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OCAN100503

October 25, 2005

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

Subject: License Amendment Request  
Emergency Cooling Pond Inspection and Inventory Requirements  
Arkansas Nuclear One - Unit 1 and Unit 2  
Docket Nos. 50-313 and 50-368  
License Nos. DPR-51 and NPF-6

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests an amendment to the Technical Specifications (TS) for Arkansas Nuclear One, Unit-1 (ANO-1) and Unit 2 (ANO-2). The proposed change modifies inventory and inspection requirements associated with the Emergency Cooling Pond (ECP), which is a common cooling water source for both ANO units during conditions that may render the normal cooling water source unavailable (Dardanelle Reservoir). Limiting Conditions for Operation (LCO) 3.7.8 and 3.7.4.1 (ANO-1 and ANO-2, respectively), "Emergency Cooling Pond," and their associated Actions and Surveillance Requirements (SR) are affected by the proposed change.

Unexpected degradation of the ECP structure was discovered earlier this year. This degradation resulted in detailed follow-up inspections, evaluations, and repairs to ensure continued compliance with station design and license requirements. In so doing, Entergy determined that new criteria for ECP level and volume were appropriate. In addition, it was noted that TS SRs required routine inspection of the ECP structure for degradation, but the TS did not provide an appropriate Action should degradation be discovered.

In light of the aforementioned evaluations, Entergy is conservatively controlling ECP level administratively at  $\geq 5.2$  feet. Such administrative controls are permitted in the interim in accordance with NRC Administrative Letter 98-10, provided the licensee submits a change to the affected TS within a reasonably short period of time (normally less than one year). Therefore, Entergy is submitting this request to correct the current ECP level and volume requirements found in the TSs, in addition to clarifying the inspection SR and providing appropriate action upon discovery of degradation associated with the ECP structure.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The basis for this determination is included in the attached submittal.

The proposed change includes no new commitments.

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Entergy requests approval of this amendment by November 1, 2006. Once approved, the amendment shall be implemented within 60 days. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact David Bice at 479-858-5338.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 25, 2005.

Very truly yours,



JSF/dbb

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (markup)
3. Markup of Technical Specification Bases (for information only)

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**Attachment 1**

**To**

**OCAN100503**

**Analysis of Proposed Technical Specification Change**

## 1.0 DESCRIPTION

This letter is a request to amend Operating Licenses DPR-51 and NPF-6 for Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2), respectively.

The proposed change will revise Technical Specification (TS) requirements associated with the Emergency Cooling Pond (ECP), which is a common cooling water source for both ANO units. The ECP provides cooling to plant safety related equipment upon loss of the normal cooling water source, Dardanelle Reservoir.

## 2.0 PROPOSED CHANGE

The proposed change will relocate ECP indicated level requirements to the TS Bases. The required ECP volume of 70 acre-feet will remain in the TS. Presently the action to perform an engineering evaluation of any degradation of the ECP structure is found in the TS Bases. This requirement should be contained in the TS and is, therefore, relocated as a new TS Action. Concurrently, the details of the ECP structural inspections are relocated from the TS to the TS Bases. NUREG-1430 and -1432, the NRC approved Standard Technical Specifications for Babcock and Wilcox Plants and Combustion Engineering Plants (ITS), respectively (Reference 3), do not include a requirement for ECP inspection since most plants do not use such a structure as a backup water supply. However, the relocation of excessive detail from the TSs to the TS Bases is consistent with NRC and industry guidelines. The above changes affect the following TS requirements:

<u>ANO-1</u>	<u>ANO-2</u>
LCO 3.7.8 Action A (new)	LCO 3.7.4.1.a
LCO 3.7.8 Action B	LCO 3.7.4.1 Action
SR 3.7.8.1	SR 4.7.4.1
SR 3.7.8.3	SR 4.7.4.1.a
SR 3.7.8.4	SR 4.7.4.1.c
	SR 4.7.4.1.b

A markup of the proposed changes is included in Attachment 2 of this submittal. The above changes may require the movement of information from one TS page to another. This is considered a format only change and is not discussed further in this proposal. Changes to the TS Bases are included for information only in Attachment 3 of this submittal.

