

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Robert C. Hagan
Vice President Engineering

November 22, 1995

ET 95-0106

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 Specification
3/4.3.1 To Reflect Deletion of The Boron Dilution
Mitigation System

Gentlemen:

This letter transmits an application for amendment to Facility Operating License No. NPF-42 for Wolf Creek Generating Station (WCGS). This license amendment request proposes incorporating the attached changes into the WCGS Technical Specifications. The proposed changes replace the requirements associated with the Boron Dilution Mitigation System (BDMS) in the WCGS Technical Specifications with alarms, indicators, procedures and controls to assure proper resolution of potential inadvertent boron dilution events.

Attachment I provides a detailed description and analysis of the proposed changes. Attachment II provides a No Significant Hazards Consideration Determination and Attachment III provides an Environmental Impact Determination. The specific changes to the technical specifications proposed by this request are provided in Attachment IV. The enclosure provides a detailed safety evaluation to support this amendment request.

The proposed changes, with the exception of the revisions to the technical specifications, can be implemented under the provisions of 10 CFR 50.59, upon completion of an evaluation which concludes that an unreviewed safety question is not involved. However, because all these changes relate to an alternate method of addressing postulated inadvertent boron dilution events, the changes are presented to the NRC for approval in a single package.

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 prior to startup from the eighth refueling outage, following formal Nuclear Regulatory Commission approval.

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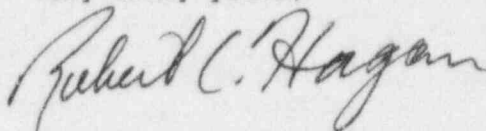
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If you have any questions concerning this matter, please contact me at (316) 364-8831, extension 4553, or Mr. Richard D. Flannigan, at extension 4500.

Very truly yours,



Robert C. Hagan

RCH/jra

Attachments I - Description And Assessment Of Proposed Change
 II - No Significant Hazards Consideration Determination
 III - Environmental Impact Determination
 IV - Proposed Technical Specification Change

Enclosure Safety Evaluation

cc: G. W. Allen (KDHE), w/a, w/e
 L. J. Callan (NRC), w/a, w/e
 W. D. Johnson (NRC), w/a, w/e
 J. F. Ringwald (NRC), w/a, w/e
 J. C. Stone (NRC), w/a, w/e

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Robert C. Hagan, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering 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 Robert C. Hagan
Robert C. Hagan
Vice President
Engineering

SUBSCRIBED and sworn to before me this 22nd day of Nov., 1995.

Angela E. Wessel
Notary Public

Expiration Date July 3, 1999

ATTACHMENT I

DESCRIPTION AND ASSESSMENT OF PROPOSED CHANGE

Description and Assessment of Proposed Change

Proposed Change

This license amendment request proposes incorporating the attached changes into the Wolf Creek Generating Station (WCGS) Technical Specifications. The proposed changes replace the requirements associated with the Boron Dilution Mitigation System (BDMS) in the WCGS Technical Specifications with alarms, indicators, procedures and controls to assure proper resolution of potential inadvertent boron dilution events.

Background

Technical Specification 3/4.3.1, "Reactor Trip System Instrumentation," requires that the boron dilution flux doubling circuitry be operable in Modes 3, 4 and 5. The flux doubling circuitry is part of the Boron Dilution Mitigation System (BDMS), which was developed to detect and mitigate an inadvertent boron dilution event in Modes 3, 4 and 5 before a complete loss of shutdown margin occurs. The system detects an inadvertent boron dilution event by monitoring the output of the source range neutron flux detectors to determine if the neutron flux has doubled over a prescribed time period. When a dilution event is detected, an alarm is sounded to alert the operator and valve movement is automatically initiated to terminate the dilution and start boration. Valves that isolate the refueling water storage tank (RWST) are opened to supply borated water to the suction of the charging pumps, and valves which isolate the chemical and volume control system (CVCS) are closed to terminate the dilution.

The BDMS senses abnormal increases in source range count rates and actuates CVCS and RWST valves to mitigate the consequences of an inadvertent boron dilution event as described in USAR Chapter 15. The current accident analyses rely on automatic BDMS actuation to mitigate the consequences of inadvertent boron dilution events. As noted in the NRC Information Notice 93-32, various issues have been raised regarding the nonconservative assumptions and boundary conditions (i.e., inverse count rate ratio data and flux-multiplication setpoint) used in the analyses. The primary concern of these issues is that it may not be feasible to demonstrate the adequacy of the BDMS under certain core configurations if the possible effects of these nonconservatisms were accounted for.

On December 15, 1992, Wolf Creek Nuclear Operating Corporation (WCNOC), along with Westinghouse and three other utilities with similar BDMS designs, met with the NRC to discuss an approach for mitigating an inadvertent boron dilution event without the use of the BDMS, which was consistent with the guidance provided in Standard Review Plan (SRP) Section 15.4.6. By letter dated February 8, 1993, the NRC indicated that the proposed approach was feasible.

