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January 27, 2000

0CAN010004

U. S. Nuclear Regulatory Commission
Document Control Desk
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Washington, DC 20555

Subject: Arkansas Nuclear One - Units 1 and 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
Condensate Storage Tank Volume Technical Specifications

Gentlemen:

Attached for your review and approval is a proposed amendment to Arkansas Nuclear One (ANO) Unit 1 and Unit 2 Technical Specifications. The proposed amendment modifies the requirements for the condensate storage tanks (CST) to permit the seismically and partially-tornado protected tank currently aligned to Unit 1 only to be used for both units. The change also updates the Bases for these specifications to reflect the safety function of the qualified CST (QCST), which is to provide a 30-minute supply for Emergency Feedwater (EFW), rather than the 4.5 hour supply capability which was an original sizing basis for the tanks.

One of the design criteria of the QCST is to utilize the tank as the source of EFW for both units for at least 30-minutes. This time period is considered acceptable to enable the operator to manually re-align the EFW suction to the Service Water System, which is the ANO assured long-term source of cooling water. In addition, Entergy committed to update the bases for these specifications to reflect this design basis (reference ANO letter dated September 22, 1997, 1CAN099703.)

The proposed change has been evaluated in accordance with 10CFR50.91(a)(1) using criteria in 10CFR50.92(c) and it has been determined that this change involves no significant hazards considerations. The bases for these determinations are included in the attached submittal.

Entergy Operations would like to ensure this change is approved prior to the approval of the Improved Technical Specifications. On this basis, it is requested that the license amendment be issued by August 31, 2000 with an effective date 30 days after issuance of the amendment. Although this request is neither exigent nor emergency, your prompt review is requested.

A001

Very truly yours

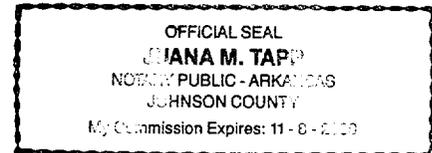


CRH/fgb
Attachments

To the best of my knowledge and belief, the statements contained in this submittal are true.

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for Johnson County and the State of Arkansas, this 27 day of January, 2000.

Jana M. Tapp
Notary Public
My Commission Expires 11-8-2000



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ATTACHMENT

TO

OCAN010004

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NOs. DPR-51 and NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNITS ONE & TWO

DOCKET NOs. 50-313 and 50-368

DESCRIPTION OF PROPOSED CHANGES

Arkansas Nuclear One – Unit 1 (ANO-1) Changes

Technical Specification (TS) 3.4.1.3 has been revised to specify a new minimum volume requirement for the seismically qualified condensate storage tank, T41B (QCST), based on providing a source of emergency feedwater (EFW) for both units for at least 30 minutes. This time would allow the operator to manually switch the EFW suction over to the assured long-term source of cooling water, the Service Water System (SWS). A minimum usable volume of 32,300 gallons is required when T41B is aligned as the source of EFW on this basis. In addition, the bases associated with this specification have been updated to reflect the new minimum water volume requirement when both units are aligned to T41B. The bases is also being expanded to clarify that the required value represents an analytical limit for the usable volume and does not account for the volume unusable due to suction piping configuration nor for instrument uncertainty.

Arkansas Nuclear One – Unit 2 (ANO-2) Changes

Technical Specification (TS) 3.7.1.3 has been revised to reflect the use of the QCST, T41B, as an alternative to the currently specified tanks. The existing condensate storage tanks, 2T41A and 2T41B, are not seismically qualified. The proposed wording specifies a minimum usable volume requirement based on providing a source of EFW for both units for at least 30 minutes; this basis is consistent with the Unit 1 requirement discussed above. A minimum usable volume of 32,300 gallons is required on this basis. The requirement for the existing tanks, when they are aligned to provide a source of EFW, has not been changed. In addition, the bases associated with this specification have been revised as follows:

- Discuss the new operational configuration and to reflect the new minimum water volume requirement when both units are aligned to the tank,
- Relate the required volumes to tank height and clarify that the required values do not account for instrument uncertainty, and
- Discuss the tornado protection provided for a portion of the QCST.

