UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 4, 2022

Ms. Nicole L. Flippin
Site Vice President
H. B. Robinson Steam Electric Plant
Duke Energy Progress, LLC
3581 West Entrance Road, RNPA11
Hartsville, SC 29550

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2 – REQUEST OF ALTERNATIVES TO ASME CODE SECTION XI SUBSECTION IWE REQUIREMENTS FOR CONTAINMENT INSPECTIONS (EPID L-2021-LLR-0064)

Dear Ms. Flippin:

On September 7, 2021, Duke Energy Progress, LLC (Duke Energy, the licensee) submitted a request (RA-20-0329) to the U.S. Nuclear Regulatory Commission (NRC) for the performance of alternatives to certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, Subsection IWE requirements for the third 10-year containment inservice inspection (CISI) interval at H.B. Robinson Steam Electric Plant, Unit 2 (Robinson).

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), Duke Energy requested to perform alternatives on the basis that the proposed alternative examinations provide an acceptable level of quality and safety.

The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the proposed alternatives would provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that Duke Energy has adequately addressed all regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternatives to certain requirements of the ASME Code, Section XI, Subsection IWE, 2013 Edition regarding containment inservice inspection examinations at the H.B. Robinson Steam Electric Plant, Unit 2, for the third 10-year CISI interval (September 9, 2019, through September 8, 2029). This request relates to VT-1 augmented visual examinations of the insulated portion of the containment liner, general visual examination of the moisture barriers at the intersection of the containment steel liner and the concrete floor at base mat level (elevation 228 ft.), as well as sealant/caulking materials at the bottom row of liner insulation panels.

All other ASME BPV Code, Section XI, requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the Project Manager, Luke Haeg.

Sincerely,

David J. Wrona

Digitally signed by David J. Wrona
Date: 2022.08.04 13:27:28 -04'00'

David J. Wrona, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure:
Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST OF ALTERNATIVES TO ASME CODE SECTION XI SUBSECTION IWE

REQUIREMENTS FOR CONTAINMENT INSPECTIONS

DUKE ENERGY PROGRESS, LLC

H.B ROBINSON STEAM ELECTRIC PLANT, UNIT 2

DOCKET NO. 50-261

1.0 INTRODUCTION

By letter dated September 7, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21250A398), Duke Energy Progress, LLC (Duke Energy, the licensee) requested the use of alternatives to certain requirements of the 2013 Edition of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, Subsection IWE at the H.B. Robinson Steam Electric Plant, Unit 2 (Robinson) for the third 10-year containment inservice inspection (CISI) interval (September 9, 2019, through September 8, 2029). This request relates to VT-1 augmented examinations of the insulated portion of the containment steel liner, and the general visual examination of the moisture barriers, located behind the insulation panels, at the intersection of the containment steel liner and the concrete floor at the 228 foot (ft.) elevation base mat level.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to perform alternatives on the basis that the alternatives provide an acceptable level of quality and safety. The licensee was previously authorized similar alternatives for its first 10-year CISI interval by NRC Safety Evaluation dated July 26, 1999 (ML14183A929), and the second 10-year CISI interval by NRC Safety Evaluation dated April 30, 2009 (ML091170345).

2.0 REGULATORY EVALUATION

In accordance with 10 CFR 50.55a(g)(4), components that are classified as Class MC pressure retaining components and their integral attachments, and components that are classified as Class CC pressure retaining components and their integral attachments, must meet the requirements set forth in Section XI of the ASME BPV Code, Rules for Inservice Inspection of Nuclear Power Plant Components. The regulations require that all inservice inspection conducted during the first 10-year interval, and subsequent intervals, comply with the requirements in the latest edition and addenda of Section XI of the ASME BPV Code, incorporated by reference into 10 CFR 50.55a(b), on the date 12 months prior to the start of the 10-year interval, subject to the conditions listed in 10 CFR 50.55a(b)(2)(viii) and (b)(2)(ix), to the extent practical within the limitation of design, geometry, and materials of construction of the

components. For Robinson, the code of record for the third 10-year CISI interval is the 2013 Edition of Section XI of the ASME Code.

