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10 CFR 50.55a

2CAN062103

June 29, 2021

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

SUBJECT: Request for Alternative ANO2-PT-003
End-of-Interval System Leakage Test for Extended Reactor Coolant
Pressure Boundary Piping – Fifth Interval

Arkansas Nuclear One, Unit 2
NRC Docket No. 50-368
Renewed Facility Operating License No. NPF-6

Pursuant to 10 CFR 50.55a(a)(3)(ii), Entergy Operations, Inc. (Entergy) proposes an alternative to the requirements of ASME Section XI IWB-5222(b) for Arkansas Nuclear One, Unit 2 (ANO-2). ASME Section XI IWB-5222(b) states, "The pressure retaining boundary during the system leakage test conducted at or near the end of each inspection interval shall extend to all Class 1 pressure retaining components within the system."

The proposed alternative is to visually examine the extended reactor coolant pressure boundary (RCPB) piping subject to this request between the first and second normally closed isolation valves during the Class 2 system leakage test conducted in the last inspection period of the inspection interval. The proposed alternative provides adequate assurance of the subject pipe integrity.

Request for Alternative ANO2-PT-003 is provided in the attachment to this letter. Entergy submitted a similar request for ANO-2 in References 1 and 3. The NRC approved the requests via References 2 and 4.

This request for alternative is based on 10 CFR 50.55a(a)(z)(2), *Alternatives to codes and standards requirements*, as discussed in attachment to this letter and states in part:

Hardship without a compensating increase in quality and safety. 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.

As discussed in the attachment, the proposed alternative avoids undue hardship and unnecessary radiation exposure without compromising the integrity of the subject piping in the extended Class 1 boundary.

This letter contains no new regulatory commitments.

Entergy requests NRC approval of this request by August 31, 2022. Once approved, the amendment shall be implemented within 30 days

If you have any questions or require additional information, please contact Riley D. Keele Jr., Manager, Regulatory Assurance, at 479-858-7826.

Sincerely,

PC/rwc

REFERENCES:

- 1) Entergy Operations, Inc. (Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), "Request for Alternative ANO2-PT-001 Visual Examination of Extended Reactor Coolant Pressure Boundary Piping During System Leakage Tests," Arkansas Nuclear One, Unit 2 (2CAN070807) (ML082170845), dated July 31, 2008
- 2) NRC letter to Entergy, "Arkansas Nuclear One, Unit No. 2 – Approval of Request for Relief No. ANO2-PT-001 on End-of-Interval System Leakage Test for the Extended Reactor Coolant Pressure Boundary Piping (TAC No. MD9537)," (2CNA050902) (ML091280245), dated May 21, 2009
- 3) Entergy letter to NRC, "Request for Alternative ANO2-PT-002 End-of-Interval System Leakage Test for Extended Reactor Coolant Pressure Boundary Piping," Arkansas Nuclear One, Unit 2 (2CAN071902) (ML19206A779), dated July 25, 2019
- 4) NRC letter to Entergy, "Arkansas Nuclear One, Unit No. 2 – Approval of Request for Alternative ANO 2-PT-002 End-of-Interval System Leakage Test for Extended Reactor Coolant Pressure Boundary Piping (EPID L-2019-LLR-0073)," (2CNA032001) (ML20083J968), dated March 26, 2020

Attachment: Request for Alternative ANO2-PT-003

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cc: NRC Region IV Regional Administrator

NRC Senior Resident Inspector – Arkansas Nuclear One

NRC Project Manager – Arkansas Nuclear One

Attachment to
2CAN062103
Request for Alternative
ANO2-PT-003

**REQUEST FOR ALTERNATIVE
ANO2-PT-003**

Code Classes: ASME Code Class 1

References: ASME Section XI 2007 Edition with 2008 Addenda, IWB-5222(b)

Examination Category: B-P

Item Number(s) B15.20

Components: Reactor Coolant Pressure Boundary:

