

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Clay C. Warren
Vice President & Chief Operating Officer

DEC 29 1998

WO 98-0104

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

Reference: Letter WM 98-0101 dated September 25, 1998, from
O. L. Maynard, WCNO, to USNRC

Subject: Docket No. 50-482: Application For Amendment To The WCGS
Technical Specifications To Incorporate Revised Heatup and
Cooldown Limit Curves, And A Revised Cold Overpressure
Mitigation System (COMS) Power-Operated Relief Valve (PORV)
Setpoint Limit Curve

Gentlemen:

This letter transmits an application for amendment to Facility Operating License No. NPF-42 for Wolf Creek Generating Station (WCGS). This request proposes to revise the WCGS Technical Specifications to incorporate revised reactor coolant system (RCS) heatup and cooldown limit curves, and a revised Cold Overpressure Mitigation System (COMS) Power-Operated Relief Valve (PORV) setpoint limit curve, as required by 10 CFR 50 Appendix H and WCGS Technical Specification 4.4.9.1.2. This information is being revised based on analysis of surveillance test data from the reactor vessel surveillance test capsule removed from the WCGS reactor vessel in November 1997 during the ninth refueling outage. The Westinghouse report on the test results from that surveillance capsule was provided to the NRC by the Reference. The revised COMS PORV setpoint limit curve includes consideration for operating the normal charging pump (NCP) during shutdown modes. Thus, this application for amendment includes a proposed change to allow the use of the NCP during shutdown modes.

A summary of the commitments made in this submittal is provided in Attachment I. A Safety Evaluation for the proposed license amendment request is provided in Attachment II and a No Significant Hazards Consideration Determination in Attachment III. Attachment IV is the related Environmental Impact Determination. Marked up pages are provided in Attachment V for the current WCGS Technical Specifications and in Attachment VI for the WCGS Improved Technical Specifications. Attachment VII provides an exemption request requesting approval to use ASME Code Case N-514 as an alternative to the ASME Code requirements for reactor vessel pressure limits at low temperatures.

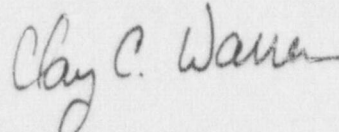
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WCNOC intends to implement this amendment within 60 days of NRC approval.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated Kansas State Official. If you should have any questions regarding this submittal, please contact me at (316) 364-4048, or Mr. Michael J. Angus at (316) 364-4077.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Clay C. Warren". The signature is fluid and cursive, with the first name "Clay" being more prominent.

Clay C. Warren

CCW/dlc

Attachments

cc: V. L. Cooper (KDHE), w/a
W. D. Johnson (NRC), w/a
E. W. Merschoff (NRC), w/a
K. M. Thomas (NRC), w/a
Senior Resident Inspector (NRC), w/a

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Clay C. Warren, of lawful age, being first duly sworn upon oath says that he is Chief Operating Officer of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the content thereof; that he has executed that same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Clay C. Warren
Clay C. Warren
Vice President and Chief Operating Officer

SUBSCRIBED and sworn to before me this 24th day of December, 1998.

Mary E. Gifford
Notary Public

Expiration Date 12/09/1999

LIST OF COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation (WCNOC) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Michael J. Angus, Manager Licensing and Corrective Action at Wolf Creek Generating Station, (316) 364-4077.

COMMITMENT	Due Date/Event
The amendment will be implemented within 60 days of NRC approval.	Within 60 days of Approval of Requested Amendment

ATTACHMENT II
SAFETY EVALUATION

Safety Evaluation

Proposed Change

This license amendment request proposes to revise the WCGS Technical Specifications to incorporate revised reactor coolant system (RCS) heatup and cooldown limit curves, and a revised Cold Overpressure Mitigation System (COMS) Power-Operated Relief Valve (PORV) setpoint limit curve, as required by 10 CFR 50