Alternate potential solutions, such as relocating detectors, refining methods used to determine the inverse count rate ratio, and attempts to reduce instrument error, have not produced a satisfactory resolution. Therefore, this license amendment request, based on the approach presented in the December 1992 meeting, is hereby submitted.

Description of Technical Specification Change Request

The proposed changes revise Technical Specification 3/4.3.1, Reactor Trip System Instrumentation, to remove reference to the source range boron dilution flux doubling instrumentation and its associated action statement, surveillance and implementation footnotes. The specific changes are listed below:

- Table 3.3-1, Reactor Trip System Instrumentation - Delete reference to table notation "***" in items 6a and 6b, concerning the operability of the Boron Dilution Flux Doubling instrumentation.
- Table 3.3-1, Table Notations - Delete Table Notation "***" concerning blocking flux doubling signals during reactor startup.
- Table 3.3-1, Action Statements - In Action 5a and 5b delete references to verification of position of valves BG-V178 and BG-V601.
- Table 4.3-1, Reactor Trip System Instrumentation Surveillance Requirements - In item 6, Source Range, Neutron Flux, delete the reference to note 12 in the Channel Calibration column.
- Table 4.3-1, Table Notations - Delete the portion of Table Notation (9) concerning the quarterly verification of Boron Dilution Alarm Setpoint. Also delete Table Notation (12) concerning the 18 month Surveillance Requirement of the Boron Flux Doubling circuitry.

Assessment of Proposed Change

In conjunction with this proposed change a number of enhancements will be made to plant hardware and operating procedures, including:

- Installation of two additional high level alarms on the volume control tank (VCT), with the alarm setpoints lower than the current high-high VCT level alarm, for improved instrumentation reliability and timeliness in identifying a potential dilution event.
- Revision to the normal operating mode of the letdown divert valve from "AUTO" to "VCT." This change enhances operator awareness during planned dilution events and eliminates the potential for masking an inadvertent dilution during routine plant operations.
- Installation of an alarm on the letdown divert valve to annunciate when the valve is not in the "VCT" position, to heighten operator awareness of the potential for a dilution event during and following planned plant evolutions.
- Revisions to operating procedures to heighten operator awareness during evolutions that potentially impact boron dilution and to include the new

alarms and indications for timely event recognition as well as the necessary actions required to terminate the event.

- Revisions to plant operating procedures to require the operation of at least one reactor coolant pump in Modes 3, 4 and 5, or have a valve in the flow paths of potential boron dilution sources closed or under administrative control. This change supports the revised analysis of the inadvertent boron dilution event which takes credit for the mixing volume associated with the operation of a reactor coolant pump in Modes 3, 4 and 5.

The enhancements described above have no impact on any event other than boron dilution. The physical modification, such as the addition of alarms and position indication, will be implemented in accordance with existing plant criteria. Because the alarms and indication only provide information and do not affect operations, they cannot adversely impact other events. The position of the letdown divert valve only affects the path for letdown flow. The flowpath selected for letdown does not affect any safety analyses. Thus, the operational change to make "VCT" the normal operating mode has no safety impact. The procedural changes heighten the awareness of potential dilution events or provide alarm responses to mitigate potential dilution events. As such, these changes enhance the response to inadvertent boron dilution events but have no other safety impact. The procedural requirement for reactor coolant pump operation or boron dilution path isolation/control in Modes 3, 4 and 5, enhances the plant operators' response to an inadvertent boron dilution event. Running with at least one reactor coolant pump operating in Modes 3, 4 and 5 is already allowed by technical specifications. Thus, there is no impact on safety. Isolating the dilution sources in Modes 3, 4 and 5 also has no safety impact. None of the accident analyses take credit for these sources in the mitigation of the accident. When plant evolutions require dilution of the RCS, the process is administratively controlled and closely monitored by the operator.

As discussed in the Enclosure, the BDMS alone could not be shown to prevent the plant from returning to critical following an inadvertent boron dilution event. With the enhancements listed above, sufficient time is provided for the plant operators to take the necessary action to prevent a return to critical. The BDMS itself has no impact on any other event. Thus, the portion of the change deleting the BDMS from the technical specifications has no other impact on safety.

The BDMS flux multiplication alarm will be retained as a plant design feature to provide the plant operators a diverse method for identifying a potential dilution event.