Alternatives to ASME Code requirements may be authorized by the NRC pursuant to 10 CFR 50.55a(z). In proposing alternatives, the licensee must demonstrate that: (1) the proposed alternatives would provide an acceptable level of quality and safety; or (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee submitted this request pursuant to 10 CFR 50.55a(z)(1).

3.0 TECHNICAL EVALUATION

3.1 VT-1 Augmented Examination of Insulated Containment Liner

Pursuant to 10 CFR 50.55a(z)(1), the licensee requested alternatives to the requirements of Table IWE-2500-1 (EC), Examination Category E-C, Item Number E4.11 of the ASME Code, Section XI, 2013 Edition for VT-1 augmented examination each inspection period of 100 percent (%) of surface areas identified by IWE-1242 of the containment liner plate, that are covered by insulation panels, which is classified as metallic liners of Class CC components.

3.1.1 Component Identification

Code Class:	Class MC and metallic liners of Class CC components
Code Reference:	ASME Code, Section XI, Table IWE-2500-1 (E-C)
Examination Category:	E-C
Item Number:	E4.11
Component:	Insulated portion of containment liner only

3,1,2 Applicable ASME Code Edition

The applicable Code of Record for the third CISI interval (September 9, 2019, through September 8, 2029) at Robinson is the ASME Code, Section XI, 2013 Edition, Subsection IWE (hereafter referred as the 2013 ASME Code) subject to the conditions in 10 CFR 50.55a(b)(2)(ix)(A)(2), and (b)(2)(ix)(B), (J), and (K), that apply to the 2013 ASME Code.

3.1.3 Applicable ASME Code Requirements

Table IWE-2500-1, Examination Category E-C, Item Number E4.11, of the 2013 ASME Code requires VT-1 augmented examination of 100% of the accessible surface areas identified by IWE-1242 of the containment liner during each examination period of the inspection interval against the IWE-3520, “Standard for Examination Category E-C, Containment Surfaces Requiring Augmented Examination,” which applies to Class MC and metallic liners of Class CC components. The specific acceptance standard requirement in IWE-3520 the licensee has requested alternatives to is IWE-3521(a): pressure-retaining component corrosion or erosion that exceeds 10% of the nominal wall thickness. The licensee is requesting alternatives to these requirements in the 2013 ASME Code for the accessible areas of the containment liner that are covered by insulation panels.

3.1.4 Licensee's Proposed Alternatives and Duration

In Section 3.1.4 of NRC Safety Evaluation dated April 30, 2009, the staff noted that the licensee identified 62 insulation panels at the interface between the containment concrete wall and the containment floor slab above the base mat at the 228 ft. elevation. In lieu of the ASME 2013 Code, Section XI, IWE requirement for augmented VT-1 visual examination of 100% of the accessible areas of the containment liner identified by IWE-1242, the licensee proposed to remove 10% of the insulation panels at the base mat interface and perform a VT-1 visual examination of the liner for the third 10-year CISI interval. In addition, the licensee proposed to remove a minimum of 90 insulation panels from diverse locations, at varying heights and azimuths, at elevations higher than the insulation panels at the base mat level, including the population of accessible liner plate areas with past degradation but more focused on those that were not examined during the first and second 10-year CISI intervals for VT-1 examination. The licensee stated in Section 5.1.4 of the submittal that this selection process will provide a reasonable representation of the condition of the liner as data will be collected from many different areas of the liner. Furthermore, the licensee proposed that during the third 10-year CISI interval, when an insulation panel at any elevation is removed for maintenance activities, a VT-1 visual examination of the liner behind that insulation panel will be performed. The licensee also indicated that successive VT-1 re-examination of insulated containment liner surfaces shall be performed, if applicable in accordance with IWE-2420, in the next inspection period in areas where examination results detect flaws, degradation or conditions requiring engineering evaluation, but may be limited to surfaces whose coatings have not been restored to protect against future degradation.