BACKGROUND

The condensate storage tanks provide a source of condensate grade water to be injected by the Emergency Feedwater System in the event of a loss of main feedwater. While the Service Water System is the assured long-term source of EFW, it is undesirable, from a plant recovery standpoint, to inject service water. The QCST (T41B) is sized to provide a large volume of water which can be used to support EFW operation for both units. This tank is currently aligned, however, as a source of water for ANO-1 only. The non-seismic CSTs (2T41A and 2T41B) are currently aligned to provide a source of water for ANO-2 only. The volumes for these tanks required by the current Technical Specifications (107,000 gallons for T41B in the ANO-1 specification and 160,000 gallons for either 2T41A or 2T41B in the ANO-2 specification) reflect supporting EFW operation for about 4.5 hours. The actual

safety function of the QCST, however, is to support the EFW operation of the unit(s) to which it is aligned for a period of time long enough to give the operator time to manually re-align the EFW pump suction to the Service Water System.

The time period allowed for the manual actions to re-align the pump suction is 30 minutes. Tank T41B has been designed to assure this 30-minute supply is available in the event of a tornado missile. The required volume in the lower part of the tank is protected against tornado effects (i.e., missiles) by a concrete wall approximately 5-feet tall. This wall affords protection of the required volume from horizontal design basis tornado missiles. Thus, the proposed required volume provides an assured source of EFW for both units for at least 30 minutes. This ensures the operator will be able to manually re-align the EFW pump suction to service water in the event a design basis tornado missile strikes the tank.

Tank T41B was incorporated into the ANO-1 Technical Specifications by Amendment 101, dated May 21, 1986. In the existing specification, the requirement is written to reflect a configuration in which the tank is solely aligned to ANO-1. The current volume requirement is 107,000 gallons and is based on providing a source of EFW for about 4.5 hours. This was further described as a volume to support cooldown to a point at which decay heat removal operation could be established. The changes proposed here for ANO-1 allow for the tank to be used by both units and only credit the assured source of water is available for at least 30 minutes to allow time for the manual re-alignment of the pump suction.

The ANO-2 Technical Specifications currently require either one of the two non-seismically qualified condensate storage tanks contain a volume of 160,000 gallons. This volume is generally described in the bases as providing the capability to maintain the RCS at HOT STANDBY conditions for one hour, with steam discharge to the atmosphere and a concurrent loss of offsite power. The ANO-2 UFSAR notes that the 160,000 gallons is adequate to bring the reactor to a HOT SHUTDOWN condition at a cooldown rate of 75°F per hour, with one hour at HOT STANDBY allowed. The changes proposed here recognize that T41B may be aligned instead of the existing non-qualified tanks to provide a source of EFW for both units.

The current design of the ANO-2 Condensate Storage System includes instrumentation to automatically switch the EFW suction source alignment from the non-qualified tank to the Service Water System. This auto-switchover design was provided because these tanks may be lost in the event of an earthquake or tornado. This automatic switchover design will be retained for those times when one of the existing CSTs is aligned to satisfy the technical specification. When the QCST is aligned as the suction source, however, this automatic switchover function, which occurs on low EFW pump suction pressure, is not required. The QCST is designed such that, in the event of an earthquake or tornado, there will be sufficient volume to support EFW operation for at least 30 minutes. This time is sufficient to allow the operator to manually re-align the source of water from the tank to the Service Water System.

DISCUSSION OF CHANGE

As noted above, the qualified condensate storage tank (Q-CST) was incorporated into the ANO-1 Technical Specifications in Amendment 101. This proposed change is needed to apply the full utilization of the tank which was designed to support both units. The tank is seismically qualified and is partially protected from the effects of a tornado missile; the lower portion of the tank has been provided with a missile shield wall. This shield wall affords protection for the volume required to satisfy the safety related design basis for the tank.

