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VPNPD-97-008

10 CFR 50.4
10 CFR 50.90

January 16, 1997

Document Control Desk
US NUCLEAR REGULATORY COMMISSION
Mail Station P1-137
Washington, DC 20555

Gentlemen:

DOCKETS 50-266 AND 50-301
TECHNICAL SPECIFICATIONS CHANGE REQUEST 191
BORON CONCENTRATION CHANGES
TO SUPPORT 18-MONTH FUEL CYCLES
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

In accordance with the requirements of 10 CFR 50.4 and 50.90, we request amendment of plant Technical Specifications. The proposed amendment changes the minimum boron concentration required in storage tanks during normal operation and the minimum boron concentration of primary coolant during refueling conditions. The additional negative reactivity provided by these changes is required of primary coolant to maintain the design basis shutdown criteria when PBNP units transition to 18-month core designs. Limits on primary coolant boron concentration during refueling will be revised, as well as limits on minimum boron concentration of refueling water storage tanks (RWSTs), boric acid storage tanks (BASTs), and safety injection accumulators. This change is necessary to support loading of the 18-month core for Unit 1 Cycle 25 in the spring of 1997.

A description of the proposed changes, a safety evaluation, an assessment of no significant hazards, and edited Technical Specifications pages are provided as attachments to this letter.

DESCRIPTION OF CURRENT LICENSE CONDITION

The basis section of Technical Specification 15.3.2, "Chemical and Volume Control System" states that the minimum required RWST supply of borated water to achieve the design basis cold shutdown is approximately 24,100 gallons of 2,000 ppm borated water. The [RWST] volume requirement is associated with boration from just critical, hot zero or full power, peak xenon with control rods at the insertion limit, to xenon-free, cold shutdown with the highest worth control rod assembly fully withdrawn.

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Technical Specification Table 15.3.2-1 describes the minimum BAST inventory for the associated range of boric acid concentration in the tanks. The minimum required BAST inventory ranges from 6,860 gallons for a 3.0 weight percent solution, to a minimum required inventory of 1,750 gallons for an 11.5 weight percent solution. The quantity of boric acid specified in the table for each concentration is the quantity necessary per reactor relying on the BAST(s) as a borated water source to borate the reactor coolant to the required cold shutdown concentration from any anticipated condition assuming the most reactive control rod is fully withdrawn. The volume requirements listed in the table are based on the lower boric acid concentration in each range.

Technical Specification 15.3.3.A.1.b states that the minimum supply of borated water from each safety injection accumulator must be 1,100 cubic feet, but no more than 1,136 cubic feet of water with a boron concentration of at least 2,000 ppm. Technical Specification 15.3.3.A.1.a states that the minimum supply of borated water from the RWST must be 275,000 gallons of water with a boron concentration of at least 2,000 ppm.

Technical Specification 15.3.6.D states that positive reactivity changes shall not be made by boron dilution when the containment integrity is not intact unless the boron concentration in the reactor is maintained >1,800 ppm. The TS Bases state that maintaining the boron concentration greater than 1,800 ppm precludes criticality in the event of required boron dilution activities or small concentration fluctuations that may occur during preparation for, recovery from, or during refueling operations. 1,800 ppm is a nominal value that ensures 5% shutdown for typical reload cores.

Technical Specification 15.3.8.5 states that a minimum boron concentration of 1,800 ppm shall be maintained in the primary coolant system during reactor vessel head removal and while loading and unloading fuel from the reactor. The Bases for TS 15.3.8.5 state that the boron concentration of refueling cavity water is sufficient to maintain the reactor subcritical by approximately 5% $\Delta k/k$ in the cold condition with all rods inserted.

CONCLUSION

We have determined that the proposed amendments do not involve a significant hazards consideration, authorize a significant change in the types or total amounts of any effluent release, or result in any significant increase in individual or cumulative occupational exposure. Therefore, we conclude that the proposed amendments meet the requirements of 10 CFR 51.22(c)(9) and that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared.

These changes are necessary to support loading of the new core design for Unit 1 Cycle 25 in the spring of 1997. Therefore, we request approval of these changes by April 1, 1997.

If you require additional information, please contact us.