In Section 5.1.7 of the submittal, the licensee stated that visual examinations of containment liner plate surfaces that reveal relevant conditions that violate 120% of the minimum liner plate wall thickness required by design shall be extended to include additional examinations during the current outage. The additional examinations shall include two accessible adjacent panels. If the additional examinations reveal flaws or relevant conditions that violate 120% of the minimum liner plate wall thickness required by design, the examinations shall be evaluated to determine if further scope expansion is warranted. No additional examinations are required if the engineering evaluation concludes that either there are no other areas of the liner subject to the same condition, or no other degradation mechanism exists.

The licensee stated that examination results from collected ultrasonic test (UT) data have shown that some liner plates had material loss of more than 10% of their nominal wall thickness due to corrosion. In lieu of the Acceptance Standards required by IWE-3521(a) that states that pressure-retaining component corrosion or erosion that exceeds 10% of the nominal wall thickness requires correction or evaluation, the licensee proposed to replace "the 10% of the nominal wall thickness" by "120% of the minimum liner wall thickness required by design."

In lieu of the examination frequency for Examination Category E-C in the ASME Code, Table IWE 2500-1 (E-C), the licensee proposed in Section 5.1.2 of the submittal that these examinations shall be performed during the first inspection period or may be distributed in approximately equal numbers during each inspection period in the inspection interval.

3.1.5 Licensee's Basis for Use of Proposed Alternatives

In accordance with 10 CFR 50.55a(z)(1), the licensee has requested alternatives for Robinson on the basis that the proposed alternative examinations provide an acceptable level of quality

and safety. The licensee stated that the requested alternatives are based, in part, on successful results obtained from relief requests that were previously authorized for the first 10-year CISI interval at Robinson by NRC Safety Evaluation dated July 26, 1999, and the second 10-year CISI interval by NRC Safety Evaluation dated April 30, 2009.

Table IWE-2500-1 (E-C), Examination Category E-C, does not consider an insulated containment liner as inaccessible for inspection. The containment liner at Robinson is partially insulated and covered by stainless steel sheathing to provide thermal protection for the liner during a design basis accident, and forms part of the defense-in-depth philosophy of the containment liner. The licensee stated that removal and reinstallation of 100% of the insulation panels for the performance of visual examinations is considered difficult.

As discussed in Section 3.1.5 of the April 30, 2009, NRC Safety Evaluation, the staff noted that the licensee removed 108 insulation panels (62 panels at the base mat elevation plus 46 panels at elevations higher than the base mat elevation) for inspection during the first 10-year CISI interval and more than 300 insulation panels (62 panels at the base mat elevation plus panels at elevations higher than the base mat elevation) for inspection during the second 10-year CISI interval. The licensee stated in Section 4.2 of the submittal that review of the data for the liner inspections associated with the first and second 10-year CISI intervals indicated degradation of the liner coating which required coating removal and reapplication. The results of visual examinations (and supplemental ultrasonic thickness measurements, when required) performed at all locations revealed that minimum liner plate wall thicknesses satisfied the minimum thicknesses required by design. Liner plate coatings were reapplied as necessary prior to reinstalling the insulation panel and the stainless-steel sheathing. The licensee considers these surfaces to no longer be priority examination locations and that re-applying the coating following the examination provides reasonable assurance that degradation is being mitigated.