1. Low Temperature Overpressure Protection (LTOP) piping between valves 2CV-4730-1 and 2CV-4731-2
2. LTOP piping between valves 2CV-4740-2, 2CV-4741-1 and 2CV-4698-1

Unit / Inspection Interval Applicability: Arkansas Nuclear One, Unit 2 / Fifth (5th) 10-Year ISI Interval

I. CODE REQUIREMENTS

The current ASME code of record governing pressure testing for Arkansas Nuclear One, Unit 2 (ANO-2), is the 2007 Edition through the 2008 Addenda. Entergy Operations, Inc. (Entergy) requests an alternative to IWB-5222(b) for ANO-2 specific to certain extensions of Reactor Coolant Pressure Boundary (RCPB) piping. Similar alternative was previously requested (References 1 and 3) and approved (References 2 and 4) for ANO-2 with respect to the Third (3rd) and Fourth (4th) 10-year Inservice Inspection (ISI) intervals.

ASME Section XI, IWB-5222(b) states:

The Class 1 pressure retaining boundary which is not pressurized when the system valves are in the position required for normal reactor startup shall be pressurized and examined at or near the end of the inspection interval. This boundary may be tested in its entirety or in portions and testing may be performed during the test of the boundary of IWB-5222(a).

II. PROPOSED ALTERNATIVE

Pursuant to 10 CFR 50.55a(z)(2), Entergy requests authorization to visually examine the extended RCPB subject to this request between the first and second normally closed isolation valves that experience Class 2 pressure during the Class 2 system leakage test, which is conducted in the last inspection period of the inspection interval for the components identified in Section I, above.

Section III, below, provides the basis for applying this proposed alternative to each identified section of piping.

III. BASIS FOR PROPOSED ALTERNATIVE

Performing the leakage test of the Class 1 boundary beyond the inboard isolation valves at or near the end of each inspection interval requires conditions that place the plant in abnormal configurations or requires off-normal activities in order to pressurize the subject piping. These challenges include:

- Removal of the safety relief valves;
- Installation of fabricated adaptors;
- Performing the system leakage test with applied external pressure source; and
- Reinstalling the safety relief valves

These off-normal configurations and challenges have a potential to adversely impact normal plant start-up because of the critical path time and effort required to ensure system configuration is restored and tested.

The piping subject to this request is outboard of the first isolation valve and is designed to RCPB conditions. However, the piping is not exposed to RCPB conditions during normal operations, but only to Class 2 system conditions. While this piping is extremely difficult to test within the scope of a Class 1 leakage test, the piping can be easily aligned and tested at Class 2 conditions. Although Class 2 pressure is lower than that of Class 1 pressure, it is representative of conditions for which the subject piping is exposed during both normal and accident conditions. Additionally, if the inboard valve leaked by (thereby pressurizing the subject piping to RCPB conditions) and a subsequent through-wall flaw existed that could only be detected at the higher pressure; leak-by and the flaw would be discovered during the Class 1 leakage test, which is performed during each refueling outage with the subject inboard valve closed.

The following is a description of the piping subject to this request and the burdens associated with performing the Class 1 test currently required by ASME Section XI.

LTOP piping between valves 2CV-4730-1 and 2CV-4731-2

The LTOP piping associated with this proposed alternative is illustrated in Figure 1.

The piping downstream of valve 2CV-4730-1 serves a Class 2 function to maintain Reactor Coolant System (RCS) integrity during normal power operation. The valve has a manual open safety function that enables LTOP relief valve 2PSV-4732 to provide overpressure protection during conditions of low temperature operation. This portion of the piping between valves 2CV-4730-1 and 2CV-4731-2 is normally not pressurized during normal plant operation. During plant cool down from Mode 4 to Mode 5, this portion of piping is placed in service when RCS pressure is < 350 psia. Likewise, during plant heat-up, this portion of piping remains in service until RCS temperature is between 275 °F to 300 °F and isolated prior to exceeding an RCS pressure of 375 psia.