The safety function of the Q-CST is to provide an assured source of water of sufficient volume to permit manual re-alignment to the assured long-term source of EFW. The volume required to meet the actual safety related function of the Q-CST has been determined based on the volumes required to cool both units for at least 30 minutes. The volume required for each unit has been determined and the results summed to establish the proposed technical specification requirement. For ANO-1, the volume is made up of two parts: that required for decay heat removal, and that required to fill in the steam generators to the EFIC natural circulation setpoint level. The amount of decay heat to be removed over a 30-minute period has been conservatively estimated based on the standard decay heat curve including a future planned power uprate of 7.5% power. A total of 32,300 gallons is required for both units. This value also includes possible system losses due to recirculation flow for Unit 2 that may not be directed back to the QCST. This volume is contained with a tank level of 3 feet-10 inches and is well within the portion of the tank protected from the design basis tornado missiles. This required volume represents approximately 17,300 gallons for ANO-1 and 15,000 gallons for ANO-2.

The QCST, with a capacity of more than 300,000 gallons, is easily large enough to meet the original volume requirements of 107,000 gallons for ANO-1 and the 160,000 gallons for ANO-2. As noted earlier, these volumes could supply the cooling needs for their respective units for more than four hours. These volumes, however, represent a non-safety related sizing basis for the tanks. ANO recognizes there is a significant plant recovery benefit to minimizing the use of service water in the steam generators. For this reason, the QCST will normally be maintained near full in order to optimize the amount of condensate grade coolant available, if required.

The effect of this change on ANO-2 is to provide for the EFW system to draw its suction from a seismically qualified source of condensate-grade water. This change is considered to increase the system reliability. T41B is proposed as an alternative to the existing 2T41A and 2T41B tanks as the required CST in the Technical Specifications. The availability of the non-qualified tanks, which are to be retained in the plant configuration, provides additional operational flexibility.

The current bases for ANO-2 TS 3.7.1.3 notes that the required volume “... ensures sufficient water is available to maintain the RCS at HOT STANDBY for one hour” Section 9.2.6.1 of the UFSAR indicates the volume is ... adequate to bring the reactor to a hot shutdown condition at a cooldown rate of 75°F per hour with a one-hour hot standby time allowed.”

Section 9.2.6.3 supports this statement and notes “...*there is sufficient volume for about four hours of decay heat removal or one hour of hot standby operation before a 130,000 gallon volume is reached, at which point cooldown toward cold shutdown would have to begin.*” These statements describe capabilities that were considered in establishing the overall capacity of the non-qualified tanks. They were not intended to be construed as safety related functional requirements. It is proposed that the TS Bases be revised to reflect the actual safety-related volume requirement for the Q-CST. When the non-qualified tanks are being used as the required CST, the current volume requirement (i.e., 160,000 gallons) has been conservatively retained.

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Entergy Operations, Inc. is proposing that the Arkansas Nuclear One Unit 1 and Unit 2 (ANO-1 & ANO-2) Operating Licenses be amended to permit the qualified condensate storage tank, T41B, be used as an assured source of EFW for both units. The tank was incorporated into the ANO-1 Technical Specifications in Amendment 101. The proposed change revises the required volume in the ANO-1 specification to reflect the actual safety related functional requirement and incorporates T41B into the ANO-2 specification as an alternative source of condensate grade water.

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the criteria in 10CFR50.92(c). A discussion of the criteria as they relate to this amendment request follows:

Criterion 1 - Does Not Involve a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated.

The condensate storage tanks provide a source of condensate grade water for the Emergency Feedwater System. The tanks, one for ANO-1 and two for ANO-2, are already included in the plant technical specifications. The proposed change does not affect the physical design, construction, or operation of the condensate storage tanks. These tanks are not associated with the precursors of any accident. This change does not increase the probability of any accident previously evaluated.