The licensee stated in Sections 5.5 and 5.6 of the submittal that the Acceptance Standards required by IWE-3521(a), that states that pressure-retaining component corrosion or erosion that exceeds 10% of the nominal wall thickness, is more appropriate for [steel containment] vessels rather than for the metallic liner of Robinson's post-tensioned concrete containment, and the metallic liner's function is only to maintain a leak tight barrier. Thus, the licensee proposed an acceptance criterion for liner plate thickness being equal to or greater than 120% of the minimum required thickness required by design. In Section 5.1.7 of the submittal, the licensee proposed that visual examinations of containment liner plate surfaces that reveal relevant conditions that violate 120% of the minimum liner plate wall thickness required by design shall be extended to include additional examinations during the current outage. The additional examinations shall include two accessible adjacent panels. If the additional examination reveals flaws or relevant conditions that violate 120% of the minimum liner plate wall thickness required by design, the examinations shall be evaluated to determine if further scope expansion is warranted. Site specific analysis of the liner has been performed and the bounding required minimum wall thickness is 0.124 inches (in.) for areas away from the studs, and higher minimum required thicknesses of 0.156 in. and 0.208 in. in the immediate 1 in. vicinity of 3/8 in. and 1/2 in. diameter studs, respectively. As alternative acceptance criteria, the licensee used 120% of the above design minimum wall thickness for the liner plates, which corresponds to an acceptable minimum thickness of 0.149 in., 0.1872 in., and 0.2496 in., respectively, for the applicable areas.

The licensee stated in Section 5.2.4 of the submittal that it performed a successful Structural Integrity Test and an Integrated Leak Rate Test during the Fall of 2020 Robinson outage, and

that these successful test results provided reasonable assurance of the integrity of the containment liner.

Based on the above, the licensee concluded that the proposed alternative examinations for the portions of the containment liner covered by insulation panels, in conjunction with the results of examinations performed during the first and second CISI intervals, continue to provide an acceptable level of quality and safety.

3.1.6 NRC Staff Evaluation

In lieu of performing a VT-1 visual examination of 100% of the accessible surface areas of the containment liner that are covered by insulation panels during each inspection period of the third 10-year CISI interval, as required by the 2013 ASME Code, Table IWE-2500-1 (E-C), Examination Category E-C, Item E4.11, the licensee proposed alternative examinations in this request as stated in Section 3.1.4 above. The staff noted from Section 4.3 of the submittal that the licensee had removed more than 400 insulation panels and performed visual examinations (and supplemental ultrasonic thickness measurements, when required) during the first and second 10-year CISI intervals. The licensee stated that results of these examinations revealed that numerous containment liner plate surfaces behind the insulation panels continued to experience coating degradation and loss of steel material due to pitting and general corrosion. However, all examination results have shown that the remaining plate thickness are greater than the minimum required liner plate thickness by design.

Further, the licensee had removed 62 insulation panels at the base mat level, which are the locations more likely to be susceptible to degradation due to potential water intrusion, during the first and second 10-year CISI intervals. In Section 5.2.2 of the submittal, the licensee stated that liner plate coatings were reapplied as necessary, and as-left examinations were performed prior to re-installation insulation panels and stainless sheathing. The licensee considers these surfaces to no longer be priority examination locations and that re-applying the coating following the examination provides reasonable assurance that degradation is being mitigated. The NRC staff agrees with the licensee that the re-applying of coating to the steel liner plate does mitigate the degradation of the liner plate. In Section 5.1.4 of the submittal, the licensee stated that VT-1 visual examinations shall be performed on additional areas of the containment liner that were not examined during the first and second CISI intervals. The NRC staff considers that the licensee's proposed alternatives to remove 10% of the 62 insulation panels at the base mat level and another 90 insulation panels at higher levels from different regions of the containment plus any insulation panels removed for maintenance activities, and performance of VT-1 visual examinations on these steel liners behind the insulation panels, a reasonable and balanced approach based on past examination experience and results. The NRC staff considers the licensee's inspection scope expansion approach, as described in Section 5.1.7 of the submittal, reasonable to find the extent of the liner plate degradation when the proposed alternative acceptance criteria is exceeded. The NRC staff also notes that the 2013 ASME Code is subjected to the regulatory conditions in 10 CFR 50.55a(b)(2)(ix)(A)(2), and (b)(2)(ix)(B), (J), and (K).