## 3.0 BACKGROUND

Separate suction and discharge water lines are used for supplying ECP water to the ANO-1 and ANO-2 Service Water Systems. The Dardanelle Reservoir provides the primary heat sink during normal plant operation while the ECP is a backup source for plant safe shutdown, if necessary, under normal or accident conditions. The ECP serves as a heat sink for simultaneously shutting down both ANO-1 and ANO-2 in the unlikely event of a loss of the Dardanelle Reservoir water inventory. Since there is slightly more stored energy for ANO-2, the operating condition which results in the minimum margin is an ANO-2 Design Basis Accident (DBA) and a concurrent ANO-1 shutdown.

Natural surface drainage (drainage area, 225 acres) is used as makeup for evaporation losses. Additionally, the pond minimum water level can be maintained by supplying makeup water from the Russellville water supply line to the plant site or from Dardanelle Reservoir using the service water pumps. A spillway is provided for the overflow of excess water.

The ECP is further described in Chapter 9.3.2.4 of the ANO-1 Safety Analysis Report (SAR) and Chapter 9.2.5 of the ANO-2 SAR (Reference 2).

The most recent evaluation of the ECP structure has determined that the ECP indicated level that corresponds to a contained volume of 70 acre-feet is 5.05 feet. ECP water level has historically been maintained at approximately 5.5 feet indicated level. Although the TS 70 acre-feet volume requirement is met, the current TS indicated ECP level of 5 feet is non-conservative in that it does not provide allowance for potential measurement error with respect to the normally utilized sounding technique or for potential degradation between surveillances. In accordance with NRC Administrative Letter 98-10, Entergy Operations, Inc. (Entergy) has put in place administrative controls to ensure the ECP is maintained at  $\geq 5.2$  feet indicated level. This submittal is intended to reconcile these differences. However, because the volume-to-level relationship may change slightly throughout the life of the plant, Entergy proposes to maintain the minimum volume requirements in the TSs while relocating the corresponding indicated level to the TS Bases.

In addition to the above, a recent inspection of the ECP noted degradation of some portions of the pond structure. An engineering evaluation was performed to determine continued operability of the ECP in accordance with the TS Bases. The portion of the ECP TS and associated Bases relevant to this submittal was reviewed and approved by the NRC in 1993 (Reference 1). However, Entergy believes it is inappropriate for actions required to be taken for failed SRs to be located in the TS Bases. Therefore, Entergy proposes a new action be incorporated in both units' TSs similar to that currently described in the TS Bases.

#### **4.0 TECHNICAL ANALYSIS**

The minimum design basis volume requirement of the ECP is 70 acre-feet. Both ANO units' TSs require inspection and sounding of the ECP on an annual basis. The information gathered through these surveillances provides a means of determining the minimum indicated level at which the ECP must be maintained to ensure a 70 acre-feet volume is available at all times during operation in Modes 1, 2, 3, and 4. Because the required volume is designated in the TSs and because the corresponding indicated level may change throughout plant life, Entergy desires to relocate the indicated level to the TS bases. In so doing, sufficient regulatory control is maintained within the TSs to ensure design basis requirements will continue to be met while relieving Entergy of the unnecessary burden of requesting a change to the TS as indicated level changes.

In addition to the above, the details of ECP inspection requirements are proposed for relocation to the TS Bases (see Attachment 3, Markup of Technical Specification Bases) and a new Action is incorporated into the TSs to ensure ECP inspection deficiencies are evaluated and corrected as necessary. Relocation of SR details to the TS Bases is consistent with the philosophy of the ITS for all plant types. The action to be taken when ECP degradation is discovered pursuant to TS SRs or by other inspection is relocated to the TSs.

This action consists of an engineering evaluation intended to determine the affect of ECP degradation on continued ECP operability. The TS Bases, as approved by the NRC, did not include a completion time for this engineering evaluation. Therefore, a 7-day completion time is proposed for this action. Seven days is reasonable based on the low likelihood of a loss of the Dardanelle Reservoir event to occur in any 7 day period. Even if a loss of the Dardanelle Reservoir were to occur, it is unlikely that the noted ECP degradation would result in the unavailability of the ECP as a cooling water source through the first 24 hours of an accident when decay heat loads are elevated.

A markup of the TS Bases is provided in Attachment 3 for information only. The minimum ECP indicated level that corresponds to the TS required 70 acre-feet is included in this markup. The markup also includes the SR details relocated from the TSs and a basis for the newly proposed TS action.

### Summary

The above proposed TS changes act to correct current TS deficiencies while reducing the burden on the licensee with regard to submitting future TS changes each time the ECP indicated level is adjusted to correspond with the TS volume limit of 70 acre-feet. Entergy believes the changes have no significant impact on plant operation, nuclear safety, or the health and safety of the public; therefore, the proposed changes are believed to be acceptable.

