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SUBJECT: Requests that NRC provide interpretation IAW 10CFR50.3 of certain aspects of 10CFR50.68, "Criticality Accident Requirements," as discussed.

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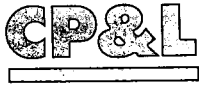
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Serial: RNP-RA/99-0099

United States Nuclear Regulatory Commission
Attn: Document Control Desk
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H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23

REQUEST FOR INTERPRETATION - 10 CFR 50.68

Sir or Madam:

Carolina Power & Light (CP&L) requests that the NRC provide an interpretation in accordance with 10 CFR 50.3 of certain aspects of 10 CFR 50.68, "Criticality accident requirements," as discussed below.

By letter dated April 23, 1997, CP&L requested an exemption from the requirements of 10 CFR 70.24 that require a criticality monitoring and alarm system and the implementation of emergency procedures, including evacuation drills. These measures are stipulated in areas where specified amounts of special nuclear materials are handled, used, or stored.

On November 12, 1998, the NRC published a revised final rule, effective December 14, 1998, giving licensees the option of either meeting the criticality accident requirements of paragraphs (a) through (c) of 10 CFR 70.24, or complying with requirements set forth in 10 CFR 50.68. By letter dated November 13, 1998, the NRC requested that CP&L review the need for the April 23, 1997, request for exemption from the requirements of 10 CFR 70.24 citing the publication of 10 CFR 50.68 (63 FR 63127).

It is the intent of CP&L to comply with the provisions of 10 CFR 50.68; however, clarification of two aspects of the rule are required. As a result of discussions with the NRC Project Manager in early 1999, it was concluded that a request for interpretation of 10 CFR 50.68 was needed to determine the ability of H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2 to meet the requirements of 10 CFR 50.68. The request and a discussion of the circumstances requiring the interpretation are provided in the Attachment to this letter.

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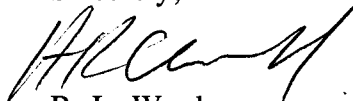
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If you have any questions concerning this matter, please contact Mr. H. K. Chernoff.

Sincerely,


for R. L. Warden
Manager - Regulatory Affairs

JSK/jsk

Attachment

c: NRC Resident Inspector, HBRSEP
R. Subbaratnam, NRC, NRR
L. A. Reyes, NRC, Region II

H. B. Robinson Steam Electric Plant, Unit No. 2
Request for Interpretation - 10 CFR 50.68

BACKGROUND

HBRSEP, Unit No. 2 received an operating license on July 31, 1970, and did not have criticality accident monitors as part of its original design. On November 5, 1974, the NRC promulgated 10 CFR 70.24, which required a criticality monitoring and alarm system in areas where special nuclear material is handled, used, or stored.

By letter dated April 23, 1997, (RNP-RA/97-0052), CP&L requested an exemption from the requirements of 10 CFR 70.24 that require a criticality monitoring and alarm system and the implementation of emergency procedures, including evacuation drills, in areas where specified amounts of special nuclear materials are handled, used, or stored. NRC letter dated July 22, 1997, requested additional information regarding the April 23, 1997, request for exemption. Specifically, the NRC letter requested information regarding how HBRSEP, Unit No. 2 met seven criteria concerning the handling, use and storage of special nuclear material.

CP&L provided a response to the request by letter dated August 27, 1997 (RNP-RA/97-0178). The response demonstrated that HBRSEP, Unit No. 2 would meet the criteria in the July 22, 1997, letter, with the exception of criterion 6. This criterion states: "Radiation monitors, as required by General Design Criterion 63, are provided in the fuel storage and handling areas to detect excessive radiation levels and to initiate appropriate safety actions." Since HBRSEP, Unit No. 2 was licensed prior to the issuance of the General Design Criteria listed in 10 CFR 50, Appendix A, GDC Criterion 63 is not part of the HBRSEP, Unit No. 2 licensing basis. HBRSEP, Unit No. 2 does, however, provide radiation monitors in fuel handling and storage areas as described in the Updated Final Safety Analysis Report, Section 11.5.

The NRC published a direct final rule (62 FR 63825) and a parallel proposed rule (62 FR 63911) amending 10 CFR 50 and 10 CFR 70 in the Federal Register on December 3, 1997. These rules would have provided licensees with the option of either meeting the criticality accident requirements of 10 CFR 70.24(a), or electing to comply with requirements that would be incorporated into 10 CFR 50.68. The statement of considerations for the direct final rule and the proposed rule stated that if significant adverse comments were received on the direct final rule, the NRC would withdraw the direct final rule and would address the comments in a subsequent final rule. Significant adverse comments were received from the public, and on February 25, 1998, the NRC published a notice withdrawing the direct final rule and revoking the regulation.

