



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

April 21, 2020

Mr. Darrell Corbin
Vice President, Operations
Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043-9530

SUBJECT: PALISADES NUCLEAR PLANT – DESIGN BASIS ASSURANCE INSPECTION
(TEAMS) INSPECTION REPORT 05000255/2020011

Dear Mr. Corbin:

On March 19, 2020, the U.S. Nuclear Regulatory Commission (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.

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,

/RA/

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

Docket No. 05000255
License No. DPR-20

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

Letter to Darrell Corbin from Karla Stoedter dated April 21, 2020.

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number: 05000255

License Number: DPR-20

Report Number: 05000255/2020011

Enterprise Identifier: I-2020-011-0025

Licensee: Entergy Nuclear Operations, Inc.

Facility: Palisades Nuclear Plant

Location: Covert, Michigan

Inspection Dates: March 02, 2020 to March 19, 2020

Inspectors: C. Baron, Contractor
J. Benjamin, Senior Reactor Inspector
I. Hafeez, Reactor Inspector
B. Jose, Senior Reactor Inspector
S. Kobylarz, Contractor
E. Sanchez Santiago, Senior 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 (teams) 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

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's performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.21M - Design Bases Assurance Inspection (Teams)

The inspectors evaluated the following components and listed applicable attributes, permanent modifications, and operating experience:

Design Review - Risk-Significant/Low Design Margin Components (IP Section 02.02) (5 Samples)

(1) Safety-Related Service Water Pump P-7A

- Updated Final Safety Analysis Report
- Technical Specifications
- Protection Against External Events
- Protection Against Internal Events
- Maintenance Effectiveness
- Overall System Health
- Translation of Vendor Specifications
- Configuration Management
- Testing
- Pump and Check Valve In-service Testing (IST)
- Pump Flow Quarterly and Semi-Annual Flow Verification
- Calculations
- Service Water Outlet Submergence Back Pressure
- Service Water System Hydraulic Model
- Generation of Flow Rate Acceptance Criteria for Technical Specification Surveillance Test RO-216
- Emergency Diesel Generator Voltage and Frequency Variation Evaluation on Safety-Related Service Water Pumps

(2) Safety-Related High Pressure Control Air Receiver T-9A

- Design Basis Documents
- Technical Specification Applicability
- Testing

- Small Break Loss of Coolant Accident and Concurrent Loss of Offsite Power Supply Capability
- Maintenance Effectiveness

(3) 125 Vdc Distribution Panels ED-11/11A/21/21A

- Load Flow Calculations to determine whether panels were applied within required current ratings
- Voltage Drop Calculations
- Voltage Rating During Battery Equalizing
- Short Circuit and Protective Device Calculations to determine whether equipment was adequately protected and immune from spurious tripping
- Maintenance Schedules, Procedures, and Maintenance Records, including Circuit Breaker Test Requirements, to determine whether panels and associated circuit breakers were properly maintained
- Visual inspection of the 125 Vdc Distribution Panels to assess material condition and the presence of hazards

(4) 125 Vdc Station Battery ED-01 and ED-02

- Short Circuit and Protective Device Calculations to determine whether the batteries were adequately protected and immune from spurious tripping
- Battery Surveillance Procedures and Completed Tests to determine whether the acceptance criteria and results were consistent with design basis calculations
- Corrective Action Documents and Maintenance Records to determine whether there were any adverse operating trends
- Visual Inspection of the 125 Vdc Batteries to assess material condition and the presence of hazards due to battery cover cracks

(5) 125 Vdc Battery Charger ED-15

- Material Condition and Configuration (e.g., Visual Inspection during a Walkdown)
- Operating Environment
- Consistency Between Station Documentation (e.g., Procedures) and Vendor Specifications
- Maintenance Effectiveness
- Corrective Maintenance Records and Corrective Action History
- Charger Short Circuit Contribution
- Surveillance Testing
- Float and Equalize Voltage and Coordination

Design Review - Large Early Release Frequency (LERFs) (IP Section 02.02) (1 Sample)