## **5.0 REGULATORY ANALYSIS**

### **5.1 Applicable Regulatory Requirements/Criteria**

The proposed change has been evaluated to determine whether applicable regulations and requirements continue to be met. Entergy has determined that the proposed change does not require any exemptions or relief from regulatory requirements, other than the Technical Specifications (TS), and do not affect conformance with any General Design Criterion (GDC) differently than described in the Safety Analysis Report (SAR).

### **5.2 No Significant Hazards Consideration**

Entergy proposes to relocate the Emergency Cooling Pond (ECP) indicated level which corresponds to the required ECP volume of 70 acre-feet from the TSs to the TS Bases. Entergy furthermore proposes to relocate excessive details associated with ECP Surveillance Requirements (SR) from the TSs to the TS Bases. Finally, Entergy proposes to relocate action required (i.e., engineering evaluation of continued operability) when degradation of the ECP structure is discovered from the TS Bases to the TSs. The latter change involves adopting a proposed 7-day completion time to perform the action. Because the ECP is a common cooling water source for both Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2), the TSs for both units are impacted by the proposed change.

Entergy Operations, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The indicated ECP level is an operator aid for routine verification that the required ECP inventory of 70 acre-feet is maintained. Relocation of this indication to the TS Bases does not change the design basis and, therefore, has no impact on any accident described in the SAR. The relocation of excessive SR details to the TS Bases does not reduce the level of testing required with regard to ECP operability verifications. Actual ECP inspection is more detailed than that currently described in the TSs. The relocation of this excessive detail to the TS Bases, therefore, has no impact on any accident described in the SAR. Finally, the inclusion of a new Action associated with the discovery of degradation of the ECP structure is more restrictive in that the proposed engineering evaluation must be performed within 7 days. Previously, the TS Bases did not require a completion time for this action. Actions associated with TS Limiting Conditions for Operation (LCO) or SRs are below the level of detail described in the SAR and, therefore, have no impact on any accident currently described in the SAR.

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

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

Response: No.

The aforementioned proposed change to the TSs does not require any physical alteration to the plant or alter plant design. The ECP is not an accident initiator. The proposed change does not adversely impact the function of the ECP as credited in any safety analyses for the prevention or mitigation of any accident.

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

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

Response: No.

The proposed change does not adversely impact a margin of safety analysis for any accident previously evaluated. Relocation of the indicated ECP level that corresponds to the required ECP volume of 70 acre-feet and the relocation of excessive SR details to the TS Bases will not result in a credible increase in nuclear safety risk. In addition, the TS Bases is part of the SAR and controlled under 10 CFR 50.59. The inclusion of a new action relocated from the TS Bases to the TS with completion time constraint is more conservative than currently described in the TS Bases. The proposed change acts to correct current TS deficiencies and, therefore, is considered risk neutral.

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

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

### 5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

### 6.0 PRECEDENCE

Not applicable.

### 7.0 REFERENCES

1. NRC letter to Jerry W. Yelverton, dated November 24, 1993, "Issuance of Amendment Nos. 170 and 153 to Facility Operating License Nos. DPR-51 and NPF-6 – Arkansas Nuclear One, Units 1 and 2 (TAC Nos. M87145 and M87146)" (OCNA119309)
2. ANO-1 and ANO-2 Safety Analysis Reports
3. NUREGs 1430 and 1432, Revision 3, *Standard Technical Specifications*



**Attachment 2**

**To**

**OCAN100503**

**Proposed Technical Specification Changes (mark-up)**

## 3.7 PLANT SYSTEMS

## 3.7.8 Emergency Cooling Pond (ECP)

LCO 3.7.8 The ECP shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. <u>Degradation of the ECP noted pursuant to SR 3.7.8.4 below or by other inspection.</u>	A.1 <u>Determine ECP remains acceptable for continued operation.</u>	<u>7 days</u>
BA. <u>Required Action and associated Completion Time of Condition A not met</u> ECP inoperable.  <u>OR</u>  <u>LCO not met for reasons other than Condition A.</u>	BA.1 Be in MODE 3.  <u>AND</u>  BA.2 Be in MODE 5.	6 hours    36 hours

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.8.1	Verify the indicated water level of ECP is <u>greater than or equal to the required ECP volume of <math>\geq 705</math> acre-ft.</u>	24 hours
SR 3.7.8.2	-----NOTE----- Only required to be performed from June 1 through September 30. -----  Verify average water temperature is $\leq 100^{\circ}\text{F}$ .	24 hours

