**UNITED STATES**
**NUCLEAR REGULATORY COMMISSION**
**REGION IV**
**1600 EAST LAMAR BOULEVARD**
**ARLINGTON, TEXAS 76011-4511**

July 14, 2022

Mr. John Ferrick, Site Vice President
Entergy Operations, Inc.
17265 River Road
Killona, LA 70057

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3 – LICENSE RENEWAL PHASE 1 INSPECTION REPORT 05000382/2022011

Dear Mr. Ferrick:

On June 9, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Waterford Steam Electric Station, Unit 3. On June 16, 2022, the NRC inspectors discussed the results of this inspection with Mr. M. Lewis, General Manager Plant Operations, and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Signed by Taylor, Nicholas
on 07/14/22

Nicholas H. Taylor, Chief
Engineering Branch 2
Division of Operating Reactor Safety

Docket No. 05000382
License No. NPF-38

Enclosure:
Inspection Report 05000382/2022011

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WATERFORD STEAM ELECTRIC STATION, UNIT 3 – LICENSE RENEWAL PHASE 1 INSPECTION REPORT 05000382/2022011 DATED JULY 14, 2022.

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|---|---|---|---|---|---|
| NAME | G.Pick | J.Mejia | N.Taylor | J.Dixon | N.Taylor |
| SIGNATURE | ***RA*** | *RA* | *RA* | *AAS for* | *RA* |
| DATE | 7/9/2022 | 7/11/2022 | 7/14/2022 | 7/13/2022 | 7/14/2022 |

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**U.S. NUCLEAR REGULATORY COMMISSION**
**Inspection Report**

| | |
|---|---|
| Docket Number: | 05000382 |
| License Number: | NPF-38 |
| Report Number: | 05000382/2022011 |
| Enterprise Identifier: | I-2022-011-0003 |
| Licensee: | Entergy Operations, Inc. |
| Facility: | Waterford Steam Electric Station, Unit 3 |
| Location: | Killona, LA |
| Inspection Dates: | April 10 to June 9, 2022 |
| Inspectors: | J. Mejia, Reactor Inspector<br>G. Pick, Senior Reactor Inspector |
| Approved By: | Nicholas H. Taylor, Chief<br>Engineering Branch 2<br>Division of Operating Reactor Safety |

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a license renewal phase 1 inspection at Waterford Steam Electric Station, Unit 3, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information.

### List of Findings and Violations

No findings or violations of more than minor significance were identified.

### Additional Tracking Items

None.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

71003 - Post-Approval Site Inspection for License Renewal

Post-Approval Site Inspection for License Renewal (1 Sample)

(1) **OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL**

71003 - Post-Approval Site Inspection for License Renewal

The inspectors evaluated the material condition of the Waterford Steam Electric Station, Unit 3 (Waterford 3) in the spring 2022 while the plant was shut down for Refueling Outage R24. This allowed the inspectors to evaluate the material condition of inaccessible areas prior to entry into the period of extended operation and to evaluate the licensee implementation of aging management review activities. The period of extended operation is the additional 20 years beyond the original 40-year licensed term and begins after midnight on December 18, 2024.

In addition, the inspectors performed this inspection to evaluate whether the licensee: (1) completed the necessary actions to comply with the license condition and commitments related to aging management; and (2) implemented programs that agreed with those approved in the safety evaluation report and described in the updated final safety analysis report. Specific activities evaluated during this inspection are described in the following paragraphs.

The inspectors evaluated whether the licensee implemented the aging management programs described in "Safety Evaluation Report Related to the License Renewal of Waterford Steam Electric Station, Unit 3" (**ML18228A668**). The inspectors verified that the licensee implemented procedures, documented inspection results, and initiated corrective action documents.

The inspectors reviewed supporting documents including work orders, inspection records, engineering evaluations, and condition reports; conducted interviews with licensee staff; and visually inspected structures, systems, and components including those not accessible during power operation.

Post-Approval Site Inspection for License Renewal (1 Sample)

(1) The inspectors evaluated the aging management programs described below and walked down selected areas of the facility while performing this phase 1 license renewal inspection.