Sincerely,

G M Krieser

Gary Krieser
Manager-Nuclear Industry
& Regulatory Services
Nuclear Power

GDA

cc: NRC Resident Inspector
NRC Regional Administrator
PSCW

Subscribed and sworn to before me
this 16th day of January, 1997

Jacqueline Gorecki
Notary Public, State of Wisconsin

My Commission expires 10/24/2000

Attachments:

1. Description of Proposed Changes and Justification of the Change
2. Safety Evaluation
3. No Significant Hazards Consideration
4. Edited Technical Specification Pages

Westinghouse has conducted analyses to support the anticipated core designs associated with extended fuel cycles. These analyses assume a change from the current 12-month fuel cycle to a nominal 18-month fuel cycle. Energy requirements are based on 510 Effective Full Power Days. The change to 18-month fuel cycles is scheduled to start with the Unit 1 refueling outage in the spring of 1997.

Although final core design and operating limits may not be completed until spring 1997, Westinghouse has developed typical core loading patterns that show sufficient margin to safety parameter limits to allow flexibility in designing actual reload cores for the Point Beach units. Boron concentrations were determined for transition and equilibrium cores at various points in the cycle assuming different core conditions. The NRC-approved methodologies described in WCAP-9273-NP-A "Westinghouse Reload Safety Evaluation Methodology" (July 1985) have been used.

In preparation for implementing 18-month core operating cycles at Point Beach Units 1 and 2, the licensing basis and Technical Specifications have been reviewed to identify any necessary changes. That review identified the proposed Technical Specification changes discussed herein. This evaluation does not address all the effects of the anticipated core designs. Specific core reload safety evaluations will address the effects of specific core designs.

To achieve nominal 18-month core operating cycles, calculations have been performed to model typical core designs. The increased energy requirements of these core designs require some boron concentration changes to ensure that the existing safety margins are maintained. The results of this review and the proposed Technical Specification changes are discussed below, and in the attached safety evaluation.

1. **TS 15.3.2 Bases** will be revised to reflect the increased boric acid inventory requirements assigned to the RWST for the cold shutdown reactivity analysis. To provide the additional negative reactivity required by the typical 18-month core designs, the minimum RWST boron concentration and the minimum RWST inventory is being increased. The minimum RWST volume and boron concentrations must be increased from 24,100 gallons at 2,000 ppm to values of 26,600 gallons at 2,700 ppm. In addition, we propose to delete the description of BAST/RWST volume requirements as a "maximum" volume requirement. The "maximum" description has been considered misleading.

   To allow the necessary boron changes to Unit 1 while Unit 2 is operating with its existing core design, we desire to implement the RWST boron concentration change during the next refueling outage for each unit. As such, these proposed changes will be implemented for Unit 1 during the Spring 1997 refueling outage (U1R24) and for Unit 2 during the Fall 1997 refueling outage (U2R23). Specifically, the RWST concentration must be

increased prior to leaving the cold shutdown condition during the startup from those outages. From the time this TSCR is implemented until U2R23, Unit 2 will be operating with the existing RWST parameters. Therefore, the following footnote is being added to clarify this situation:

"These RWST parameters are in effect prior to leaving the cold shutdown condition for Unit 1 (following U1R24) and for Unit 2 (following U2R23). Prior to U2R23, the Unit 2 minimum RWST volume and boron concentration for this basis statement is 24,100 gallons and 2,000 ppm respectively."

2. **TS Table 15.3.2-1**. This table will be revised to reflect the increased boric acid inventory requirements assigned to the BAST(s) for the cold shutdown reactivity analysis. To provide the additional negative reactivity required by the typical 18-month core designs, the minimum required BAST inventory for any given boron concentration is being increased. The typical reactor core designs associated with extended fuel cycles indicate that the minimum BAST volume at a boric acid concentration of 3.00 weight percent should be 7,950 gallons (presently, 6,860 gallons). The minimum BAST volume at a boric acid concentration of 11.50 weight percent should be 2,000 gallons (presently, 1,750 gallons). The calculated values within that range have also been proposed for revision.

3. **TS 15.3.3.A.1.a** will be revised to reflect the increased boric acid inventory requirements assigned to the RWST for power operation with reactor cores designed for extended fuel cycles. The limiting analysis for this boron requirement is the post-LOCA subcriticality analysis. According to this analysis, the minimum RWST boron concentration must be increased from 2,000 ppm to 2,700 ppm. Note that we have requested removal of this boron concentration parameter from the TS in our Core Operating Limits Report (COLR) submittal because it is one of those reactor physics parameters that may change with each core reload. In this interim period, prior to COLR approval, we propose to revise this parameter as noted. (Reference our December 13, 1995 submittal entitled "Technical Specification Change Request 185, Core Operating Limits Report").

