

September 22, 1997

Mr. Oliver D. Kingsley, Jr.  
President, TVA Nuclear and  
Chief Nuclear Officer  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

SUBJECT: ENVIRONMENTAL ASSESSMENT RELATED TO ACCEPTANCE CRITERIA FOR FRACTURE PREVENTION MEASURES FOR LIGHTWATER NUCLEAR POWER REACTORS FOR NORMAL OPERATION, WATTS BAR NUCLEAR PLANT, UNIT 1 (TAC NO. M99063)

Dear Mr. Kingsley:

Enclosed for your information is a copy of an "Environmental Assessment and Finding of No Significant Impact." This notice relates to your application dated June 20, 1997, requesting an exemption from the requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention for Lightwater Nuclear Power Reactors for Normal Operation."

This notice is being forwarded to the Office of the Federal Register for publication.

Sincerely,

ORIGINAL SIGNED BY:

Frederick J. Hebdon, Director  
Project Directorate II-3  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Environmental Assessment

cc w/enclosure: See next page

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

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A handwritten signature in cursive script, reading "Frederick J. Hebdon".

Frederick J. Hebdon, Director  
Project Directorate II-3  
Division of Reactor Projects I/II  
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Environmental Assessment

cc w/enclosure: See next page

Mr. Oliver D. Kingsley, Jr.  
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Environmental Review Coordinator  
345 Courtland Street, NE  
Atlanta, GA 30365

UNITED STATES NUCLEAR REGULATORY COMMISSIONTENNESSEE VALLEY AUTHORITYDOCKET NO. 50-390WATTS BAR NUCLEAR PLANT, UNIT 1ENVIRONMENTAL ASSESSMENT AND FINDING OFNO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an exemption from certain requirements of its regulations for amendment to Facility Operating License No. NPF-90, issued to Tennessee Valley Authority, (TVA), for operation of the Watts Bar Nuclear Plant (WBN), Unit 1, located in Rhea County, Tennessee.

ENVIRONMENTAL ASSESSMENTIdentification of Proposed Action:

The proposed action would allow the licensee to utilize the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Case N-514, "Low Temperature Overpressure Protection" to determine its low temperature overpressure protection (LTOP) setpoints and is in accordance with the licensee's application for exemption dated June 20, 1997. The proposed action requests an exemption from certain requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for Lightwater Nuclear Power Reactors for Normal Operation," to allow application of an alternate methodology to determine the LTOP setpoints for the Watts Bar Nuclear Plant.

Appendix G of the ASME Code requires that the P/T limits be calculated:

- (a) using a safety factor of two on the principal membrane (pressure) stresses.
- (b) assuming a flaw at the surface with a depth of one quarter (1/4) of the vessel wall thickness and a length of six (6) times its depth, and
- (c)

using a conservative fracture toughness curve that is based on the lower bound of static, dynamic, and crack arrest fracture toughness tests on material similar to the Watts Bar reactor vessel material.

In determining the PORV setpoint for LTOP events, the licensee proposed the use of safety margins based on an alternate methodology consistent with the proposed ASME Code Case N-514 guidelines. ASME Code Case N-514 allows determination of the setpoint for LTOP events such that the maximum pressure in the vessel will not exceed 110% of the P/T limits of the existing ASME Appendix G. This results in a safety factor of 1.8 on the principal membrane stresses. All other factors, including assumed flaw size and fracture toughness, remain the same. Although this methodology would reduce the safety factor on the principal membrane stresses, use of the proposed criteria will provide adequate margins of safety to the reactor vessel during LTOP transients.

The proposed alternate to the methodology of Appendix G is consistent with guidelines developed by the ASME Working Group on Operating Plant Criteria (WGOPC) to define pressure limits during LTOP events that avoid certain unnecessary operational restrictions, provide adequate margins against failure of the reactor pressure vessel, and reduce the potential for unnecessary activation of pressure relieving devices used for LTOP. These guidelines have been incorporated into Code Case N-514, "Low Temperature Overpressure Protection," which has been incorporated into Appendix G of Section XI of the ASME Code and published in the 1993 Addenda to Section XI. However, 10 CFR 50.55a, "Codes and Standards," and Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability" have not been updated to reflect the acceptability of Code Case N-514.

The philosophy used to develop Code Case N-514 guidelines is to ensure that the LTOP limits are still below the pressure/temperature (P/T) limits for normal operation, but allow the pressure that may occur with activation of pressure relieving devices to exceed the P/T limits, provided acceptable margins are maintained during these events. This philosophy protects the pressure vessel from LTOP events, and still maintains the Technical Specifications P/T limits applicable for normal heatup and cooldown in accordance with 10 CFR Part 50, Appendix G and Sections III and XI of the ASME Code.

