



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

October 29, 2019

Mr. Darrell Corbin
Vice President, Operations
Entergy Nuclear Operations, Inc.
27780 Blue Star Memorial Highway
Covert, MI 49042-9530

**SUBJECT: REISSUE—PALISADES NUCLEAR PLANT—DESIGN BASIS ASSURANCE
INSPECTION (PROGRAMS) INSPECTION REPORT 05000255/2019010**

Dear Mr. Corbin:

The U.S. Nuclear Regulatory Commission (NRC) identified an administrative error in NRC Inspection Report 05000255/2019010 dated October 21, 2019, (ADAMS Accession Number ML19294A287). As a result, the NRC is reissuing the report in its entirety with the administrative error corrected.

On September 12, 2019, the NRC completed an inspection at Palisades Nuclear Plant and discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or significance or severity of the violation documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspector at Palisades.

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 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Karla K. Stoedter, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 05000255
License No. DPR-20

Enclosure:
As stated

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INSPECTION (PROGRAMS) INSPECTION REPORT 05000255/2019010

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

Docket Number: 05000255

License Number: DPR-20

Report Number: 05000255/2019010

Enterprise Identifier: I-2019-010-0053

Licensee: Entergy Nuclear Operations, Inc.

Facility: Palisades Nuclear Plant

Location: Covert, MI

Inspection Dates: August 18, 2019 to September 12, 2019

Inspectors: N. Feliz-Adorno, Senior Reactor Inspector
M. Greenleaf, Reactor Inspector
M. Jones, Reactor Inspector

Approved By: Karla K. Stodter, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (programs) inspection at Palisades Nuclear Plant 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

Failure to Environmentally Qualify Electric Equipment Inside Containment for the Most Severe Chemical Composition			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000255/2019010-01 Open/Closed	None (NPP)	71111.21N
The inspectors identified a Green finding and an associated Non-Cited Violation of Title 10 of the <i>Code of Federal Regulations</i> , Part 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," Paragraph (e)(3), for the licensee's failure to base the qualification of electric equipment inside containment on a chemical composition that was at least as severe as that resulting from the most limiting mode of plant operation. Specifically, the most severe chemical composition expected inside containment would result from the containment spray injection mode. However, the qualification of electric equipment inside containment was based on the less severe chemical composition of the containment spray recirculation mode, which is borated water from the injection mode neutralized by the sodium tetraborate located inside of containment.			

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.

REACTOR SAFETY

71111.21N - Design Bases Assurance Inspection (Programs)

The inspectors evaluated the environmental qualification program implementation through the sampling of the following components:

Select Sample Components to Review - Risk Significant/Low Design (Inside/Outside Containment) (IP Section 02.01) (6 Samples)

- (1) Shutdown Cooling Suction Valve MO-3015
- (2) Low Pressure Safety Injection Pump P-67A Motor
- (3) Cable 19-I29A
- (4) Narrow Range Pressure Transmitter PT-0104B
- (5) Component Cooling Water Heat Exchanger Control Valve Pilot Valve SV-0821
- (6) Shutdown Cooling Heat Exchanger Inlet Valve SV-0937

Select Sample Components to Review - Primary Containment (Inside Containment) (IP Section 02.01) (1 Sample)

- (1) Power Operated Relief Valve PRV-1042B

INSPECTION RESULTS

Failure to Environmentally Qualify Electric Equipment Inside Containment for the Most Severe Chemical Composition			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000255/2019010-01 Open/Closed	None (NPP)	71111.21N
The inspectors identified a Green finding and an associated Non-Cited Violation of Title 10 of the <i>Code of Federal Regulations</i> (10 CFR), Part 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," Paragraph (e)(3), for the licensee's failure to base the qualification of electric equipment inside containment on a chemical composition that was at least as severe as that resulting from the most limiting mode of plant operation. Specifically, the most severe chemical composition expected inside containment would result from the containment spray injection mode. However, the			

qualification of electric equipment inside containment was based on the less severe chemical composition of the containment spray recirculation mode, which is borated water from the injection mode neutralized by the sodium tetraborate located inside of containment.

Description:

The containment spray system has two modes of operation. During the initial injection mode, the containment spray system draws borated water from the safety injection and refueling water tank and sprays it inside containment to alleviate pressure during large break loss of coolant accidents and to scrub radioactive particles. The sprayed borated water collects at the containment sump where it is neutralized by mixing with sodium tetraborate, which is pre-staged in baskets inside of containment. The containment spray system transitions to its recirculation mode of operation after depleting the tank, drawing suction from the containment sump and spraying the recirculated solution inside containment to continue scrubbing radionuclides.

The most severe chemical composition expected inside containment would result from the containment spray initial injection mode. However, in 2004, the licensee discovered the environmental qualification of electric equipment inside of containment was based on the chemical effects of the containment spray recirculation mode. This condition was captured in the Corrective Action Program as CR-PLP-2004-1616. As a result, the licensee evaluated the effects of the initial spray pH. However, the inspectors noted the licensee did not evaluate the chemical compatibility of the initial spray with each exposed material composing the electric equipment required to be environmentally qualified. During this inspection period, the licensee determined this concern affected 17 systems such as low pressure injection, high pressure injection, and shutdown cooling.