   As mentioned previously, we desire to implement the RWST parameter changes after the next refueling outage of each unit. Therefore, the following footnote is being added to clarify this situation:

   "This value is in effect prior to leaving the cold shutdown condition for Unit 1 (following U1R24) and for Unit 2 (following U2R23). Prior to U2R23, the Unit 2 minimum RWST boron concentration is 2,000 ppm."

4. **TS 15.3.3.A.1.b** will be revised to reflect the increased boric acid inventory requirements assigned to the safety injection accumulators for power operation with reactor cores designed for extended fuel cycles. The limiting analysis for this boron

requirement is the post-LOCA subcriticality analysis. According to this analysis, the minimum accumulator boron concentration must be increased from 2,000 ppm to 2,600 ppm. The resulting accumulator boron inventory in combination with the RWST inventory achieve the minimum required boron concentrations to maintain at least 100 ppm of margin to the post-LOCA subcriticality limit. Note that we have requested removal of this boron concentration parameter from the TS in our COLR submittal because it is one of those reactor physics parameters that may change with each core reload. In this interim period, prior to COLR approval, we propose to revise this parameter as noted.

For the same reasons used for the RWST parameters, we desire to implement the SI accumulator boron concentration changes after the next refueling outage of each unit. Therefore, the following footnote is being added to clarify this situation:

"This value is in effect prior to leaving the cold shutdown condition for Unit 1 (following U1R24) and for Unit 2 (following U2R23). Prior to U2R23, the Unit 2 minimum SI accumulator concentration is 2,000 ppm."

5. **TS 15.3.6.D and Bases** will be revised to reflect a higher value of boron concentration required to maintain the 5% shutdown margin during refueling for typical reload cores. Core neutronic studies of the typical core designs for 18-month cycles have determined that boron concentrations as high as 2,100 ppm may be required. In addition, the reference in the TS Bases to FSAR Section 14.1.5 will be revised to reference FSAR Section 14.1.4, which is the appropriate reference for boron dilution analyses.

6. **TS 15.3.8.5** will be revised to reflect the increased boron concentration required in the primary coolant when refueling the typical core designs associated with extended fuel cycles. The analysis has determined that the boron concentration must be increased to 2,100 ppm to achieve the required 5% $\Delta k/k$ shutdown margin during refueling operations and provide the necessary response time for postulated boron dilution events. As stated in the TS Bases, this margin will keep the core subcritical even if all control rods are withdrawn from the core in this condition.

INTRODUCTION

Wisconsin Electric Power Company has applied for amendments to the Point Beach Nuclear Plant Technical Specifications. The proposed revisions will increase the minimum required boron inventory of various systems to maintain the shutdown margins prescribed by Technical Specifications. The increased boron inventory is necessary to provide the operational flexibility for pending extended fuel cycle reactor core designs. Typical core designs indicate that the minimum required boron inventory assigned to Boric Acid Storage Tanks (BASTs), Refueling Water Storage Tanks (RWSTs), safety injection accumulators, and the primary coolant system (during refueling) must increase.

As described in FSAR 9.2, either the RWST or the BAST(s) may be used to provide the technical specification required volume of borated water needed for cold shutdown of a unit. Periodic sampling is performed in accordance with Technical Specifications to ensure the desired concentrations are maintained. Each of the three BASTs has a capacity of 5,000 gallons, and may be shared by Unit 1 and Unit 2. One tank is normally aligned to each unit of the two-unit station and the third tank acts as a standby. One 275,000 gallon RWST is aligned to supply each unit.

Note that several of these parameters are addressed in our Technical Specification Change Request TSCR 185, "Core Operating Limits Report", dated December 13, 1995.

EVALUATION

The performance requirements of the chemical and volume control system (CVCS) and safety injection (SI) systems are described in sections 3.1.2, 6.2, and 9.2 of the FSAR. The applicable general design criteria (GDC) are defined in the PBNP Final Safety Analysis Report (FSAR):

GDC 27 Two independent reactivity control systems, preferably of different principles, shall be provided.

GDC 28 The reactivity control system provided shall be capable of making and holding the core subcritical from any hot standby or hot operating condition.