As a source of emergency feedwater, the tanks serve an accident mitigation function. The proposed change does not alter this function. The change does revise the required volume to reflect the actual safety-related aspect of this function provided by the qualified condensate storage tank. Previously, the technical specifications described the non-safety functional capability of the tanks to provide for the cooldown of their respective units for an arbitrary period of time. The Service Water System is the long-term assured source of emergency feedwater. The proposed change allows the use of the qualified condensate storage tank as an assured source of emergency feedwater for both units. It further establishes a volume requirement that ensures there will be sufficient time to permit the operator to manually switch the

emergency feedwater suction to the Service Water System, if required, and enable it to continue to meet its design accident mitigation function. Because this function continues to be assured, the proposed changes do not increase the consequences of an accident.

Therefore, this change does not involve a significant increase in the probability or consequences of any accident previously evaluated.

Criterion 2 - Does Not Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated.

The condensate storage tanks serve an accident mitigation function as a temporary source of emergency feedwater. These tanks have not been identified as a precursor to any accident previously evaluated. The design and operation of these tanks has not changed. While the proposed change does permit the qualified tank to be used by ANO-2, the design has been evaluated and it has been demonstrated that the existing tank is capable of meeting the intended design function of both units.

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

Criterion 3 - Does Not Involve a Significant Reduction in the Margin of Safety.

The effect of this change on the ANO-1 specifications is a reduction in the required volume. However, the actual safety function of the tank, which is to provide a source of emergency feedwater until the source can be re-aligned to the Service Water System is not changed. The Service Water System is the assured long-term source of cooling water for both units. While the required volume has been reduced, the safety function of decay heat removal and core cooling continues to be met. There is no reduction in the margin of safety for ANO-1.

The proposed change to the ANO-2 specifications will provide a qualified alternative source of emergency feedwater. The required function of the tanks is the same as for ANO-1; that is, to provide a source of water until the Service Water System is aligned for long-term core cooling. The addition of this qualified condensate storage tank to the specification as an alternative to the existing tanks represents an increase in the margin of safety

Therefore, this change does not involve a significant reduction in the margin of safety.

Therefore, based upon the reasoning presented above and the previous discussion of the amendment request, Entergy Operations has determined that the requested change does not involve a significant hazards consideration.

ENVIRONMENTAL IMPACT EVALUATION

10CFR51.22(c) provides criteria for the identification of licensing and regulatory actions eligible for categorical exclusion from performing an environmental assessment. A proposed amendment to an operating license for a facility requires no environmental assessment if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant hazards consideration, (2) result in a significant change in the types or significant increase in the amounts of any effluents that may be released off-site, or (3) result in a significant increase in individual or cumulative occupational radiation exposure. Entergy Operations, Inc. has reviewed this license amendment and has determined that it meets the eligibility criteria for categorical exclusion set forth in 10CFR51.22(c)(9). Pursuant to 10CFR51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the proposed license amendment. The basis for this determination is as follows:

1. The proposed license amendment does not involve a significant hazards consideration as described previously in the evaluation.
2. As discussed in the significant hazards evaluation, this change does not result in a significant change or significant increase in the radiological doses for any Design Basis Accident. The proposed license amendment does not result in a significant change in the types or a significant increase in the amounts of any effluents that may be released off-site.
3. The proposed license amendment does not result in a significant increase to the individual or cumulative occupational radiation exposure because this change does not affect the design, operation, or accident mitigating performance of the condensate storage tanks.

PROPOSED TECHNICAL SPECIFICATION CHANGES

ANO-1 – Proposed Technical Specification Changes

3.4 STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core.

Specifications

3.4.1 The reactor shall not be heated above 280°F unless the following conditions are met:

1. Capability to remove decay heat by use of two steam generators.
- *2. Fourteen of the steam system safety valves are operable.
3. A minimum usable volume of 32,300 gallons of water is available in Tank T41B.
4. (Deleted)
5. Both main steam block valves and both main feedwater isolation valves are operable.

3.4.2 Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot shutdown condition within 12 hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition within 24 hours.