Corrective Actions: The licensee was still evaluating its planned corrective actions at the time of the inspection. However, the continued non-compliance does not present an immediate safety concern because the licensee reasonably determined the affected equipment remained capable of performing their safety functions. Specifically, the licensee identified all material in environmentally qualified components inside containment and located an evaluation from a similar nuclear power plant addressing boric acid interaction with all but one of the materials located inside of Palisades' containment. The licensee determined this evaluation reasonably demonstrated the evaluated materials were compatible with the initial borated water spray. Similarly, the licensee located industry information for the material that was not addressed by the evaluation (i.e., chlorinated polyethylene) and reasonably determined it was compatible with the initial borated water spray.

Corrective Action References: CR-PLP-2019-3692, CR-PLP-2019-3693, CR-PLP-2019-3694, CR-PLP-2019-3695, CR-PLP-2019-3697, CR-PLP-2019-3698, CR-PLP-2019-3699, CR-PLP-2019-3700, CR-PLP-2019-3702, CR-PLP-2019-3703, CR-PLP-2019-3704, CR-PLP-2019-3705, CR-PLP-2019-3706, CR-PLP-2019-3707, CR-PLP-2019-3708, CR-PLP-2019-3709, and CR-PLP-2019-3710.

Performance Assessment:

Performance Deficiency: The failure to base the qualification of electric equipment inside containment on a chemical composition that was at least as severe as that resulting from the most limiting mode of plant operation was contrary to 10 CFR 50.49(e)(3) and was performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to demonstrate qualification of electric equipment inside containment for the most severe chemical effects does not ensure the equipment would be capable of providing its accident mitigating functions.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The finding screened as of very low safety significance (Green) because it did not result in the loss of operability or functionality of mitigating systems. Specifically, the licensee reasonably determined the affected equipment remained capable of performing their safety functions based on an evaluation from a similar nuclear power plant and industry information addressing boric acid interaction with the affected materials.

Cross-Cutting Aspect: Not Present Performance. No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR 50.49(e)(3) requires "The electric equipment qualification program must include and be based on...", in part, "Chemical Effects," and that "The composition of chemicals used must be at least as severe as that resulting from the most limiting mode of plant operation (e.g., containment spray, emergency core cooling, or recirculation from containment sump)."

Contrary to the above, as of September 16, 2019, the licensee's electric equipment qualification program failed to include and be based on the chemical effects of the most severe composition of chemicals resulting from the most limiting mode of plant operation. Specifically, the most severe chemical composition expected inside containment would result from the containment spray injection mode. However, the qualification of electric equipment inside containment was based on the chemical composition of the containment spray recirculation mode, which was less severe due to the borated water from the injection mode being neutralized by the sodium tetraborate located inside of containment.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

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

- On September 12, 2019, the inspectors presented the design basis assurance inspection (programs) inspection results to Mr. Darrell Corbin and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21N	Corrective Action Documents	CR-PLP-2004-01616	PRE-NRC SSDI, RB Spray pH Considerations Title: FSA Pre-NRC SSDI, RB Spray pH Considerations	03/02/2004
		CR-PLP-2015-00583	EQ replacement dates occur before 1R24 begins	02/19/2015
		CR-PLP-2017-01007	VOP-3015 Gear Box Grease Degraded	03/18/2017
		CR-PLP-2018-00238	EMA-1206 oil was identified with higher than expected viscosity	01/12/2018
	Corrective Action Documents Resulting from Inspection	CR-HQN-2019-01982	The NRC identified that EN-MA-141, Attachment 1 does not contain any reference to potential EQ implications during grease evaluation	09/06/2019
		CR-PLP-2019-03371	Boric acid leak on P-67A	08/27/2019
		CR-PLP-2019-03409	Corrective action document written for unsat oil viscosity for EMA-1206 did not address EQ or past-operability	08/29/2019
		CR-PLP-2019-03463	Unable to locate auxiliary feedwater pump P-8C motor oil analysis for 2013	09/04/2019
		CR-PLP-2019-03464	Auxiliary feedwater pump P-8C had unsat oil viscosity	09/04/2019
		CR-PLP-2019-03559	DBD-7.01 contain misleading information regarding what containment spray density is required for EQ Qualification of equipment inside containment	09/10/2019
		CR-PLP-2019-03692	Qualification of CIS did not consider chemical effects	09/16/2019
		CR-PLP-2019-03693	Qualification of CLP did not consider chemical effects	09/16/2019
		CR-PLP-2019-03694	Qualification of CRS did not consider chemical effects	09/16/2019
		CR-PLP-2019-03695	Qualification of CSW did not consider chemical effects	09/16/2019
		CR-PLP-2019-03697	Qualification of CVC did not consider chemical effects	09/16/2019