The NRC staff recognizes that the strength of liner plates was not considered in the design of a post-tensioned concrete containment, such as at Robinson, and agrees with the licensee's assessment that the function of liner plates in Robinson's post-tensioned concrete containment is to maintain a leak tight barrier. The NRC staff considers that the successful Structural Integrity Test and an Integrated Leak Rate Test performed in 2020 have demonstrated the integrity of the steel liner plates in the Robinson containment building. Therefore, the NRC staff

accepts the licensee's proposal for replacing "10% of the nominal wall thickness" with "120% of the minimum liner wall thickness required by design" as an acceptable criterion for liner plates.

The NRC staff considers that the licensee's proposal for implementing the proposed alternative inspections during the first inspection period or in approximately equal numbers in the three inspection periods within the 10-year CISI interval will provide more administrative flexibility to accomplish the same amount of inspection, and thus accepts the licensee's proposal.

The NRC staff finds that the licensee's proposed alternative examinations during the third 10-year CISI interval for the portion of containment liner surfaces covered by sealed insulation panels between elevation 228 ft., 0 in., and elevation 367ft., 10 in., in conjunction with the findings of similar examinations performed during the first and second 10-year CISI intervals, and the applicable conditions found in 10 CFR 50.55a(b)(2)(ix)(A)(2), and (b)(2)(ix)(B), (J), and (K), that apply to the 2013 ASME Code would provide an acceptable level of quality and safety. Therefore, the NRC staff concludes that the proposed alternatives for the VT-1 augmented examinations of the insulated containment steel liner plates can be authorized pursuant to 10 CFR 50.55a(z)(1) for the third 10-year CISI interval at Robinson.

3.2 Visual Examination of Moisture Barriers

Pursuant to 10 CFR 50.55a(z)(1), the licensee requested alternatives to the requirements of Table IWE-2500-1 (E-A), Examination Category E-A, Item Number E1.30, of the ASME Code, Section XI, 2013 Edition for general visual examination of the containment moisture barriers that are covered by the steel liner and insulation panels.

3.2.1 Component Identification

Code Class:	Class MC and metallic liners of Class CC Components
Code Reference:	ASME Code, Section XI, Table IWE-2500-1 (E-A)
Examination Category:	E-A
Item Number:	E1.30
Component:	Moisture Barriers

3.2.2 Applicable ASME Code Edition

The applicable Code of Record for the third CISI interval (September 9, 2019, through September 8, 2029) at Robinson is the ASME Code, Section XI, 2013 Edition, Subsection IWE, subject to the regulatory conditions in 10 CFR 50.55a(b)(2)(ix)(A)(2), and (b)(2)(ix)(B), (J), and (K), that apply to the 2013 ASME Code.

3.2.3 Applicable ASME Code Requirement from which Relief is Requested:

Table IWE-2500-1(E-A), Examination Category E-A, Item Number E1.30 of the 2013 ASME Code requires general visual examination of 100% of the containment moisture barriers during each inspection period of the inspection interval against the IWE-3512 acceptance standard – General Visual Examination of Moisture Barriers. Table IWE-2500-1 (E-A), Examination Category E-A, Item Number E1.30 of the 2013 ASME Code defines that containment moisture

barriers include caulking, flashing, and other sealants. The IWE-3512 acceptance standard requires that moisture barriers with defects that permit intrusion of moisture against inaccessible areas of the pressure retaining surfaces of the metal containment shell or liners shall be corrected by corrective measures. Corrective measures may be deferred until the next regularly scheduled outage if an engineering evaluation (IWE-3122.3) demonstrates that degradation from any moisture intrusion would not reduce the thickness of the base metal in local areas by more than 10% of the nominal plate thickness, or the degradation-reduced thickness can be shown by analysis to satisfy the requirements of the Design Specification. The licensee's requests are related to the 2013 ASME Code's requirement of general visual examination of 100% of the containment moisture barriers and the IWE-3512 acceptance standard.