18.1.6 Containment Inservice Inspection Program (IWE) and Commitment 5

The Containment Inservice Inspection (IWE) Program manages aging effects for steel containments (class MC) and steel liners for concrete containments (class CC). The containment is a low leakage, freestanding steel containment vessel consisting of a vertical upright cylinder with a hemispherical dome and an ellipsoidal bottom. The ellipsoidal bottom of the steel containment vessel is encased in concrete and founded on the common concrete foundation with the shield building. Since the class CC equivalent concrete foundation slab and the bottom steel plate are inaccessible, they are exempted from examination in accordance with IWL-1220(b) and IWE-1220(b).

Commitment 5 specified:

Revise plant procedures to include the preventive actions for storage of ASTM A325, ASTM F1852, and ASTM A490 bolting from Section 2 of Research Council of Structural Connections publication “Specification for Structural Joints Using ASTM A325 or A490 Bolts."

The inspectors determined that the licensee included this requirement in Procedure EN-MP-125, “Control of Material,” Revision 18, on August 24, 2021. During field verification to evaluate how the licensee stored the high-strength bolts, the inspectors found the bolts stored in partially opened bags that allowed moisture and dirt to contaminate the bolt surface. The licensee wrote Condition Report CR-WF3-2022-02584 to determine the cause and identify the extent of condition. Although a performance deficiency related to storage of high strength bolts, the inspectors determined that this failure to effectively implement a commitment was not a violation because the licensee was not within 6 months of entering the period of extended operation, as prescribed in License Condition 2.C.21.(b).(1). The licensee wrote Condition Report CR-HQN-2022-00762 to ensure the other sites evaluate their material handling practices for high strength bolting.

Based on review of the actions implemented related to the IWE Program, the inspectors determined that the licensee will have met their commitments once corrective actions are implemented. The inspectors determined that reasonable assurance exists that this program will manage the effects of aging during the period of extended operation. No further review of this aging management program is anticipated, and this commitment is closed.

18.1.7 Containment Leak Rate Program

The Containment Leak Rate Program manages the effects of aging to detect degradation of the steel containment vessel and associated welds, penetrations, fittings, and other access openings that may compromise the containment pressure boundary, including seals and gaskets. The program consists of tests performed in accordance with the regulations and guidance provided in 10 CFR Part 50,

Appendix J, Option B; NEI 94-01, “Industry Guideline for Implementing Performance-Based Options of 10 CFR Part 50, Appendix J,” and ANSI/ANS 56.8, “Containment System Leakage Testing Requirements.”

The licensee performed three types of tests at frequencies specified in 10 CFR Part 50, Appendix J, Option B. Type A integrated leak rate tests demonstrated the leak-tightness and structural integrity of the containment. Type B and type C containment local leakage rate tests detect local leaks across each pressure-containing or leakage-limiting boundary of containment penetrations.

The inspectors reviewed this program to ensure that the licensee would continue to manage the effects of aging during the period of extended operation. The inspectors verified that this program had no enhancements and no exceptions. The inspectors identified no issues during review of this aging management program and consider evaluation of this aging management program complete.

18.1.19 Masonry Wall Program and Commitment 15

The Masonry Wall Program manages aging effects so that the evaluation basis established for each masonry wall within the scope of license renewal remains valid through the period of extended operation. The program includes visual inspection of in-scope masonry walls. The program included masonry walls required by fire protection regulations, radiation shielding masonry walls, and masonry walls with the potential to affect safety-related components.

Commitment 15 specified that the licensee would enhance the Masonry Wall Program to

1. Revise plant procedures to ensure masonry walls located within in-scope structures are included in the scope of the Masonry Wall Program.

2. Revise plant procedures to include monitoring gaps between the structural steel supports and masonry walls that could potentially affect wall qualification.

3. Revise plant procedures to specify that masonry walls will be inspected at least once every 5 years with provisions for more frequent inspections in areas where significant aging effects (missing blocks, cracking, etc.) are observed to ensure there is no loss of intended function.

4. Revise plant procedures to include acceptance criteria for masonry wall inspections that ensure observed aging effects (cracking, loss of material, or gaps between the structural steel supports and masonry walls) do not invalidate the wall's evaluation basis or impact its intended function.