<u>SURVEILLANCE</u>		<u>FREQUENCY</u>
SR 3.7.8.3	<u>Perform soundings of the ECP to vVerify:</u> <u>1. A contained water volume of ECP <math>\geq</math> 70 acre-feet at water level of 5 ft., and</u> <u>2. The minimum indicated water level needed to ensure a volume of 70 acre-feet is maintained.</u>	12 months
<u>SURVEILLANCE</u>		<u>FREQUENCY</u>
SR 3.7.8.4	<del>Verify earth portions of stone covered embankments and spillway of ECP;</del> <u>Perform visual inspection of the ECP to verify conformance with design requirements.</u> <del>a. Have not been eroded or undercut by wave action, and</del> <del>b. Do not show apparent changes in visual appearance or other abnormal degradation from as-built condition.</del>	12 months

## PLANT SYSTEMS

### 3/4.7.4 EMERGENCY COOLING POND

#### LIMITING CONDITION FOR OPERATION

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3.7.4.1 The emergency cooling pond (ECP) shall be OPERABLE with:

- a. A minimum contained water volume of 70 acre-feet ~~(equivalent to an indicated water level of 5 feet).~~
- b. An average water temperature of  $\leq 100^{\circ}\text{F}$ .

APPLICABILITY: MODES 1, 2, 3 and 4.

#### ACTION:

- a. With the volume and/or temperature requirements of the above specification not satisfied or, with the requirements of Action b not met, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. If degradation is noted pursuant to 4.7.4.1.d below or by other inspection, perform an evaluation to determine that the ECP remains acceptable for continued operation within 7 days.

#### SURVEILLANCE REQUIREMENTS

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4.7.4.1 The ~~ECP~~ emergency cooling pond shall be determined OPERABLE:

- a. At least once per 24 hours by verifying the pond's indicated water level of the ECP is greater than or equal to the required volume of  $\geq 705$  acre-feet.
- b. At least once per 24 hours during the period of June 1 through September 30 by verifying that the pond's average water temperature at the point of discharge from the pond is within its limit.
- c. At least once per 12 months by making soundings of the pond and verifying: ~~an average depth of 5 feet and that the contained water volume of the pond is within its limit.~~
  1. A contained water volume of  $\text{ECP} \geq 70$  acre-feet, and
  2. The minimum indicated water level needed to ensure a volume of 70 acre-feet is maintained.
- d. At least once per 12 months by performance of a visual inspection of the loose stone (riprap) placed on the banks of the pond and of the concrete slab spillway and verifying that the earth portions of the stone covered embankments and the spillway ~~ECP to verify conformance with design requirements:~~
  1. ~~Have not been eroded or undercut by wave action, and~~
  2. ~~Do not show apparent changes in visual appearance or other abnormal degradation from their as-built condition.~~

**Attachment 3**

**To**

**OCAN090503**

**Markup of Technical Specification Bases (for information only)**

## B 3.7 PLANT SYSTEMS

### B 3.7.8 Emergency Cooling Pond (ECP)

#### BASES

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#### BACKGROUND

The ECP provides a shared heat sink for removing operating heat from safety related components if the heat sink provided by the Dardanelle Reservoir is unavailable. This is done utilizing the Service Water System (SWS).

The ECP is a portion of the complex of water sources which fulfill the ultimate heat sink requirements for ANO. This complex includes the necessary retaining structures and the piping connecting the sources with, but not including, the SWS intake structure, as discussed in the SAR, Section 9.3 (Ref. 1). The principal function of the ECP is dissipation of residual heat after a reactor shutdown.

The basic performance requirements are that a 30 day supply of water be available for both units, and that the design basis temperatures of safety related equipment not be exceeded. Additional information on the design and operation of the system can be found in Reference 1.

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#### APPLICABLE SAFETY ANALYSES

The ECP is the sink for heat removal from the reactor core following an abnormality in which the unit is cooled down and placed on decay heat removal following a loss of the Dardanelle Reservoir inventory which would be considered a single failure.