Appendix H and Technical Specification 4.4.9.1.2. This amendment request proposes a revision to WCGS Technical Specification Bases Figure B 3/4.4-1 to indicate the projected fluence values used in determining the limits for WCGS Technical Specification Figures 3.4-2, 3.4-3, and 3.4-4. Figure B 3/4.4-1 was revised using data from WCAP-15078 Revision 1, "Analysis of Capsule V from the Wolf Creek Nuclear Operating Corporation Wolf Creek Reactor Vessel Radiation Surveillance Program." Capsule V was removed from the reactor vessel in November 1997, during the ninth refueling outage, as part of the continuing surveillance program that monitors the effects of neutron irradiation on the Wolf Creek reactor vessel material under actual plant operating conditions. The three WCAPs from Westinghouse (WCAP-15078 Revision 1, WCAP-15079 Revision 1, and WCAP-15080 Revision 1) that provide the report of Capsule V test results were submitted to the NRC by WCNOG Letter WM 98-0101 dated September 25, 1998.

The specific proposed changes are:

- 1) Update Figures 3.4-2 and 3.4-3 based on Capsule V test results and to support plant operation up to 20 Effective Full Power Years (EFPY). WCGS Technical Specification 4.4.9.1.2 requires the heatup and cooldown limits be evaluated based on testing of the irradiated vessel samples. Capsule V was removed from the Wolf Creek vessel in November 1997. The revised curves are based on the test results and evaluations of Capsule V.
- 2) Update Figure 3.4-4. The COMS pressure/temperature (P/T) limits are impacted by the change in the vessel heatup/cooldown limits. The setpoint analysis is also impacted by the additional injection flow by allowing the normal charging pump (NCP) to be operational. Along with the setpoint analysis, a revised instrumentation uncertainty calculation was performed.
- 3) Bases revised to remove paragraph on page B 3/4 4-7. The deleted text related to the initial basis for fracture toughness and is no longer applicable. Current fracture toughness is established through the surveillance program required by WCGS Technical Specification 4.4.9.1.2.
- 4) The first sentence of the first paragraph on WCGS Technical Specification Bases page B 3/4 4-8 is redundant text and is being deleted.
- 5) Update WCGS Technical Specification Bases Figure B 3/4 4-1 (Neutron Fluence) based on the results of the Capsule V test results.
- 6) The first and second paragraphs on WCGS Technical Specification Bases page B 3/4 4-13 are replaced to describe that the steady-state curve is used for developing the COMS setpoints. The current (NRC approved) Westinghouse method for calculating COMS setpoints does not use a combination of the steady-state and finite heatup rate curves. WCAP-15078-NP-A clearly states that the steady-state heatup and cold curves are used as the basis for developing the COMS setpoints, and that this approach is acceptable since COMS events are most likely to occur when the reactor vessel is at isothermal conditions.

- 7) Add reference to the use of WCAP-14040-NP-A methodology in the generation of the revised WCGS Technical Specification Figures 3.4-2, 3.4-3 and 3.4-4 on WCGS Technical Specification Bases pages B3/4 4-7 and B3/4 4-13.
- 8) References to use of the NCP (change to allow use of NCP in shutdown modes: currently the NCP must be in the pull-to-lock position) has been added, where applicable, throughout WCGS Technical Specification Bases Section B3/4.4.

The modification of Figures 3.4-2, 3.4-3, and 3.4-4 incorporates the nil-ductility reference temperature (RT_{NDT}) as determined from the test results of Reactor Surveillance Capsule V. The revisions to the Bases are editorial in nature or add discussion and clarification on the use of the NCP.

Reason for Proposed Change

Technical Specification 4.4.9.1.2 requires that the heatup and cooldown pressure/temperature (P/T) limit curves shown in Technical Specification Figures 3.4-2 and 3.4-3 and the COMS PORV setpoint limit curve shown in Technical Specification Figure 3.4-4 be evaluated and updated, if necessary, on the basis of the results of the surveillance testing of irradiated vessel material samples. Reactor Surveillance Capsule V, of the Wolf Creek Generator Station (WCGS) reactor vessel surveillance program specimens, was withdrawn from the reactor during the ninth refueling outage. The results of testing and evaluation of the specimens from Capsule V were provided in WCAP-15078 Revision 1, "Analysis of Capsule V from the Wolf Creek Nuclear Operating Corporation Wolf Creek Reactor Vessel Radiation Surveillance Program" which was submitted to the NRC on September 25, 1998 by letter WM 98-0101.

