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May 15, 1995

1CAN059505

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Proposed Exigent Technical Specification Change Concerning Service Water Flow Rate To The Reactor Building Cooling System

Gentlemen:

Attached for your review and approval is a proposed Technical Specification (TS) change revising the Surveillance Requirement (SR) for verifying adequate service water flow to each train of reactor building emergency cooling. This change replaces the specified minimum flow rate of 1200 gpm with a requirement to verify the minimum flow rate based on the ability of the system to remove post-accident reactor building heat loads under the existing system conditions.

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 requests that the effective date for this change be immediately upon NRC issuance of the amendment. We request that this proposed change be considered under exigent circumstances as described in 10CFR50.91(a)(6) in that failure to act quickly could result in the shutdown of ANO-1.



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Very truly yours,

Jerry W Yelverton

JWY/gra
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** 14 **day of** May, **1995.**

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

OFFICIAL SEAL
JUANA M. TAPP
NOTARY PUBLIC - ARKANSAS
JOHNSON COUNTY
My Commission Expires: 11 - 8 - 2000

cc: Mr. Leonard J. Callan
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ATTACHMENT

TO

1CAN059505

PROPOSED TECHNICAL SPECIFICATION

AND

RESPECTIVE SAFETY ANALYSES

IN THE MATTER OF AMENDING

LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT ONE

DOCKET NO. 50-313

## DESCRIPTION OF PROPOSED CHANGES

Arkansas Nuclear One - Unit 1 (ANO-1) Technical Specification (TS) Surveillance Requirement (SR) 4.5.2.1.2(a)(1) has been revised to replace the specific 1200 gpm minimum service water flow rate to each train of reactor building emergency cooling with a requirement to verify a minimum flow rate based on the ability of the system to remove post-accident reactor building heat loads. Also, information has been added to the TS Bases consistent with the changes to SR 4.5.2.1.2(a)(1).

## BACKGROUND

The reactor building emergency cooling system consists of two redundant trains, each containing two cooling units. Each unit contains normal and emergency cooling coils and a single speed fan. During normal plant operation, chilled water is circulated through the normal cooling coils in each of the four units. During emergency operation, a bypass damper redirects airflow from the normal cooling coils to the emergency cooling coils. In this configuration, cooling is provided by service water to the emergency cooling coils.

The safety function of the reactor building emergency cooling system is to operate in conjunction with the reactor building spray system to maintain reactor building temperature and pressure below design limits following a design basis accident. In addition to limiting the peak reactor building temperature and pressure, the reactor building pressure must be reduced by 50% of the peak pressure within 24 hours following the initiation of the design basis accident. Further description of the reactor building emergency cooling system is provided in the ANO-1 Safety Analysis Report Section 6.3.

The original ANO-1 Technical Specifications contained no specific requirements for periodic flow testing of the reactor building coolers. On September 3, 1980 ANO-2 was shut down after a failure to meet the ANO-2 Technical Specification surveillance requirements for minimum service water flow rate through its containment cooling units. The inadequate flow was due to extensive plugging of the containment cooling units by Asiatic clams (corbicula species). Subsequent examinations of the ANO-1 service water system revealed that the "C" and "D" containment coolers were also clogged by Asiatic clams. As a result of this event ANO management committed, in a meeting with the NRC on October 22, 1980, to modify the ANO-1 Technical Specification, during the next refueling outage, to incorporate similar surveillance and chlorination procedures as contained in the ANO-2 Technical Specifications.

Proposed technical specification changes were submitted to the NRC for their review on January 30, 1981. This proposed change specified that at least once per 14 days, each reactor building cooling group shall be tested to demonstrate proper operation of the system. The proposed test was to be performed in accordance with the procedure summarized below:

1) Verifying a service water flow rate of ≥ 1200 gpm to each group of cooling units.

2) Chlorinating the service water during this surveillance, whenever service water temperature is between 60°F and 80°F.

Additionally, a limiting condition for operation 3.3.7 (F) was added which required when any cooling unit of the required groups is inoperable because the associated fan is inoperable, verify that the operable cooling unit in that group has a service water flow rate of ≥ 1200 gpm through the cooling coils or restore the inoperable cooling unit to operable status within 7 days or be in at least hot shutdown within the next 6 hours and in cold shutdown within the following 30 hours.