3.4.3 Two (2) EFW trains shall be operable as follows:

1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.
2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is $\geq 280^{\circ}\text{F}$. **

* Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained.

** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

The OPERABILITY of the condensate storage tank with the minimum required water volume ensures that sufficient water is available to support EFW operation for both units for at least 30 minutes. This provides adequate time for the operators to manually switch the EFW suction alignment to the Service Water System (SWS), if required. The SWS provides the assured long-term source of cooling water. The required volume considers that the EFWS of both units may be aligned to T41B simultaneously. The tank is seismically qualified and the required volume is also protected from tornado missiles.

The required minimum usable volume includes an allowance for losses due to Unit 2 recirculation line flow. It does not include any allowance for instrument uncertainty or for the unusable volume due to the suction piping configuration. The required volume plus the unusable volume is equivalent to a tank level of approximately 3'-10".

The tank has sufficient capacity to support more than four hours of cooling flow for both units. This capability is not considered to be a safety related design function and is not controlled by the Technical Specifications.

ANO-2 – Proposed Technical Specification Changes

PLANT SYSTEMS

CONDENSATE STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.7.1.3 At least one condensate storage tank (CST) shall be OPERABLE with a minimum water volume of EITHER:

a. 32,300 usable gallons in T41B,

OR

b. 160,000 contained gallons in EITHER 2T41A OR 2T41B.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

With the required condensate storage tank inoperable, within 4 hours either:

a. Restore at least one CST to OPERABLE status or be in HOT SHUTDOWN within the next 12 hours, or

b. Demonstrate the OPERABILITY of the service water system as a backup supply to the emergency feedwater pumps and restore at least one condensate storage tank to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.3.1 The above required condensate storage tank shall be demonstrated OPERABLE at least once per 12 hours by verifying the contained water volume is within its limits when the tank is the supply source for the emergency feedwater pumps.

4.7.1.3.2 The service water system shall be demonstrated OPERABLE at least once per 12 hours by verifying that at least one service water loop is operating and that the service water system - emergency feedwater system isolation valves are either open or OPERABLE whenever the service water system is the supply source for the emergency feedwater pumps.

PLANT SYSTEMS

BASES

3/4.7.1.2 EMERGENCY FEEDWATER SYSTEM

The OPERABILITY of the emergency feedwater (EFW) system ensures that the Reactor Coolant System can be cooled down to Shutdown Cooling (SDC) entry conditions from normal operating conditions in the event of a total loss of off-site power.

The EFW system is designed to supply sufficient water to the steam generator(s) to remove decay heat with steam generator pressure at the setpoint of the MSSVs. Subsequently, the EFW system supplies sufficient water to cool the unit to SDC entry conditions, and steam is released through the ADVs.

SR 4.7.1.2.b.1 verifies that each EFW pump's developed head at the flow test point is greater than or equal to this required developed head. This test ensures that EFW pump performance has not degraded during the cycle. Flow and differential head are normal tests of pump performance required by Section XI of the ASME Code. Because it is undesirable to introduce cold EFW into the steam generators while they are operating, this testing is performed on recirculation flow. This test confirms one point that is indicative of pump overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. Performance of inservice testing, discussed in the ASME Code, Section XI, satisfies this requirement. The SR for the turbine driven EFW pump is allowed to be deferred for up to 24 hours after exceeding 700 psia in the steam generators. This allowance will ensure the test is completed within a reasonable period of time after establishing sufficient steam pressure to perform the test.

SR 4.7.1.2.c ensures that EFW can be delivered to the appropriate steam generator, in the event of any accident or transient that generates an EFAS signal. This is assured by demonstrating that each automatic valve in the flow path actuates to its correct position on an actual or simulated actuation signal. The 18 month frequency is based on the need to perform the SRs under the conditions that apply during a unit outage and the potential for an unplanned transient if the SRs were performed with the reactor at power.

