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Donald C. Cook Nuclear Plant Unit 2
Docket No. 50-316
License No. DPR-74
WAIVER OF COMPLIANCE REQUEST TO
TECHNICAL SPECIFICATIONS 3/4 1.2.8 and 3/4 5.5

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Attn: A. Bert Davis

January 23, 1992

Dear Mr. Davis:

The purpose of this letter is to confirm the results of a teleconference among American Electric Power Service Corporation (AEPSC), Indiana Michigan Power Company (I&M), NRC Region III, and NRR staffs on January 22, 1992. In this teleconference, AEPSC and I&M requested a Regional Waiver of Compliance from Technical Specifications 3/4 1.2.8 and 3/4 5.5 as they pertain to the boron concentration of the refueling water storage tank (RWST) for Donald C. Cook Nuclear Plant Unit 2. Currently, Unit 2 is in Mode 1. AEPSC/I&M requests that the upper limit of the requirement to have RWST boron concentration between 2,400 ppm and 2,600 ppm be temporarily waived on a one-time basis for 6 days to commence at 0630 EST on January 22, 1992, the time that boron concentration was first measured to be greater than the T/S limit. At the end of the six-day period, the existing T/S requirement will go back into effect. The basis for this request is provided below.

1. Technical Specifications for which a Waiver is Requested

Limiting Condition for Operation (LCO) 3.1.2.8.b.2 in Technical Specification 3/4 1.2.8 and LCO 3.5.5.b in Technical Specification 3/4 5.5 require that the boron concentration of the RWST be between 2,400 ppm and 2,600 ppm. The action statement requires: with the refueling water storage tank inoperable, restore the tank to operable status within one hour or be in at least hot standby within six hours, and in cold shutdown within the following 30 hours.

2. Circumstances Leading to the Request

On or about December 17, 1991, the Unit 2 RWST boron concentration was identified to management as a parameter outside self-imposed administrative limits. On January 3, 1992, the Operations and Chemistry Departments completed a plan of action for returning the Unit 2 RWST to within the administrative guidelines (2450-2550 ppm). This plan included a decision not to adjust the boron concentration during power operations.

On January 11, 1992, in accordance with normal operating procedures, the Unit 2 RWST level was raised from 91.5% to 95.5%. A blend of borated water was used to ensure minimal impact on boron concentration. This activity was accomplished to provide adequate volume in on-site water storage tanks to allow for storage and use of processed radioactive waste water. At the conclusion of this water addition to the RWST, the tank was sampled and the boron concentration was confirmed in specification at 2587 ppm. A check calculation made prior to commencing this activity also indicated that the boron concentration would not exceed the technical specification limit.

On January 20, 1992, a routine sample of the RWST for boron concentration identified the concentration at 2607 ppm, above the technical specification limit of 2600 ppm. As a result, the RWST was declared inoperable at 1245, and confirmatory samples were ordered. By 1338, double confirmatory samples had been drawn to verify the boron concentration was in specification (2,589 ppm and 2,595 ppm). In response to the unexpected elevated concentration, the Operations Superintendent directed that 2,000 gallons of primary water (<10 ppm boron) be added to the Unit 2 RWST and that the tank be recirculated. To ensure adequate mixing, a recirculation was started at 0429 on January 21, 1992, and completed at 0545 on January 22, 1992.

At 0630 on January 22, at the conclusion of RWST recirculation, a sample of the Unit 2 RWST was at 2628 ppm. Confirmatory samples were then drawn at several locations, which confirmed the out-of-specification boron concentration.

Corrective Actions Taken

At 0822 on January 22, 1992, a shutdown was commenced and an Unusual Event was declared. The Unusual Event was due to a

technical specification shutdown required by an action statement for an engineered safety feature system. The shutdown was terminated at 0940, based on receipt of a preliminary, verbal agreement that a waiver of compliance would be considered. At 1200, the Unusual Event was terminated on receipt of the temporary waiver of compliance.

