ARKANSAS POWER & LIGHT COMPANY
POST OFFICE BOX 551 LITTLE ROCK, ARKANSAS 72203 (501) 371-4000

June 7, 1982

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Director of Nuclear Reactor Regulation
ATTN: Mr. J. F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing
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 (EFW) System Upgrade -
NUREG 0737 Items II.E.1.1&2

Gentlemen:

During several recent telephone conversations with Mr. Guy Vissing of your staff, AP&L was requested to provide additional information relative to our efforts to upgrade the ANO-1 Emergency Feedwater (EFW) system. AP&L's letter dated May 28, 1982, (1CANØ582Ø6) provided the current status of this item and projected final installation during the sixth ANO-1 refueling outage which is scheduled for the fall of 1984. The specific questions asked by Mr. Vissing are repeated below followed by our response. This additional information provides the technical basis necessary for your resolution of our request for a delay in the implementation date of a safety grade EFW initiation system. We feel the requested delay is warranted and will not detract from the safe operation of ANO-1.

Question 1: What specific items of equipment are scheduled for installation during the fifth ANO-1 refueling outage?

Response: The items scheduled to be accomplished during the upcoming refueling outage are listed below. These items are contingent, however, on currently scheduled equipment delivery dates being met by the equipment vendors and no significant change in the current outage schedule.

a) Sixteen (16) steam generator level transmitters will be installed along with the associated cabling. This modification will require thirty-two (32) new penetrations of the steam generator pressure boundary to provide taps for these transmitters.

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b) The Emergency Feedwater Initiation and Control (EFIC) equipment cabinets will be installed in the control room and the field cabling will be pulled.

c) The Trip Interface Equipment, needed to provide the interface between the EFIC system and various actuated components (EFW pumps, control valves, etc.), will be installed and associated cable pulled.

d) A new EFW steam turbine will be installed on the turbine driven EFW pump along with associated piping modifications.

e) The Reactor Protection System and Engineered Safeguards Features modules, needed to provide input signals to the EFIC system, will be installed.

Question 2: How long an outage will be required for installation of the remaining equipment?

Response: The items to be completed during a subsequent outage include installation of new EFW valves and piping, installation and final hook up of the EFW control console in the ANO-1 control room, completion of all component cabling terminations and final system testing.

These remaining items involve extensive plant modifications. For example, four (4) new EFW control valves and twenty (20), isolation and check valves must be installed. This will require installation of approximately nine hundred (900) feet of new piping which will require approximately five weeks to install. The installation of the EFW control console will require installation of a completely new control board in the ANO-1 control room. This modification will require six weeks to complete. Following these modifications, approximately three weeks will be required for completion of system testing provided no major difficulties or equipment malfunctions are encountered. The startup of the new EFW system will involve extensive testing due to the complexity and magnitude of these modifications.

Since the startup testing cannot begin until all other modifications are complete, and allowing for plant cooldown and heatup, an outage of at least ten weeks will be required.

Question 3: Describe in more detail the equipment qualification requirements which have resulted in the long lead time for procurement of the EFIC control console.

Response: Concurrent with our efforts to design an upgraded EFW system per the requirements of NUREG 0578, and later

NUREG 0737, the NRC began an extensive program of modifications to, and reinterpretation of, the requirements for environmental qualification of electrical equipment. These new requirements were imposed via IE Bulletin 79-01B issued in January of 1980 (and later supplements) and also by a specific order dated October 24, 1980, (1CNA10806). In our efforts to comply with these requirements AP&L modified the specifications for the EFIC control console to require compliance to IEEE 323-1974. Since the majority of the needed equipment was not commercially available with qualification to IEEE 323-1974, the vendor has embarked on a testing program to meet this requirement. Following is a breakdown, supplied by the equipment vendor, of the resulting required lead time.

Qualification plan	4 weeks
Approval of qualification plan	2 weeks
Aging qualification of components	6 weeks
Radiation of components	1 week
Qualification report	4 weeks
Approval of qualification report	2 weeks
Seismic test of aged components & cabinet	2 weeks
Test report	4 weeks
Test report approval	2 weeks
Component delivery of qualified devices	12 weeks
Fabrication and assembly	4 weeks
Total	43 weeks

Question 4: In view of the long lead times involved in procuring Class 1E, environmentally qualified, electrically operated control valves, was the alternative of a safety grade plant air supply system and air operated control valve evaluated?

Response: The possibility of installing a safety grade air supply system was considered. This would have required the addition of an entire safety grade plant air supply system. The expense and engineering difficulties involved made this alternative impracticable.

Other alternatives, including a local air supply system, were also evaluated and rejected based on operational and reliability considerations.

Question 5: What is the basis for continued operation of ANO-1 pending completion of the EFW upgrade project?

Respnse: It should be noted that the EFW upgrade project described in our letter of May 28, 1982, goes far beyond the requirements of Item II.E.1.2 for a safety-grade EFW initiation system. This requirement has been included in

our response to the requirements of Item II.E.1.1 - "Auxiliary Feedwater System Evaluations." As you are aware, the modifications currently underway in response to this item include a new safety-grade EFW initiation and control system as well as upgrades and replacements of active EFW components as required.

During the interim period pending completion of these modifications the currently installed automatic EFW initiation system will provide a reliable means of initiating EFW. This system was installed in early 1980 in response to NUREG 0578 Item 2.1.7a and is described by AP&L's letter dated October 31, 1979, (1CAN1Ø7927). Specifically, the EFW intiation system was modified to provide complete independence from the Integrated Control System (ICS). Train A of the EFW system is now completely controlled by the Non Nuclear Instrumentation (NNI) X channel and Train B is initiated and controlled by NNI-Y. The complete operation of Train A (NNI-X) and Train B (NNI-Y) is such that no credible single failure can prevent initiation and control of EFW to at least one steam generator. It should be stressed that these modifications were achieved using high quality hardware modules identical to those originally installed in the NNI. Use of the standard hardware contributed to increased reliability as well as enhancing our ability to test and maintain the system. Hardware of this type has performed reliably in the field for many years at ANO and other facilities.

The reliability of the NNI system was further improved via modifications and verification testing conducted later in 1980 as a result of the loss of NNI power at Crystal River 3 on February 26, 1980. As part of AP&L's response to this incident, a vital bus AC power supply and transfer switch were added to the NNI system. This modification is described in AP&L's letter dated March 24, 1980, (1CANØ38Ø12). The overall reliability of the NNI system, and therefore the EFW system, was substantially improved by this modification, resulting in a design equivalent to safety grade systems.

In the two years since the installation of the present EFW initiation system, the EFW initiation system has performed reliably. Based on this experience and the design features discussed above we feel operation with the present system, pending completion of the EFW long term upgrades, is justified.

Very truly yours,

John R. Marshall

John R. Marshall
Manager, Licensing

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