3.2.4 Licensee's Proposed Alternatives and Duration

The licensee proposed in Section 5.1.3 of the submittal to perform a general examination of moisture barriers installed between the containment liner plate and the interior concrete floor embedment zone, where 10% of the 62 insulation panels are removed as stated in Section 3.1.4 above, once in the 10-year interval, in lieu of the requirements in Table IWE-2500-1 (E-A), Examination Category E-A, Item Number E1.30, of the 2013 ASME Code. The licensee proposed in Section 5.1.5 of the submittal that when any insulation panel at the base mat level (elevation 228 ft.) is removed for maintenance activities, a visual examination of the exposed moisture barrier shall be performed.

In Section 5.3.1 of the submittal, the licensee proposed that a general visual examination shall be performed, each inspection period, on all accessible sealant and caulking materials installed at the base of the bottom row of insulation panel stainless steel covers at elevation 228 ft. except for very high radiological areas such as the area near the regenerative heat exchanger. The licensee also proposed to perform examination of sealant and caulking materials between vertical joints in the bottom row of insulation panel stainless steel covers, each inspection period, in accordance with Table IWE-2500-1 (E-A), Examination Category E-A, Item Number E1.30 of the 2013 ASME Code.

Section 5.1.8 of the submittal stated that if visual examination of containment moisture barriers installed between the containment liner plate and the interior concrete floor embedment zone at elevation 228 ft. reveal relevant conditions that exceed the acceptance standard of IWE-3512, and the criteria to defer repair one refueling cycle cannot be met, examinations shall be extended to include additional examinations during the current outage. The additional examinations shall include the adjacent panel on each side of the panel where the relevant condition exists. If the additional examinations reveal conditions that exceed the acceptance standards of IWE-3512, and the criteria to defer repair one refueling cycle cannot be met, the examinations shall be further extended to include additional panels until no relevant conditions are present or the criteria to defer repair for one refueling cycle is met. No additional examinations are required if the engineering evaluation concludes that either there are no other areas of the moisture barrier subject to the same root cause condition, or no degradation mechanism exists.

3.2.5 Licensee's Basis for Use of Proposed Alternatives

Table IWE-2500-1 (E-A), Examination Category E-A, does not explicitly address insulated containment liner moisture barriers. The containment moisture barrier at Robinson is covered by stainless steel sheathing and insulation to provide thermal protection for the carbon steel liner during a design basis accident. As shown in Figure IWE-2500-1 and noted in Table IWE-2500-1

(E-A), moisture barrier materials are intended to prevent intrusion of moisture against inaccessible areas of the pressure-retaining metal containment shell or liner at concrete-to-metal interfaces and at metal-to-metal interfaces which are not seal-welded. For Robinson, the epoxy joint filler that interfaces with the concrete floor-to-containment liner interface at the 228 ft. elevation meets the definition of a moisture barrier.

The licensee stated in Section 5.1.1 of the submittal that during the first and second 10-year CISI intervals, 100% of the moisture barrier at the interface between the metallic liner and the insulation panels was inspected. The staff noted in the April 30, 2009, NRC Safety Evaluation, that the licensee's review of the results of the moisture barrier inspections indicated degradation of the moisture barrier in some locations, which required removal and reapplication of the epoxy joint filler. Subsequent visual examination of the containment liner after moisture barrier removal revealed that the minimum wall thickness of the liner behind the moisture barrier was not violated and remained acceptable. The liner coatings and the moisture barrier were reapplied in these areas and as-left examinations were performed prior to reinstalling the insulation panels and replacing the stainless-steel sheathing.

Sealant and caulking materials are installed at the base of the insulation panel stainless steel covers at the concrete floor interface at elevation 228 ft. and in the vertical joints between the insulation panel stainless steel covers as a secondary method to prevent water from accessing inaccessible surfaces of the containment liner plate. The licensee proposed to examine these areas once in each inspection period in accordance with Table IWE-2500-1, Examination Category E-A, Item Number E1.30, to provide reasonable assurance that any potential standing water that could accumulate on the concrete floor cannot contact the containment liner plate behind the insulation panels at this elevation.