GDC 29 One of the reactivity control systems provided shall be capable of making the core subcritical under any anticipated operating condition (including anticipated operational transients) sufficiently fast to prevent exceeding acceptable fuel damage limits. Shutdown margin should assure subcriticality with the most reactive control rod fully withdrawn.

GDC 30 The reactivity control systems provided shall be capable of making the core subcritical under credible accident conditions with appropriate margins for contingencies

and limiting any subsequent return to power such that there will be no undue risk to the health and safety of the public.

GDC 31 The reactor protection systems shall be capable of protecting against any single malfunction of the reactivity control system, such as an unplanned continuous withdrawal (not ejection or dropout) of a control rod, by limiting reactivity transients to avoid exceeding acceptable fuel damage limits.

GDC 27. In addition to the reactivity control achieved by the control rods, reactivity control is provided by the chemical and volume control system (CVCS) which regulates the concentration of boric acid solution neutron absorber in the reactor coolant system. The system is designed to prevent uncontrolled or inadvertent reactivity changes which might cause system parameters to exceed design limits.

The injection of boric acid is shown to afford backup reactivity shutdown capability independent of control rods which normally serve this function in the short-term situation. Shutdown for long-term and reduced temperature conditions can be accomplished with boric acid injection using redundant components. Boric acid solution can be supplied from either the RWST or the BAST(s). This solution can be transferred directly by the charging pumps. For added flexibility, the safety injection pumps can also be supplied with boric acid solution from either the BAST(s) or the RWST.

GDC 28. FSAR 9.2.1 states that the reactivity control systems are capable of making and holding the core subcritical from any hot standby or hot operating condition, including conditions resulting from power changes. This includes the maximum excess reactivity expected for the core, which occurs for the cold, clean condition at the beginning of life of the initial core. Upon demand for the hot shutdown condition, insertion of control rods will immediately make the reactor subcritical from any hot operating condition. Subsequent injection of soluble poison can be used to assure continuation of the hot shutdown condition under all circumstances.

GDC 29. FSAR 9.2.1 specifies that GDC 29 applies to the control rod shutdown function in the short-term, with reliance on boron addition for the long-term. The control rods are the one reactivity control system that can make the core subcritical sufficiently fast to prevent exceeding acceptable fuel damage limits in the short-term. Sufficient shutdown capability is also provided to maintain the core subcritical with the most reactive rod assumed to be fully withdrawn, for the most severe anticipated cooldown transient associated with a single active failure. This is achieved with a combination of control rods and automatic boron addition via the CVCS or SI system. The required volume of boric acid to achieve the cold shutdown condition is proposed

herein. If the BAST is the available source, the specified volume proposed in TS Table 15.3.2-1 must be available. If the RWST is the available source, the specified volume in proposed TS Bases 15.3.2 must be available.

GDC 30. FSAR 9.2.1 states that normal reactivity shutdown capability is provided by control rods with soluble neutron absorber (boric acid) injection used to compensate for the long term xenon decay transient and for plant cooldown. Any time the reactor is at power, the quantity of boric acid retained in the BAST(s) and/or the RWST and ready for injection always exceeds that amount required for normal cold shutdown. This quantity will always exceed that amount required to bring the reactor to hot shutdown and to compensate for subsequent xenon decay. Boric acid may be pumped from the BAST(s) by one of two boric acid transfer pumps (or via gravity-feed from the RWST) to the suction of one of the three charging pumps which inject boric acid into the reactor coolant.

FSAR 9.2 also describes the capability of the CVCS pumps (one charging pump or BATP) to shut down the reactor in a 75-minute time period with no credit for control rod insertion. In 75 additional minutes, enough boric acid can be injected to compensate for xenon decay although xenon decay will not begin until 12-15 hours after shutdown. The description of this capability may be affected by the actual core designs. If the reload safety evaluation of a specific core design demonstrates a different time period than that presently described in the FSAR, the FSAR will be revised accordingly. This description of CVCS capability is not derived from a General Design Criterion (GDC).

The accident analyses were reviewed to ascertain the potential effects of the new core designs for the 18-month fuel cycles. The loss of coolant accident (LOCA) analysis and boron dilution events were the only analyses that specifically required changes to boron concentration parameters. Other design basis accidents, such as Main Steam Line Break, were determined to be less limiting. In any case, all the applicable design basis accidents are reanalyzed for each new core design in accordance with the NRC-approved methodology of WCAP-9273-NP-A "Westinghouse Reload Safety Evaluation Methodology". If the RWST or SI boron concentration limits in the Technical Specifications are inadequate to demonstrate the adequate accident response, the Technical Specifications will be changed necessarily at that time.

