes (NPPD), dated January 28, 1999, "Response to Request for Additional Information - Individual Plant Examination for External Events (IPEEE) - Cooper Nuclear Station"
8. Letter to NPPD from USNRC dated May 23, 1979, "Fire Protection Safety Evaluation Report in the Matter of Nebraska Public Power District, Cooper Nuclear Station - Unit 1, Docket No. 50-298"
9. IEEE Std 323-1971: "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations". The Institute of Electrical and Electronics Engineers, New York City, New York, 1971

Correspondence Number: NLS2000058

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
The District plans to submit the responses to the remaining questions no later than September 22, 2000.	September 22, 2000