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March 26, 1984

1CAN038405

Director of Nuclear Reactor Regulation  
ATTN: Mr. J. F. Stolz, Chief  
Operating Reactors Branch #4  
Division of Licensing  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
NUREG/CR-2787, Interim Reliability  
Evaluation Program for ANO-1

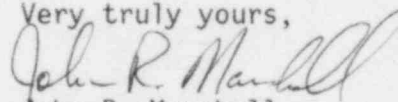
Gentlemen:

The purpose of this letter is to respond to your December 23, 1983, request (1CNA128302) for a status of our activities related to the Interim Reliability Evaluation Program (IREP) Analysis for ANO-1 (NUREG/CR-2787).

In our letter dated December 9, 1982, (1CAN128203) we stated that we had reviewed the ANO-1 IREP Report and concluded that (1) there was no need for any additional modifications to the plant design or operation of ANO-1 beyond those modifications already underway or accomplished, and (2) there was no need for any actions by AP&L with regard to the main contributors to the core melt frequencies identified in the report. Additionally, we stated that we had no immediate changes planned at ANO-1 as a result of the findings in the IREP Report, although we did plan to use the report in our future evaluations and planning where appropriate.

This is to reaffirm that there has been no change in our above conclusions or plans with regard to IREP since our 1CAN128303 submittal. However, for your information, the enclosure provides our comments and a brief overview of various plant or procedural modifications, either completed or in progress, which may be of interest to you in light of IREP.

Very truly yours,

  
John R. Marshall  
Manager, Licensing

JRM:DET:gw

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## ENCLOSURE TO 1CAN038405

The purpose of this enclosure is to provide comments and a brief overview of various work which may be of interest in view of the ANO-1 IREP Report (NUREG/CR-2787) dated June, 1982.

### 1. RCP Seal Upgrade Program

AP&L and several other utilities voluntarily initiated an effort in March 1981 to identify the causes of what appeared to be common RCP seal failures and recommend actions to improve seal performance. The RCP seal modification increases controlled bleed-off flow from 1 GPM to 1.5 GPM and installs internal parts of a later design for the purpose of improving seal performance and life. For purposes of this report, the significance is that reducing the RCP failure rates for the small LOCA sequences should correspondingly reduce the associated core melt frequencies cited in IREP.

Specifically, the controlled bleed-off flow increase is accomplished by shortening the pressure breakdown staging coils. The higher flow rate allows a higher variation in seal leakage without changing the seal cavity pressure. This will decrease the tendency of the seals to sustain oscillations, thereby promoting longer seal life.

Secondly, the improved internal parts consist of:

- a. Carbide rotating face seal rings which have radial slots machined on the outer diameter of the sealing surface. This will reduce the overall hydraulic loading on the seal faces and the additional fluid between the faces will result in more heat removal.
- b. An improved design "U" cup is installed to reduce sliding friction on the shaft sleeve. This modification will reduce the tendency of the seals to hang up on the sleeve during system pressure changes.
- c. Modifications were made to alter the staging flow path for the purpose of providing a more uniform temperature distribution at the two lower seals.

As a result of preliminary analyses of the modifications suggested for the RCP seal system design, it appears that the mean time between seal failures can be effectively doubled, with the potential existing for an eventual threefold increase in seal performance. Again, the significance is that reducing RCP failure rates for the small LOCA sequences should correspondingly reduce associated core melt frequencies.

### 2. Diesel Generator Modification

The purpose of this modification is to provide for additional redundancy and assurance of being able to start the Emergency Diesel

Generator. Specifically, this modification provided the capability to manually start an emergency diesel in the event of a total loss of DC power by providing:

- a. starter solenoids with manual override capability;
- b. circuit modifications to remove the field "short circuit" to allow residual magnetism to excite the generator; and
- c. procedures and training to accomplish this.

3. Check Valve Reconfiguration

Since the IREP Report was published, we have also provided for additional redundancy by improving the operational design of a check valve arrangement on the Condensate Storage Tank. Specifically, we have installed two additional check valves in a parallel configuration on a common line with the two existing check valves. This modification should lessen the probability of multiple check valve failures impacting the operability of this line.

4. Abnormal Transient Operating Guidelines (ATOG) Implemented

A new emergency operating procedure based on ATOG (Plant Procedure 1202.01) was implemented in January 1983. The purpose of the ATOG is to give operators an overview on the diagnosis and control of reactor transients such that the consequences of severe transients will be mitigated. These guidelines are intended to provide enough background and understanding from a symptom-oriented approach such that appropriate actions may be taken by the operator to correctly respond to the transient using the principles of heat transfer control without reliance on prompt identification of the exact nature of the transient.

5. Training

Though not a result of the IREP study, our operator training programs undergo thorough and periodic review to minimize operator error probabilities. Additional training on HPI and ATOG are two examples of recent improvements to our operator training programs. We are confident that we have improved our operator training program and have made significant progress to reduce the operator error probabilities in the dominant accident sequences.

6. AP&L Comments on the Use of IREP

There have been no changes in the conclusions or plans with regard to IREP since our ICAN128303 submittal. However, we remain committed to use the report in our future evaluations and planning where appropriate.

Your review of the IREP study questioned the assessment of operator error probabilities. The final human factors probabilities came from the author of the handbook used in the IREP Analysis (Reference 15 in the IREP Report). While we agree that 10% may not constitute an absolute "ceiling" to the contribution of operation error probability

to the total dominant core melt frequency, neither is their sufficient basis to conclude that this contribution is significantly higher. AP&L is not, of course, in a position to respond to questions relative the statistical approach used by Dr. Swain in Reference 15 (NUREG/CR-1278) to assess these probabilities.

Your letter concentrated on several areas of the IREP which you felt were nonconservative. It must also be noted however, that other aspects of the analysis are overly conservative. For example, the end use of failure data was inconsistent and arbitrary. Actual data which showed no failures was presented in a manner which resulted in a more conservative failure rate than generic data. Supposedly, this was due to the small data base for a specific plant. Yet, where failures had occurred, the failure rates were calculated using the available data base without considering plant design changes being implemented to correct the cause of the failure. In other words, if there were no failures the data base was assumed to be too small; yet if there were failures, no credit was given for corrective actions taken to preclude recurrence.