Evaluation

The surveillance program for the Wolf Creek Generating Station reactor vessel material covers the 40-year plant design life and is based on ASTM E185-73, "Standard Recommended Practice for Surveillance Tests for Nuclear Reactor Vessels." Capsule V Charpy V-notch impact and tensile surveillance specimens were subjected to postirradiation mechanical testing. The postirradiation data from surveillance Capsule V are summarized in WCAP-15078 Revision 1.

The heatup and cooldown P/T limit curves, and the COMS PORV setpoint limit curve, define the range of acceptable operation for the Reactor Coolant System (RCS) in order to protect the vessel against non-ductile failure. These limits ensure that the margin of protection against non-ductile failure is maintained in accordance with 10 CFR 50, Appendix G, requirements. This is accomplished by limiting the maximum allowable pressure at low temperatures.

The heatup and cooldown limit curves (Technical Specification Figures 3.4-2 and 3.4-3) were calculated using the NRC-approved methods described in WCAP-14040-NP-A, Revision 2 (Reference 1) and meet the requirements of 10 CFR 50, Appendices G and H. The curves are applicable for the first 20 EFPY of operation. The changes to these curves are consistent with the design basis as described in the Bases section of the Technical Specifications. The calculated heatup and cooldown limit curves are documented in WCAP-15079 Revision 1.

The PORV Setpoint Curve (Technical Specification Figure 3.4-4) for the Cold Overpressure Mitigation System (COMS) is developed based on the heatup and cooldown curves. Therefore, anytime the heatup/cooldown curves are revised, the PORV Setpoint Curve and the COMS setpoints must be evaluated and revised, if necessary. For the purpose of this submittal, the heatup/cooldown limit

curves were revised such that a revision to the PORV Setpoint Curve was required.

Attachment VII provides an exemption request from the requirements of 10 CFR 50.60, "Acceptance Criteria for Fracture Prevention for Lightwater Nuclear Reactors for Normal Operation." This request for exemption is made in order to apply the guidance of American Society of Mechanical Engineers (ASME) Code Case N-514, "Low Temperature Overpressure Protection," in lieu of those specified by 10 CFR 50, Appendix G. Code Case N-514 was used in developing Technical Specification Figure 3.4-4 per the methodology of Reference 1.

The ASME Working Group for Operating Plant Criteria developed Code Case N-514 as an alternative methodology to the safety margin requirements of Appendix G to 10 CFR 50. Code Case N-514 provides criteria to determine pressure limits during COMS events that avoid certain operational restrictions, provide adequate margins against failure of the reactor vessel, and reduce the potential for unnecessary activation of relief valves used for COMS. Code Case N-514 allows determination of the COMS setpoints such that for COMS events the maximum pressure in the reactor vessel would not exceed 110% of the pressure/temperature (P/T) limits of the existing ASME Appendix G curves. Code Case N-514 has been approved by the ASME Code committee and its content has been incorporated in Appendix G of ASME Section XI and published in the 1993 Addenda and 1995 edition. Code Case N-514 has not been approved for use in Regulatory Guide 1.147, "Inservice Inspection Code case Acceptability, ASME Section XI;" however, it has been included in Draft Regulatory Guide 1.147 (DG-1050).

The revised PORV setpoint limits for the COMS were derived using the same methodology employed in the development of the current COMS PORV setpoints. The COMS PORV setpoint limit curve (Technical Specification Figure 3.4-4) is determined based on the revised heatup and cooldown limit curves, and the analysis results of limiting Low Temperature Over-Pressure (LTOP) transients. The limiting LTOP mechanisms analyzed for WCGS under water solid conditions were:

a. FOR LIMITING MASS ADDITION LTOP MECHANISM

Operation of one Centrifugal Charging Pump (CCP) and the Normal Charging Pump (NCP) with instrument air failure resulting in the flow control valve in the letdown line failing closed (letdown isolation) and the flow control valve in the charging line failing open (maximum charging flow), and

b. FOR LIMITING HEAT ADDITION LTOP MECHANISM

Inadvertent start-up of a reactor coolant pump with a maximum 50°F temperature mismatch between the RCS and the hotter steam generators.