The Need for the Proposed Action:

Pursuant to 10 CFR 50.60, all lightwater nuclear power reactors must meet the fracture toughness requirements for the reactor coolant pressure boundary as set forth in 10 CFR Part 50, Appendix G. Appendix G of 10 CFR Part 50 defines P/T limits during any condition of normal operation including anticipated operational occurrences and system hydrostatic tests, to which the pressure boundary may be subjected over its service lifetime. It is specified in 10 CFR 50.60(b) that alternatives to the described requirements in 10 CFR Part 50, Appendix G, may be used when an exemption is granted by the Commission under 10 CFR 50.12.

To prevent transients that would produce excursions exceeding the 10 CFR Part 50, Appendix G, P/T limits while the reactor is operating at low temperatures, the licensee installed an LTOP system. The LTOP system includes pressure relieving devices in the form of power-operated relief valves (PORVs) that are set at a pressure below the LTOP enabling temperature that would prevent the pressure in the reactor vessel from exceeding the P/T limits of 10 CFR Part 50, Appendix G. To prevent these valves from lifting as a result of

normal operating pressure surges (e.g., reactor coolant pump (RCP) starting and shifting operating charging pumps) with the reactor coolant system in a solid water condition, the operating pressure must be maintained below the PORV setpoint.

In addition, to prevent damage to RCP seals, the operator must maintain a minimum differential pressure across the RCP seals. Hence, the licensee must operate the plant in a pressure window that is defined as the difference between the minimum required pressure to start an RCP and the operating margin to prevent lifting of the PORVs due to normal operating pressure surges. 10 CFR Part 50, Appendix G, safety margin adds instrument uncertainty in the LTOP setpoint. The licensee's current LTOP analysis indicates that using this 10 CFR Part 50, Appendix G, safety margin to determine the PORV setpoint would result in an operating window between the LTOP setpoint and the minimum pressure required for RCP seals which is significantly restricted when physical conditions such as PORV overshoot, RCP Delta Ps, and static head corrections are taken into account in setpoint determination. Operating with these limits could result in the lifting of the PORVs or damage to the RCP seals during normal operation. Using Code Case N-514 would allow the licensee to recapture most of the operating margin that is lost by factoring in the instrument uncertainties in the determination of the LTOP setpoint. The net effect of using Code Case N-514 is that the setpoint will not change significantly with the next setpoint analysis. Therefore, the licensee proposed that in determining the setpoint for LTOP events for Watts Bar, the allowable pressure be determined using the safety margins developed in an alternate methodology in lieu of the safety margins required by 10 CFR Part 50, Appendix G. The alternate methodology is consistent with the ASME Code

Case N-514. The content of this Code Case had been incorporated into Appendix G of Section XI of the ASME Code and published in the 1993 Addenda to Section XI.

An exemption from 10 CFR 50.60 is required to use the alternate methodology for calculating the maximum allowable pressure for LTOP considerations. By application dated June 20, 1997, the licensee requested an exemption from 10 CFR 50.60 to allow it to utilize the alternate methodology of Code Case N-514 to compute its LTOP setpoints.

Environmental Impacts of the Proposed Action:

The proposed action will not increase the probability or consequences of accidents, no changes are being made in the types of any effluents that may be released offsite, and there is no significant increase in the allowable individual or cumulative occupational radiation exposure. Accordingly, the Commission concludes that there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential nonradiological impacts, the proposed action involves features located entirely within the restricted area, as defined in 10 CFR Part 20. It does not affect nonradiological plant effluents and has no other environmental impact. Accordingly, the Commission concludes that there are no significant nonradiological environmental impacts associated with the proposed action.

Accordingly, the Commission concludes that there is no significant environmental impact associated with this action.

Alternatives to the Proposed Action:

Since the Commission has concluded there is no significant environmental impact associated with the proposed action, any alternatives with equal or

greater environmental impact need not be evaluated. As an alternative to the proposed action, the staff considered denial of the proposed action. Denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the alternative action are similar.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the Final Environmental Statement, Supplement No 1, for WBN Units 1 and 2, dated April 1995.

Agencies and Persons Consulted:

In accordance with its stated policy, on August 21, 1997 the staff consulted with the Tennessee State official, Mr. J. Graves of the Division of Radiological Health, regarding the environmental impact of the proposed action. The State official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

Based upon this environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment.

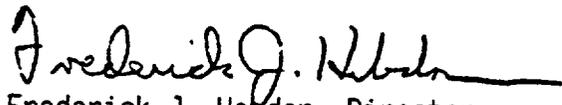
Accordingly, the Commission has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated June 20, 1997, which is available for public

inspection at the Commission's Public Document Room, the Gelman Building, 2120 L Street, NW., Washington, DC, and at the local public document room located at the Chattanooga-Hamilton County Library, 1001 Broad Street, Chattanooga, Tennessee.

Dated at Rockville, Maryland, this 22nd day of September 1997.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Heddon, Director  
Project Directorate II-3  
Division of Reactor Projects - I/II