SR 4.7.1.2.d ensures that the EFW System is properly aligned by verifying the flow path from the condensate storage tank (CST) to each steam generator prior to entering MODE 2 operation, after more than 30 days below MODE 3. OPERABILITY of the EFW flow paths must be verified before sufficient core heat is generated that would require the operation of the EFW System during a subsequent shutdown. The Frequency is reasonable, based on engineering judgment, and other administrative controls to ensure that flow paths remain OPERABLE. To further ensure EFW System alignment, the OPERABILITY of the flow paths is verified following extended outages to determine that no misalignment of valves has occurred. This SR ensures that the flow path from the CST to the steam generators is properly aligned.

3/4.7.1.3 CONDENSATE STORAGE TANK

The ANO-2 Condensate Storage System design includes two non-seismic condensate storage tanks (2T41A and 2T41B). In addition, it is capable of being aligned to the seismically qualified condensate storage tank for Unit 1 (T41B). These tanks are designed to provide a volume of condensate-grade cooling water to the Emergency Feedwater System (EFW) for a limited time. The Service Water System (SWS) provides the assured long-term source of cooling water for EFW.

The OPERABILITY of the seismically-qualified condensate storage tank (T41B) with the minimum required water volume ensures that sufficient water is available to support EFW operation for both units for at least 30 minutes. This provides adequate time for the operators to manually switch the EFW suction alignment to the Service Water System, if required. The required volume considers that the EFW systems of both units may be aligned to T41B simultaneously. In addition, the required volume is protected from tornado missiles.

The required minimum usable volume for T41B includes an allowance for losses due to Unit 2 recirculation flow. It does not include an allowance for instrument uncertainty or for water not usable due to suction piping configuration. The required volume plus the unusable volume is equivalent to a tank level of approximately 3'-10".

The OPERABILITY requirement for the non-seismically-qualified condensate storage tanks (2T41A and 2T41B) has been retained for operational flexibility. A minimum required volume consistent with the requirement before the qualified CST was capable of being aligned to Unit 2 has been specified. With the design provision of an automatic EFW re-alignment to the SWS on low EFW pump suction pressure, there is no safety related minimum volume required for these tanks. In the event of a failure of one of these tanks, EFW pump suction will be automatically re-aligned to draw from the SWS. Should the EFW be aligned to the Unit 1 tank (T41B), the automatic suction re-alignment to SWS may be bypassed.

The required minimum contained volume for tanks 2T41A and 2T41B includes an allowance for water not usable because of suction piping configuration. It does not include an allowance for instrument uncertainty. The required volume represents a tank level of about 80% of the tank height.

Each of the tanks, when maintained nearly full, has sufficient capacity to support more than four hours of cooling flow to its respective units (i.e., T41B for both units and 2T41A or 2T41B for Unit 2 only). This capability is not considered to be a safety related design function and is not controlled by the Technical Specifications.

MARKUP OF CURRENT TECHNICAL SPECIFICATIONS

(FOR INFO ONLY)

3.4 STEAM AND POWER CONVERSION SYSTEM

Applicability

Applies to the turbine cycle components for removal of reactor decay heat.

Objective

To specify minimum conditions of the turbine cycle equipment necessary to assure the capability to remove decay heat from the reactor core.

Specifications

3.4.1 The reactor shall not be heated above 280°F unless the following conditions are met:

1. Capability to remove decay heat by use of two steam generators.
- *2. Fourteen of the steam system safety valves are operable.
3. A minimum usable volume of 32,300 gallons~~11.1 feet (107,000 gallons)~~ of water is available in Tank T41B.
4. (Deleted)
5. Both main steam block valves and both main feedwater isolation valves are operable.

3.4.2 Components required to be operable by Specification 3.4.1 shall not be removed from service for more than 24 consecutive hours. If the system is not restored to meet the requirements of Specification 3.4.1 within 24 hours, the reactor shall be placed in the hot shutdown condition within 12 hours. If the requirements of Specification 3.4.1 are not met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition within 24 hours.