The verbal waiver of compliance was granted, provided the following conditions were met:

- The plant must set bounds on tank boron concentrations. The high boron concentration was set at 2700 ppm, and the low boron concentration was set at 2400 ppm.
- With a containment spray (CTS) pump aligned to recirculate the Unit 2 RWST, no work was to be performed on the other train of CTS.
- Procedures should be in place to return the CTS pump aligned to recirculate the RWST to service during accident conditions.
- The waiver of compliance was granted for up to six days, or until the Unit 2 RWST boron concentration is returned to within the specifications, and no further mixing is required.
- Any anomalies in plant conditions associated with the RWST boron would be promptly communicated to the NRC Resident Inspector.

The above conditions have been met.

In response to the elevated boron concentration, a process for dilution, recirculation, and increased sampling was begun immediately. The dilutions were based on independently verified bounding calculations to ensure that the technical specification limits for low boron concentration were not violated. In addition, preparations were taken to add the dilution volume in steps to permit re-circulation of the tank during dilution. By 1046 on January 22, 1992, sufficient primary water had been added and recirculation started, utilizing the west containment spray pump, to ensure that the RWST boron concentration was within technical specification limits. By 1200, initial samples taken at the west containment spray pump discharge indicated approximately 2560 ppm. Tank recirculation and confirmatory samples continue.

Cause

On January 22, 1992, an engineering review of the Unit 2 RWST, primary water storage tank (PWST), and middle boric acid storage tank (BAST) level changes and initial boron concentrations of the tanks during the January 11, 1992 blend to the Unit 2 RWST was made. An upper bound was calculated for the maximum boron concentration, indicating it could have been as high as 2,611 ppm. To reach this concentration, a blend concentration of about 3,600 ppm would have been needed. A sample taken during the blending indicated concentration of 2,650 ppm. The blend concentration was reduced after that sample. Considering this calculation, the plant believes that the sample results on January 20, 1992 of 2,607 ppm, 2,589 ppm, and 2,595 ppm were reasonable. Preliminary review by plant personnel indicates that the 2,644 ppm boron concentration in the Unit 2 RWST was most likely contributed to by the introduction of boric acid plated out on the RWST wall above the initial water level, and/or stratification caused by the increased level and/or temperature changes caused by subsequent recirculation. We will be investigating all credible and potential contributors and sequences to this event.

Preventive Action

As a result of the review of this event, plant management will increase attention to maintaining the RWST boron concentration within the administrative limits to ensure that normal tank level changes do not increase the RWST boron concentration above the technical specification high limit.

In addition, we believe that, had the RWST administrative limits and the action plan to reduce the Unit 2 RWST boron concentration below the administrative limit been communicated to operating shift personnel, the Unit Supervisor would not have elected to blend to the RWST on January 11, 1992. Increased attention will be placed on communicating changes in performance standards to affected personnel.

3. Compensatory Measures

The upper limit for the RWST boron concentration is based on the calculation of post-LOCA sump pH and boron concentration. The key assumptions in this calculation are that the RWST boron concentration is equal to 2,600 ppm and the reactor coolant system (RCS) boron concentration is equal to 2,400 ppm. By

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taking credit for current operating conditions (i.e., near end of cycle, low boron concentration), we have determined that adequate margin exists in the design basis calculation to permit RWST concentrations to run as high as 2,872 ppm. Based on this calculation, we have conservatively implemented a temporary upper limit of 2,700 ppm for RWST boron concentration.

These results were obtained by a calculation performed by AEPSC. An RCS boron concentration of 700 ppm was used to conservatively reflect current core conditions (130 ppm at 100% power) in place of the 2,400 ppm RCS concentration assumed in the design basis calculation. The calculation conservatively shows that, as long as the RCS boron concentration remains below 700 ppm, the boron concentration in the RWST may be up to 2,700 ppm without impacting the results of the original analysis. The present RCS boron concentration is approximately 124 ppm.

The validity of the hot leg recirculation switchover time is ensured by the same reasoning. Also, the containment spray pH will be within its design basis during injection using the RWST with 2,700 ppm boron.

In addition, with regard to reactivity control, RWST boron concentrations greater than the 2,600 ppm limit are conservative.