Westinghouse performed core neutronic calculations to determine the new post-LOCA subcriticality limit with typical core designs. The RWST and accumulator boron concentrations were varied to establish the minimum required boron concentrations to maintain at least 100 ppm of margin to the new post-LOCA subcriticality limit. These calculations show that the minimum RWST boron concentration for normal power operation must increase from the current value of 2,000 ppm to 2,700 ppm, and the minimum

concentration are proposed in changes to Technical Specifications 15.3.3.A.1.a and 15.3.3.A.1.b, respectively.

GDC 31. As stated in FSAR 9.1, the reactor protection systems are designed to limit reactivity transients to DNBR ≤1.30 due to any single malfunction in the boron dilution controls. In FSAR Section 14.1.4, boron dilution events are analyzed for all phases of plant operation, including; refueling, cold shutdown, startup, and power operation. Significant parameters affecting these analyses include; the number of charging pumps running, RCS volume, and initial system boron concentration. Westinghouse has reviewed the existing limits for these analyses and ensured their validity with the anticipated core designs.

The only specific changes to the analysis assumptions relate to the initial boron concentration associated with the boron dilution during refueling. The refueling boron concentration will be revised from a minimum value of 1,800 ppm to a minimum value of 2,100 ppm. The proposed increase in the minimum boron concentration of primary coolant will ensure that adequate operator response time is available for the postulated boron dilution event. Existing analyses provide for a 30-minute response time, which is ample time for the operator to recognize the audible high count rate signal and isolate the dilute reactor makeup water source.

As stated in Westinghouse WCAP-9273-NP-A, there is no transient analysis of the boron dilution events described in the FSAR. The boron dilution events are classified as Condition II events, and are only analyzed to ensure that adequate time is available for operator action to terminate the event before all shutdown margin is lost. For each new core design, the reload safety evaluation is performed to confirm the validity of the existing safety analyses. These reload safety evaluations are conducted in accordance with Westinghouse WCAP-9273-NP-A, "Westinghouse Reload Safety Evaluation Methodology". The existing safety analysis is defined as the reference safety analysis and is intended to be valid for all plant cycles.

The effects on the Appendix R safe shutdown requirements were reviewed. A calculation showed that an adequate amount of RWST boric acid at 2,700 ppm boron could be injected to achieve and maintain a cold shutdown during recovery from the design basis fire. Ample margin was demonstrated for the beginning-of-life and end-of-life conditions of typical core designs.

The proposed changes were reviewed with respect to previously evaluated accidents. The proposed changes have no effect on the potential initiators of plant accidents, as discussed below.

<u>Higher Boron Concentration During Refueling</u>. The only accidents postulated for refueling conditions include; (1) fuel handling accidents, and (2) boron dilution during refueling. As described in FSAR 14.2.1, fuel handling accidents are initiated by mis-handling and dropping a single fuel assembly. As described in

FSAR 14.1.4, boron dilution events during refueling are initiated by operational errors that lead to charging unborated water at the maximum rate. The proposed incremental change in boron concentration will not contribute to the mishandling of fuel, nor will it increase the likelihood for operational errors that could lead to charging unborated water. Therefore, the probability for an accident to occur is not increased by the proposed changes.

Higher Boron Inventory of RWSTs, BASTs, SI Accumulators. During normal operation, these tanks provide a readily-available source of borated water for the reactor coolant system (RCS). This is a passive function. These tanks do not form an RCS pressure boundary, and do not exchange fluid (to any significant degree) with the RCS during normal operations. Therefore, the only possibility that the proposed changes would increase the probability of an accident would be if there were an accident initiated by the spurious injection of one of these tanks. The PBNP design basis includes no such accidents. Therefore, the probability for an accident to occur is not increased by the proposed changes.

The proposed changes were reviewed with respect to previously evaluated accidents. The proposed changes do have bearing on accident analysis results, but, in nearly all cases, the higher concentration of boron has a positive effect on the analysis results. These results are discussed below.

