Palo Verde Nuclear
Generating Station

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10 CFR 50.90

102-04452-CDM/AKK/SAB/GAM
June 6, 2000

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-37
Washington, DC 20555-0001

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528/529/530
Proposed Amendment for Administrative Changes to Technical Specification Figure 3.5.5-1, "Minimum Required RWT Volume"

Arizona Public Service Company (APS) is requesting NRC review and approval of administrative changes to revise Technical Specification (TS) Figure 3.5.5-1, "Minimum Required RWT Volume," to (1) relocate design bases information (but not the TS limits) to the TS Bases, (2) truncate the lower end of the RWT limit curve at 210°F, (3) re-title the right ordinate from "minimum useful volume in the RWT" to "RWT volume," and (4) delete the footnotes. The design bases information to be relocated are the portions of refueling water tank (RWT) volume that are shown for engineered safety features (ESF) volume (plus margin) and for cold shutdown volume (plus margin). These changes are requested to allow APS to make a needed update to the RWT design information more appropriately under the TS Bases control program and to enhance the usability of Figure 3.5.5-1.

Provided in Enclosure 1 to this letter are the following sections which support the proposed changes:

A. Description of the Proposed Technical Specification Amendment
B. Purpose of the Technical Specification
C. Need for the Technical Specification Amendment
D. Safety Analysis for the Proposed Technical Specification Amendment
E. No Significant Hazards Consideration Determination
F. Environmental Consideration
G. Marked-up Technical Specification Page 3.5.5-3
H. Re-typed Technical Specification Page 3.5.5-3

Enclosure 2 contains the TS Bases changes that will incorporate RWT volume design information.

In accordance with the PVNGS quality assurance program, the Plant Review Board and the Offsite Safety Review Committee have reviewed and concurred with this request. By copy of this letter, this submittal is being forwarded to the Arizona Radiation Regulatory Agency (ARRA) pursuant to 10 CFR 50.91(b)(1).

An implementation time of 45 days is requested for this amendment

No commitments are being made to the NRC by this letter.

Should you have any questions, please contact Scott A. Bauer of my staff at (623) 393-5978.

Sincerely,

CDM/AKK/SAB/GAM

Enclosure 1: Proposed Amendment to PVNGS Unit 1, 2 and 3 Technical Specification Figure 3.5.5-1

Enclosure 2: Technical Specification Bases Changes that will Incorporate RWT Volume Design Information

cc: E. W. Merschoff (NRC Region IV)
M. B. Fields (NRR Project Manager)
J. H. Moorman (NRC Resident Inspector)
A. V. Godwin (ARRA)

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, David Mauldin, represent that I am Vice President Nuclear Engineering and Support, Arizona Public Service Company (APS), that the foregoing document has been signed by me on behalf of APS with full authority to do so, and that to the best of my knowledge and belief, the statements made therein are true and correct.

David Mauldin

Sworn To Before Me This 2nd Day Of June, 2000.

Nora E. Meador
Notary Public

"OFFICIAL SEAL"
Nora E. Meador
Notary Public-Arizona
Maricopa County
My Commission Expires 4/6/2003

My Commission Expires

April 6, 2003

ENCLOSURE 1

Proposed Amendment to PVNGS Unit 1, 2 and 3
Technical Specification Figure 3.5.5-1

ENCLOSURE 1

Proposed Amendment to PVNGS Unit 1, 2 and 3 Technical Specification Figure 3.5.5-1

A. DESCRIPTION OF THE PROPOSED TECHNICAL SPECIFICATION AMENDMENT

The proposed administrative TS amendment would revise TS Figure 3.5.5-1, "Minimum Required RWT Volume," to (1) relocate design bases information (but not the TS limits) to the TS Bases, (2) truncate the lower end of the RWT limit curve at 210°F, (3) re-title the right ordinate from "minimum useful volume in the RWT" to "RWT volume," and (4) delete the footnotes. The design bases information to be relocated are the portions of RWT volume that are shown for engineered safety features (ESF) volume (plus margin) and for cold shutdown volume (plus margin). These proposed changes are shown on a marked-up copy and a re-typed copy of Figure 3.5.5-1 in Sections G and H of this Enclosure.

B. PURPOSE OF THE TECHNICAL SPECIFICATION

The following description utilizes information from the Bases for TS 3.5.5, refueling water tank (RWT).