3.4.3 Two (2) EFW trains shall be operable as follows:

1. The motor driven EFW pump and its associated flow path shall be operable when the RCS is above CSD conditions and any Steam Generator is relied upon for heat removal.
2. The turbine driven EFW pump and its associated flow path shall be operable when the RCS temperature is $\geq 280^{\circ}\text{F}$.**

* Except that during hydrotests, with the reactor subcritical, fourteen of the steam system safety valves may be gagged and two (one on each header), may be reset for the duration of the test, to allow the required pressure for the test to be attained.

** Except that the surveillance testing of the turbine driven EFW pump shall be performed at the appropriate plant conditions as specified by Surveillance Requirement 4.8.1.

The OPERABILITY of the condensate storage tank with the minimum required water volume ensures that sufficient water is available to support EFW operation for both units for at least 30 minutes. This provides adequate time for the operators to manually switch the EFW suction alignment to the Service Water System (SWS), if required. The SWS provides the assured long-term source of cooling water. The required volume considers that the EFW systems of both units may be aligned to T41B simultaneously. The tank is seismically qualified and the required volume is also protected from tornado missiles.

The required minimum usable volume includes an allowance for losses due to Unit 2 recirculation line flow. It does not include any allowance for instrument uncertainty or for the unusable volume due to the suction piping configuration. The required usable volume plus the unusable volume is equivalent to a tank level of approximately 3'-10".

The tank has sufficient capacity to support more than four hours of cooling flow for both units. This capability is not considered to be a safety related design function and is not controlled by the Technical Specifications.

~~The minimum amount of water in tank T41B would be adequate for about 4.5 hours of operation. This is based on the estimate of the average emergency flow to a steam generator being 390 gpm. This operation time with the volume of water specified would not be reached, since the decay heat removal system could be brought into operation within 4 hours or less.~~

~~A portion of tank T41B is protected from tornado missiles. The protected volume is sufficient to provide a thirty minute supply of water. This thirty minute period is sufficient to allow manual operator action, if required, to transfer suction of the emergency feedwater pumps to service water.~~

PLANT SYSTEMS

CONDENSATE STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.7.1.3 At least one condensate storage tank (CST) shall be OPERABLE with a minimum contained water volume of EITHER:
~~160,000 gallons (equivalent to an indicated level of 80% of one tank).~~

a. 32,300 usable gallons in T41B,

OR

b. 160,000 contained gallons in EITHER 2T41A OR 2T41B.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

With the required condensate storage tank inoperable, within 4 hours either:

- a. Restore at least one CST to OPERABLE status or be in HOT SHUTDOWN within the next 12 hours, or
- b. Demonstrate the OPERABILITY of the service water system as a backup supply to the emergency feedwater pumps and restore at least one condensate storage tank to OPERABLE status within 7 days or be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.3.1 The above required condensate storage tank shall be demonstrated OPERABLE at least once per 12 hours by verifying the contained water volume is within its limits when the tank is the supply source for the emergency feedwater pumps.

4.7.1.3.2 The service water system shall be demonstrated OPERABLE at least once per 12 hours by verifying that at least one service water loop is operating and that the service water system - emergency feedwater system isolation valves are either open or OPERABLE whenever the service water system is the supply source for the emergency feedwater pumps.

PLANT SYSTEMS

BASES

3/4.7.1.2 EMERGENCY FEEDWATER SYSTEM

The OPERABILITY of the emergency feedwater (EFW) system ensures that the Reactor Coolant System can be cooled down to Shutdown Cooling (SDC) entry conditions from normal operating conditions in the event of a total loss of off-site power.

The EFW system is designed to supply sufficient water to the steam generator(s) to remove decay heat with steam generator pressure at the setpoint of the MSSVs. Subsequently, the EFW system supplies sufficient water to cool the unit to SDC entry conditions, and steam is released through the ADVs.