The proposed Technical Specification Bases changes associated with the above described submittal provides no insights with respect to the selection of the ≥ 1200 gpm value.

The NRC incorporated these proposed changes to the ANO-1 Technical Specifications as Amendment 62. The associated safety evaluation report (SER) for Amendment 62 reiterated the background information discussed above. In the evaluation portion of the SER it noted that "the augmented surveillance of flow with chlorination will assure mortality of non-valved larvae in the service water system and the detection of valved larvae or other flow clogging mechanisms before rendering the reactor building cooling units inoperable."

The reactor building cooler technical specifications were next modified by amendment 145 issued April 10, 1991. This change was proposed to provide clarification in light of events which required blanking off a number of coils in the Loop 2 ("C" and "D") reactor building coolers. Analysis performed by ANO at that time showed that with both fans and a complete set of coils split between the two coolers, the design heat removal requirements of a single train were exceeded.

The proposed changes submitted to the NRC in letter 1CAN019101, dated January 29, 1991, which were incorporated as amendment 145, defined the requirements for reactor building emergency cooling function in terms of heat removal capacity to meet the requirements of the Safety Analysis Report rather than specific component operation. This change also replaced the nomenclature of "reactor building cooling fan and its associated cooling units" with "train of reactor building emergency cooling", the term "unit" or "group" with "train" and "reactor building cooling" was changed to "reactor building emergency cooling".

Most relevant, among the changes was the deletion of Section 3.3.7 (F) containing a service water flow rate of ≥ 1200 gpm and the addition of the following to the bases of section 3.3:

> A train consists of two coolers and their associated fans which have sufficient capacity to meet post accident heat removal requirements. Conservatively each reactor building emergency cooling train consists of two fans powered from the same emergency bus and their associated coils, but other combinations may be justified by an engineering evaluation.

Other than the terminology changes the surveillance requirements for the reactor building coolers remained unchanged.

The proposed changes were incorporated as submitted. The accompanying SER endorsed the proposed concept of determining operability of the coolers based upon engineering evaluations. With respect to the deletion of Specification 3.3.7(F) the SER noted "with the proposed upgrading of the affected Technical Specifications in terms of an operable train, this Technical Specification is redundant to Technical Specification 3.3.7 (C) and is, therefore, unnecessary."

Since amendment 145 the reactor building cooler technical specifications have remained unchanged.

## DISCUSSION OF CHANGE

On May 7, 1995 one of the reactor building emergency cooling fans associated with the green train of the reactor building emergency cooling system tripped. After an unsuccessful attempt to restart the fan, a reactor building entry was made which determined that the fan motor was inoperable and would require extensive repairs or replacement.

With the cooling fan inoperable, the associated cooling unit cannot be credited for cooling purposes and must be considered inoperable. With one cooling unit providing no heat removal capability, the remaining cooling unit has insufficient service water flow to consider the train to be operable. In an effort to maximize the heat removal capability of the train and possibly restore it to an operable condition, the cooling coils associated with the inoperable fan were blind flanged so that the total green train reactor building cooler service water flow passes through the coils of the operable cooling unit. The resultant flow rate is less than the total green train reactor building cooler service water flow because with one cooler blind flanged the resistance in that portion of the system is greater. Testing was conducted which verified that flow in the current configuration was in excess of 1750 gpm through the operable cooling unit. However, when corrected to post-accident service water conditions, less than 1200 gpm would be supplied to the cooler. As discussed above, it is unclear whether the 1200 gpm acceptance criteria in SR 4.5.2.1.2(a)(1) was intended to be verified under post-accident service water conditions. However, it seems clear from the bases of specification 3.3 that an engineering evaluation could be used to demonstrate that adequate heat removal capability exists with less than the full complement of cooling units.

An engineering evaluation of the temporary configuration of the reactor building coolers was performed. The evaluation concluded that even with less than 1200 gpm, the reactor building cooling train was still capable of removing the required amount of post-accident heat load. Therefore, the minimum flow rate of 1200 gpm specified in the SR is inconsistent with the definition of operability in TS in that the system is still capable of meeting its safety function even though it may not meet the acceptance criteria in the SR. Also, there is no indication in the history of the SR that 1200 gpm was intended to preserve additional margin in the safety analysis.