Technical Specification (TS) Figure 3.5.5-1 identifies the minimum required RWT volume necessary for RWT operability in accordance with TS surveillance requirement SR 3.5.5.2. The RWT supports the ECCS and the Containment Spray System by providing a source of borated water for Engineered Safety Feature (ESF) pump operation.

The RWT supplies two ECCS trains by separate, redundant supply headers. Each header also supplies one train of the Containment Spray System. A motor operated isolation valve is provided in each header to allow the operator to isolate the usable volume of the RWT from the ECCS after the ESF pump suction has been transferred to the containment sump following depletion of the RWT during a Loss of Coolant Accident (LOCA). A separate header is used to supply the Chemical and Volume Control System (CVCS) from the RWT. Use of a single RWT to supply both trains of the ECCS is acceptable since the RWT is a passive component, and passive failures are not assumed to occur coincidently with the Design Basis Event during the injection phase of an accident.

Technical Specification LCO 3.5.5 ensures that:

a. The RWT contains sufficient borated water to support the ECCS during the injection phase;

b. Sufficient water volume exists in the containment sump to support continued operation of the ESF pumps at the time of transfer to the recirculation mode of cooling; and

c. The reactor remains subcritical following a LOCA.

Insufficient water inventory in the RWT could result in insufficient cooling capacity of the ECCS when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SDM or excessive boric acid precipitation in the core following a LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside containment.

The RWT also provides a source of borated water to the charging system for makeup to the RCS to compensate for contraction of the RCS coolant during plant cooldown while maintaining adequate shutdown margin. Although this charging system boration function is not required to be in a Technical Specification LCO per 10 CFR 50.36(c)(2)(ii) criteria, the RWT volume requirements of Figure 3.5.5-1 include this function in order to provide the plant operators with a single requirement for RWT volume.

For hot zero power temperature of 565°F, the RWT volume requirement of 600,000 gallons will ensure adequate shutdown margin during a subsequent cooldown. For power levels greater than zero, with a corresponding increase in average RCS temperature, the volume of borated water to maintain the shutdown margin is the same as at zero power. Contraction requirements are greater at higher average RCS temperatures; however, the additional contraction is accommodated by an acceptable reduction in pressurizer level. Consequently, for operation at average RCS temperatures greater than 565°F, the minimum volume required in the RWT is constant at 600,000 gallons.

The RWT, along with the active emergency core cooling system (ECCS) components and the passive safety injection tanks (SITs), provides the cooling water necessary to meet 10 CFR Part 50, Appendix A, General Design Criteria 35, Emergency Core Cooling.

C. NEED FOR THE TECHNICAL SPECIFICATION AMENDMENT

Technical Specification (TS) Figure 3.5.5-1 identifies the minimum required refueling water tank (RWT) volume necessary for RWT operability in accordance with TS surveillance requirement SR 3.5.5.2. TS Figure 3.5.5-1 also contains the

design portions of RWT volume for engineered safety features (ESF) volume (plus margin) and for cold shutdown volume (plus margin). Currently, any changes to the design information shown in the TS figure would require prior NRC review and approval, even though this information is not required for compliance with TS 3.5.5 for RWT operability. Revisions to the PVNGS design bases have identified the need to update the ESF and cold shutdown portions of the RWT volume, but not change the minimum RWT volume requirement. By relocating this design information to the TS Bases, APS would more appropriately be able to update the information under the TS Bases control program specified in TS 5.5.14, utilizing the criteria of 10 CFR 50.59.

The proposed change to truncate the RWT limit curve in Figure 3.5.5-1 to the lowest average RCS temperature of 210°F would be a human-factors enhancement. Since this figure is applicable only in modes 1, 2, 3, and 4, the lowest RCS temperature at which it is applicable is 210°F. This truncation would eliminate any potential confusion caused by this figure showing limits for operating conditions outside the modes in which this figure is applicable.

The proposed editorial change to re-title the right ordinate of the graph in Figure 3.5.5-1 from "minimum useful volume in the RWT" to "RWT volume" would make the graph consistent with the figure title and the RWT design bases.

The proposed editorial change to delete the footnotes from Figure 3.5.5-1 would eliminate unnecessary or redundant information from the figure. Footnote 1 is not necessary because it provides no useful information to the plant operators who ensure compliance within the RWT limits of Figure 3.5.5-1. Footnote 2 is redundant to the information provided in the figure, and provides no additional useful information to the plant operators.

