ENTERGY

Entergy Operations, Inc.
1448 S.R. 333
Russellville, AR 72801
Tel 501 858-5000

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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Additional Information on ANO-2 LTOP for Fluence Considerations

Gentlemen:

In letters dated April 11, 1996 (2CAN049601) and June 18, 1996 (2CAN069602), Entergy submitted proposed technical specifications for the Arkansas Nuclear One, Unit 2 (ANO-2) low temperature overpressure protection (LTOP) system. The proposed change involves the incorporation of a new LTOP Specification 3/4.4.12 for addressing final resolution of Generic Letter 90-06. The LTOP analyses are based on the current ANO-2 Technical Specifications for the pressure-temperature (P-T) curves contained in specification 3/4.4.9.

The existing P-T curves have been approved for 21 effective full power years (EFPY) by the NRC in Amendment 124 to the ANO-2 Technical Specifications dated September 10, 1991. The NRC's safety evaluation was based, in part, on the analyses and assumptions provided by Entergy Operations in ANO-2 Technical Specification change request dated June 18, 1991 (2CAN069109). The ANO-2 fluence analyses utilized cross sections from the BUGLE-80 library. Subsequent to the ANO-2 P-T analyses, the cross sectional data has been revised. The revised data is reflected in the most recent Oak Ridge Evaluated Nuclear Data File (ENDF/B-VI). This includes revisions to the scattering cross section for iron. In recent discussions with the NRC Reactor Systems Branch, the NRC has requested that the effects of the changes for iron scattering in our LTOP and P-T analyses be evaluated. The concern raised by the NRC reviewer is related to the potential underprediction of the inner-wall fluence.

Updated ENDF/B-VI iron cross-section data have been demonstrated to provide a more accurate determination of the flux attenuation through iron. As noted in Draft Regulatory Guide DG-1053, "Calculational and Dosimetry Methods for Determining Pressure Vessel

Neutron Fluence", the ENDF/B-IV and the first three modifications of the ENDF/B-V iron cross-sections result in as much as 20% underprediction of the vessel inner-wall fluence.

To determine the impact on the inner-wall fluence due to the change in the iron cross-sections would require a complete reanalysis of the data from the surveillance capsule which was withdrawn and analyzed previously. This task is expensive and resource intensive. Entergy Operations believes that the existing analyses for 21 EFPY are thoroughly bounding for our current operation. This is based on the following:

- The additional uncertainty for iron scattering is dependent upon the amount of steel that exists between the fuel and the outer wall of the vessel. A primary contributor to the additional outward scattering toward the vessel is the thermal shield which is present in many vessel internals designs. ANO-2's vessel internals design does not utilize a thermal shield. This reduces the potential impact from the additional fluence predictions to the vessel wall due to changes in iron scattering cross sections. Entergy Operations expects an increase in fluence to the vessel wall of approximately 10% or less for ANO-2.

- The fluence determined from the surveillance capsule was linearly extrapolated to 21 EFPY. The fuel management at the time the capsule was withdrawn and analyzed was a high leakage core (cycle 2). ANO-2 fuel management went to a low leakage design in cycle 6. The fuel management for the unit has remained with the low leakage design since that time. The current fuel cycle is cycle 12. Therefore, the fluence at the inner-wall is conservative to that previously predicted in the existing 21 EFPY fluence calculation.

- Since the time the capsule was evaluated, ANO-2 has lowered the RCS inlet temperature due to other concerns. This has a beneficial impact by reducing the flux of high energy neutrons to the vessel wall.

- ANO-2 is currently analyzed for 21 EFPY as indicated above. After startup from the next refueling outage which is scheduled to commence in April 1997, the unit will still be at less than 13 EFPY of operation. This provides an additional 8 EFPY of operating margin after the next refueling outage based on current analysis.

Therefore, based on the above conservatism already contained in the existing fluence calculations and the current operating cycle, any additional impact from increased vessel wall fluence estimates due to the change in the ENDF/B-VI library for neutron scattering for iron is currently bounded.

Entergy Operations is presently addressing the NRC requested actions from Generic Letter 92-01, Revision 1, Supplement 1 for evaluating any potential effects from additional vessel chemistry data that may be available within the industry as discussed in letters dated August 11, 1995 (0CAN089505) and November 19, 1995 (0CAN119502). Results of this evaluation are expected to be reported to the NRC in early 1997. At that time, Entergy Operations proposes to evaluate the vessel wall fluence effects considering ENDF /B-VI along with any new vessel chemistry data. In the early 1997 submittal, Entergy Operations will provide a best

estimate of our remaining EFPY operating margin, the next vessel specimen withdrawal schedule and when we expect to perform a revised P-T analysis for ANO-2.

If you require any additional information, please contact Steve Bennett at (501) 858-4626.

Very truly yours,

Dwight C. Mims
Director, Nuclear Safety

DCM/sab

cc: Mr. Leonard J. Callan
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. George Kalman
NRR Project Manager Region IV/ANO-1 & 2
U. S. Nuclear Regulatory Commission
NRR Mail Stop 13-H-3
One White Flint North
11555 Rockville Pike
Rockville, MD 20852