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CR-PLP-2019-03698	Qualification of ESS did not consider chemical effects	09/16/2019
		CR-PLP-2019-03699	Qualification of FWS did not consider chemical effects	09/16/2019
		CR-PLP-2019-03700	Qualification of HPI did not consider chemical effects	09/16/2019
		CR-PLP-2019-03702	Qualification of LPI did not consider chemical effects	09/16/2019
		CR-PLP-2019-03703	Qualification of MFW did not consider chemical effects	09/16/2019
		CR-PLP-2019-03704	Qualification of NMS did not consider chemical effects	09/16/2019
		CR-PLP-2019-03705	Qualification of PCS did not consider chemical effects	09/16/2019
		CR-PLP-2019-03706	Qualification of PZR did not consider chemical effects	09/16/2019
		CR-PLP-2019-03707	Qualification of RIA did not consider chemical effects	09/16/2019
		CR-PLP-2019-03708	Qualification of SDC did not consider chemical effects	09/16/2019
		CR-PLP-2019-03709	Qualification of SIT did not consider chemical effects	09/16/2019
		CR-PLP-2019-03710	Qualification of VAS did not consider chemical effects	09/16/2019
	Drawings	VEN-E48	Install Conduit/Component Seals	4
	Engineering Changes	EC-7083	Equivalent Replacement and/or Substitution of "Nebula EP0 Grease" with "MOV Long Life Grade 0 Grease"	0
	Engineering Evaluations	E48-EMA-01	EQ File - Louis-Allis Model COGX Motors	12
		E48-EMA-07	EQ File - Reliance Electric 2300 Vac motor	10
		E48-SV-01	EQ file: Automatic Switch Company (ASCO) Model 206-381 and NP 8320 solenoid valves	18
		E48-VOP-03	EQ File - Limitorque Valve Operators with RH Motor Insulation Systems Located in Containment	18

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		E48-XMTR-01	EQ File: Rosemount Series 1153B and 1153D Transmitters	8
		E48-XMTR-02	EQ File: Rosemount Series 1154 Transmitters	8
	Miscellaneous	DBD-7.01	Electrical Equipment Qualification Program	10
		DBD-7.02	EQ Master Equipment List	14
		E48-CABLE-19	Samuel Moore EPDM Insulated and Hypalon Jacketed Instrumentation Cable	13
		E48-SV-08	ASCO Model NP 8316 and NP 8321 Solenoid Valves	18
		E48-SV-24	Target Rock Power Operated Relief Valves for Pressurizer Pressure	7
		NUREG/CR-6095	Aging, Loss-of-Coolant Accident (LOCA), and High Potential Testing of Damaged Cables	04/01/1994
	Procedures	EN-DC-303	Lubrication Program	1
		EN-DC-310	Predictive Maintenance Program	8
		EN-MA-141	Limitorque Valve Operator Model SMB/SB/SBD-000 Through 5 MOV and HBC Periodic Inspection	13
		EOP-4.0	Loss of Coolant Accident Recovery	24
		MSE-E-41	Refurbishment of Limitorque Type SMB-0 Though SMB-3 Actuators	10
		SEP-EQ-PLP-001	Environmental Qualification of Electrical Equipment	2
		SEP-LUB-PLP-001	Lubrication Analysis and Monitoring	2
		WI-SPS-E-02	Insulation Resistance Testing of Electrical Equipment	9
	Self-Assessments	LO-PLPLO-2019-00013	Environmental Qualification (EQ) Program Assessment	05/28/2019
	Work Orders	WO00262884	PRV-1042B; VT-2 NOP/NOT (CR-PLP-2011-00191)	01/31/2011
		WO00325740	MO-3015 Burnish Torque Switch Contacts	02/09/2014
		WO51591547	PRV-1042B; Replace PRV-1042B EC-20196	08/19/2011
		WO51591548	PRV-1043B; Replace PRV-1043B EC-20196	11/08/2010
		WO52435844	*EEQ* REPLACE SV-0821	01/27/2014
		WO52436138	EEQ Maint. - PM VOP-3015	02/09/2014
		WO52537816	RI-59C - LTOP Pessure Transmitter Cals	10/19/2015
		WO52544964	PT-0104B, EEQ Replace Transmitter	09/28/2015

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		WO52608846	P-67A MTR/PMP Oil Change	04/08/2016
		WO52610930	EEQ Maint.-PM VOP-3009	06/28/2016
		WO52650632	EEQ - EMA-1206 LPSI Pump P-67A Motor	03/27/2017
		WO52681040	EEQ Maint. - PM VOP-3015	03/18/2017
		WO52681204	EEQ Maint.-PM VOP-3012	07/25/2017
		WO52753971	EEQ - EMA-1206 LPSI Pump P-67A Motor	09/18/2018
		WO52765497	Thermalscan Equip.- P-67A Motor/Breaker	06/20/2018
		WO52778170	RI-59C - LTOP Pressure Transmitter Cals	11/08/2018
		WO52779578	QO-2X - Recirculation Actuation System	12/19/2014
		WO52785113	P-67A MTR/PMP Oil Change	03/25/2019
		WO52827608	Thermalscan Equip.- P-67A Motor/Breaker	06/18/2019