SR 4.7.1.2.b.1 verifies that each EFW pump's developed head at the flow test point is greater than or equal to this required developed head. This test ensures that EFW pump performance has not degraded during the cycle. Flow and differential head are normal tests of pump performance required by Section XI of the ASME Code. Because it is undesirable to introduce cold EFW into the steam generators while they are operating, this testing is performed on recirculation flow. This test confirms one point that is indicative of pump overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance. Performance of inservice testing, discussed in the ASME Code, Section XI, satisfies this requirement. The SR for the turbine driven EFW pump is allowed to be deferred for up to 24 hours after exceeding 700 psia in the steam generators. This allowance will ensure the test is completed within a reasonable period of time after establishing sufficient steam pressure to perform the test.

SR 4.7.1.2.c ensures that EFW can be delivered to the appropriate steam generator, in the event of any accident or transient that generates an EFAS signal. This is assured by demonstrating that each automatic valve in the flow path actuates to its correct position on an actual or simulated actuation signal. The 18 month frequency is based on the need to perform the SRs under the conditions that apply during a unit outage and the potential for an unplanned transient if the SRs were performed with the reactor at power.

SR 4.7.1.2.d ensures that the EFW System is properly aligned by verifying the flow path from the condensate storage tank (CST) to each steam generator prior to entering MODE 2 operation, after more than 30 days below MODE 3. OPERABILITY of the EFW flow paths must be verified before sufficient core heat is generated that would require the operation of the EFW System during a subsequent shutdown. The Frequency is reasonable, based on engineering judgment, and other administrative controls to ensure that flow paths remain OPERABLE. To further ensure EFW System alignment, the OPERABILITY of the flow paths is verified following extended outages to determine that no misalignment of valves has occurred. This SR ensures that the flow path from the CST to the steam generators is properly aligned.

3/4.7.1.3 CONDENSATE STORAGE TANK

The ANO-2 Condensate Storage System design includes two non-seismic condensate storage tanks (2T41A and 2T41B). In addition, it is capable of being aligned to the seismically qualified condensate storage tank for Unit 1 (T41B). These tanks are designed to provide a volume of condensate-grade cooling water to the Emergency Feedwater System (EFW) for a limited time. The Service Water System (SWS) provides the assured long-term source of cooling water for EFW.

The OPERABILITY of the seismically-qualified condensate storage tank (T41B) with the minimum required water volume ensures that sufficient water is available to maintain the RCS at HOT STANDBY conditions for one hour with steam discharge to atmosphere with concurrent with total loss of off-site power. support EFW operation for both units for at least 30 minutes. This provides adequate time for the operators to manually switch the EFW suction alignment to the Service Water System, if required. The required volume considers that the EFW systems of both units may be aligned to T41B simultaneously. In addition, the required volume is protected from tornado missiles.

The required minimum usable volume for T41B includes an The contained water volume limit includes an allowance for losses due to Unit 2 recirculation flow. It does not include an allowance for instrument uncertainty or for water not usable due to suction piping configuration. water not usable because of tank discharge line location or other physical characteristics. The required volume plus the unusable volume is equivalent to a tank level of approximately 3'-10".

The OPERABILITY requirement for the non-seismically-qualified condensate storage tanks (2T41A and 2T41B) has been retained for operational flexibility. A minimum required volume consistent with the requirement before the qualified CST was capable of being aligned to Unit 2 has been specified. With the design provision of an automatic EFW re-alignment to the SWS on low EFW pump suction pressure, there is no safety related minimum volume required for these tanks. In the event of a failure of one of these tanks, EFW pump suction will be automatically re-aligned to draw from the SWS. Should the EFW be aligned to the Unit 1 tank (T41B), the automatic suction re-alignment to SWS may be bypassed.

The required minimum contained volume for tanks 2T41A and 2T41B includes an allowance for water not usable because of suction piping configuration. It does not include an allowance for instrument uncertainty. The required volume represents a tank level of about 80% of the tank height.

Each of the tanks, when maintained nearly full, has sufficient capacity to support more than four hours of cooling flow to its respective units (i.e., T41B for both units and 2T41A or 2T41B for Unit 2 only). This capability is not considered to be a safety related design function and is not controlled by the Technical Specifications.