



ARKANSAS POWER & LIGHT COMPANY  
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October 22, 1979

1-109-21

Director of Nuclear Reactor Regulation  
ATTN: Mr. R. W. Reid, Chief  
Operating Reactor Branch #4  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: Arkansas Nuclear One-Unit 1  
Docket No. 50-313  
License No. DPR-51  
Emergency Feedwater Pump  
Power Supply Upgrade  
(File: 1510.1)

Gentlemen:

In accordance with the request of Mr. Harold R. Denton's letter of May 31, 1979, the following information is provided as it pertains to providing an emergency power source to the motor-driven Emergency Feedwater Pump for Arkansas Nuclear One-Unit 1 (ANO-1).

To ensure the availability of power to the motor-driven Emergency Feedwater Pump (EFWP), engineered safeguards bus A3 was selected as the vital power source. This bus can be fed from one of two sources:

- a) Bus A1; i.e. off-site or unit Auxiliary Transformer, or
- b) Diesel generator

The following criteria was used in the redesign of the EFWP control circuit:

- a) No overloading should occur to the diesel generator, and
- b) Upon ICS command ensure starting of the EFWP motor.

The first requirement is accomplished by a sequence timer. All diesel generator fed loads have their sequence timer started by the same signal; i.e., loss of bus voltage then restoration of voltage. For the EFWP motor, with ICS start command present, the time delay is 100 seconds after restoration of voltage or 60 seconds after the last engineered safeguard load has started. Should off-site power be available when an ICS start is initiated, the EFWP motor will start after a 100 second time delay.

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The second requirement is met by the seal-in interposing relay 152X-311 which "memorizes" an ICS automatic start command should I005/X3 contacts close only momentarily.

Alarms are initiated in the ANO-1 control room for the following conditions:

- (1) EFWP discharge pressure high or low
- (2) EFWP tripped
- (3) EFWP motor failure to automatically start on ICS command
- (4) EFWP motor handswitch in pull-to-lock position

Although the EFW System is not a part of the Engineered Safeguard Actuation System, it is considered to perform a critical function and requires a high degree of reliability. Therefore, certain design criteria were followed to enhance the reliability of the EFW control.

IEEE 279-1971 was used as a guide in the design of the EFWP control scheme. This standard was met in the areas of channel independence, equipment quality, indication of bypasses, and equipment identification.

It should be noted that a single failure in the motor-driven EFWP scheme could result in the loss of the automatic initiation of the pump motor. However, manual initiation from the control room or at the switchgear could be accomplished. A single failure in the manual circuit (e.g. hand-switch failure) would not result in the loss of the EFW system function.

The initiating signals and circuits are testable to the extent that a contact closure can be simulated and the motor breaker observed to close. The design of the Integrated Control System (ICS) does not allow simulation of an EFW actuation signal during power operation.

The initiating signal circuitry (ICS), the motor-driven pump control circuit and all EFW system valves are supplied from emergency buses.

Three (3) copies of the following drawings are provided to facilitate your review:

<u>Drawing No.</u>	<u>Revision</u>
E-294	5-2
E- '99	8-2
E- 5	7-2
E-531	9-1

We have reviewed the proposed design change pursuant to 10 CFR 50.59 and have determined an unreviewed safety question does not exist. Therefore, installation of the modification will proceed to comply with our commitment to supply vital power to the motor-driven EFWP no later than October 31, 1979.

Very truly yours,

*David C. Trimble*  
David C. Trimble  
Manager, Licensing

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