Performing a ten-year Class 1 system leakage test of the piping between LTOP valves 2CV-4730-1 and 2CV-4731-2 involves the challenges listed above. Additional risks associated with this activity include damage to permanent plant equipment and seat leakage

at downstream isolation valves, causing unnecessary delays and increased radiological exposure.

LTOP piping between valves 2CV-4740-2, 2CV-4741-1, and 2CV-4698-1

The LTOP piping associated with this proposed alternative is illustrated in Figure 2.

The piping downstream of valve 2CV-4740-2 performs a Class 2 function by maintaining RCS integrity during normal power operation. The valve has a manual open safety function that enables LTOP relief valve 2PSV-4742 to provide overpressure protection during conditions of low temperature operation. In addition, this isolation valve has a manual open safety function to support feed and bleed cooling operations when normal cooling methods are unavailable. The portion of piping between valves 2CV-4740-2, 2CV-4741-1, and 2CV-4698-1 is not pressurized during normal plant operation. During plant cooldown from Mode 4 to Mode 5, this portion of piping is placed in service when RCS pressure is < 350 psia. Likewise, during plant heat-up, this portion of piping remains in service until RCS temperature is between 275 °F to 300 °F and isolated prior to exceeding an RCS pressure of 375 psia.

Performing a 10-year Class 1 system leakage test of the piping between LTOP valves 2CV-4730-1 and 2CV-4731-2 involves the challenges listed above. Additional risks associated with this activity include damage to permanent plant equipment and seat leakage at downstream isolation valves, causing unnecessary delays and increased radiological exposure.

To perform the Class 1 system leakage tests described above, Entergy estimates the additional actions listed above would require a total of approximately 72 person-hours to complete and result in a radiological exposure of approximately 0.2 person-rem.

IV. DURATION OF THE PROPOSED INTERVAL

The proposed alternative identified in this request, upon approval, shall be utilized during the Fifth (5th) 10-year ISI interval, currently scheduled to end March 25, 2030.

V. CONCLUSION

ANO-2 will perform a VT-2 of the piping subject to this request for alternative under Class 2 conditions. 10 CFR 50.55a(a)(z), *Alternatives to codes and standards requirements*, states:

Alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

- (z)(1) *Acceptable level of quality and safety.* The proposed alternatives would provide an acceptable level of quality and safety; or

- (z)(2) *Hardship without a compensating increase in quality and safety.* 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.

As discussed in Section III above, to perform a Class 1 system leakage test of the subject piping will result in undue burden without a compensating increase in quality and safety. The proposed alternative to visually examine the extended RCPB between the first and second normally closed isolation valves that experience Class 2 pressure during the Class 2 system leakage test conducted in the last inspection period of the inspection interval provides adequate assurance of the subject piping integrity. Therefore, Entergy requests authorization to perform the requested alternative to the Code requirement pursuant to 10 CFR 50.55a(z)(2).