D. SAFETY ANALYSIS FOR THE PROPOSED TECHNICAL SPECIFICATION AMENDMENT

This proposed administrative TS amendment would revise TS Figure 3.5.5-1, "Minimum Required RWT Volume," to (1) relocate design bases information (but not the TS limits) to the TS Bases, (2) truncate the lower end of the RWT limit curve at 210°F, (3) re-title the right ordinate "minimum useful volume in the RWT" to "RWT volume," and (4) delete the footnotes.

The design bases information to be relocated to the TS Bases are the portions of RWT volume that are shown for engineered safety features (ESF) volume (plus margin) and for cold shutdown volume (plus margin). The minimum required RWT volume limits in Figure 3.5.5-1 are not being changed. The design information to be relocated to the TS Bases is not needed for compliance with the requirements of TS 3.5.5, which references Figure 3.5.5-1. This design information is not included in the TSs in NUREG-1432, Improved Standard

Technical Specifications for Combustion Engineering Plants. The information in the TS Bases is controlled under the TS Bases Control Program, TS 5.5.14, which utilizes the criteria of 10 CFR 50.59 to determine if prior NRC approval is required for any changes. Therefore, any changes to the relocated information would be strictly controlled. This administrative change does not involve any changes to the design, operation, or maintenance of any structures systems or components.

The proposed changes to truncate the lower end of the RWT limit curve at 210°F, re-title the right ordinate from "minimum useful volume in the RWT" to "RWT volume," and delete the footnotes are editorial changes to enhance the usability of Figure.3.5.5-1. These changes do not change the minimum required RWT volume limits shown in Figure 3.5.5-1 and required by TS 3.5.5 for RWT operability. This proposed administrative change does not involve any changes to the design, operation, or maintenance of any structures systems or components.

E. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92. A proposed amendment to an operating license for a facility does not involve a significant hazards consideration if operation of the facility in accordance with a proposed amendment would not: 1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or 2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) Involve a significant reduction in a margin of safety.

A discussion of these standards as they relate to this amendment request follows:

Standard 1 – Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

No. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed administrative Technical Specification (TS) amendment would revise TS Figure 3.5.5-1, "Minimum Required RWT Volume," to (1) relocate design bases information (but not the TS limits) to the TS Bases, (2) truncate the lower end of the RWT limit curve at 210°F, (3) re-title the right ordinate "minimum useful volume in the RWT" to "RWT volume," and (4) delete the footnotes.

This proposed administrative change does not involve any changes to the design, operation, or maintenance of any structures systems or components.

The requirements in TS 3.5.5 for RWT operability will not be changed. This proposed amendment does not alter, degrade, or prevent actions described or assumed in an accident described in the PVNGS UFSAR from being performed. It will not alter any assumptions previously made in evaluating radiological consequences or, affect any fission product barriers. It does not increase any challenges to safety systems as well. Any changes to the information relocated to the TS Bases would be controlled under the TS Bases Control Program, TS 5.5.14, which utilizes the criteria of 10 CFR 50.59 to determine if prior NRC approval is required for any changes. Therefore, this proposed amendment would not significantly increase the consequences of an accident previously evaluated.

Standard 2 – Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

No. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

This proposed administrative change does not involve any changes to the design, operation, or maintenance of any structures systems or components. The requirements in TS 3.5.5 for RWT operability will not be changed. This proposed amendment does not alter, degrade, or prevent actions described or assumed in an accident described in the PVNGS UFSAR from being performed. Any changes to the information relocated to the TS Bases would be controlled under the TS Bases Control Program, TS 5.5.14, which utilizes the criteria of 10 CFR 50.59 to determine if prior NRC approval is required for any changes.

Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Standard 3 – Does the proposed change involve a significant reduction in a margin of safety?

