WOLF CREEK
NUCLEAR OPERATING CORPORATION

Bart D. Withers
President and
Chief Executive Officer

November 30, 1989

WM 89-0264

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Subject: Docket No. 50-482: Revision to Technical Specifications 3.4.1.4.2, 3.5.4, 4.9.8.1, and 4.9.8.2 - Residual Heat Removal Flow Rate and Safety Injection Pump Availability

Gentlemen:

The purpose of this letter is to transmit an application for amendment to Facility Operating License No. NPF-42 for Wolf Creek Generating Station (WCGS), Unit No. 1. This license amendment request proposes revising Technical Specification 3.4.1.4.2 to change a note at the bottom of page 3/4.4-6 to add the additional criterion of ensuring the reactor vessel water level is above the vessel flange before the running Residual Heat Removal (RHR) pump can be stopped while in Mode 5 with the rector coolant loops not filled. In addition, this amendment request proposes revising Technical Specifications 4.9.8.1 and 4.9.8.2 to decrease the required flow rate of the running RHR pump. Finally, this amendment request proposes revising the Technical Specification 3.5.4 mode applicability to have the Safety Injection Pumps immediately available to the Operators should RHR cooling be lost when the Reactor Coolant level is below the vessel flange.

Additionally technical specification changes related to the removal of the RHR autoclosure interlock are planned for future submittal by Wolf Creek Nuclear Operation Corporation. These changes will further enhance the safe operation of WCGS during shutdown conditions.

A complete Safety Evaluation and No Significant Hazards Consideration determination are provided as Attachments I and II, respectively. The proposed changes to the Technical Specifications are provided as Attachment III. Wolf Creek Nuclear Operating Corporation requests that this Technical Specification amendment request be approved by March 1, 1990 to facilitate its use during the fourth refueling outage at WCGS scheduled to begin on March 15, 1990.

In accordance with 10 CFR 50.91, a copy of this application, with attachments, is being provided to the designated Kansas State official. This proposed revision to the WCGS Technical Specifications will be fully implemented within 30 days of formal Nuclear Regulatory Commission approval.

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If you have any questions concerning this matter, please contact me or Mr. O. L. Maynard of my staff.

Very truly yours,

Bart D. Withers
President and
Chief Executive Officer

BDW/aem

Attachments: I - Safety Evaluation
II - Addressing The Standards In 10 CFR 50.92
III - Proposed Technical Specification Changes

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STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Bart D. Withers, of lawful age, being first duly sworn upon oath says that he is President and Chief Executive 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 B D Withers
Bart D. Withers
President and
Chief Executive Officer

SUBSCRIBED and sworn to before me this 30 day of November 1989.

Marlene Heathman
Notary Public

Expiration Date August 4, 1990

ATTACHMENT I

SAFETY EVALUATION

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Description of Changes

Technical Specifications 4.9.8.1 and 4.9.8.2 currently requires a flow of greater than 2800 gpm from at least one Residual Heat Removal (RHR) pump. Technical Specification 3.5.4 requires both safety injection pumps to be inoperable, when the plant is in MODE 5 or in MODE 6 with the reactor vessel head on. The note at the bottom of the page for LCO 3.4.1.4.2 allows the running RHR pump to be stopped for up to 1 hour, while in MODE 5 with the reactor coolant loops not filled, provided nothing is done that would allow a dilution and core outlet temperature remains at least 10°F below saturation temperature.

The proposed changes to 4.9.8.1 and 4.9.8.2, decreases the required flow rate of the running RHR pump from $\geq$ 2800 gpm to $\geq$ 1000 gpm and sufficient to maintain the RCS temperature at $\leq$ 140°F. The proposed change to 3.5.4 changes the APPLICABILITY from MODE 5 and MODE 6 with the reactor vessel head on, to MODE 5 and MODE 6 (with the reactor vessel head on) with water level above the reactor vessel flange. The proposed change to the note at the bottom of the page to LCO 3.4.1.4.2 adds the additional criteria of ensuring the reactor vessel water level is above the vessel flange before the running RHR pump can be stopped while in MODE 5 with the reactor coolant loops not filled. The Bases to 3/4.5.4 and 3/4.9.8 are also being changed to reflect these proposed changes.

Background

NRC Generic Letter 88-17 recommended several program enhancements that each nuclear unit should consider. Among these recommendations, was the following;

"Technical Specifications that restrict or limit the safety benefit of the actions identified in this letter should be identified and appropriate changes should be submitted."

Wolf Creek Nuclear Operating Corporation (WCNOC) has identified these changes as enhancements to the present Wolf Creek Generating Station (WCGS) Technical Specifications.