Higher Boron Concentration During Refueling. The only accidents postulated for refueling conditions include; (1) fuel handling accidents, and (2) boron dilution during refueling. As described in FSAR 14.2.1, radiological consequences of fuel handling accidents are dependent on many factors independent of coolant boron concentration. However, some relationship with the boric acid solution was established in the analysis. The analysis predicts that a significant portion of the halogens from the ruptured fuel would be absorbed into the boric acid solution from the bubbles of fixed gases. Experiments indicated that gaseous iodine was readily transferred to the aqueous boric acid solution and that a high stripping efficiency would result in only 1/1,000 of the incident halogen reaching the pool surface and being available for release to the environment. No specific requirements for boron concentration or solution pH were established in the analysis. The incremental increase in boric acid concentration from 1,800 ppm to 2,100 ppm will have little impact on the solution pH, and therefore, little effect on the capability to strip iodine during the postulated fuel handling accident. Therefore, the consequences of a fuel handling accident are not increased by the proposed changes.

Initial boron concentration is a factor in determining the severity of the boron dilution events described in FSAR 14.1.4, "Chemical and Volume Control System Malfunction". Westinghouse evaluated the parameters of the refueling boron dilution event and determined that the initial concentration of 2,100 ppm in the primary coolant would ensure that the results of the current

licensing basis analysis are still valid for the present and the anticipated core designs needed for the extended operating cycles.

Higher Boron Inventory of RWSTs, BASTs, SI Accumulators. It is inherent to this evaluation that the higher boron inventory of these tanks is proposed for the express objective of providing the same safe shutdown margins and provide the same safety margin for plant accidents for the new core designs that was provided for the existing core designs. Specifically, the higher boron inventories were required by analysis to mitigate the LOCA event by ensuring post-LOCA subcriticality was achieved. Westinghouse performed core neutronic calculations to determine that the minimum RWST boron concentration had to be increased to 2,700 ppm and the SI accumulator boron concentration had to be increased to 2,600 ppm.

The collateral effect of increasing the boron inventory of these tanks is that fluid pH may be reduced marginally and the margin to boron precipitation may be reduced. These collateral effects are evaluated below:

Boron Precipitation in RWST and SI accumulators. As a consequence of increasing the boric acid concentration in the RWST and SI accumulators to a minimum of 2,700 ppm and 2,600 respectively, the potential for boron precipitation was evaluated. Even with consideration of chemical analysis uncertainty, there is ample margin to the solubility limit of boric acid at a temperature of 32 degrees F (At 32 degrees F, the solubility limit is greater than 4,500 ppm boron).

Containment Spray pH Decreases. As a consequence of increased boron concentration in the RWST, containment spray water during the injection phase will have a lower pH for any given addition rate of 30 weight-percent sodium hydroxide (spray additive). The spray solution is modified by adding NaOH to raise the pH and improve its iodine removal capability. FSAR Appendix C states that the containment spray pH is assumed to be in the range of 9.0 to 10.0. As stated in Appendix C, the pH of the spray solution is important to ensure adequate removal of elemental iodine, and the hydrolytic reaction that drives this process is nearly complete at pH > 8. Calculations show that the minimum pH of containment spray with elevated RWST boron concentration will remain at 8.5 or above. Therefore, a small reduction in the containment spray pH below 9 may occur, but the capability of the spray to remove elemental iodine will not be adversely affected.

Containment Sump pH May Decrease. As a consequence of transferring more acidic RWST and SI accumulator contents to the containment sump during the injection phase of an accident, the containment sump may have a lower pH at the end of the injection phase. FSAR Sections 5.6 and 6.4 state that the potential range of containment sump pH is 7.5 to 9.0 after the spray additive is mixed with the reactor coolant and other sources of borated water. The contribution of lower-pH safety

injection water challenges the capability of the spray additive to keep the sump water in the prescribed range of pH.

WE calculations have shown that the range of pH will not change significantly due to the higher concentrations of boric acid in the RWST and SI accumulators. These calculations consider the effects of recent changes to post-LOCA safety injection system operation, including the isolation of the Boric Acid Storage Tanks as the initial supply to safety injection pumps. These calculations show that the equilibrium containment sump pH will remain above 7.5. Maintaining this pH level is important for the following reasons:

(1) A lower sump pH may lose its capacity to retain elemental iodine. As discussed in Westinghouse WCAP-11611, adequate iodine retention will be provided for a sump pH as low as 7.0.