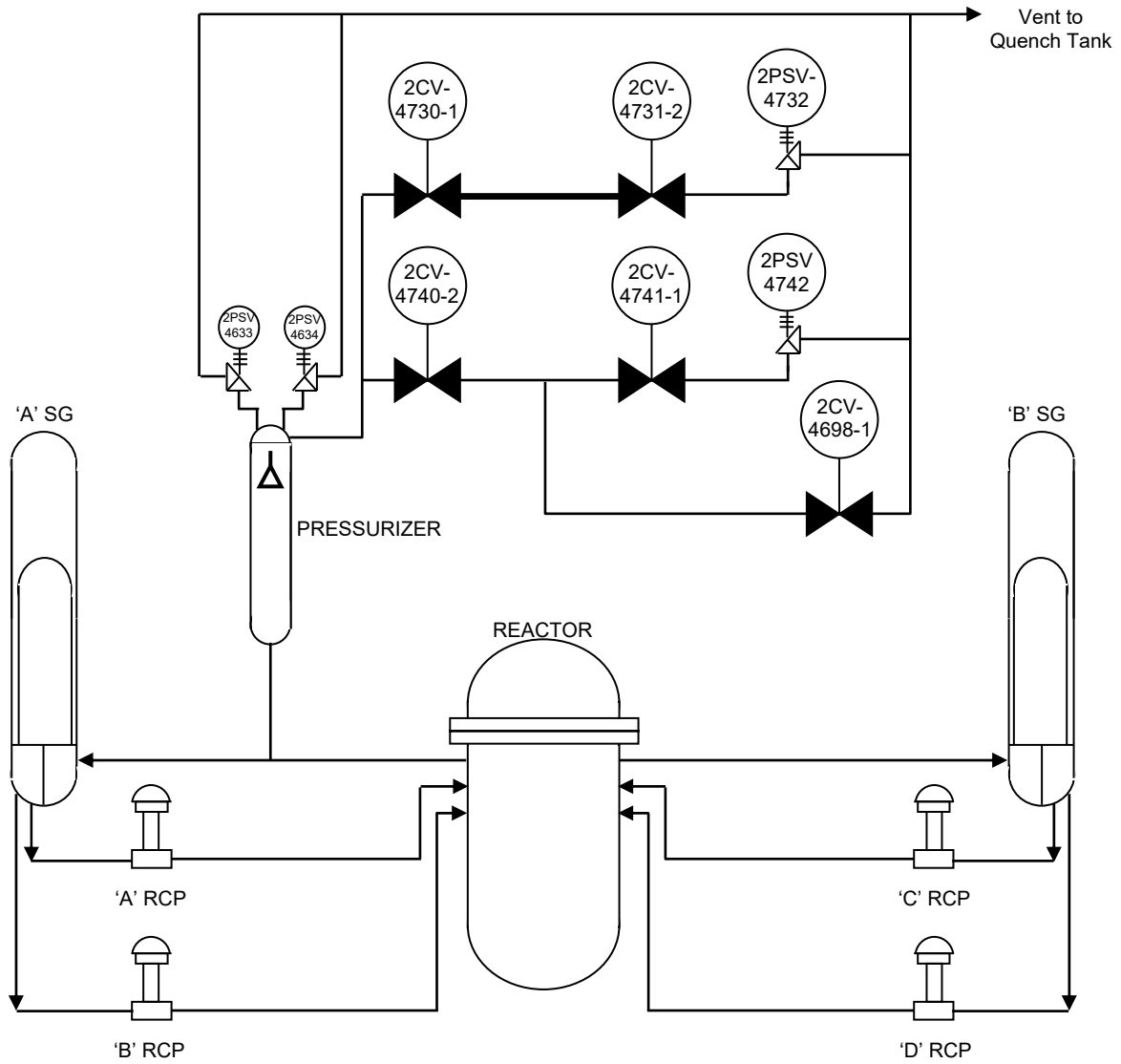
VI. PRECEDENT

Similar alternatives were previously requested (References 1 and 3) and approved (References 2 and 4) for ANO-2 with respect to the Third (3rd) and Fourth (4th) 10-year ISI interval.