Enclosure 1 provides a detailed Safety Analysis of the postulated inadvertent boron dilution event in Modes 3, 4 and 5 using the revised analytical methodology discussed with the NRC at the December 15, 1992 meeting. With this revised method, it is recognized that the Chemical and Volume Control System (CVCS) and the RCS (RCS) form a closed system, and mass imbalances which may affect the RCS may be detected in the CVCS. The analysis demonstrates that positive indication of an inadvertent boron dilution event occurrence is provided to the operator and that sufficient time is available

to perform all requisite activities necessary to terminate the event prior to the loss of all shutdown margin. Indications available to the operator include the Volume Control Tank water level indications and alarms, as well as other diverse backup indications and alarms (such as the source range flux multiplication alarm).

WCGS Cycle 9 specific boron dilution event analyses, discussed in the enclosure and based on the enhancements discussed above, show that the event will be terminated before there is a complete loss of shutdown margin and that operator action will not be credited in the analyses until at least 15 minutes after the alarm which announces the inadvertent dilution (30 minutes when in the refueling mode).

Discussions provided in NSAC-183 and Generic Letter (GL) 85-05 indicated that an unmitigated inadvertent boron dilution event is self limiting, due to inherent core reactivity feedback mechanisms, and no fuel damage is expected. GL 85-05 required that protection against an inadvertent boron dilution event be provided by meeting the criteria specified in the Standard Review Plan (SRP). As discussed in Enclosure 1, the proposed change is consistent with the SRP guidance. Therefore, the level of protection also continues to be adequate. Thus, the consequences of the event are not significantly affected by the proposed changes.

ATTACHMENT II

NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

No Significant Hazards Consideration Determination

This license amendment request proposes incorporating the attached changes into the WCGS Technical Specifications. The proposed changes replace the requirements associated with the Boron Dilution Mitigation System (BDMS) in the WCGS Technical Specifications with alarms, indicators, procedures and controls to assure proper resolution of potential inadvertent boron dilution events.

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

The only event potentially impacted by the proposed change is the inadvertent boron dilution event. The discussion of the probability and consequences of an inadvertent boron dilution event at WCGS is provided in USAR Section 15.4.6. Primarily, the proposed changes revise the method of detecting and mitigating the event. The only aspect of the changes that impact the potential causes of an inadvertent boron dilution event is the increased requirement to isolate potential dilution sources in Modes 3, 4 and 5. As a result, the overall probability of the event is slightly decreased.

The alternate methods to detect and mitigate this event achieve the same basic goal as the current BDMS; to prevent a return to critical during an inadvertent dilution event. The proposed changes to the BDMS will result in an improved system that will provide an improved response to the inadvertent boron dilution event, and that will prevent a return to critical. Thus, it can be concluded that the proposed change will not significantly increase the consequences of a postulated inadvertent boron dilution event.

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

The revisions to plant procedural requirements to either operate a reactor coolant pump or to isolate/control potential dilution sources does not create the potential for a new or different kind of accident because these new requirements are configurations which have always been allowed. Similarly, the new normal position for the letdown divert valve does not create a new or different accident because the new normal position has always been an allowed position. The other procedural changes only increase the plant operators' awareness of potential boron dilution problems or provide the steps needed to respond to available indications and alarms to mitigate the potential event. As a result, these procedural changes do not create the possibility of a new or different kind of accident.

The proposed changes also include addition of new redundant VCT high level alarms and a new alarm indicating that the letdown divert valve is not in the "VCT" position. Because the alarms are passive, they do not create the possibility of a new or different kind of accident.

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

The design criterion and margin of safety for the current BDMS is that the dilution event is terminated prior to the loss of all shutdown margin. The same criterion will be met following the implementation of the proposed changes. Therefore, there is no reduction in the margin of safety.

Based on the above discussions, it has been determined that the requested technical specification changes 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 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 III
ENVIRONMENTAL IMPACT DETERMINATION

Environmental Impact Determination

This amendment request meets the eligibility criteria for categorical exclusion set forth 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 consideration

- (ii) **there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite**

The proposed changes do not involve a change to the facility or operating procedures which would create new types of effluents. The alternate methods to detect and mitigate the inadvertent boron dilution event achieve the same basic goal as the current BDMS; to prevent a return to critical during an inadvertent dilution event. The proposed changes will provide an improved response to the inadvertent boron dilution event, and will not increase the consequences of a postulated inadvertent boron dilution event. Therefore, all offsite and control room doses will remain within the limits of 10 CFR 100 and 10 CFR 50 Appendix A, GDC 19.

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

The proposed revisions to plant procedural requirements either permit configurations which have always been allowed, increase the plant operators' awareness of potential boron dilution problems, or provide the steps needed to respond to available indications and alarms to mitigate the potential inadvertent boron dilution event. These changes do not adversely affect any radioactive systems or increase any radioactive effluents. Thus, these changes will not result in a significant increase in individual or cumulative occupational radiation exposure.

Based on the above, it is concluded that there will be no impact on the environment resulting from the proposed changes and that the proposed changes meet 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.

ATTACHMENT IV
PROPOSED TECHNICAL SPECIFICATION CHANGE