

April 7, 1997
LIC-97-0040

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, DC 20555

References: 1. Docket No. 50-285
2. Letter from NRC (L. R. Wharton) to OPPD (T. L. Patterson) dated June 13, 1996
3. Letter from OPPD (T. L. Patterson) to NRC (Document Control Desk) dated August 19, 1996

Subject: Use of 0.85 Heat Loss Factor in IPEEE Fire Analyses

Omaha Public Power District (OPPD) received a Request for Additional Information (RAI) dated June 13, 1996 from the Commission in response to our IPEEE submittal. One question, concerning the use of a heat loss factor (HLF), is repeated below:

On page 4-12 it is stated that 0.85 is used for a heat loss factor. This value is not approved by NRC staff. Please show the impact on IPEEE results if the original value of 0.7 is used.

The OPPD response to the RAI (Reference 3) discussed the conservatism in OPPD's PRA methodology and the justification for using the 0.85 HLF identified in the EPRI Fire Implementation Guide. On December 11, 1996, in a phone call involving OPPD and NRC/NRR staff, the NRC reviewers repeated their assertion that it was not appropriate for OPPD to use the 0.85 HLF since it was not "approved." The review could not be satisfactorily completed without resolution of this concern.

In response to the NRC's assertion that the 0.85 HLF is not approved and, therefore, not appropriate for use in the Fort Calhoun Station (FCS) IPEEE, OPPD has reviewed the issue. The following information is provided for consideration by the NRC staff in the completion of their review. The overall

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approach to the FCS IPEEE fire analyses was to first apply conservative, bounding assumptions followed by more realistic assumptions if required. This is illustrated in the initial approach to each scenario that assumed total loss of all the room or area components and then estimated the core damage frequency. If the estimated core damage frequency was above a $1\text{E-}07/\text{yr}$ screening value, then increasingly more realistic assumptions, within the framework established in the Fire Induced Vulnerability Evaluation (FIVE) and the EPRI Fire Probabilistic Risk Assessment (PRA) Implementation Guide, were applied.

The original FCS IPEEE submittal showed that the 0.85 HLF was used due to the evidence in the EPRI Fire PRA Implementation Guide suggesting that the 0.70 HLF provided in FIVE was a conservative value for bounding analyses. This was reiterated in OPPD's Reference 3 response to the NRC IPEEE RAI. Specifically, the EPRI Fire PRA Implementation Guide provides the following insight:

FIVE suggests 0.70 as a conservative value and 0.85 as a realistic value. The reference used in FIVE [10] provides test data that report values of 0.74 to 0.93 at 2.5 minutes (depending on the size of the fire source and enclosure) and 0.93 to 0.99 at 5 minutes. These values are cumulative over time and increase as temperature increases over time... We expect better values from COMPBRN because of concrete heat sinks (versus gypsum wall board in tests)... The EPRI Fire PRA recommends using at least 0.94 for times ≥ 5 minutes where the whole compartment is filled with HGL. However, smaller values (0.85) should be considered appropriate for exposure fire scenarios away from a wall and quickly developing hot gas layers (e.g., large flammable liquid pool fires).

To arrive at an appropriate HLF for FCS, plant-specific configurations must be considered. Specific to this issue is the fact that all of the rooms in FCS are concrete construction. The heat sink properties are similar to the insight regarding the difference between the test configuration and the expected conditions in nuclear power plants. Additionally, the FCS fire IPEEE analyses applied the 0.85 value to all fires, including the longer duration events and multi-compartment analyses where an even higher HLF may be appropriate. Based on the insights from the FIVE reference, this is a conservative approach. Therefore, considering the conservatism in the heat rate values used, OPPD

believes that the intent of GL 88-20, Suppl. 4 to identify plant specific vulnerabilities is fully met. Application of the 0.70 HLF would introduce excessive conservatism to the FCS fire IPEEE evaluations. The undesirable outcome of such an approach would be the masking of insights or inappropriate importance of selected fire scenarios.

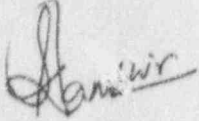
Despite this concern regarding a masking of results, OPPD has reviewed the use of the 0.85 HLF in the FCS fire IPEEE analyses. Fire modeling was only used in five (5) fire areas. A review of the fire modeling for these areas shows that the insights would not change if a HLF of 0.70 was applied. A major reason for this conclusion is that, as indicated above, the FCS approach to fire IPEEE was one of applying increasingly realistic assumptions. Therefore, the review performed here takes credit for some remaining conservatism in other parts of the analyses. It is noted that the fire modeling for the multi-compartment analyses was not reviewed. Since the timing for such scenarios involves longer duration fires, a higher HLF, such as 0.85, is clearly appropriate.

Because OPPD had chosen to develop a Fire PRA in response to the NRC's IPEEE request, more realistic assumptions were essential. FIVE, the original basis for the HLF of 0.70, was a conservative screening approach and not a PRA. As the NRC has identified in its PRA Policy Statement, PRAs should be realistic. Unnecessary conservatism is counterproductive in PRA because it can bias results and mask real contributors. Consequently, OPPD believes that, based on the available technical data, the use of 0.85 is appropriate for the FCS Fire PRA. OPPD does not plan to perform sensitivity analyses, beyond those summarized above.

To summarize, OPPD requests NRC concurrence that a 0.85 HLF is appropriate and realistic for the FCS IPEEE, and that NRC finalize review and approval of our fire IPEEE. Please contact me or Mr. Alan Hackerott at 402-533-7276 if you have any questions.

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Sincerely,

A handwritten signature in dark ink, appearing to read 'S. K. Gambhir', written in a cursive style.

S. K. Gambhir
Division Manager
Engineering & Operations Support

SKG/mah

c: Winston & Strawn
E. W. Mershoff, NRC Regional Administrator, Region IV
L. R. Wharton, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
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