The inspectors verified that the licensee had added statements reflecting items 1, 2, and 3 to Procedure EN-DC-150, “Condition Monitoring of Maintenance Rule Structures,” Revision 15.

During the field walkdown of a masonry block wall that surrounded a stairwell and functioned as a fire barrier on April 14, 2022, the inspectors identified the following discrepancies: a small, spalled area of concrete, a void located under the stairs, a small crack in the wall, and a gap seal that was detaching from the wall. Subsequently, the licensee initiated Condition Report CR-WF3-2022-03854. The licensee determined that the small crack in the wall, the spalling, gap seal, and void met their structural acceptance criteria. Following discussions with the inspectors and consultation with the fire protection engineer, the licensee determined that the allowed void for the fire barrier could be 4 inches and the void measured an acceptable 3.6 inches.

During interviews, the team determined that the licensee had not verified the capability of the masonry block wall to meet its fire barrier function during the most recently completed structural inspection. In addition, the licensee had no records of a fire barrier inspection. The licensee expressed the opinion that the personnel familiar with fire barrier requirements and radiation shielding requirements should validate those functions. Further, the licensee indicated that the civil engineers would continue to conduct structural inspections. The licensee wrote Condition Report CR-WF3-2022-04691 to document that the structural inspections would focus on structural integrity. The licensee described that they would place requirements for the functional inspections (such as radiation shielding and fire barrier), including reference to this commitment, in appropriate documents.

Based on review of the corrective actions implemented following this inspection, the inspectors determined that reasonable assurance exists that the Masonry Wall Program will manage the effects of aging related to structural integrity during the period of extended operation. Because the program, as implemented, did not verify all functions performed by the masonry block wall, this commitment remains open and will be reviewed during a future inspection.

18.1.22 Nickel Alloy Inspection Program

The Nickel Alloy Inspection Program manages cracking caused by primary water stress corrosion cracking (PWSCC) for nickel-alloy (alloys 600/82/182) components and loss of material caused by boric acid-induced corrosion in susceptible safety-related components. The program provides (a) inspection requirements for the reactor coolant pressure boundary components that contain PWSCC-susceptible dissimilar metals (alloys 600/82/182) and (b) inspection requirements for reactor coolant pressure boundary components in the vicinity of PWSCC-susceptible dissimilar metals (alloys 600/82/182).

The program monitors for reactor coolant pressure boundary cracking and leakage using various methods, including non-destructive examination techniques, radiation monitoring, and visual inspections for boric acid deposits or the presence of moisture to identify cracking in the reactor coolant pressure boundary or loss of material. The program follows the requirements of 10 CFR 50.55a.

During this inspection, the inspectors reviewed the follow-up nondestructive examinations performed for nickel-alloy butt welds. The indications had not resulted in reactor coolant system leakage but consisted of indications that failed to meet acceptance criteria during a planned phased array ultrasonic examination of

dissimilar metal welds during Refueling Outage R22. The licensee identified the axially-oriented indications within the butt welds and weld butter in the reactor coolant pump suction drain nozzle to safe-end butt welds 07-009 (RCP 1A) and 11-007 (RCP 2A). The licensee performed the examination to verify that the weld overlay implemented on the welds continued to perform their function. The inspectors did not identify any issues with this activity.

The inspectors reviewed this program to ensure that the licensee would continue to manage the effects of aging during the period of extended operation. The inspectors verified that this program had no enhancements and no exceptions. The inspectors identified no issues during review of this aging management program and consider evaluation of this aging management program complete.

Plant Condition Monitoring Walkdowns

The inspectors walked down the facility looking at the structures, systems, and components for signs of aging, such as corrosion on piping and supports, corrosion of cable trays, water intrusion, cracking, and spalling of concrete.

Specific areas reviewed, and components evaluated during this inspection included:

- Containment – multiple elevations
- Regenerative heat exchanger room
- Annulus between secondary and primary containment
- Reactor auxiliary building train B electrical switchgear room
- Masonry walls in the control building

During the walkdowns of the areas, the inspectors did not identify any signs of aging that affected the structures, systems, or components.

## INSPECTION RESULTS

No findings were identified.

## EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On June 16, 2022, the inspectors presented the license renewal Phase 1 inspection results to Mr. M. Lewis, General Manager Plant Operations, and other members of the licensee staff.

