



Entergy

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72802
Tel 501 858 5000

2CAN020203

February 7, 2002

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 Request for Additional Information on Vessel Head Penetration
Nozzles Regarding the ANO-2 Power Uprate License Application

Dear Sir or Madam:

By application dated December 19, 2000 (2CAN120001), Entergy Operations, Inc. submitted an "Application for License Amendment to Increase Authorized Power Level." Section 4.1.1.1 of Enclosure 5 to the application assessed the effect of the increase in power on the integrity of the Alloy 600 components in the reactor coolant system pressure boundary. On January 29, 2002, a teleconference was held to discuss Entergy's response to a question from the Nuclear Regulatory Commission staff regarding the Alloy 600 information provided in the license application. Following the telephone discussion, a written request for additional information was received from the staff via telex on February 1, 2002. The attachment contains Entergy's written response.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 7, 2002.

Sincerely,

Glenn R. Ashley
Manager, Licensing

GRA/dwb
Attachment

A001

cc: Mr. Ellis W. Merschoff
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

NRC Senior Resident Inspector
Arkansas Nuclear One
P.O. Box 310
London, AR 72847

Mr. Thomas W. Alexion
NRR Project Manager Region IV/ANO-2
U. S. Nuclear Regulatory Commission
NRR Mail Stop 07-D-01
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

NRC Question

Your response to Bulletin 2001-01 for ANO-2 calculated the relative susceptibility of the plant using the current head operating temperature to represent future operation of the plant, and did not consider the proposed power uprate operating conditions. Evaluate the relative susceptibility for ANO-2 considering both the actual head operating temperature for the cycle prior to the spring 2002 outage, and subsequent operation at the projected power uprate head temperature. Describe any modifications to VHP nozzle inspections that may be necessary as a result of the change in relative susceptibility from that provided in your response to Bulletin 2001-01 for ANO-2.

ANO Response

NRC Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles" required all holders of operating licenses for pressurized water reactors (PWRs) to provide information related to the structural integrity of the reactor pressure vessel head penetration nozzles. The response was to include the extent of nozzle leakage and cracking that has been found to date, the inspections and repairs that have been undertaken and the basis for concluding that their plans for future inspections will ensure compliance with applicable regulatory requirements.

In response to the bulletin, the Materials Reliability Program Alloy 600 Issues Task Group produced a document, "PWR Materials Reliability Program Response to NRC Bulletin 2001-01 (MRP-48)", dated August 2001. The document included a ranking of each PWR plant according to the operating time in effective full power years (EFPYs) required for the plant to reach an effective time-at-temperature equivalent to Oconee Nuclear Station Unit 3 (i.e., the time when circumferential cracks were identified in the base nozzle material above the J-groove weld in early 2001). The ranking time for ANO-2 documented in MRP-48 is 17.1 EFPY until the Oconee 3 time-at-temperature is reached. The projected time is based on the reactor vessel (RV) current head operating temperature and does not account for the increased RV head temperature that will result following refueling outage 2R15 when ANO-2 will implement a 7.5% power uprate. The revised ranking time, including power uprated conditions (i.e., an increase in T_{HOT} to 609 °F), is 14.2 EFPY. The 14.2 EFPY is measured from a starting date of March 1, 2001, in accordance with the requirements of the bulletin¹.

The time-at-temperature analysis reported in MRP-48 was revised by correcting the RV head temperature, accounting for power uprate conditions, to determine the new normalized operating time equivalence to Oconee 3. The analysis, which already included current Cycle 15 RV head temperature as a function of 604 °F T_{HOT} , was revised for a Cycle 16 forward RV head temperature based on T_{HOT} equal to 609 °F. The increased T_{HOT} assumption was applied beginning at the projected Cycle 16 start date.

Using the criteria stated in the bulletin, at uprated conditions, ANO-2 continues to fall within the moderate category regarding susceptibility to primary water stress corrosion cracking, i.e., plants with greater than 5 effective full power years (EFPYs) and less than 30 EFPYs until reaching the Oconee 3 time-at-temperature. Therefore, no changes in RV head nozzle inspections are required.

¹ Dominion Engineering, Inc. "Time at Temperature Assessment for ANO-2 RVH Nozzles Revised for Power Uprate," DEI Calculation C-5509-00-04, Rev. 0, February 7, 2002.