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2CAN101403

October 31, 2014

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Emergency Request Alternative to Utilize ASME Code Case N-513-4,
"Evaluation Criteria for Temporary Acceptance of Flaws in Moderate
Energy Class 2 or 3 Piping Section XI, Division 1"
Relief Request ANO2-ISI-017
Arkansas Nuclear One – Unit 2
Docket No. 50-368
License No. NPF-6

Dear Sir or Madam:

In accordance with 10 CFR 50.55a(a)(3)(ii), Entergy Operations, Inc. (Entergy) is requesting emergency NRC approval of a proposed alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI for Arkansas Nuclear One, Unit 2 (ANO-2). The alternative is for the current fourth 10-year inservice inspection interval. This interval began on March 26, 2010.

Specifically, Entergy is requesting to apply the evaluation methods of ASME endorsed Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1," to Class 2 and 3 moderate energy piping including elbows, bent pipe, reducers, expanders, and branch tees. The NRC has not generically endorsed this Code Case.

This methodology is to be used to evaluate a through-wall flaw that was identified in a 6-inch branch connection from the Service Water (SW) supply header to the suction of the "B" Emergency Feedwater Pump. This line was determined to be inoperable and the unit entered a Technical Specification 72-hour allowable outage time (AOT) in accordance with Limited Condition of Operation (LCO) 3.7.3.1 on October 30, 2014, at 2118. Immediate repair or replacement of the pipe is not feasible during this LCO. Without approval of this relief, ANO-2 will be required to shutdown following expiration of the AOT and result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

It has been determined that the root cause of the flaw is microbiological induced corrosion (MIC). The majority of leaks in ANO-2 SW piping in the past have been MIC-induced. The associated piping system continues to be capable of performing its required safety function and is not susceptible to sudden or catastrophic failure.

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The attached request maintains the quality and safety considerations of structures, systems, and components required for safe operation of ANO-2.

Entergy requests the use of Code Case N-513-4 until a Section XI compliant repair / replacement can be completed prior to startup from the next refueling outage (fall of 2015) or exceeding the temporary acceptance criteria of Code Case N-513-4 and this relief request, whichever comes first.

Attachment 1 contains the request for alternative. The stress analysis is provided in Attachment 2 with the NDE Data Sheet provided in Attachment 3.

Entergy requests approval of this relief prior to the expiration of the LCO AOT which will end at 2118 on November 2, 2014.

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

Sincerely,



SLP/rwc

Attachments:

1. Relief Request ANO2-ISI-017
2. Structural Integrity Associates Calculation 1401289.301
3. UT Thickness Examination - Report 2-BOP-UT-14-040

cc: Mr. Marc L. Dapas
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ATTACHMENT 1 TO
2CAN101403
RELIEF REQUEST ANO2-ISI-017

RELIEF REQUEST

ANO2-ISI-017

Component / Number: 2HCC-2003 (elbow) and 2HBC-33 (sweep-o-let)

Code Class: American Society of Mechanical Engineers (ASME Section III) Class 3

References: ASME Code, Section XI, 2001 Edition with the 2003 Addenda Code Case N-513-4

Description: Service Water (SW) to 2P-7B, Emergency Feed Water (EFW) Pump Suction

Unit / Inspection Interval Applicability: Arkansas Nuclear One, Unit 2 (ANO-2) / Fourth (4th) 10-year interval, 2R24 Refueling Outage

I. CODE REQUIREMENTS

The applicable ASME Section XI Code Edition and Addenda for ANO-2 is the ASME Code, Section XI, 2001 Edition with the 2003 Addenda. Articles IWC-3120 and IWC-3130 require that flaws exceeding the defined acceptance criteria be corrected by repair / replacement activities or be evaluated and accepted by analytical evaluation. ASME Code, Section XI, IWD-3120(b) requires that components exceeding the acceptance standards of IWD-3400 be subject to supplemental examination, or to a repair / replacement activity:

II. PROPOSED ALTERNATIVE

Background

On October 20, 2014, Operations personnel identified leakage at the toe of the dissimilar weld between the stainless steel elbow and the carbon steel sweep-o-let on the SW piping to the suction of the "B" EFW pump. This leak is located in the Arkansas Nuclear One, Unit 2 (ANO-2) Auxiliary Building. The insulation around the subject line was wet; however, the leak rate at the time of discovery was 1 to 2 drops per hour. Upon buffing of the weld for enhanced ultrasonic testing (UT), the leak progressed to 12 drops per hour, or one drop every 5 minutes. The piping in question forms a branch connection, via a sweep-o-let, with the main SW header.

To evaluate the piping in the region of the leak, a detailed UT mapping was conducted immediately around the leak. This thickness mapping provided the means of characterizing the flaw at the leak location and verification that the flaw could be treated as a single flaw with respect to the proximity of other thinned regions. The UT report noted that the flaw could be characterized as a nonplanar flaw. The report from this mapping is provided in Attachment 3. Based on the results of the report, the remaining

pipng beyond the flaw is sufficient to maintain a pressure-retaining boundary and postulated leakage does not exceed operability margins. The nonplanar indication is the result of microbiological induced corrosion (MIC). Such corrosion indications are historically limited to localized areas on ANO-2 SW piping and piping components and do not manifest in general thinning, cracking, or other prompt structural failure precursors. This isolated corrosion area can be reliably monitored to ensure flow and structural integrity are maintained.

ASME Code Case N-513-3 is conditionally acceptable to the NRC (per Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 17). It does not allow evaluation of flaws located away from attaching circumferential piping welds that are in elbows, bent pipe, reducers, expanders, and branch tees. ASME Code Case N-513-4 provides guidance for evaluation of flaws in these locations. This code case was recently endorsed by ASME on May 7, 2014. This code case has not been generically approved by the NRC.