(1) Motor Operated Valve (MOV) 3015: Shutdown Cooling Return from Reactor Coolant System

- Updated Final Safety Analysis Report
- Technical Specifications

- Protection Against External Events
- Protection Against Internal Events
- Maintenance Effectiveness
- Overall System Health
- Translation of Vendor Specifications
- In-service and Generic Letter 89-10 Testing
- Calculations
- Weak Link Analysis
- Pressure Lock/Thermal Binding Evaluation
- Generic Letter 89-10 MOV Thrust Window
- Torque Reduction at Elevated Temperatures
- Design Basis Flows and Delta Pressures
- Generic Letter 89-10 Valve Factor
- Generic Letter 89-10 Stem Nut Friction

Modification Review - Permanent Mods (IP Section 02.03) (4 Samples)

- (1) Engineering Change (EC) 74105 - SPTS-1474; Replace Speed Switch for Emergency Diesel Generator 1-1
- (2) EC 54503 - 250/251-205: Replace Obsolete Overcurrent Relay for Pump P-2B
- (3) EC 55409 - Child EC to Replace Motor Control Center Breaker
- (4) EC 55441 - Install High Head Auxiliary Feedwater Pump P-8D & Shed and Cross Connect Tanks T-2 to T-939 - NFPA 805 Project

Review of Operating Experience Issues (IP Section 02.06) (2 Samples)

- (1) NRC Information Notice (IN) 2017-06, Battery and Battery Charger Short Circuit Current Contributions to a Fault on the Direct Current Distribution System
- (2) NRC IN 2002-29 Recent Design Problems in Safety Functions of Pneumatic Systems

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

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

- On March 19, 2020, the inspectors presented the design basis assurance inspection (teams) inspection results to Mr. D. Corbin, Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21M	Calculations	1/4RB	System Protection Calculation Sheet	5
		1/6C	Primary Loop Shut Down Cooling Valve MO-3015	12/20/2012
		1B-205-250-251	Protective Device Calculation for Relay 205/250-251	2
		1D-204-150-151	Update Breaker Setting for Breaker 152-204 of Pump P-7A	1
		EA-A-PAL-94-279-009	Seismic Analysis and Weak Link Calculation for 12" 1500 Forges Stainless Motor Operated Bolted Bonnet Gate Valve	03/20/1995
		EA-C-PAL-00-3258-01	High Pressure Air Single Failure Evaluation	0
		EA-C-PAL-97-0853	Evaluation of the Effect of Submerged Service Water System (SWS) Outlets on the Minimum Predicted SWS Rate Using Pipe - Flo	06/27/1997
		EA-C-PAL-99-1209B-01	Generation of Flow Rate Acceptance Criteria for Technical Specifications Surveillance Test RO-216	3
		EA-CPCP-PAL-DSS-94-01	GL 89-10 Program Worst Case Pressures and Flows	04/13/1995
		EA-EC-235-1	Assessment of the High Pressure Air System's Capacity to Cycle Valves in the West Engineering Safeguards	0
