

June 15, 1993

Docket Nos. 50-327
and 50-328

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President
Technical Support
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT
IMPACT FOR AN EXEMPTION FROM 10 CFR 50.60, "ACCEPTANCE
CRITERIA FOR FRACTURE PREVENTION MEASURES FOR LIGHT-WATER
NUCLEAR POWER REACTORS FOR NORMAL OPERATION" - SEQUOYAH
NUCLEAR PLANT, UNITS 1 AND 2 (TAC NOS. M86675 AND M86676)

Enclosed is the "Environmental Assessment and Finding of No Significant
Impact" related to your request for an exemption from certain requirements of
10 CFR 50.60, "Acceptance Criteria for Fracture Prevention Measures for
Lightwater Nuclear Power Reactors for Normal Operation," for the Sequoyah
Nuclear Plant Units 1 and 2. The request was submitted by letter dated
June 5, 1993, and requests an exemption from Appendices G and H to 10 CFR
Part 50 so that the American Society of Mechanical Engineers Code Case N-514,
"Low Temperature Overpressure Protection," may be used as an acceptable
alternative method to determine the acceptable low temperature overpressure
protection setpoints.

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-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Environmental Assessment

cc w/enclosure:

See next page *SEE PREVIOUS CONCURRENCE

SRXB*
RJones
6/10/93

OFC:	PDII-4/LA	PDII-4/PM	EMCB*	OGC*	PDII-4/D
NAME:	BClayton	DLaBarge:as	JStrosnider	BBordenick	FHebdon
DATE:	6/14/93	6/15/93	6/11/93	6/14/93	6/15/93

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Tennessee Valley Authority
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cc:

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UNITED STATES NUCLEAR REGULATORY COMMISSION

TENNESSEE VALLEY AUTHORITY

DOCKET NOS. 50-327 AND 50-328

ENVIRONMENTAL ASSESSMENT AND

FINDING OF NO SIGNIFICANT IMPACT

The U. S. Nuclear Regulatory Commission (the Commission) is considering issuance of an exemption from certain requirements of its regulations to Facility Operating License Nos. DPR-77 and DPR-79, issued to the Tennessee Valley Authority, licensee for the Sequoyah Nuclear Plant Units 1 and 2. The plants are located at the licensee's site in Hamilton County, Tennessee. The exemption was requested by the licensee by letter dated June 5, 1993.

ENVIRONMENTAL ASSESSMENT

Identification of Proposed Action:

The proposed action requests an exemption from certain requirements of 10 CFR 50.60, "Acceptance criteria for fracture prevention measures for light-water nuclear power reactors for normal operation," to allow application of an alternate methodology to determine the low temperature overpressure protection (LTOP) setpoint for the Sequoyah Nuclear Plant Units 1 and 2. The proposed alternate methodology is consistent with guidelines developed by the American Society of Mechanical Engineers (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 approved by the ASME Code Committee. NRC endorsement of the WGOPC methodology, and publication of the Code Case, are expected in the near future.

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 Specification P/T limits applicable for normal heatup and cooldown in accordance with Appendix G to 10 CFR Part 50 and Sections III and XI of the ASME Code.

The Need for the Proposed Action:

10 CFR 50.60 states that all light-water nuclear power reactors must meet the fracture toughness and material surveillance program requirements for the reactor coolant pressure boundary as set forth in Appendices G and H to 10 CFR Part 50. Appendix G to 10 CFR 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. 10 CFR 50.60(b) specifies that alternatives to the described requirements in Appendices G and H to 10 CFR Part 50 may be used when an exemption is granted by the Commission under 10 CFR 50.12.

To prevent transients that would produce pressure excursions exceeding the 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 low enough that if a transient occurred while the coolant temperature is below the LTOP enabling temperature, they would prevent the pressure in the reactor vessel from exceeding the Appendix G P/T limits. To prevent these valves from lifting as a result of normal operating pressure surges (e.g., reactor coolant pump starting, and shifting operating charging pumps) with the reactor coolant system in a water solid condition, the operating pressure must be maintained below the PORV setpoint. The P/T limits and operability requirements for the LTOP system are incorporated into Technical Specification 3.4.12.

The licensee has determined that the generic methodology used by Westinghouse Electric Corporation to calculate the LTOP setpoint for Sequoyah is deficient since it did not account for the differential pressure across the reactor core during reactor coolant pump operation. The resultant errors consist of: (a) static head differences between the reactor coolant system (RCS) wide range pressure transmitter sensing point and the referenced point of the Appendix G curves, (b) flow velocity induced pressure drops throughout the RCS, and (c) nozzle differential pressure drop. As a result, the analytically determined maximum pressure limits for LTOP events for a certain design basis condition exceeded the pressure limits of the 10 CFR 50 Appendix G curves. Therefore, the licensee proposed that in determining the PORV setpoint for LTOP events for Sequoyah, the allowable pressure be determined using the safety margins developed in an alternate methodology in lieu of the safety margins required by Appendix G to 10 CFR Part 50. The alternate methodology is consistent with ASME Code Case N-514 that is expected to be approved and published in the near future.

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 5, 1993, the licensee requested an exemption from 10 CFR 50.60.

Environmental Impacts of the Proposed Action:

The Commission has completed its evaluation of the licensee's application.

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

- (a) using a safety factor of 2 on the principal membrane (pressure) stresses,
- (b) assuming a flaw at the surface with a depth of one quarter of the vessel wall thickness and a length of six 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 Sequoyah reactor vessel material.

In determining the PORV setpoint for LTOP events, the licensee proposed to use safety margins based on an alternate methodology consistent with the proposed ASME Code Case N-514 guidelines. The ASME Code Case N-514 allows determination of the setpoint for LTOP events such that the maximum pressure in the vessel would 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. In addition, application of the Code Case would allow continued

operation with the present PORV setpoints and Technical Specification requirements.

Accordingly, the Commission concludes that this proposed action would result in no significant radiological environmental impact.

With regard to potential non-radiological impacts, the proposed change involves use of more realistic safety margins for determining the PORV setpoint during LTOP events. It does not affect non-radiological plant effluents and has no other environmental impact. Therefore, the Commission concludes that there are no significant non-radiological environmental impacts associated with the proposed exemption.

Alternative to the Proposed Action:

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 did not involve the use of any resources not previously considered in the Final Environmental Statements related to operation of the Sequoyah Nuclear Plant, dated February 13, 1974.

Agencies and Persons Consulted:

The NRC staff consulted with the state of Tennessee regarding the environmental impact of the proposed action. The state official had no comments.

FINDING OF NO SIGNIFICANT IMPACT:

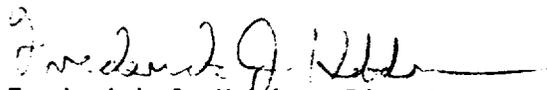
The Commission has determined not to prepare an environmental impact statement for the proposed exemption.

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

For further details with respect to this action, see the request for exemption dated June 5, 1993, which is available for public inspection at the Commission's Public Document Room, 2120 L Street, NW., Washington, DC and at the local public document room located at the Chattanooga-Hamilton County Library, 1101 Broad Street, Chattanooga, Tennessee 37402.

Dated at Rockville, Maryland, this 15th day of June 1993.

FOR THE NUCLEAR REGULATORY COMMISSION



Frederick J. Heddon, Director
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

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