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October 31, 1979

1-109-27

Director of Nuclear Reactor Regulation
ATTN: Mr. Robert W. Reid, Chief
Operating Reactors 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
Auxiliary (Emergency) Feedwater
Control System
(File: 1510.1)

Gentlemen:

Our May 11, 1979 letter committe to incorporate the Auxiliary (Emergency) Feedwater Control System (AFWCS) being developed by B&W as described in J.H. Taylor's letter to H.R. Denton dated April 28, 1979. This long-term improvement was to improve the timeliness and reliability of the emergency feedwater system (EFWS) at Arkansas Nuclear One-Unit 1 (ANO-1). The May 17, 1979 Order for ANO-1 directed us to accomplish, as promptly as practicable, the long-term modifications described in our May 11, 1979 letter. Our letter of June 29, 1979, submitted a schedule, as requested by the May 31, 1979, H.R. Denton letter, which proposed to submit a generic concept for the AFWCS to you by October 31, 1979. This letter provides a conceptual design for initiation and control of EFW independent of the Integrated Control System (ICS).

The existing Integrated Control System (ICS) and Non-Nuclear Instrumentation System (NNI) will be modified to achieve the following:

-separate initiation and control of each EFW train; Train A to be initiated and controlled by NNI-X, Train B to be initiated and controlled by NNI-Y.

-automatic initiation and removal of a bypass around the loss of main feedwater (LMFW) initiation of EFW to prevent inadvertent initiation during normal startups and shutdowns.

-Train A (NNI-X) will be completely separate from Train B (NNI-Y) such that no credible single failure can prevent initiation and control of EFW to at least one steam generator.

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This change will entail removal of EFW initiation and flow control modules from the ICS. The ICS will thus have no involvement with EFW operation after the change is effected. This change will entain the addition of modules to each subsystem (X and Y) for the initiation and flow control of EFW. Initiation and control modules for Train A will be located in NNI-X and the modules for Train B will be located in NNI-Y.

Figure 1 shows the initiation logic for Train A (NNI-X). This logic will be duplicated in NNI-Y for Train B. The associated EFW train will automatically start whenever one of three conditions exist:

- -loss of both mainfeed pumps
- -loss of all four reactor coolant pumps
- -low level in the associated steam generator

Train A initiation will result in opening signals being supplied to turbine steam supply valves CV-2617 and CV-2667. Train B initiation will result in a start signal being supplied to motor-driven pump P7B. Control of EFW flow will be identical to the present ICS control scheme except that CV-2670 will be controlled by NNI-X and CV-2620 will be controlled by NNI-Y.

The automatic initiation on LMFW will be automatically bypassed when Reactor Power is less than 5% FP and the bypass will be automatically removed when Reactor Power is greater than 5% FP. An annunciator output is provided for "LMFW TRIP BYPASSED" whenever Reactor Power is less than 5% FP. The automatic initiations due to loss of all reactor coolant pumps or low level in the steam generator do not have a bypass feature.

Automatic initiation on low steam generator level can be tested by disconnecting the level transmitter input at the terminal board and inserting an external test signal to simulate the transmitter input at jacks provided on the frontpanel. Testing of the automatic bypass can be accomplished during the Reactor Protection System monthly surveillance tests. To prevent perturbations in the ICS while the above tests are being conducted, the signal not under test can be selected for ICS input. For example, when testing startup level for OTSG 'B' in the Y cabinet, the technician would first select OTSG 'B' startup level from the X transmitter for ICS input. Testability of automatic initiation on loss of feed pumps or reactor coolant pumps can be accomplished via utilization of jumpers.

The following design features will be provided:

1. NNI subsystems X and Y must be powered from separate vital sources.

2. Pump P7B and valves requiring AC power will be automatically loaded on the diesel buses.

3. Separate, redundant inputs will be provided to NNI subsystems X and Y for (a) loss of all reactor coolant pumps, (b) loss of main feed pumps, and (c) steam generator levels.

We currently anticipate incorporation of this change during the January 1980 shutdown to make NUREG-0578 modifications.

