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W3F1-2021-0001

January 8, 2021

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

Subject: Special Report SR-21-001-00
Reactor Vessel Level Monitoring System (RVLMS) Channel Inoperable for Greater than 30 Days

Waterford Steam Electric Station, Unit 3 (Waterford 3)
NRC Docket No. 50-382
Renewed Facility Operating License No. NPF-38

Attached is Special Report Number SR-21-001-00 for Waterford Steam Electric Station, Unit 3. This Special Report is submitted in accordance with Technical Specification 3.3.3.6.

This letter contains no new regulatory commitments.

If you have any questions or require additional information, please contact Paul Wood, Regulatory Assurance Manager, at 504-464-3786.

Paul Wood

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Enclosure: Waterford 3 Special Report SR-21-001-00

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Waterford Steam Electric Station, Unit 3
NRR Project Manager

ENCLOSURE

W3F1-2021-0001

Entergy Operations, Inc.

Waterford 3 Special Report SR-21-001-00

SPECIAL REPORT
SR-21-001-00

Reactor Vessel Level Monitoring System (RVLMS) Channel Inoperable Greater Than 30 Days

SUMMARY

The Qualified Safety Parameter Display System (QSPDS) Reactor Vessel Level Monitoring System (RVLMS) Channel 2 level 6 was declared inoperable due to a thermocouple failure on November 29, 2020. Repairs could not be completed since it required access to the reactor vessel head area which is not possible at power. Since the instrument was not returned to service within 30 days, this report is submitted pursuant to Technical Specification (TS) 3.3.3.6.

NARRATIVE

The Qualified Safety Parameter Display System (QSPDS) performs safety grade signal processing and display of the inadequate core cooling (ICC) parameters and is located on the main control panel for reactor protection in order to facilitate operator use. The QSPDS is capable of providing to the operator important information on the performance of many critical safety functions.

TS 3.3.3.6, Table 3.3-10, requires RVLMS to be operable in Modes 1 through 3. Action 29 requires:

> With the number of OPERABLE accident monitoring channels less than the Required number of Channels as shown in Table 3.3-10, either restore the inoperable channel to OPERABLE status within 30 days, or prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within the following 14 days. The reports shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels to OPERABLE status.

A channel is eight sensors in a probe. A channel is operable if four or more sensors, one or more in the upper three and three or more in the lower five, are operable.

At 0446 hours on November 29, 2020, Operations personnel at Waterford Steam Electric Station, Unit 3 (Waterford 3) observed that the QSPDS RVLMS level 6 differential temperature was less than 25°F. The level 6 unheated junction thermocouple (UHJTC) was reading higher than normal and slowly rising.

QSPDS RVLMS Channel 2 levels 4 and 8 were already inoperable. Level 6 reading below the required 25°F differential resulted in 3 of the 5 thermocouples in the lower quadrant to be inoperable. This is below the minimum number of thermocouples required for operability of the RVLMS channel. Based on this information, QSPDS RVLMS Channel 2 cannot perform its specified function for this condition. The required actions per TS 3.3.3.6 were taken and an Equipment Out of Service log was initiated to track the condition.

Preplanned Alternate Method of Monitoring

The preplanned alternate method of monitoring reactor vessel level with RVLMS Channel 2 inoperable is to use the hot leg instruments RC-ITI-0122HA and RC-ITI-0112HB to determine saturation conditions. Saturation Margin on RVLMS Channel 1 has also been listed for defense in depth. This indication contains hot leg temperatures and representative core exit thermocouple (CET) temperatures. A caution tag, 1CT-1-000951, was placed on RVLMS Channel 2 identifying the alternate instrument. The remaining operable sensors in RVLMS Channel 2 are also available for use.

The backup method if RVLMS Channel 1 became inoperable would be to continue to use the hot leg instruments RC-ITI-0122HA and RC-ITI-0112HB and CETs as alternate instruments.

Cause of the RVLMS Channel 2 Inoperability

RVLMS Channel 2 detectors 4 and 8 are currently non-functional. Testing revealed that the detector 4 unheated thermocouple circuit is open from the maintenance panel to the reactor head. In addition, signal wires are grounded between the disconnect panel to QSPDS path. Testing revealed a hard ground on UHJTC detector 8 heater coil and shield wires between penetration 122 and the Reactor Disconnect Panel connection.

A third detector in the lower group (RVLMS Channel 2 detector 6) is also non-functional. Testing revealed a failing thermocouple or an open circuit near the reactor head. The plant must be shut down in order to complete the containment entry to resolve the conditions that exist close to the reactor head.

Schedule for Restoration of RVLMS Channel 2

Refueling Outage 24 is the next scheduled opportunity to resolve the conditions listed above. A work order has been issued to correct the condition. This work order has been approved for addition to the Refueling Outage 24 scope.