		EA-EC64020-01	NFPA 805 Related 125 Vdc Electrical Coordination Analysis	0
		EA-ELEC-EDSA-004	Palisades System Level Under Voltage Relay Setpoint Determination	0
		EA-ELEC-EDSA-006	Palisades AC Power System Short Circuit Analysis	2
		EA-ELEC-EDSA-13	DC System Battery D02 Short Circuit Analysis	1
		EA-GL-89-10-01	Generic Letter 89-10 Motor Operated Valve (MOV) Thrust Window Calculations	11
		EA-GL-89-10-05	Design Valve Factors for Palisades GL - 89-10 MOVs	02/03/1999
		EA-GL-89-10-10	Periodic Verification of GL-89-10 MOV Operating Margins Using Static Diagnostic Test Results	3
		EA-GL-8910-02	Torque Loss Calculation for MOVs at Elevated Temperatures	3
		EA-GL-8910-04	Replacement of MOV Stem Lubricant	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		EA-GL-8910-DP-01	Consolidated MOV 89-10 Analysis of the Worst Case Operating Scenarios	2
		EA-MOV-KALSI-05	Fatigue Life Prediction of Limitorque Type SBM/SB/SBD Actuator Torsional Components	05/11/1995
		EA-PIPEFLO-SWS-01	Service Water Hydraulic Model Using Pipe - Flo	2
		EA-PLTB-02	Pressure Locking Evaluation for MOV 3015 and 3016	0
	Corrective Action Documents Resulting from Inspection	CR-PLP-2020-00712	2020 Design Bases Assurance Inspection, the NRC Identified a Small Amount of Green Corrosion on Station Battery ED-01 Cell #43 Positive Post	03/03/2020
		CR-PLP-2020-00737	During DBA Inspection Walkdown of High Pressure Air Compressor T-9A in East Safeguards, Temporary Lighting with no Work Tags and Unplugged was Found Around T-9A	03/04/2020
		CR-PLP-2020-00743	Work Order (WO) 52790738 was Found to Be Missing Page 16 of the Completed RE-133 Procedure	03/05/2020
		CR-PLP-2020-00753	During the 2020 Design Bases Assurance Inspection, the NRC Questioned why the Dial Setting on One of the Adjustable Trips on Battery Charger ED-15 Output Breaker 72-15A is Set at a Different Position than the Other Adjustable Trip Settings	03/05/2020
		CR-PLP-2020-00754	2020 Design Bases Assurance Inspection, the NRC Identified, During an ED-01 Walkdown, a Lid Crack Between the Positive Posts of Cell #23	03/05/2020
		CR-PLP-2020-00882	During the 2020 Design Bases Assurance Inspection, the NRC Questioned the Technical Specification Impact from Non-Functional High Pressure Air Compressors C-6A/B	03/18/2020
		CR-PLP-2020-00888	During the 2020 Design Bases Assurance Inspection, It was Identified that Section 9.5.2.5 Implies There is a Mitigating Function for High Pressure Air Compressors	03/18/2020
	Drawings	E-1, Sheet 1	Single Line Meter & Relay Diagram, 480 Volt Motor Control Center	90
		E-1, Sheet A	Single Line Meter & Relay Diagram	15
		E-5, Sheet 1	Single Line Meter & Relay Diagram, 480 Volt Motor Control Centers	59

