January 31, 2007

Mr. Jeffrey S. Forbes
Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 1 - REQUEST FOR ALTERNATIVE NO. ANO1-ISI-007 TO EXTEND THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL FOR REACTOR VESSEL INTERIOR ATTACHMENTS AND CORE SUPPORT STRUCTURE VISUAL EXAMINATIONS (TAC NO. MD1395)

Dear Mr. Forbes:

By letter dated April 24, 2006, Entergy Operations, Inc, (Entergy), the licensee for Arkansas Nuclear One, Unit 1 (ANO-1), submitted a request for authorization to extend the third 10-year inservice inspection (ISI) interval for visually examining the reactor vessel interior attachments and the core support structure to the end of the subsequent fall 2008 refueling outage (1R21) and to defer the period-based visual examination of accessible locations of the reactor vessel interior to this same outage, 1R21. Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(ii), the licensee requests approval for the use of an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, IWA-2432, for ANO-1. In response to a Nuclear Regulatory Commission (NRC) Request for Additional Information, Entergy resubmitted a revised request for authorization in a letter dated September 8, 2006.

Based on the NRC staff's review of the information provided by the licensee in its letters dated April 24 and September 8, 2006, authorizing the proposed alternative provides reasonable assurance of structural integrity and is justified on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, the staff authorizes the proposed alternative pursuant to paragraph 50.55a(a)(3)(ii) of 10 CFR for the third 10-year ISI interval at ANO-1. The proposed alternative is authorized until the end of the ANO-1 fall 2008 refueling outage and is deferring the period-based visual examination of accessible locations of the reactor vessel interior to this same outage.

The NRC staff's safety evaluation is enclosed.

Sincerely,

/RA/
David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure: Safety Evaluation

cc w/encl: See next page

The NRC staff's safety evaluation is enclosed.

Sincerely,

/RA/
David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-313

Enclosure: Safety Evaluation

cc w/encl: See next page

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OFFICIAL AGENCY RECORD

cc:
Executive Vice President
& Chief Operating Officer
Entergy Operations, Inc.
P.O. Box 31995
Jackson, MS 39286-1995

General Manager Plant
Operations
Entergy Operations, Inc.
Arkansas Nuclear One
1448 SR 333
Russellville, AR 72802

Director, Nuclear Safety Assurance
Entergy Operations, Inc.
Arkansas Nuclear One
1448 SR 333
Russellville, AR 72802

Manager, Licensing
Entergy Operations, Inc.
Arkansas Nuclear One
1448 SR 333
Russellville, AR 72802

Director, Nuclear Safety & Licensing
Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213-8298

Section Chief, Division of Health
Radiation Control Section
Arkansas Department of Health and
Human Services
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3867

Section Chief, Division of Health
Emergency Management Section
Arkansas Department of Health and
Human Services
4815 West Markham Street, Slot 30
Little Rock, AR 72205-3867

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 310
London, AR 72847

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

County Judge of Pope County
100 W. Main Street
Russellville, AR 72801

Vice President, Operations Support
Entergy Operations, Inc.
P.O. Box 31995
Jackson, MS 39286-1995

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR ALTERNATIVE TO ASME CODE, SECTION XI

PROPOSED ALTERATIVE TO EXTEND THE THIRD 10-YEAR INSERVICE

INSPECTION INTERVAL FOR REACTOR VESSEL

INTERIOR ATTACHMENTS AND CORE SUPPORT STRUCTURE VISUAL EXAMINATIONS

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT 1

DOCKET NUMBER 50-313

1.0 INTRODUCTION

By letter dated April 24, 2006, Entergy Operations, Inc., (Entergy), the licensee for Arkansas Nuclear One, Unit 1 (ANO-1), submitted a request for authorization to extend the third 10-year inservice inspection (ISI) interval for visually examining the reactor vessel interior attachments and the core support structure to the end of the subsequent fall 2008 refueling outage (1R21) and to defer the period-based visual examination of accessible locations of the reactor vessel interior to this same outage, 1R21. Specifically, pursuant to Title 10 of the Code of Federal Regulations, (10 CFR) 50.55a(a)(3)(ii), the licensee requests approval for the use of an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, paragraph IWA-2432, for the ANO-1 Nuclear Power Plant. In response to a Nuclear Regulatory Commission (NRC) Request for Additional Information, Entergy resubmitted a revised request for authorization in a letter dated September 8, 2006.

ANO-1 is currently in its third ISI interval, which began June 1, 1997, and ends May 31, 2007. ASME Code, Section XI, IWA-2430(d) allows a 1-year extension of an interval, which would extend the interval to May 31, 2008. (Use of this 1-year extension does not require approval from the NRC.) In order to comply with ASME Code requirements, third interval visual examinations of the reactor vessel interior attachments (Examination Category B-N-2), accessible vessel interior (Examination Category B-N-1), and the core support structure (Examination Category B-N-3) must be performed during ANO-1's spring 2007 refueling outage (1R20). Entergy proposes to perform these examinations during 1R21.

