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504-739-6250

W3F1-2023-0001

10 CFR 50.73

January 3, 2023

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

Subject: Licensee Event Report Supplement 50-382/2022-001-01, Non-Compliance
with Technical Specifications Due to Incorrect Procedural Guidance for
Radiation Monitors

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

Entergy Operations, Inc. (Entergy) submits the enclosed Licensee Event Report (LER) supplement 50-382/2022-001-01 for Waterford Steam Electric Station, Unit 3. The event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation or condition which was prohibited by the plant's Technical Specifications.

The LER supplement describes a non-compliance with TS 3.3.3.1 due to incorrect procedure revisions resulting in inadequate calibration methods applied to the Condenser Wide Range Gas Monitor (WRGM), Plant Stack WRGM, Fuel Handling Building WRGM, and Main Steam Line B radiation detector.

This letter contains no new commitments.

Should you have any questions concerning this issue, please contact Leia Milster, Manager, Regulatory Assurance, at 504-739-6250.

Respectfully,

A handwritten signature in black ink, appearing to read 'Leia Milster', written in a cursive style.

Leia Milster

LEM/mrp


Enclosure: Licensee Event Report 50-382/2022-001-01

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Waterford Steam Electric Station, Unit 3
NRC Project Manager – Waterford Steam Electric Station, Unit 3
Louisiana Department of Environmental Quality

Enclosure

W3F1-2023-0001

Licensee Event Report 50-382/2022-001-01

RC FORM 366 (08-2020)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104			EXPIRES: 08/31/2023		
		LICENSEE EVENT REPORT (LER) (See Page 3 for required number of digits/characters for each block) (See NUREG-1022, R.3 for instruction and guidance for completing this form https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)								
1. Facility Name Waterford Steam Electric Station, Unit 3					2. Docket Number 05000 - 0382			3. Page 1 OF 5		
4. Title Non-Compliance with Technical Specifications Due to Incorrect Procedural Guidance for Radiation Monitors										
5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
01	18	2022	2022	- 001 -	01	03	18	2022	N/A	N/A
9. Operating Mode <div style="text-align: center;">1</div>					10. Power Level <div style="text-align: center;">100</div>					
11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)										
10 CFR Part 20		<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)		
<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		10 CFR Part 73		
<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.69(g)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(4)		
<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> 73.71(a)(5)		
<input type="checkbox"/> 20.2203(a)(2)(i)		10 CFR Part 21		<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)		<input type="checkbox"/> 73.77(a)(1)(i)		
<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 21.2(c)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)		<input type="checkbox"/> 73.77(a)(2)(i)		
<input type="checkbox"/> 20.2203(a)(2)(iii)		10 CFR Part 50		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)		<input type="checkbox"/> 73.77(a)(2)(ii)		
<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)				
<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)				
<input type="checkbox"/> Other (Specify here, in Abstract, or in NRC 366A).										
12. Licensee Contact for this LER										
Licensee Contact Leia Milster / Manager, Regulatory Assurance								Phone Number (Include Area Code) (504) 739-6250		
13. Complete One Line for each Component Failure Described in this Report										
Cause	System	Component	Manufacturer	Reportable To IRIS	Cause	System	Component	Manufacturer	Reportable To IRIS	
D	IL	MON	G063	Y	D	IL	MON	G063	Y	
14. Supplemental Report Expected								15. Expected Submission Date		
<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)								Month	Day	Year
								03	03	2023
16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines) On January 18, 2022, while operating in Mode 1, at 100% power, Waterford 3 Steam Electric Station Unit 3 (WF3) discovered that the engineering conversion factors (ECF) used in three gaseous radiation monitors were incorrect. This resulted in the Condenser Wide Range Gas Monitor (WRGM), Plant Stack WRGM, and Fuel Handling Building WRGM being inoperable. WF3 Technical Specification (TS) 3.3.3.1, Action b pursuant TS Table 3.3-6 Action 27, require the minimum number of Effluent Accident Monitor channels to be operable in Modes 1, 2, 3, and 4. TS 3.3.3.1, Action b, and TS Table 3.3-6, Action 27, required that the radiation monitors be restored to operable status within 72 hours, or initiate the preplanned alternate method of monitoring the appropriate parameter(s). The WRGMs exceeded the allowed outage time. The ECFs were not revised when the original detectors were replaced, which caused incorrect count-rates to be used in the detector calibrations. The correct ECFs were determined, and the radiation monitors were recalibrated using the corrected ECFs. This supplement includes an update to the Extent of Condition (EOC) activities, which revealed additional procedural and monitor calibration errors. The EOC is in progress and will result in an additional supplement to this LER. This condition is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) – any operation or condition that was prohibited by the plant's technical specifications.										

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form)

<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collection Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Waterford Steam Electric Station, Unit 3	05000-0382	YEAR	SEQUENTIAL NUMBER	REV NO.
		2022	001	01

NARRATIVE**PLANT STATUS**

On January 18, 2022, at 1018 Central Time, Waterford Steam Electric Station, Unit 3 (WF3) was operating at 100% power in Mode 1. There were no other structures, systems, or components that were inoperable at the time that contributed to the event.