**PROGRAM REVIEWS**

The inspectors completed review of the following aging management programs without commitments from the updated final safety analysis report supplement: 18.1.7 and 18.1.22

The inspectors completed review of the following aging management program with commitments from the updated final safety analysis report supplement: 18.1.6 and Commitment 5

The inspectors reviewed but did not close the following aging management program with commitments from the updated final safety analysis report supplement: 18.1.19 and Commitment 15

**DOCUMENTS REVIEWED**

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|---|---|---|---|---|
| 71003 | Corrective Action Documents | CR-WF3- | 2012-05523, 2014-05375, 2019-01580, 2021-04796, 2021-04797, 2021-07049, 2022-00205 | |
| | Corrective Action Documents Resulting from Inspection | CR-HQN- | 2022-0762 | |
| | Corrective Action Documents Resulting from Inspection | CR-WF3- | 2022-02584, 2022-03854, 2022-04526, 2022-04691 | |
| | Drawings | G-502 | Waterford S.E.S. Unit 3 Reactor Building Containment Vessel Support - Plan & Section - Master | 9 |
| | | G-503 | Waterford S.E.S. Unit 3 Reactor Building Interior Base Concrete - Plan - Master | 10 |
| | | G-509 | Waterford S.E.S. Unit 3 Reactor Building Structural Layout | 5 |
| | Engineering Evaluations | WF3-CS-21-00001 | Maintenance Rule Walkdown for Evaluation of Structures | 0 |
| | | WF3-EP-14-00006 | Aging Management Program Evaluation Results – Class 1 Mechanical, Section 4.1, Nickel Alloy Inspection Program | 1 |
| | | WF3-EP-14-00008, Section | Waterford 3 License Renewal Project Aging Management Program Evaluation Results Civil/Structural | 2 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|---|---|---|---|---|
| | | 3.5, Masonry Wall Program | | |
| | | WF3-EP-19-00008 | Review of the Containment Leak Rate Program for License Renewal Implementation | 0 |
| | | WF3-EP-19-00020 | Review of the Masonry Wall Program for License Renewal Implementation | 0 |
| | | WF3-EP-19-00023 | Review of the Nickel Alloy Inspection Program for License Renewal Implementation | 0 |
| | | WF3-EP-19-00025 | Review of the Non-EQ Inaccessible Power Cables (>/= 400V) Program for License Renewal Implementation | 0 |
| | | WF3-EP-19-00029 | Review of the Masonry Wall Program for License Renewal Implementation | 0 |
| | Miscellaneous | | WF3 RF-22 Cycle Report LLRT Frequency Determination NEI-94-01 Revision 2A | 2/25/2019 |
| | | | WF3 2019 Integrated Leak Rate Test Report | |
| | | ANSI/ANS 56.8 | Containment System Leakage Testing Requirements | 2002 |
| | | EC 89989 | Waterford 3 RF 23 Post Outage Report | 5/12/2021 |
| | Procedures | CEP-APJ-001 | Primary Containment Leakage Rate Testing (10CFR50 Appendix J) Program Plan | 6 |
| | | CEP-CII-004 | General and Detailed Visual Examinations of Concrete Containments | 311 |
| | | CEP-CISI-104 | WF3 Containment Inservice Inspection Program | 5 |
| | | EN-DC-150 | Condition Monitoring of Maintenance Rule Structures | 15 |
| | | EN-DC-334 | Primary Containment Leakage Rate Testing (Appendix J) | 4 |
| | | EN-DC-346 | Cable Reliability Program | 8 |
| | | EN-MP-125 | Control of Material | 18 |
| | | NOECP 451 | Conducting Engineering Inspection of Reactor Containment Building Protective Coatings | 1 |
| | | SEP-APJ-005 | Waterford 3 Primary Containment Leakage Rate Testing | 9 |
| | | SEP-ISI-104 | Program Section for ASME Section XI, Division 1 WF3 Inservice Inspection Program | 11 |
| | Work Orders | | 00553156-01, 00553301-01, 00554048-21, 00557438-01, 00558619-01, 00559688-01, 00569946-01, 00569946-02, 00569946-03, 00569946-04, 00571028-01, 52894167-01 | |