The flow requirements for 3/4.9.8.1 and 3/4.9.8.2 ensures that; (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the Reactor Vessel below 140°F as required during the refueling mode, and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

The requirement to have no operable Safety Injection Pumps in MODE 5 or 6 with the reactor vessel head on, provides assurance that a mass addition pressure transient can be relieved by the operation of a single Power Operated Relief Valve (PORV) or RHR suction relief valve. The proposed change to 3.5.4 will allow the safety injection pumps to be immediately available to the operators, should RHR cooling be lost, when the reactor coolant level is below the vessel flange. As technical specifications are currently written, both safety injection pumps must be safety tagged out of service with their breakers racked down in MODES 5 and 6 whenever the reactor vessel head is in place. For the operators to use a safety injection pump after a loss of RHR they must remove the safety tags and rack up the breaker prior to running the pump. It is estimated that it will take approximately 15 to 20 minutes to get a pump running. With the proposed change, the operators could have a safety injection pump running in approximately one minute.

The note at the bottom of the page for Technical Specification Limiting Condition for Operation (LCO) 3.4.1.4.2, presently allows the running RHR pump to be stopped for up to 1 hour with the reactor coolant loops not filled in MODE 5. The two criteria that must be met when the RHR pump is stopped prevent stratification of the coolant boron concentration and prevent core boiling. The proposed change to reduce the RHR minimum flow rate in MODE 6, while maintaining decay heat removal requirements, reduces potential problems due to vortexing and subsequent loss of the RHR system. The added restriction to the Technical Specification 3.4.1.4.2 footnote is proposed so that the operating RHR pump cannot be intentionally deenergized for one hour when reactor vessel water level is below the vessel flange. This will ensure that the operating pump will not be intentionally deenergized during operation with the RCS loops partially filled.

Evaluation

A reduction of RHR flow in the shutdown cooling mode could potentially affect the decay heat removal rate, boron stratification, and the boron dilution accident analysis. The present Bases for Technical Specification 3/4.9.8 specifies that at least one RHR train be in operation to ensure that: (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor vessel below 140°F as required during the refueling mode, and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

The WCGS Technical Specifications do not contain provisions to minimize the potential for vortexing and air entrainment in the RHR system which may occur during Reactor Coolant System (RCS) operation under certain conditions. Although the current requirement for a minimum 2800 gpm flowrate is conservative for decay heat removal and uniform boron mixing, it is clear that minimizing the potential for vortexing was not considered when the minimum flow rate requirement was established.

Operation with the RCS partially drained in MODES 5 and 6 is necessary for required inspection and maintenance on RCS components such as reactor coolant pumps and steam generators. A reduced RHR flow rate would provide a greater margin to vortexing and preclude an inadvertent loss of decay heat removal capability due to air entrainment and cavitation of the RHR pumps. The likelihood of vortexing at the suction of the RHR pumps could be lowered by reducing the RHR flow rate.

As the time after plant shutdown increases decay heat removal requirements for the RHR system flow are reduced since decay heat decreases as a function of time after initial reactor shutdown. However, continuous decay heat removal capability is still required. Since the consequences of a loss of decay heat removal during the RCS partial drain conditions can be severe, the RHR system flow rate should not only meet decay heat removal and uniform coolant boron mixing requirements, but should also consider minimizing the potential for loss of RHR flow by vortexing and air entrainment at the RHR pump suction.

Revisions to Technical Specifications 4.9.8.1 and 4.9.8.2 are proposed so that RHR system flow rate may be reduced to the greater of the flow required to maintain the water in the reactor vessel below 140°F or 1000 gpm. Although a reduced flow rate is not required for prevention of vortexing and air entrainment for water levels above the reactor vessel flange greater than 23 feet (Technical Specification 4.9.8.1), this change is being made for consistency to minimize operator confusion and human factors problems.

The added restriction to the Technical Specification 3.4.1.4.2 footnote is proposed so that the operating RHR pump cannot be intentionally deenergized for one hour when reactor vessel water level is below the vessel flange. This will ensure that the operating pump will not be intentionally deenergized during operation with the RCS loops partially filled.

An evaluation of boron dilution and boron stratification at RHR flow rates of 1000 gpm has been performed. The results of this evaluation indicate that the minimum required RHR flow rate is established at 1000 gpm for these two concerns.

Allowing the Safety Injection Pumps to be operable affects the cold over-pressure analysis. Whenever the reactor coolant level is below the vessel flange, there is a minimum empty volume of approximately 17,000 gallons. These pumps would only be used in an emergency situation, while attempting to return an RHR pump to service. This empty space will allow the operators sufficient room to provide cooling to the core and still not completely fill the reactor coolant system.