EVENT DESCRIPTION

On January 18, 2022, during an engineering review, it was discovered that the engineering conversion factors used in three gaseous radiation monitors [IL] were incorrect. This resulted in the Plant Stack [VL] Wide Range Gas Monitor (WRGM) (PRMIRE0110), the Fuel Handling Building (FHB) [ND] WRGM (PRMIRE3032), and the Condenser [SG] WRGM (PRMIRE0002) being inoperable. Waterford Technical Specification (TS) 3.3.3.1 requires the minimum number of Effluent Accident Monitor channels shown in TS Table 3.3-6 to be operable in Modes 1, 2, 3, and 4. TS 3.3.3.1, Action b, pursuant TS Table 3.3-6 Action 27, require that, with the number of operable channels less than required by the minimum channels operable requirement, either restore the inoperable channel(s) to operable status within 72 hours, or initiate the preplanned alternate method of monitoring the appropriate parameter(s), and if the monitor is not restored to operable status within 72 hours after the failure, a special report is required to be submitted in accordance with TS 6.9.2 within 14 days after the failure outlining the actions taken, the cause of the inoperability and the plans and schedule for restoring the system to operable status.

The engineering conversion factors used in the three WRGMs were not revised when the original detectors for these monitors were replaced (PRMIRE0110 high range in 2005; PRMIRE3032 mid-range in 2008; PRMIRE0002 mid and high range in 2011). In addition, the incorrect count-rate was used to calibrate the PRMIRE0110 high range detector since 2005; the PRMIRE3032 mid-range detector since 2008; and the PRMIRE0002 mid-range and high-range detectors since 2011. This caused these radiation monitors to be inoperable during the period following their respective detector replacements until the correct conversion factors were applied and the detectors were calibrated on February 4, 2022. This period exceeds the allowed outage time required by Action 27 of TS Table 3.3-6.

Special Report SR-2022-001 (ML22032A066) was issued on February 1, 2022, and Special Report SR-2022-002 (ML22039A278) was issued on February 8, 2022, after discovery, as required by Action 27 of TS Table 3.3-6.

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated and adjusted in accordance with the methodology and parameters in the Offsite Dose Calculation Manual (ODCM) to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20.

The Condenser WRGM monitors condenser vacuum pump [P] discharge continuously to detect steam generator tube leakage and to quantify release rate.

The Plant Stack WRGM monitors air being released from the plant stack to measure the radiation being released to the environment during both normal and accident conditions.

The FHB WRGM monitors air which is released from the FHB emergency exhausts during accident conditions.

This event is being reported under 10 CFR 50.73(a)(2)(i)(B) which requires submittal of a Licensee Event Report within 60 days after the discovery for any operation or condition that was prohibited by the plant's technical specifications.

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CONTINUATION SHEET**

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Estimated burden per response to comply with this mandatory collection request: 30 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collection Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

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EXTENT OF CONDITION

An Extent of Condition (EOC) review resulted in LER 2022-003-00 and LER 2022-004-00, which documents events involving Containment High Range A and B radiation monitors out of calibration due to inadequate procedural guidance. The corrective actions associated with the Containment High Range monitors were to revise procedural guidance with area radiation monitor calibration source reference values. This revision included MI-003-389 "Main Steam Line Radiation Monitor Channel Calibration ARMIR5500A or ARMIR5500B" and contained no specific guidance for detector replacement versus detector transfers. The guidance was updated through non-technical processes and was based upon the assumption that the detectors are obtained pre-calibrated and do not require recalibration.

On October 13, 2022, Main Steam Line B radiation monitor (ARMIRE5500B) failed. ARMIRE5500B is used to detect and indicate dose levels following an accident. If the condenser WRGM is unavailable or the condenser is isolated, ARMIRE5500B would be one of the primary radiation monitor used for accessing dose. WF3 purchased a replacement RD-12, General Atomics part number 03602039-002 Geiger- Mueller (GM) tube assembly, detector from another site. WF3 technicians installed the replacement monitor per the newly revised procedure, using MI-003-389. The procedure revision did not specify acceptance criteria and subsequent functional testing was not performed. During the performance of the work order, count rates were noted to be low, but the procedure did not specify an acceptance criteria. On October 20, 2022, WF3 declared ARMIRE5500B operable.

On October 31, 2022, a Radiation Monitor System (RMS) subject matter expert (SME) was brought in to support additional EOC evaluation actions. The SME reviewed the work order associated with AMIRE5500B replacement and identified that the count rate was low. It was confirmed on November 3, 2022, that the detector was out of tolerance and unable to perform its specified function since replacement on October 20, 2022. This resulted in AMIRE5500B exceeding TS 3.3.3.1, Action b, pursuant TS Table 3.3-6, Action 27, and is reportable per 10 CFR 50.73(a)(2)(i)(B) for any operation or condition that was prohibited by the plant's technical specifications. AMIRE5500B was replaced with a compatible detector, calibrated, and returned to service on November 10, 2022.