The operating limits are based on conservative heat transfer analyses for the worst case initial conditions that could be present considering a Unit 2 Design Basis Accident concurrent with a normal shutdown of Unit 1 and a loss of the Dardanelle Reservoir water inventory. Reference 1 provides the details of the assumptions used in the analysis. The minimum ECP requirements take into account: water loss from evaporation due to heat load and climatological conditions, fire pump usage, ECP bottom irregularities, suction pipe level at the ECP, and operator action in transferring the SWS from the Dardanelle Reservoir. An indicated level of 5.05 feet corresponds to the required volume of 70 acre-feet. An additional 0.15 feet is appropriate to account for measurement, calculation, and other uncertainties, resulting in the minimum ECP indicated level to ensure a 70 acre-foot volume of 5.2 feet. Operator action is credited in the inventory analysis during the transfer of the SWS to the ECP. Specifically, pump returns are transferred to the ECP shortly after the Dardanelle Reservoir loss of inventory event begins and pump suctions are transferred later in the event depending on pump bay level. In the time frame between the transfer of the returns and suctions to the ECP, lake water is pumped into the ECP, increasing level by at least 4.5 inches. This additional water is required, along with that maintained in the ECP, to ensure a 66.94.5 inch depth, which ~~ensures~~ corresponds to a 30 day supply of cooling water. The ECP is designed in accordance with Regulatory Guide 1.27 (Ref. 2), which requires a 30 day supply of cooling water.

APPLICABLE SAFETY ANALYSES (continued)

The ECP satisfies Criterion 3 of 10 CFR 50.36 (Ref. 3).

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LCO

The ECP is a backup system that is required to be OPERABLE to support the SWS. To be considered OPERABLE, the ECP must contain a sufficient volume of water at or below the maximum temperature that would allow the SWS to operate for at least 30 days following the design basis event without exceeding the maximum design temperature of the equipment served by the SWS. To meet this condition, the ECP initial temperature should not exceed 100°F, and the volume of water should not fall below 70 acre-feet during normal unit operation.

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APPLICABILITY

In MODES 1, 2, 3, and 4, the ECP is a backup system that is required to support the OPERABILITY of the equipment serviced by the SWS and is required to be OPERABLE in these MODES.

In MODES 5 and 6, the OPERABILITY requirements of the ECP are determined by the systems it supports. Although the systems it supports may be required to be OPERABLE, the ECP is not required to meet the same OPERABILITY requirements in MODES 5 and 6 as it must in MODES 1, 2, 3, and 4. The definition of OPERABILITY embodies the principle that a system can perform its function(s) only if all necessary support systems are capable of performing their related support functions. If the supported system is capable of performing its safety function without reliance on the ECP, then the ECP is not required to be OPERABLE. Similarly, operation with the ECP in a less than fully qualified state is acceptable provided an assessment has been performed to determine that the supported system remains capable of performing its safety function. It is important to recognize that single failure criteria is not applicable in MODES 5 and 6. Therefore, the availability of Lake Dardanelle as a heat sink during periods of ECP unavailability may be acceptable provided the probability of a loss of lake and the time to respond to a loss of lake event are considered when planning ECP unavailability periods.

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ACTIONSA.1

If degradation is noted during performance of SR 3.7.8.4 or during other inspection, the impact on ECP OPERABILITY must be assessed. As discussed in the SR 3.7.8.4 Bases below, an engineering evaluation is performed of any apparent changes in visual appearance or other abnormal degradation to determine OPERABILITY. The Completion Time associated with this action is reasonable based on the low probability that a loss of the Dardanelle Reservoir would occur in any 7-day period. If, by evaluation, the ECP is determined to be inoperable at any point during the 7-day evaluation period, the ECP must immediately be declared inoperable and Action B applied.

BA.1 and BA.2

If the ECP is inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

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SURVEILLANCE REQUIREMENTSSR 3.7.8.1

This SR (together with SR 3.7.8.3 and SR 3.7.8.4) verifies that adequate long term (30 days) cooling inventory is available. ~~The level specified also ensures NPSH is available for operating the SWS pumps.~~ The 24 hour Frequency is based on operating experience related to the trending of the ECP level during the applicable MODES. This SR verifies that the ECP indicated water level is  $\geq 5.2$  feet, which is sufficient to ensure a water volume of  $\geq 70$  acre-ft when crediting operator action to initiate makeup to the ECP upon a loss of Dardanelle Reservoir event (described in the Applicable Safety Analyses section above). The 5.2-foot minimum level requirement includes measurement, calculation, and other uncertainties.