VII. REFERENCES

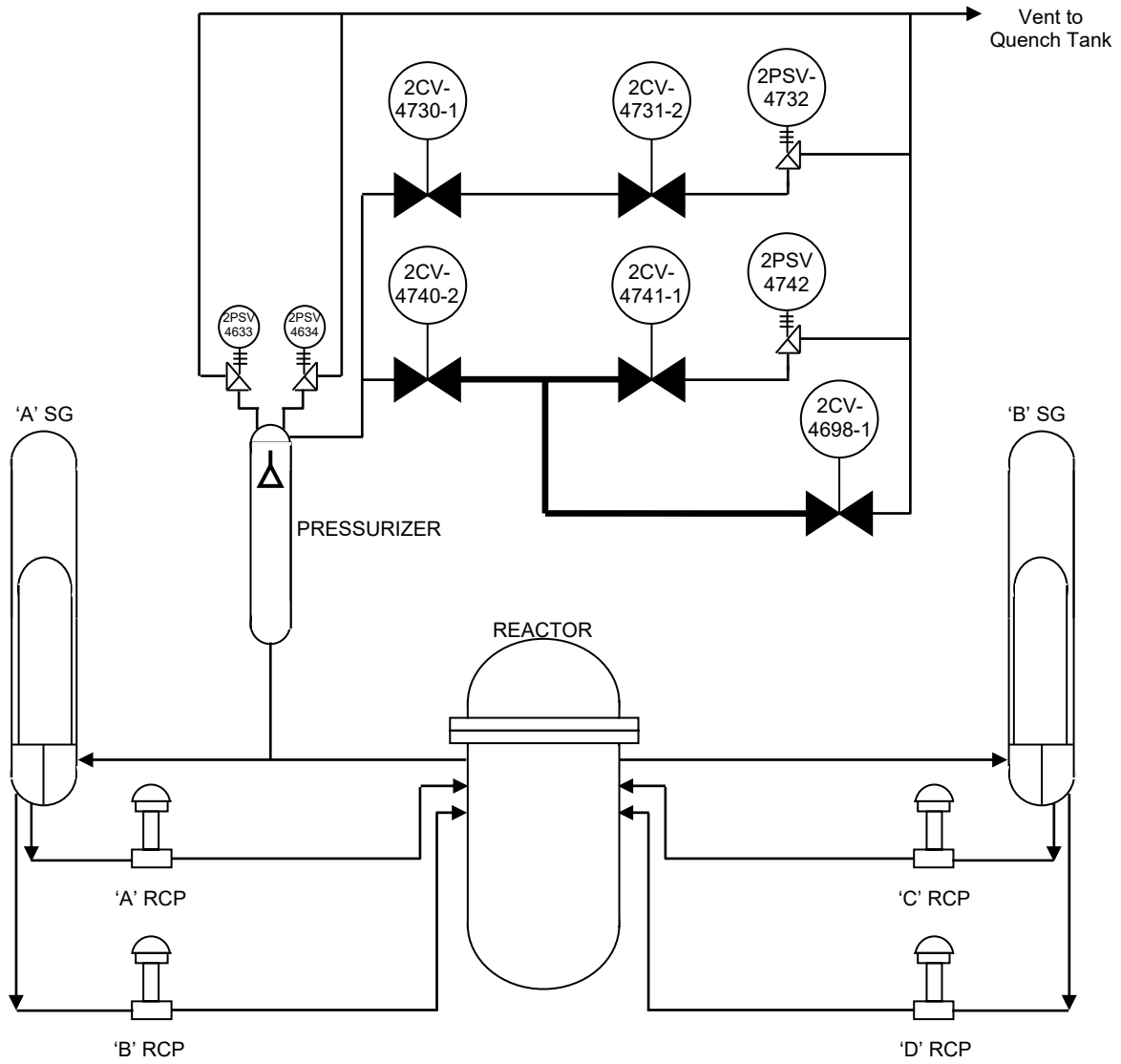
- 1) Entergy Operations, Inc.(Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), "Request for Alternative ANO2-PT-001 Visual Examination of Extended Reactor Coolant Pressure Boundary Piping During System Leakage Tests," Arkansas Nuclear One, Unit 2 (2CAN070807) (ML082170845), dated July 31, 2008
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FIGURE 1
LOW TEMPERATURE OVERPRESSURE PROTECTION



NOTE: Affected test boundary shown in BOLD.

FIGURE 2
LOW TEMPERATURE OVERPRESSURE PROTECTION



NOTE: Affected test boundary shown in BOLD.