

DCCMS-016

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Docket No. 50-368

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Mr. John X. Griffin
 Vice President, Nuclear
 Operations
 Arkansas Power & Light Company
 P. O. Box 551
 Little Rock, Arkansas 72203

Dear Mr. Griffin:

SUBJECT: NUREG-0737, ITEM II.E.1.2, AUXILIARY (EMERGENCY) FEEDWATER SYSTEM
 AUTOMATIC INITIATION AND FLOW INDICATION

The staff is continuing its review regarding the above subject for Arkansas Nuclear One, Unit 2. We have prepared a safety evaluation and technical evaluation report (Enclosure 1). The evaluation concludes that NUREG-0737, Item II.E.1.2.2, Auxiliary (Emergency) Feedwater System Flow Indication, complies with the staff's long term safety grade requirements, and therefore, is acceptable. Therefore, this item is considered to be complete. The evaluation also concludes that NUREG-0737, Item II.E.1.2.1, Auxiliary (Emergency) Feedwater System Automatic Initiation does not fully comply with the staff's long term safety grade requirements.

By letter dated December 21, 1982, we provided you with a request for additional information in order to resolve the automatic initiation concerns. You provided your responses in a letter dated February 3, 1983. We have performed a detailed review of your responses and have written a supplemental safety evaluation (Enclosure 2). We conclude that all of our concerns regarding automatic initiation have not been resolved. In the conclusion section of the safety evaluation we have identified (as exceptions) our concerns that must be resolved. We request that you provide the information and/or commitments to meet the identified standards and 0737 requirements within thirty days of receipt of this letter in order that we may complete the resolution of this issue in a timely manner.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P. L. 96-511.

Please contact us if you have any questions concerning this letter.

Sincerely,
 Original signed by

Robert A. Clark, Chief
 Operating Reactors Branch #3
 Division of Licensing

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 PDR

OFFICE	Enclosures: As stated	ORB#3:DL ETourigny/pn	ORB#3:DL RLee	ORAB TAllexion	ORB#3:DL RACTark
SURNAME	cc: See next page	4/11/83	4/12/83	4/12/83	4/12/83
DATE					

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION

ARKANSAS UNIT 2 AUXILIARY (EMERGENCY) FEEDWATER

AUTOMATIC INITIATION AND FLOW INDICATION

ACTION PLAN ITEM II.E.1.2

INTRODUCTION AND SUMMARY

To improve the reliability of Emergency Feedwater Systems (EFWS) at pressurized water reactor (PWR) facilities, the staff is requiring licensees to upgrade the system where necessary to ensure safety grade automatic initiation and flow indication. The criteria for this upgrading are contained in NUREG-0737 (Clarifications of TMI Action Plan Requirements), Section II.E.1.2.

The evaluation of the Arkansas Nuclear One Unit 2 (ANO-2) EFWS design was performed for the NRC by Franklin Research Center (FRC) as part of a technical assistance contract program. The results of the FRC evaluation are reported in the attached Technical Evaluation Report (TER - C5257 - 307).

Based on our review of the FRC TER, we conclude that the EFWS automatic initiation and flow indication designs are acceptable with the exception noted below.

EVALUATION

The attached TER provides a technical evaluation of the electrical, instrumentation, and control design aspects of the ANO-2 EFWS with regard to automatic initiation and flow indication. Page 7 of the TER lists a bypass which is used during the startup and shutdown modes of operation by removing the EFWS

initiation logic channel modules and installing jumpers to allow EFWS operation outside of the normal operating band. This bypass was described by the licensee during a May 18, 1982 telephone conversation between FRC, NRC, and the licensee (Arkansas Power and Light Company). This bypass is removed (i.e., modules are reinserted) as part of the "pre-heatup check list". It is the staff's position that total reliance upon administrative controls to reinstate a protective function is unacceptable. We were informed that a "jumper and bypass" card is hung on the pump control switches in the main control room, but that there was no automatic indication of this bypass displayed when the modules were removed. As a result, this design was found to be unacceptable in the conclusion sections of the TER (pages 8 and 12).

Subsequent to this conversation we were informed that the logic modules were not removed, but that resistors were inserted between the steam generator (low) level sensors and their associated trip units such that a false high level would be sensed by the trip units even if the steam generators were drained. This would prevent an automatic start of the EFWS on steam generator low level. It is our understanding that bypassing the EFWS automatic actuation circuitry in this manner is only done when going to cold shutdown when steam generator maintenance is planned. The resistors are to be removed by procedure prior to startup.

This arrangement is also unacceptable to the staff. It is our position that the means used to effect the bypass of a protective function should not in any way alter or modify the

existing hardwired protection system circuitry. In addition, it appears that placing resistors between the sensors and trip units such that the trip units will detect a false high level, will also cause the steam generator level indication in the control room to provide misleading information (false high levels) to the operator. It is our position that bypassing a protective function should not cause control room instrumentation to provide erroneous information to the operators. Furthermore there is no continuous indication of bypass provided in the control room when this bypass is in effect, as required by Section 4.13 (Indication of Bypasses) of IEEE Standard 279-1971 (Criteria for Protection Systems for Nuclear Power Generating Stations).

The environmental qualification of safety related systems including EFWS circuits and components is being reviewed by the Environmental Qualification Branch as part of their review of licensee responses to "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors," issued to the licensee in NRR Letter dated March 5, 1980.

In order to adequately determine from the control room the performance of the EFWS, steam generator level instrumentation is used, in addition to flow indication. The requirements for this steam generator level instrumentation are specified in Regulatory Guide 1.97 Revision 2 (R.G. 1.97 - "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident"). The steam generator level in-

strumentation at ANO-2 should be in conformance with these requirements and implemented in accordance with the schedule for implementation of the referenced R.G.

CONCLUSION

Based on our review of the Franklin Research Center TER and subsequent conversations with the licensee, we conclude that the ANO-2 EFWS automatic initiation and flow indication systems comply with the staff's long term safety grade requirements with the following exceptions:

1. The bypass used to prevent EFWS actuation when going to a cold shutdown condition (where steam generator maintenance is planned) should not alter or modify the existing protection system circuitry or cause control room instrumentation to provide misleading information to the operators.
2. Continuous indication of EFWS operability should be provided in the control room when automatic initiation signals are bypassed.

The licensee should provide a detailed design description (including electrical schematic diagrams) of the ANO-2 EFWS design which indicates exactly how this bypass is accomplished and demonstrate how the bypass complies with the requirements of NUREG-0737, Section II.E.1.2. In addition, if the means used to effect the bypass can cause control room instrumentation to provide anomalous indications confusing to the operator (i.e., false high steam generator level readings), the licensee should

modify the design to bring it into conformance with Section 4.20 (Information Read-Out) of IEEE Standard 279-1971.

Further guidance regarding indication of bypasses may be found in Regulatory Guide 1.47 (Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems). The indication design (when submitted by the licensee) should be reviewed by the Human Factors Engineering Branch (HFEB).