

September 29, 1997

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

SUBJECT: EXEMPTION FROM THE REQUIREMENTS OF 10 CFR Part 50.60, ACCEPTANCE
CRITERIA FOR FRACTURE PREVENTION MEASURES FOR LIGHTWATER NUCLEAR
POWER REACTORS FOR NORMAL OPERATION - WATTS BAR NUCLEAR PLANT
(TAC NO. M99063)

Dear Mr. Kingsley:

By letter dated June 20, 1997, Tennessee Valley Authority requested an
exemption from the requirements of 10 CFR 50.60, "Acceptance Criteria for
Fracture Prevention for Lightwater Nuclear Power Reactors for Normal
Operation."

The Commission has issued the enclosed exemption from the requirements of 10
CFR 50.60. This exemption permits using the safety margins recommended in the
American Society of Mechanical Engineers Boiler and Pressure Vessel Code Case
N-514, "Low Temperature Overpressure Protection," in lieu of the safety
margins required by 10 CFR Part 50, Appendix G.

A copy of the exemption has been forwarded to the Office of the Federal
Register for publication.

Sincerely,

/s/

Robert E. Martin, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Exemption

cc w/encl: See next page

DISTRIBUTION:

Docket File	F. Hebdon	G. Hill(2)
PUBLIC	M. Boyle	ACRS
WBN Reading	B. Clayton	J. Strosnider
B. Boger	R. Martin	M. Gamberoni
OGC		J. Johnson, RII



DOCUMENT NAME: G:\wbn\WB99063.EXE

To receive a copy of this document, indicate in the box: "C" = Copy without
attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	PM:PDII-3	E	LA:PDII-3	OGC	D:PDII-3	D:DRPE
NAME	RMartin:m		BClayton	R. Bachmann	FHebdon	BBoger
DATE	08/24/97		08/21/97	08/19/97	08/ /97	08/ /97
OFFICE	ADPR	E	D:NRR	BC:EmCB		
NAME	RZimmerman		SCollins	J. Strosnider		
DATE	08/24/97		08/21/97	08/19/97	08/ /97	08/ /97

9710060092 970929
PDR ADOCK 05000390
P PDR

Official Record Copy

10/1/97 10:00 AM COPY



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

WASHINGTON, D.C. 20555-0001

September 29, 1997

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

SUBJECT: EXEMPTION FROM THE REQUIREMENTS OF 10 CFR Part 50.60, ACCEPTANCE
CRITERIA FOR FRACTURE PREVENTION MEASURES FOR LIGHTWATER NUCLEAR
POWER REACTORS FOR NORMAL OPERATION - WATTS BAR NUCLEAR PLANT
(TAC NO. M99063)

Dear Mr. Kingsley:

By letter dated June 20, 1997, Tennessee Valley Authority requested an exemption from the requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention for Lightwater Nuclear Power Reactors for Normal Operation."

The Commission has issued the enclosed exemption from the requirements of 10 CFR 50.60. This exemption permits using the safety margins recommended in the American Society of Mechanical Engineers Boiler and Pressure Vessel Code Case N-514, "Low Temperature Overpressure Protection," in lieu of the safety margins required by 10 CFR Part 50, Appendix G.

A copy of the exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

A handwritten signature in cursive script that reads "Robert Martin".

Robert E. Martin, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Exemption

cc w/encl: See next page

Mr. Oliver D. Kingsley, Jr.
Tennessee Valley Authority

Mr. O. J. Zeringue, Sr. Vice President
Nuclear Operations
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Jack A. Bailey, Vice President
Engineering & Technical Services
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. J. A. Scalice, Site Vice President
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

General Counsel
Tennessee Valley Authority
ET 10H
400 West Summit Hill Drive
Knoxville, TN 37902

Mr. Raul R. Baron, General Manager
Nuclear Assurance
Tennessee Valley Authority
4J Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Mark J. Burzynski, Manager
Nuclear Licensing
Tennessee Valley Authority
4J Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Paul L. Pace, Manager
Licensing
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

WATTS BAR NUCLEAR PLANT

Mr. Richard T. Purcell, Plant Manager
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
61 Forsyth Street, SW., Suite 23T85
Atlanta, GA 30303-3415

Senior Resident Inspector
Watts Bar Nuclear Plant
U.S. Nuclear Regulatory Commission
1260 Nuclear Plant Road
Spring City, TN 37381

County Executive
Rhea County Courthouse
Dayton, TN 37321

County Executive
Meigs County Courthouse
Decatur, TN 37322

Mr. Michael H. Mobley, Director
Division of Radiological Health
3rd Floor, L and C Annex
401 Church Street
Nashville, TN 37243-1532

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)	
)	
TENNESSEE VALLEY AUTHORITY)	Docket No. 50-390
)	
Watts Bar Nuclear Plant)	

EXEMPTION

I.