4. Preliminary Evaluation of Safety Significance and Potential Consequences

The granting of this temporary waiver will preclude unnecessary thermal cycling of the primary system. As stated in Section 4.1.4 of the UFSAR, the RCS components were designed to withstand the effects of cyclic loads due to reactor system temperature and pressure changes. However, the UFSAR further states that, ideally, heatup and cooldown should occur only before and after refueling. The integrity of the reactor vessel and other components of the primary system of a nuclear plant can be adversely affected by the number of thermal transients that they are subjected to during their lifetime. As each additional thermal transient can affect this integrity, it is prudent to avoid such transients as long as the health and safety of the public is preserved. The number of thermal and loading cycles used for design purposes is given on page 4.1-10 of the UFSAR.

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Furthermore, given the current RCS boron concentration, the conclusions of the original post-LOCA sump pH and boron concentration analysis remain valid.

5. Justification for the Duration of the Request

From past operating experience, we know that it can take up to two days for the RWST boron concentration to come into equilibrium after the addition of borated water. To verify the accuracy of the measurements of the boron concentration in the RWST, current plans are to obtain samples from the RWST through the top enclosure on the tank. As this activity is not typically performed at Cook Nuclear Plant, time will be required to adequately plan this task and to give due consideration to potential inclement weather conditions.

6. No Significant Hazards Consideration Analysis

We have evaluated the proposed waiver of compliance and have determined that it does not represent a significant hazards consideration based on the criteria established in 10CFR50.92(c). Operation of Unit 2 in accordance with the proposed waiver of compliance will not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated.

Although the proposed waiver of compliance relaxes the upper limit on the allowable boron concentration in the RWST, it does not create a significant increase in the probability or consequences of an accident previously evaluated. As previously discussed, because Unit 2 is near the end of the current fuel cycle, the RCS boron concentration is relatively low. The post-LOCA sump boron concentration will be conservatively less than the values on which the minimum post-LOCA sump pH and the hot leg recirculation switchover time were based. Also, we have determined that the use of 2,700 ppm borated water during injection does not result in the spray pH being outside its design basis. In addition, increasing the boron concentration beyond 2,600 ppm provides additional margin to all other accidents analyzed in the UFSAR.

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(2) Create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed waiver does not create the possibility of a new or different kind of accident from any accident previously evaluated. The requested waiver would not result in changes to the parameters governing normal plant operation. Consequently, the proposed waiver of compliance does not create the possibility of a new or different kind of accident from any previously analyzed.

(3) Involve a significant reduction in a margin of safety.

The requested waiver would not involve a significant reduction in the margin of safety because adequate margin exists to the assumptions made in the post-LOCA sump pH and hot leg recirculation switchover time calculations, the use of 2,700 ppm borated water in the containment spray system has been determined to be acceptable, and the presence of additional boron in the RWST provides additional margins of safety to all other related accident analyses.

Lastly, we note that the Commission has provided guidance concerning the determination of significant hazards by providing certain examples (48 FR 14870) of amendments (changes) considered not likely to involve a significant hazards consideration. The sixth of these examples refers to changes that may result in some increase to the probability of consequences of a previously analyzed accident, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan. We believe that the proposed waiver of compliance falls within the scope of this example.

7) Environmental Impact

This request does not involve a change in the installation or use of the facilities or components located within the restricted areas as defined in 10 CFR 20. AEPSC has determined that this temporary waiver of compliance involves no significant increase in the amounts, and no significant changes in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. Accordingly, this temporary waiver of compliance meets the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c)(9). Pursuant to 10 CFR 50.22(b) no environmental

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impact statement or environmental assessment need be prepared in connection with the granting of the temporary waiver of compliance.

This letter has been reviewed by the Plant Nuclear Safety Review Committee and will be reviewed by the Nuclear Safety and Design Review Committee at their next regularly scheduled meeting.

This document has been prepared following Corporate procedures that incorporate a reasonable set of controls to ensure its accuracy and completeness prior to signature by the undersigned.

Sincerely,



E. E. Fitzpatrick
Vice President

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