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October 12, 2001

2CAN100107

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

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Response to Second Request for Additional Information from the Materials and
Chemical Engineering and Plant Systems Branches Regarding the ANO-2 Power
Uprate License Application

Gentlemen:

By application dated December 19, 2000, Entergy Operations, Inc. submitted an "Application for License Amendment to Increase Authorized Power Level." On September 10, 2001, personnel from the Plant Systems Branch requested additional information (one question) related to the application. Entergy's response is provided in Attachment 1.

Attachment 2 contains the response to a request for additional information (one question) from Materials and Chemical Engineering Branch personnel. A telephone conference was held on September 27, 2001, to discuss the proposed response. The two questions are unrelated. They were combined into one letter for efficiency.

This submittal contains no regulatory commitments.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 12, 2001.

Very truly yours,

A handwritten signature in cursive script that reads "Glenn R. Ashley".

Glenn R. Ashley
Manager, Licensing

GRA/dwb
Attachments

A001

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**Response to Second Request for Additional Information from the
Plant Systems Branch Regarding the ANO-2 Power Uprate License Application**

NRC Question

Verify that for the 7.5% power uprate, the 160,000 gallon minimum volume for the operable condensate storage tank (CST) specified in Technical Specification 3.7.1.3 is adequate to meet the design criteria discussed in Section 9.2.6.1 of the Safety Analysis Report (SAR). The design criteria in the SAR indicate that the operable CST needs to have sufficient water for one hour of hot standby operations and the cooldown to hot shutdown. The design cooldown rate to hot shutdown is 75 degrees per hour. Include the volume required to meet the design criteria in your response.

ANO Response

The 160,000-gallon minimum volume for the operable condensate storage tank is adequate to meet the design criteria discussed in Section 9.2.6.1 of the Safety Analysis Report. The amount of condensate water needed to remove the sensible heat during the cooldown from the metal and reactor coolant system water is approximately 35,000 gallons. Approximately 70,000 gallons is needed to remove the decay heat from one hour of hot standby conditions and the decay heat associated with the cooldown time based on a 75 degree per hour cooldown rate to hot shutdown conditions. This total is well within the 160,000-gallon volume maintained in the condensate storage tanks.

**Response to Second Request for Additional Information
from the Materials and Chemical Engineering Branch
Regarding the ANO-2 Power Uprate License Application**

NRC Question

In section 2.4.3.1, "Primary-side Chemistry," on page 2-16 of the application, the licensee states that:

"The SAR [Safety Analysis Report] section is unaffected except for the following:

CE Nuclear Power Co., LLC (CENP, formerly ABB-CE) has evaluated a concern with RSG [replacement steam generator] and core designs regarding deposition of nickel on the core. Based on CENP recommendations, a new lithium strategy is being incorporated starting in Cycle 15."

The staff requests the licensee to provide details on this new lithium strategy (i.e., a description of the strategy, its purpose, its frequency and basis for its use.) In addition, the staff requests information regarding the effects of this strategy on the power uprate conditions of flow, pressure, and temperature, and the results of the licensee's evaluation for power uprate.

ANO Response

Some pressurized water reactors that have replaced Alloy 600 steam generator tubes with Alloy 690 tubes have experienced higher than normal nickel releases during shutdowns and/or axial offset anomaly (AOA) events. Both phenomena can be related to crud deposition on the core. Westinghouse issued a report, "Evaluation of RCS [reactor coolant system] Nickel Management Options for RSG [replacement steam generator] Operation at ANO-2" because of the potential for these phenomena following steam generator replacement and power uprate at ANO-2.

Recommendations from the report included changing the lithium control strategy. A constant 7.1 pH is being maintained through the current operating cycle (Cycle 15). For Cycle 15 only, this change involved lithium levels of greater than 3.5 ppm for a limited number of days (<17) in the RCS. It is believed that operating with a higher pH early in the cycle minimizes corrosion product release, hence minimizing crud deposition at a time when release rates are expected to be at their highest.

The Westinghouse fuels group evaluated this lithium exposure to fuel and concluded there would be no harmful effects to fuel cladding or significant increases in lithium borate precipitation as long as lithium did not exceed 3.8 ppm or 3.5 ppm for greater than 17 effective full power days. Final Safety Analysis Report (FSAR) section 9.3.4.2.4 was revised via the station 10CFR50.59 process to allow exceeding 3.5 ppm for a short duration in Cycle 15 following steam generator replacement.

This constant 7.1 pH lithium strategy will continue in cycle 16 with the exception that the lithium will not be allowed to increase above 3.5 ppm. The lithium level will be controlled in accordance with station procedures.

The new lithium strategy will have no effect on the power uprate conditions of flow, temperature and pressure. The power uprate core design combined with higher early cycle lithium should result in no increased potential for AOA. The higher pH is expected to reduce transport of corrosion products from the replacement steam generators to the core. Lithium borate precipitation, which could affect AOA potential, should be insignificant based on the controls implemented with the new lithium strategy. The Westinghouse report also references data that demonstrates the increase in subcooled boiling, which could also affect AOA potential, in Cycles 15 and 16 is offset by the increase in RCS flow resulting from the larger replacement steam generators.