



August 31, 1994

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U. S. Nuclear Regulatory Commission  
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Subject: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
10 CFR 50.61 Response for Unit 1

Gentlemen:

The requirements section of 10 CFR 50.61 was amended, effective June 14, 1991, to require that projected values of  $RT_{PTS}$  for reactor vessel beltline materials and other information be submitted within five years of the effective date. The submittal shall include calculated  $RT_{PTS}$  values based on the time of the submittal and based on the expiration date of the operating license. Entergy Operations wishes to formally document the calculated values and respond to the 10 CFR 50.61 requirements for ANO-1 with this submittal. The 10 CFR 50.61 response for ANO-2 was submitted on June 18, 1991 (2CAN069109) as part of a proposed technical specification change.

A discussion of the information provided in this submittal for ANO-1 is included as an attachment. The specific information required by 10 CFR 50.61 is contained in Tables 1 and 2 of the attachment to this letter. The ANO-1 reactor vessel does not exceed the NRC screening criteria for pressurized thermal shock before the expiration date of its current operating license as shown in Table 2. The most limiting material, WF-112, is a circumferential weld and has a  $RT_{PTS}$  value of 233 °F at the operating license expiration date. Therefore, pursuant to 10 CFR 50.61, no further action is required.

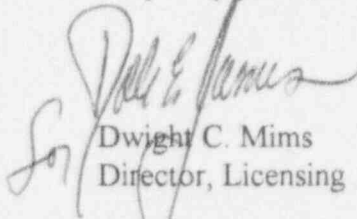
In accordance with 10 CFR 50.61, the information provided by this submittal will be updated whenever there is a significant change in projected values of  $RT_{PTS}$ , or upon a request for a change in the expiration date for operation of ANO-1.

Should you have any questions regarding this submittal, please contact me.

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Very truly yours,



Dwight C. Mims  
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DCM/jrh

Attachment

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Attachment

The projected values of  $RT_{PTS}$  for the ANO-1 reactor pressure vessel beltline materials are contained in Table 1 for the end of Cycle 11 and Table 2 for the operating license expiration date. The values were calculated in accordance with 10 CFR 50.61. Projections of neutron fluence at the operating license expiration date (end of life, EOL) were made using the average of the fluences from cycles 8, 9, and 11 for extrapolations beyond Cycle 11. Thus, the projections assume continued use of very low leakage (VLL) core designs. Cycle 10 fluences were not used in the averaging due to the use of once-burned fuel assemblies along the peripheral 'flat' of the core. Cycle 10 core design was unique and is not expected to occur again in the foreseeable future. The fluences reported for the beltline materials at EOL differ from those values submitted in response to the original PTS rule (see AP&L letter 1CAN018606 dated January 22, 1986). The differences are due to implementation of the VLL core design.

The copper content of the longitudinal welds (heat number WF-18) differs from that submitted in response to the original PTS rule. Justification for the change to the copper content of WF-18 was provided in BAW-2121P dated April 1991. All other copper and nickel contents are the same as those reported in response to the original PTS rule.

Although its cumulative fluence values are very low, the  $RT_{PTS}$  for circumferential weld SA-1788 is reported for completeness of all beltline materials.

TABLE 1  
 Evaluation of Reactor Vessel Pressurized Thermal Shock  
 at End of Cycle 11 (11.94 EFPY) - Arkansas Nuclear One Unit 1

| Beltline Identification                         | Heat Number | Type          | w/o Copper <sup>a</sup> | w/o Nickel <sup>a</sup> | End C11<br>Fluence <sup>b</sup> | Initial<br>RT <sub>NDT</sub> <sup>a</sup> | Chemistry<br>Factor <sup>a</sup> | Fluence<br>Factor <sup>c</sup> | Margin <sup>c</sup> | RT <sub>PTS</sub> <sup>c</sup> | Screening<br>Criterion <sup>c</sup> |
|---|-------------|---------------|-------------------------|-------------------------|---------------------------------|---|----------------------------------|--------------------------------|---------------------|--------------------------------|-------------------------------------|
| Nozzle Belt Forging                             | AYN 131     | SA-508, Cl. 2 | 0.03                    | 0.70                    | 3.57E+18                        | 3   | 20.00                            | 0.715709                       | 48                  | 65.31                          | 270                                 |
| Upper Shell                                     | C5120-2     | SA-533, Gr. B | 0.17                    | 0.55                    | 4.06E+18                        | -10                                       | 122.75                           | 0.750001                       | 34                  | 116.06                         | 270                                 |
| Upper Shell                                     | C5114-2     | SA-533, Gr. B | 0.15                    | 0.52                    | 4.06E+18                        | -10                                       | 105.60                           | 0.750001                       | 34                  | 103.20                         | 270                                 |
| Lower Shell                                     | C5120-1     | SA-533, Gr. B | 0.17                    | 0.55                    | 3.90E+18                        | -10                                       | 122.75                           | 0.739223                       | 34                  | 114.74                         | 270                                 |
| Lower Shell                                     | C5114-1     | SA-533, Gr. B | 0.15                    | 0.52                    | 3.90E+18                        | 0   | 54.90                            | 0.739223                       | 34                  | 74.58                          | 270                                 |
| Nozzle Belt/Upper Shell Circ.<br>Weld, WF-182-1 | 821T44      | ASA/Linde 80  | 0.24                    | 0.63                    | 3.57E+18                        | -5  | 162.09                           | 0.715709                       | 66                  | 177.01                         | 300                                 |
| Upper/Lower Shell Circ. Weld,<br>WF-112         | 406L44      | ASA/Linde 80  | 0.31                    | 0.59                    | 3.90E+18                        | -5  | 174.96                           | 0.739223                       | 66                  | 190.33                         | 300                                 |
| Lower Shell/ Dutchman Circ.<br>Weld, SA-1788    | 61782       | ASA/Linde 80  | 0.25                    | 0.54                    | 2.27E+16                        | -5  | 167.60                           | 0.036360                       | 66                  | 67.09                          | 300                                 |
| Upper Shell Axial Welds,<br>WF-18               | 8T1762      | ASA/Linde 80  | 0.20                    | 0.55                    | 2.92E+18                        | -5  | 152.25                           | 0.663324                       | 66                  | 161.99                         | 270                                 |
| Lower Shell Axial Welds,<br>WF-18               | 8T1762      | ASA/Linde 80  | 0.20                    | 0.55                    | 2.88E+18                        | -5  | 152.25                           | 0.659788                       | 66                  | 161.45                         | 270                                 |