(2) If containment spray is initiated in the recirculation phase of a LOCA, a spray solution pH outside the prescribed range may slightly increase the corrosion rates of materials inside containment. FSAR Sections 5.6 and 6.4 presently discuss the compatibility of materials over a pH range of 7.5 to 9.0. As evaluated in Westinghouse WCAP-11611, the sump pH should be maintained greater than 7.0 to ensure material integrity. Further justification of material integrity for the containment environment is provided in FSAR Section 5.6.

(3) If containment spray is initiated in the recirculation phase of a LOCA, a spray solution pH outside the prescribed range may challenge the existing environmental qualification (EQ) of equipment in containment. Previous WE evaluations (NCR N-89-275) have confirmed the environmental qualification of containment equipment for pH as low as 7.5 to be acceptable.

Therefore, the injection of higher-concentration boric acid to the containment sump during a LOCA has no significant effect on system response. The existing capability of the spray additive system (sodium hydroxide) to adequately neutralize the sump is not challenged.

Potential Onset of Boron Precipitation in the Post-LOCA Core. As a consequence of increasing RWST and SI accumulator boron concentrations, the potential may increase for the onset of boron precipitation in the post-LOCA core. Licensing basis commitments have been implemented in the emergency operating procedures (EOPs) to ensure simultaneous cold leg and reactor vessel injection within 14 hours of the LOCA (Reference NRC SER dated 12/24/75). For large break LOCAs, EOP 1.3 "Transfer to Containment Sump Recirculation" ensures such alignments at the time of transfer to sump recirculation. For small break LOCAs, EOP-1.2, "Small Break LOCA Cooldown And Depressurization" ensures such alignments are complete within the 14-hour limit. Each core reload safety evaluation assesses the injected fluids and ensures

that the 14-hour time limit is still valid. If the core reload safety evaluation identifies a more limiting time requirement, the emergency operating procedures will be revised to reflect that limit.

Material Compatibility with Higher Boric Acid Concentration. Increasing the nominal RWST boron concentration from 2,000 ppm to 2,700 ppm will reduce the pH from approximately 4.62 to 4.46. Increasing the SI accumulator boron concentration from 2,000 ppm to 2,600 ppm will reduce the pH from approximately 4.62 to 4.48. In either case, the solution will remain a mild acid (pH>4), and the corrosive effects on the austenitic stainless steels and other corrosion-resistant materials used in the system will be negligible.

The operation of RWSTs and BASTs at the elevated boric acid concentrations discussed herein has been previously evaluated. Chemistry specifications indicate that the RWST and BAST boric acid concentrations were expected to range as high as 4,000 ppm for the RWST and 12% (21,000 ppm) for the BAST. The solution pH was expected to range down to a value of 4. Therefore, the values of RWST and BAST boron concentration proposed by this TSCR are encompassed by the original specifications.

For the SI accumulators, material specifications indicate that the incremental increase in boron concentration from 2,000 to 2,600 ppm will have no detrimental effect on material integrity. According to purchase specifications, the accumulator vessels are carbon steel with an interior cladding of Type 304 stainless steel. The nominal boron concentration of 2,500 was previously used as a design parameter (FSAR Table 6.2-4). This concentration corresponds to an approximate pH of 4.50. Increasing the boron concentration to 2,600 ppm will only decrease the pH to 4.48. The difference in pH and corrosion-resistance is therefore negligible.

For the adjacent safety injection piping and pressure-retaining components, material specifications also indicate that such components in contact with borated water are constructed of austenitic stainless steel or equivalent corrosion-resistant material to ensure the structural integrity over the design life of the plant. The incremental reduction in accumulator solution pH will keep it within the mild acid regime and not affect the system's corrosion resistance.

CONCLUSION

These changes maintain the original design and licensing bases and ensure the safe and reliable operation of Point Beach Nuclear Plant. The shutdown margins defined in the TS bases and the TS definitions are maintained.

In accordance with the requirements of 10 CFR 50.91(a), Wisconsin Electric Power Company has evaluated the proposed changes against the standards of 10 CFR 50.92 and has determined that the operation of Point Beach Nuclear Plant, Units 1 and 2, in accordance with the proposed amendments does not present a significant hazards consideration. The analysis of the requirements of 10 CFR 50.92 and the basis for this conclusion are as follows:

1. Operation of this facility under the proposed Technical Specifications will not create a significant increase in the probability or consequences of an accident previously evaluated.

   The probabilities of accidents previously evaluated are based on the probability of initiating events for these accidents. Initiating events for accidents previously evaluated are described in the PBNP FSAR.