SW System Description

Briefly, the SW system for ANO-2 consists of two independent full capacity 100 percent redundant loops. Each SW loop is capable of supplying cooling water to the required components during normal and emergency conditions. This redundancy allows continued plant operation when a single component failure occurs. System cross tie valves provide additional redundancy by allowing one of the three SW pumps to be removed from service for maintenance. The remaining two pumps provide total system flow for both SW loops.

In the event of an emergency, the SW system can be the supply source for the EFW system (ANO-2 Technical Specification (TS) 3.7.1.3).

The design pressure for the ANO-2 SW system is 150 psig and the design temperature is 130°F.

ANO-2 TS 3.7.3 requires that two SW loops shall be operable and powered from independent essential buses to provide redundant and independent flow paths in Modes 1, 2, 3, and 4. ANO-2 TS 3.7.4 requires the Emergency Cooling Pond (ECP) to be operable in Modes 1, 2, 3, and 4. Two EFW pumps and associated flow paths are to remain operable in Modes 1, 2, and 3 (ANO-2 TS 3.7.1.2).

On October 30, 2014, at 2118, Loop 1 of SW and 2P-7B, Emergency Feedwater pump were declared inoperable and the appropriate Technical Specification actions entered. It was determined that conducting a code qualified repair during power operation is not feasible with the time clock of the TS. The inoperable loop is required to be restored within 72 hours or the unit must be placed in Hot Shutdown within 6 hours and Cold Shutdown within the following 30 hours per ANO-2 TS 3.7.3. Based on the insignificance of the flaw, it appears inappropriate to challenge the operation of the plant.

Due to the fact that the original flaw is MIC-induced, and ANO-2 has extensive experience with similar flaws in this system and it is well understood by ANO-2 staff, consideration of flaw growth is not a significant concern. Therefore, it has been

concluded that the overall condition and the continued operation of the associated SW loop until the next ANO-2 refueling outage is acceptable.

Proposed Alternative

The NRC issued Generic Letter 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping (Generic Letter 90-05)," to address the acceptability of limited degradation in moderate energy piping. The generic letter defines conditions that would be acceptable to utilize temporary non-code repairs with NRC approval. The ASME recognized that relatively small flaws could remain in service without risk to the structural integrity of a piping system and developed Code Case N-513. NRC approval of Code Case N-513 versions in Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," allows acceptance of partial through-wall or through-wall leaks for an operating cycle provided all conditions of the Code Case and NRC conditions are met. The Code Case also requires the Owner to demonstrate system operability due to leakage and any implied / potential spray.

ASME recognized that the limitations in Code Case N-513-3 were preventing needed use in piping components such as elbows, bent pipe, reducers, expanders, and branch tees. Code Case N-513-4 was recently approved by the ASME to expand use on these locations and to revise several other areas of the Code Case. It should be noted that Code Case N-513-4 is not listed in the latest revision of Regulatory Guide 1.147 (Revision 17, August 2014).

Code Case N-513-4 utilizes technical evaluation approaches that are based on principals that are accepted in other Code documents already accepted by the NRC.

As required, ANO-2 will perform the augmented examinations as described in Section 5 of Code Case N-513-4.

III. BASIS FOR ALTERNATIVE

A structural evaluation, using Code Case N-513-4, was performed for the affected piping components. The basis for the evaluation includes Structural Integrity Associates (SIA) calculation number 1401289.301 (Attachment 2).

In addition to the structural evaluations discussed above, the proposed alternative was evaluated for:

- Flooding / Spray Concerns
- Reduction in flow to SW supplied components
- Emergency cooling pond inventory concerns

The results of these evaluations are presented below.

Flooding / Spray Concerns

The leakage at present is insignificant and does not present a flooding concern. No equipment susceptible to water damage is under or adjacent to the leakage site. The magnitude of the water loss can easily be accommodated by the room drainage system and does not pose a flooding concern. The leak is located in a well-lighted area (ANO-2 Auxiliary Building) that is frequented by Operations personnel on rounds. Thus if the leak rate experienced a rapid increase it would be quickly identified and addressed. A floor drain is located approximately 3 feet from the leak and is sized to remove normal leakage from this area of the plant. However, based on the structural assessment and engineering experience with respect to flaw growth, no significant leak rate increase is expected to occur.

Reduction in Flow to SW Supplied Components

Due to the small leak magnitude there is no appreciable impact on flow to other components in the ANO-2 SW System. The flow margin above that required for the minimum margin component is bounded, assuming all leakage in this condition were taken from that component, per the latest SW flow test.

ECP Inventory Concerns

The current leak is essentially imperceptible relative to ECP inventory and thus has no impact on ECP inventory.

IV. DURATION OF PROPOSED ALTERNATIVE

The proposed alternative is for use of Code Case N-513-4 in the evaluation of the flaw identified in ANO-2 SW piping components. A Section XI compliant repair / replacement can be completed prior to startup from the next refueling outage (fall of 2015) or exceeding the temporary acceptance criteria of Code Case N-513-4 and this relief request, whichever comes first.

V. PRECEDENT

By letter dated March 5, 2014 (ML14073A059), as supplemented by letter dated March 25, 2014 (ML14091A407), Entergy Nuclear Operations, requested authorization of a proposed alternative to certain requirements of the ASME Code, Section XI, Article IWD-3000 for the Pilgrim Station. Specifically, it was proposed to use alternate analytical evaluation criteria for acceptance of through-wall flaws. The alternate analytical evaluation criteria were based on the draft Code Case N-513-4. The NRC granted verbal authorization of the proposed alternative on March 26, 2014. The safety evaluation associated with the authorization was provided via letter dated September 30, 2014 (ML14240A603).