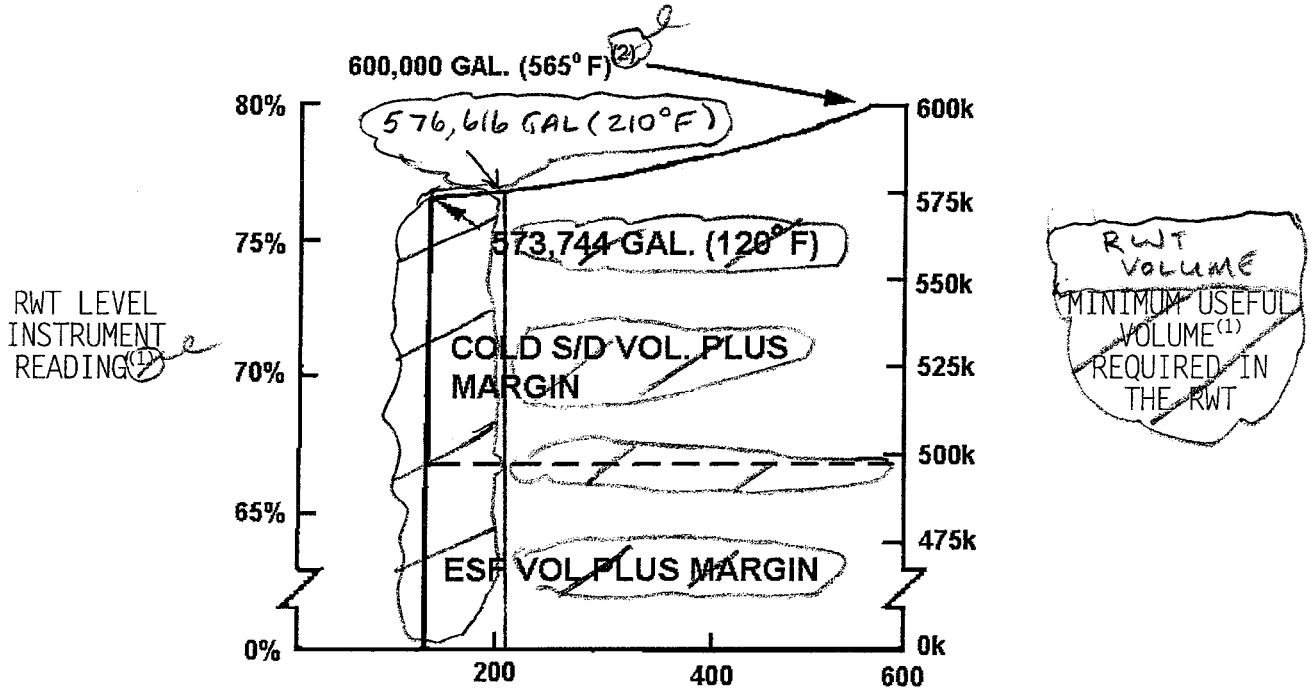
No. The proposed change does not involve a significant reduction in a margin of safety.

This proposed administrative change does not involve any changes to the design, operation, or maintenance of any structures systems or components. The requirements in TS 3.5.5 for RWT operability will not be changed. This proposed amendment does not alter, degrade, or prevent actions described or assumed in an accident. Any changes to the information relocated to the TS Bases would be controlled under the TS Bases Control Program, TS 5.5.14, which utilizes the criteria of 10 CFR 50.59 to determine if prior NRC approval is required for any changes. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

F. ENVIRONMENTAL IMPACT DETERMINATION

The proposed amendment i) involves no significant hazards consideration, ii) does not result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and iii) does not result in a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment is categorically excluded from an environmental assessment in accordance with 10 CFR 51.22(c)(9).

G. Marked-up Technical Specification Page 3.5.5-3



(1) The tank level and volume shown are the useful level and volume above that in the tank which is required for vortex considerations.

(2) When average RCS temperature is > 565°F, the minimum useful volume required in the RWT is 600,000 gallons.