Very truly yours,

John M. Griffin for

David C. Trimble
Manager, Licensing

DCT:ata

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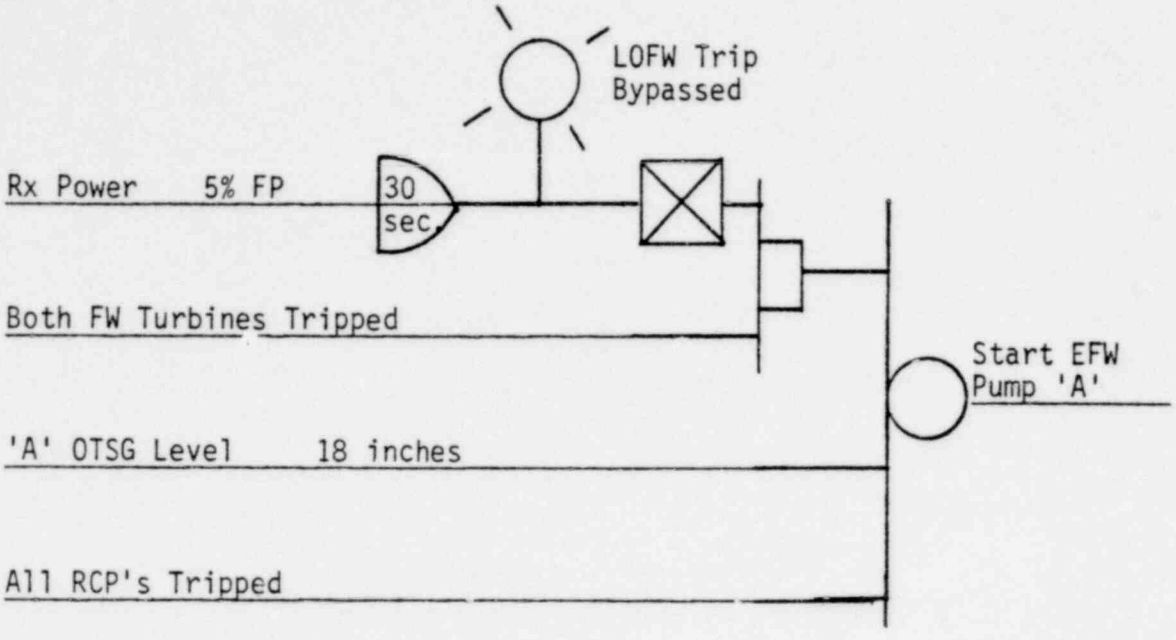
FIGURE 1

EFW INITIATION




Train 'A' Initiation (Duplicate for Train 'B')

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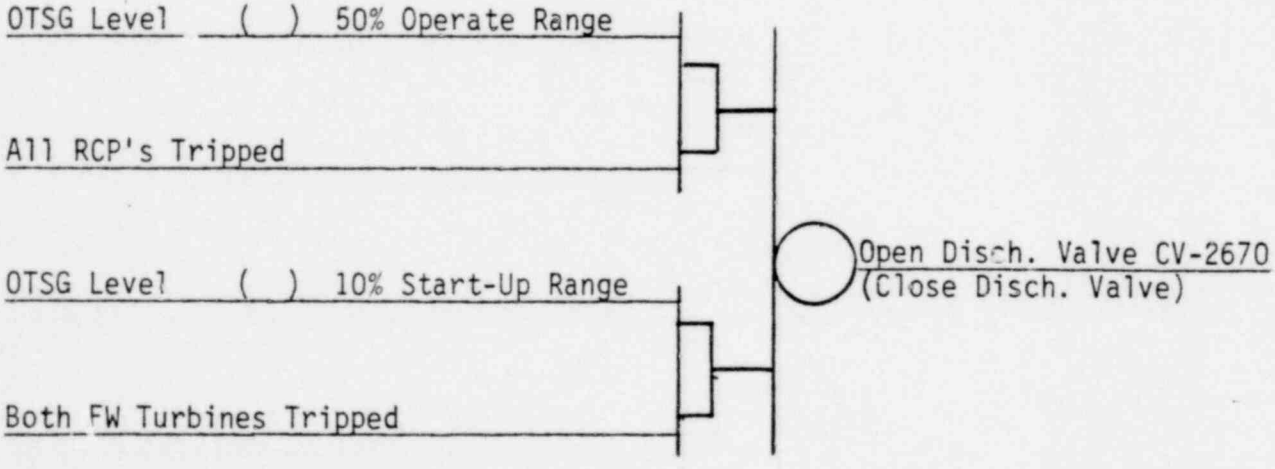
EFW CONTROL




Train 'A' Control (Duplicate for Train 'B', CV-2620)