On November 12, 1998, the NRC published a revised final rule, effective December 14, 1998, to give licensees the option of either meeting the criticality accident requirements of paragraphs (a) through (c) of 10 CFR 70.24, or electing to comply with certain requirements that are set forth in 10 CFR Part 50.68. The requirements in 10 CFR 50.68 are generally the requirements that the NRC has used to grant specific exemptions from the requirements of 10 CFR 70.24. Additionally, certain changes were made to 10 CFR 70.24 to delete redundancy in the regulations and to define applicability of the regulations.

By letter dated November 13, 1998, the NRC requested that CP&L review the need for the April 23, 1997, request for exemption from the requirements of 10 CFR 70.24 citing the publication of the final rule (63 FR 63127).

HBRSEP, Unit No. 2 reviewed the provisions of the final rule. The review revealed that the criteria published in the final rule were similar to the criteria in the NRC's July 22, 1997, request for additional information regarding the April 27, 1997, exemption request with certain significant differences. As a result of discussions with the NRC Project Manager in early 1999, it was concluded that a request for interpretation was needed to determine the ability of HBRSEP, Unit No. 2 to meet the requirements of 10 CFR 50.68.

ITEMS FOR INTERPRETATION

10 CFR 50.68(b)(1)

10 CFR 50.68(b)(1) states: "Plant procedures shall prohibit the handling and storage at any one time of more fuel assemblies than have been determined to be safely subcritical under the most adverse moderation conditions feasible by unborated water."

At the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, analysis demonstrates that borated water is needed to maintain fuel safely subcritical during reactor offloading/loading, and during a fuel handling accident in the spent fuel pool.

In the reactor vessel, analysis demonstrates that criticality would be achieved with a boron concentration of less than or equal to 1213 ppm boron for Cycle 19, with all rods in and the most reactive rod stuck out. Technical Specifications require a boron concentration established in the Core Operating Limits Report (e.g., 1950 ppm during refueling outage 19) during refueling operations to preclude criticality and to provide additional margin.

In the spent fuel pool, analysis demonstrates the fuel will remain safely subcritical in unborated water during fuel storage. However, analysis also demonstrates that a boron concentration of 1000 ppm is required to maintain adequate safety margin during a fuel handling accident, and that criticality could result from a fuel handling accident in unborated water. Technical Specifications require a minimum boron concentration of 1500 ppm in the spent fuel pool during fuel handling.

Point for Interpretation

Is the wording of 10 CFR 50.68(b)(1) intended to apply to fuel handling and storage in the spent fuel pool, and in the reactor vessel, during operations that are conducted under analyzed conditions and in accordance with the plant's Technical Specifications?

10 CFR 50.68(b)(2) and (b)(3)

10 CFR 50.68(b)(2) states: "The estimated ratio of neutron production to neutron absorption and leakage (k-effective) of the fresh fuel in the fresh fuel storage racks shall be calculated assuming the racks are loaded with fuel of the maximum fuel assembly reactivity and flooded with unborated water and must not exceed 0.95, at a 95 percent probability, 95 percent confidence level. This evaluation need not be performed if administrative controls and/or design features prevent such flooding or if fresh fuel storage racks are not used."

10 CFR 50.68(b)(3) states: "If optimum moderation of fresh fuel in the fresh fuel storage racks occurs when the racks are assumed to be loaded with fuel of the maximum fuel assembly reactivity and filled with low-density hydrogenous fluid, the k-effective corresponding to this optimum moderation must not exceed 0.98, at a 95 percent probability, 95 percent confidence level. This evaluation need not be performed if administrative controls and/or design features prevent such moderation or if fresh fuel storage racks are not used."

At HBRSEP, Unit No. 2, analyses performed for the fresh fuel storage area are performed with the assumption that certain storage locations are administratively prohibited from containing fuel and as such are treated as "locked out."

Analysis demonstrates that the maximum k-effective achievable with accessible fuel racks loaded with fuel of the maximum fuel assembly reactivity and flooded with unborated water is less than 0.95, at a 95 percent probability, 95 percent confidence level. Similarly, analysis demonstrates that the maximum k-effective achievable with accessible fuel racks loaded with fuel of the maximum fuel assembly reactivity and filled with a low density hydrogenous fluid is less than 0.98, at a 95 percent probability, 95 percent confidence level.

These analyses, however, were not performed with the assumption that there is fuel in each of the storage racks. Technical Specifications require that certain storage positions be "locked out" to prevent achieving a geometry that would allow a k-effective of greater than 0.95, at a 95 percent probability, 95 percent confidence level when flooded with unborated water, and a k-effective of greater than 0.98, at a 95 percent probability, 95 percent confidence level when filled with a low density hydrogenous fluid. In this case, administrative controls are in place not to prevent flooding or moderation, but to assure an adverse fuel geometry is avoided.

Point for Interpretation

Does the phrase in 10 CFR 50.68(b)(2) and (b)(3), “racks are . . . loaded with fuel,” require that rack cells that are “locked out” by administrative controls be assumed to contain fuel for the purposes of the analysis required by 10 CFR 50.68(b)(2) and (b)(3)?