FIGURE 3.5.5-1
Minimum Required RWT Volume

H. Retyped Technical Specification Page 3.5.5-3

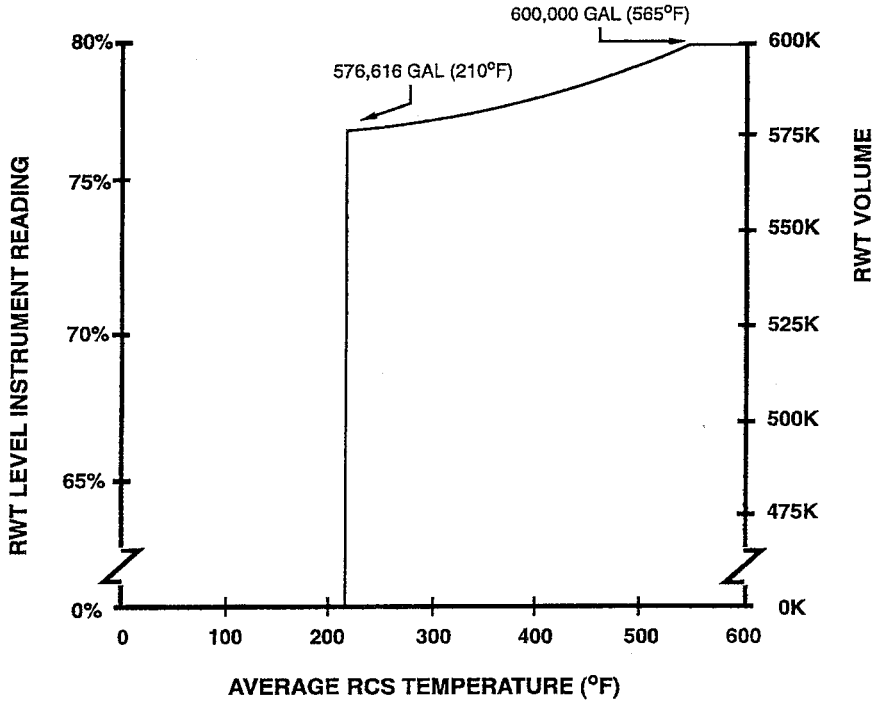


FIGURE 3.5.5-1
Minimum Required RWT Volume

ENCLOSURE 2

Technical Specification Bases Changes that will Incorporate RWT Volume Design Information

No changes to this page

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.5 Refueling Water Tank (RWT)

BASES

BACKGROUND

The RWT supports the ECCS and the Containment Spray System by providing a source of borated water for Engineered Safety Feature (ESF) pump operation.

The RWT supplies two ECCS trains by separate, redundant supply headers. Each header also supplies one train of the Containment Spray System. A motor operated isolation valve is provided in each header to allow the operator to isolate the usable volume of the RWT from the ECCS after the ESF pump suction has been transferred to the containment sump following depletion of the RWT during a Loss of Coolant Accident (LOCA). A separate header is used to supply the Chemical and Volume Control System (CVCS) from the RWT. Use of a single RWT to supply both trains of the ECCS is acceptable since the RWT is a passive component, and passive failures are not assumed to occur coincidently with the Design Basis Event during the injection phase of an accident. Not all the water stored in the RWT is available for injection following a LOCA; the location of the ECCS suction piping in the RWT will result in some portion of the stored volume being unavailable.

The High Pressure Safety Injection (HPSI), Low Pressure Safety Injection (LPSI), and containment spray pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at shutoff head conditions. These lines discharge back to the RWT, which vents to the Fuel Building Ventilation System. When the suction for the HPSI and containment spray pumps is transferred to the containment sump, this flow path must be isolated to prevent a release of the containment sump contents to the RWT. If not isolated, this flow path could result in a release of contaminants to the atmosphere and the eventual loss of suction head for the ESF pumps.

This LCO ensures that:

a. The RWT contains sufficient borated water to support the ECCS during the injection phase;

(continued)

No changes to this page

BACKGROUND (continued)

b. Sufficient water volume exists in the containment sump to support continued operation of the ESF pumps at the time of transfer to the recirculation mode of cooling; and

c. The reactor remains subcritical following a LOCA.

Insufficient water inventory in the RWT could result in insufficient cooling capacity of the ECCS when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SDM or excessive boric acid precipitation in the core following a LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside containment.

The RWT also provides a source of borated water to the charging system for makeup to the RCS to compensate for contraction of the RCS coolant during plant cooldown while maintaining adequate shutdown margin. Although this charging system boration function is not required to be in a Technical Specification LCO per 10 CFR 50.36(c)(2)(ii) criteria, the RWT volume requirements of Figure 3.5.5-1 include this function in order to provide the plant operators with a single requirement for RWT volume.

For hot zero power temperature of 565 degrees F, the RWT volume requirement of 600,000 gallons will ensure adequate shutdown margin during a subsequent cooldown. For power levels greater than zero, with a corresponding increase in average RCS temperature, the volume of borated water to maintain the shutdown margin is the same as at zero power. Contraction requirements are greater at higher average RCS temperatures; however, the additional contraction is accommodated by an acceptable reduction in pressurizer level. Consequently, for operation at average RCS temperatures greater than 565 degrees F, the minimum volume required in the in the RWT is constant at 600,000 gallons.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWT provides a source of borated water to the HPSI, LPSI and containment spray pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of Bases B 3.5.3, "ECCS – Operating," and B 3.6.6, "Containment Spray." These analyses are used to assess changes to the RWT in order to evaluate their effects in relation to the acceptance limits.