   In effect, the proposed changes will result in: (1) higher boron concentrations of primary coolant during refueling, and (2) higher boron inventories in the RWSTs, BASTs, and SI accumulators. These changes do not require hardware changes or changes to the operation of accident-mitigating equipment. These changes relate to the performance capability of particular accident mitigation systems; equipment that is not postulated to cause accidents. Therefore, these proposed changes do not cause an increase in the probabilities of any accidents previously evaluated.

   The consequences of accidents previously evaluated in the PBNP FSAR are determined by the results of analyses that are based on initial conditions of the plant, the type of accident, transient response of the plant, and the operation and failure of equipment and systems.

   In effect, the proposed changes will result in: (1) higher boron concentrations of primary coolant during refueling, and (2) higher boron inventories in the RWSTs, BASTs, and SI accumulators. These increased boron concentrations do not increase the probability that engineered safety features equipment will fail, nor do these changes affect the capability of this equipment to operate as required for the accidents previously evaluated in the PBNP FSAR. These changes do not require hardware changes or changes to the operation of accident-mitigating equipment.

   The consequential effects of a lower containment spray pH will not affect the capability of the containment spray to remove elemental iodine during design basis LOCA accidents. Also, the consequential reduction in containment sump water pH will not affect the fluid's capability to retain elemental iodine, nor will it adversely increase the potential corrosion rates for materials inside containment if the sump water is sprayed into containment during the recirculation phase of a LOCA.

Another consequence of injecting a higher concentration boric acid solution into the core during a LOCA may be an abbreviated onset to boron precipitation in the post-LOCA core. An incremental change in the boron injection concentration would not have significant effect on the postulated onset, but each core reload safety evaluation will continue to verify that the existing emergency operating procedures accommodate the potential for boron precipitation.

Therefore, this proposed license amendment does not affect the consequences of any accident previously evaluated in the PBNP FSAR, because the factors that are used to determine the consequences of accidents are not changed.

2. Operation of this facility under the proposed Technical Specifications change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

New or different kinds of accidents can only be created by new or different accident initiators or sequences. New and different types of accidents (different from those that were originally analyzed for Point Beach) have been evaluated and incorporated into the licensing basis for PBNP. Examples of different accidents that have been incorporated into the PBNP licensing basis include anticipated transients without scram and station blackout.

The changes proposed by this TSCR do not create any new or different accident initiators or sequences because these changes to minimum boron concentrations will not cause failures of equipment or accident sequences different than the accidents previously analyzed. No new equipment interfaces are created, and no new materials or fluids are introduced. The incremental increase in boron concentrations will not create a failure mechanism not previously known and evaluated. Therefore, these proposed Technical Specification changes do not create the possibility of an accident of a different type than any previously evaluated in the PBNP FSAR.

3. Operation of this facility under the proposed Technical Specifications change will not create a significant reduction in a margin of safety.

The margins of safety for Point Beach are based on the design and operation of the reactor and containment and the safety systems that provide their protection. Plant safety margins are established through Limiting Conditions for Operation, Limiting Safety System Settings and Safety Limits specified in the Technical Specifications. The proposed Technical Specification changes to refueling water storage tank (RWST), SI accumulator, and BAST boron inventory requirements have all been evaluated to preserve the shutdown capability described in the associated bases (boration from just critical, hot zero or full power, peak

xenon with control rods at the insertion limit, to xenon-free cold shutdown with the highest worth control rod assembly fully withdrawn). Similarly, the proposed TS change to the minimum boron concentration of the primary coolant system for refueling operations have been evaluated to preserve the subcriticality margin described in the associated TS bases (i.e., 5% $\Delta k/k$ in the cold condition with all rods inserted).

Because there are no changes to any of these margins, the proposed license amendment does not involve a reduction in any margin of safety.

4. Evaluation of Proposed Editorial Changes

In addition to substantive changes evaluated above, the proposed editorial changes have no effect on the consequences of previously-evaluated accidents, they have created no potential for initiating a new type of accident, and they have no effect on the margin of safety. The proposed editorial change to remove the misleading description of tank volumes as a "maximum" requirement in the Basis section of TS 15.3.2 has no effect on the description of the associated requirements. The volume requirements are clearly described as minimum requirements in TS 15.3.2 Basis (for RWST) and TS Table 15.3.2-1 (for BAST). Also, the proposed editorial correction to the FSAR reference in TS 15.3.6 has no negative effect.