Because inspections performed to date have indicated no violation of the required minimum liner thickness, and that the proposed program will perform inspections of sealant and caulking materials over the course of the third 10-year CISI interval, the licensee concluded that the proposed alternative examinations for the containment moisture barrier continue to provide an acceptable level of quality and safety.

3.2.6 NRC Staff Evaluation

In lieu of performing the general visual examinations of 100% of the containment moisture barrier during each examination period of the third 10-year CISI interval, as required by the 2013 ASME Code, Table IWE-2500-1 (E-A), Examination Category E-A, Item E1.30, the licensee proposed alternative examinations in this request. The proposed alternatives are to perform a general visual examination of all accessible sealant and caulking materials installed at the base of the bottom row of insulation panel stainless steel covers at elevation 228 ft. except for very high radiological areas, and between vertical joints in the bottom row of insulation panel stainless steel covers during each inspection period of the third 10-year CISI interval. The staff considers that the licensee's proposal provides reasonable assurance that any potential standing water that could accumulate on the concrete floor cannot contact the containment liner plate behind the insulation panels at the top of the base mat elevation (elevation 228 ft.).

Results of the licensee's inspection of 100% of moisture barriers performed during the first and second 10-year CISI intervals indicated degradation of the moisture barrier in some locations, which was removed, reapplied, and reexamined. Visual examination of the containment liner after moisture barrier removal revealed that the minimum wall thickness of the liner behind the moisture barrier was not violated and was acceptable. Thus, examination of the containment

liner behind areas of the insulation with degraded moisture barriers did not reveal any significant liner degradation during the first and second 10-year CISI intervals.

The licensee proposed to perform a general visual examination once in a 10-year interval of the exposed moisture barriers after removing 10% of the 62 bottom row insulation panels, as proposed for containment liner examination, and when removing any insulation panels due to maintenance activities at the base mat level. If the moisture barrier examination results fail to meet the acceptance standard of IWE-3512, and the criteria to defer repair one refueling cycle cannot be met, examinations shall be extended to include additional examinations during the current outage until no relevant conditions are present or the criteria to defer repair for one refueling cycle is met, as described in Section 3.2.4 above. The NRC staff considers the licensee's approach to expand the visual examination on moisture barriers to wider areas reasonable.

Based on the above, the staff finds that the licensee's proposed alternative examinations during the third 10-year CISI interval for the insulation covered containment moisture barrier and inspection each period of accessible sealant and caulking materials installed at the base and vertical joints of the bottom row of insulation panels, in conjunction with the findings of similar examinations performed during the first and second 10-year CISI intervals, and the applicable regulatory conditions found in 10 CFR 50.55a(b)(2)(ix)(A)(2), and (b)(2)(ix)(B), (J), and (K), that apply to the 2013 ASME Code, would provide an acceptable level of quality and safety. Therefore, the staff concludes that the proposed alternative examinations of the moisture barrier can be authorized pursuant to 10 CFR 50.55a(z)(1) for the third 10-year CISI interval at Robinson.

4.0 CONCLUSION

As set forth above, the NRC staff has determined that the proposed alternatives would provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the proposed alternatives to certain requirements of the ASME Code, Section XI, Subsection IWE, 2013 Edition regarding containment inservice inspection examinations at the H.B. Robinson Steam Electric Plant, Unit 2, for the third 10-year CISI interval (September 9, 2019, through September 8, 2029). This request relates to VT-1 augmented visual examinations of the insulated portion of the containment liner, general visual examination of the moisture barriers at the intersection of the containment steel liner and the concrete floor at base mat level (elevation 228 ft.), as well as sealant/caulking materials at the bottom row of liner insulation panels. All other ASME BPV Code, Section XI, requirements for which an alternative was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: J. Ma, NRR

Date: August 4, 2022

SUBJECT: H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2 – REQUEST OF ALTERNATIVES TO ASME CODE SECTION XI SUBSECTION IWE REQUIREMENTS FOR CONTAINMENT INSPECTIONS (EPID L-2021-LLR-0064) AUGUST 4, 2022

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