2.0 REGULATORY REQUIREMENTS

In accordance with the 10 CFR 50.55a, licensees are required to perform periodic inspections of components. Paragraph 50.55a(g) of 10 CFR requires that licensees perform surveillance testing in accordance with the ASME Code, Section XI requirements. ANO-1 is currently in its third ISI interval, which began June 1, 1997, and ends May 31, 2007.

Paragraph 50.55a(a)(3) of 10 CFR states: "Proposed alternatives to the requirements of (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director of the Office of Nuclear Reactor Regulation. The applicant shall demonstrate that: (i) The proposed alternatives would provide an acceptable level of quality and safety, or (ii) Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety." Entergy believes that compliance with the requirements of ASME Code, Section XI, IWA-2432, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, Entergy requests the NRC staff approve this proposed alternative in accordance with 10 CFR 50.55a(a)(3)(ii).

3.0 TECHNICAL EVALUATION

3.1 Components for which Relief is Requested

The affected component is the ANO-1 reactor vessel, N-50. The specific examination categories and item numbers are from Table IWB-2500-1 of the 1992 Edition of ASME Code, Section XI.

Component	Number	Description
B-N-1	B13.10	Vessel Interior
B-N-2	B13.50	Interior Attachments Within Beltline Region
B-N-2	B13.60	Interior Attachments Beyond Beltline Region
B-N-3	B13.70	Core Support Structure

These components are ASME Code, Class 1, components.

3.2 ASME Code Requirements

ASME Code, Section XI, IWB-2412, Inspection Program B, requires visual examination of the reactor vessel interior attachments and the core support structure identified in Table IWB-2500-1 once each 10-year interval. IWA-2430(d) allows inspection intervals to be extended by as much as 1 year if this adjustment does not cause successive intervals to be altered by more than 1 year. Pursuant to 10 CFR 50.55a(a)(3)(ii), Entergy proposes an alternative to the requirements of IWA-2432, which requires visual examination of the reactor vessel interior attachments and the core support to be performed once each 10-year ISI interval. Additionally, Entergy requests a similar deferral of the period-based visual examination of the accessible locations of the reactor vessel interior per Examination Category B-N-1.

3.3 Licensee's Request for Relief

Entergy requests to extend the ISI interval for the items identified above in Sections 3.1 of this safety evaluation to the end of 1R21 (approximately 180 days beyond the currently scheduled interval and the ASME Code-allowed 1-year extension).

3.4 Basis for Proposed Alternative

ANO-1 is currently in its third ISI interval, which began June 1, 1997, and ends May 31, 2007. ASME Code, Section XI, IWA-2430(d) allows a 1-year extension of an interval, which would extend the interval to May 31, 2008. (Use of this 1-year extension does not require approval from the NRC.) In order to comply with ASME Code requirements, third interval visual examinations of the reactor vessel interior attachments (Examination Category B-N-2), accessible vessel interior (Examination Category B-N-1), and the core support structure (Examination Category B-N-3) must be performed during ANO-1's 1R20. Entergy proposes to perform these examinations during 1R21.

Given approval to extend the ANO-1's 10-year reactor vessel ISI interval to the end of 1R21 as contained in Entergy's Request for Alternative ANO1-ISI-005 (Reference 1), Entergy also seeks to defer the ASME Code-required visual examinations for Examination Categories B-N-2 and B-N-3 items until 1R21. In order to perform these examinations, the core barrel must be removed from the reactor vessel to allow access to the applicable welds and surfaces. As a result, these examinations are best performed in concert with the reactor vessel ISI examinations. Entergy also believes that removing the core barrel would provide better coverage of Examination Category B-N-1 items when performing the ASME Code-required period-based inspections. Entergy believes that performing these examinations during the upcoming 1R20 refueling outage will result in a hardship without a compensatory increase in the level of quality and safety.

ASME Code, Section XI, requires that the visual examinations of the reactor vessel interior attachments and the core support structure required by Examination Categories B-N-2 and B-N-3 be performed once every inspection interval. These exams are typically performed at the end of the interval during the same refueling outage as the reactor vessel examinations. The inspection requirements for the Examination Category B-N-1 examinations are to be performed every inspection period.

Examinations required for Examination Categories B-N-2 and B-N-3 items involve removing the core barrel from the reactor to allow access to applicable welds and surfaces. These exams were last performed during the 1995 refueling outage with acceptable results. Additionally, review of industry surveys indicate that these exams have been performed many times by the industry without any reportable findings (see Table 2-1, Summary of Survey Results on RV [Reactor Vessel] ISI Findings in Reference 2).

Examination Category B-N-1 visual examination includes the space above and below the reactor core that is made accessible for examination by removing components during the associated refueling outage. A more comprehensive visual examination can be realized by removing the core barrel. This examination is required once each inspection period and provides reasonable assurance of structural integrity.