The volume limit of Figure 3.5.5-1 for the ESF function is based on two factors:

a. Sufficient deliverable volume must be available to provide at least 20 minutes (plus a 10% margin) of full flow from all ESF pumps prior to reaching a low level switchover to the containment sump for recirculation; and

b. The containment sump water volume must be sufficient to support continued ESF pump operation after the switchover to recirculation occurs. This sump volume water inventory is supplied by the RWT borated water inventory.

Replace with Insert A

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Twenty minutes is the point at which 75% of the design flow of one HPSI pump is capable of meeting or exceeding the decay heat boiloff rate.

When ESF pump suction is transferred to the sump, there must be sufficient water in the sump to ensure adequate Net Positive Suction Head (NPSH) for the HPSI and containment spray pumps. The RWT capacity must be sufficient to supply this amount of water without considering the inventory added from the safety injection tanks or Reactor Coolant System (RCS), but accounting for loss of inventory to containment subcompartments and reservoirs due to containment spray operation and to areas outside containment due to leakage from ECCS injection and recirculation equipment.

The 4000 ppm limit for minimum boron concentration was established to ensure that, following a LOCA with a minimum level in the RWT, the reactor will remain subcritical in the cold condition following mixing of the RWT and RCS water volumes. Small break LOCAs assume that all control rods are inserted, except for the Control Element Assembly (CEA) of highest worth, which is withdrawn from the core. Large break LOCAs assume that all CEAs remain withdrawn from the core. The most limiting case occurs at beginning of core life.

The maximum boron limit of 4400 ppm in the RWT is based on boron precipitation in the core following a LOCA. With the reactor vessel at saturated conditions, the core dissipates heat by pool nucleate boiling. Because of this boiling phenomenon in the core, the boric acid concentration will increase in this region. If allowed to proceed in this manner, a point will be reached where boron precipitation will occur in the core. Post LOCA emergency procedures direct the operator to establish simultaneous hot and cold leg injection to prevent this condition by establishing a forced flow path through the core regardless of break location. These procedures are based on the minimum time in which precipitation could occur, assuming that maximum boron concentrations exist in the borated water sources used for injection following a LOCA. Boron concentrations in the RWT in excess of the limit could result in precipitation earlier than assumed in the analysis.

The upper limit of 120°F and the lower limit of 60°F on RWT temperature are the limits assumed in the accident

(continued)

INSERT A

TO TECHNICAL SPECIFICATION BASES B 3.5.5

The volume limit of Figure 3.5.5-1 for the ESF function is based on two factors:

a. A required volume of 558,978 gallons (138' 11") must be available to provide inventory to the ESF pumps prior to reaching a low level switchover to the containment sump for recirculation. This ESF Reserve Volume ensures that the ESF pump suction will not be aligned to the containment sump until the point at which 75% of the minimum design flow of one HPSI pump is capable of meeting or exceeding the decay heat boil-off rate.

b. A required volume of 576,616 gallons to ensure that sufficient water will be transferred to the sump for adequate net positive suction head to support continued ESF pump operation after the switchover to recirculation occurs. This sump volume water inventory is supplied by the RWT borated water inventory.

No changes to this page

BASES

APPLICABLE SAFETY ANALYSES (continued)

analysis. Although RWT temperature affects the outcome of several analyses, the upper and lower limits established by the LCO are not limited by any of these analyses.

The RWT ESF function satisfies Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

The RWT ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA) and to cool and cover the core in the event of a LOCA, that the reactor remains subcritical following a DBA, and that an adequate level exists in the containment sump to support ESF pump operation in the recirculation mode.

To be considered OPERABLE, the RWT must meet the limits established in the SRs for water volume, boron concentration, and temperature.

APPLICABILITY

In MODES 1, 2, 3, and 4, the RWT OPERABILITY requirements are dictated by the ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWT must be OPERABLE to support their operation.

Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops – MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Shutdown Cooling (SDC) and Coolant Circulation – High Water Level," and LCO 3.9.5, "Shutdown Cooling (SDC) and Coolant Circulation – Low Water Level."

ACTIONS

A.1

With RWT boron concentration or borated water temperature not within limits, it must be returned to within limits within 8 hours. In this condition neither the ECCS nor the Containment Spray System can perform their design functions; therefore, prompt action must be taken to restore the tank to OPERABLE condition. The allowed Completion Time of

(continued)