ARKANSAS POWER & LIGHT COMPANY
CAPITOL TOWER BUILDING/P. O. BOX 551/LITTLE ROCK, ARKANSAS 72203/(501) 377-3525

January 29, 1988

T. GENE CAMPBELL
Vice President
Nuclear Operations

1CANØ188Ø3

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Attn: Mr. Jose A. Calvo, Director
Project Directorate IV
Division of Reactor Projects
III, IV, V and Special Projects

SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Arkansas Nuclear One, Unit 1 Action Plan for
Reactor Building Temperature Reduction

Gentlemen:

The Arkansas Power & Light Company (AP&L) committed, in our August 27, 1987 Justification for Continued Operation (1CANØ887Ø7), to submit our planned long term actions to further improve the temperature profile in the Arkansas Nuclear One, Unit 1 (ANO-1) reactor building.

During the period of October 16, 1987 to November 3, 1987 ANO-1 was in a scheduled mid-cycle outage. As previously discussed, advantage was taken of this outage to collect data, and perform tests of selected components and systems to provide design input for a long term action plan. In addition, attention was given to the identification of any measures which could be taken to provide incremental reductions to reactor building temperature.

The walkdowns, performance tests, and inspections conducted during the outage, as well as operational data collected from the temporary instrumentation which was installed, have resulted in the identification of the performance of the reactor coolant system (RCS) insulation to be the primary contributor to the elevated reactor building temperature. The design of the insulation has resulted in a heat loss rate from the RCS components that is significantly greater than the original design values. In addition, some instances of damaged as well as improperly installed insulation were found and this also has contributed to the less than expected performance.

A001
1/1

Also identified as affecting reactor building temperature were degraded performance of reactor building coolers and inadequate chilled water flow for the current heat load. However, neither of these last two contributors impacted the reactor building temperature as significantly as did the performance of RCS insulation.

An improvement in reactor building cooler performance was obtained during the outage following a cleaning of cooling coils, registers, and dampers. In August, 1987, when this issue came to the forefront, AP&L placed a second standby chiller in operation to support the reactor building heat load. This practice will continue, as needed and if available, between now and the next scheduled ANO-1 refueling outage (1R8). In addition, during the mid-cycle outage, tie-ins to the chilled water system were added to enable an additional third chiller to be added at a later date, if required.

The results of these tests and inspections along with additional data collected during the outage and in subsequent plant operation have been utilized to calculate new heat loads in the ANO-1 reactor building. Using the new heat loads, a mathematical model has been developed to predict the reactor building return air temperature under varying conditions of plant operation, with varying cooling system parameters such as chilled water flow, air flow and outside ambient air temperature. The mathematical model has been employed to analyze the effectiveness of various modifications and potential long term actions. The reactor building return air temperature is now being monitored by the temporary instrumentation installed during the mid cycle outage and will be used as the point of measure in the future. This reference point was selected since it has been shown to correlate to measurements taken in the upper regions of the reactor building, specifically the 486 foot level.

A project scoping report was prepared to identify and evaluate various options for mitigating the reactor building temperature. Following the evaluation of that report, AP&L has identified the following action plan to accomplish a further reduction of the ANO-1 reactor building temperature:

- Summer, 1988 - Collect temperature data to benchmark against the summer temperatures predicted by the mathematical model. As stated previously, AP&L will also continue to operate two (2) chillers if needed, to more effectively remove heat from the reactor building.

- Refueling Outage 1R8, Fall, 1988

  - Replace the two chilled water pumps with pumps of higher capacity to increase the chilled water flow rate. The goal will be to achieve a 650 GPM chilled water flow rate.

  - Re-balance/modify the HVAC system in the reactor building to maximize air flow with four-fan operation. The goal will be to achieve 100,000 cfm air flow.

- Refueling Outage 1R8, Fall, 1988 (continued)

  - Upgrade RCS insulation by repairing selected, damaged insulation identified during mid-cycle outage walkdowns.

  - Install permanent temperature monitoring instrumentation to replace the temporary instrumentation installed during the mid-cycle outage.

Our mathematical model predicts that these modifications should result in a maximum return air temperature, post 1R8, of ~ 133°F. This will be the 1R8 goal.

Actions following 1R8 will include:

- Winter, 1988-89 - Collect temperature data to benchmark against the post 1R8 winter temperatures predicted by the mathematical model. Assessment of the effectiveness of 1R8 modifications will also commence.

- Summer, 1989 - Collect temperature data to benchmark against the post 1R8 summer temperature predicted by the mathematical model. Further assessment of 1R8 modifications will continue.

During the post 1R8 timeframe, efforts will be directed toward monitoring of the reactor building temperature profile response to achieve two objectives: (1) to validate the mathematical model and (2) to determine the effectiveness of the 1R8 modifications.

Additional actions, beyond 1R8, will depend upon the actual results noted following implementation of the action plan outlined above. Modifications under consideration for 1R9 include the addition of additional chiller capacity, the addition of an air handling unit with chilled water coil to use the reactor building purge system duct to gain greater cooling capacity, and replacement of portions of the RCS insulation. Decisions regarding proposed 1R9 modifications will be made during the summer of 1989 based upon temperature measurements at that time. Our goal for the ANO-1 reactor building temperature is to maintain a maximum return air temperature of 120-125°F by the end of the 1R9 refueling outage.

AP&L believes that this action plan is sound from an engineering standpoint and represents a comprehensive evaluation of options and alternatives. The actions outlined in the plan will result in an acceptable reduction of the ANO-1 reactor building temperature in a timely and responsive manner.

Very truly yours,

Lance M Terme

for T. Gene Campbell

TGC:MWT:mb

cc: U. S. Nuclear Regulatory Commission
Document Control Desk
Washinton, D.C. 20555

Regional Administrator
Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011