The engineering analysis also highlighted that the minimum flow rate necessary to ensure adequate post-accident heat removal capability is affected by the current conditions in the reactor building coolers and in the service water system, e.g. service water system supply and discharge pressure, fouling on either the service water side or the airflow side of the cooling coils, anticipated service water temperature, and the number of cooling coils and fans that are in service. Each of these conditions has the potential to change during normal operation of the plant. Specifying one minimum flow rate in TS may be overly restrictive on system operation or may not ensure that adequate heat removal capability exists under all conditions.

The proposed change to SR 4.5.2.1.2(a)(1) would require that the minimum flow rate be established by an engineering evaluation. Consistent with specification 3.3 this would ensure that the heat removal capacity of the reactor building coolers is sufficient to satisfy the safety analysis assumptions regardless of the current system configuration.

## DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

An evaluation of the proposed change has been performed in accordance with 10CFR50.91(a)(1) regarding no significant hazards considerations using the standards in 10CFR50.92(c). A discussion of these standards 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 reactor building emergency cooling system is not an initiator of any accident described in the ANO-1 Safety Analysis Report. Therefore, the proposed change does not involve an increase in the probability of an accident.

The proposed change to the ANO-1 Technical Specifications replaces the minimum service water flow rate to the reactor building coolers with a requirement to establish the minimum service water flow rate based on an engineering evaluation. The engineering evaluation ensures that with the minimum service water flow rate the system is capable of removing the post-accident heat load in the reactor building and that the safety analysis assumptions are met. The Surveillance Requirement still demonstrates the ability of the reactor building emergency cooling system to remove the post-accident heat load from the reactor building in order to maintain reactor building temperature and pressure within design limits. Based on the above, the proposed change does not increase the consequences of an accident previously evaluated.

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 proposed change to the ANO-1 Surveillance Requirements to replace the minimum service water flow rate to the reactor building coolers with a requirement to verify the minimum service water flow rate based on the ability of the system to remove post-accident reactor building heat loads does not alter the design, configuration, or method of operation of the plant. 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 proposed change to the ANO-1 Surveillance Requirements to replace the minimum service water flow rate to the reactor building coolers with a requirement to establish the minimum service water flow rate based on an engineering evaluation could allow the system to be considered operable with less service water flow to the coolers. However, the engineering evaluation which establishes the minimum service water flow rate would ensure

that sufficient post-accident heat removal capability exists to satisfy the safety analysis assumptions. 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.

## STATEMENT OF EXIGENT CIRCUMSTANCES

The need for the expeditious processing of this technical specification change could not have been avoided. The reactor building fans have historically been extremely reliable components. These motors are periodically examined and preventive maintenance is performed. Upon discovery of the failed fan motor extensive efforts were made to locate a qualified replacement. These efforts included contacts with the original equipment manufacturer, other electric motor vendors and other nuclear utilities throughout the United States. No other qualified direct replacement motor could be located. The original equipment manufacturer estimated a several month delivery time to manufacture a new motor. In parallel with these efforts the inoperable motor was evaluated to determine if it could be repaired. These evaluations concluded at a minimum the stator would require rewinding and the motor shaft replaced or rebuilt. The motor is contaminated, therefore, to facilitate repairs the motor must first be decontaminated. The motor has been shipped offsite for decontamination and repair. Total repair efforts are estimated to take between 30 to 90 days.

In the interim the reactor building cooler system was modified as described above, diverting 100% of service water flow to the affected train through the cooler associated with the operable fan to assure adequate heat removal. Because of the decreased flow area, service water flow through the affected train was reduced to a value slightly below that required by the surveillance requirements of the technical specifications.

In order to continue plant operation in non-compliance with technical specification 4.5.2.1.2.(a)(1) enforcement discretion was verbally requested and received from the NRC on May 12, 1995. Enforcement discretion was requested for a period of time necessary for the NRC to process this technical specification change which will allow continued operation in the current configuration. Therefore, this change must be processed expeditiously to limit the time enforcement discretion is applied.

# PROPOSED TECHNICAL SPECIFICATION CHANGES