WOLF CREEK
NUCLEAR OPERATING CORPORATION

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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 Bases

Gentlemen:

This letter transmits several clarifications to the Wolf Creek Generating Station Technical Specification Bases. Attachment I provides background information and justification for the changes.

Attachment II consists of affected Technical Specification Bases pages marked-up to show the clarification.

If you have any questions regarding the changes, please contact me at (316) 364-8831 Ext. 4553 or Mr. Kevin J. Moles of my staff at Ext. 4565.

Very truly yours,

Robert C. Hagan

Robert C. Hagan
Vice President
Nuclear Assurance

RCH/jra

Attachment I - Background and Justification
Attachment II - Marked-Up Bases Pages

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STATE OF KANSAS )
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Robert C. Hagan, of lawful age, being first duly sworn upon oath says that he is Vice President Nuclear Assurance 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
Nuclear Assurance

SUBSCRIBED and sworn to before me this 22 day of Dec., 1992.

DENISE L. LAWHORN
NOTARY PUBLIC
STATE OF KANSAS
My Appt. Exp. 1/08/96

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Notary Public

Expiration Date 1/08/96

# BACKGROUND AND JUSTIFICATION FOR REVISION TO TECHNICAL SPECIFICATION BASES REGARDING POSITIVE REACTIVITY INSERTIONS AND REDUCTIONS IN RCS BORON CONCENTRATION

## 1.0 INTRODUCTION

Several technical specification action statements require suspension of all operations involving positive reactivity changes whenever impairments occur to 1) systems and equipment required to mitigate boron dilution events, 2) equipment required to detect and mitigate reactivity addition accidents and transients, or 3) equipment required to mitigate the effects of an inadvertent criticality event.

Other action statements require suspension of all operations involving a reduction in boron concentration of the reactor coolant system (RCS) whenever insufficient coolant flow is available to adequately mix the coolant and promote gradual reactivity changes during the reduction.

A listing of the applicable action statements is provided in Table 1.

At times during reactor shutdown evolutions, the RCS boron concentration may be maintained very much greater than the minimum required. If plant conditions involve entering the action statement of one of the technical specifications identified in Table 1, any addition of water with a boron concentration less than the RCS would constitute a violation to technical specification requirements, i.e., it would result in a positive reactivity change or a reduction in RCS boron concentration. A violation would occur even though the boron concentration in the added water exceeds the concentration required to be maintained in the Refueling Water Storage Tank (RWST) for mitigating boron dilution events and maintaining shutdown margins. Therefore, a clarification is proposed to the bases of the affected specifications to state that the addition of RWST water or equivalent (i.e. water with a minimum boron concentration equal to that of the RWST) is not considered to be either a positive reactivity change or a reduction in boron concentration. Justification for this clarification is provided in the following section.

## 2.0 EVALUATION

The action statements in question prohibit evolutions that add positive reactivity or reduce the boron concentration of the RCS. Neither the action statements nor the corresponding Technical Specification Bases provide quantitative limits or define the safety margins available during these evolutions. The proposed clarification to the bases would allow reactivity additions or RCS boron concentration reductions as long as they were made within the quantitative limits defined by the RWST boron concentration.

The RWST limit for boron concentration (which is currently a minimum of 2400 ppm) has been used to define safety margins as discussed in the bases to specifications 3/4.1.2, Boration Systems. The RWST water, in the proper quantity, has been shown to provide the shutdown margin requirements of 1.3% delta k/k for Mode 5. (In Mode 6, the limitations on reactivity are $K_{eff}$ no greater than 0.95 or a boron concentration of at least 2000 ppm whichever is more restrictive).

The RWST concentration has also been used to evaluate boron dilution events in the Updated Safety Analysis Report (USAR) Section 15.4.6. The boron dilution mitigating equipment, upon detecting a neutron flux doubling, alarms and automatically aligns the charging pump suction to the RWST. Injection of RWST water terminates the dilution event and regains lost shutdown margin.

The RWST is also the main source of coolant that plant operators would rely on to provide makeup to the RCS should an inadvertent draining of the RCS occur. The operators should not be put in the position of deliberately violating a technical specification while taking action to place the plant in a safe condition, 10 CFR 50.54(x) not withstanding.

The above discussion shows that the RWST, with its boron concentration maintained in accordance with specifications 3.1.2.5 and 3.1.2.6, will be the main source of RCS makeup regardless of the initial RCS boron concentration. The addition of RWST water, or its equivalent, should not result in a violation of technical specification requirements.