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		E-625	Wiring Diagram Battery D02, Fuse Box JL259	9
		E-8	Single Line Meter & Relay Diagram, 125 Vdc, 120 V Instrument & Preferred AC System	61
		E-8, Sheet 1	Single Line Meter & Relay Diagram 125 Vdc, 120 V Instrument & Preferred AC System	58
		E-8, Sheet 2P	125 Vdc Distribution Panel No 2 ED21-1 Breaker Schematic Diagrams	4
		M-207, Sheet 2	P&ID Auxiliary Feedwater System	45
		M-207, Sheet 3	P&ID P-8D/K-17 Diesel Driven Auxiliary Feedwater System	2
		M-213	P&ID Service Water, Screen Structure and Chlorinator	97
	Engineering Changes	0000060795	125 Vdc Panel ED-21-1 Replacement	0
		EC#0000054503	250/251-205: Replace Obsolete O/C Relay For Pump P-2B	09/10/2015
	Engineering Evaluations	PLP-RPT-12-0014	Engineering Report System Protection Engineering Protective Device Calculation Review (EGAD-ELEC-22)	0
	Miscellaneous	00520027	QO-14A-P-7A IST Service Water Pump	10/25/2019
		5608	LCR 25: Foreign Material Inside Jar	05/08/2019
		7S007.0	Seismic Test Report for C&D Batteries P/N: LCUN-33	1
		Completed Test: 9.20	Service Water Flow Verification 1R26	11/12/2018
		DBD-1.02	Design Basis Document (DBD) Service Water System	10
		DBD-1.05	Design Basis Document for Compressed Air Systems	6
		DBD-2.01	DBD Low Pressure Safety Injection System	12
		DBD-2.04	Design Basis Document for Primary Coolant System	8
		DBD-4.02	DBD for 125 Vdc System (Safety-Related)	10
		DPR-20	Palisades Plant – Facility Operating License	02/21/1991
		E11B	Specification for Inverter ED-06, ED-07, ED-08, and ED-09 and Battery Charger D15, D16, D17 and D18 Replacement	0
		E11B-1	Solidstate Controls, Inc. Instruction/Technical Manual 200 Ampere Charger – Palisades	0
		EA-SC-96-033-01	Replace Existing Chargers/Inverters	1
		ESI-SR-17-199	Seismic Qualification of Speed Switch, 125 Vdc Input ESI P/N: ESI50269B (DYNALCO P/N: SST2400A-424)	0
		LER - 98-006-01	Licensee Event Report - Manual Operator Actions Not	1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Adequately Addressed in Operating Procedures	
		NB-PSA-SY-CIS	Palisades Probabilistic Risk Analysis (PRA) System Notebook Containment Isolation and Penetrations	0
		NB-PSA-SY-HPA	Palisades PRA Notebook High Pressure Air System	0
		NB-PSA-SY-PZR	Palisades PRA Notebook Pressurizer Pressure and Level Control System and Power Operated Relief Valves	0
		NB-PSA-SY-SWS	Palisades PRA Notebook Service Water System	1
		OE-NOE-2017-00346	NRC-IN-2017-06 – Battery & Battery Charger Short-Circuit Contributions to a Fault on the Direct Current Distribution System	10/04/2017
		PLLP-ESPO-PBSO-SWS	Training: Palisades Basis System Orientation - Service Water System	5
		QO-14B 0120	Completed Test: Inservice Test Procedure - Service Water Pumps	01/14/2020
		RO-144 1R26	Completed Test: Comprehensive Pump Test Procedure, Service Water Pumps P-7A, P-7B, P-7C 1R26	11/12/2018
		SC 96-033	Replace Safety Related Battery Chargers ED-15,16, 17& 18 & Inverters ED-06, 07, 08 & 09	0
		Specification No: 5935-M-11	Specification for Service Water Pumps Palisades Plant Consumers Power Company	08/25/1967
		T-SC-96-033-01	Post Installation Test for Battery Charger 1 (ED-15)	2
	Procedures	AOP-23	Primary Coolant Leak	2
		AOP-23	Primary Coolant Leak	2
		AOP-23	Primary Coolant Leak	2
		ARP-3 Electrical Auxiliaries and Diesel Generator Scheme Rev. 82 EK-05 (EC-11)	Electrical Auxiliaries and Diesel Generator Scheme EK-05 (EC-11)	82
		EN-DC-167	Classification of Structures, Systems, and Components	11
		EOP-4.0	Loss of Coolant Accident Recovery	24
		EOP-9 MVAA-CA	Maintenance of Vital Auxiliaries - Air	20
		EPS-I-10	Diesel Generator 1-1 Electronic Speed Switch Calibration and Interlock Check	7

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Procedure No 1.01	Material Condition Standards and Housekeeping Responsibilities	31
		RT-41	Pressurizer Safety Valves RV-1039, RV-1040, RV-1041	6
		SOP-12	Feedwater System	81
		SOP-20	High Pressure Control Air System	38
	Work Orders	00515984-01	C-6A, Replace HP & LP Heads	08/19/2019
		51660162-01	ED-15; Overhaul Battery Charger	05/06/2010
		52436095	VOP 315 Static Test	03/30/2017
		52646112-02	Design Engineering System Protection – Settings Station Battery Charger #1 ED-15	05/02/2017
		52687593-01	ED-15 Battery Charger #1 PM	11/09/2017
		52693245-01	RE-133 -ED-15, Battery Charger No 1 Performance Test	11/09/2017
		52713165-01	SPTS-1474; Replace Speed Switch (EC 75105)	02/06/2018
		52722763-02	1-1 Diesel Tach Pak Calibration	02/08/2018
		52764439	Inspect Electrical Panel Water Seals	01
		52847642	QO- 4 Shutdown Cooling Valves IST	07/31/2019