Based on the above discussions and the considerations presented in Attachment II, the proposed revision to the WCGS Technical Specifications does not increase the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report; or create a possibility for an accident or malfunction of a different type than any previously evaluated in the safety analysis report; or reduce the margin of safety as defined in the basis for any technical specification. Therefore, the proposed revision does not adversely affect or endanger the health or safety of the general public or involve a significant safety hazard.

ATTACHMENT II

ADDRESSING THE STANDARDS IN 10 CFR 50.92

ADDRESSING THE STANDARDS IN 10 CFR 50.92

The proposed changes revise Technical Specification 3.4.1.4.2 to change a note at the bottom of page 3/4.4-6 to add the additional criterion of ensuring the reactor vessel water level is above the vessel flange before the running Residual Heat Removal (RHR) pump can be stopped in MODE 5 with the reactor coolant loops not filled. In addition, the proposed changes would revise Technical Specifications 4.9.8.1 and 4.9.8.2 to decrease the required flow rate of the running RHR pump. Finally, the proposed change would revise Technical Specification 3.5.4, changing the mode applicability so that the safety injection pumps would be immediately available to the operators should RHR cooling be lost when the reactor coolant level is below the vessel flange. The following sections discuss the proposed changes under the three 10 CFR 50.92 standards:

Standard 1 - Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated

These changes do not involve a significant increase in the probability or consequences of an accident previously evaluated. The change to the RHR flow rate reduces the probability of a loss of decay heat removal due to vortexing and cavitation, while the probability of accidents analyzed in the Updated Safety Analysis Report (USAR) are unaffected. A reduction of RHR flow could potentially affect decay heat removal rate, boron stratification and the boron dilution accident analysis. An evaluation concluded that the consequences of these accidents are not increased. Allowing the safety injection pumps to be operable affects the cold over-pressure analysis. Whenever the rector coolant level is below the vessel flange, there is a minimum empty volume of approximately 17,000 gallons. These pumps would only be used in an emergency situation, while attempting to return an RHR pump to service. This empty space will allow the operators sufficient room to provide cooling to the core and still not completely fill the reactor coolant system.

Standard 2 - Create the Possibility of a New or Different Kind of Accident From any Accident Previously Evaluated

These changes do not create the possibility of a new or different kind of accident from any accident previously evaluated. The WCGS Technical Specifications do not contain provisions to minimize the potential for vortexing and air entrainment in the RHR system which may occur during RCS operation under certain conditions. Although the current requirements for a minimum 2800 gpm flow rate is conservative for decay heat removal and uniform boron mixing, it is clear that minimizing the potential for vortexing was not considered when the minimum flow rate requirement was established.

Revisions to Technical Specifications 4.9.8.1 and 4.9.8.2 are proposed so that RHR system flow rate may be reduced to the greater of the flow required to maintain the water in the reactor vessel below 140°F or 1000 gpm. Although a reduced flow rate is not required for prevention of vortexing and air entrainment for water level above the reactor flange greater than 23 feet (Technical Specification 4.9.8.1), this change is being made for consistency to minimize operator confusion and human factors problems. Allowing the Safety Injection Pumps to be operable gives the operators added flexibility in providing cooling to the core whenever RHR is lost. The requirement that the reactor coolant level be below the vessel flange prior to making the pumps operable, provides a sufficient empty volume to not completely fill the reactor coolant system.

Standard 3 - Involve a Significant Reduction in a Margin of Safety

These changes do not involve a significant reduction in a margin of safety. Operation with the RCS partially drained in MODES 5 and 6 is necessary for required inspection and maintenance on RCS components such as reactor coolant pumps and steam generators. A reduced RHR flow rate would provide a greater margin to vortexing and preclude an inadvertent loss of decay heat removal capability due to air entrainment and cavitation of the RHR pumps. The likelihood of vortexing at the suction of the RHR pumps could be lowered by reducing the RHR flow rate.

The proposed minimum flow rate of 1000 gpm and ensures a sufficient flow rate as assumed in the boron dilution and boron stratification evaluations. Having reactor coolant level below the vessel flange prior to making the safety injection pumps operable provides sufficient empty volume in the reactor coolant system, to where cold over-pressure concerns are negligible.

The change that adds the restriction to the Technical Specification 3.4.1.4.2 footnote will ensure that the operating pump will not be intentionally deenergized during operation with the RCS loops partially filled.

Based on the above discussions and those presented in Attachment I, it has been determined that the requested Technical Specification revisions do not involve a significant increase in the probability or consequences of an accident or other adverse condition over previous evaluations; or create the possibility of a new or different kind of accident over previous evaluations; or involve a significant reduction in a margin of safety. Therefore, the requested changes do not involve a significant hazards consideration.