NOTES: (a) BAW-2222, June 1994.  
 (b) Calculated using the peak fluence for 11.94 EFPY as reported in BAW-2108, "Fluence Tracking System," Rev. 1, May 1992. Shutdown from Cycle 11 occurred on September 6, 1993.  
 (c) Title 10, Code of Federal Regulations, Section 50.61.

TABLE 2  
 Evaluation of Reactor Vessel Pressurized Thermal Shock  
 at End of Life (32 EFPY) - Arkansas Nuclear One Unit 1

| Beltline Identification                         | Heat Number | Type          | w/o Copper <sup>a</sup> | w/o Nickel <sup>a</sup> | EOL Fluence <sup>a</sup> | Initial<br>RT <sub>NDT</sub> <sup>a</sup> | Chemistry<br>Factor <sup>a</sup> | Fluence<br>Factor <sup>b</sup> | Margin <sup>b</sup> | RT PTS <sup>b</sup> | Screening<br>Criterion <sup>b</sup> |
|---|-------------|---------------|-------------------------|-------------------------|--------------------------|---|----------------------------------|--------------------------------|---------------------|---------------------|-------------------------------------|
| Nozzle Belt Forging                             | AYN 131     | SA-508, Cl. 2 | 0.03                    | 0.70                    | 8.62E+18                 | 3   | 20.00                            | 0.958354                       | 48                  | 70.17               | 270                                 |
| Upper Shell                                     | C5120-2     | SA-533, Gr. B | 0.17                    | 0.55                    | 9.79E+18                 | -10                                       | 122.75                           | 0.994056                       | 34                  | 117.02              | 270                                 |
| Upper Shell                                     | C5114-2     | SA-533, Gr. B | 0.15                    | 0.52                    | 9.79E+18                 | -10                                       | 105.60                           | 0.994056                       | 34                  | 128.97              | 270                                 |
| Lower Shell                                     | C5120-1     | SA-533, Gr. B | 0.17                    | 0.55                    | 9.40E+18                 | -10                                       | 122.75                           | 0.982661                       | 34                  | 144.62              | 270                                 |
| Lower Shell                                     | C5114-1     | SA-533, Gr. B | 0.15                    | 0.52                    | 9.40E+18                 | 0   | 54.90                            | 0.982661                       | 34                  | 87.95               | 270                                 |
| Nozzle Belt/Upper Shell Circ.<br>Weld, WF-182-1 | 821T44      | ASA/Linde 80  | 0.24                    | 0.63                    | 8.62E+18                 | -5  | 162.09                           | 0.958354                       | 66                  | 216.34              | 300                                 |
| Upper/Lower Shell Circ. Weld,<br>WF-112         | 406L44      | ASA/Linde 80  | 0.31                    | 0.59                    | 9.40E+18                 | -5  | 174.96                           | 0.982661                       | 66                  | 232.93              | 300                                 |
| Lower Shell/ Dutchman Circ.<br>Weld, SA-1788    | 61782       | ASA/Linde 80  | 0.25                    | 0.54                    | 5.48E+16                 | -5  | 167.60                           | 0.071705                       | 66                  | 73.02               | 300                                 |
| Upper Shell Axial Welds,<br>WF-18               | 8T1762      | ASA/Linde 80  | 0.20                    | 0.55                    | 7.05E+18                 | -5  | 152.25                           | 0.901962                       | 66                  | 198.32              | 270                                 |
| Lower Shell Axial Welds,<br>WF-18               | 8T1762      | ASA/Linde 80  | 0.20                    | 0.55                    | 6.95E+18                 | -5  | 152.25                           | 0.897964                       | 66                  | 197.71              | 270                                 |

NOTES: (a) BAW-2222, June 1994.  
 (b) Title 10, Code of Federal Regulations, Section 50.61.