As discussed above, Entergy has submitted to the NRC staff a request to defer performing the complete reactor vessel ISI via Request for Alternative ANO1-ISI-005 (Reference 1). The complete reactor vessel ISI requires removing the core barrel. Deferring the examinations of the Examination Categories B-N-1, B-N-2, and B-N-3 items until the performance of the complete reactor vessel ISI will consolidate activities and reduce personnel radiological exposure. Specifically, removing and replacing the core barrel in order to perform these examinations involves approximately a 600-millirem dose. Performing these examinations

during the same planned outage will result in a dose savings of 600 millirem since the core barrel will be removed and replaced only once rather than twice.

3.5 Staff Evaluation

Inservice inspection of reactor vessel and piping pressure-retaining welds helps to ensure structural integrity by identifying flaw growth before flaws become large enough to challenge pressure boundary integrity. The licensee stated that, “Examinations required for Examination Categories B-N-2 and B-N-3 items involve removing the core barrel from the reactor to allow access to applicable welds and surfaces. These exams were last performed during the 1995 refueling outage with acceptable results.” The licensee also stated that a review of industry surveys indicates that the examinations required for Examination Categories B-N-2 and B-N-3 items have been performed many times by the industry without any reportable findings. Therefore, the NRC staff agrees with the licensee's assessment that the prior examinations were of sufficient quality to identify any significant flaws that would challenge reactor vessel and piping pressure-retaining weld integrity.

ASME Code, Section XI, requires that the visual examinations of the reactor vessel interior attachments and the core support structure required by Examination Categories B-N-2 and B-N-3 be performed once every inspection interval. These exams are typically performed at the end of the interval during the same refueling outage as the reactor vessel examinations. The inspection requirements for the Examination Category B-N-1 examinations are to be performed every inspection period. Examinations required for Examination Categories B-N-2 and B-N-3 items involve removing the core barrel from the reactor to allow access to applicable welds and surfaces. Examination Category B-N-1 visual examination includes the space above and below the reactor core that is made accessible for examination by removing components during the associated refueling outage. A more comprehensive visual examination can be realized by removing the core barrel. Given that prior examinations were of sufficient quality to identify any significant flaws that would challenge reactor vessel and piping pressure-retaining weld integrity and removing the core barrel allows for a more comprehensive visual examination, the proposed alternative provides reasonable assurance of structural integrity. The NRC staff agrees with the licensee that by performing the Examination Category B-N-1 visual examination with the core barrel removed a more comprehensive visual examination can be realized.

As discussed above, Entergy has submitted to the NRC staff a request to defer performing the complete reactor vessel ISI via Request for Alternative ANO1-ISI-005 (Reference 1). The complete reactor vessel ISI requires removing the core barrel. Deferring the examinations of the Examination Categories B-N-1, B-N-2, and B-N-3 items until the performance of the complete reactor vessel ISI will consolidate activities and reduce personnel radiological exposure. Specifically, removing and replacing the core barrel in order to perform these examinations involves approximately a 600-millirem dose. Performing these examinations during the same planned outage (1R21) will result in a dose savings of 600 millirem since the core barrel will be removed and replaced only once rather than twice. Staff agrees with the licensee that by performing the same additional work during two separate outages, which could incur additional dose, a hardship condition is created which can be avoided by performing all of the inspections during the 1R21 outage.

In summary, the NRC staff concurs with the licensee's assessment that the subject components have a low likelihood of having significant flaws that can be detected visually and that there is a low likelihood of experiencing a severe event during the proposed extension period. Therefore,

the NRC staff believes that conducting the examinations required for Examination Categories B-N-1, B-N-2, and B-N-3 items in the same outage (1R21) with the performance of the complete reactor vessel ISI will consolidate activities and reduce personnel radiological exposure. Examination of the subject items during the upcoming refueling outage (1R20) would not provide an additional level of safety or quality in comparison to deferring the examination for one refueling cycle to the 1R21 outage. The NRC staff finds that the hazard associated with the one-cycle extension of the examination interval is sufficiently small and coupled with the dose savings that would result, the alternative provides reasonable assurance that compliance with the specified requirements of ASME Code, Section XI, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative provides reasonable assurance of structural integrity and that compliance with the specified requirements of ASME Code, Section XI, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the NRC staff authorizes the extension of the third 10-year ISI interval for visually examining the reactor vessel interior attachments and the core support structure to the end of the subsequent fall 2008 refueling outage and defer the period-based visual examination of accessible locations of the reactor vessel interior to this same outage,1R21.

All other requirements of the ASME Code for which relief has not been specifically requested remain applicable including third-party review by the Authorized Nuclear Inservice Inspector.

5.0 REFERENCES

1. Entergy Operations, Inc., letter CNRO-2006-00024, Request for Alternative ANO-ISI-005, Proposed Alternative to Extend the Third Inservice Inspection Interval for Reactor Vessel Inservice Examinations, dated April 24, 2006

2. Westinghouse Owners Group report WCAP-16168-NP, Revision 1, Risk-Informed Extension of the Reactor Vessel In-Service Inspection Interval (January 2006)

Principal Contributor: Edward V. Andruszkiewicz

Date: January 31, 2007