On February 7, 1996, the Nuclear Regulatory Commission issued Facility Operating License No. NPF-90 to Tennessee Valley Authority (TVA or the Licensee) for the Watts Bar Nuclear Plant. The license stipulated, among other things, that the facility is subject to all rules, regulations, and orders of the Commission.

II.

In its letter dated June 20, 1997, the licensee requested an exemption from the Commission's regulations. Section 50.60 of Title 10 of the Code of Federal Regulations, "Acceptance Criteria for Fracture Prevention Measures for Lightwater Nuclear Power Reactors for Normal Operation," states that all lightwater 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 Part 50 defines pressure/temperature (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 also states that the American Society of Mechanical

Engineers Boiler and Pressure Code (ASME Code) edition and addenda specified in 10 CFR 50.55a are applicable. It is specified in 10 CFR 50.60(b) 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 low-temperature overpressure transients that would produce pressure excursions exceeding the 10 CFR Part 50, Appendix G, P/T limits while the reactor is operating at low temperatures, the licensee installed a low-temperature overpressure protection (LTOP) system. The system includes pressure-relieving devices called power-operated relief valves (PORVs). The PORVs are set at a pressure low enough so that if an LTOP transient occurred, the mitigation system would prevent the pressure in the reactor vessel from exceeding the 10 CFR Part 50, Appendix G, P/T limits. To prevent the PORVs 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 solid water condition, the operating pressure must be maintained below the PORV setpoint. Applying the LTOP instrument uncertainties required by the staff's approved methodology results in an LTOP setpoint that establishes an operating window that is too narrow to permit reasonable system makeup and pressure control.

To prevent these difficulties, the licensee has requested to use the ASME Code Case N-514, "Low Temperature Overpressure Protection," which designates the allowable pressure as 110 percent of that specified by 10 CFR Part 50, Appendix G. This would provide an increased band to permit system makeup and pressure control. ASME Code Case N-514 is consistent with

guidelines developed by the ASME Working Group on Operating Plant Criteria 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. The content of this ASME Code Case has been incorporated into Appendix G of Section XI of the ASME Code and published in the 1993 Addenda to Section XI and has been incorporated into the latest draft of Regulatory Guide 1.147 (Draft Regulatory Guide DG-1050, Revision 12 of Regulatory Guide 1.147, Inservice Inspection Code Case Applicability ASME Section XI, dated May 1997). However, 10 CFR 50.55a, "Codes and Standards," only authorizes addenda through the 1988 Addenda.

III.

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security and (2) when special circumstances are present. According to 10 CFR 50.12(a)(2)(ii), special circumstances are present whenever application of the regulation in question is not necessary to achieve the underlying purpose of the rule.

The underlying purpose of 10 CFR Part 50, Appendix G, is to establish fracture toughness requirements for ferritic materials of pressure-retaining components of the reactor coolant pressure boundary to provide adequate margins of safety during any condition of normal operation, including anticipated operational occurrences, to which the pressure boundary may be

subjected over its service lifetime. Section IV.A.2 of Appendix G requires that the reactor vessel be operated with P/T limits at least as conservative as those obtained by following the methods of analysis and the required margins of safety of Appendix G of the ASME Code.

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 setpoint for LTOP events, the licensee proposed to use safety margins based on an alternate methodology consistent with the 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 percent of the P/T limits of the existing ASME Code 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 stress, the proposed criteria will provide adequate margins of safety on the reactor vessel during LTOP transients, and thus will satisfy the underlying purpose of 10 CFR 50.60 for fracture toughness requirements. Further, by relieving the operational restrictions, the potential for undesirable lifting of the PORV would be reduced, thereby improving plant safety.

IV.

For the foregoing reasons, the NRC staff has concluded that the licensee's proposed use of the alternate methodology in determining the acceptable setpoint for LTOP events will not present an undue risk to public health and safety and is consistent with the common defense and security. The NRC staff has determined that there are special circumstances present, as specified in 10 CFR 50.12(a)(2), in that application of 10 CFR 50.60 is not necessary in order to achieve the underlying purpose of this regulation.

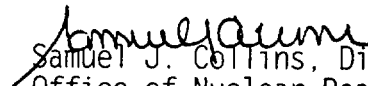
Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, this exemption is authorized by law, will not present an undue risk to the public health and safety, and is consistent with the common defense and security.

Accordingly, the Commission hereby grants an exemption from 10 CFR 50.60 such that in determining the setpoint for LTOP events, the Appendix G curves for P/T limits are not exceeded by more than 10 percent. This exemption permits using the safety margins recommended in the AMSE Code Case N-514, in lieu of the safety margins required by 10 CFR Part 50, Appendix G. This exemption is applicable only to LTOP conditions during normal operation.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of the exemption will have no significant impact on the quality of the human environment (62 FR 50630).

This exemption is effective upon issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Samuel J. Collins, Director
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,
this 29th day of September 1997