EOC review activities are in progress and will result in an additional supplement to this LER.

SAFETY ASSESSMENT

The actual consequences were that the condenser WRGM mid and high-range detectors, the plant stack WRGM high range detector, and FHB WRGM mid-range detector were incorrectly calibrated, resulting in these channels being incapable of performing their TS 3.3.3.1 functions. The actual consequence to AMIRE5500B reading low resulting in the detector inappropriately being declared operable which would have had impacts on dose assessment in the event of an emergency. There were no other actual consequences to general safety of the public, nuclear safety, industrial safety, and radiological safety for this event.

The potential consequence to general safety of the public, nuclear safety, industrial safety, and radiological safety of this event if the other radiation detectors monitoring similar release points (plant stack Particulate Iodine Gas [PIG] A and B; FHB PIG A and B; steam generator steam line Nitrogen-16 [N-16] detectors) were removed is the inability to enter applicable emergency action levels when those criteria are met. The safety significance of an inability to enter an emergency action level and take appropriate action vary depending on the emergency action level severity. The safety significance of this event is determined to be low. The basis for this determination is that multiple, alternative monitoring methods exist to monitor the site release points enabling WF3 to accurately classify radiological events.

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CONTINUATION SHEET**

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There is an impact on the station's dose assessment capability due to the ARMIRE5500B calibration issue. In scenarios where the Main Condenser is isolated rendering the Condenser WRGM unavailable (Main Steam Isolation Valves are closed), the Main Steam Line radiation monitors would then be used as the primary monitors for dose assessment. In those instances, any dose assessment completed using the Main Steam Line radiation monitor B (ARMIRE5500B) would have been lower than actual.

EVENT CAUSE(S)

The engineering conversion factor for WRGM mid/high range detector types is specific to each detector. Review of historical documents confirmed that the mid and high range engineering conversion factors associated with the original detectors were still being used for the channels listed above after detector replacements. These values were not revised when the original detectors were replaced (PRMIRE0110 high range - 2005; PRMIRE3032 mid-range - 2008; PRMIRE0002 mid and high range in 2011) due to a lack of procedural guidance. The RMS users' group was unaware of this requirement until the vendor stressed this requirement in 2009.

An adjustment factor must be applied to the calibration count-rate when a WRGM mid/high range detector is replaced. This guidance did not exist in 2005 and 2008. Procedural guidance did exist in 2011, however the form used to perform this calculation is missing a field for the very last step. Review of work records revealed that maintenance personnel noticed this deficiency in 2013 during PRMIRE3032 high range detector replacement and added a calibration count-rate adjustment factor field to that work package, which was used to calibrate PRMIRE3032. This is why the PRMIRE3032 high range is considered calibrated and capable of achieving its alarm set-point.

Procedure MI-003-089 rev 309 added a new section 6.4 titled "Detector Transfer Calibration" which does not perform a calibration. By only performing this section and not section 6.5, the performer is not directed to validate the acceptance criteria within the body of the procedure. The consensus of those interviewed was that only section 6.4 "Detector Transfer Calibration" needed to be performed when a new detector was installed as setting the baseline for future calibrations. The revision was performed using an editorial correction process and did not reference an approved technical document which resulted in a procedure that was inadequate to declare a transferred radiation detector operable and contained technically inaccurate information.

CORRECTIVE ACTIONS

The correct engineering factors were determined, and the radiation monitors were recalibrated using the corrected engineering factors. Waterford plans to implement the following additional corrective actions.

- Revise the MI-005-906 (Radiation Monitoring System Desk Guide) to have sufficient guidance to correctly perform a cadmium telluride solid state radiation detector (RD-72) replacement and sensitivity adjustment instruction
- Revise procedures to include steps to refer to MI-005-906 for calibration instructions when the replacement of a RD-72 radiation detector is required

AMIRE5500B was replaced, calibrated and returned to service. The correct technical justification via EC 93617 was created. Waterford plans to implement the following additional corrective actions.

- Revise MI-003-389 with technical guidance.
- Identify the procedures that were revised as EOC actions to include the incorrect "Detector Transfer Calibration" section and revise with technical guidance.



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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PREVIOUS SIMILAR EVENTS

LER 2022-003-00 reported a non-compliance with TS 3.3.3.1, Action b, TS Table 3.3-6 Action 27, due to the calibration procedure for the Containment High Range radiation monitors containing incorrect procedural guidance to account for the keep alive source decay when the original Log Pico-ammeter and ADC circuit board was replaced. LER 2022-004-00, "Operation Prohibited by Technical Specifications Due to Inadequate Radiation Monitor Calibration Procedures," was a direct result of the extent of condition reviews and activities conducted as part of the corrective actions for LER 2022-001-00 and LER 2022-003-00. LER 2022-006-00 reported during engineering reviews, it was discovered that the Plant Stack and FHB WRGM monitors were recalibrated during maintenance to the previous, incorrect engineering conversion factor(s) due to a human performance error with the RMS control room database.