These analyses, using the LOFTRAN computer code, take into consideration pressure overshoot and undershoot beyond the PORV open and close setpoints, which can occur as a result of time delays in signal processing and valve stroke times. The maximum expected pressure overshoot and undershoot calculated from the limiting mass input and heat input transients, in conjunction with the 10 CFR 50, Appendix G, pressure limits and reactor coolant pump No. 1 seal pressure limit, are utilized in the selection of the pressure setpoints for the PORV. The mass injection rate assumed in the design basis mass input transient is based on 100% flow capacity of the NCP and one CCP. The maximum combined pump flow has been assumed in order to envelop the maximum flow possible by the operational configuration that uses

the NCP for charging with one CCP remaining operable, or the use of one CCP for charging with the NCP remaining operable, during shutdown modes.

The pressure difference from the wide range pressure transmitter to the beltline region of the reactor vessel has been properly accounted for in the determination of the maximum allowed PORV setpoint. Specifically, the calculated maximum allowable PORV setpoint (throughout the entire temperature range for which COMS is enabled) is reduced by an amount equivalent to the applicable differential pressure when the reactor coolant pumps are in operation. The actual open setpoints of the PORVs for the COMS are less than the maximum allowed PORV setpoints and less than the PORV piping limit. The setpoints are also normally staggered so that only one valve would open during any cold overpressure transient. Operation with the setpoints of both valves within the limits of Technical Specification Figure 3.4-4 ensures that the maximum allowed pressure limits will not be exceeded for the events analyzed.

The design and analysis of COMS satisfies single failure criteria (failure of one of two PORVs available for over-pressure relief) by assuming that only one PORV is available to provide pressure relief. Each of the two PORVs is capable of providing 100% of the pressure relief necessary to mitigate overpressure transients.

The major effect of adopting the revised P/T limit curves and the COMS PORV setpoint limit curve is re-defining the P/T range for acceptable operation at low temperatures. The revised range for acceptable operation compensates for in-service radiation-induced embrittlement of the WCGS reactor vessel in a conservative manner. The revised P/T limit curves also account for a requirement that the minimum metal temperature of the closure head flange and vessel flange regions must be at least 120°F higher than the limiting RT_{NDT} for these regions when the pressure exceeds 20% of the preservice hydrostatic test pressure (3106 psig). The initial RT_{NDT} of 20°F occurs in both the closure head flange and the vessel flange of the Wolf Creek reactor vessel, so the minimum allowable temperature of these regions is 140°F at pressures greater than 621 psig. These limits are shown in Technical Specification Figures 3.4-2 and 3.4-3 whenever applicable.

The revised PORV setpoint limit curve also provides a basis for updating the COMS Setpoint Program. Since the PORV setpoint limit curve is more limiting in the lower temperature range than the curve it is intended to replace, the breakpoints of the function generator in the current COMS Setpoint Program will be reset within the limits of Technical Specification Figure 3.4-4 to assure the operability of the COMS. The operability of the COMS ensures that the RCS pressure will be maintained within acceptable limits following a design basis overpressure transient which might occur during low temperature, water-solid operation when the Residual Heat Removal System relief valves are isolated from the RCS.

References

- 1) WCAP-14040-NP-A, "Methodology Used to Develop Cold Overpressure Mitigation System Setpoints and RCS heatup and Cooldown Limit Curves," Revision 2, J. Andrachek et. al., January 1996.

ATTACHMENT III

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

No Significant Hazards Consideration Determination

Proposed Change

This license amendment request proposes to revise the WCGS Technical Specifications to incorporate revised reactor coolant system (RCS) heatup and cooldown limit curves, and a revised Cold Overpressure Mitigation System (COMS) Power-Operated Relief Valve (PORV) setpoint limit curve, as required by 10 CFR 50 Appendix H and Wolf Creek Generating Station (WCGS) Technical Specification 4.4.9.1.2. This amendment request proposes a revision to WCGS Technical Specification Bases Figure B 3/4.4-1 to indicate the projected fluence values used in determining the limits for WCGS Technical Specification Figures 3.4-2 and 3.4-3. Figure B 3/4.4-1 was revised using data from WCAP-15078 Revision 1, "Analysis of Capsule V from the Wolf Creek Nuclear Operating Corporation Wolf Creek Reactor Vessel Radiation Surveillance Program." Also, the revision to the COMS PORV Setpoint Limit Curve (WCGS Technical Specification Figure 3.4-4) includes consideration of operation of the normal charging pump (NCP) in shutdown modes. The proposed amendment has been reviewed per the standards provided in 10 CFR 50.92. Each standard is discussed separately below.