With regard to the reduction in boron concentration that could occur as the result of adding RWST water or its equivalent, it should be noted that the RWST boron concentration is sufficient to provide the required shutdown margin. If a pocket of coolant with RWST or equivalent boron concentration should accumulate in an idle RCS loop and subsequently be swept into the reactor core, there is no danger of an inadvertent criticality even though a positive reactivity addition would occur. Therefore, injecting RWST water, or equivalent, should not involve a violation of technical specifications.

The action statement for Technical Specification 3.4.2.1 involves placing an RHR loop in operation in the shutdown cooling mode. An implication of this action is that a cooldown of the RCS may be necessary in order to return a code safety valve to an operable condition. In this case, the proposed revision to the technical specification bases includes a statement that the RCS cooldown, if it represents a positive reactivity change, for the purpose of restoring valve operability is not considered to be a positive reactivity addition provided that the RCS has been borated to cold shutdown, Xenon-free conditions.

## 3.0 CONCLUSIONS

Based on the evaluation above, it is proposed that:

1. The bases to Technical Specifications 3/4.1.2, 3/4.3.1, 3/4.7.6, 3/4.8.1, 3/4.8.2, 3/4.8.3, and 3/4.9.2 be revised to add the statement, "When determining compliance with action statement requirements, addition to the RCS of borated water with a concentration greater than or equal to the minimum required RWST concentration shall not be considered to be a positive reactivity change."

Note that the clarification will not significantly impact Technical Specification 3.3.1 action 4, because this action applies in Mode 2, startup, and the critical boron concentration will be less than the RWST concentration. Therefore, adding RWST or equivalent water does not involve a positive reactivity change under these conditions.

2. The bases to Technical Specification 3/4.4.1 and 3/4.9.8 be revised to add the statement: "Addition of borated water with a concentration greater than or equal to the minimum required RWST concentration but less than the actual RCS boron concentration shall not be considered a reduction in boron concentration".

3. The bases to Technical Specification 3/4.4.2 be revised to add the statement, "Addition to the RCS of borated water with a concentration greater than or equal to the minimum required RWST concentration shall not be considered a positive reactivity change. Cooldown of the RCS for restoration of operability of a pressurizer code safety valve, with a negative moderator temperature coefficient, shall not be considered a positive reactivity change provided the RCS is borated to the COLD SHUTDOWN, Xenon-free conditions per specification 3.1.1.2".

TABLE 1

Action statements requiring the suspension of all operations that involve positive reactivity changes or a reduction in reactor coolant boron concentration.

3.1.2.1 Action: With none of the above flow paths OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes. (Mode 4, 5, and 6)

Bases: The Boration System ensures that negative reactivity control is available during each mode of facility operation.

3.1.2.3 Action: With no centrifugal charging pump OPERABLE or capable of being powered from an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes. (Mode 4, 5, and 6)

Bases: The Boration System ensures that negative reactivity control is available during each mode of facility operation.

3.1.2.5 Action: With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes. (Modes 5 and 6)

Bases: The Boration System ensures that negative reactivity control is available during each mode of facility operation.

3.3.1 Action: ACTION 4 - With the number of OPERABLE channels one less than the minimum channels OPERABLE requirements suspend all operations involving positive reactivity changes (applicable to source range, Neutron Flux during startup in Mode 2 below P-6).

ACTION 5 - a. With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or open the Reactor Trip Breakers, suspend all operations involving positive reactivity changes and verify valves BG-V178 and BG-V601 are closed and secured in position within the next hour. b. With no channels OPERABLE, open the Reactor Trip Breakers, suspend all

operations involving positive reactivity changes, and verify compliance with the SHUTDOWN MARGIN requirements of specification 3.1.1.1 or 3.1.1.2, as applicable, within 1 hour and every 12 hours thereafter, and verify valves BG-V178 and BG-V601 are closed and secured in position within 4 hours and verified to be closed and secured in position every 14 days, (Applicable to source range, Neutron Flux during shutdown in Modes 3, 4, and 5)

Bases: The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. (The source range detectors prevent and mitigate potential reactivity addition events per USAR Section 15.4)

3.4.1.2 Action: With no reactor coolant loops in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required reactor coolant loops to operation. (Mode 3)

Bases: The operation of one reactor coolant pump (RCP) or one RHR pump provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reduction will, therefore, be within the capability of operator recognition and control.