SR 3.7.8.2

This SR provides assurance that the heat sink for the SWS can dissipate the maximum accident or normal heat loads for 30 days following the design basis event. The temperature, measured at the point of discharge from the ECP, is considered a conservative average of total ECP conditions since solar gain, wind speed, and thermal current effects throughout the ECP will essentially be at equilibrium conditions under initial stagnant conditions. The 24 hour Frequency is based on operating experience related to the trending of the ECP temperature during the applicable MODES. This SR verifies that the ECP average water temperature at the point of discharge from the ECP (i.e., SWS suction) is  $\leq 100^{\circ}\text{F}$ .

This SR is modified by a Note indicating that the temperature monitoring is required to be performed only during the summer months (i.e., June 1 to September 30). During other periods of the year, the ECP temperature will not have the potential to reach the temperature limit.

SR 3.7.8.3

This SR (together with SR 3.7.8.1 and 3.7.8.4) verifies that adequate inventory exists to support long term (30 days) cooling. Soundings are performed to ensure the water volume is within limits and that the indicated water level is indicative of an equivalent water volume for accident mitigation. The 12 month Frequency reflects the gradual pace of degradation of the physical properties of the ECP.



SR 3.7.8.4

This SR (together with SR 3.7.8.1 and 3.7.8.3) verifies that adequate inventory exists to support long term (30 days) cooling. Visual inspections of the loose stone (riprap) placed on the banks of the ECP and of the concrete slab spillway are performed to ensure erosion, undercut caused by wave action, or any physical degradation, is within acceptable limits to enable the ECP to fulfill its safety function. An engineering evaluation ~~is performed of any apparent changes in visual appearance or other abnormal degradation~~ is performed within 7 days to determine OPERABILITY. The 12 month Frequency reflects the gradual pace of degradation of the physical properties of the ECP.

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REFERENCES

1. SAR, Section 9.3.
  2. Regulatory Guide 1.27, Rev. 1, "Ultimate Heat Sink for Nuclear Power Plants," March 1974.
  3. 10 CFR 50.36.
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## PLANT SYSTEMS

### BASES

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#### 3/4.7.2 STEAM GENERATOR PRESSURE/TEMPERATURE LIMITATION

The limitation on steam generator pressure and temperature ensures that the pressure-induced stresses in the steam generators do not exceed the maximum allowable fracture toughness stress limits. The limitations to 90°F and 275 psig are based on a steam generator RTNDT of 30°F and are sufficient to prevent brittle fracture.

#### 3/4.7.3 SERVICE WATER SYSTEM

The OPERABILITY of the service water system ensures that sufficient cooling capacity is available for continued operation of equipment during normal and accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the accident analyses.

#### 3/4.7.4 EMERGENCY COOLING POND

The limitations on the emergency cooling pond volume level and temperature are based on worst case initial conditions which could be present considering a simultaneous normal shutdown of Unit 1 and emergency shutdown of Unit 2 following a LOCA in Unit 2, using the ECP as a heat sink. The minimum indicated ECP level of 5.2 feet is based on soundings and includes measurement, calculation, and other uncertainties (equivalent to 0.15 feet) to ensure a minimum contained water volume of 70 acre-feet (equivalent to an indicated level of 5.05 feet), crediting operator action to initiate makeup to the ECP upon a loss of Dardanelle Reservoir event as discussed below. These soundings ensure degradation is within acceptable limits such that the indicated level is consistent with the required volume and the pond meets its design basis. The measured ECP temperature at the discharge from the pond is considered a conservative average of total pond conditions since solar gain, wind speed, and thermal current effects throughout the pond will essentially be at equilibrium conditions under initial stagnant conditions. Visual inspections are performed to ensure erosion, undercut caused by wave action, or any physical degradation is within acceptable limits to enable the ECP to fulfill its safety function. An engineering evaluation shall be performed by a qualified engineer of any apparent changes in visual appearance or other abnormal degradation within 7 days to determine operability.

The limitations on minimum water level and maximum temperature are based on providing a 30-day cooling water supply to safety-related equipment without exceeding their design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants", March 1974. Operator action is credited in the inventory analysis during the transfer of the service water system to the pond. Specifically, pump returns are transferred to the pond shortly after a loss of lake event and pump suctions are transferred later in the event depending on pump bay level. In the time frame between the transfer of the returns and suctions to the pond, lake water is pumped into the pond, increasing level by at least 4.5 inches. This additional water is required, along with that maintained by Technical Specifications, to ensure a 66.94.5-inch pond depth, which ensures~~corresponds to~~ a 30 day supply of cooling water.

#### 3/4.7.5 FLOOD PROTECTION

The limitation on flood protection ensures that facility protective actions will be taken in the event of flood conditions.