Standard I - Involves a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated

Incorporating the revised heatup and cooldown pressure/temperature limit curves and the COMS PORV setpoint limit curve into the WCGS Technical Specifications does not affect the probability or consequences of an accident previously evaluated.

The revised limit curves are calculated using the most limiting RT_{NDT} for the reactor vessel components and include a radiation-induced shift corresponding to the end of the period for which the curves are generated. The COMS PORV Setpoint Limit Curve is calculated using the most limiting mass injection transient, taking into account operation of the NCP during shutdown modes. The changes do not affect the basis, initiating events, chronology, or availability/operability of safety related equipment required to mitigate transients and accidents analyzed for WCGS.

Standard II - Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated

Adopting the revised limit curves redefines the range of acceptable operation for the Reactor Coolant System. This redefinition is a result of the analysis of reactor vessel surveillance specimens removed from the reactor in a continuing surveillance program which monitors the effects of neutron irradiation on the WCGS reactor vessel materials under actual operating conditions. Included in the revised limit curves is consideration for NCP operation during shutdown modes. Incorporating these revised curves does not create the possibility of an accident of a different type from any previously evaluated for WCGS.

Standard III - Involve a Significant Reduction in the Margin of Safety

The revision of these limit curves continues to maintain the margin of safety required for prevention of non-ductile failure of the WCGS reactor vessel during low temperature operation as required by 10 CFR 50, Appendices G and H. The revised curves primarily affect RCS operation below 350°F by limiting the available pressure/temperature window for heatup and cooldown. The revised limit curves compensate for the in-service radiation induced embrittlement of

the reactor vessel and accounts for the requirement that the closure flange region temperature must exceed the nil-ductility temperature by at least 120°F when pressure exceeds 20% of the preservice hydrostatic test pressure. The revised COMS PORV Setpoint Limit Curve, which includes consideration of NCP operation during shutdown modes, ensures overpressure protection of the RCS and reactor vessel.

Based on the above discussions, it has been determined that the requested technical specification revision does not involve a significant increase in the probability of consequences of an accident or other adverse conditions over previous evaluations; or create the possibility of a new or different kind of accident or condition over previous evaluations; or involve a significant reduction in a margin of safety. Therefore, the requested license amendment does not involve a significant hazards consideration.

ATTACHMENT IV
ENVIRONMENTAL IMPACT DETERMINATION

Environmental Impact Determination

10 CFR 51.22(b) specifies the criteria for categorical exclusions from the requirement for a specific environmental assessment per 10 CFR 51.21. This amendment request meets the criteria specified in 10 CFR 51.22(c)(9) as specified below:

- (i) the amendment involves no significant hazards consideration

As demonstrated in Attachment II, the proposed changes do not involve any significant hazards considerations.

- (ii) there is not significant change in the types or significant increase in the amounts of any effluents that may be released offsite

The proposed change does not involve a change to the facility or operating procedures that would cause an increase in the amounts of effluents or create new types of effluents. The changes impact surveillance requirements for reactor power distribution used to assure the operation of the plant within its safety design basis. Therefore, the proposed changes will have no effect on normal plant effluents and there will be no change in the types or amounts of any effluents released offsite.

- (iii) there is no significant increase in individual or cumulative occupational radiation exposure

The proposed changes to surveillance requirements will have no effect on general levels of radiation present in the plant; nor will additional quantities of radioactive materials be generated as a result of the proposed changes. Therefore, there will be no increase in individual or cumulative occupational radiation exposure associated with this proposed change.

Based on the above, it is concluded that there will be no impact on the environment resulting from this change and the change meets the criteria specified in 10 CFR 51.22 for a categorical exclusion from the requirements of 10 CFR 51.21 relative to requiring a specific environmental assessment by the Commission.