3.4.1.3 Action: With no reactor coolant or RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant system and immediately initiate corrective action to return the required coolant loop to operation. (Mode 4).

Bases: The operation of one reactor coolant pump (RCP) or one RHR pump provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reduction will, therefore, be within the capability of operator recognition and control.

3.4.1.4.1 Action: With no RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the require RHR loop to operation. (Mode 5 with RCS loop filled)

Bases: The operation of one reactor coolant pump (RCP) or one RHR pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reduction will, therefore, be within the capability of operator recognition and control.

3.4.1.4.2 Action: With no RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required RHR loop to operation. (Mode 5 with RCS loops not filled)

Bases: The operation of one reactor coolant pump (RCP) or one RHR pump provides adequate flow to ensure mixing, prevent stratification, and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reduction will, therefore, be within the capability of operator recognition and control.

3.4.2.1 Action: With no pressurizer Code safety valve OPERABLE, immediately suspend all operations involving positive reactivity changes and place an OPERABLE RHR loop into operation in the shutdown cooling mode. (Modes 4 and 5)

Bases: No bases are given; however, it can be assumed that the action statement is intended to avoid a pressurization of the RCS resulting from an inadvertent criticality and power surge.

3.7.6 Action: With both Control Room Emergency Ventilation Systems inoperable, or with the OPERABLE Control Room Emergency Ventilation System required to be in the recirculation mode by ACTION a., not capable of being powered by an OPERABLE emergency power source, suspend all operations involving CORE ALTERATIONS or positive reactivity changes. (Mode 5 and 6)

Bases: The OPERABILITY of the Control Room Emergency Ventilation System ensures that: (1)..., and (2) the control room will remain habitable for operations personnel during and following all credible accident conditions.

3.8.1.2 Action: With less than the above minimum A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operations with loads over the spent fuel pool. In addition,... (Mode 5 and 6)

Bases: The bases for the action statement are not specifically stated; however, it can be assumed that the intention is to avoid any accidents that could cause a release of radioactivity during the time that electrical power to monitoring and mitigating systems is impaired.

3.8.2.2 Action: With the required battery bank and/or full capacity charger inoperable, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, or movement of irradiated fuel;... (Mode 5 and 6)

Bases: The bases for the action statement are not specifically stated; however, it can be assumed that the intention is to avoid any accidents that could cause a release of radioactivity during the time that electrical power to monitoring and mitigating systems is impaired.

3.8.3.2 Action: Without one of the above required divisions of electrical busses energized in the required manner, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, or movement of irradiated fuel;... (Mode 5 and 6)

Bases: The bases for the action statement are not specifically stated, however, it can be assumed that the intention is to avoid any accidents that could cause a release of radioactivity during the time that electrical power to monitoring and mitigating systems is impaired.

3.9.1 Action: With the requirements of the above specifications not satisfied, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes and initiate and continue boration at greater than or equal to 30 gpm of a solution containing greater than or equal to 7000 ppm boron or its equivalent until $K_{eff}$ is reduced to 0.95 or the boron concentration is restored to greater than or equal to 2000 ppm, whichever is more restrictive. (Mode 6)

Bases: The limitation on reactivity conditions during REFUELING ensures that: (1) the reactor will remain subcritical during CORE ALTERATIONS, and (2) a uniform boron concentration is maintained for reactivity control in the water volume having direct access to the reactor vessel.

3.9.2 Action: With one of the above required monitors inoperable or not operating, immediately suspend all operations involving CORE ALTERATIONS or positive reactivity changes. (Mode 6)

Bases: The OPERABILITY of the source range neutron flux monitors ensures that redundant monitoring capability is available to detect changes in the reactivity condition of the core.

3.9.8.1 Action: With no RHR loop OPERABLE and in operation, suspend all operations involving an increase in the reactor decay heat load, or a reduction in boron concentration of the reactor concentration of the reactor system and...(Mode 6 with >23 feet of water above the vessel flange)

Bases: The requirement that at least one residual heat removal (RHR) loop be in operation ensures that: (1)..., and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.

3.9.8.2 Action: With no RHR loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to ... (Mode 6 with <23 feet of water above the vessel flange).

Bases: The requirement that at least one residual heat removal (RHR) loop be in operation ensures that: (1) ..., and (2) sufficient coolant circulation is maintained through the core to minimize the effect of a boron dilution incident and prevent boron stratification.